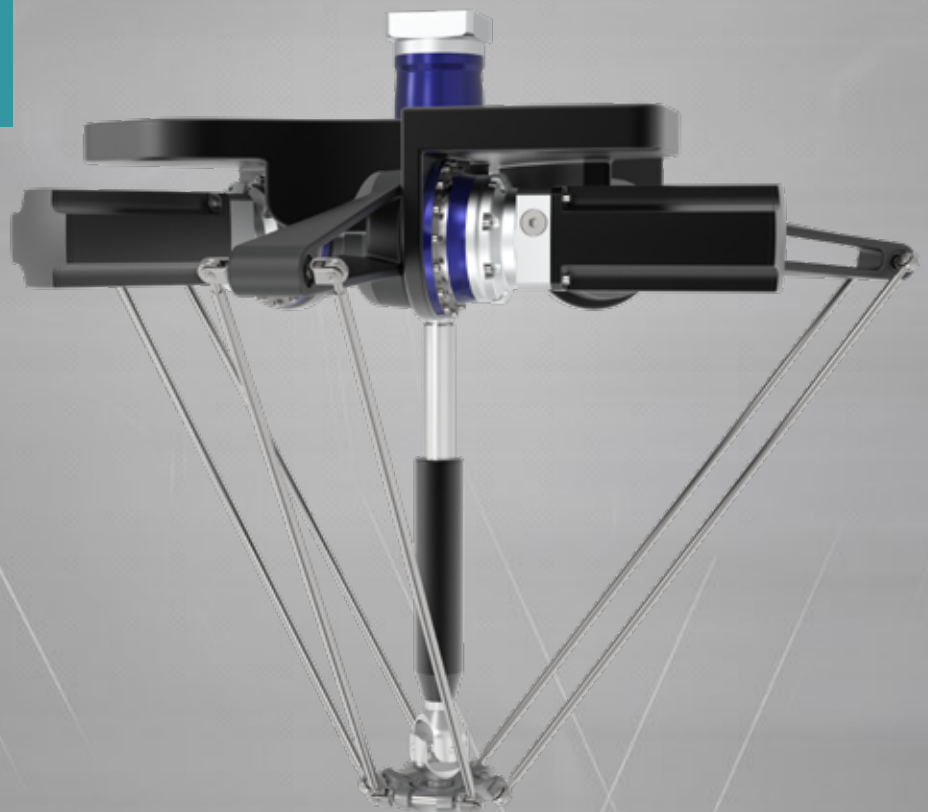


## Gearboxes and servo actuators for Delta robots

The right solution for all requirements

Flexible  
Precise  
Powerful



# Specialists in Delta robots: More than 15 years of experience in drive technology

Individual solutions for your robot concept

Varying customer requirements create major challenges for Delta robots and require continuous further development of the drives. For more than fifteen years, WITTENSTEIN has been developing and manufacturing gearbox and servo actuator solutions for Delta robots that are just as individual as the applications of our customers. With unique engineering experience, recognized methodological

competencies and software expertise as well as a high-performance product portfolio, we offer our customers the security of a technically and economically refined drive design for highly dynamic, multidimensional movement profiles. Our success story is continuing with an extended product portfolio and new individual drive solutions for your robot concept.

Delta robot design variations



# WITTENSTEIN is setting benchmarks in drive technology

The number one point of contact for many international customers



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Experience  
since 2005



**WITTENSTEIN**

alpha

# Market requirements for the Delta robotics industry

Optimized drive solutions for highly dynamic applications

The varying requirements of machine users and construction companies create major challenges when developing robot concepts. This has an effect on the machine design and component selection.

## Production requirements

- Lightweight construction
- High protection class
- Small footprint
- High degree of productivity
- Increased flexibility
- High degree of accuracy
- High speeds
- Low energy consumption
- Maximum safety level

## Challenges for machine construction companies

- Safety
- Reliable system design
- Performance
- Flexibility
- Speed and dynamics
- Accuracy
- Resource efficiency
- Selection of components and materials

## Range of industrial applications



Packaging



Cosmetics



Electronics

## The advantages of WITTENSTEIN drive solutions:

### Reliability

Extremely reliable gearboxes prevent cost-intensive machine breakdowns.

### Positioning accuracy

Minimal backlash and extreme rigidity ensure maximum positioning accuracy at the tool center point.

### Speed

High speeds increase machine output.

### Low maintenance

Highest quality standards guarantee a long service life and extend maintenance intervals.

### Consistently high performance

Constant backlash throughout the service life of the gearbox ensures a consistently high performance.

### Low inertia

Use of an servo actuator further reduces inertia.

### Drive and component requirements

- Highly dynamic 3D movement profiles for Toolcenter Point with requirements for maximum positioning accuracy
- Different vibration movements of the drives
- Resistance to vibrations
- High degree of rigidity for reducing low-frequency vibrations
- Heterogeneous load allocation for different drives
- System interaction generates maximum torque



Confectionery



Pharmaceuticals



Foodstuffs

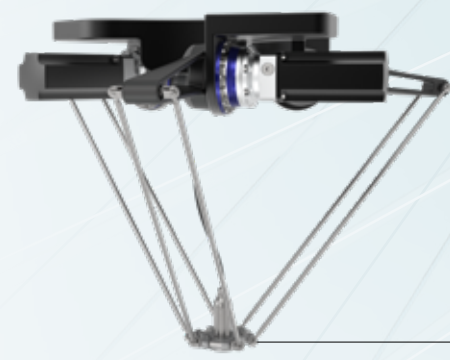
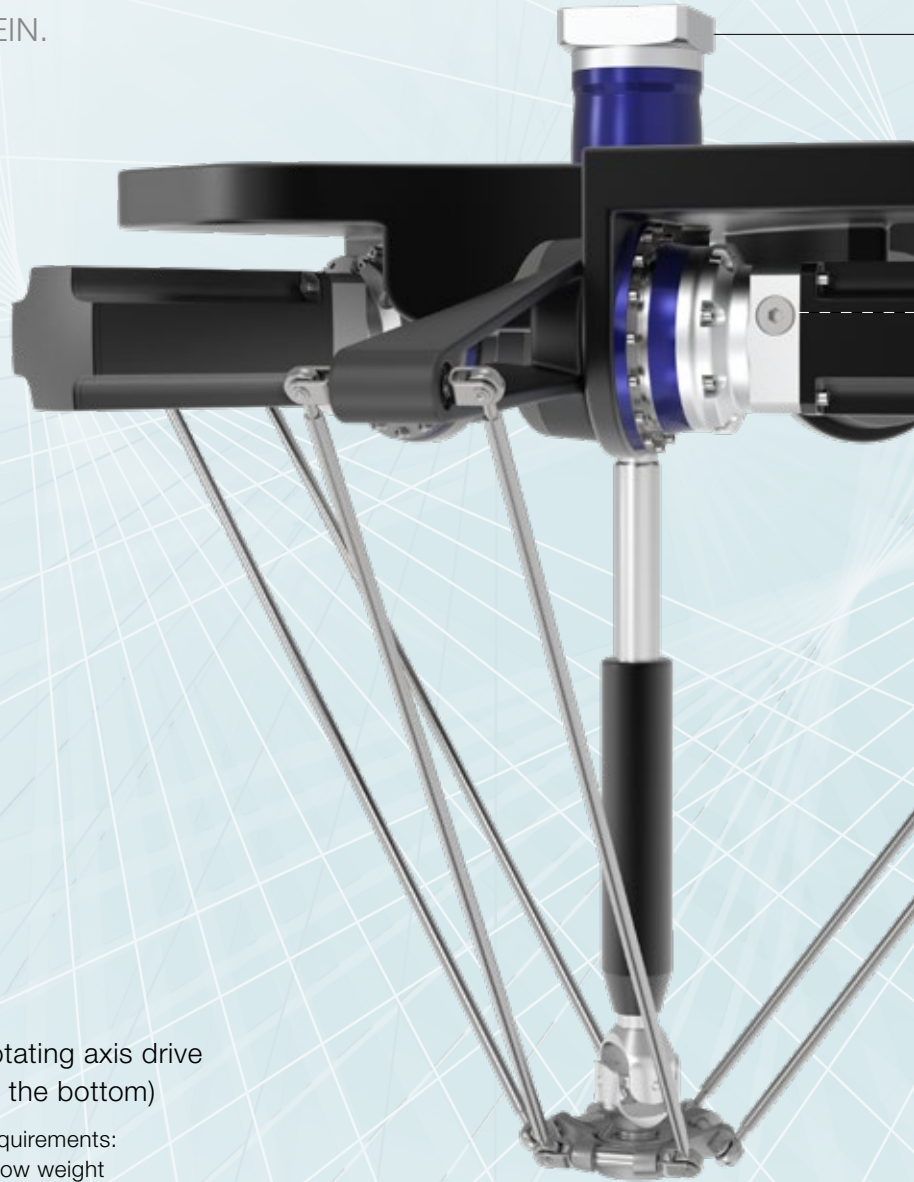


# Delta robot design requires adapted product features

Maximum performance and efficiency:  
Delta drive components from WITTENSTEIN.

## Basic requirements

- Reliability
- Positioning accuracy
- Speed
- Low maintenance
- Consistently high performance
- Low inertia



## Rotating axis drive (at the bottom)

- Requirements:
- Low weight
  - Low backlash
  - High rigidity
  - Positive connection for flange installation
  - Outstanding dynamics

With this version of Delta robot, the rotating axis is driven directly at the tool center point instead of being controlled by a fourth axis in the center.



premo®  
TP Line



cyber®  
dynamic line



NP

NPK+

SP+ / SPK+

premo®  
SP Line

### Rotating axis drive Precision (at the top)

Requirements depend on the accuracy of the goods being positioned



DP+

premo®  
TP Line

HDP+

Project-specific servo  
actuator solutions  
**on request**

### Top arm drive

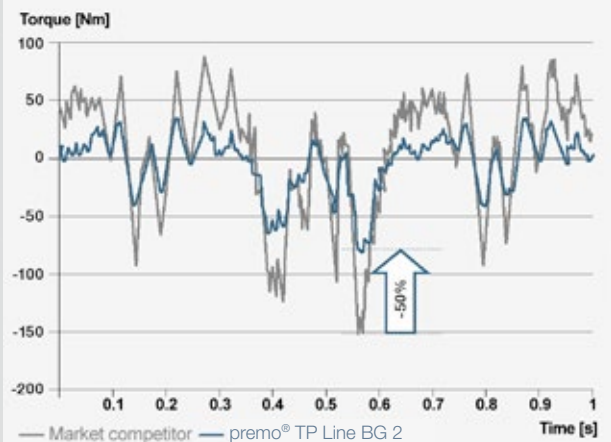
System integration

Requirements:

- High rigidity
- Low backlash
- Low inertia
- Outstanding dynamics
- Positive involute connection of arms

Up to 50% reduced energy consumption with the same productivity

Through the use of servo actuators, the premo® TP line achieves the same degree of productivity while drastically reducing energy consumption. The high rigidity of the servo actuator allows the use of a smaller motor with lower inertia. Power savings of up to 50% are possible.



# Unmistakably WITTENSTEIN.

## Our products at a glance

As unique as your requirements

### Process-integrated axes

In the field of Delta robotics, there is a wide range of different application areas with varying requirements such as process integration or hygiene and cleaning, for example. WITTENSTEIN therefore offers its customers individual solutions that

are optimized to meet special requirements and guarantee maximum reliability while maintaining a consistently high performance throughout the entire service life of the product.

#### A DP+

Planetary gearboxes designed for Delta applications are available in 4 sizes and cover a ratio range of  $i=16-55$ . An optimized sealing concept and reduced inertia ensure outstanding results in terms of dynamics and durability.

#### B HDP+

HDP+ planetary gearboxes were designed for direct contact with foodstuffs in line with EHEDG guidelines. They are available in 3 sizes and cover a ratio of  $i=16-55$ .

#### C premo® TP Line

The servo actuator consists of a precision planetary gearbox designed for ratios of 16 to 55 and a brushless synchronous servo motor. Premo is characterized by higher productivity and outstanding energy efficiency.

#### D cyber® dynamic line with cyber® simco® drive 2

Suitable for industrial applications, the small servo motors from the cyber® dynamic line are available in 4 sizes and cover a performance range of 7-345 watt.

The perfect addition: intelligent, space-saving cyber® simco® drive 2 servo regulators available as a switch cabinet variant (IP20) or as a decentralized unit in protection class IP65.


The cyber dynamic® system is available as an option. A highly integrated solution consisting of a servo motor with integrated servo drive.


#### E On request


We are happy to advise and offer you individual solutions for project-specific requirements.



### Classification as per DIN EN 1672-2

 Standard application in dry areas (not food sector)

 Application in wet and damp environments (spray areas)  
→ close to the process

 Application in wet areas, including high-pressure cleaning as well as contact with cleaning agents and chemicals (food sector)  
→ integrated in the process



# No compromises: The perfect solution for every application

We are happy to help you choose the right drives

 Dry area	 Spray area (close to the process)	 Wet area (integrated in the process)
		
<p><b>Field of application:</b></p> <ul style="list-style-type: none"> <li>· Secondary packaging</li> <li>· End packaging</li> <li>· Handling (e.g. feeding, stacking, sorting, removing, etc)</li> <li>· Bonding/sealing</li> <li>· Mounting</li> <li>· Intralogistics</li> </ul>	<p><b>Field of application:</b></p> <ul style="list-style-type: none"> <li>· Secondary packaging</li> <li>· Pharmaceutical industry</li> <li>· Medical technology</li> <li>· Primary packaging without hygienic design requirements</li> <li>· Clean room</li> </ul>	<p><b>Field of application:</b></p> <ul style="list-style-type: none"> <li>· Primary packaging with hygienic design requirements</li> </ul>
<p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>· With standard or food-grade lubrication (NSF certified), depending on the application</li> </ul>	<p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>· Corrosion resistant for mild cleaning agents</li> <li>· If required, no paint or labels (e.g. type plate) on the product</li> <li>· Standard incl. food-grade lubrication (NSF certified)</li> </ul>	<p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>· Protection class IP69K (max. 30 bar)</li> <li>· Easy removal of dirt (microorganisms)</li> <li>· No dead spaces, high surface quality</li> <li>· Resistant to aggressive cleaning agents</li> <li>· CIP/SIP compatible</li> </ul>
<p><b>Your benefits:</b></p> <ul style="list-style-type: none"> <li>· Fast availability</li> <li>· speedline® available 24h</li> </ul>	<p><b>Your benefits:</b></p> <ul style="list-style-type: none"> <li>· Protection from external influences</li> <li>· Spray water protection as per IP65</li> <li>· Protection against flash rust and oxidation</li> <li>· Easy removal of dirt</li> </ul>	<p><b>Your benefits:</b></p> <ul style="list-style-type: none"> <li>· Hygienic and sterile production drive</li> <li>· New freedom in design through direct process integration</li> <li>· Direct contact with foodstuffs possible</li> <li>· Fast, efficient and safe cleaning</li> <li>· Resistant against chemical cleaning agents and disinfectants</li> </ul>
<p><b>Products:</b></p> <ul style="list-style-type: none"> <li>· DP+ for industrial applications (S)</li> <li>· DP+ with foodstuff lubrication (F)</li> <li>· premo® TP Line</li> <li>· cyber® dynamic line – Standard design with cyber® simco® drive 2 (IP20)</li> </ul>	<p><b>Products:</b></p> <ul style="list-style-type: none"> <li>· DP+ corrosion-protected (W)</li> <li>· DP+ corrosion-protected without paint</li> <li>· project-specific solutions on request</li> <li>· cyber® dynamic line – Inox design with cyber® simco® drive 2 (IP65)</li> <li>· cyber® dynamic system</li> </ul>	<p><b>Products:</b></p> <ul style="list-style-type: none"> <li>· HDP+ Hygienic Design</li> <li>· Project-specific servo actuator solutions on request</li> <li>· cyber® dynamic line – Hygienic Design</li> </ul>

# Competitive edge with innovative drives in Hygienic Design

Simpler, more compact, efficient and hygienic.

Previously, Delta robotic drives used in sectors with high hygienic standards had to be enclosed in complex housings, which was disadvantageous in terms of cleaning and durability. The new drives from WITTENSTEIN with Hygienic Design offer innovative design freedom with enormous benefits:

## Comparison of installation



### Conventional solutions:

Complicated encapsulation is required to protect the drives.

- Risk of dirt and moisture build-up under the encapsulation
- Surfaces to be cleaned are large
- Extra costs (design, cleaning)
- Heat build-up under the encapsulation reduces the service life of the drive



### Hygienic solution:

New design freedom thanks to the Hygienic Design motor-gearbox unit.

- Hygienic production because the drive components are cleaned directly
- Smaller surfaces save time and cleaning costs
- Open drive system extends the service life

## Product benefits

- High chemical / corrosion resistance
- High IP protection for optimal sealing
- Design integration Hygienic Design (the complete plant can be designed according to Hygienic Design principles)
- High power density and dynamics

## Benefits for plant manufacturers

- Integration in a plant designed according to hygienic principles
- All legal obligations fulfilled (Machinery Directive, food hygiene regulations)
- Easier production / assembly because there are fewer components
- More compact machine design
- Higher overall equipment effectiveness
- Innovative technology / competitive advantage

## Benefits for operators

- Easier, faster cleaning: shorter CIP / SIP times
- Improved reliability and longer life
- Quick and easy disassembly
- Reduced consumption of cleaning materials
- Minimal costs for maintenance and repair
- Cost savings: competitive advantage and lower end user price
- Increased food safety

## Applications in the food industry



Fish processing



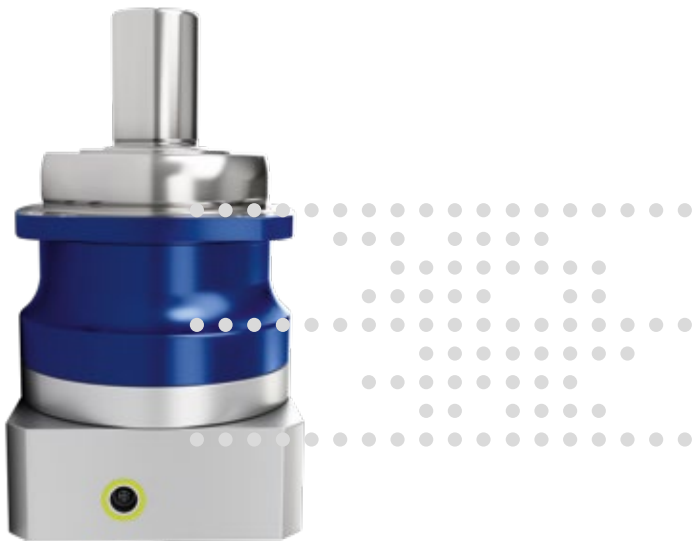
Filling and packing milk products



Portioning meat products

# cynapse – It's new. It's connective. The smart gearbox.

Mechatronic drive systems that can independently acquire and communicate information are an essential precondition for IIoT. WITTENSTEIN alpha is the first component manufacturer to offer smart gearboxes as standard – gearboxes with cynapse. They have an integrated sensor module which enables industry 4.0 connectivity.



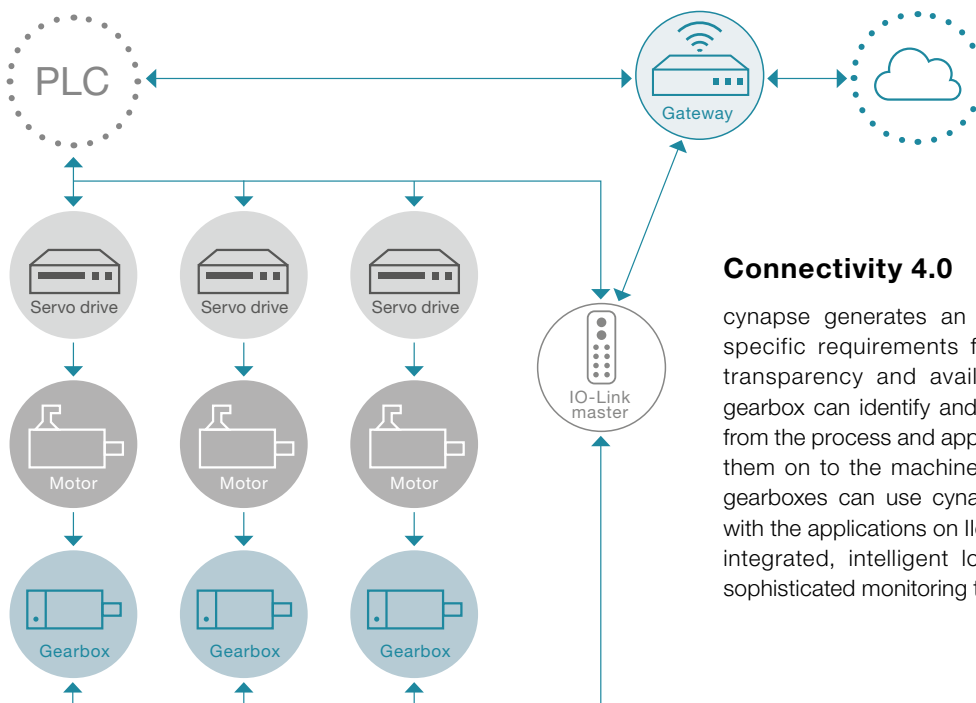
cynapse  
play IIoT

## cynapse – how it works

cynapse ensures that the gearbox can be easily integrated into the digital world in future. A sensor module is fitted in the existing installation space and is connected via an IO-Link interface, thus providing access to performance data such as the gearbox's **temperature, vibration, operating time, acceleration and product-specific information.**

### cynapse wins customers over with:

- Sensor module integrated into the installation space
- Simple connection by IO-Link interface
- Gearbox threshold monitoring
- Quick product identification thanks to digital name plate



## Connectivity 4.0

cynapse generates an electronic “fingerprint” with specific requirements for performance, efficiency, transparency and availability. Because the smart gearbox can identify and measure parameters directly from the process and application environment and pass them on to the machine control system. In addition, gearboxes can use cynapse to exchange information with the applications on IIoT platforms and, thanks to its integrated, intelligent logic functions, can perform sophisticated monitoring tasks independently.

# Support at each interaction stage

With the WITTENSTEIN alpha service concept, we are also setting new standards in the field of customer support.

## DESIGN



We offer the right sizing methodology for every requirement. Whether easy downloading of CAD data, quick and easy calculation, or precise sizing of the drive train.

## STARTUP



Our service experts are happy to support you in the installation and startup of complex mechatronic systems, guaranteeing maximum availability of your plant.

## SERVICING



WITTENSTEIN alpha guarantees fast repairs of the highest quality and precision.

In addition, we will provide you with information about various measurements, material analyses, and condition monitoring inspections.





**Consultation**

- Personal contact on site
- Competent application calculations and drive sizing

**Engineering**

**Catalog gearboxes:**

- Advanced software tools for accurate calculation, simulation, and analysis of the drive train
- Optimization of your productivity

**Special gearboxes:**

- Development and production of customized gearboxes
- Gearing design and development
- Inquiries: [sondergetriebe@wittenstein.de](mailto:sondergetriebe@wittenstein.de)



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YOUR SMART CATALOG



**cymex® select**  
BEST SOLUTION WITHIN SECONDS



**cymex® 5**  
CALCULATE ON THE BEST



**speedline® delivery**

Tel. +49 7931 493-10444

- Delivery of standard product range in 24 or 48 hours ex works\*
- Fast deliveries at short notice

**Installation on site**

- Professional installation
- Optimal application integration
- Introduction to the operation of the drive

**Operating and installation instructions**

- Detail description of how to use the product
- Installation and motor mounting videos

\* Non-binding delivery time depending on part availability



**WITTENSTEIN Service Portal**  
One gate. All support.

**WITTENSTEIN Service Portal**

- Instant Access to Product Information
- Quick Installation and Commissioning for example Tutorial-Videos

**Pick-up & return service**

- Minimization of downtimes
- Professional logistics organization
- Reduction of transport risks



**24 h service hotline**

Tel. +49 7931 493-12900

**Maintenance and inspection**

- Documentation regarding condition and expected service life
- Customer-specific maintenance schedules

**Repairs**

- Repair to nominal condition
- Immediate response in time-critical situations

**cymex® statistics**

- Systematic field data acquisition
- Reliability calculations (MTBF)



**WITTENSTEIN Service Portal**  
One gate. All support.

**WITTENSTEIN Service Portal**

- Fast Processing of Replacement Products
- The Right Contact for Queries
- Tailor-Made Maintenance Services

**Modernization**

- Professional retrofitting
- Reliable compatibility testing of existing solutions

# The WITTENSTEIN group – The company and its fields of business



**WITTENSTEIN**

With approximately 2,900 employees worldwide, the WITTENSTEIN group stands for innovation, precision and excellence in the world of mechatronic drive technology, both nationally and internationally. The group is active in seven innovative fields of business. Furthermore, WITTENSTEIN group is represented by some 60 subsidiaries in around 40 countries in all important technology and sales markets worldwide.



## Our fields of expertise

### We provide know-how for a host of different sectors:

- Machine and plant construction
- Software development
- Aerospace
- Automotive & E-mobility
- Energy
- Oil & Gas Exploration and Production
- Medical technology
- Measurement and testing technology
- Nanotechnology
- Simulation

# The WITTENSTEIN Group



WITTENSTEIN | alpha

WITTENSTEIN alpha GmbH  
High-precision servo drives and linear systems



WITTENSTEIN | cyber motor

WITTENSTEIN cyber motor GmbH  
Highly dynamic servo motors and drive electronics



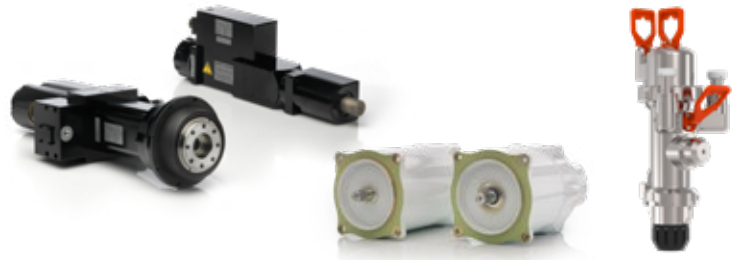
WITTENSTEIN | galaxie

WITTENSTEIN galaxie GmbH  
Superior gearboxes and drive systems



WITTENSTEIN | motion control

WITTENSTEIN motion control GmbH  
Drive systems for the most extreme environmental requirements



WITTENSTEIN group

attocube systems AG  
Nanoprecision drive and measurement technology solutions



baramundi software GmbH  
Secure management of IT infrastructure in offices and production areas



WITTENSTEIN – one with the future



alpha

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info@wittenstein-alpha.com

WITTENSTEIN\_alpha\_Delta-Roboter. Subject to technical changes

## WITTENSTEIN alpha – Intelligent drive systems

[www.wittenstein-alpha.com](http://www.wittenstein-alpha.com)

The entire world of drive technology – Catalogs available on request or online at [www.wittenstein-alpha.com/catalogs](http://www.wittenstein-alpha.com/catalogs)



**alpha Premium Line.** Unique, individual solutions that offer unparalleled power density.



**alpha Advanced Line.** Maximum power density and outstanding positioning accuracy for complex applications.



**alpha Basic Line & alpha Value Line.** Reliable, flexible and economical solutions for a wide range of applications.



**alpha Linear Systems.** Precise, dynamic system solutions for every requirement.



**alpha Mechatronic Systems.** Energy-efficient, versatile and flexible mechatronic drive systems.



**alpha Accessories.** Optimally designed and adapted for gearboxes and actuators.