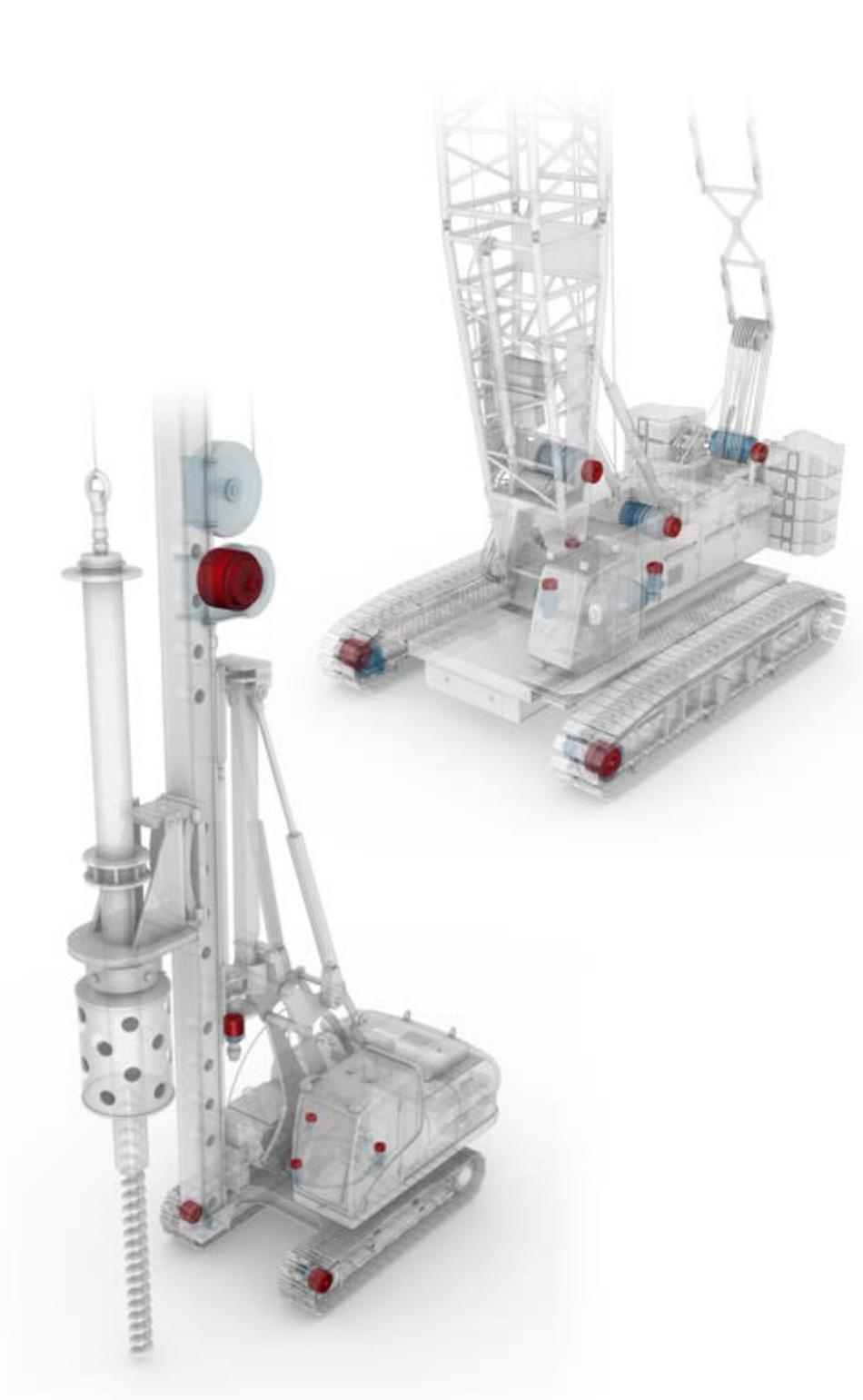


Ortlinghaus



Construction Technology



Ortlinghaus

Founded in:	1898
Employees:	> 500
Subsidiaries:	Ortlinghaus (U.K.) Ltd. / England Ortlinghaus France / France Ortlinghaus AG / Switzerland Ortlinghaus Drive Technology (Shanghai) Co., Ltd / China Ortlinghaus Drive Technology India Pvt.Ltd. / India OOO „Ortlinghaus RUS“ / Russia
Manufacturing:	Wermelskirchen / Germany Gams / Switzerland Shanghai / China
Sales:	Worldwide via agencies

Ortlinghaus Group.

Otto Ortlinghaus established the Ortlinghaus Group in 1898. It originally manufactured machine knives and tools. Since 1923 Ortlinghaus has been producing plates, which form the technological core of most of our products.

Today, we are a fourth-generation family-run company with more than 550 employees and manufacturing sites in Germany, Switzerland, and China. We are proud of our long history and have structures and processes in place to ensure the long-term stability of the Group. Our values and long-term targets, which comprise stability, innovation, and growth, are aligned in this respect, too.

One of the most distinctive features of the Group is its collaborative culture. Shareholders, management and employees alike all have a firm commitment to this. In addition, we promise our customers to always and unwaveringly protect the Ortlinghaus brand, which is embodied in the quality of our products. Since the foundation of our company, we have repeatedly left our mark on technology history: As early as 1932, Ortlinghaus produced multi-plate clutches as a complete machine element.

However, we achieved worldwide renown with the Sinus® plate, which had a substantial impact on press technology. The last decade has seen many breakthrough developments in the field of mechatronic systems, especially in the press technology and marine technology sectors. One recent example of this is the Pa.go mechatronic closed-loop control system for clutch-brake units in large automotive presses.

Next to the construction technology sector, Ortlinghaus is active in the following industries:

- Marine technology
- Agriculture & Forestry technology
- Press technology
- Oil & Gas technology
- Materials handling technology
- Mining technology





We have been active in the field of construction technology for more than 75 years. Today, we offer products across the entire spectrum of drives and slewing gears as well as cranes and winches. This includes free-fall winch brakes, hydraulic multi-plate brakes and plates.

our previous standards. We work with our customers to create custom solutions that are characterized by innovation and superior engineering.

Ortlinghaus has developed a reputation for quality throughout the world – and we are highly motivated to meet and exceed

Our worldwide network of more than 25 subsidiaries, sales partners and service hubs ensures our high degree of customer service.



Industry Overview and Business Units.



Drive-/slewing gear/hydraulic drills

Different types of brakes are used for excavator applications. Some of them are in use for high static torque, others must be backlash-free. In deep drilling machines, a drill is driven by pressure from the top and a downward rotational movement in the soil. Depending on the depth, this drill can be extended indefinitely with a drill link.

>> Page 6



Cranes/winches

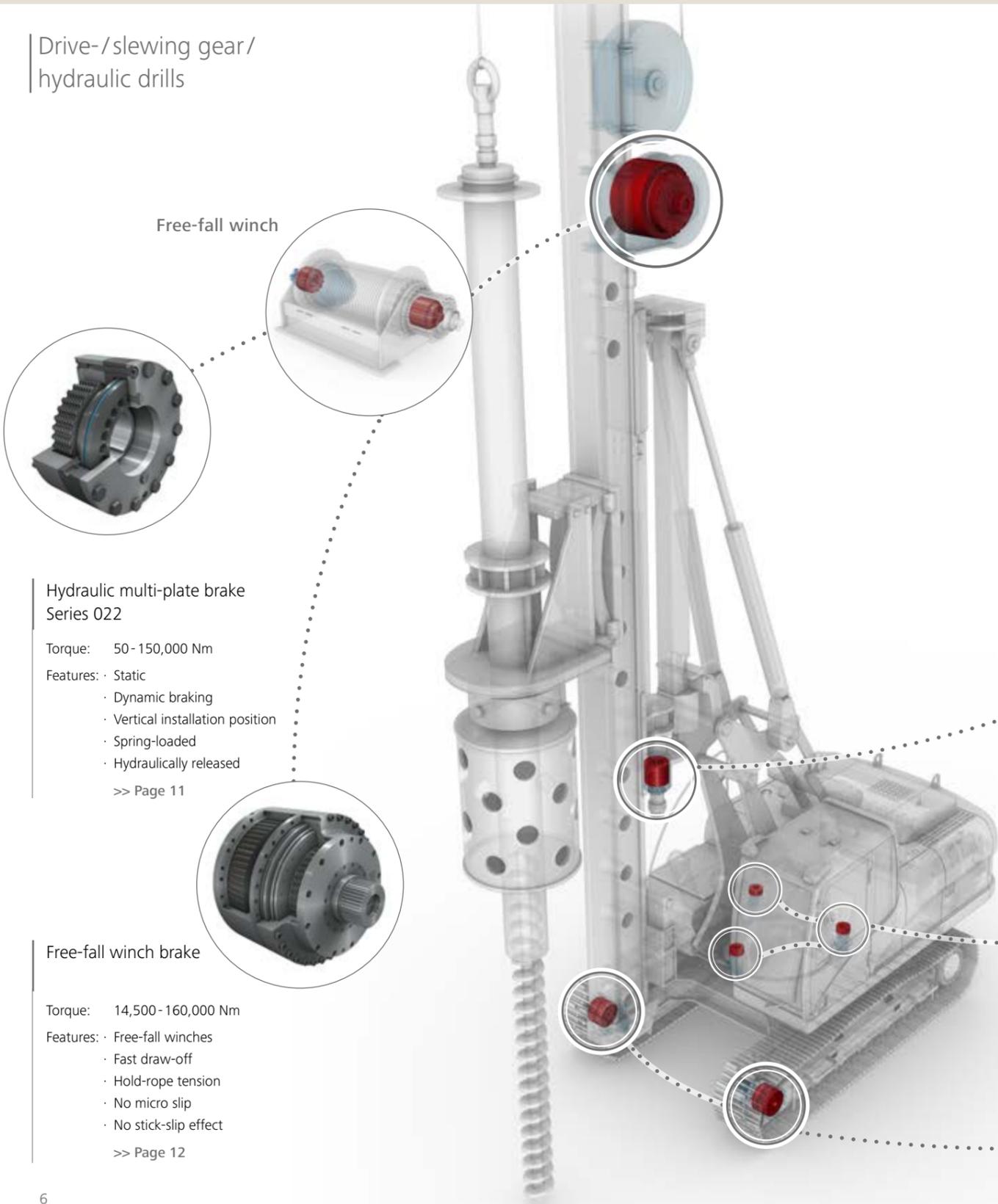
A crane is a device powered by motors for vertical and horizontal loading. It is usually used for loading and unloading ships (cargo and container), trains and trucks, as well as in assembly, manufacturing, warehouses, and building construction. For lifting and lowering loads and moving masts different winches are used.

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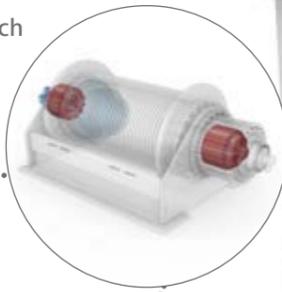


Applications.

Drive-/slewing gear/
hydraulic drills



Free-fall winch



Hydraulic multi-plate brake Series 022

- Torque: 50 - 150,000 Nm
- Features:
- Static
 - Dynamic braking
 - Vertical installation position
 - Spring-loaded
 - Hydraulically released
- >> Page 11



Free-fall winch brake

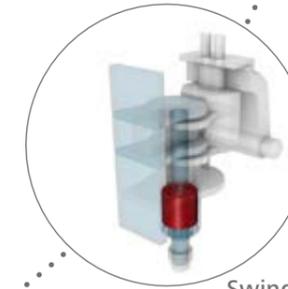
- Torque: 14,500 - 160,000 Nm
- Features:
- Free-fall winches
 - Fast draw-off
 - Hold-rope tension
 - No micro slip
 - No stick-slip effect
- >> Page 12

Conical brake

- Torque: 40,000 - 160,000 Nm
- Features:
- Backlash-free
 - High torque
 - Engagement at every position
 - Small outside diameter



Swing brake



Hydraulic multi-plate brake Series 022

- Torque: 50 - 150,000 Nm
- Features:
- Static
 - Dynamic braking
 - Vertical installation position
 - Spring-loaded
 - Hydraulically released
- >> Page 11



Slewing gear

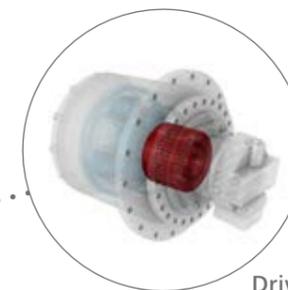


Drive brake Series 022

- Torque: 100 - 800 Nm
- Features:
- Static
 - Spring-applied
 - Customized solutions
 - Fully integrated in drive unit
- >> Page 11



Drive



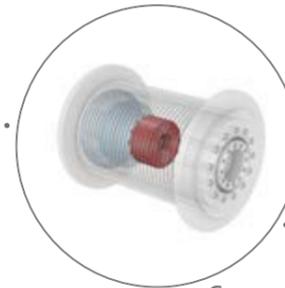
Applications.

Brake Series 022

- Torque: 500 - 10,000 Nm
- Features:
- Static
 - Spring-applied
 - Customized solutions
 - Fully integrated in drive unit
- >> Page 11



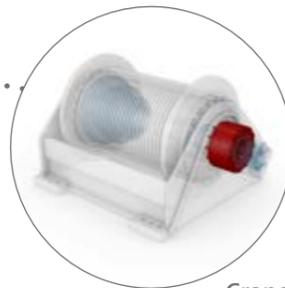
Drive- / Slewing gear Cranes/Winches



Crane winches

Free-fall winch brake

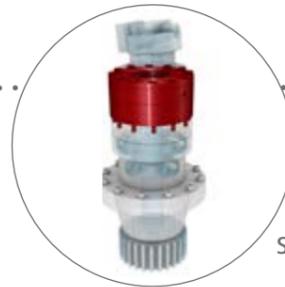
- Torque: 14,500 - 160,000 Nm
- Features:
- Free-fall winches
 - Fast draw-off
 - Hold-rope tension
 - No micro slip
 - No stick-slip effect
- >> Page 12



Crane winches

Hydraulic multi-plate brake Series 022

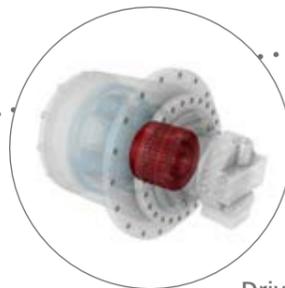
- Torque: 100 - 1,200 Nm
- Features:
- Static
 - Dynamic braking
 - Vertical installation position
 - Spring-loaded
 - Hydraulically released
- >> Page 11



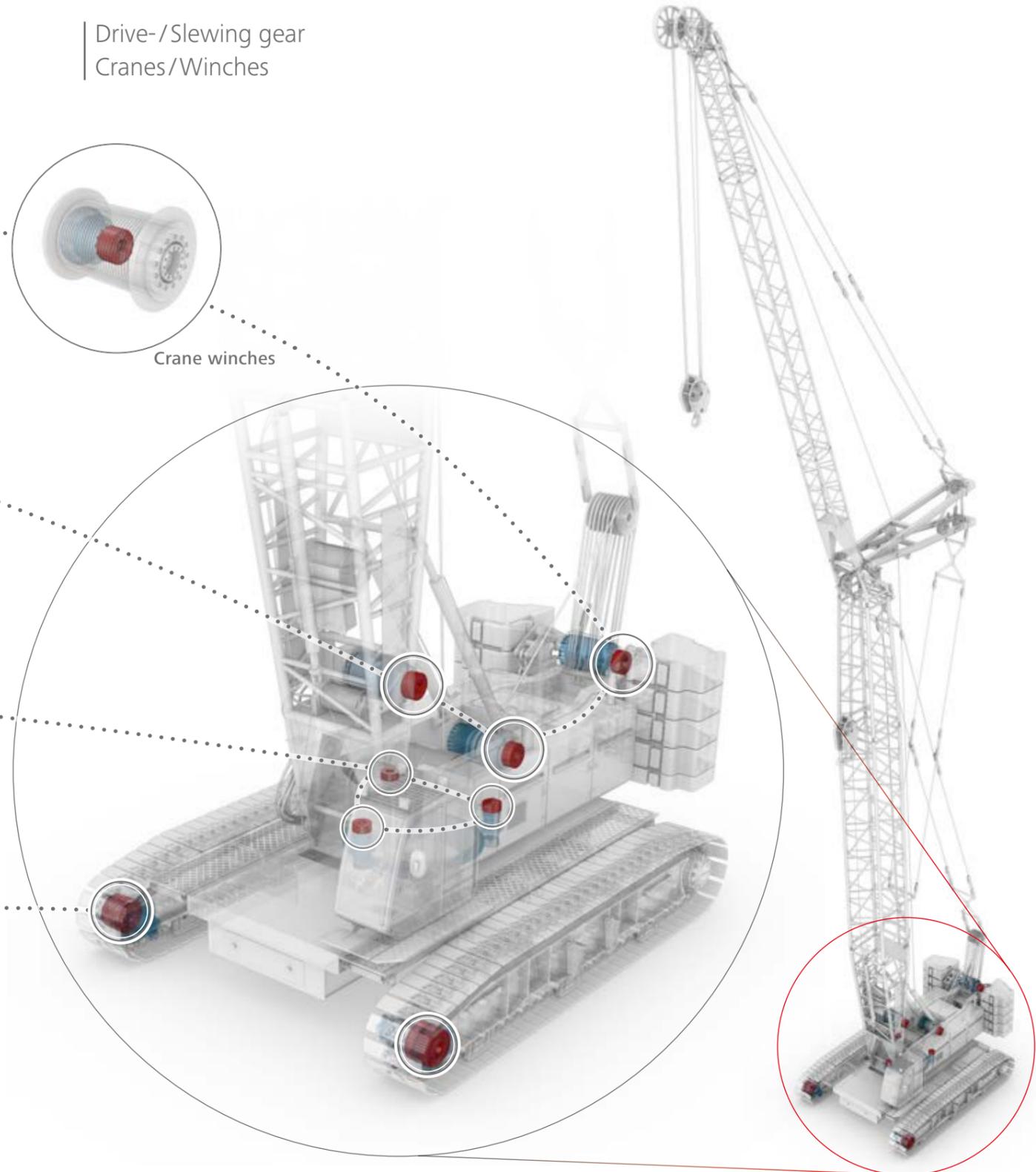
Slewing gears

Drive brake Series 022

- Torque: 100 - 800 Nm
- Features:
- Static
 - Spring-applied
 - Customized solutions
 - Fully integrated in drive unit
- >> Page 11



Drive



Plates



- T** Torque: 50 - 160,000 Nm
- n** Rotations per minute: Up to 5,000 min⁻¹
- F** Friction diameter: 60 - 460 mm



- T** Torque: 50 - 150,000 Nm
- n** Rotations per minute: 45 - 6,570 min⁻¹
- Ø** Outside diameter: 83 - 910 mm
- Ø** Bore diameter: 18 - 350 mm
- Length: 59 - 360 mm

Hydraulic multi-plate brakes Series 022

For dry- and wet-running clutches and brakes, Ortlinghaus is able to provide a very comprehensive range of plates. The plates and the friction surface are important functional elements in every clutch and brake, and have been developed in many different ways since the early days of clutches and brakes. The choice of friction system depends on the application: in general, one plate with friction material works together with a counterplate of steel or cast iron. The inner and outer plates are mounted with

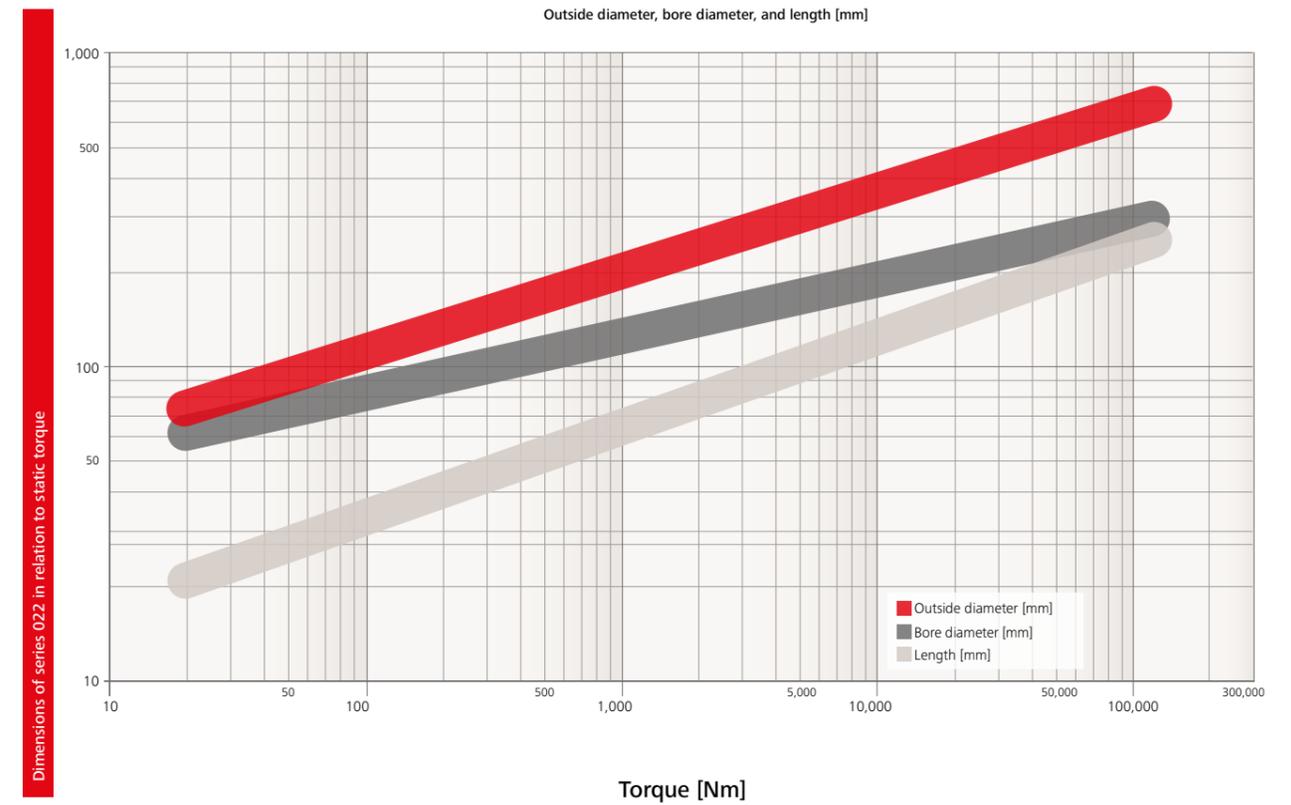
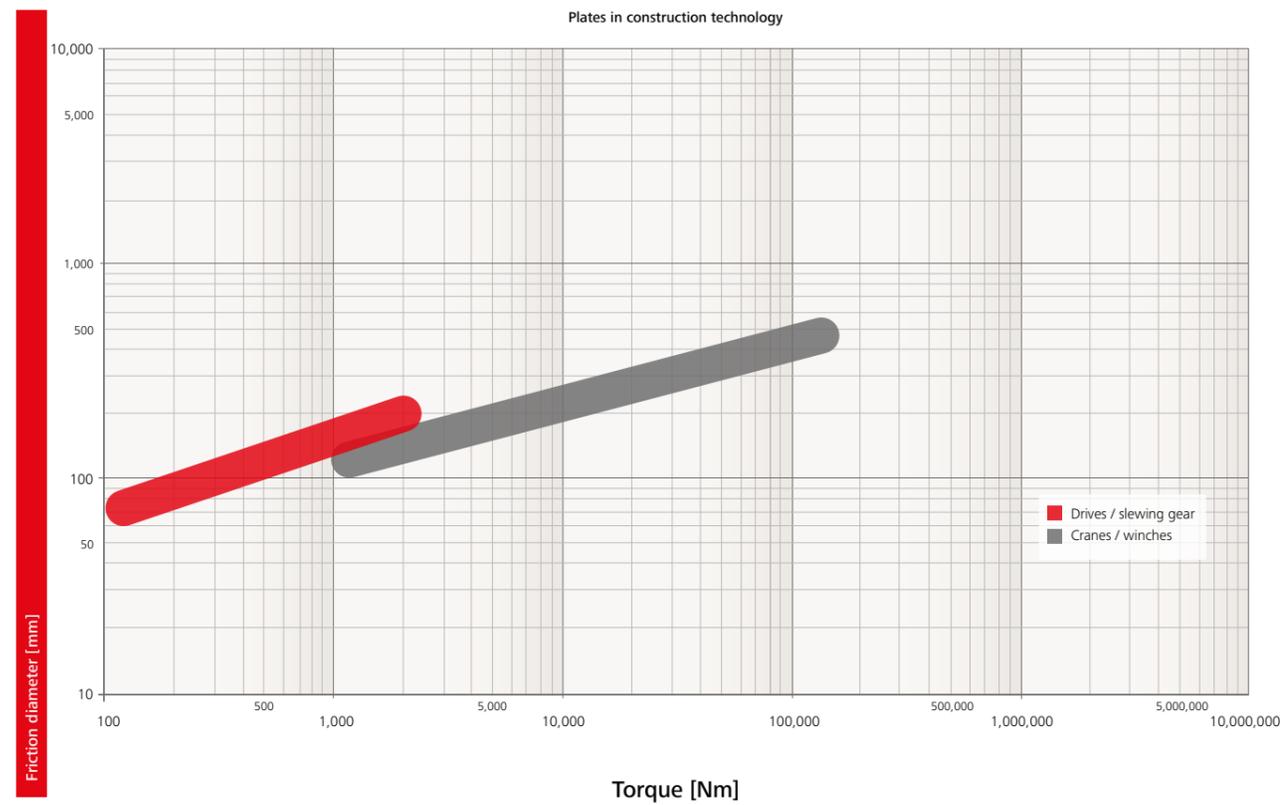
the other drive components by lugs and slots, and the spline is in accordance with DIN 867 and DIN 5480 as well as other standards. In addition, holes in the plate for studs and special shapes in accordance with customer requirements are available.

Combined with a multi-plate clutch or brake, these plates come in a multitude of different dimensions, friction combinations, and surface patterns.

The 022 series is one of the most successful Ortlinghaus products. Well over one million units are in service around the world wherever safety brakes with an extremely long service life and quality without compromise are required. In construction equipment engineering, these multi-plate brakes are used in travel-/drive and slew-drive brake applications.

The advantage of these wet-running, hydraulically released and spring-applied multi-plate brakes is the high torques they achieve in compact dimensions. Hydraulically actuated brakes are also available as a special version.

The spring-loaded brakes are safety brakes, which automatically work in cases of pressure failure. The brakes can achieve full torque even when there is no pressure.

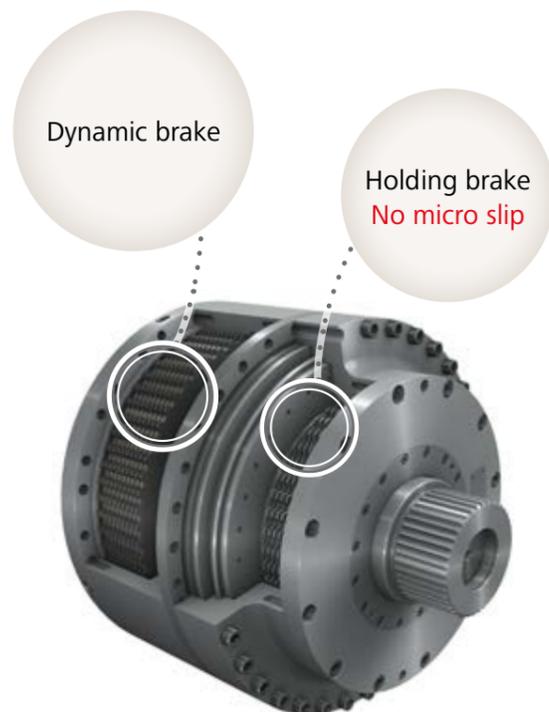


Free-fall winch brake

The Ortlinghaus brake products for free-fall winch applications represent the cutting edge in construction brake engineering. We offer two brake types, one with a single plate pack, the other with a double plate pack.

Both are spring-loaded brakes which are hydraulically released. The single plate pack product is based on the construction principle of the model series 022, with an additional piston chamber which allows pressure-activated braking.

The double plate pack product has two plate packs with different friction pairings. This allows dynamic braking as well as holding a load while avoiding micro-slippage.



Single plate pack

Torque: 14,500 - 160,000 Nm

Outside diameter: 295 - 620 mm

Length: 395 - 560 mm

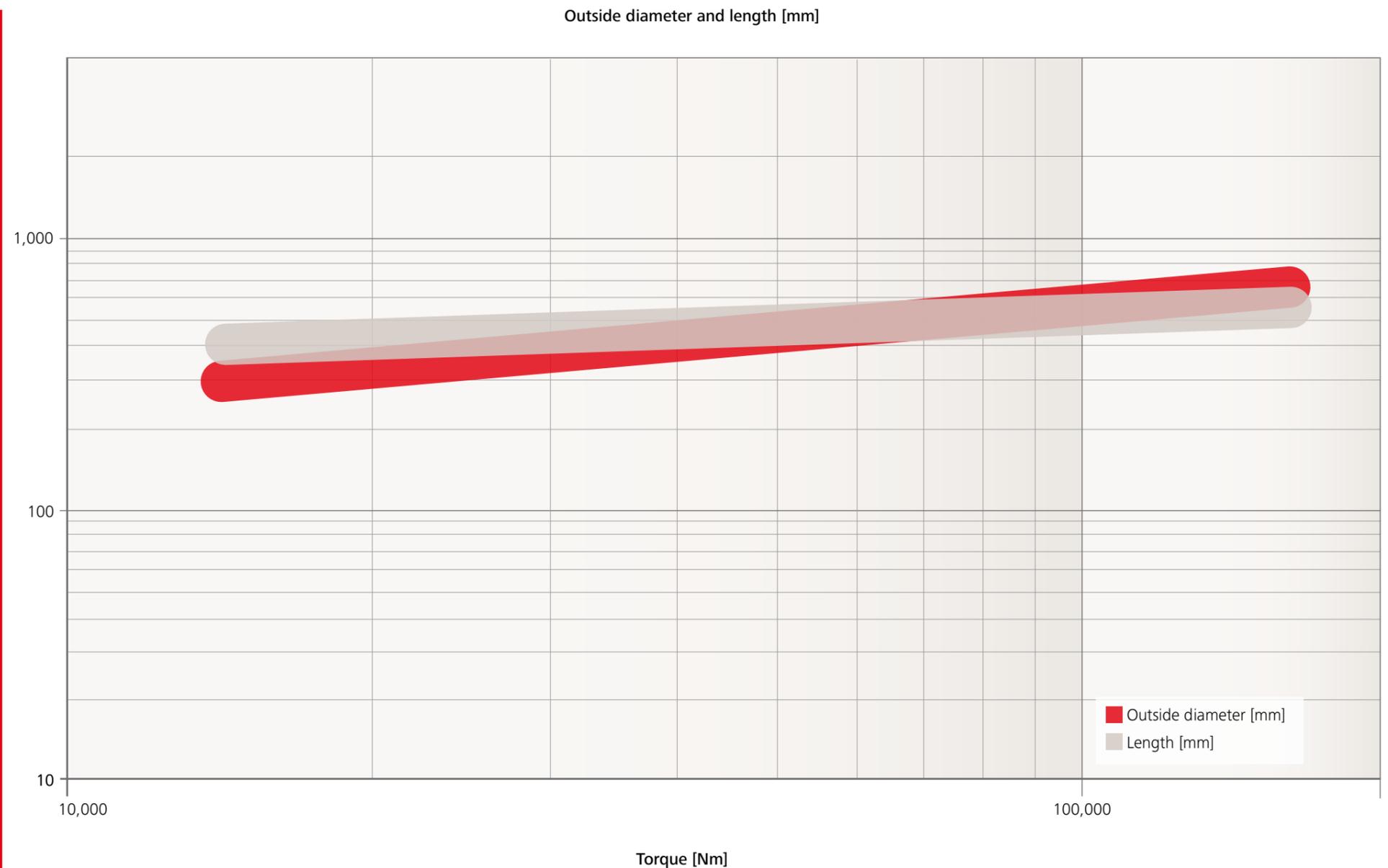
Double plate pack

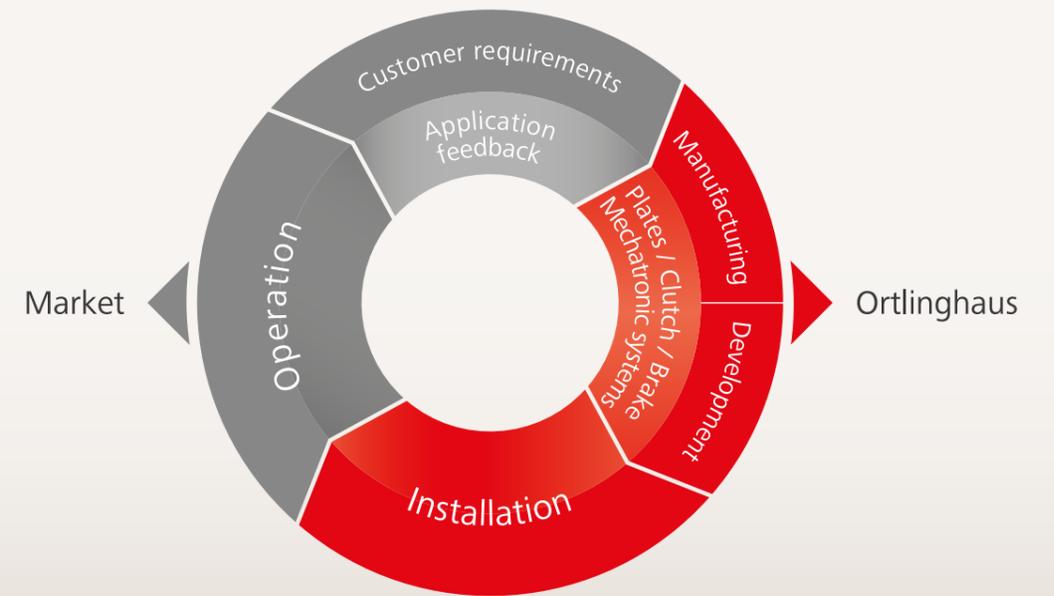
Torque: 120,000 Nm

Outside diameter: 620 mm

Length: 562.5 - 570 mm

Dimension of free-fall single-plate winch brake in relation to the static torque





The Ortlinghaus Factor.

We have been operating successfully for more than 100 years – and we are proud of this achievement. Experience, structure, processes, and systems are key words in explaining what makes us and our products stand out. We like to call it the Ortlinghaus factor.

Experience

Practical experience and acquired knowledge form the basis of our success – but we never rest on our laurels. We are extremely well versed in construction technology applications and their requirements. That is why we are able to develop completely new, innovative solutions for our customers or make intelligent modifications to existing products and systems with the same degree of success.

Industry management

Sales and order processing at Ortlinghaus are structured in a unique way, with a focus on industry management. Our staff are highly specialized in particular sectors and concentrate exclusively on trends and requirements within their designated industry.

The industry management system is supported by technology experts who are each dedicated to a relevant field of technology and its technical challenges.

Construction technology is one of our largest segments. We have outstanding expertise in this field, comply with recognized industry standards, and can boast worldwide references.

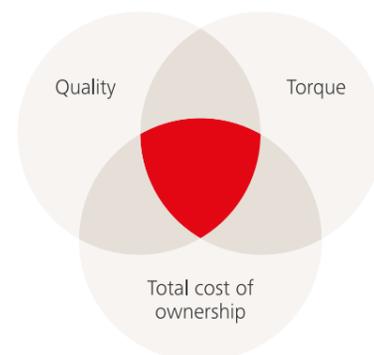
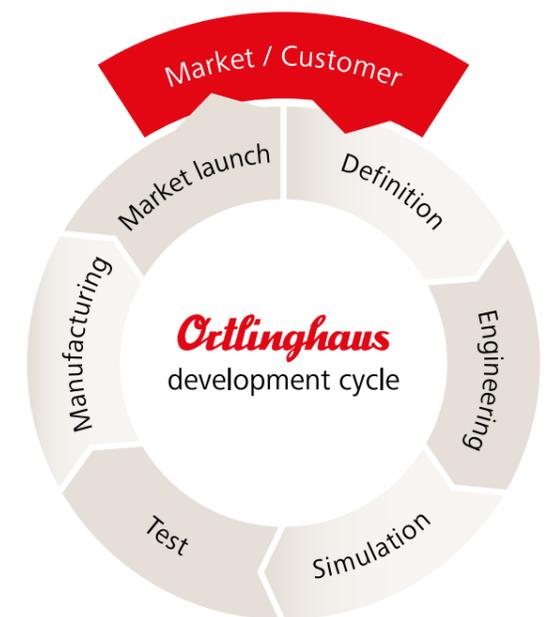
Processes

Systematic development processes are crucial for Ortlinghaus. We constantly analyze our markets, the trends in key areas of technology, and our customers' needs and requirements. The results shape and optimize our new product developments and versions of existing models.

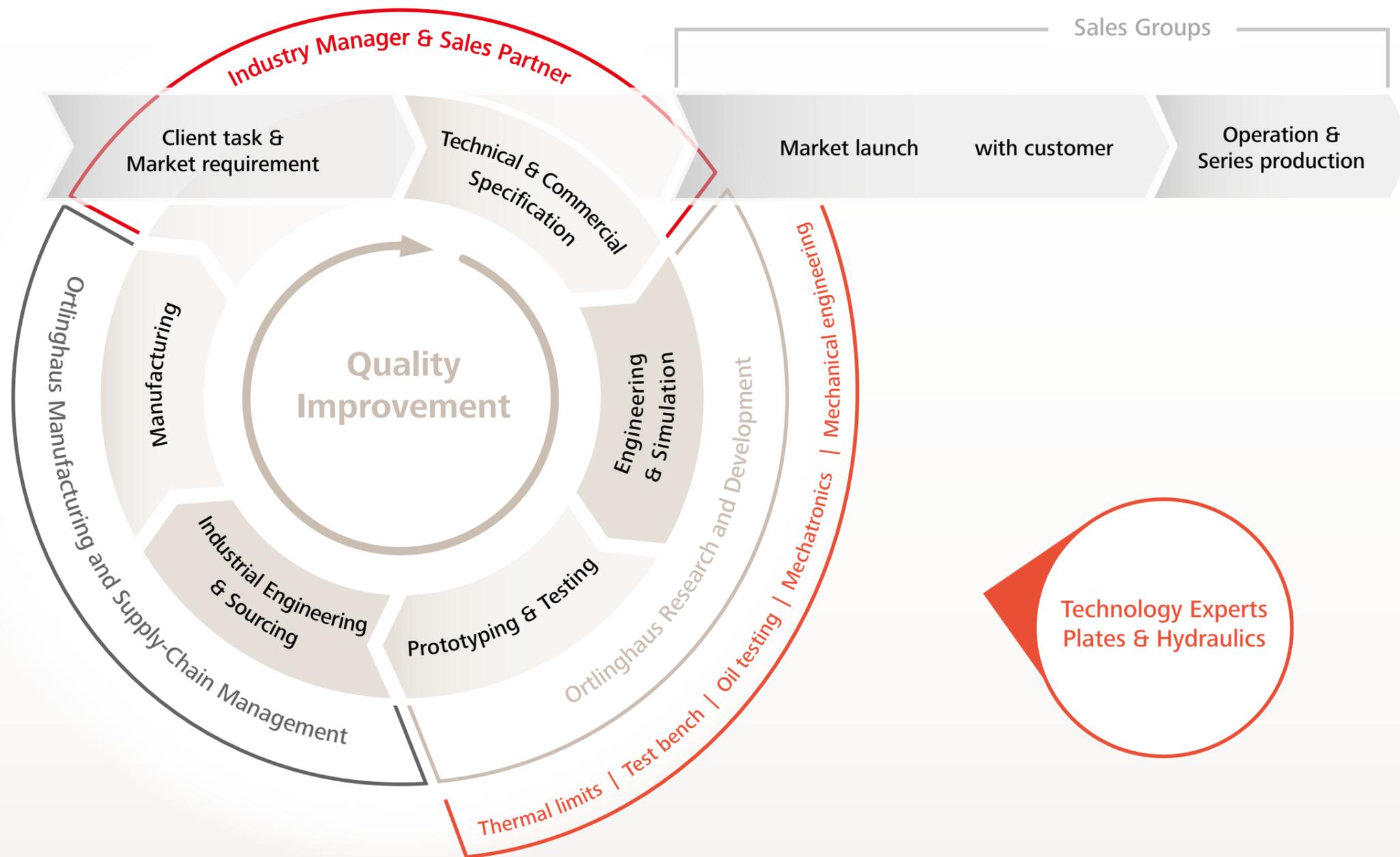
Systems

Our systems for designing clutch and brake systems are one of a kind within the industry. They enable us to calculate products precisely and align them with all the relevant application parameters.

Our new product developments are recorded, structured, and documented in our own software systems. This speeds up the design process for any additional versions which are developed in the future.



Ortlinghaus innovations process.



Technology Experts
Plates & Hydraulics





Quality, Health, Safety and Environment.

An integrated management system (IMS) that takes into account all processes is the basis for Ortlinghaus' corporate policy. Quality, occupational health and safety, and environmental protection play crucial roles for our company.

We have analyzed and documented all relevant processes in the value chain. Our IMS is based on the resulting summary of process descriptions, plans, procedures and guidelines as well as the Ortlinghaus Management Manual.

The management system is the basis for all business activities in our company and for our relationship with our customers. It ensures that all customer-oriented product and manufacturing specifications are reflected in elaborate instructions regarding

quality assurance and quality control and that they comply with the relevant operating instructions and quality standards of the Ortlinghaus Management System.

Our quality management system is based on the ISO 9001 standard. In the area of environmental protection, we are certified at the Wermelskirchen site according to ISO 14001. In energy management, we are certified according to ISO 50001.

Ortlinghaus assigns the highest priority to occupational health and safety. We live up to our principles in this area in our daily conduct. At Wermelskirchen, we have achieved ISO 18001 certification.

Our goal is to minimize the impact of our activities on the environment. For this reason, all employees of the Ortlinghaus Group have committed themselves to complying with essential environmental guidelines. In addition, all our processes in Wermelskirchen are certified accordingly.

We are convinced that long-term success can be achieved only through the right balance of economic, ecological and social conduct.



Ortlinghaus-Werke GmbH
Kenkhauser Str. 125
42929 Wermelskirchen
Germany

Phone: +49 (0)2196 85-0
Fax: +49 (0)2196 855-444

info@ortlinghaus.com
www.ortlinghaus.com