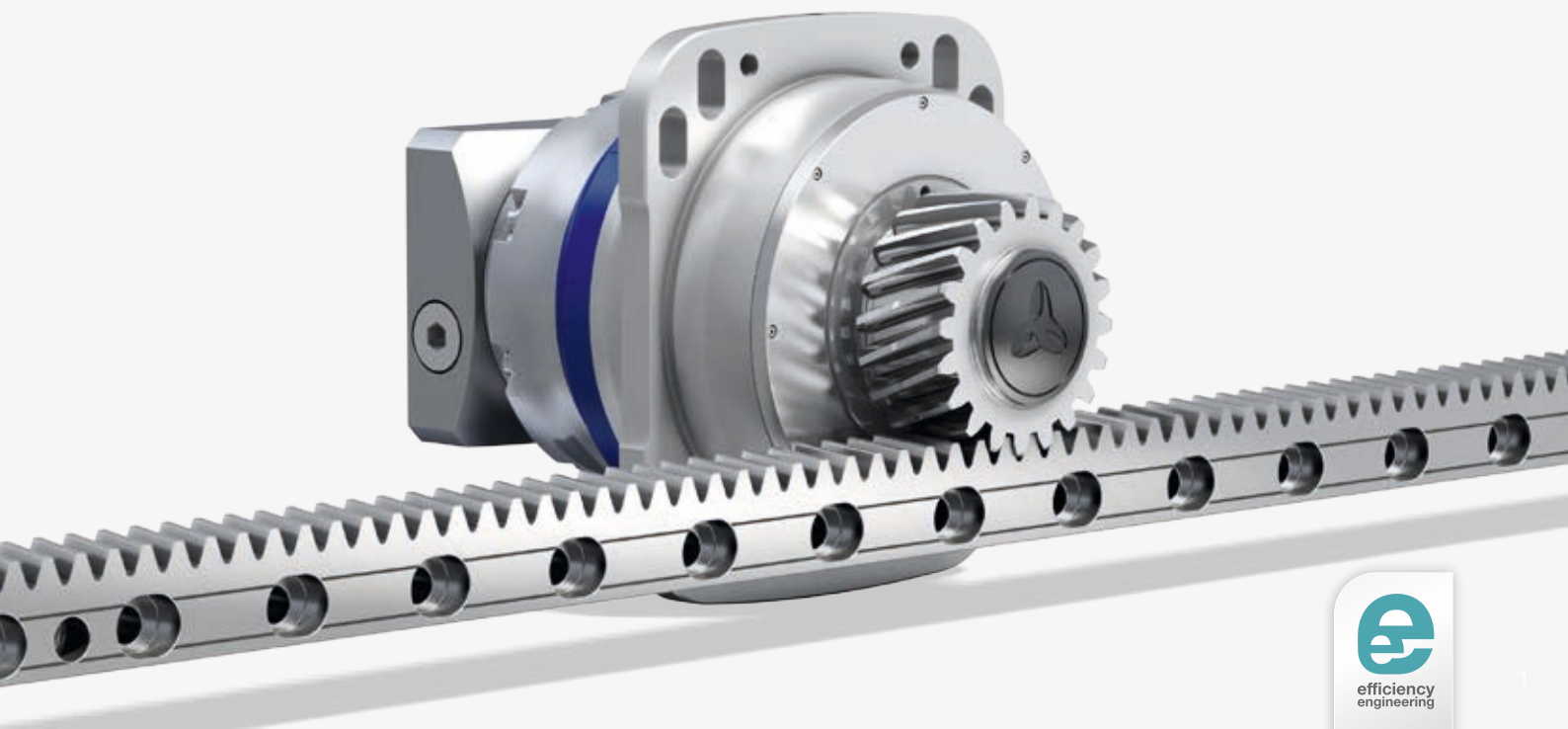
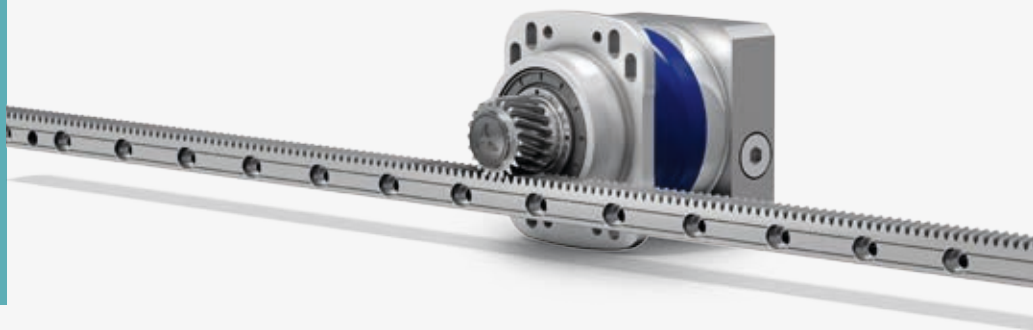


Performance and High Performance Linear System System catalog

Highest power density
Maximum moving force
Highest system rigidity



Highly innovative mechatronic drive technology

More than 30 years experience of
expertise and developmental know-how

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.

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Servo right-angle gearhead RPK ⁺ – the right-angle gearhead option for the system	36
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alpha rack & pinion system accessory range – Lubrication	47

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.

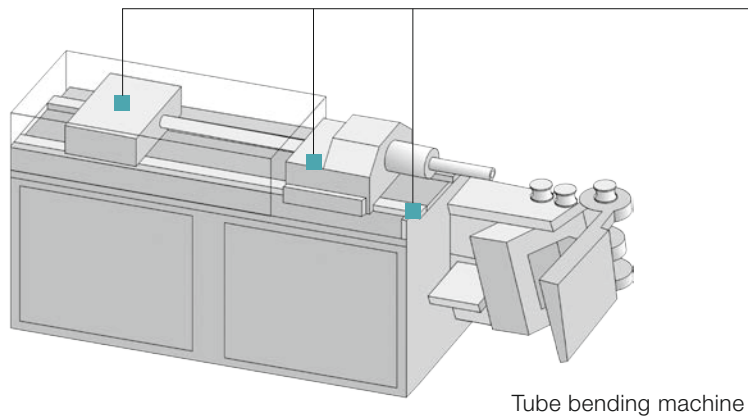
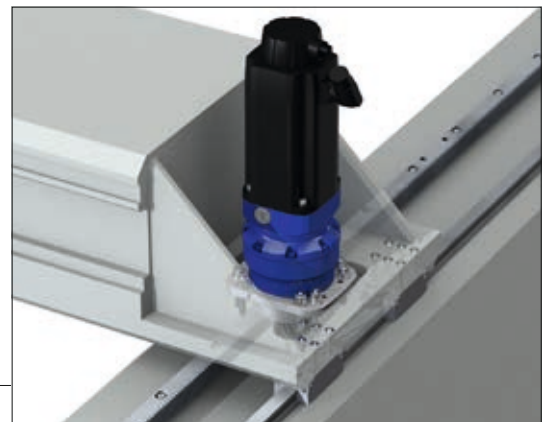
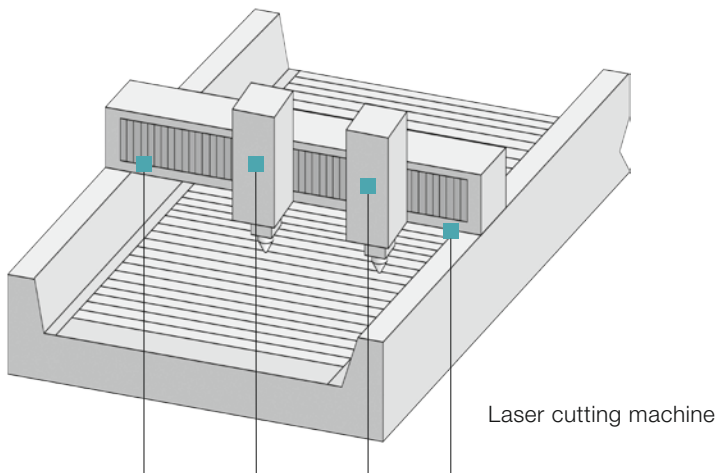


Application

Performance Linear System

Performance and High Performance Linear Systems – the perfect solution for linear feed drives in machine tools and highly dynamic automation applications.

The Performance Linear System is mainly used as an individual drive at up to 12,000 N/motor.



Reference applications: Performance Linear System



Tube bending machine
Source: Wafios AG



CNC machine for wood/plastic/composites
Source: MAKA Systems GmbH

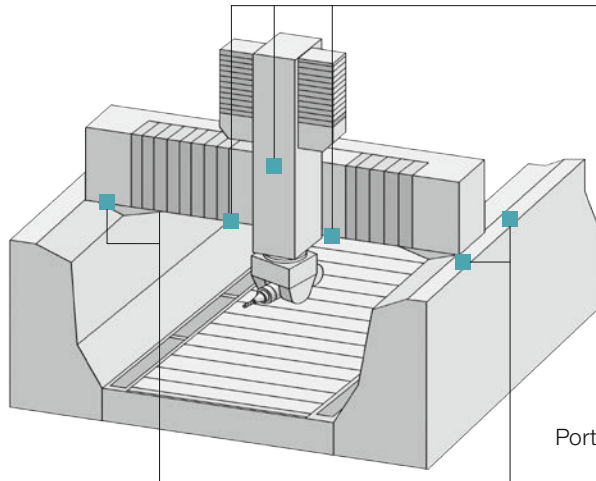


Flatbed laser
Source: Yamazaki Mazak Corporation

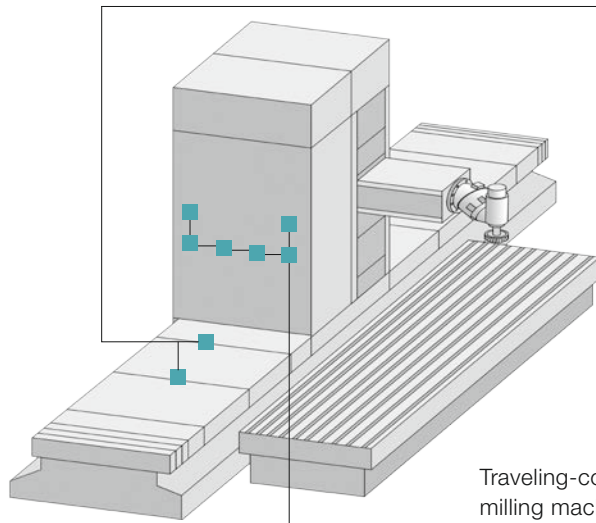
Application

High Performance Linear System

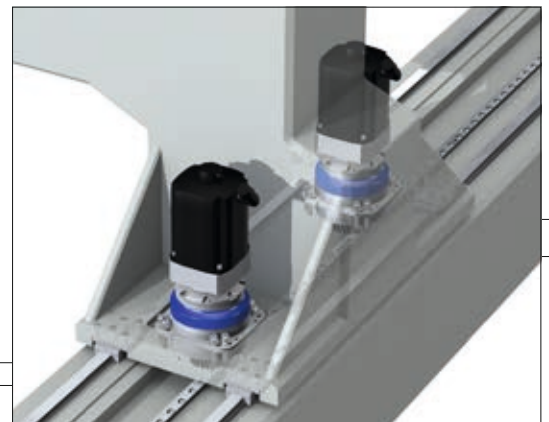
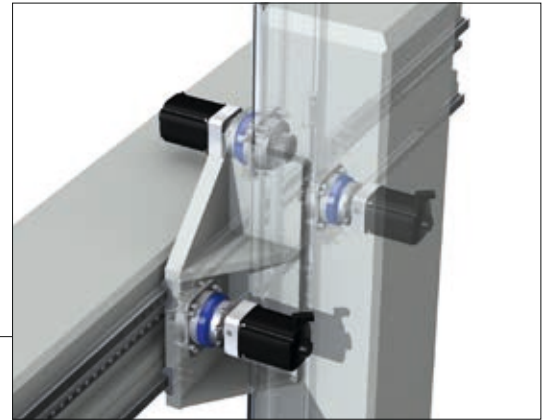
The High Performance Linear System is generally used as an electrically preloaded master-slave configuration in machine tools. Feeding forces up to 113,000 N/motor can be realized.



Portal milling machine



Traveling-column milling machine



Reference applications: High Performance Linear System



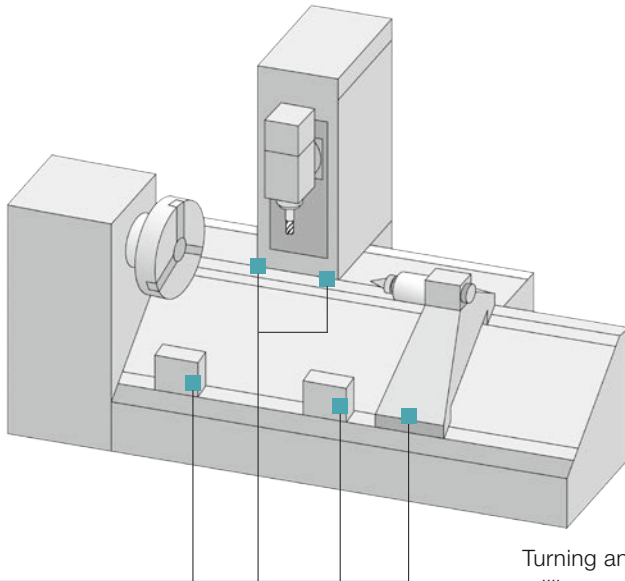
Press transfer
Source: Strothmann Machines & Handling GmbH



Universal machining centre for turning and milling
Source: Weingärtner Maschinenbau GmbH



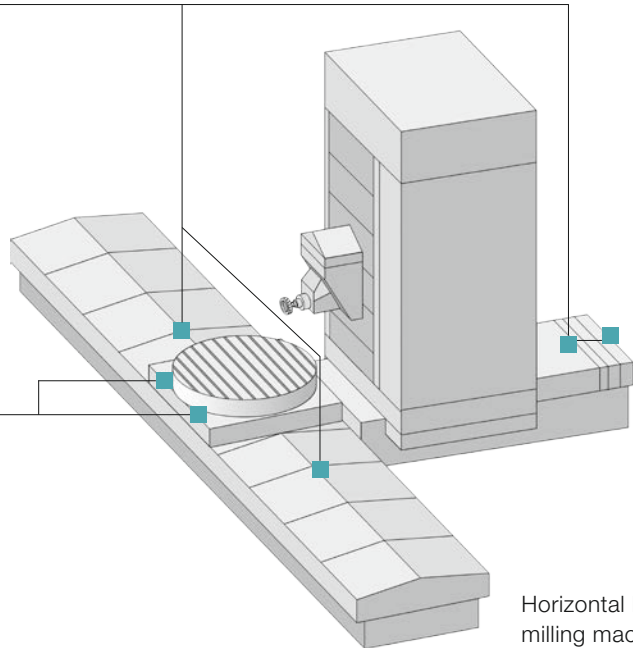
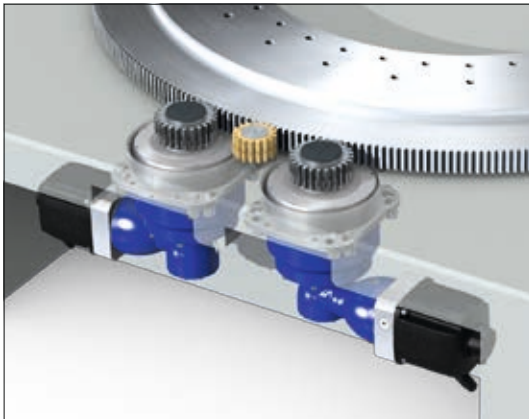
Flatbed milling machine
Source: BURKHARDT+WEBER
Fertigungssysteme GmbH



Turning and
milling machining center

Benefits for you:

- Optimally interacting components characterized by very high efficiency and maximum power density
- High overall rigidity in the linear drive for even more dynamics and precision
- Intelligent design for easy installation and maximum integration in the powertrain
- Several different sizes and performance classes available



Horizontal bed-type
milling machine



High performance travelling column machine
Source: Karl Keppler Maschinenbau GmbH



HSC portal milling machine
Source: F. Zimmermann GmbH

More information

Our experts will be pleased to assist if you have any questions.

Just give us a call to arrange a personal appointment. If you prefer, we can obviously also answer your questions directly:

Phone +49 7931 493-0 or
e-Mail info@wittenstein-alpha.com

More than 30 years experience

We are the innovation leader

The will for innovation and a pioneering spirit were behind the founding of alpha getriebebau 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.

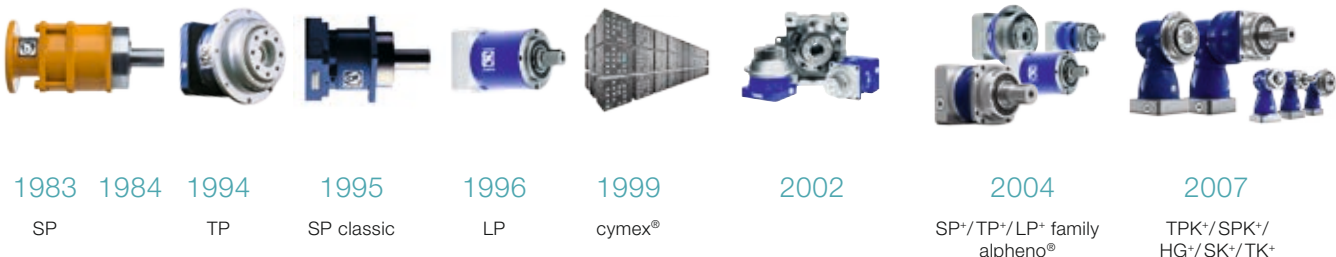
We will continue to concentrate on our own strengths in the future and do exactly what has made the founder of the WITTENSTEIN group and especially WITTENSTEIN alpha so very successful: focus with a passion on the innovational trends of the future!

First low backlash planetary gearheads

Software development System solutions

Low backlash planetary gearheads

Servo right-angle gearheads



alpha

Founding of
alpha getriebebau GmbH

alpha is the most innovative
of German
medium-sized companies

Research & development, production and sales in one house



alpha

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

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®.

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.

Our guiding concept
"efficiency engineering"

„efficiency engineering“ means „designing efficiency“ and „designing efficiently“. efficiency engineering is our concept for efficient processes and efficient products. It is more than simply the efficiency of individual components – it embraces the entire spectrum of customer requirements.

- Efficient processes – we specialize in customized applications
- Efficient products – we help you size the complete powertrain optimally
- Expert consulting – we offer you advice founded on 30 years of experience
- Continuous innovation – we invest particularly heavily in research and development
- One contact person for development, production and sales

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.

The revolution in linear technology



2008

High Performance Linear System

LP+/LPB+ Generation 3



2012

LP+/LPB+ Generation 3

Hygienic Design
New generation bevel gearheads



2013

Hygienic Design/
SC+/SPC+/TPC+

New generation racks



2014

Innovative rack assembly

alpha Value Line



2015

NP / NPS / NPL /
NPT / NPR

Software development



2016

cymex® 5



alpha

Renamed as
WITTENSTEIN alpha GmbH



Guiding principle
efficiency engineering

Groundbreaking Performance and High Performance Linear Systems

3 x 1 = one

Gearhead, rack and pinion from a single source!

3 components –
Unsurpassed top performance

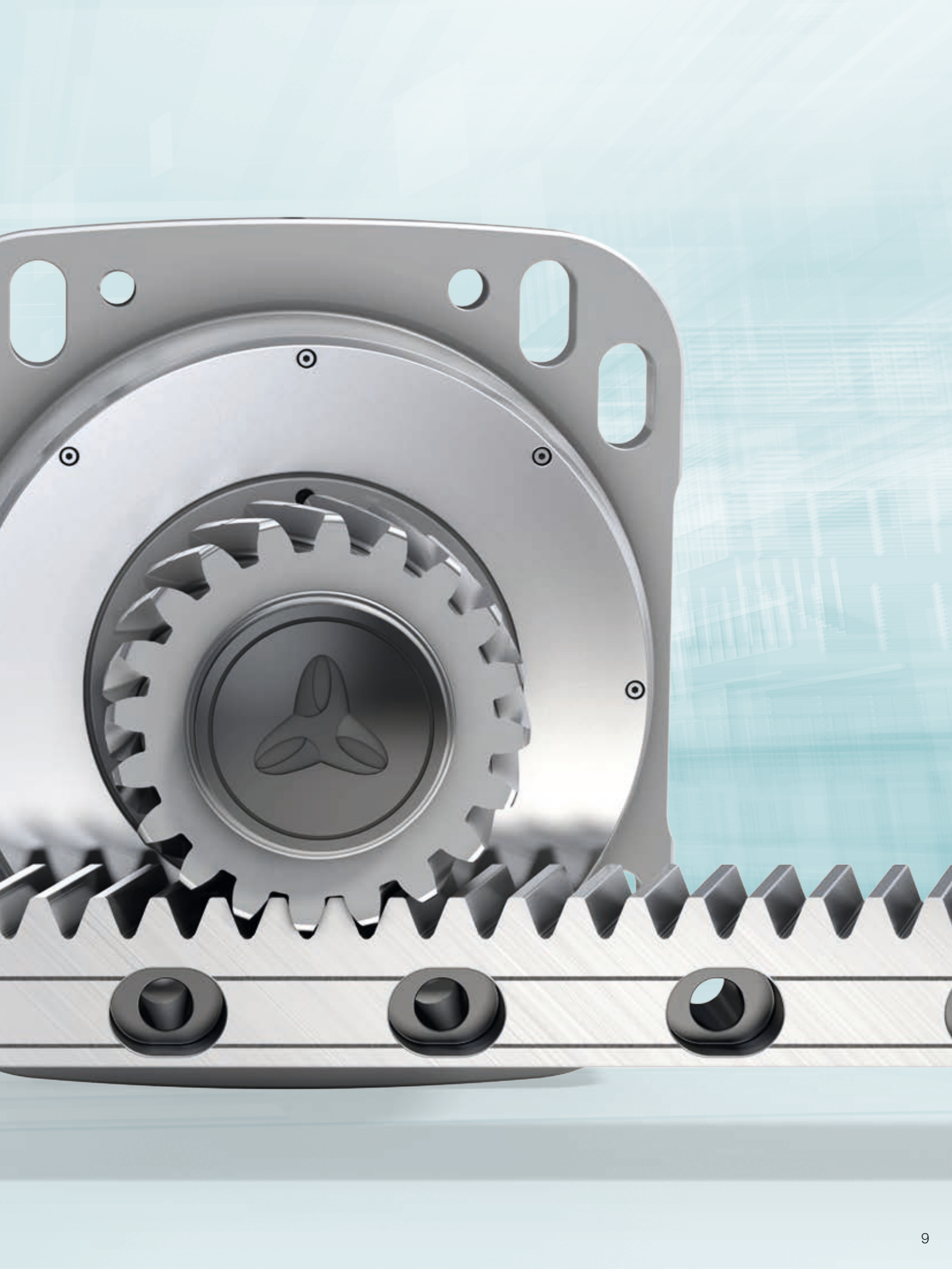
3 components –
Perfectly configured system

3 components –
One contact source

3 components –
A unique and perfect system

Gearhead and rack & pinion from a single source – with the competence of a system supplier and the know-how of more than 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 two different designs – Performance and High Performance Linear System – reflect the technological advances achieved with our rack and pinion system and the performance improvements can be directly utilized for your applications. From the customer solution of individual components up to complete configurations.



High Performance means highest power density

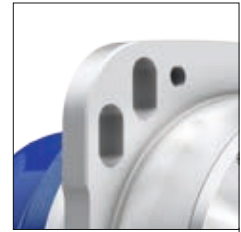


1 revolutionary system – 3 gearhead options

The RP+ gearhead is also available as servo right-angle gearhead RPK+ and servo actuator RPM+. Please see pages 36-39 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

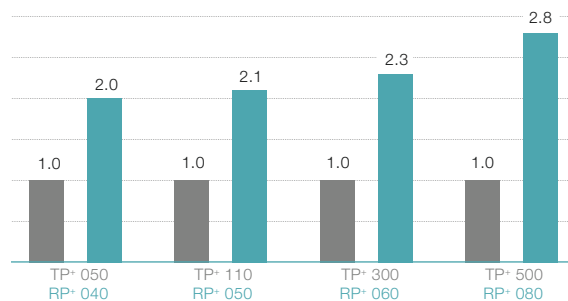


Front and back centering
for more design freedom
(only for RP+)

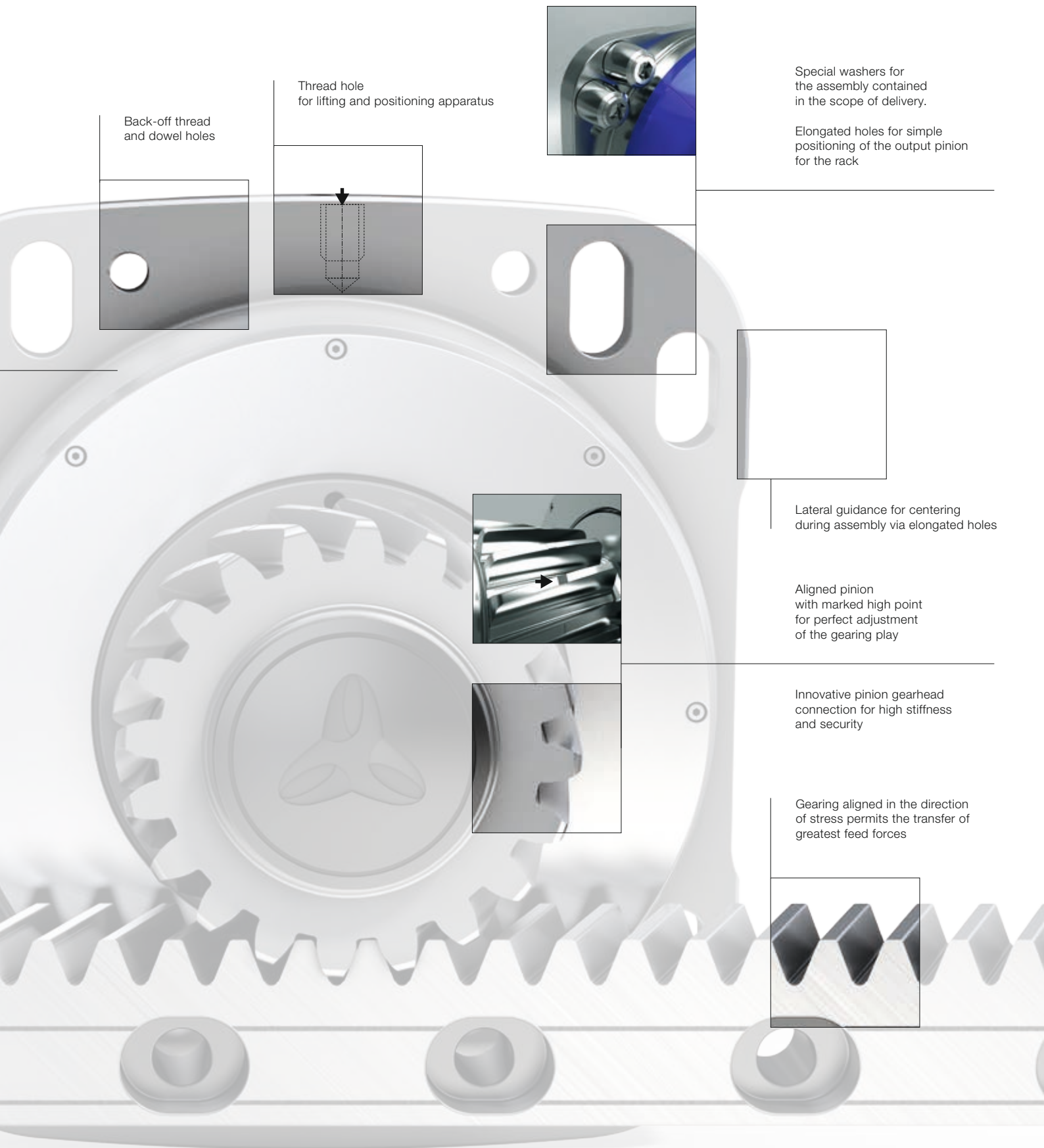
High Performance Linear Systems convince with highest power density

- 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



Back-off thread
and dowel holes

Thread hole
for lifting and positioning apparatus

Special washers for
the assembly contained
in the scope of delivery.

Elongated holes for simple
positioning of the output pinion
for the rack

Lateral guidance for centering
during assembly via elongated holes

Aligned pinion
with marked high point
for perfect adjustment
of the gearing play

Innovative pinion gearhead
connection for high stiffness
and security

Gearing aligned in the direction
of stress permits the transfer of
greatest feed forces

Optionally with innovative rack
installation technique – INIRA

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	19000	200
HPLS 4	22000	83
HPLS 5.4	35000	90
HPLS 5	47200	108
HPLS 6	75100	73
HPLS 8	112400	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 [PLS] **	Max. moving force [N]	Max. speed [m/min]
PLS 2.2	5300	265
PLS 3.2	8500	200
PLS 4.3	11500	265

Your advantages *

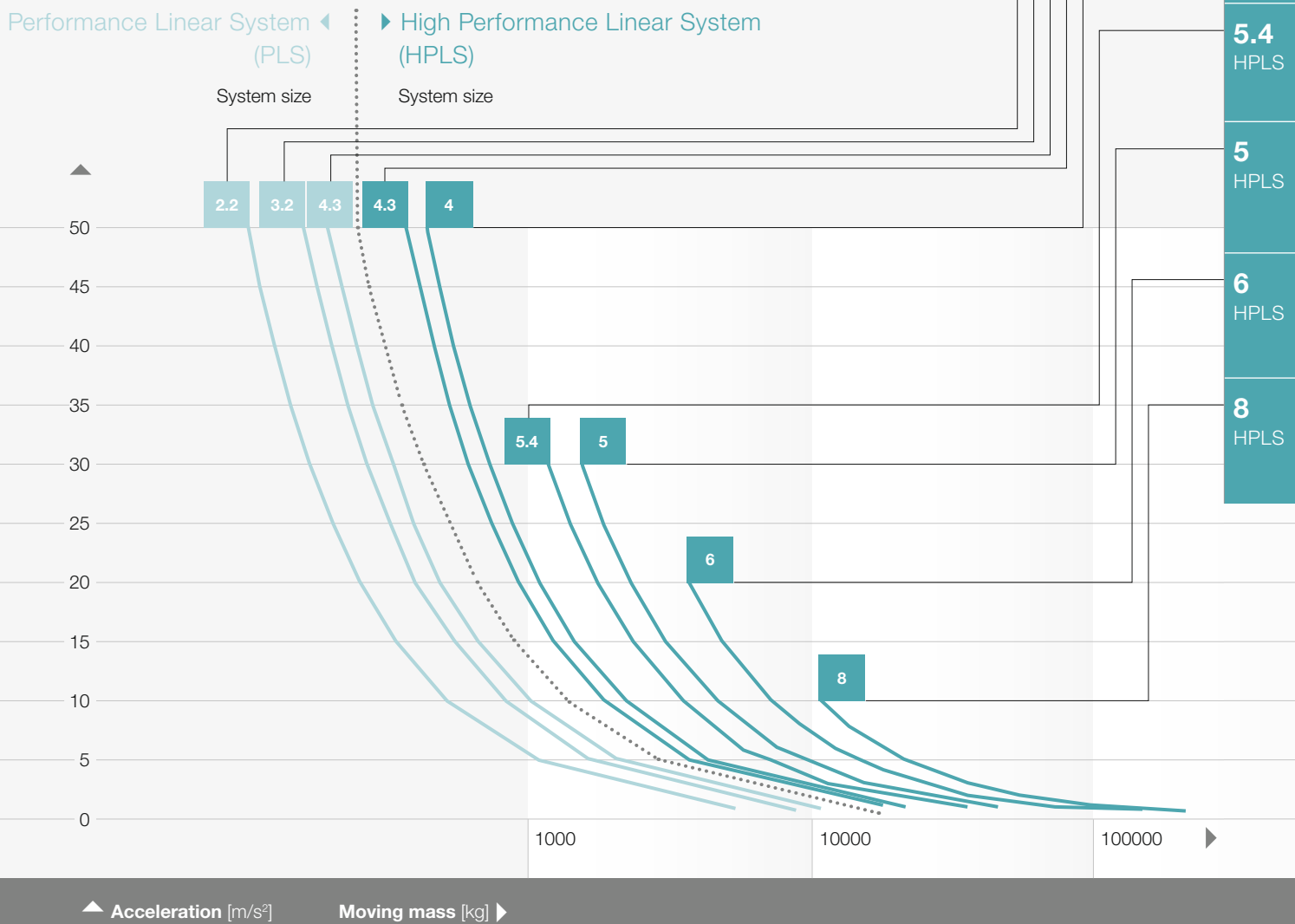
150 % more moving force
100 % higher power density
50 % higher system rigidity
50 % less labor required for installation
15 % more accurate positioning

* compared to the industrial standard



The High Performance Linear System
with a positioning precision $< 5 \mu\text{m}$
and an efficiency $\leq 97 \%$.

Rapid system selection



Performance Linear System – PLS 2.2

Planetary gearhead apheno® 20 with High Performance Pinion Module 2 and Performance Class Rack Module 2

Performance Linear System 2.2		1 stage	2 stage
Max. moving force	F_{2T} [N]	5300	5300
Max. movement speed ¹⁾	v_{max} [m/min]	265	50
Ratios	i	3 / 4 / 5 / 7 / 10	16 / 20 / 25 / 28 / 35 / 40 / 50 / 70 / 100
Max. input speed	n_{1max} [min ⁻¹]	6000	6000
System weight (gearhead including pinion)	m [kg]	4,3	3,9
Lubrication	gearhead	lubricated for life	
	pinion/rack ²⁾	lubrication pinion in preparation with lubricant WITTENSTEIN alpha G11 ²	
Clamping hub diameter	[mm]	14 / 19 / 24	11 / 14 / 19

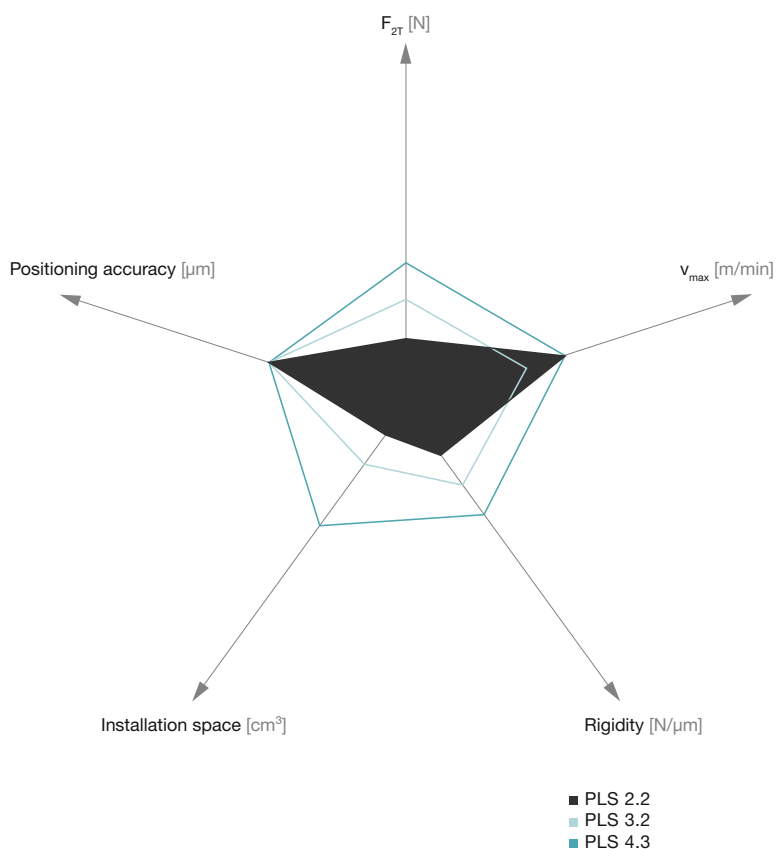
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m_n [mm]	2
Number of teeth	z	20
Pressure angle	α	20°
Inclination angle	β	19.5283°
Flanks form		left

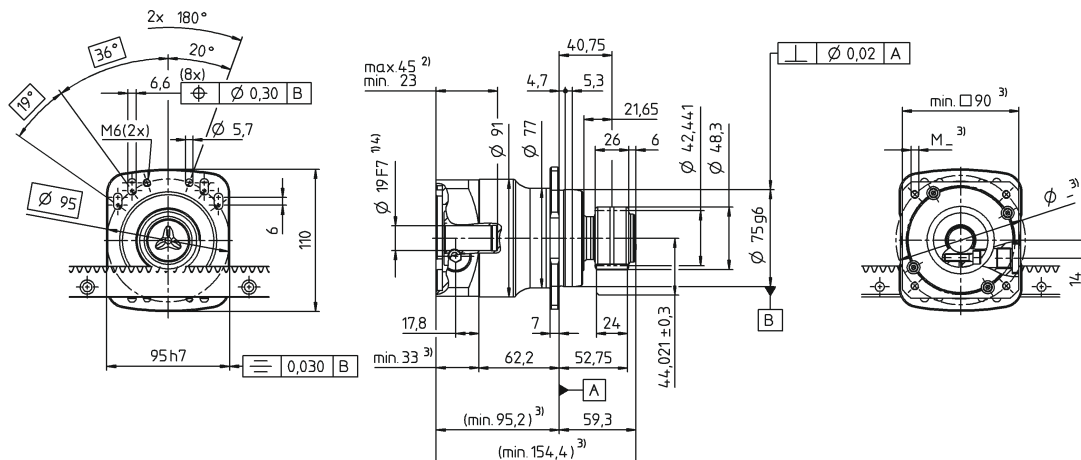
You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46



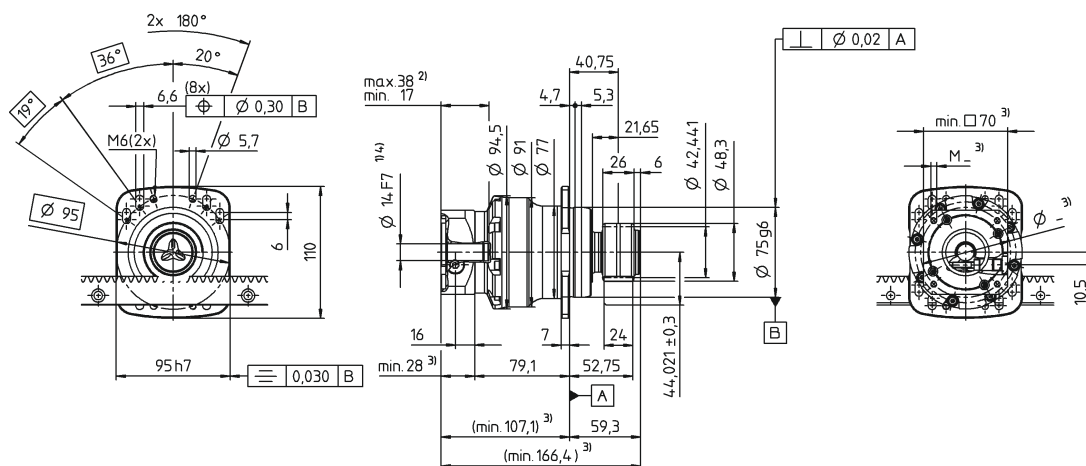
View A

View B

1 stage:



2 stage:



Clamping hub diameter 19 mm (E)

Additional available clamping hub diameters: 14 mm (C) 24 mm (G)

Clamping hub diameter 14 mm (C)

Additional available clamping hub diameters: 11 mm (B) 19 mm (E)

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

Performance Linear System – PLS 3.2

Planetary gearhead alphen[®] 30 with High Performance Pinion Module 2 and Performance Class Rack Module 2

Performance Linear System 3.2		1 stage	2 stage
Max. moving force	F_{2T} [N]	8500	8500
Max. movement speed ¹⁾	v_{max} [m/min]	200	50
Ratios	i	3 / 4 / 5 / 7 / 10	16 / 20 / 25 / 28 / 35 / 40 / 50 / 70 / 100
Max. input speed	n_{1max} [min ⁻¹]	4500	6000
System weight (gearhead including pinion)	m [kg]	8,1	8,0
Lubrication	gearhead	lubricated for life	
	pinion/rack ²⁾	lubrication pinion in preparation with lubricant WITTENSTEIN alpha G11 ²	
Clamping hub diameter	[mm]	19 / 24 / 28 / 38	14 / 19 / 24

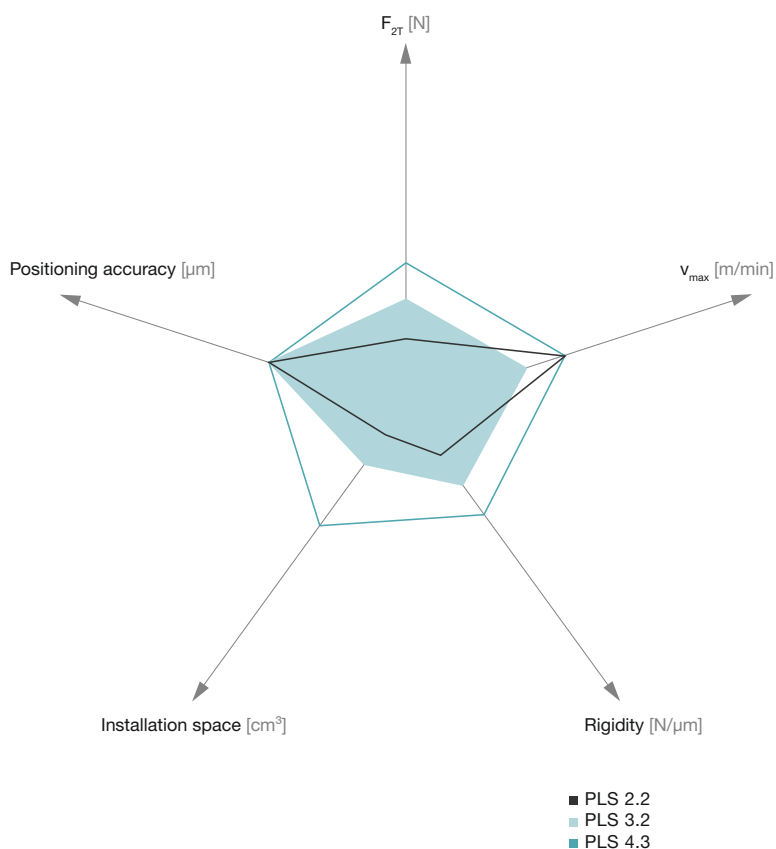
Please contact us for a detailed configuration with cymex[®]. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
Alternative lubricants on request

High Performance Preferred Pinion		
Module	m_n [mm]	2
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 42
Extended information on the High Performance Rack
on pages 44-46



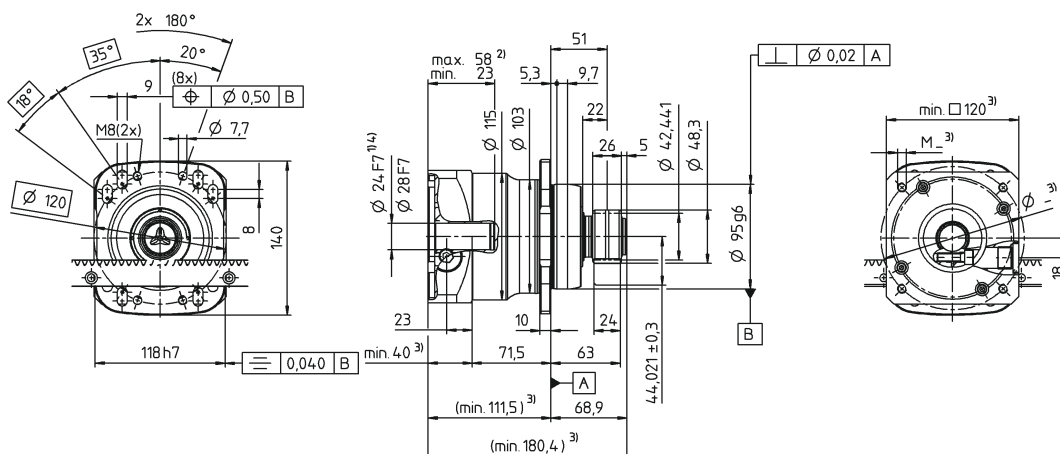
View A

View B

1 stage:

Clamping hub diameter
24 mm (G)
28 mm (H)

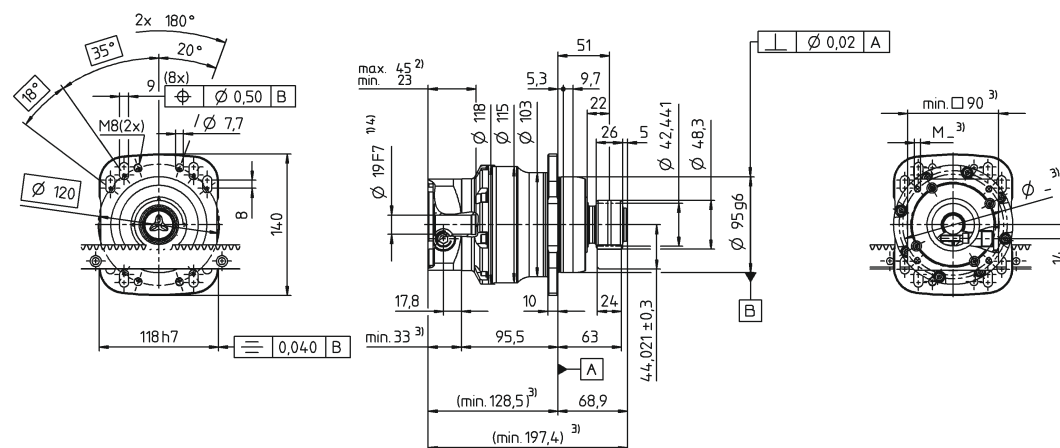
Additional available clamping hub diameters:
19 mm (E)
38 mm (K)



2 stage:

Clamping hub diameter
19 mm (E)

Additional available clamping hub diameters:
14 mm (C)
24 mm (G)



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

Performance Linear System – PLS 4.3

Planetary gearhead alphen[®] 40 with High Performance Pinion Module 3 and Performance Class Rack Module 3

Performance Linear System 4.3		1 stage	2 stage
Max. moving force	F_{2T} [N]	11500	11500
Max. movement speed ¹⁾	v_{max} [m/min]	265	62,5
Ratios	i	3 / 4 / 5 / 7 / 10	16 / 20 / 25 / 28 / 35 / 40 / 50 / 70 / 100
Max. input speed	n_{1max} [min ⁻¹]	4000	5000
System weight (gearhead including pinion)	m [kg]	18,2	17,5
Lubrication	gearhead	lubricated for life	
	pinion/rack ²⁾	lubrication pinion in preparation with lubricant WITTENSTEIN alpha G11 ²	
Clamping hub diameter	[mm]	24 / 32 / 38 / 48	19 / 24 / 38

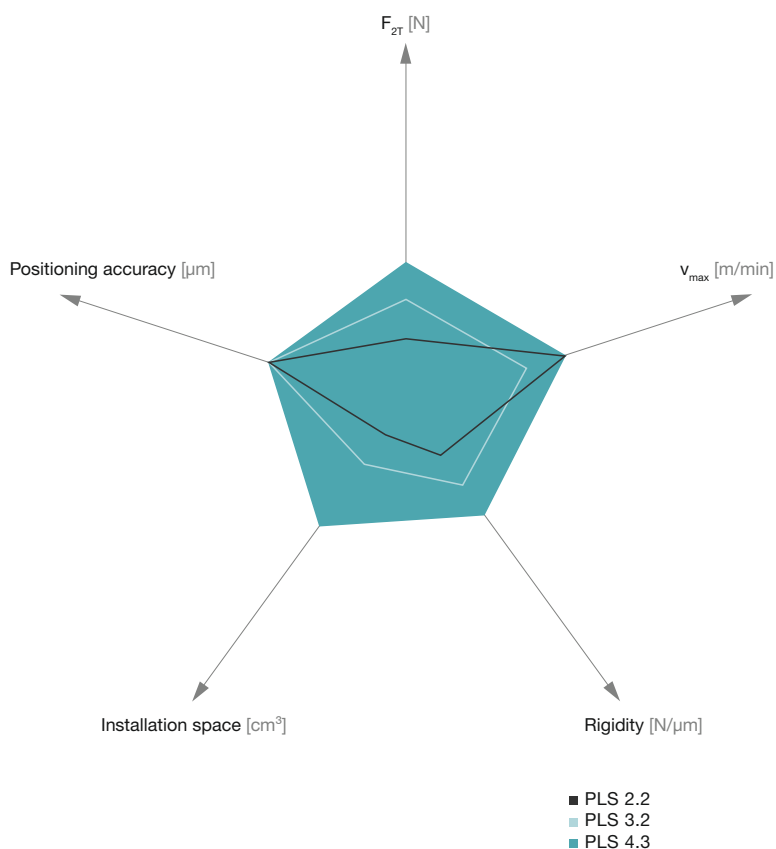
Please contact us for a detailed configuration with cymex[®]. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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	

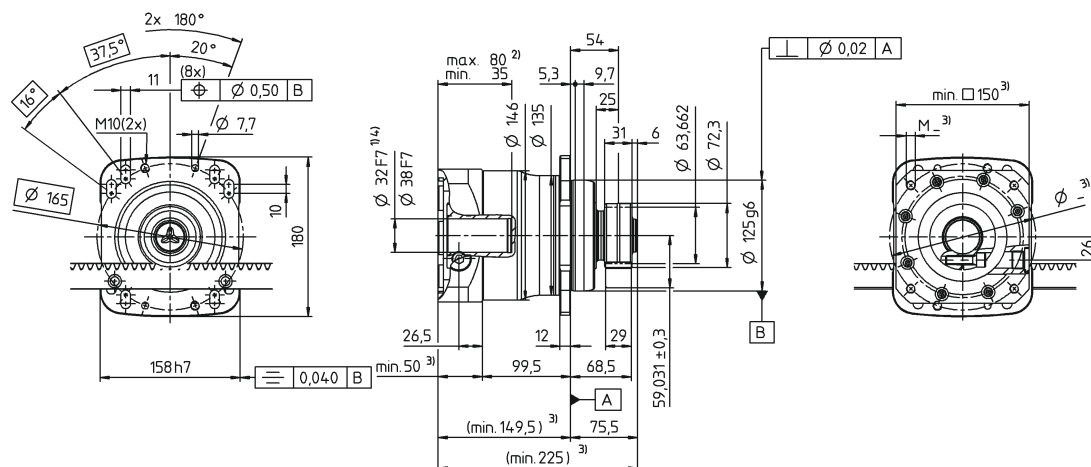
You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46



View A

View B

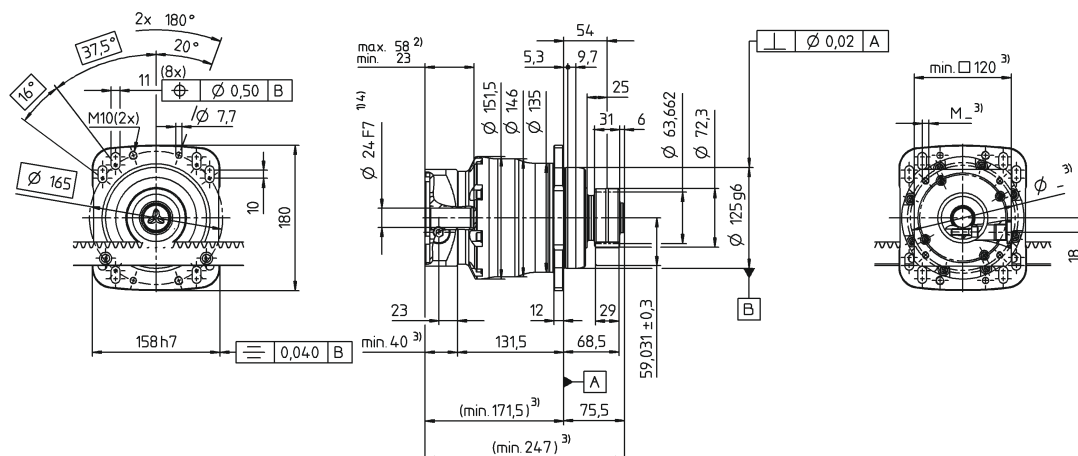
1 stage:



Clamping hub diameter
32 mm (I)
38 mm (K)

Additional available clamping hub diameters:
24 mm (G)
48 mm (M)

2 stage:



Clamping hub diameter
24 mm (G)

Additional available clamping hub diameters:
19 mm (E)
38 mm (K)

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

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 Linear 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

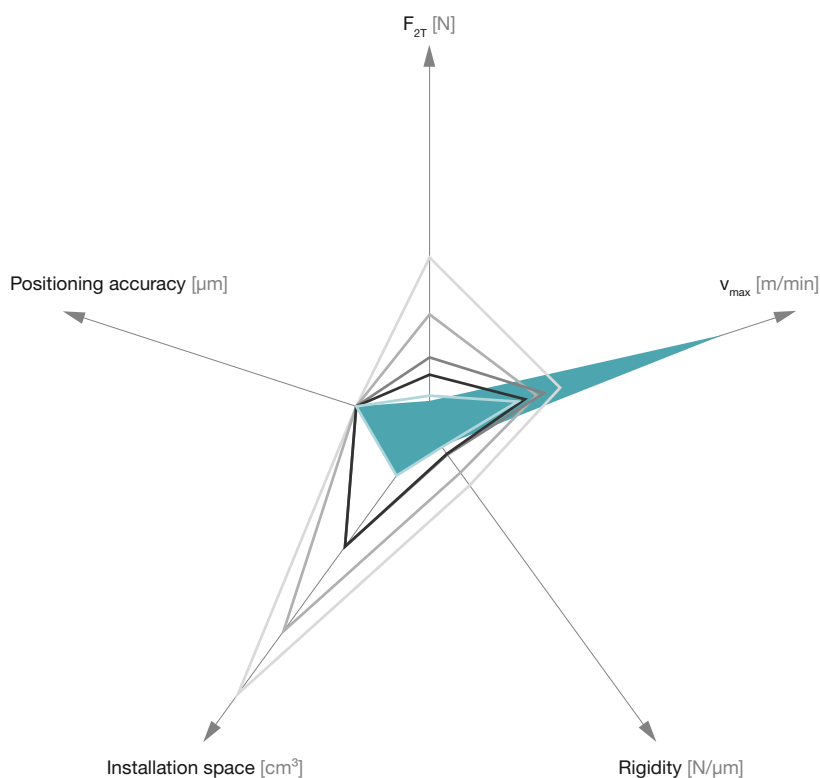
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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 42
Extended information on the High Performance Rack
on pages 44-46



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

High Performance Linear System – HPLS 4

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

High Performance Linear 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	66 / 88 / 110 / 154 / 220
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	
Clamping hub diameter	[mm]	24 / 38	24

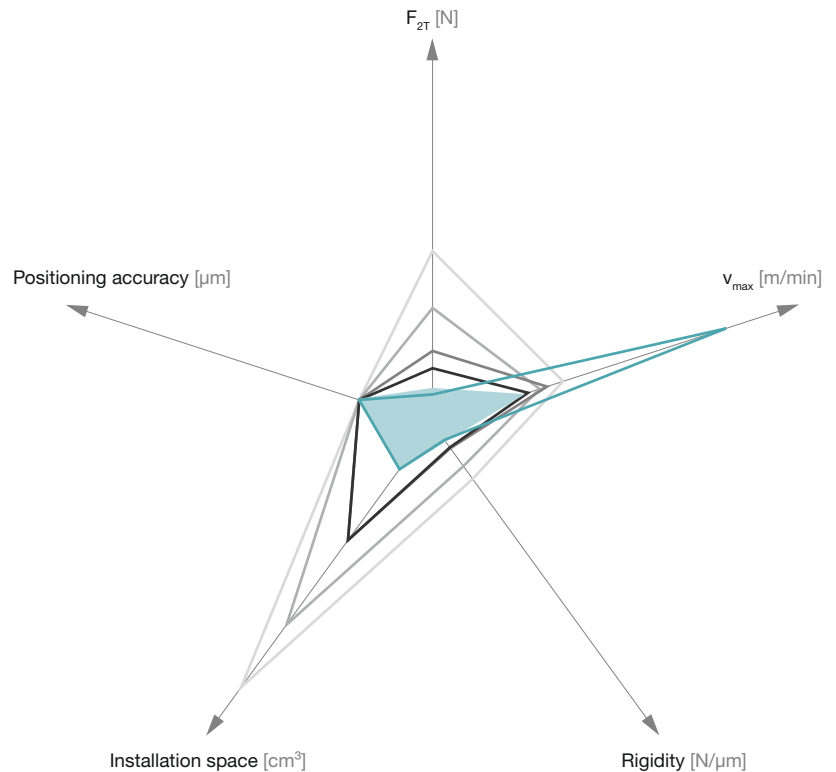
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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		left	

You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46

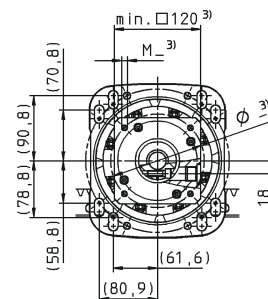
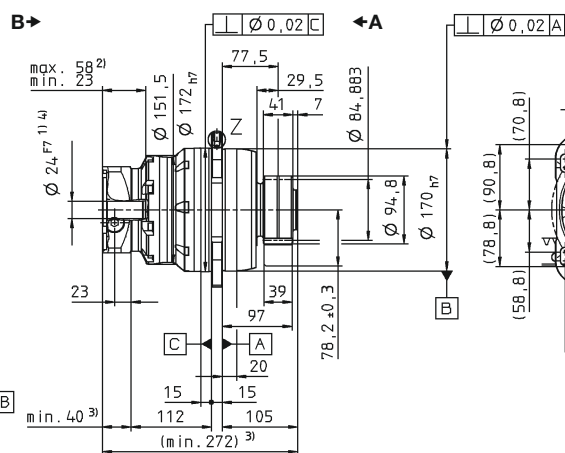
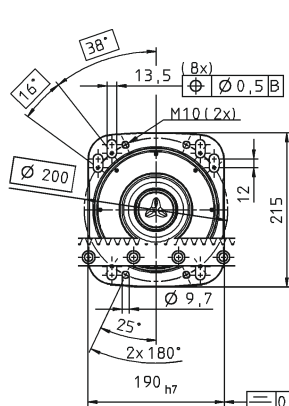


- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

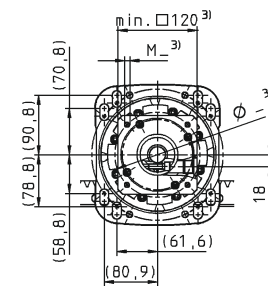
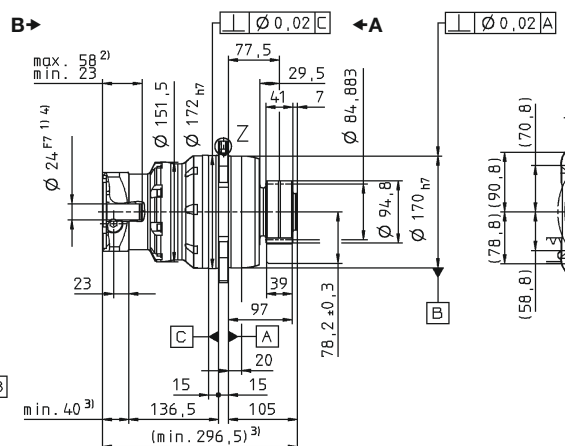
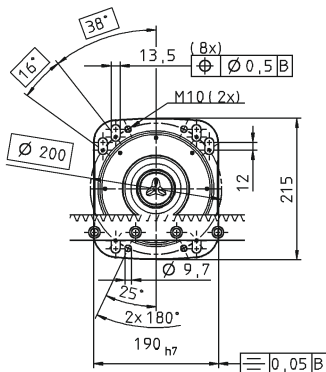
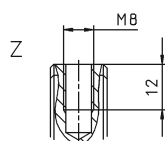
View A

View B

2 stage:


to 24⁴⁾ (G)
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 Linear 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	66 / 88 / 110 / 154 / 220
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	
Clamping hub diameter	[mm]	38 / 48	38

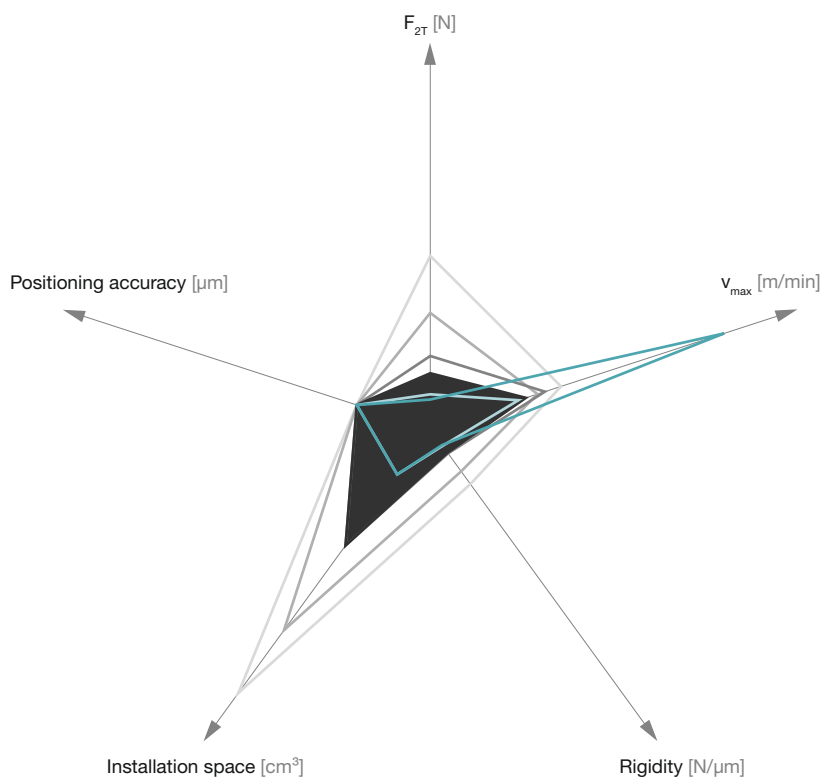
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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		left

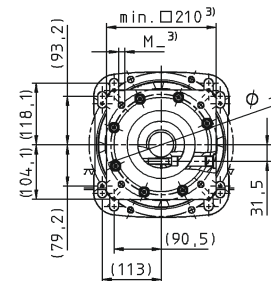
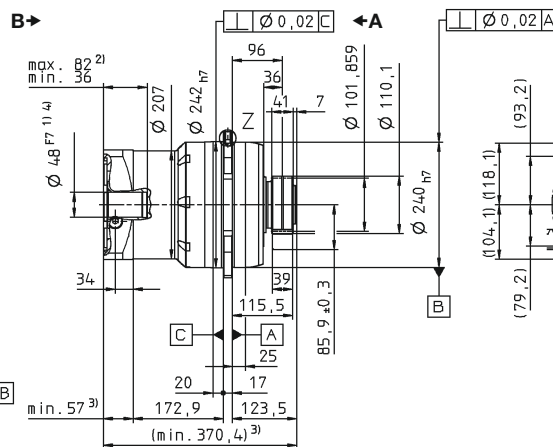
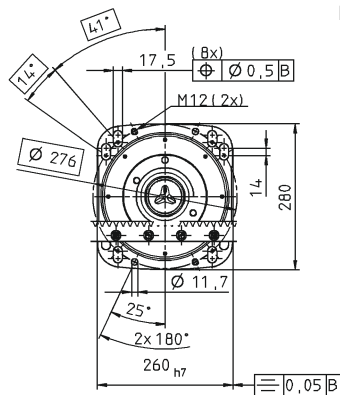
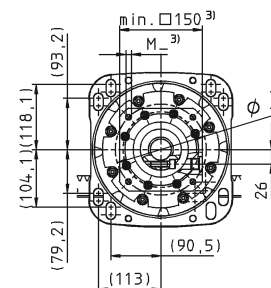
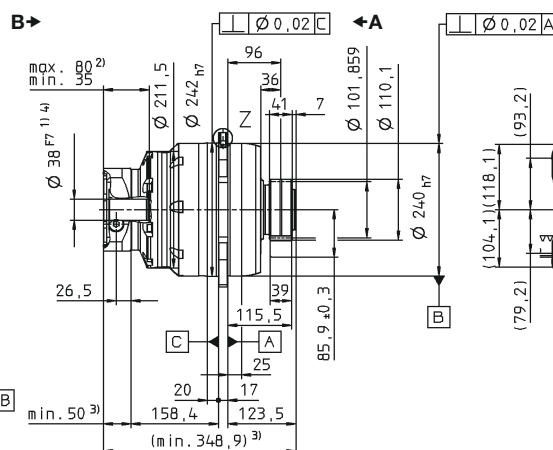
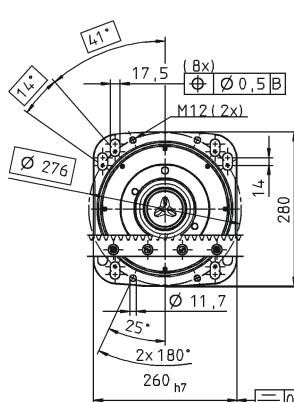
You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46



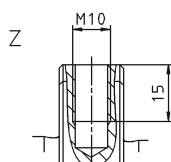
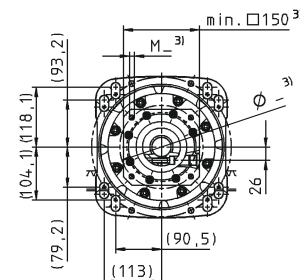
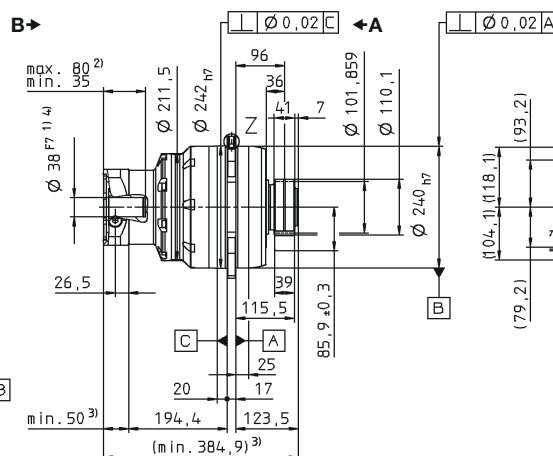
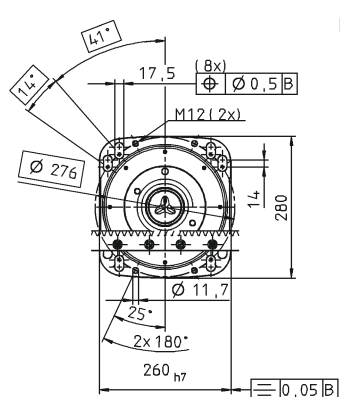
View A

View B

2 stage:

to 38⁴⁾ (K)
Clamping hub
diameter


3 stage:

to 38⁴⁾ (K)
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

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

High Performance Linear 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	
Clamping hub diameter	[mm]	38 / 48	38

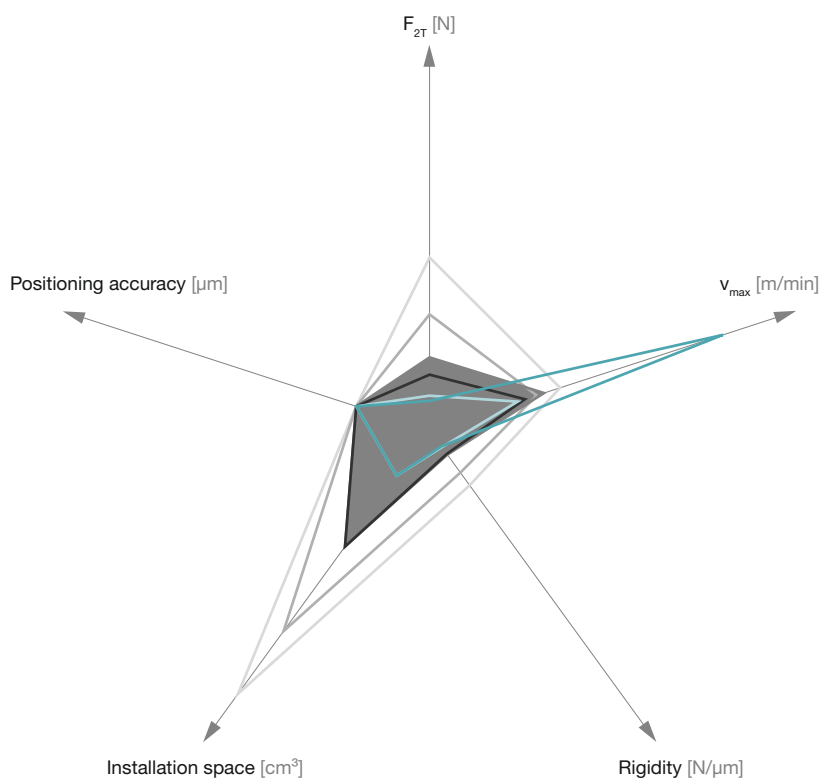
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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		left	

You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46

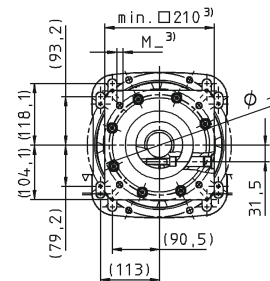
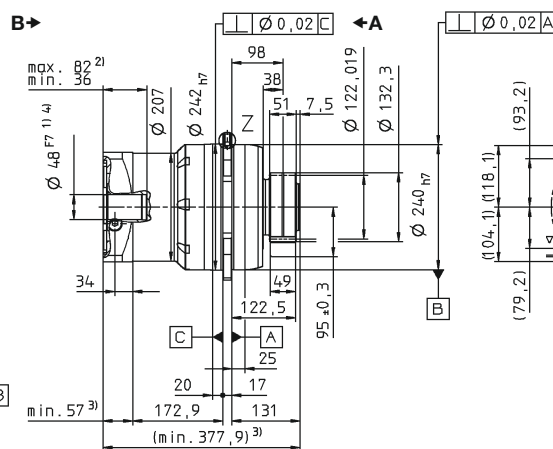
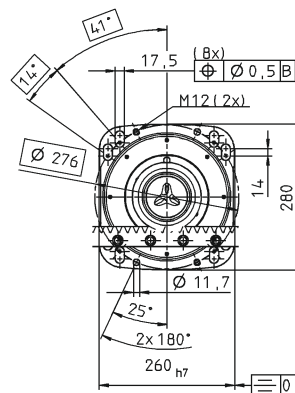
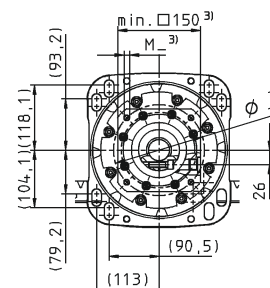
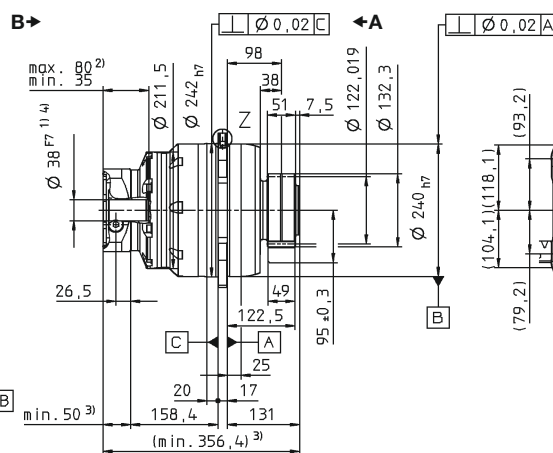
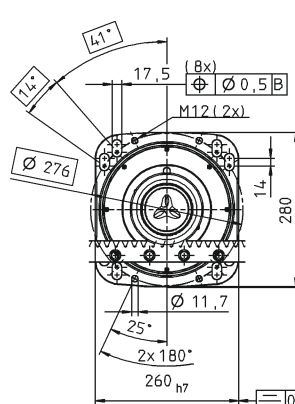


- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

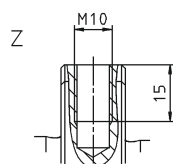
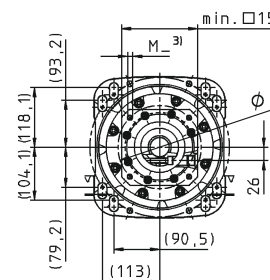
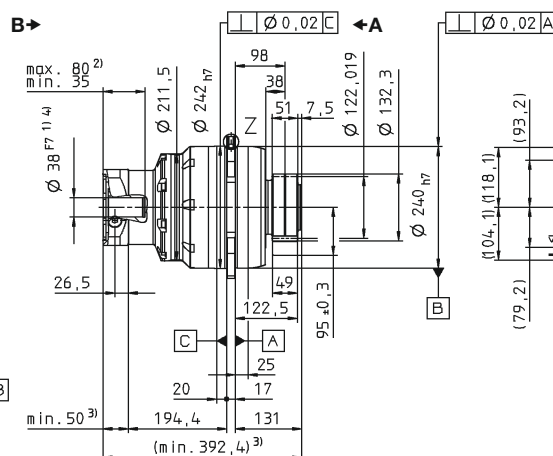
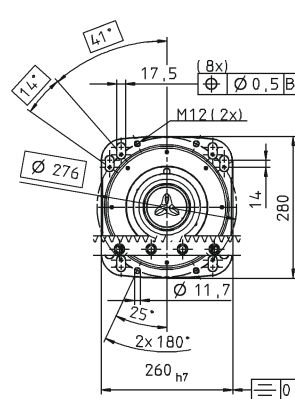
View A

View B

2 stage:

to 38⁴⁾ (K)
Clamping hub
diameter


3 stage:

to 38⁴⁾ (K)
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 6

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

High Performance Linear 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	66 / 88 / 110 / 154 / 220
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	
Clamping hub diameter	[mm]	48	38

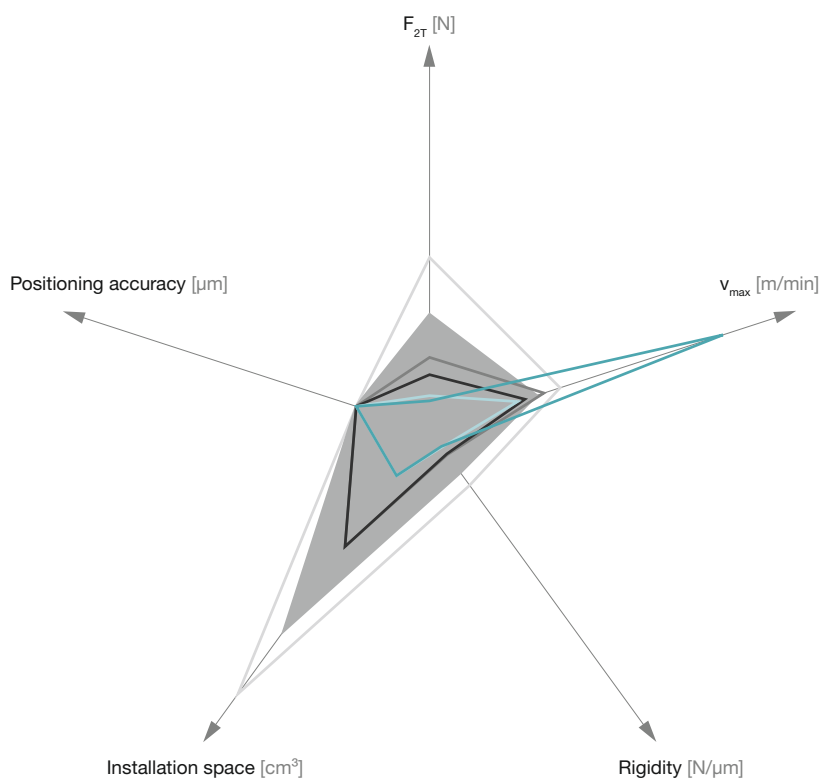
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead $\leq 1,5$ arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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		left	

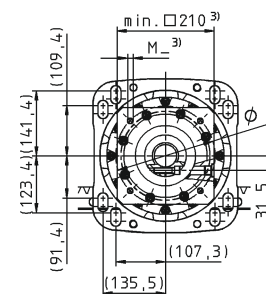
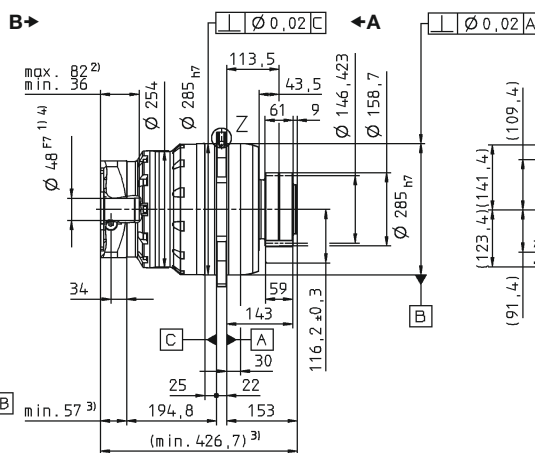
You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46



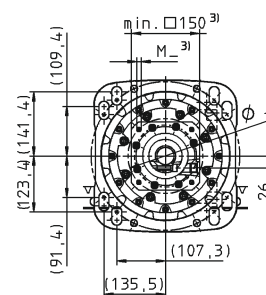
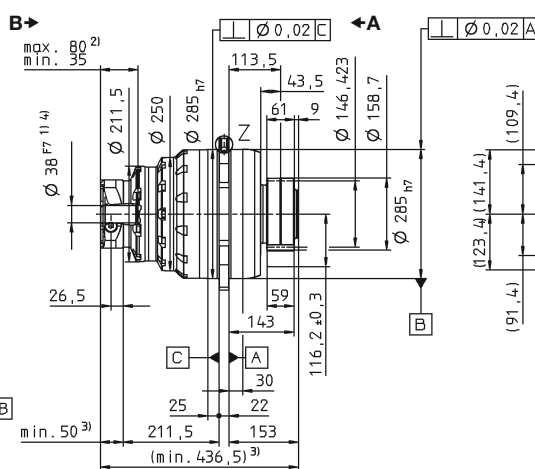
- HPLS 4.3
- HPLS 4
- HPLS 5.4
- HPLS 5
- HPLS 6
- HPLS 8

View B

B→

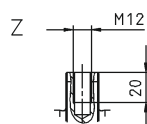


B→



to 48 ⁴⁾ (M)
Clamping hub
diameter

to 38 ⁴⁾ (K)
Clamping hub
diameter



- 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

6 HPLS

High Performance Linear System – HPLS 8

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

High Performance Linear 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	
Clamping hub diameter	[mm]	48	38 / 48

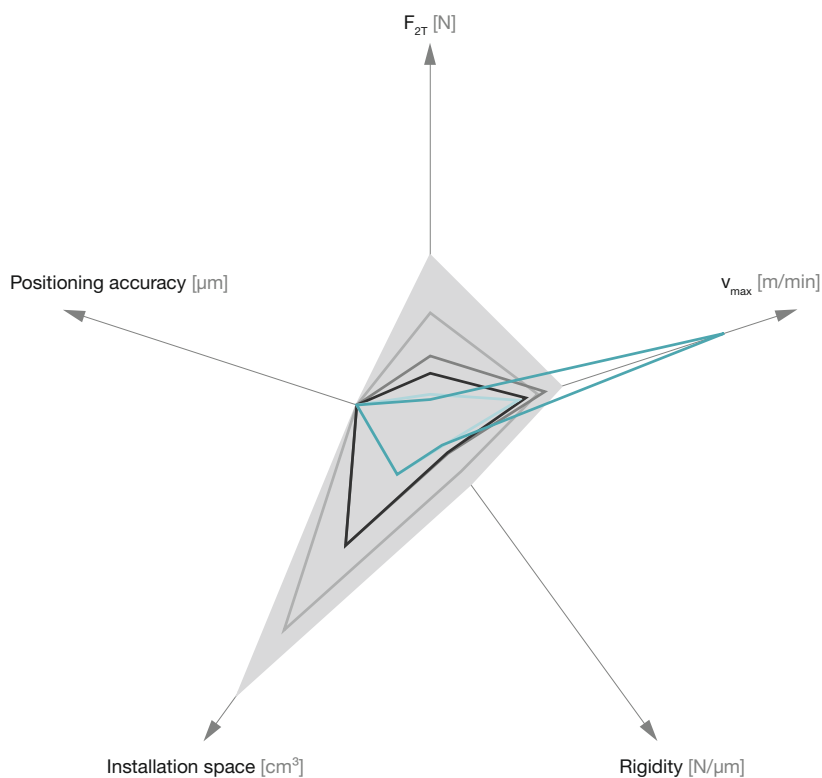
Please contact us for a detailed configuration with cymex®. Hotline: +49 7931 493-10800
backlash gearhead ≤ 1,5 arcmin

¹⁾ Calculation with the smallest gearing and maximum driving speed

²⁾ More information on the lubrication system in the complete WITTENSTEIN alpha catalog
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		left	

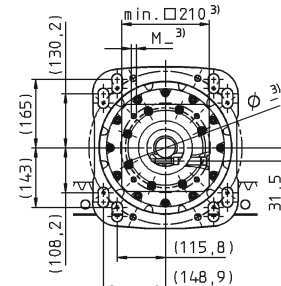
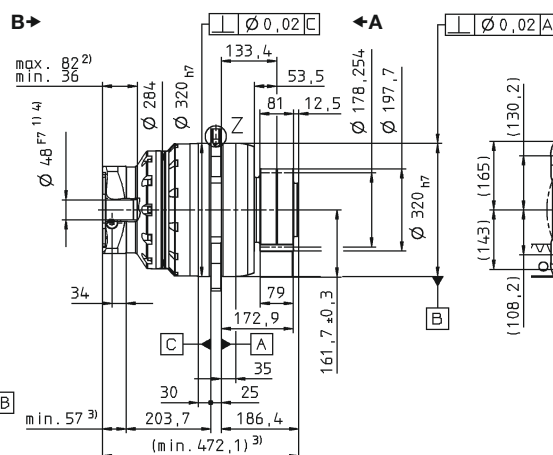
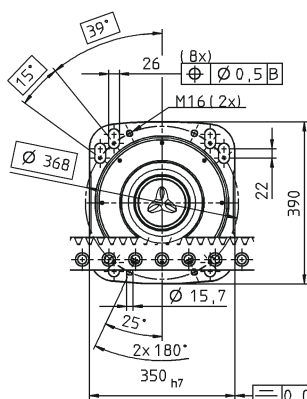
You will find additional available pinions on page 42
Extended information on the High Performance Rack
on pages 44-46



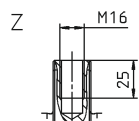
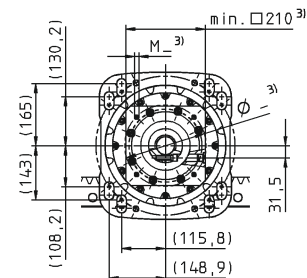
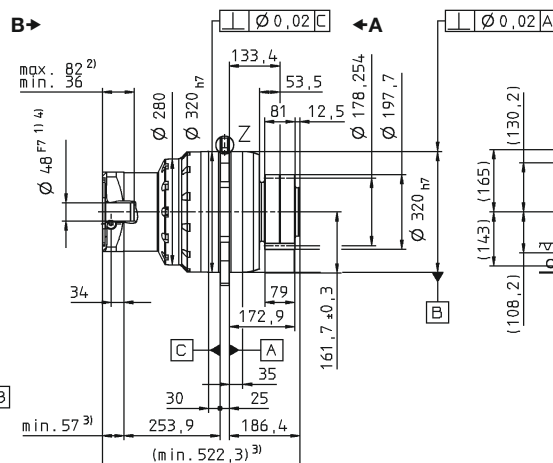
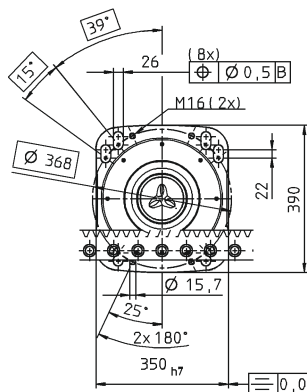
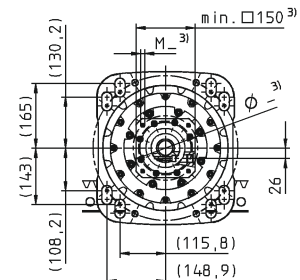
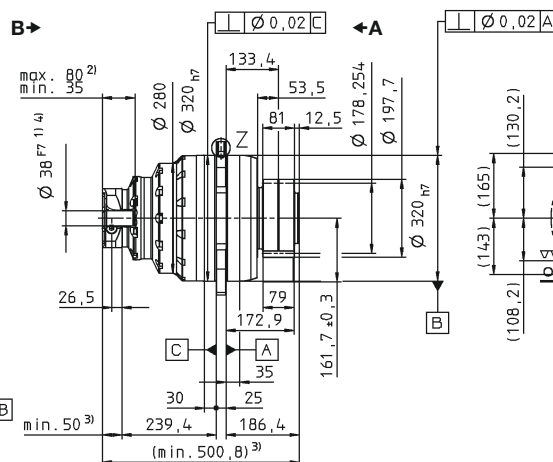
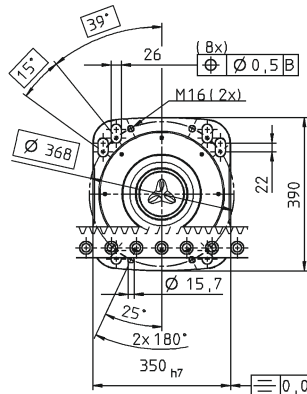
View A

View B

2 stage:



3 stage:

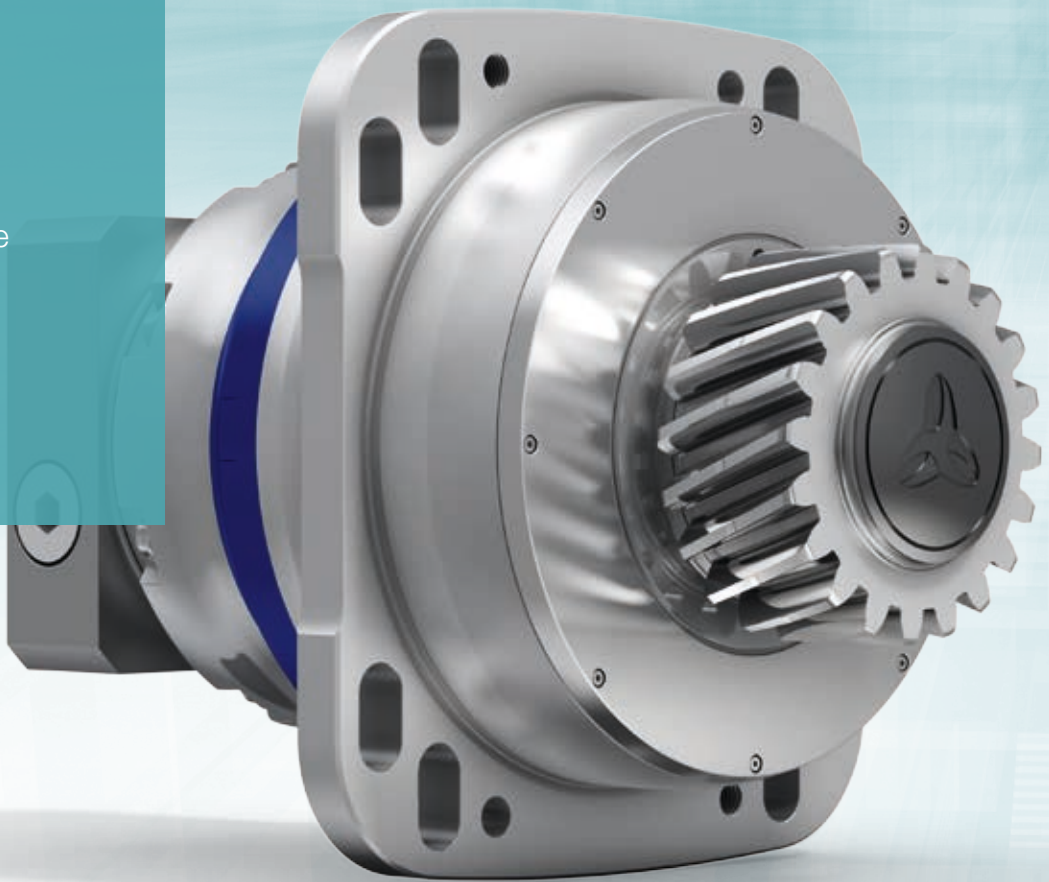

Non-tolerated dimensions ± 1 mm

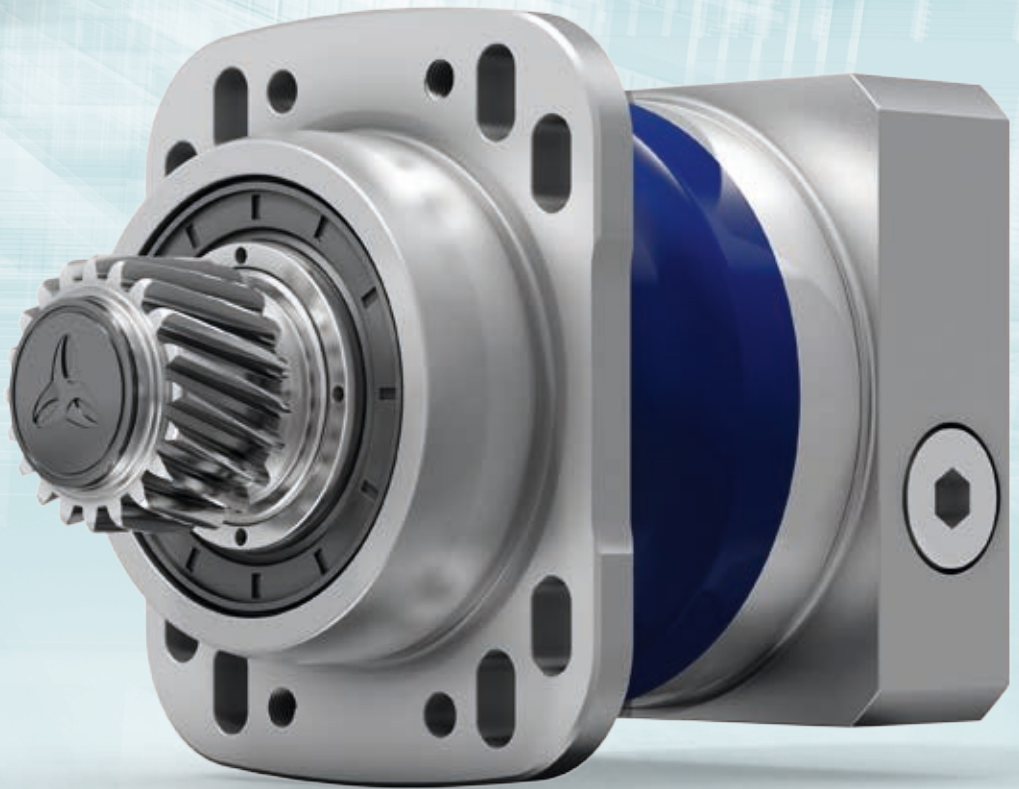
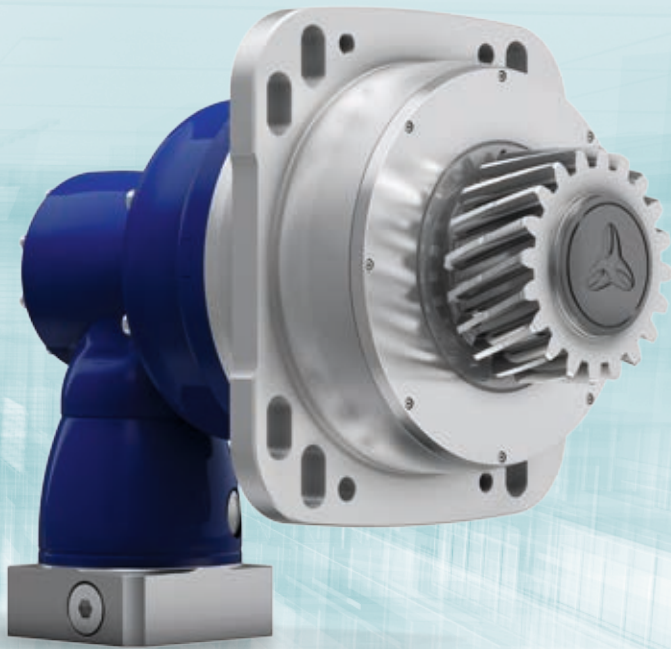
- 1) Examine motor shaft tolerance
- 2) Min/max permissible motor shaft length. Longer motor shafts are possible, please contact us
- 3) Measurements are motor-dependent
- 4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm

Operating Manual at www.wittenstein-alpha.com

Groundbreaking systems need outstanding drives Gearhead options for PLS and HPLS

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.

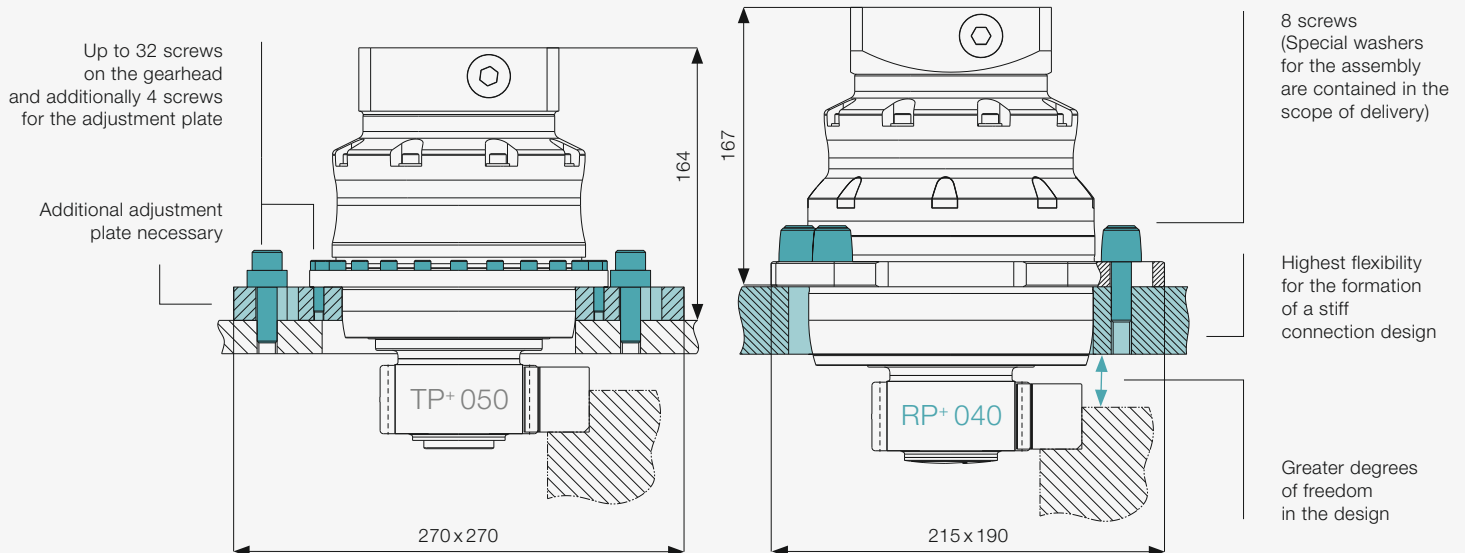
Once again we set new standards with the new high performance planetary gearhead RP⁺ with regard to power density, stiffness, transferable torques and ease of assembly.

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.

Far-sighted design

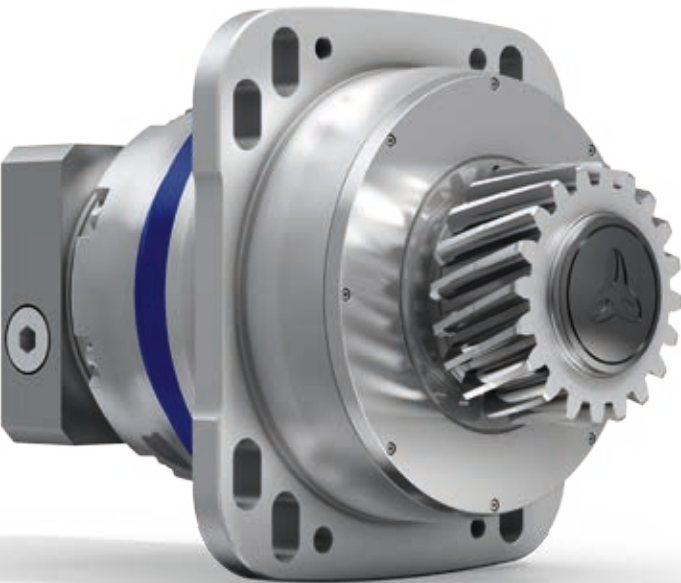
The overhung mounting of the output pinion leaves no design wishes unfulfilled. Large disrupting contours which occur in end support solutions that are frequently seen in rack and pinion drives have now turned out to be completely obsolete. Compare for yourself!

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 gearhead mounting are now a thing of the past.

Previous solution



Our solution

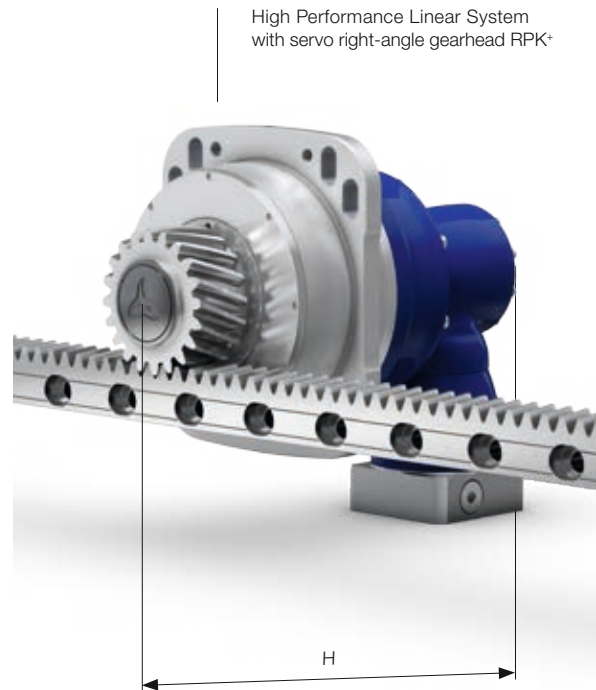


Servo right-angle gearhead RPK⁺ – the right-angle gearhead option for the system

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

RPK⁺ as servo right-angle gearhead RPK⁺

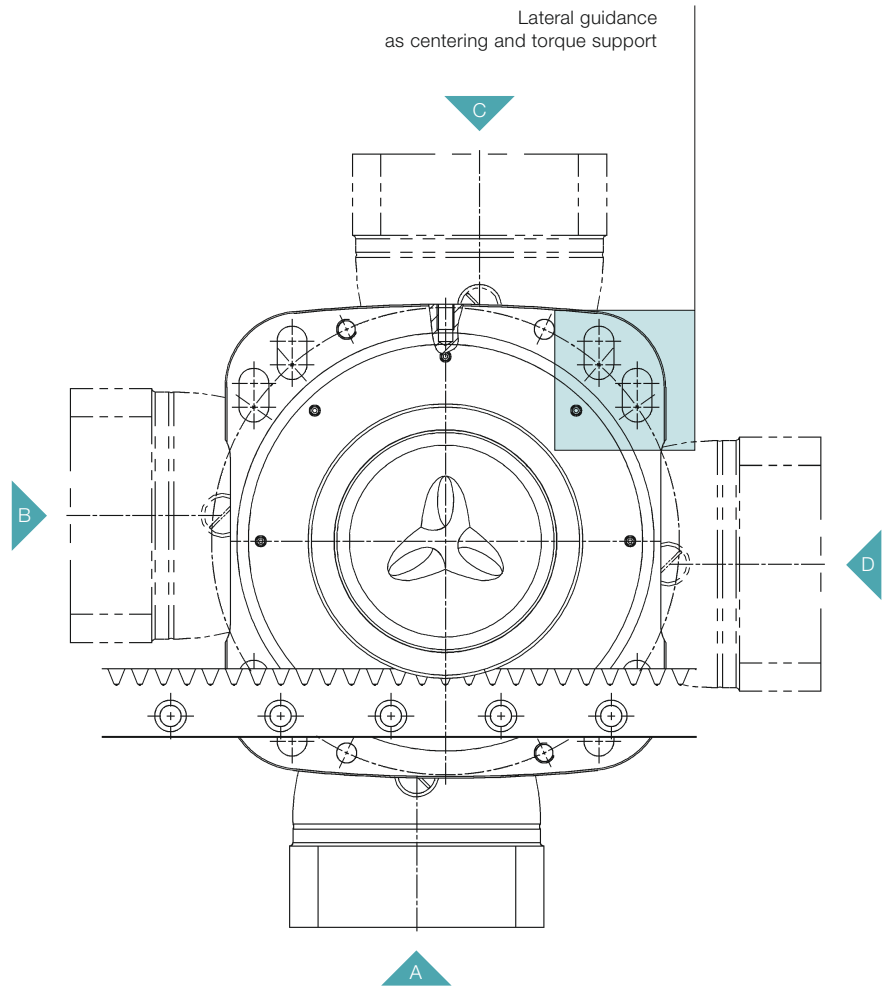
The RPK⁺ unites the advantages of the RP⁺ High Performance Planetary Gearheads with the most advanced hypoid gearing.
The servo right-angle gearhead RPK⁺ is the ideal solution for limited installation space.
The unique interface, combined with highest power density, enables an even more compact design.



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 gearhead flange guide the gearhead 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 gearhead 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	≤ 1.3	≤ 1.3	≤ 1.3	≤ 1.3	≤ 1.8	≤ 1.8
Max. feed force up to	F_{2T} N	19000	22380	36000	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⁺

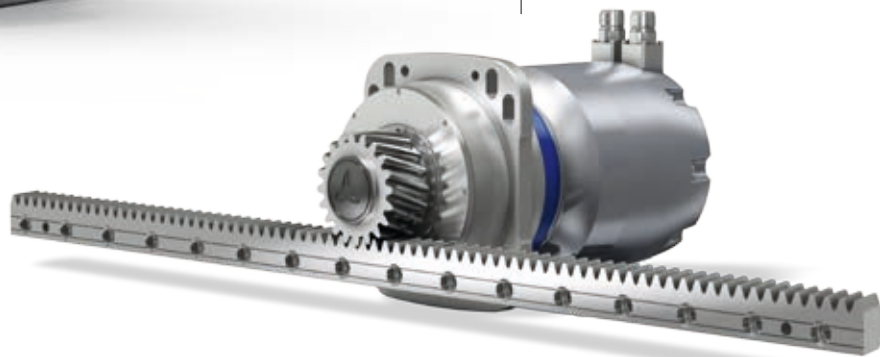
The RPM⁺ actuator is extremely dynamic, extremely compact and perfectly adapted to linear applications with a pinion and rack. It combines superior power density and a functional design in one unit – leading to effective length savings and a more compact design than ever! The integrated motor guarantees 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.



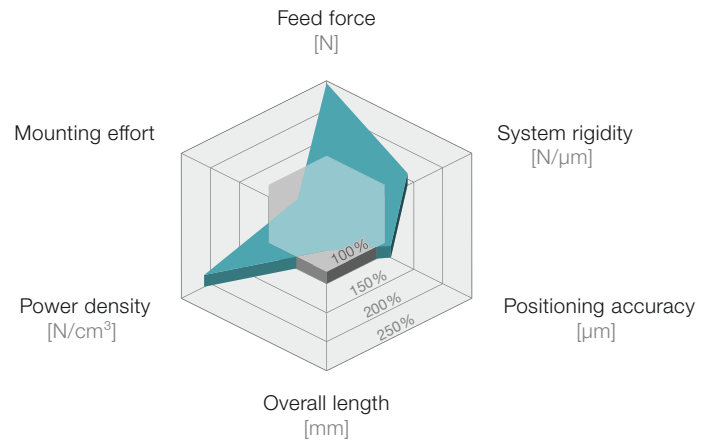
High Performance Linear System
with servo actuator RPM⁺



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	≤ 1	≤ 1	≤ 1	≤ 1
Max. feed force up to	F_{2T}	N	19000	22380	36000	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}	kW	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

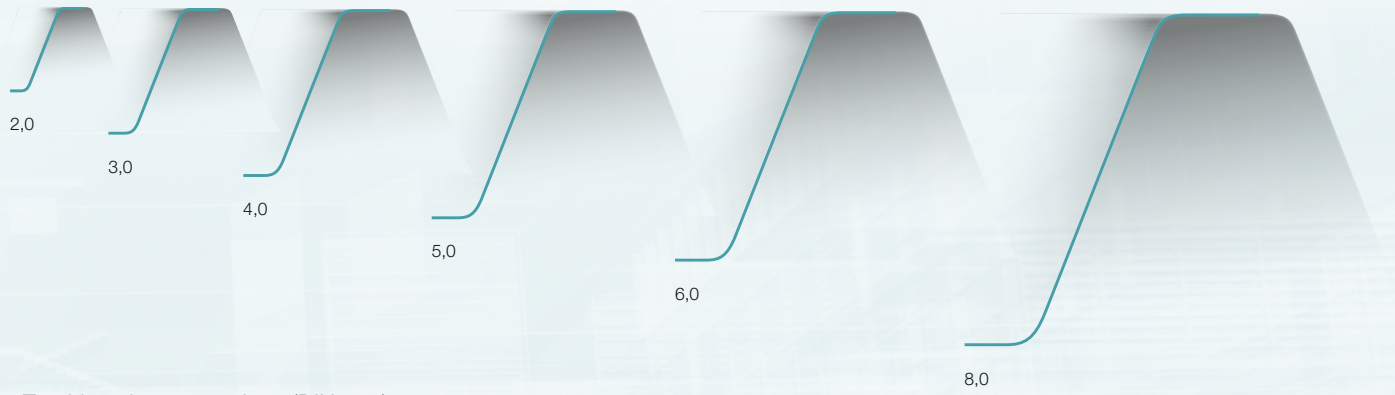
b) Calculation with smallest ratio and max. input speed

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

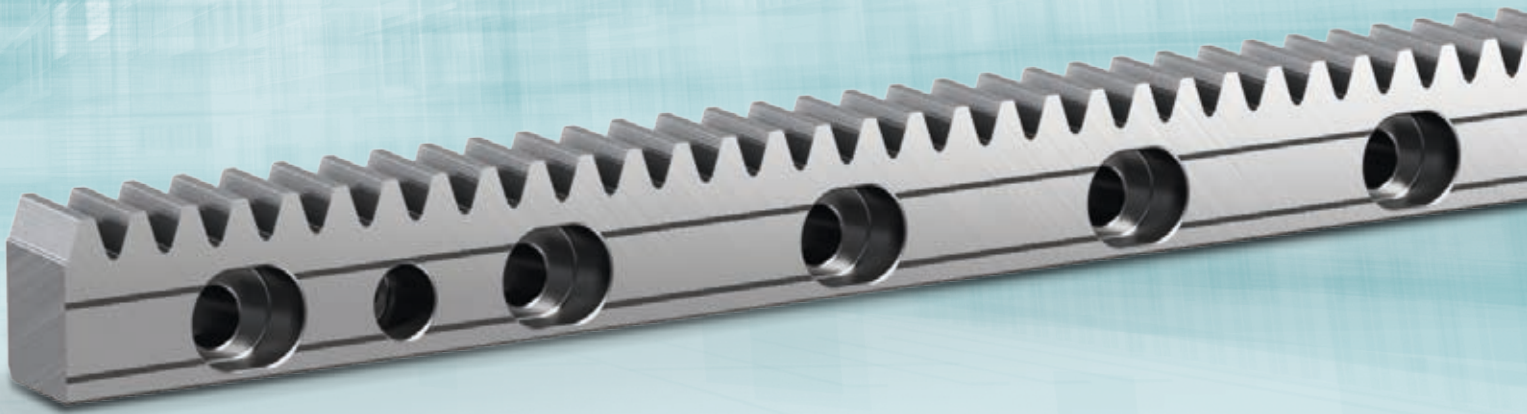
High Performance Pinion and High Performance Rack

greatest linear stiffness
highest precision
highest quality





Toothing size comparison (DIN 867)



High Performance Pinion

Systems with a High Performance Pinion are distinguished by extreme linear stiffness and precision. The High Performance Pinion is optimized for the alphen[®] and RP⁺ series.

The advantages at a glance:

High precision gearing and optimally designed gearing geometries for:

- best power gearhead
- very smooth running
- application precision

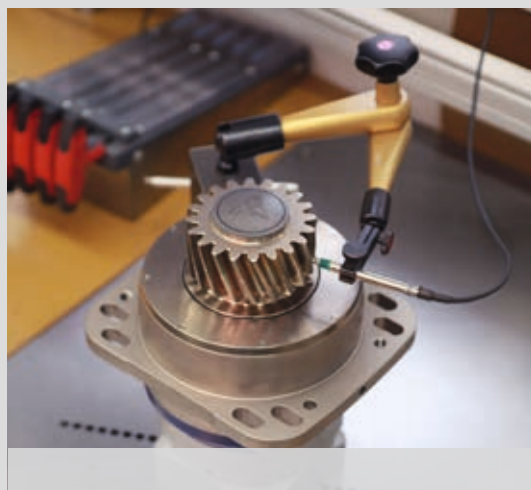
Innovative pinion-gearhead connection for:

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

Straight-toothed High Performance Pinions with identical characteristics are now also available alongside helical-toothed High Performance Pinions. They are specially adapted to rotary applications, e.g. in conjunction with turntables.

High Performance Pinions are available with diverse tooth numbers and modules. All pinions are assembled at the factory before delivery.

Gearhead and output pinion – a perfectly harmonized unit



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

Helical-toothed

Overview of High Performance Pinion (helical-toothed)	
m2**	z=20, z=40
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 / **alpheno® also possible in connection with RSP pinion, other numbers of teeth on request

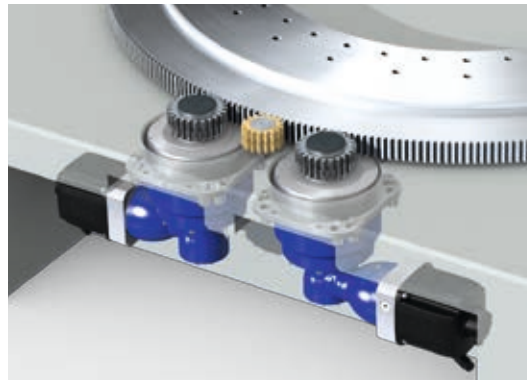


Typical application – helical-toothed pinions:
Linear movements, e.g. in portal milling machines

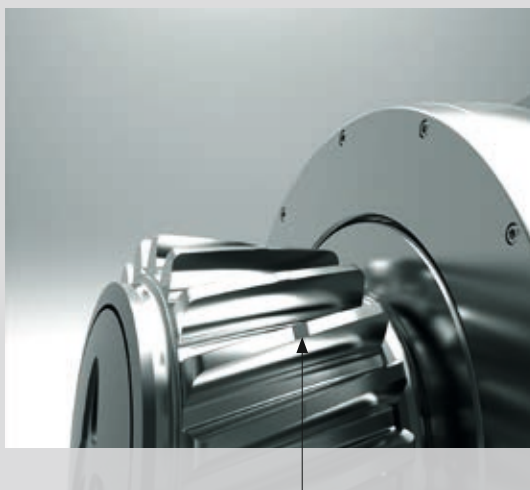
Straight-toothed

Overview of High Performance Pinion (straight-toothed)	
m2**	z= 22*
m3**	z= 21*
m4	z= 22*
m5	z= 25* , z= 21
m6	z= 25* , z= 20
m8	z= 23* , z=19

* Preferred pinion / **alpheno® also possible in connection with RSP pinion, other numbers of teeth on request



Typical application – straight-toothed pinions:
Rotary actuator, e.g. on turntables



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.

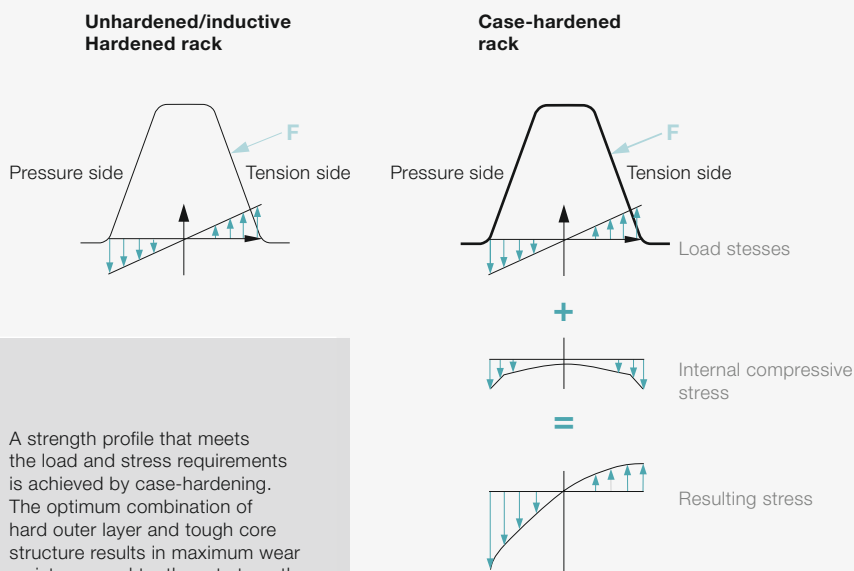
WITTENSTEIN alpha with the new rack class sets a new standard in matters of performance. Because of its special hardening process which is completely different from all other racks available on the market, it is a real powerhouse.

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

The Innovative Rack Assembly – INIRA

Up to 50% less labour required for installation

Optional for Performance and High Performance Linear Systems

The INIRA installation concept is faster, more precise and more ergonomic. In the past, fixing the racks to the machine bed, for example with screw clamps, has always been incredibly complicated. For the first time, the clamping device is now integrated in the rack. The rack is clamped instead using a special sleeve, which is guided over the head of the fastening screw.

Advantages of the INIRA rack installation technique:

- Very short assembly times (up to 50% saving)
- Optimized assembly ergonomics
- Maximum assembly precision
- Extreme ease of assembly
- Existing axes can be used

For more information, see:

www.wittenstein-alpha.com/inira



- The rack is positioned on the mounting surface



- Cylinder head screw are inserted and screwed in



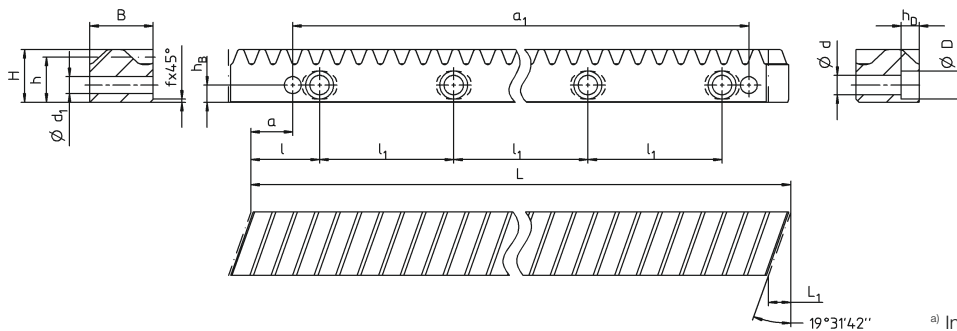
- Assembly sleeves are fitted



- The rack is clamped by tightening the sleeves
- The screws are tightened to full torque
- The assembly sleeves are loosened again, removed and reused

High Performance Rack with innovative installation option (INIRA)





a) Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle $\alpha = 20^\circ$, right-handed

High Performance 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	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]

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

* not with INIRA

p_t = Reference circle pitch

z = Number of teeth

m = Module

Performance 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	I	I_1	L_1
2	6,67	1000	150	31,7	936,6	24	7	5,7	11	2	22	8	7	24	62,5	125,0	8,5
3	10	1000	100	35,0	930,0	29	10	7,7	15	2	26	9	9	29	62,5	125,0	10,3
4	13,33	1000	75	33,3	933,4	39	10	7,7	15	3	35	12	9	39	62,5	125,0	13,8
5	16,67	1000	60	37,5	925,0	49	14	11,7	20	3	34	12	13	39	62,5	125,0	17,4
6	20	1000	50	37,5	925,0	59	18	15,7	26	3	43	16	17	49	62,5	125,0	20,9
8*	26,67	960	36	119,92	720	79	22	19,7	33	3	71	25	21	79	60	120	28

All dimensions in [mm]

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

* not with INIRA

p_t = Reference circle pitch

z = Number of teeth

m = Module

High Performance Rack
Standard design



alpha rack & pinion system accessory range – Lubrication



Replaceable lubricant container 400 ccm

Up to 4 outlets with up to 2 different, freely adjustable lubricant quantities

Control and voltage supply via machine control system

Lubricator LUC+ 400

Solution for decentralized lubrication – a solution you can rely on.



High-pressure plastic hose

Pre-filled, suitable for cable tracks

Open pore polyurethane foam stores the lubricant and dispenses it evenly

Axle has no interference contour (countersunk screw)

Low-wearing thanks to integrated bearing bushing



Lubricating pinion

Perfectly adapted to our rack and pinion systems

Perfect lubrication – for a perfect system

In order to achieve a long service life, our rack and pinion systems require adequate lubrication. We offer you suitable lubricating pinions, fastening axles, and lubricators, all adapted perfectly to our systems. The polyurethane foam lubricating pinion is supplied with a preset quantity of grease via a lubricator or central lubricating system. This ensures an optimal lubricating film on the rack and pinion. In addition to the supply of lubricant, the lubricating pinion also ensures cleaning of the open tooththing.

Your benefits

- Greatly reduced maintenance costs:
 - Replaceable cartridge
 - Up to 16 lubrication points can be supplied with just one lubricator
 - Lubricating pinion has a long service life
- Can be fully integrated in the machine control system:
 - Direct control
 - Different error messages via PLC
- Lubricant quantities can be precisely adjusted to the application (minimal-quantity lubrication)
- Minimal current required
- Perfectly adapted for the lubrication of rack and pinion systems

Please see page 388 of the Product Catalog for further information.



alpha

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WITTENSTEIN alpha – intelligent drive systems

www.wittenstein-alpha.com

