



WITTENSTEIN

alpha

High Performance Linear System System catalog

Maximum performance
Optimal partner
Perfect design



Highly innovative
mechatronic
drive technology ...

More than only the sum
of specialized
engineering knowledge

... precision and top performance –
the WITTENSTEIN trademark

30 years of expertise and developmental
know-how

The strength of the WITTENSTEIN group is the mastery and further development of all relevant technologies of mechatronics and drive technology. "Developed under one roof" are low-backlash planetary and servo gears, servo-drive systems, miniature servo assemblies, gearing technology, rotating and linear actuator systems, electronic and software components as well as medical technology. Beyond these business sectors, we consolidate our knowledge and proficiency in developing efficient drive system solutions for our customers.

With this in mind, we exemplify "competence" for mechatronic drive technology and solution definition for our customers. We offer you the expertise of our entire engineering technical knowledge under one roof.

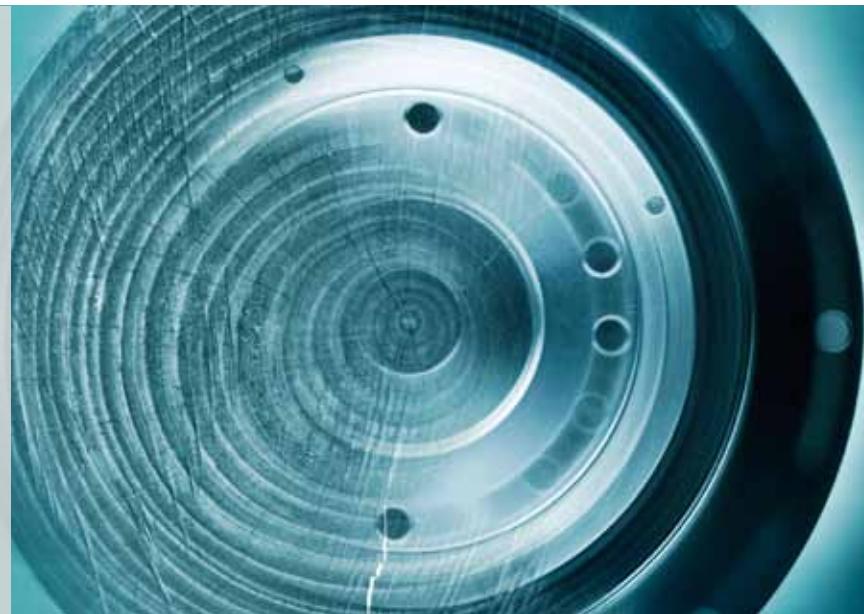
Furthermore, we are excellently positioned as an organization: for 100% quality management, for rapid and flexible manufacturing processes, and deliveries which meet your needs.

Our drive and our ability is to consolidate this knowledge and develop optimal solutions.

Drive technology for today and the future

Our expertise makes us the market and technology leader in many sectors – and an attractive partner for the development of future markets.

The mastery of the latest technologies and the permanent integration of our core competencies underscore the entitlement of the trademark:
"WITTENSTEIN – being one with the future".



Trailblazing – Your partner for the future

We cultivate personal relationships with our customers based on confidence and shared values. Together with you we develop future-oriented solutions for the needs of a market that is continually changing. Collaboration creates a community of success.



Challenge us! We offer you clear benefits. Discover our values! Together we will boost your competitiveness, ensuring you and your company a successful future.

Worldwide marketing & service

It doesn't matter where you need us: a dense sales and service network ensures for rapid accessibility and competent support worldwide.

Our professional contact personnel are available on location for all questions.

Approximately 1,400 employees in Germany and in some 60 international locations of the WITTENSTEIN group are focused on taking care of your needs.

Contents

30 years experience	4
Research & development, production and sales in one house	5
The results of 30 years experience	6
High performance means highest power density	10
New dimensions in performance capability	12
High Performance Linear System in detail	14
RP Philosophy	28
Servo right-angle gearhead RPK ⁺ – the right-angle gearhead option for the system	30
Servo actuator RPM ⁺ – the actuator option for the system	32
High Performance Pinion	36
Gearhead and output pinion – a perfectly harmonized unit	37
High Performance Rack	38



30 years experience

We are the innovation leader

The will for innovation and a pioneering spirit were behind the founding of alpha getriebbau GmbH thirty years ago. The company name has changed, but the attributes of success of WITTENSTEIN alpha GmbH have remained the same to this day. Since the beginning, the name WITTENSTEIN alpha stands for high-precision, low backlash planetary gearheads, servo right angle gearheads and mechanical drive systems.

But in fact you are the actual drive behind our success: our customers, who over the years have remained faithful to us, and who challenge us daily to put our innate core competencies to test time and time again, to re-examine and scrutinize them. The continual effort means continual development.

Standing still means moving backwards in our fast-paced markets driven by accelerated advancements in machinery development which need to be driven, controlled and regulated with extreme precision. As an internationally active company and world market leader in many products, we are also aware of our responsibility for your success.

Your confidence in our expertise and our mechatronic passion for your needs have brought us – and you – more than 30 years of continuous growth and success.

We will continue to concentrate on our own strengths in the future and do exactly what has made the founder of the WITTENSTEIN group and especially WITTENSTEIN alpha so very successful: focus with a passion on the innovative trends of the future!

First low backlash planetary gearheads

Software development

System solutions

Low backlash planetary gearheads



1983

1984

1994

1995

1996

1999

2002

2004

SP

TP

SP classic

LP

cymex®

SP⁺/TP⁺/LP⁺ family
alpheno®



Founding of
alpha getriebbau GmbH

alpha is the most innovative
of German
medium-sized companies

Research & development, production and sales in one house



WITTENSTEIN

alpha

3x1 = one, or "The system is more than the sum of its parts!"

Unbeatable together

Listen, understand, calculate, optimize and implement a tailored solution for the customer – for WITTENSTEIN alpha, engineering begins very early and is far from over after the successful implementation. All application requirements and conditions regarding mechatronic and drive technical solutions are taken into consideration with our servo configuration software cymex®.

The revolutionary linear drive systems from WITTENSTEIN alpha are flexible and variable systems made of several innovative elements. The newest servo motor and servo gearhead technology partnered with rack and pinions with unsurpassed precision and power density team to create a revolution for linear technology in the new **High Performance Linear System**.

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

Unique calculations and simulations combined with the consultation skills of our sales engineers let us determine the optimum solution.

The result is that you are optimally prepared for the future with the **High Performance Linear System!**

Analysis

We assist with detailed and comprehensive analysis for complex applications.

Optimization

With the help of state-of-the-art software tools for calculation and simulation, we optimize your machinery with regard to efficiency, design, and drive system construction.

Realization

Together we realize your customized solution.

Servo right-angle gearheads



2006

alphira®



2007

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



2008

LK+/LPK+

New generation SP+/TP+



2009

SP+/TP+

Linear systems



2011

High Performance Linear System

Technological advantage

Set standards

12% of the employees work in research & development.

10% invested in research & development



Renamed as
WITTENSTEIN alpha GmbH

25 years

WITTENSTEIN alpha
The revolution in linear technology

The result of 30 years experience

Low backlash planetary gearheads

alpheno®

Perfection in a new dimension

You seek a solution tailored to your needs? Your requirements are our challenges.

More performance in less space!
alpheno® – the safe way to success.

RP+

High performance planetary gearhead

Sets standards for power density, modularity and ease of assembly.

TP+/TP+ HIGH TORQUE

The compact precision

Low backlash planetary gearhead with output flange. Optimal for highly precise and highly dynamic production cycles. High tilting and torsional rigidity.

alpheno®



RP+



TP+



LP+ Generation 3

SP+



alphira®



LPB+ Generation 3

SP+/SP+ HIGH SPEED

The new generation

Low backlash planetary gearheads with output shaft.

SP+ HIGH SPEED optimal for high speed and continuous operation.

LP+/LPB+ Generation 3

Innovation sets standards

Low backlash planetary gearhead with output shaft (LP+ Generation 3) or output flange (LPB+ Generation 3). Optionally available with belt pulley.

alphira®

The simple precision

Ideal for basic servo applications.

WITTENSTEIN alpha – planetary gearheads

- highest quality and reliability
- minimal noise level
- high precision and synchronism
- highest power density
- long life expectancy

- permanent lubrication
- easy motor mounting
- optional mounting positions
- ideal for cyclic and continuous operation

Servo right-angle gearheads

Hypoid planetary gearheads

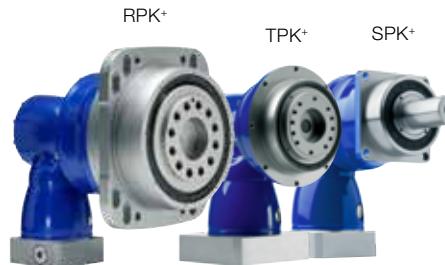
Right-angle gearhead of highest precision and power density

Output shape:

RPK⁺: output flange

TPK⁺: output flange

SPK⁺: output shaft smooth, keyed, with involute toothings



Hypoid gearheads

Right-angle gearhead, highest precision and compactness

Output shape:

HG⁺: hollow shaft

SK⁺: output shaft smooth, keyed, with involute toothings

TK⁺: output flange with hollow shaft



System solutions

Linear systems

Precise rack and pinion drives – a perfect fit for your applications

Harmonized to your requirements, we present you with the optimal system solution of gearhead, rack and pinion. Three components – a system from one source!

High Performance Linear System



V-Drive⁺/V-Drive economy

The new generation of servo worm gears

Output shape:

VDH⁺/VDHe: hollow shaft, smooth or keyed

VDT⁺: output flange, hollow shaft flange

VDS⁺/VDSe: output shaft smooth, keyed, with involute toothings

LK⁺/LPK⁺/LPBK⁺

The economic right-angle precision

The flexible all-round talent LK⁺/LPK⁺/LPBK⁺ with its excellent price/performance ratio is ideal for every field of application which requires mid-range precision.

cymex[®] – The software for drive technology

cymex[®] permits the simple dimensioning and configuration of the entire powertrain (application + motor + gearhead). An exact calculation is made considerably easier by predefined standard applications. Consideration of all decisive influencing factors and customer-specific parameters allows an optimal configuration of the drive system.



The revolutionary High Performance Linear System

3 x 1 = one

Gearhead, rack and pinion
from a single source!

3 components –
Unsurpassed top performance

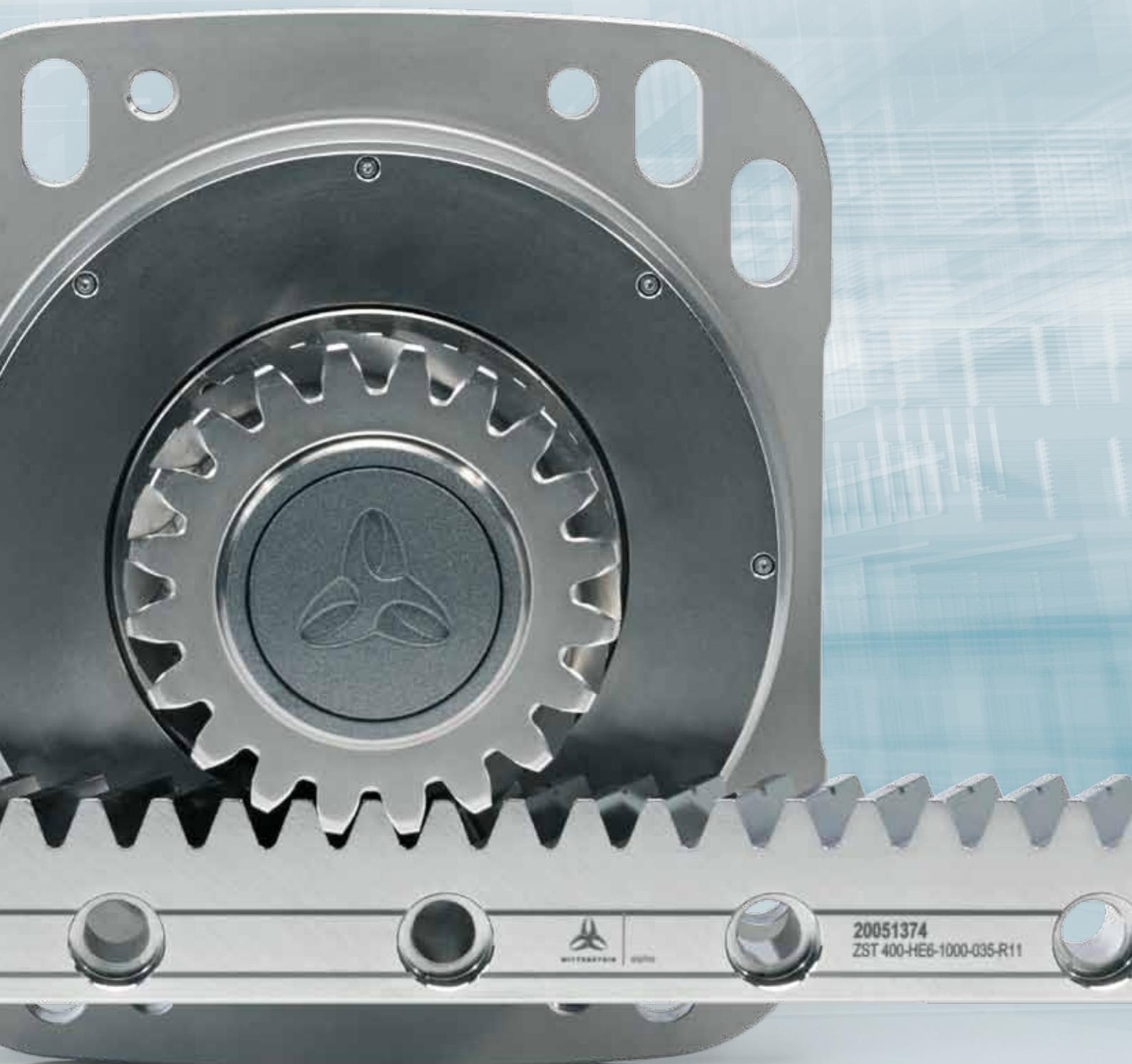
3 components –
Perfectly configured system

3 components –
One contact source

3 components –
A unique and perfect system

Gearhead and rack and pinion from a single source – with the competence of a system supplier and the know-how of 30 years. A rack and pinion system has been developed which sets new industrial standards on the market with respect to feed forces, power density, and stiffness.

The new design of the [High Performance Linear System](#) can be directly utilized for your applications with its further technical developments of the rack and pinion system and its performance improvements. From the customer solution of individual components up to complete configurations.



High Performance means highest power density



Front and back centering
for more design freedom



1 revolutionary system – 3 gearbox options

The RP⁺ gearbox is also available as servo right-angle gearbox RPK⁺ and servo actuator RPM⁺. Please see pages 26/27 for further information.

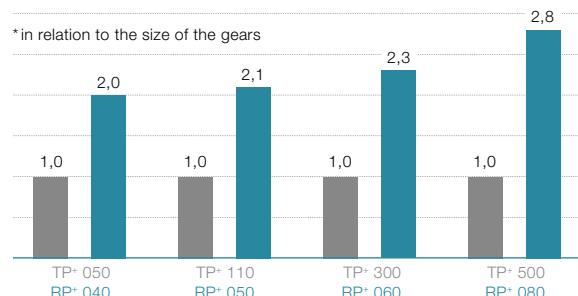
Your advantages

- more confidence in the configuration
- maximum output efficiency
- potential use of smaller gearheads and therefore cost reduction
- maximum degrees of freedom in the design

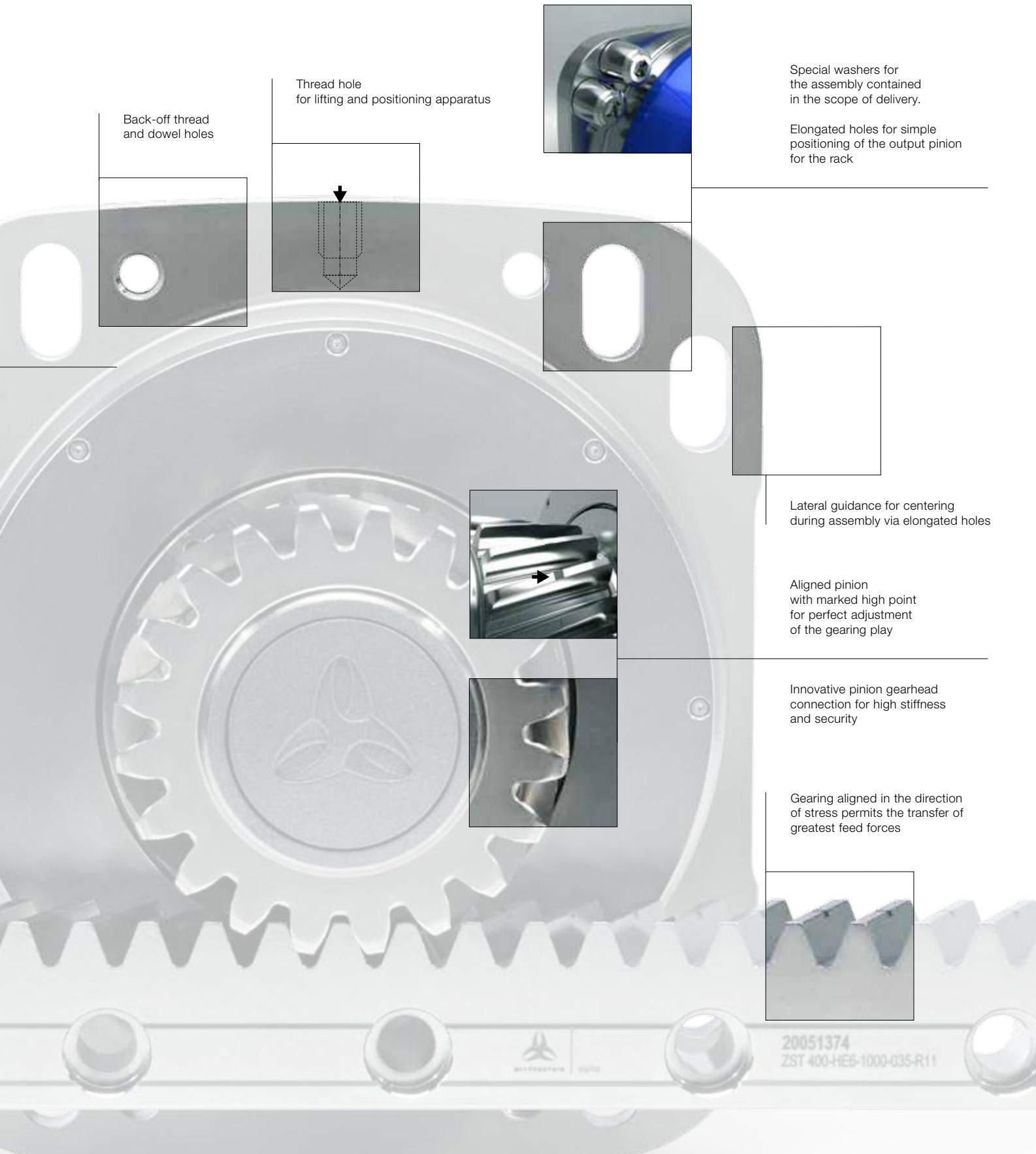
High Performance Linear Systems convince with highest power density

- if your linear drive requires maximum performance
- if you appreciate the best engineering support
- if the system has to be even more compact

Power density for the industrial standard & **High Performance Linear System***



Optimized hole pattern for the transfer of greatest feed forces



MITSUBISHI
Gears

20051374
ZST400-HE6-1000-035-R11

New dimensions in performance capability

Doubled performance
in less space!

The suitable linear drive system
for your application

The performance capability of the rack and pinion system achieves a new dimension with the **High Performance Linear System**. While others are still engaged in adapting existing solutions, WITTENSTEIN alpha is once again several steps ahead with its advanced linear system. The innovative **High Performance Linear System** is employed in applications where individual requirements go significantly beyond previous possibilities. Compared to industrial standards, the values can be improved upon up to 150 % on average.

High Performance Linear System	Max. moving force [N]	Max. speed [m/min]*
HPLS 4.3	19,000	200
HPLS 4	22,000	83
HPLS 5.4	35,000	90
HPLS 5	47,200	108
HPLS 6	75,100	73
HPLS 8	112,400	89

* Movement speed dependent on pinion tooth number and gearing (e.g. HPLS 4 also possible with 320 m/min)

** In connection with alpheno® additional variants on request

Performance Linear System**	Max. moving force [N]	Max. speed [m/min]
HPLS 3.2	9,900	200

Your advantages *

- 150 % more moving force
- 100 % higher power density
- 50 % higher system rigidity
- 50 % less labor required for installation
- 15 % more accurate positioning

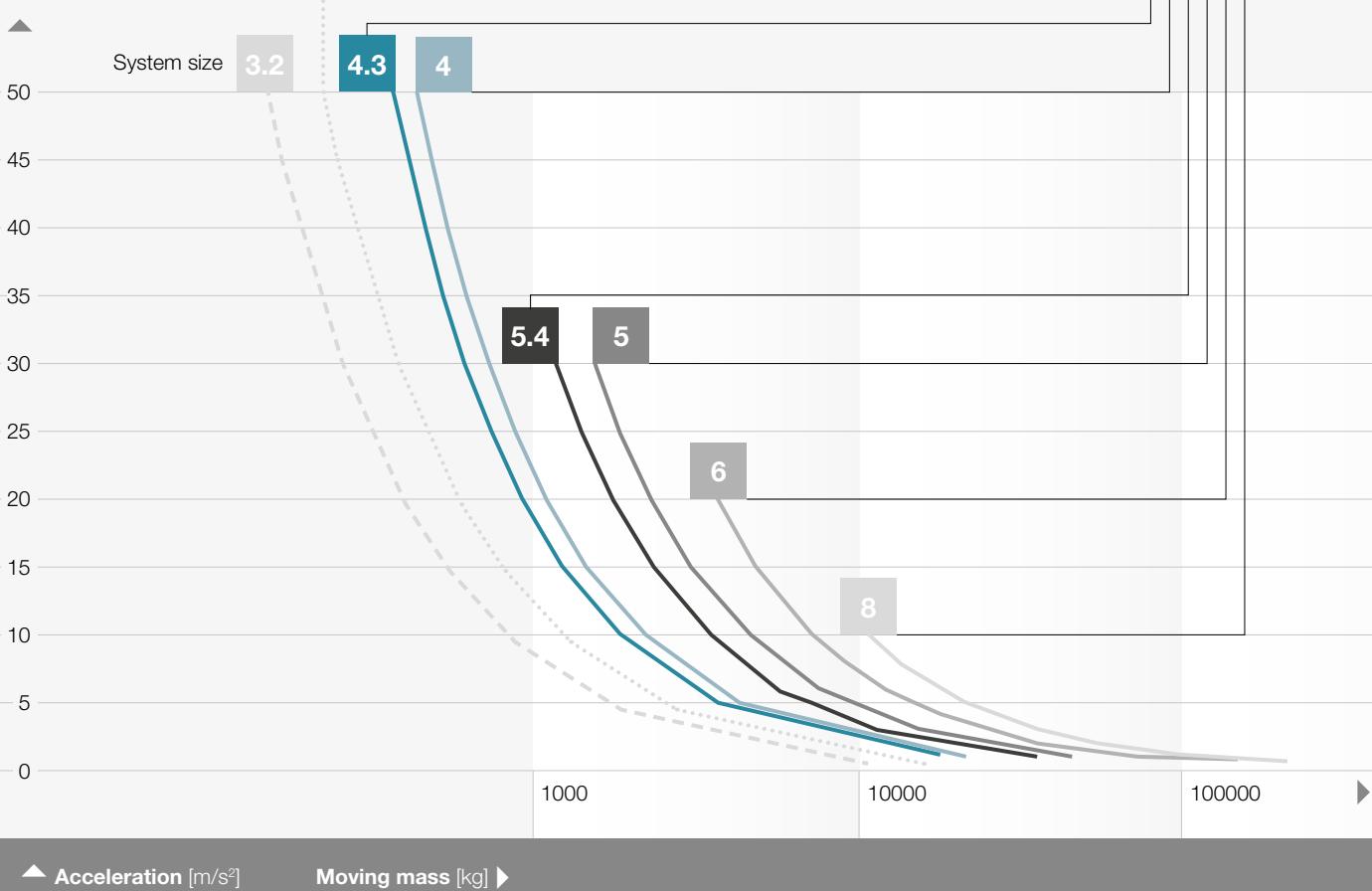
* compared to the industrial standard



The High Performance Linear System
with a positioning precision < 5 µm
and an efficiency ≤ 97 %.

Rapid system selection

Performance Linear System ◀ ▶ **High Performance Linear System**



High Performance Linear System – HPLS 4.3

Planetary gearhead RP⁺ 040 with High Performance Pinion Module 3 and High Performance Rack Module 3

High Performance System 4.3		1 stage	
Max. moving force	F_{2T}	[N]	19000
Max. movement speed ¹⁾	v_{max}	[m/min]	200
Ratios	i		4 / 5 / 7 / 10
Max. input speed	n_{1max}	[min ⁻¹]	4000
System weight (gearhead including pinion)	m	[kg]	24
Lubrication	gearhead		lubricated for life
	pinion/rack ²⁾		lubrication pinion with lubricant Klüber GB0/GE11
Clamping hub diameter		[mm]	24 / 38 / 48

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

backlash gearhead ≤ 1 arcmin

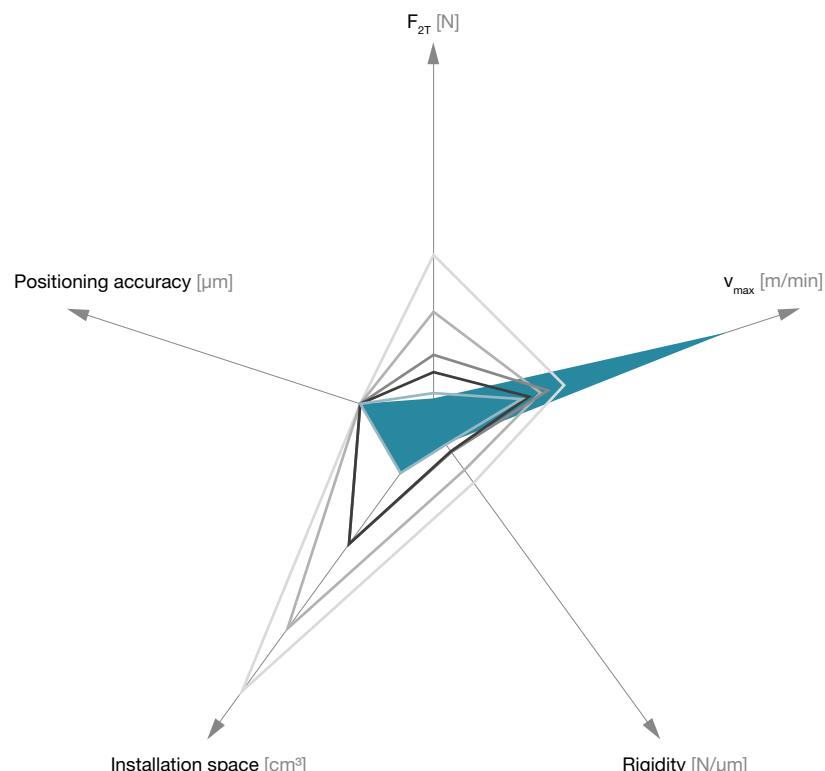
¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m_n	[mm]
		3
Number of teeth	z	20
Pressure angle	α	20°
Inclination angle	β	19.5283°
Flanks form		left

You will find additional available pinions on page 36

Extended information on the High Performance Rack on pages 39/40



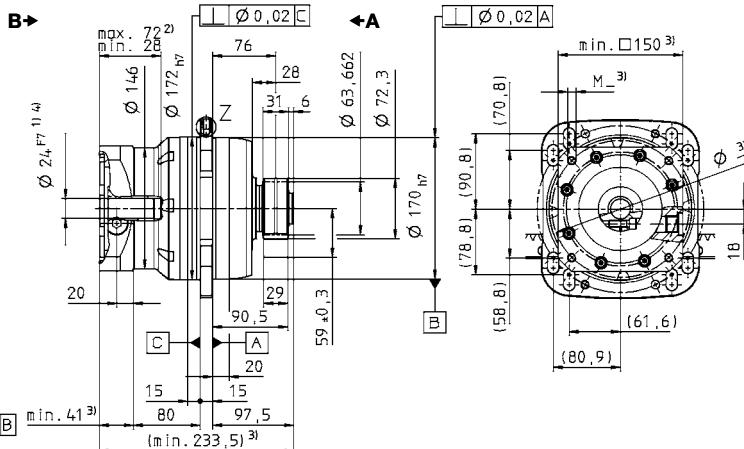
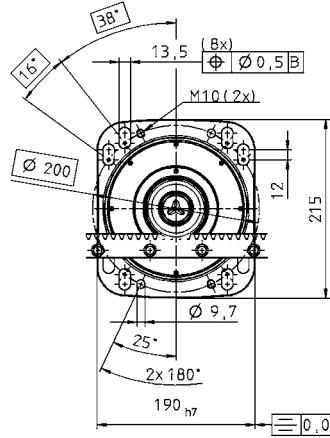
- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

Motor shaft diameter [mm]

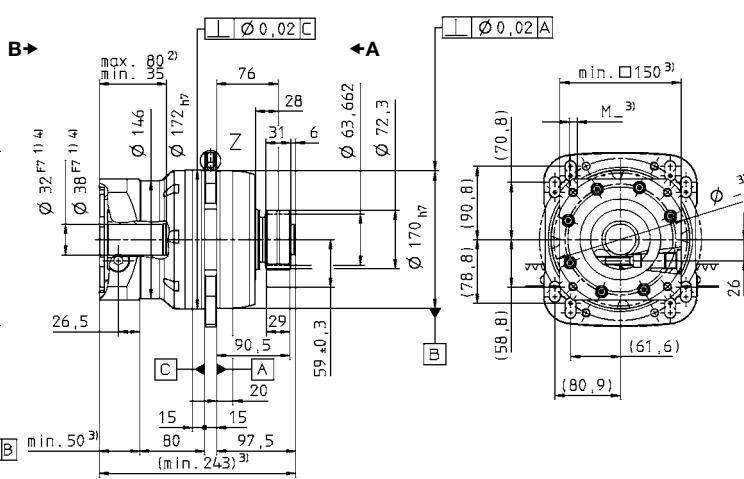
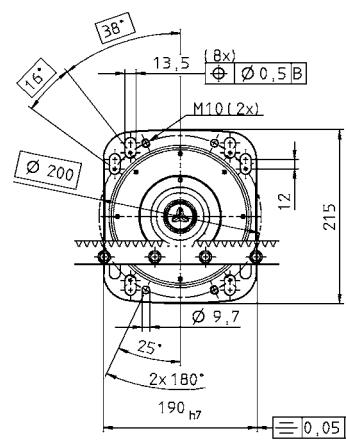
View A

View B

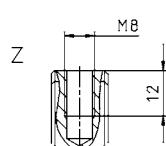
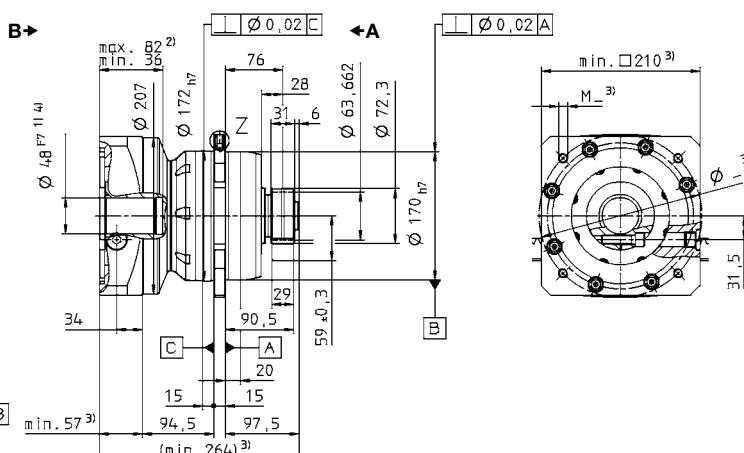
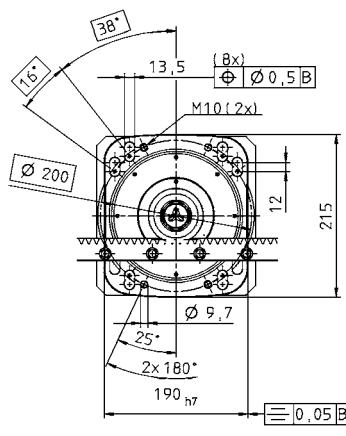
to 24⁴⁾ (G)
Clamping hub diameter



to 38⁴⁾ (K)
Clamping hub diameter



to 48⁴⁾ (M)
Clamping hub diameter



Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

High Performance Linear System – HPLS 4

Planetary gearhead RP⁺ 040 with High Performance Pinion Module 4 and High Performance Rack Module 4

High Performance System 4			2 stage	3 stage
Max. moving force		F _{2T} [N]	22380	
Max. movement speed ¹⁾		v _{max} [m/min]	83	20
Ratios		i	16 / 22 / 27,5 / 38,5 / 55	
Max. input speed		n _{1max} [min ⁻¹]	5000	
System weight (gearhead including pinion)		m [kg]	23,5	24,5
Lubrication	gearhead		lubricated for life	
	pinion/rack ²⁾		lubrication pinion with lubricant Klüber GB0/GE11 Alternative lubricants on request	
Clamping hub diameter		[mm]	24 / 38	24

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

backlash gearhead ≤ 1 arcmin

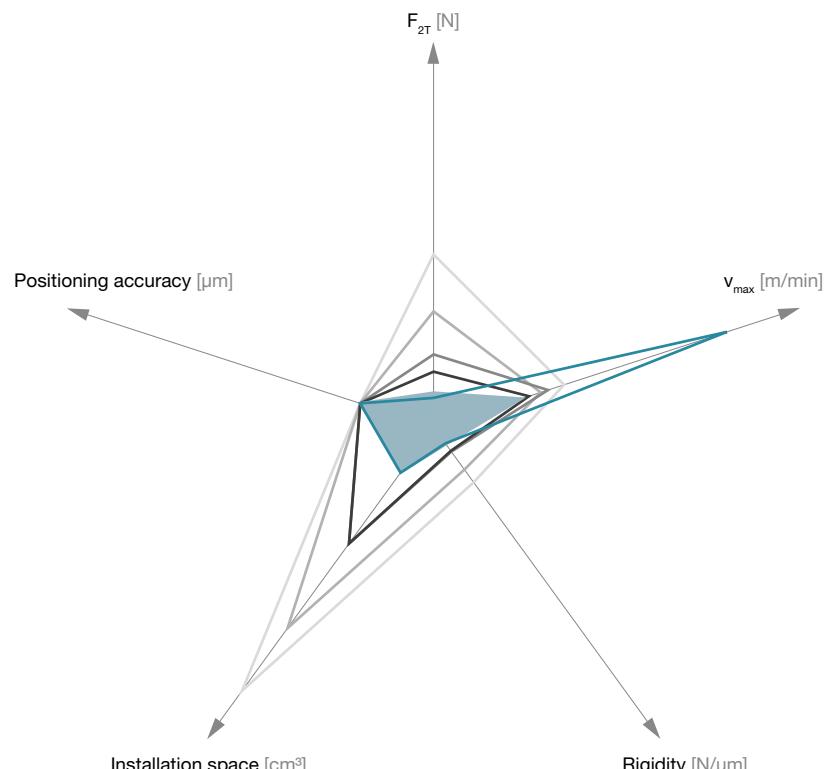
¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m _n [mm]	4
Number of teeth	z	20
Pressure angle	α	20°
Inclination angle	β	19,5283°
Flanks form		links

You will find additional available pinions on page 36

Extended information on the High Performance Rack on pages 39/40



- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

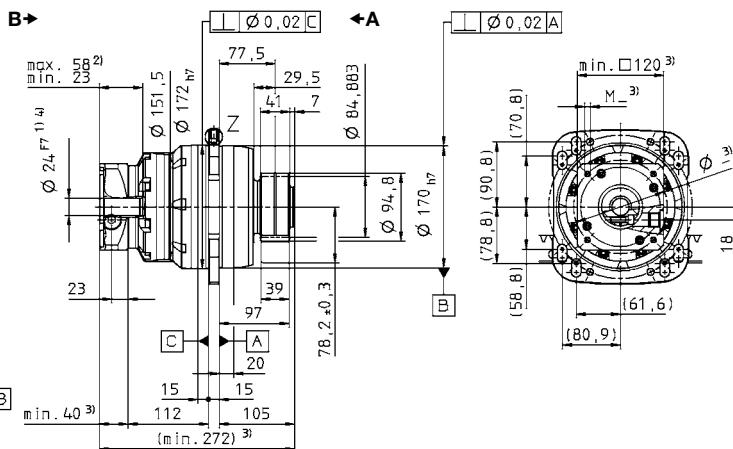
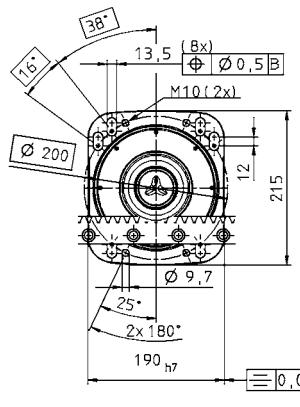
View A

View B

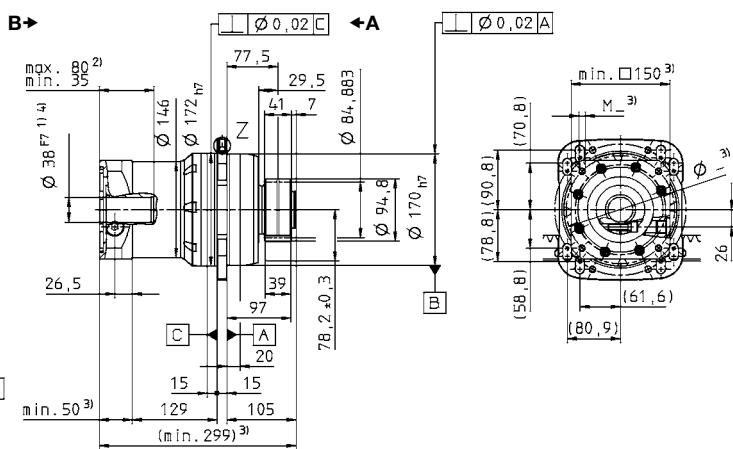
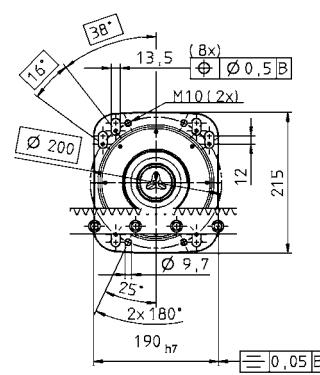
Motor shaft diameter [mm]

2 stage:

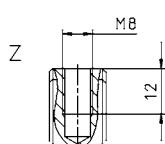
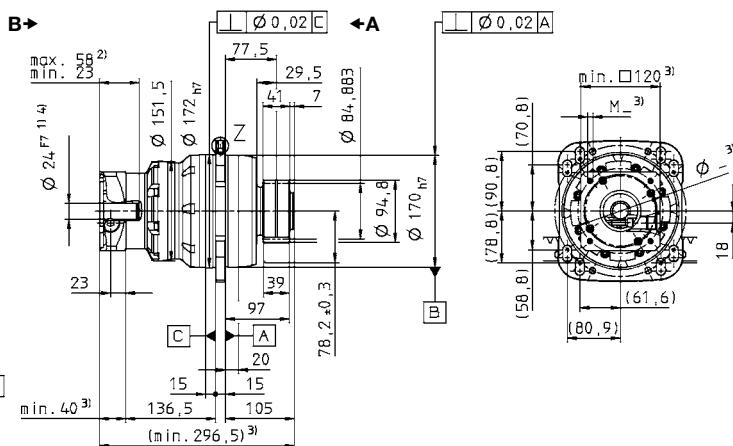
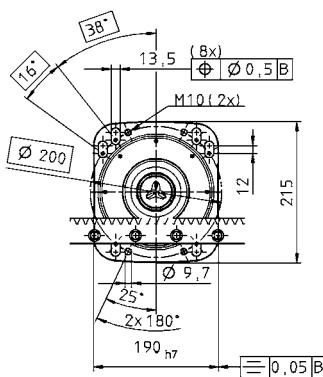
to 24⁴⁾ (G)
Clamping hub diameter



to 38⁴⁾ (K)
Clamping hub diameter

**3 stage:**

to 24⁴⁾ (G)
Clamping hub diameter



Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

 Operating Manual at www.wittenstein-alpha.com

High Performance Linear System – HPLS 5.4

Planetary gearhead RP⁺ 050 with High Performance Pinion Module 4 and High Performance Rack Module 4

High Performance System 5.4			2 stage	3 stage
Max. moving force		F _{2T} [N]	36000	
Max. movement speed ¹⁾		v _{max} [m/min]	90	22
Ratios		i	16 / 22 / 27,5 / 38,5 / 55	
Max. input speed		n _{1max} [min ⁻¹]	4500	
System weight (gearhead including pinion)		m [kg]	63	65
Lubrication	gearhead		lubricated for life	
	pinion/rack ²⁾		lubrication pinion with lubricant Klüber GB0/GE11 Alternative lubricants on request	
Clamping hub diameter		[mm]	38 / 48	38

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

backlash gearhead ≤ 1 arcmin

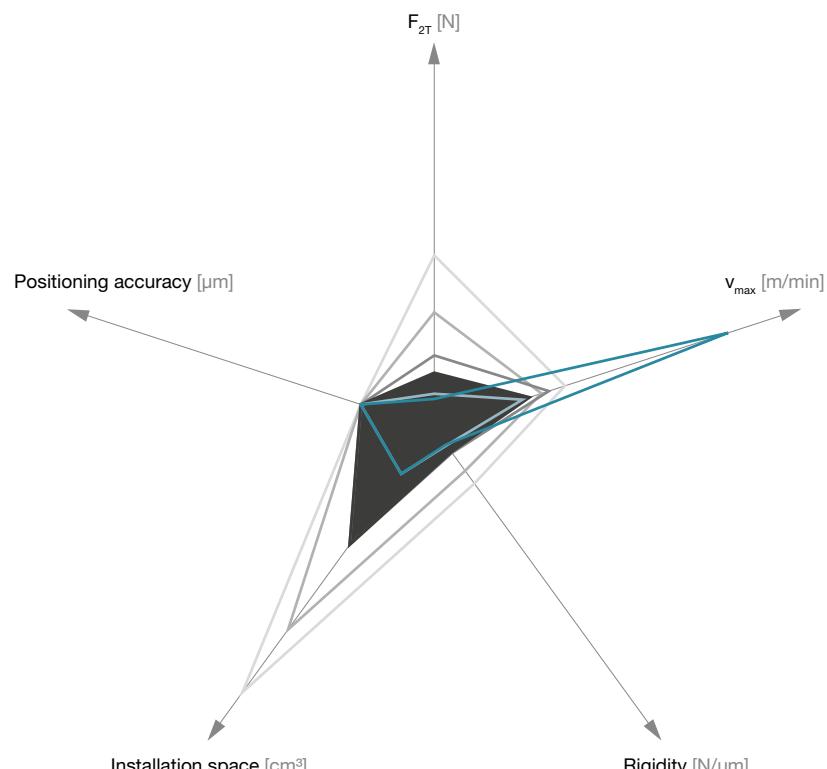
¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m _n [mm]	4
Number of teeth	z	24
Pressure angle	α	20°
Inclination angle	β	19,5283°
Flanks form		links

You will find additional available pinions on page 36

Extended information on the High Performance Rack on pages 39/40



- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

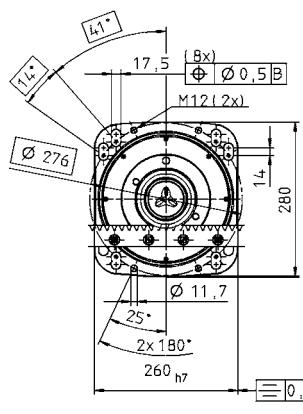
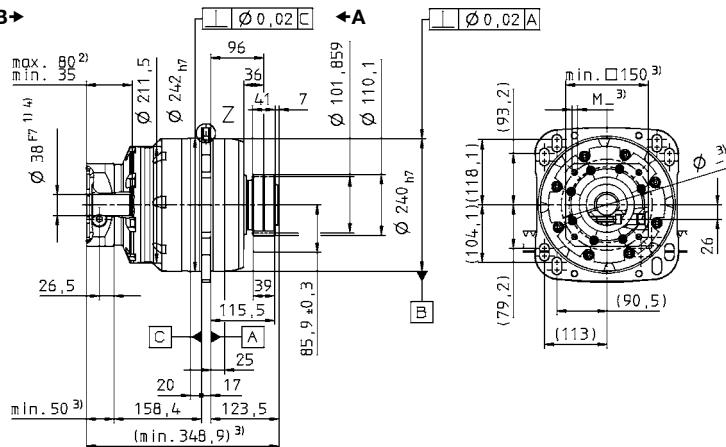
View A

View B

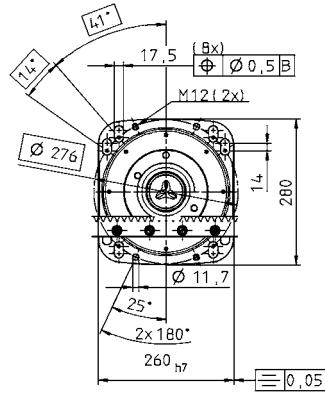
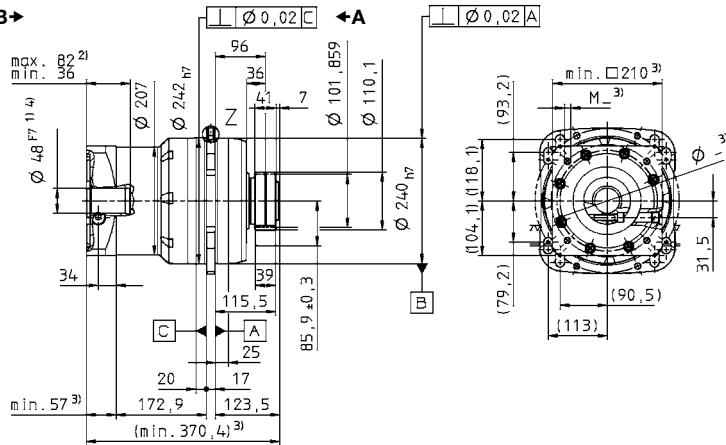
Motor shaft diameter [mm]

2 stage:

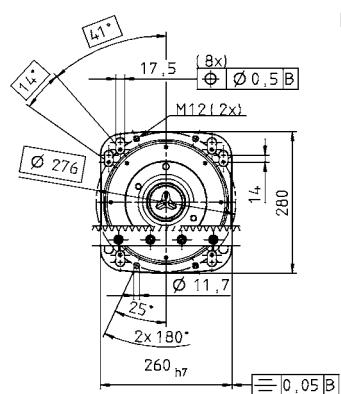
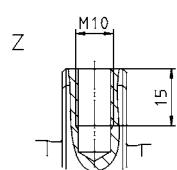
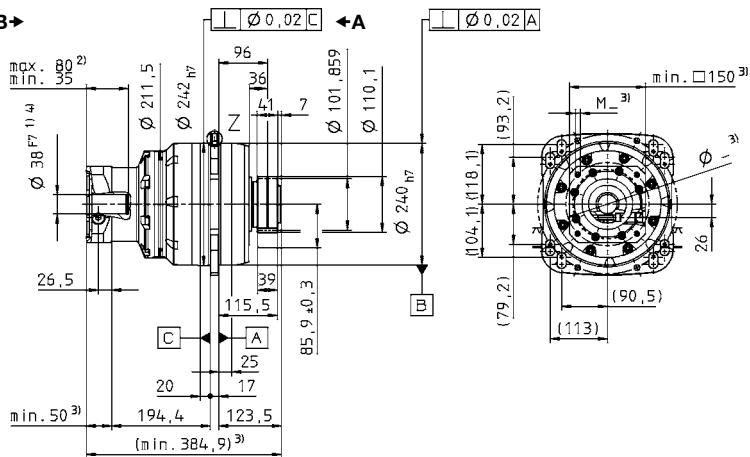
to 38⁴⁾ (K)
Clamping hub diameter

**B→**

to 48⁴⁾ (M)
Clamping hub diameter

**B→****3 stage:**

to 38⁴⁾ (K)
Clamping hub diameter

**B→**

Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

High Performance Linear System – HPLS 5

Planetary gearhead RP⁺ 050 with High Performance Pinion Module 5 and High Performance Rack Module 5

High Performance System 5			2 stage	3 stage
Max. moving force		F _{2T} [N]	47200	42600
Max. movement speed ¹⁾		v _{max} [m/min]	108	26
Ratios		i	16 / 22 / 27,5 / 38,5 / 55	66 / 88 / 110 / 154 / 220
Max. input speed		n _{1max} [min ⁻¹]	4500	
System weight (gearhead including pinion)		m [kg]	64,5	66,5
Lubrication	gearhead		lubricated for life	
	pinion/rack ²⁾		lubrication pinion with lubricant Klüber GB0/GE11 Alternative lubricants on request	
Clamping hub diameter		[mm]	38 / 48	38

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

backlash gearhead ≤ 1 arcmin

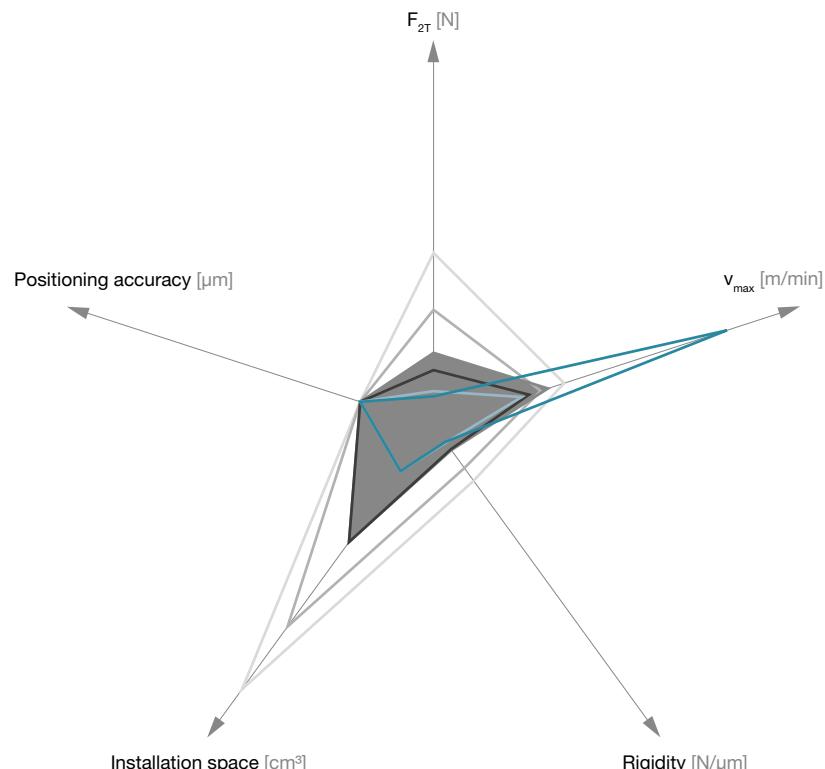
¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m _n [mm]	5
Number of teeth	z	23
Pressure angle	α	20°
Inclination angle	β	19,5283°
Flanks form		links

You will find additional available pinions on page 36

Extended information on the High Performance Rack on pages 39/40



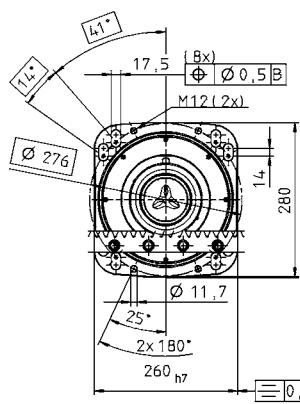
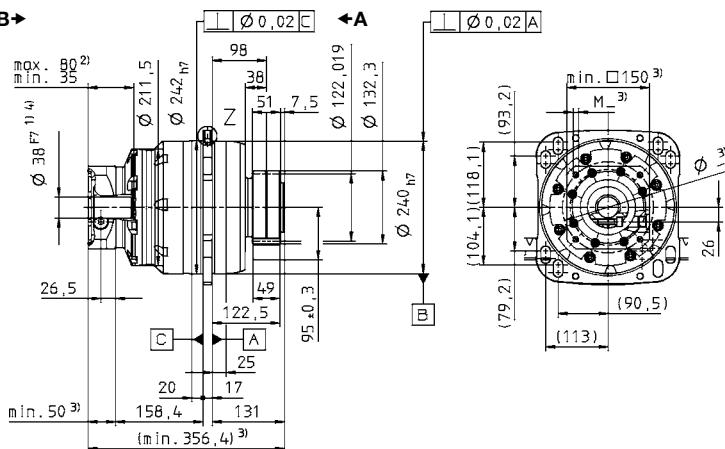
- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

View A

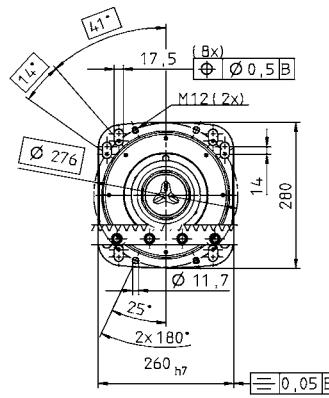
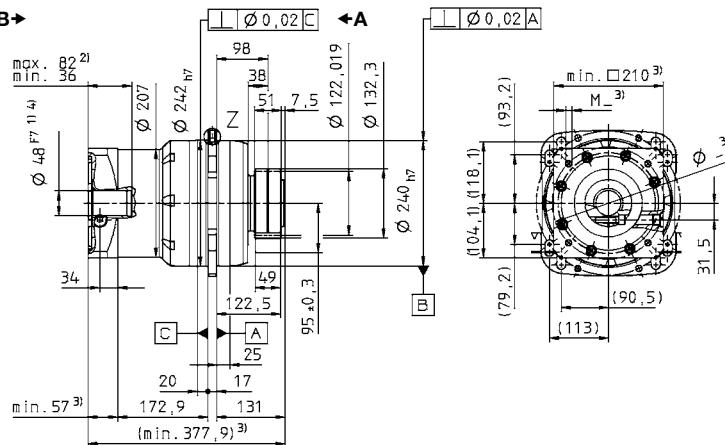
View B

2 stage:

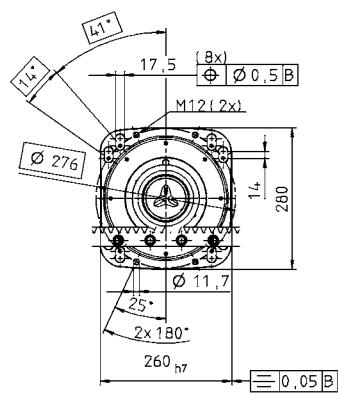
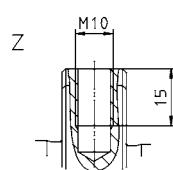
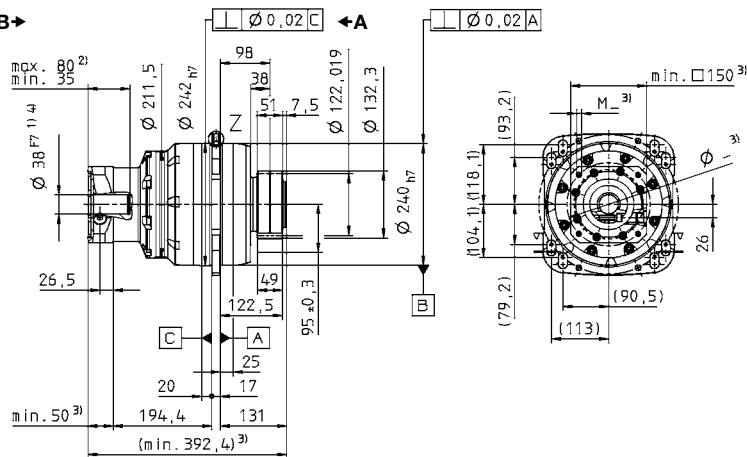
to 38⁴⁾ (K)
Clamping hub diameter

**B→**

to 48⁴⁾ (M)
Clamping hub diameter

**B→****3 stage:**

to 38⁴⁾ (K)
Clamping hub diameter

**B→**

Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

High Performance Linear System – HPLS 6

Planetary gearhead RP⁺ 060 with High Performance Pinion Module 6 and High Performance Rack Module 6

High Performance System 6			2 stage	3 stage
Max. moving force		F _{2T} [N]	75100	
Max. movement speed ¹⁾		v _{max} [m/min]	73	24
Ratios		i	22 / 27,5 / 38,5 / 55	
Max. input speed		n _{1max} [min ⁻¹]	3500	
System weight (gearhead including pinion)		m [kg]	110	113
Lubrication	gearhead		lubricated for life	
	pinion/rack ²⁾		lubrication pinion with lubricant Klüber GB0/GE11 Alternative lubricants on request	
Clamping hub diameter		[mm]	48	38

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

backlash gearhead $\leq 1,5$ arcmin

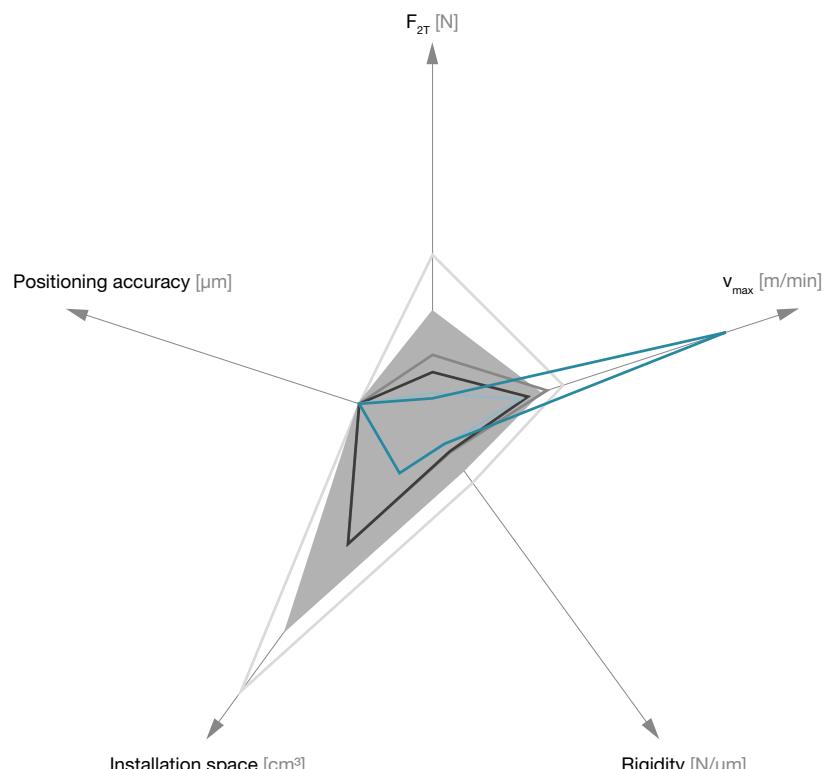
¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m _n [mm]	6
Number of teeth	z	23
Pressure angle	α	20°
Inclination angle	β	19,5283°
Flanks form		links

You will find additional available pinions on page 36

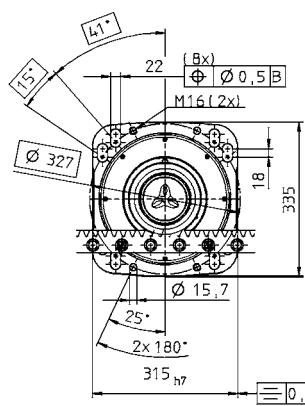
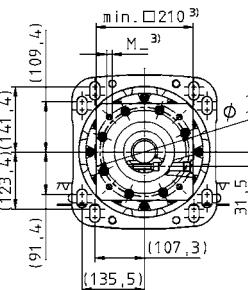
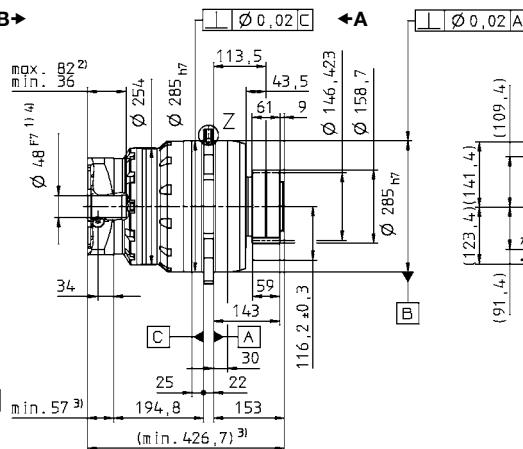
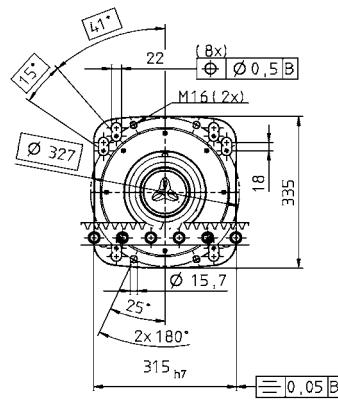
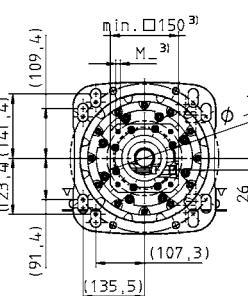
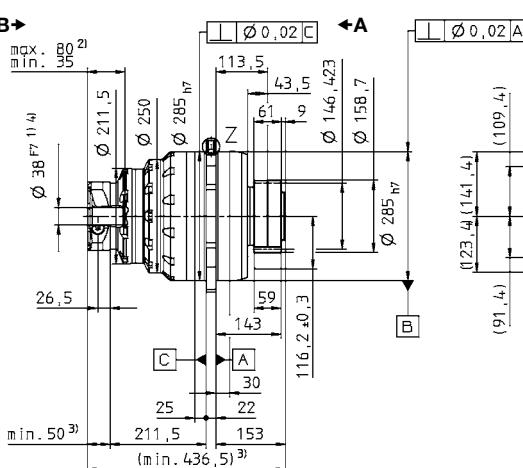
Extended information on the High Performance Rack on pages 39/40



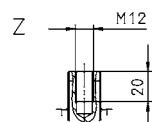
- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

View A

View B

2 stage:**B**→**3 stage:****B**→

Motor shaft diameter [mm]



Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

 Operating Manual at www.wittenstein-alpha.com

High Performance Linear System – HPLS 8

Planetary gearhead RP⁺ 080 with High Performance Pinion Module 8 and High Performance Rack Module 8

High Performance System 8		2 stage	3 stage
Max. moving force	F _{2T} [N]	112000	
Max. movement speed ¹⁾	v _{max} [m/min]	89	30
Ratios	i	22 / 27,5 / 38,5 / 55	66 / 88 / 110 / 154 / 220
Max. input speed	n _{1max} [min ⁻¹]	3500	
System weight (gearhead including pinion)	m [kg]	151	160
Lubrication	gearhead	lubricated for life	
	pinion/rack ²⁾	lubrication pinion with lubricant Klüber GB0/GE11 Alternative lubricants on request	
Clamping hub diameter	[mm]	48	38 / 48

Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800

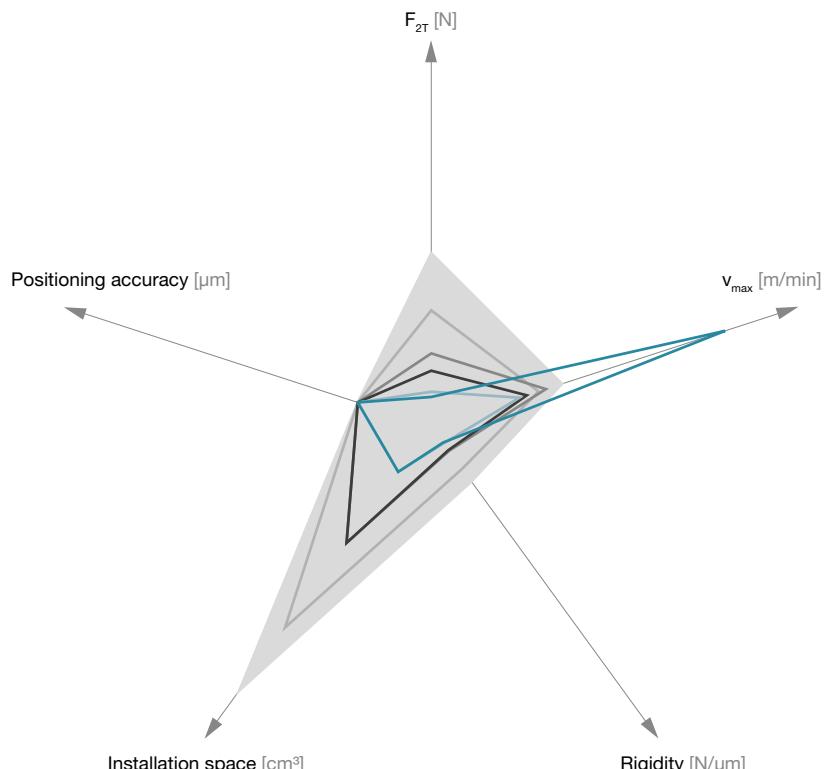
backlash gearhead $\leq 1,5$ arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog or online at www.rack-pinion.com
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m _n [mm]	8
Number of teeth	z	21
Pressure angle	α	20°
Inclination angle	β	19,5283°
Flanks form		links

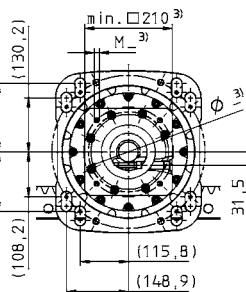
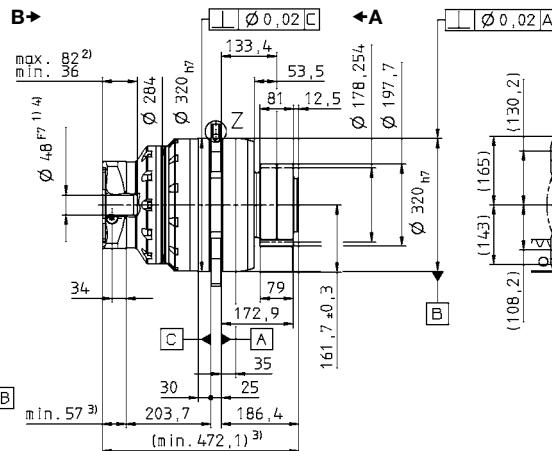
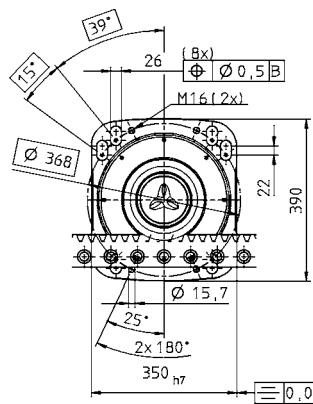
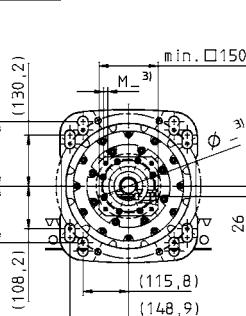
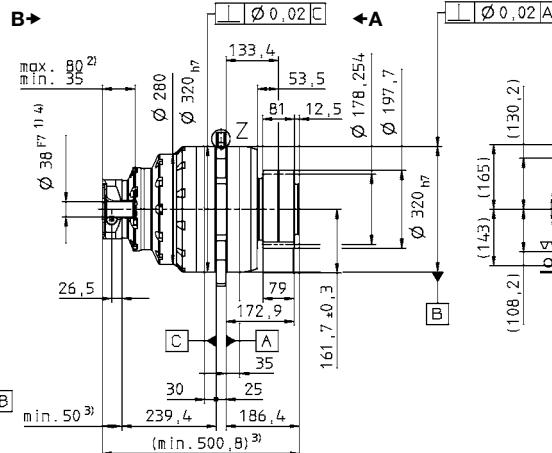
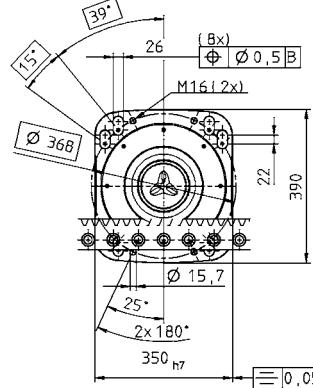
You will find additional available pinions on page 36
Extended information on the High Performance Rack on pages 39/40



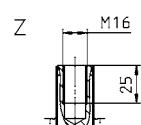
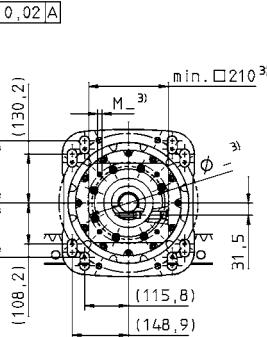
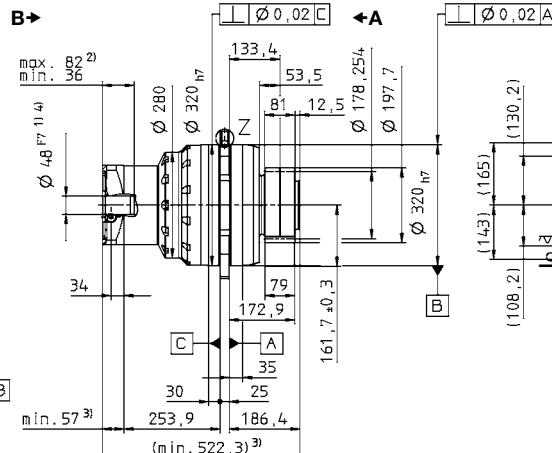
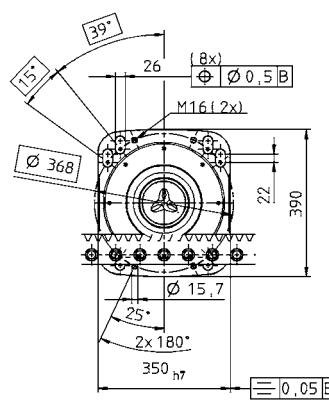
- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

View A

View B

2 stage:**3 stage:**

to 48⁴⁾ (M)
Clamping hub diameter



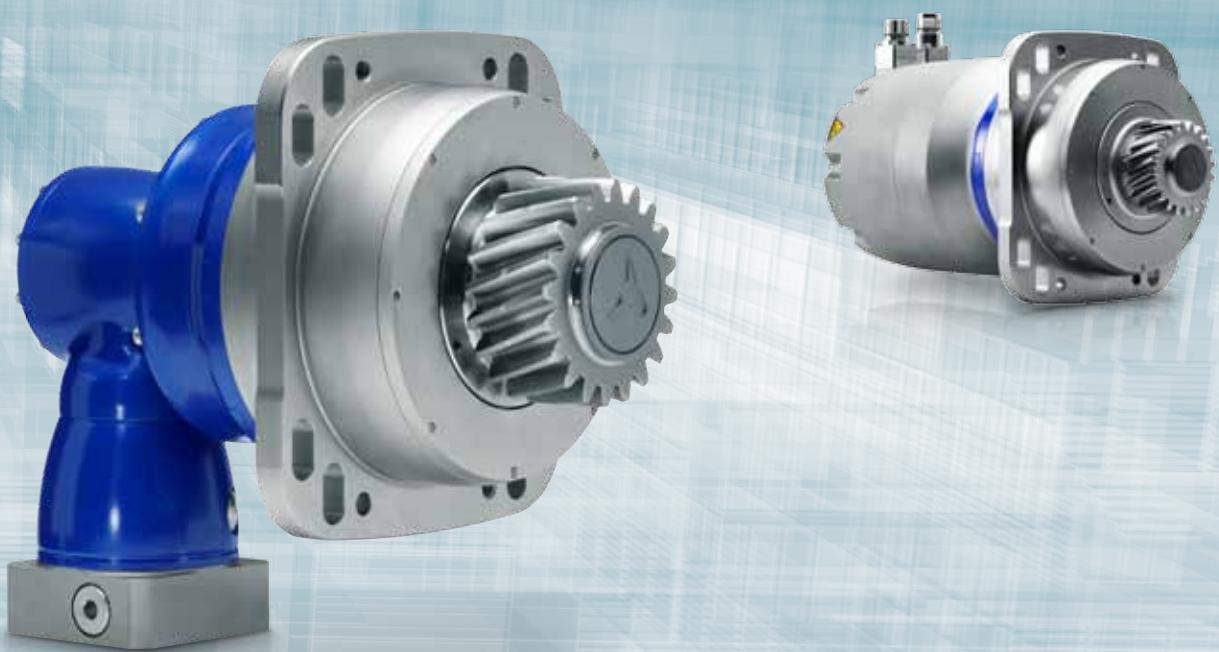
Non-tolerated dimensions ± 1 mm

- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

1 revolutionary system –
3 gearhead options
 $3 \times 1 = \text{one}$

maximum performance
extraordinary design
perfect configuration





RP Philosophy

Sets standards
in matters of power density, modularity
and ease of assembly.

The RP Philosophy unites all advantages of entire WITTENSTEIN alpha product line. Proven world-class attributes include reduced backlash of $\leq 1\text{arcmin}$, highest power density, any mounting position, extremely simple motor mounting very smooth running with helical gearing, highest positioning precision and life expectancy.

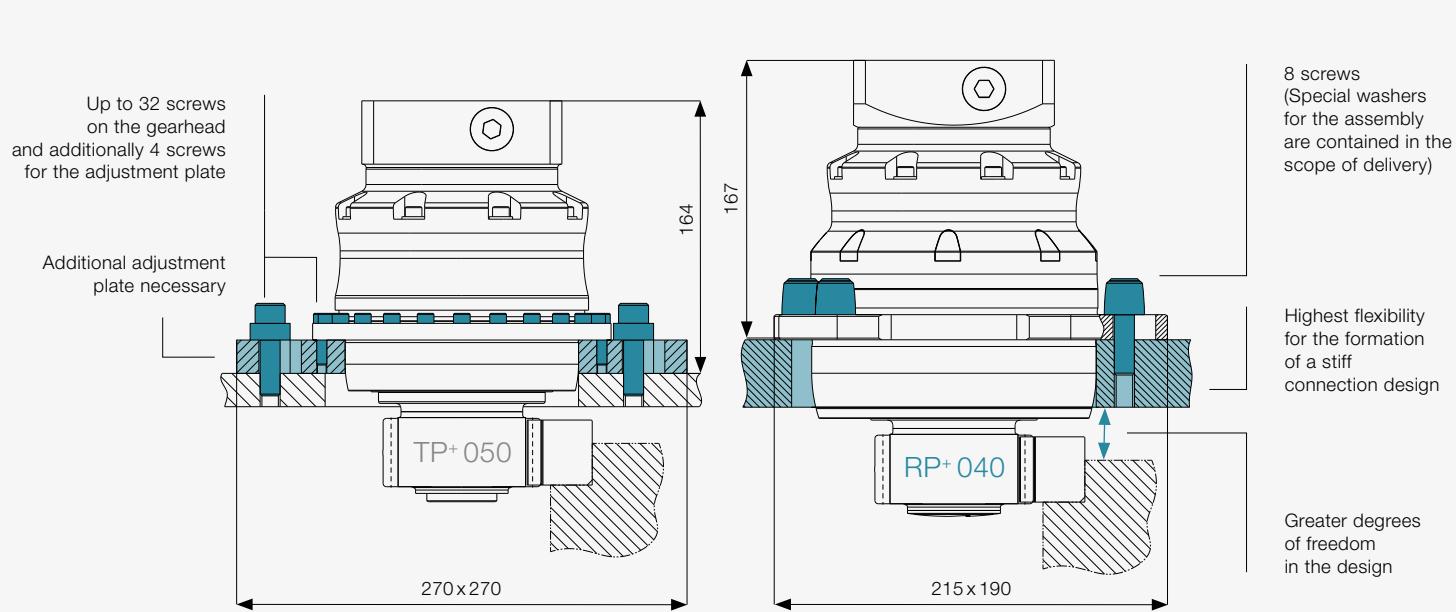
Once again we set new standards with the new high performance planetary gearhead RP⁺ with regard to power density, stiffness, transferable torques and ease of assembly.

The RP⁺ gearhead is optimized as standard for our high performance pinion. Upon request, you can also receive the gearhead with thread holes in the output flange which can be tailored to your individual solution.

With the elongated holes integrated in the gearhead flange, it is now possible to easily position the gearhead with a mounted pinion on the rack. Cumbersome and expensive solutions such as intermediate plates or excenter solutions are a thing of the past.

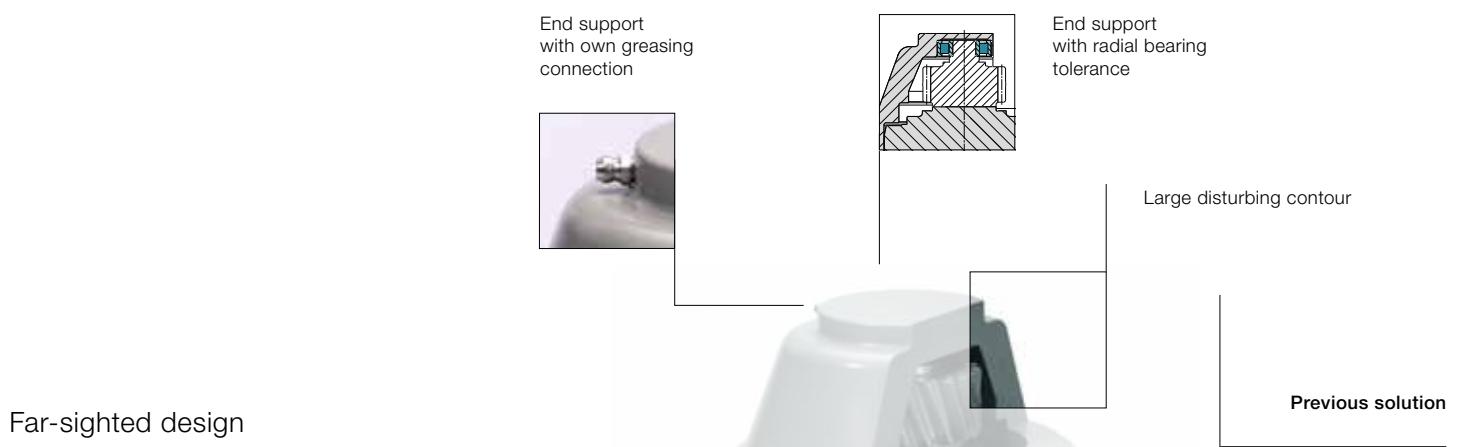
The gearhead is guided for positioning with the ground stop edges of the gearhead flange. A milled lay-on edge on the machinery sled completely suffices.

The low backlash planetary gearheads from WITTENSTEIN alpha will make your heart beat faster. Your engineer's heart as well as your entrepreneur's heart, since these gearheads boost efficiency, productivity and process security.



Comparison of the RP⁺ to the industrial standard:

The RP⁺ 040 has more than double the feed force with the same clearance space compared to the TP⁺ 050.



The overhung mounting of the output pinion leaves no design wishes unfulfilled. Large disrupting contours which occur in end support solutions that are frequently seen in rack and pinion drives have now turned out to be completely obsolete. Compare for yourself!

The well-known technical disadvantages of a static redundantly dimensioned bearing in lubrication and servicing, high radial bearing tolerance leading to low stiffness and poor effectiveness of the counter bearing which results in overburdening of the gearbox mounting are now a thing of the past.



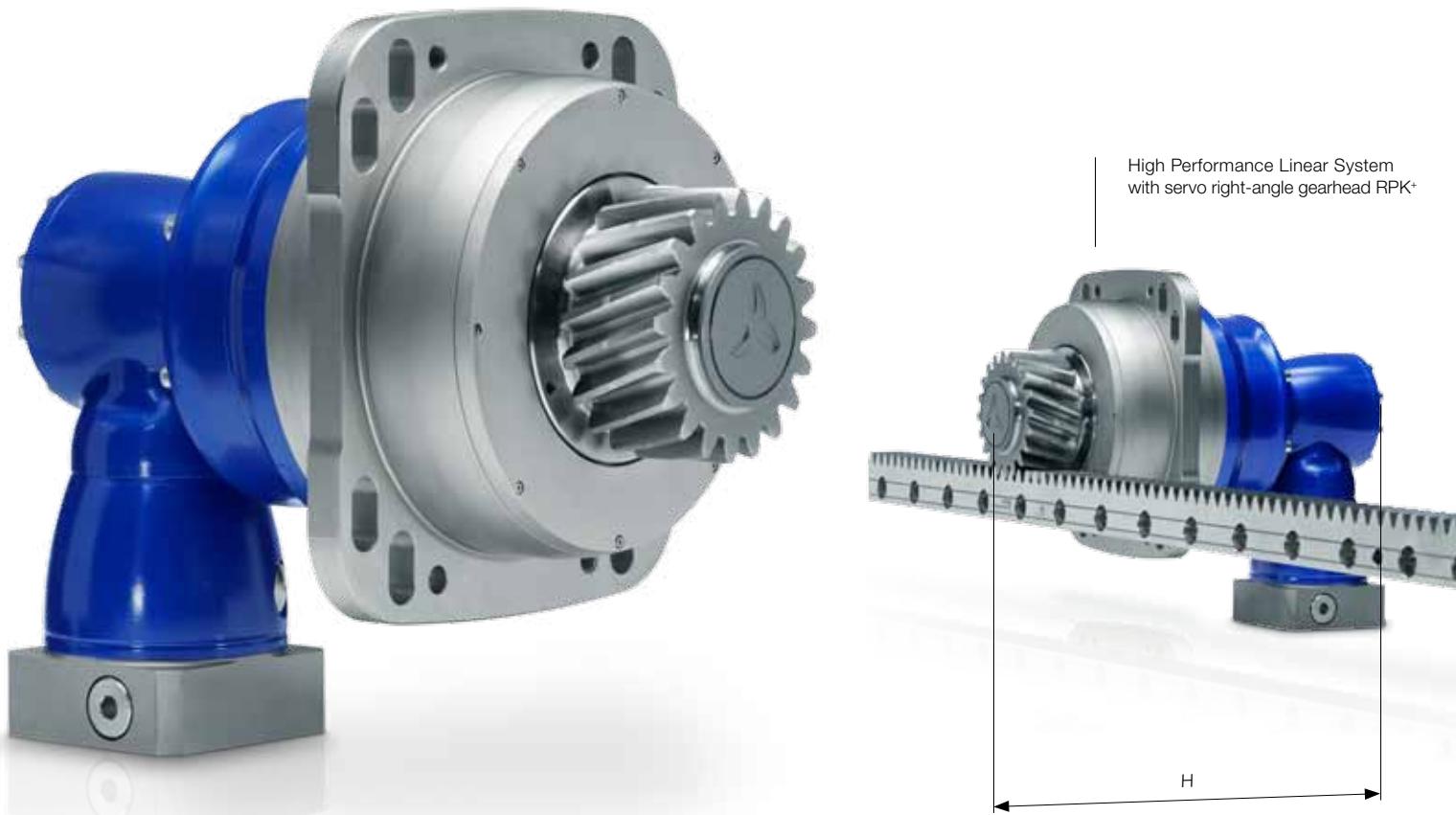
Our solution

Servo right-angle gearhead RPK⁺ – the right-angle gearhead option for the system

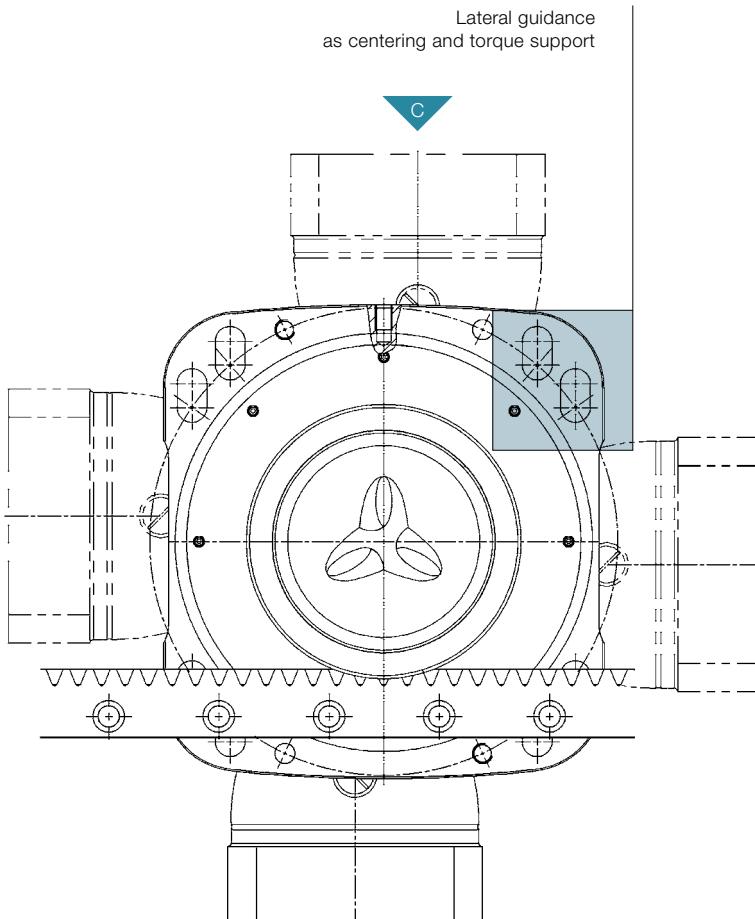
Sets standards in power density, modularity,
and ease of assembly –
coupled with even more freedom of design.

RP⁺ as servo right-angle gearhead RPK⁺

The RPK⁺ unites the advantages of the RP⁺ High Performance Planetary Gearheads with the most advanced hypoid gearing. The servo right-angle gearhead RPK⁺ is the solution for limited installation space. The new interface, combined with highest power density, enables still more compact designs.



Flexibility of installation



Practically every wish can be met, since the mounting position of the RPK⁺ series is freely selectable. The position A, B, C or D is oriented on the position of the elongated holes.

The ground stop edges on the gearbox flange guide the gearbox during positioning and prevent drive twisting at installation. The lateral guidance furthermore acts as torque support in operation.

Technical data: High Performance Linear System with servo right-angle gearbox RPK⁺

Size High Performance Linear System		4.3	4	5.4	5	6	8
Size RPK ⁺		040	040	050	050	060	080
Module rack & pinion	m_N mm	3	4	4	5	6	8
Number of teeth output pinion ^{a)}	z	20	20	24	23	23	21
Torsional backlash	j_t arcmin	$\leq 1,3$	$\leq 1,3$	$\leq 1,3$	$\leq 1,3$	$\leq 1,8$	$\leq 1,8$
Max. feed force up to	F_{2T} N	19000	22000	35000	47200	75100	112400
Max. speed up to	V_{max} m/min	25	33	30	36	31	34
Stage ^{b)}		3	3	3	3	3	3
Clamping hub bore diameter	mm	19/28	19/28	28/38	28/38	38	48
Ratio	i	48 - 385	48 - 385	48 - 385	48 - 385	66 - 385	66 - 385
Installation height	H mm	304	311	388	396	504	567

Dimensions of the output stage are shown on page 14-15.

Dimension sheets on request.

^{a)} different numbers of teeth on gear on request

^{b)} also available with 4 stages

Servo actuator RPM⁺ – the actuator option for the system

The expansion with the integrated motor gearbox unit of WITTENSTEIN motion control sets new standards.

RP⁺ as servo actuator RPM⁺

The RPM⁺ actuator is extremely dynamic, extremely compact and perfectly adapted to linear applications with a pinion and rack. It combines superior power density and a functional design in one unit – leading to effective length savings and a more compact design than ever! The integrated motor guarantees extra performance while the unique architecture of the permanently excited synchronous motor results in unprecedented power density.



High Performance Linear System
with servo actuator RPM⁺

The RPM⁺ actuator helps you maximize the synergy effects for your High Performance Linear System. The integrated motor gives you twice the power in a smaller space envelope. The four optimally interacting components provide maximum dynamics, compactness and precision.

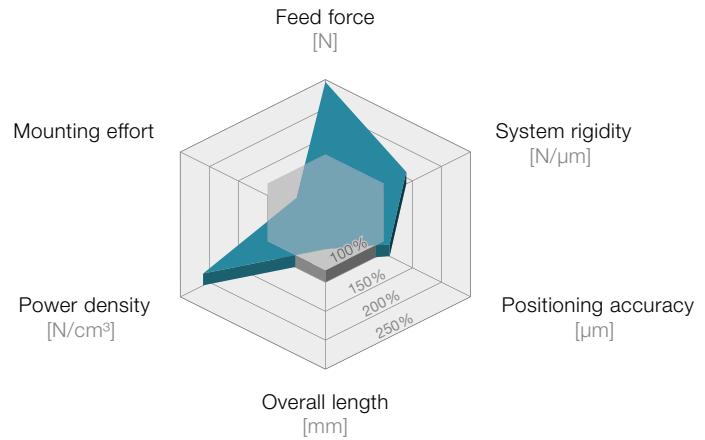
High Performance Linear System
with servo actuator RPM⁺



Comparison of rack and pinion systems
industry standard and
High Performance Linear System with servo actuator RPM⁺

The new system delivers substantial **benefits**
compared to the industry standard:

- 150% more feeding forces
- 100% higher power density
- 50% higher system rigidity
- 50% lower mounting effort
- 15% more accurate positioning
- 40% less mounting space required**



Technical data: High Performance Linear System with servo actuator RPM⁺

Size High Performance Linear System		4.3	4	5.4	5	6	8
Size RPM ⁺ a)		040	040	050	050	060	080
Module rack & pinion	m_N mm	3	4	4	5	6	8
Number of teeth output pinion	z	20	20	24	23	23	21
Torsional backlash	j_t arcmin	≤ 3	≤ 1				
Max. feed force up to	F_{2T} N	19000	22000	35000	47200	75100	112400
Max. speed up to b)	V_{max} m/min	200	83	90	108	73	89
Ratio	i	4 - 10	16 - 220	16 - 220	16 - 220	22 - 220	22 - 220
Overall length c)	L mm	354	354	474	484	614	629
Max. motor power up to	P_{max} W	44,4	18,4	44,4	44,4	120,1	183,5
Motor options		Water cooling, holding brake, EnDat and Hiperface multi-turn encoder					

Dimensions of the output stage are shown on page 14-15.
Dimension sheets on request.

a) No series production, customized projects, please contact us

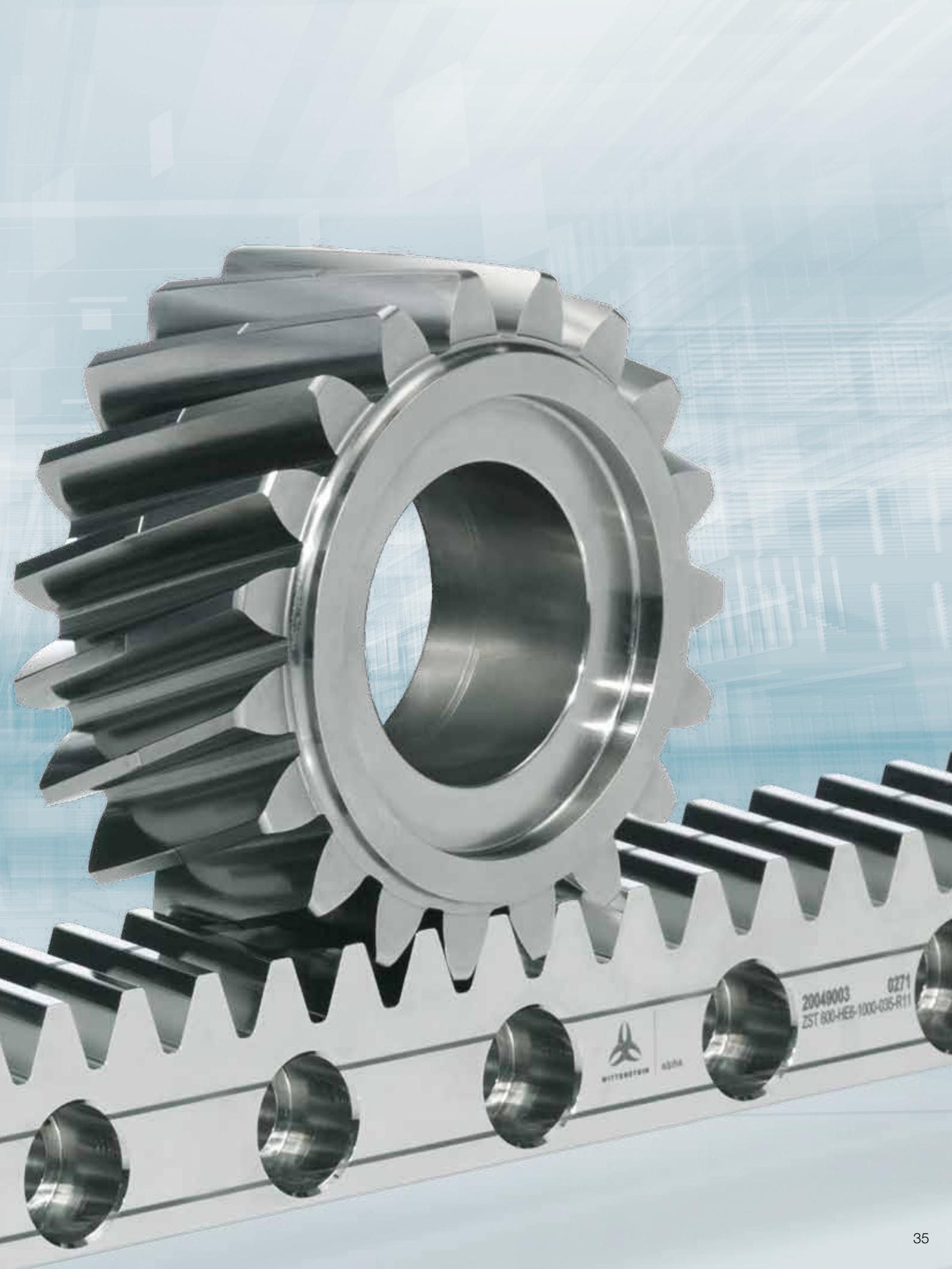
b) Calculation with smallest ratio and max. input speed

c) Length depends on ratio, dimensions without connectors/screws,
incl. pinion, motor with resolver without break

High Performance Pinion and High Performance Rack

greatest linear stiffness
highest precision
highest quality





WITTENSTEIN alpha

0271
20049003
ZST 600-H6-100-035-R11

High Performance Pinion



The High Performance Pinion is distinguished by greatest linear stiffness and precision. The High Performance Pinion can make full use of its advantages in connection with the RP⁺.

The advantages at a glance:

High precision gearing and optimally designed gearing geometries for:

- best power gearhead
- very smooth running
- application precision

Innovative pinion-gearhead connection for:

- highest linear stiffness
- maximum flexibility
- optimally dimensioned and stiff pinion-gearhead connection
- compact drive design

Apart from our standard pinions for rack and pinion applications, we offer additional options for special requirements such as rotating ring drives:

- diverse modules
- tooth number
- helix angle

Please contact us!

Additional pinion and gearhead combinations are provided in the WITTENSTEIN alpha general catalog.

The High Performance Pinion is available in diverse tooth numbers and modules. All pinions are assembled at the factory before delivery.

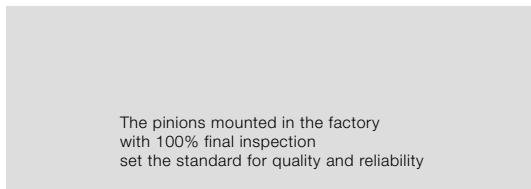
Overview of High Performance Pinion	
m3	z=20* , z=34
m4	z=20* , z=24* , z=30
m5	z=19 , z=23* , z=30
m6	z=19 , z=23* , z=28
m8	z=21*

* Preferred pinion



The High Performance Pinion ensures the perfect translation of rotating to linear movement.

Gearhead and output pinion – a perfectly harmonized unit



The pinions mounted in the factory with 100% final inspection set the standard for quality and reliability

All output pinions leave our factory already assembled, giving you the following advantages:

- certified quality with 100% final inspection
- highest quality and reliability in use
- perfect adjustment of the gearing play between rack and pinion because of aligned pinion and marked high point
- elimination of potential sources of error in assembly



The marked high point makes a perfect adjustment of the gearing play between rack and pinion possible

A pinion-gearhead connection of high strength, proven over several years, guarantees highest stiffness and a secure connection over the entire service life of the drive.

The Disadvantages of a bolted solution, overburdened bolted connections and reduced stiffness due to adapter flange are no longer a concern.

The possibility of connecting a pinion with smaller diameter yet equal feeding forces with smaller torque is now a reality. This can result in cost savings for servo motor and controller. Put briefly: a plus in efficiency.



High Performance Rack

Areas of application for the High Performance Rack can be found everywhere in situations requiring the mastery of high accelerations or moving large masses. In other words, always where high feed forces must be transferred.

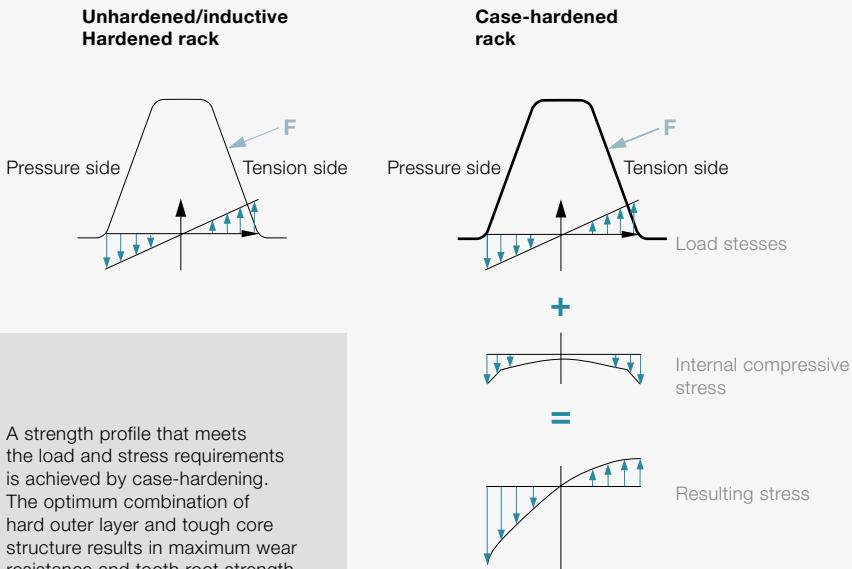
WITTENSTEIN alpha with the new rack class sets a new standard in matters of performance. Because of its special hardening process which is completely different from all other racks available on the market, it is a real powerhouse.

The advantages at a glance

Significantly improved characteristics in:

- hardness and strength in the depth hardness and core structure
- permissible torsional and bending strain
- fatigue strength for oscillating stress
- wear resistance
- service life

→ Possibility of downsizing

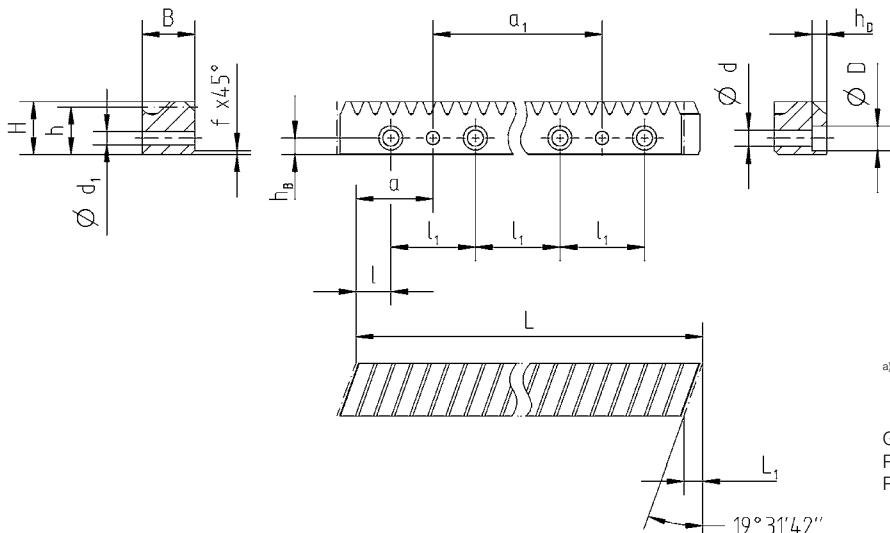


A strength profile that meets the load and stress requirements is achieved by case-hardening. The optimum combination of hard outer layer and tough core structure results in maximum wear resistance and tooth root strength. The high-quality base material with subsequent case-hardening allows for the gearhead of maximum drive forces.

A hole pattern harmonized to highest feed forces

With the hole pattern, WITTENSTEIN alpha sets a new standard of the High Performance Rack. The new hole pattern offers the following advantages:

- uniformly distributed surface pressure profile
- perfect connection between rack and machinery bed
- high transferable feed forces with optimal screw security



Module	p_t	L	z	a^a	a_1	B	d	d_1^b	D	$f^{0.5}$	h	h_B	h_D	H	I	I_1	L_1
2	6,67	1000	150	58,22	875	24	7	5,7	11	2	22	8	7	24	26,97	62,5	8,5
3	10	1000	100	57,33	875	29	10	7,7	15	2	26	9	9	29	26,08	62,5	10,3
4	13,33	1000	75	55,56	875	39	12	9,7	18	3	35	12	11	39	24,31	62,5	13,8
5	16,67	1000	60	53,78	875	49	14	11,7	20	3	34	12	13	39	22,53	62,5	17,4
6	20	1000	50	52,01	875	59	18	15,7	26	3	43	16	17	49	20,76	62,5	20,9
8	26,67	960	36	50	832	79	22	19,7	33	3	71	25	21	79	18	64	28

All dimensions in [mm]

Cumulative pitch error F_p : 35 $\mu\text{m}/1000 \text{ mm}$

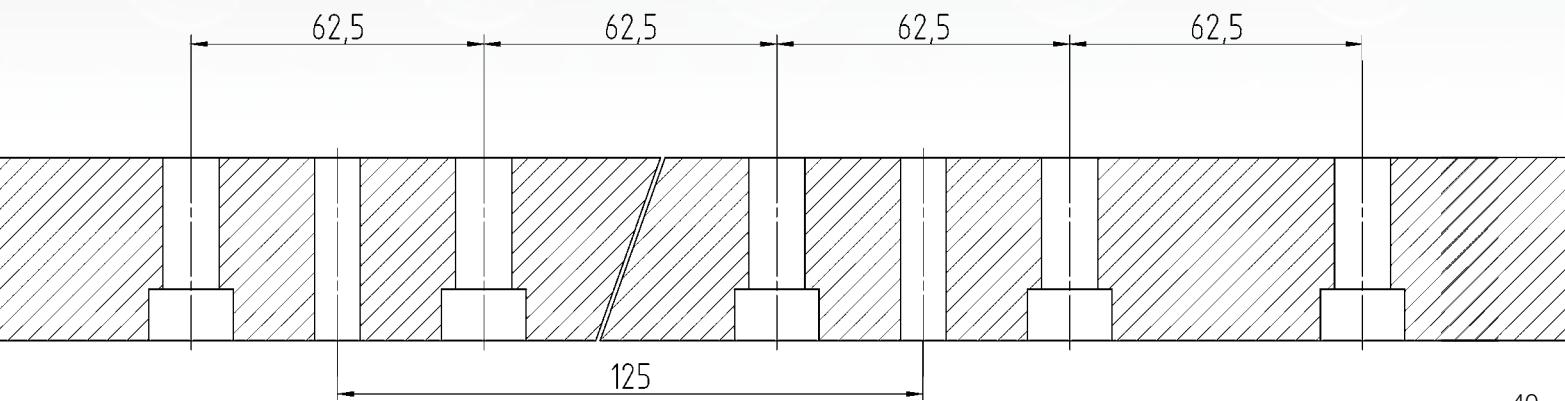
Single pitch error f_p : 8 μm ; 10 μm for m5 and m6

^{a)} Recommended tolerance dimension: 6 ${}^{H7}/8$ ${}^{H7}/10$ ${}^{H7}/12$ ${}^{H7}/16$ ${}^{H7}/20$

p_t = Reference circle pitch

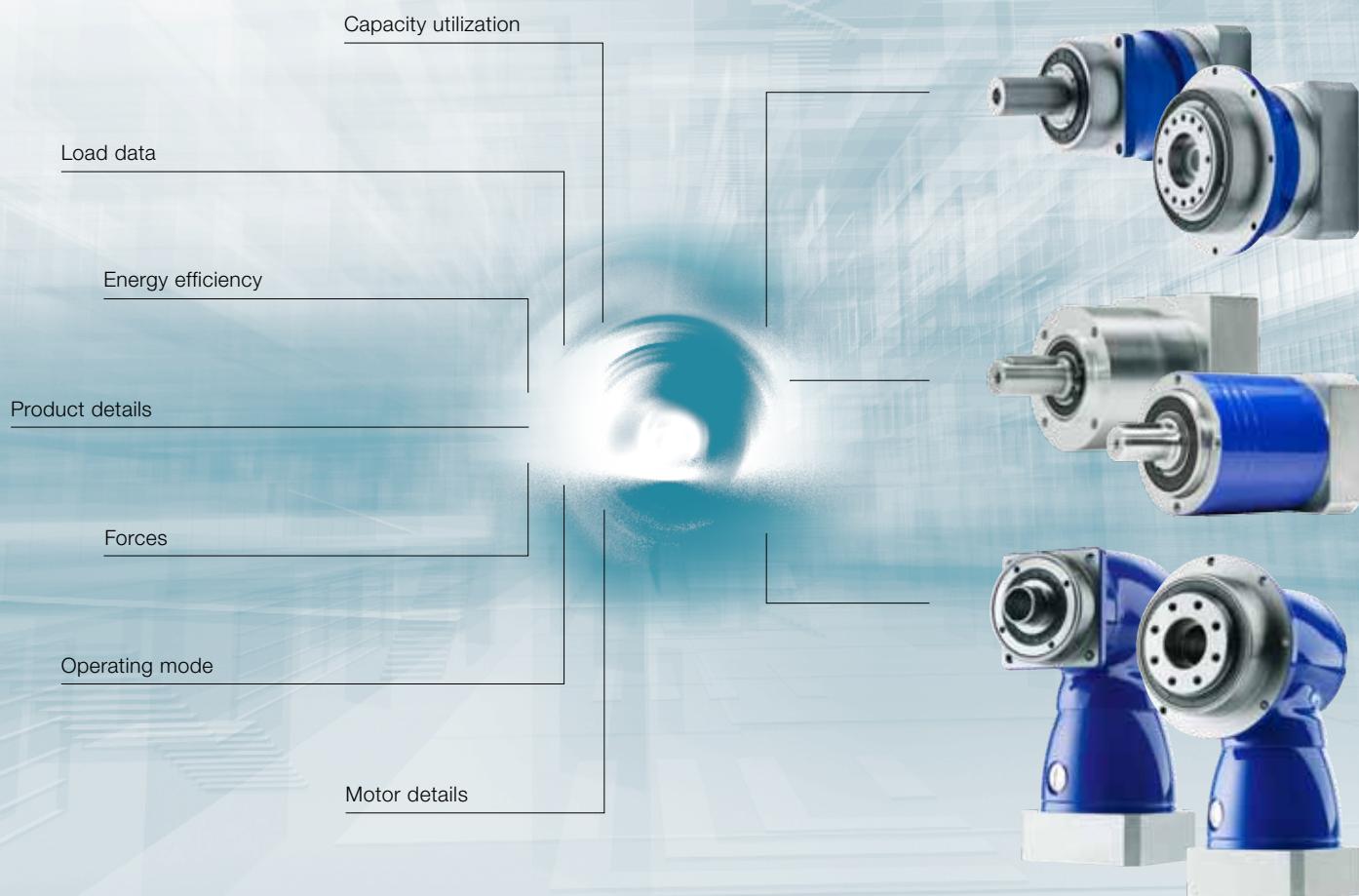
z = Number of teeth

m = Module



The new Online Product Configurator!

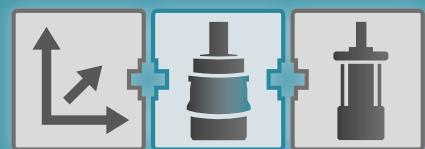
www.wittenstein-alpha.com



Simply finding the optimal solution

The Online Product Configurator from WITTENSTEIN alpha GmbH offers customers rapid and efficient application configuration. By entering the most important parameters such as torque, motor speed, precision and forces, the customer is intuitively brought to the optimal solution.

- optimized for a rapid and efficient selection
- intuitive user guidance
- automatic geometric matching between motor and gearhead
- all application information at a glance



WITTENSTEIN alpha – intelligent drive systems

www.wittenstein-alpha.com



alpha

WITTENSTEIN alpha GmbH · Walter-Wittenstein-Straße 1 · 97999 Iggersheim · Tel. +49 7931 493-0 · info-alpha@wittenstein.de

WITTENSTEIN alpha – **intelligent** drive systems

www.wittenstein-alpha.com · www.rack-pinion.com

