

Ortlinghaus

Mining 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 mining technology sector, Ortlinghaus is active in the following industries:

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





We have been active in the mining industry for more than 75 years. Today, we offer superior products for travel-/drive-brake, slewing-/drive brake, and chain conveyor applications.

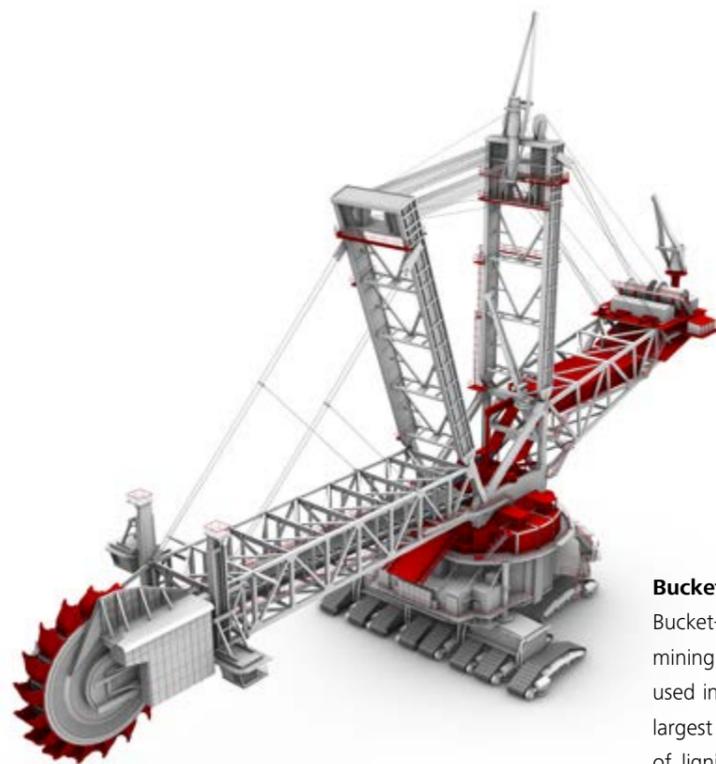
We have by far the longest-standing experience in the successful combination of brake and clutch manufacturing with plate engineering and in-house plate lining production. Ortlinghaus has developed a reputation for quality throughout the world – and we are highly motivated to meet and exceed our previous standards.

We work with our customers to create individual solutions that are characterized by innovation and superior engineering. Our worldwide network of more than 25 subsidiaries, sales partners, and service hubs ensures our high degree of customer service.

Additionally, we can confirm that the series 022 conforms to the directive 94/9/EG (ATEX). We are also able to support our clients in achieving conformity with this directive with regards to other products as well.



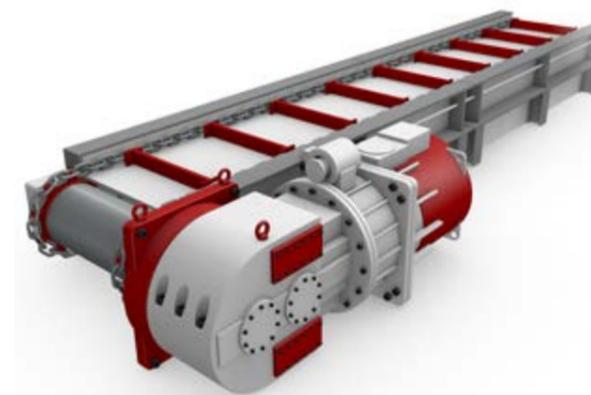
Industry Overview and Business Units.



Bucket-wheel excavator

Bucket-wheel excavators are very large machines used in the mining and construction sector. The largest of these machines are used in open-pit mining of lignite. In fact, they are some of the largest machines ever built since the 1930s. Up to 240,000 tons of lignite or overburden can be moved daily by one of these machines. Bucket-wheel excavators consist of a chassis, a turnable body, and the loading system.

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Conveyors

Conveyors are stationary transport systems, which are used in a wide variety of applications in the mining industry. They offer high operational safety and low energy costs. The drives of conveyors consist of one or more drive drums, and the conveyor belt.

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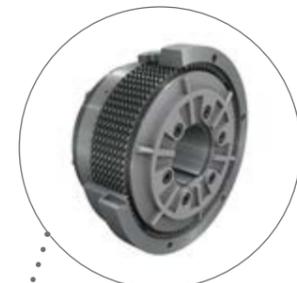
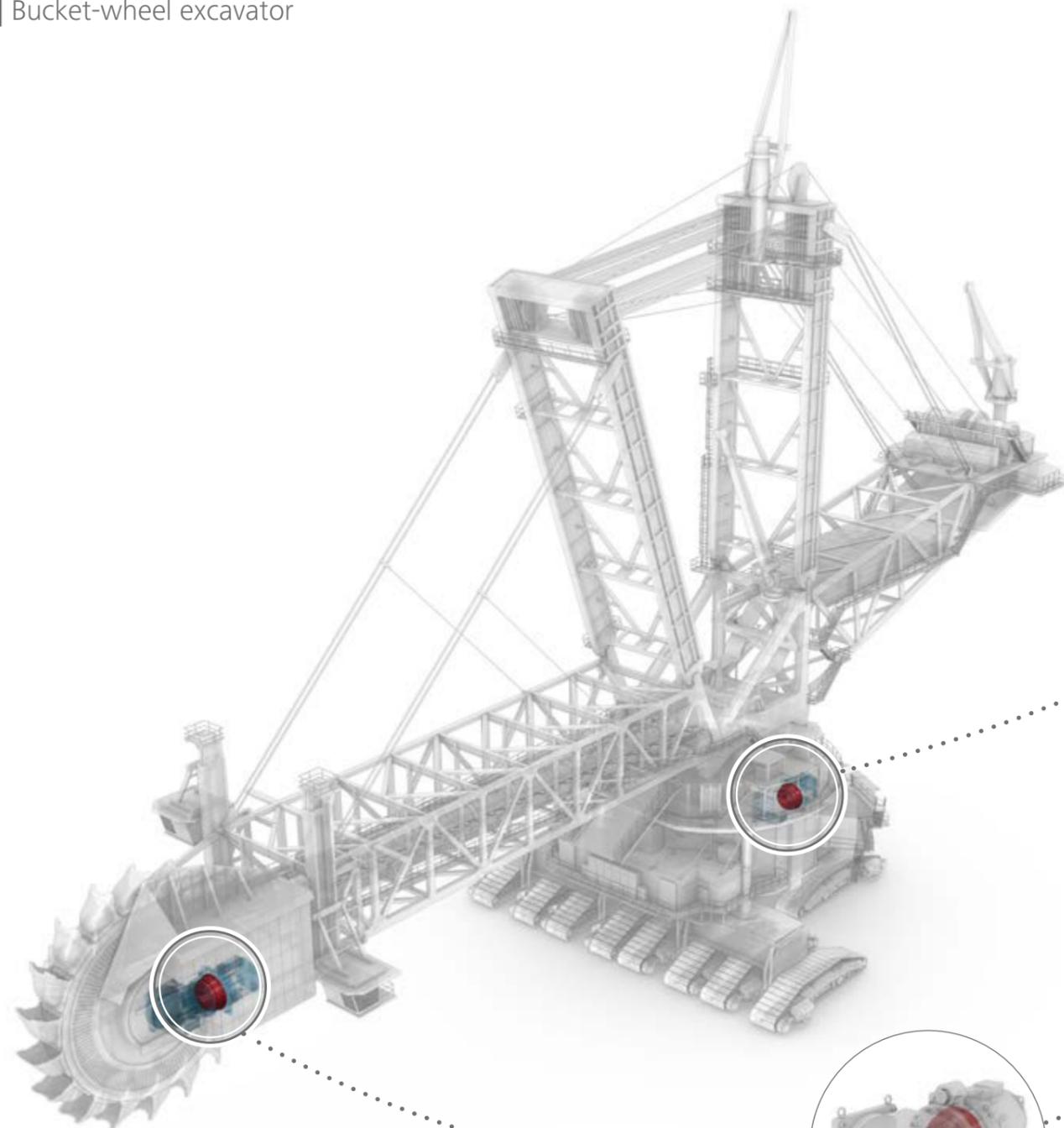
Road header

Road headers are excavating equipment used in underground mining. They consist of a machine chassis in which all hydraulic systems are based. In the front is a boom-mounted cutting head with cutting chisels. The boom can be moved vertically as well as horizontally. Movement is achieved by crawler tracks.

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Applications.

| Bucket-wheel excavator



Spring-applied slipping clutches
Series 600/700

Torque: 20-50,000 Nm

- absorption of peak loads
- torque transmission
- controllable torque
- spring-applied
- machinery protection

>> Page 13



Slewing gear



Hydraulic multi-plate clutches
Series 021

Torque: 150-50,000 Nm

- fast and slow synchronization
- service-friendly
- broad power spectrum
- overload clutch

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Spring-applied slipping clutches
Series 600/700

Torque: 20-50,000 Nm

- absorption of peak loads
- torque transmission
- controllable torque
- spring-applied

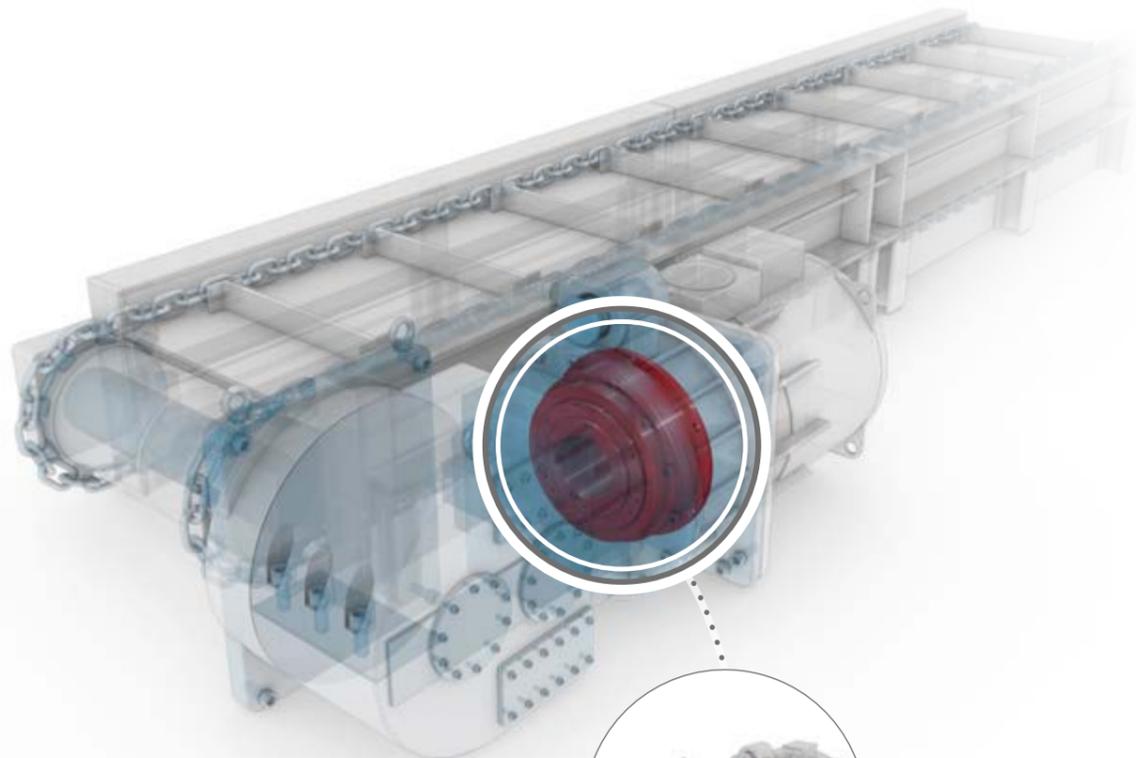
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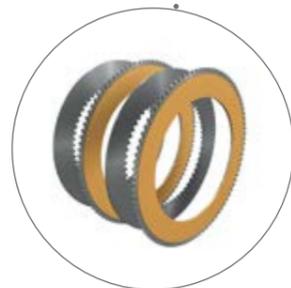
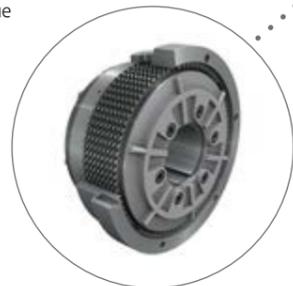
Drive

Applications.

| Conveyor



Drive



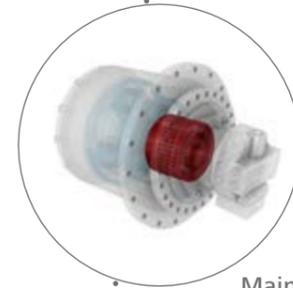
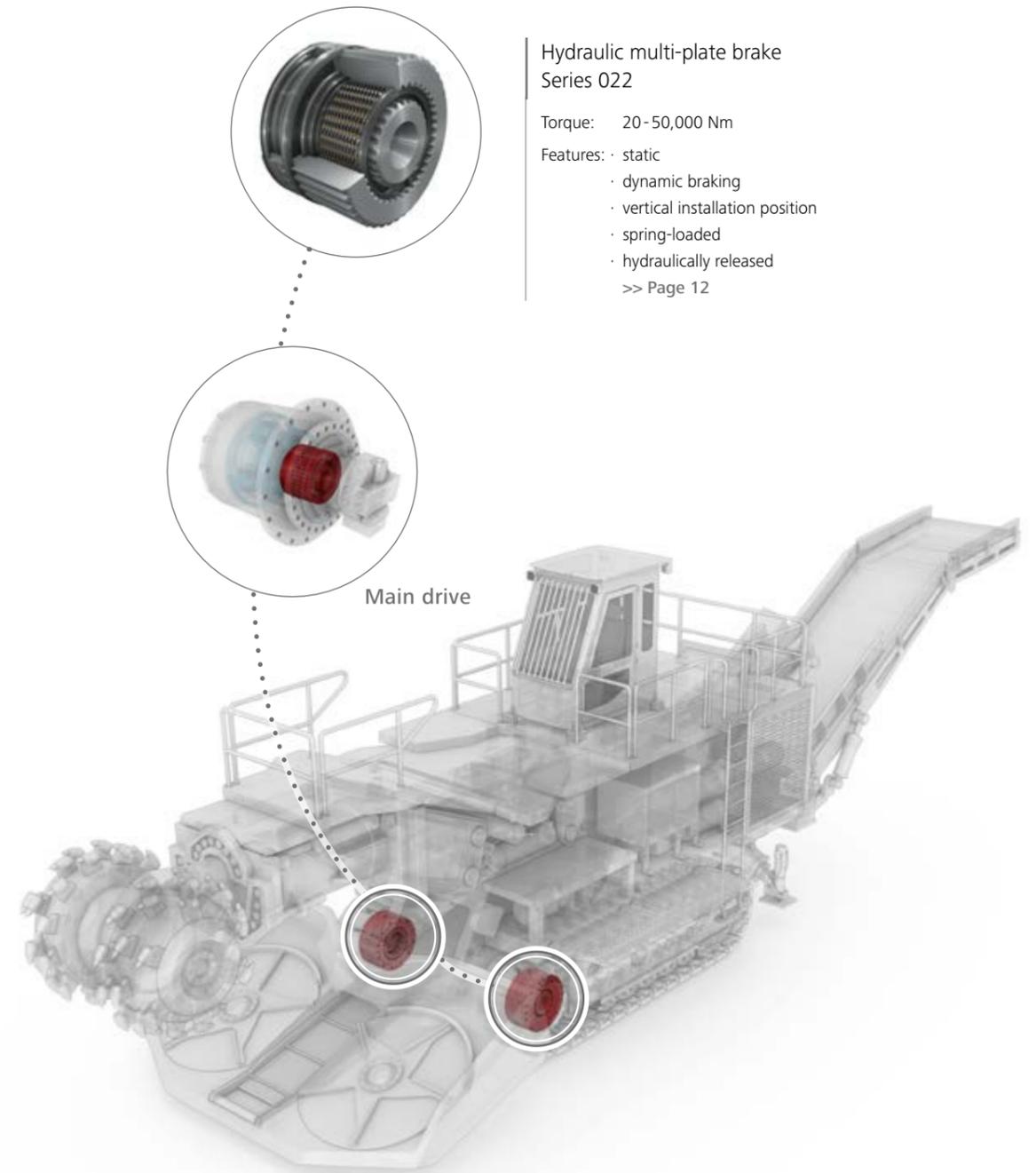
Plates

Spring-applied slipping clutches Series 600 / 700

- Torque: 20 - 50,000 Nm
- Features:
- absorption of peak loads
 - torque transmission
 - controllable torque
 - spring-applied
- >> Page 13

- Torque: 2,000 - 50,000 Nm
- Features:
- plate package with sintered linings against steel plates
 - virtually wear-free
 - require no maintenance
 - fixed, defined friction coefficient with reliable torque value
- >> Page 10

| Road header



Main drive

Hydraulic multi-plate brake Series 022

- Torque: 20 - 50,000 Nm
- Features:
- static
 - dynamic braking
 - vertical installation position
 - spring-loaded
 - hydraulically released
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Plates



- T** Torque: 2,000 - 50,000 Nm
- F** Friction Diameter: 150 - 420 mm



- T** Torque: Torque: 150 - 50,000 Nm
- n** Rotations per minute: 9,800 - 350 min⁻¹
-  Outside diameter: 90 - 1,200 mm
-  Bore diameter: 35 - 500 mm
-  Length: 64 - 755 mm

Hydraulic multi-plate clutches Series 021

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.

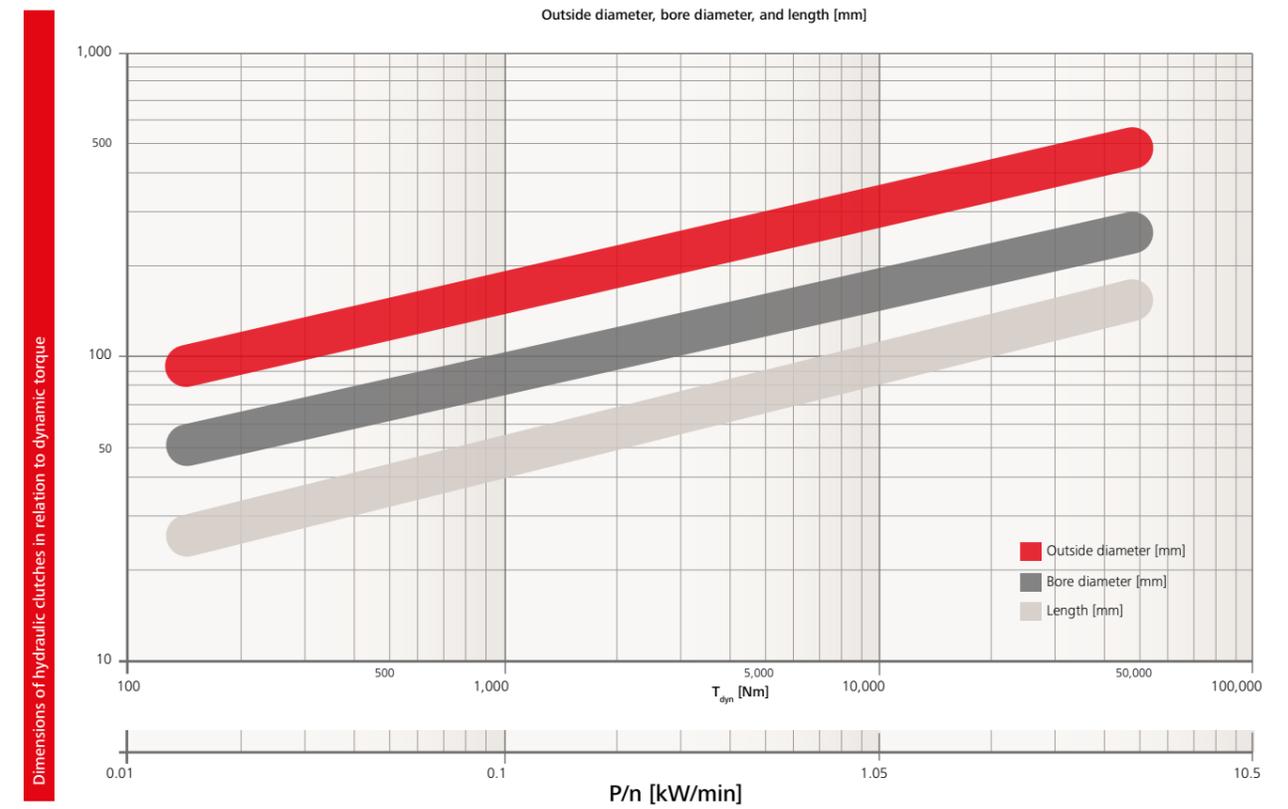
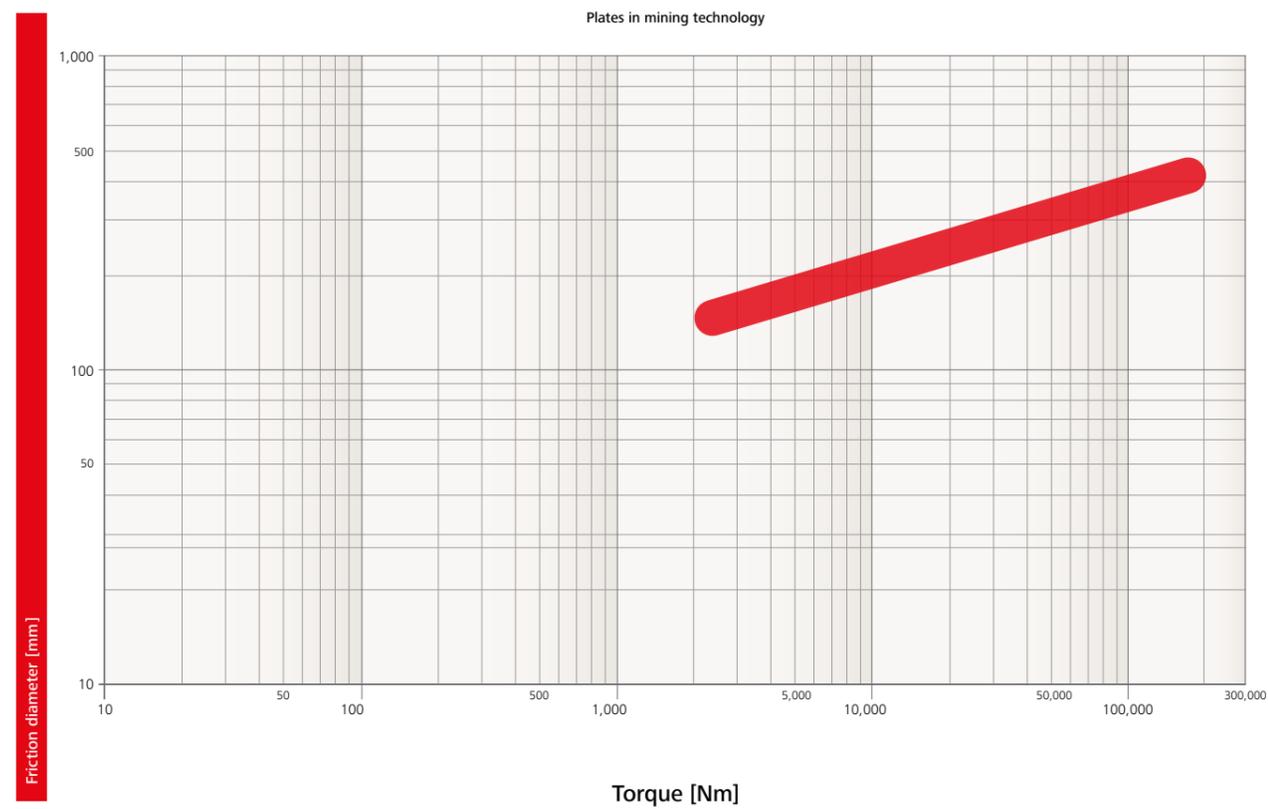
Combined with a multi-plate clutch or brake, these plates come in a multitude of different dimensions, friction combinations, and surface patterns.

Based on our friction linings, which have been tried and trusted for many years in the mining sector, clutches in this series reconcile high torque and thermal absorption rates as well as a favorable outer diameter. A high shaft diameter can also be used.

Due to their broad power spectrum, smaller sizes can be achieved with corresponding weight and cost benefits, especially in higher torque ranges. The optimized outer diameter makes shorter distances between axes possible, and in this way offers clear savings potential in the gearbox.

The hydraulic multi-plate clutches impress with their comprehensive service friendliness. The plate pack, which is wear-free under the specified conditions, can be accessed from either side depending on the model and ensures an easy, safe, and swift replacement of the plate pack. The special design also ensures that other components cannot fall out during replacement.

The Ortlinghaus multi-plate clutches safely accelerate even very large drive equipment. This optimal further development of our tried-and-tested technology sets today's industry standards.



Hydraulic multi-plate brakes Series 022



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



- T** Torque: 20 - 50,000 Nm
- Outside diameter: 70 - 700 mm
- Bore diameter: 12 - 250 mm
- Length: 90 - 300 mm

Spring-applied slipping clutches Series 600/700

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 mining equipment engineering, these multi-plate brakes are used in travel-drive and slew-drive brake applications.

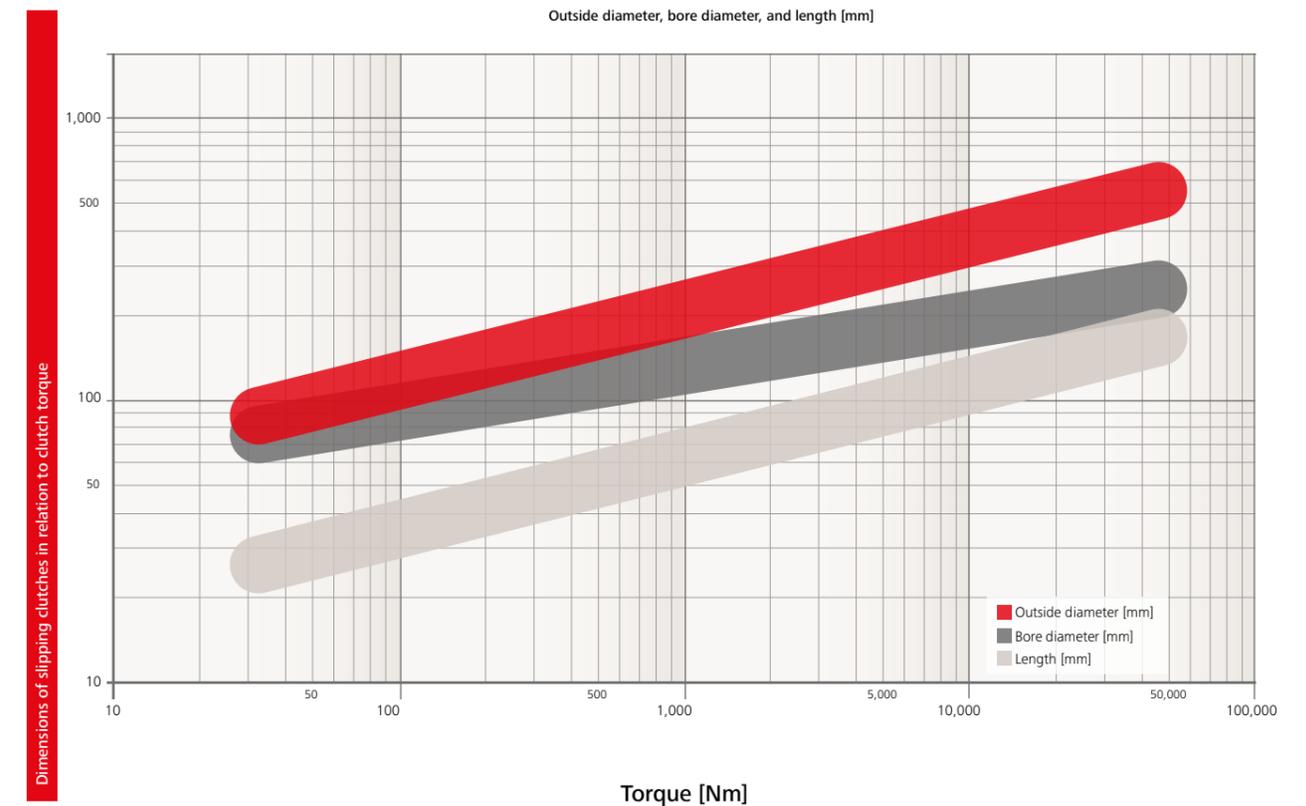
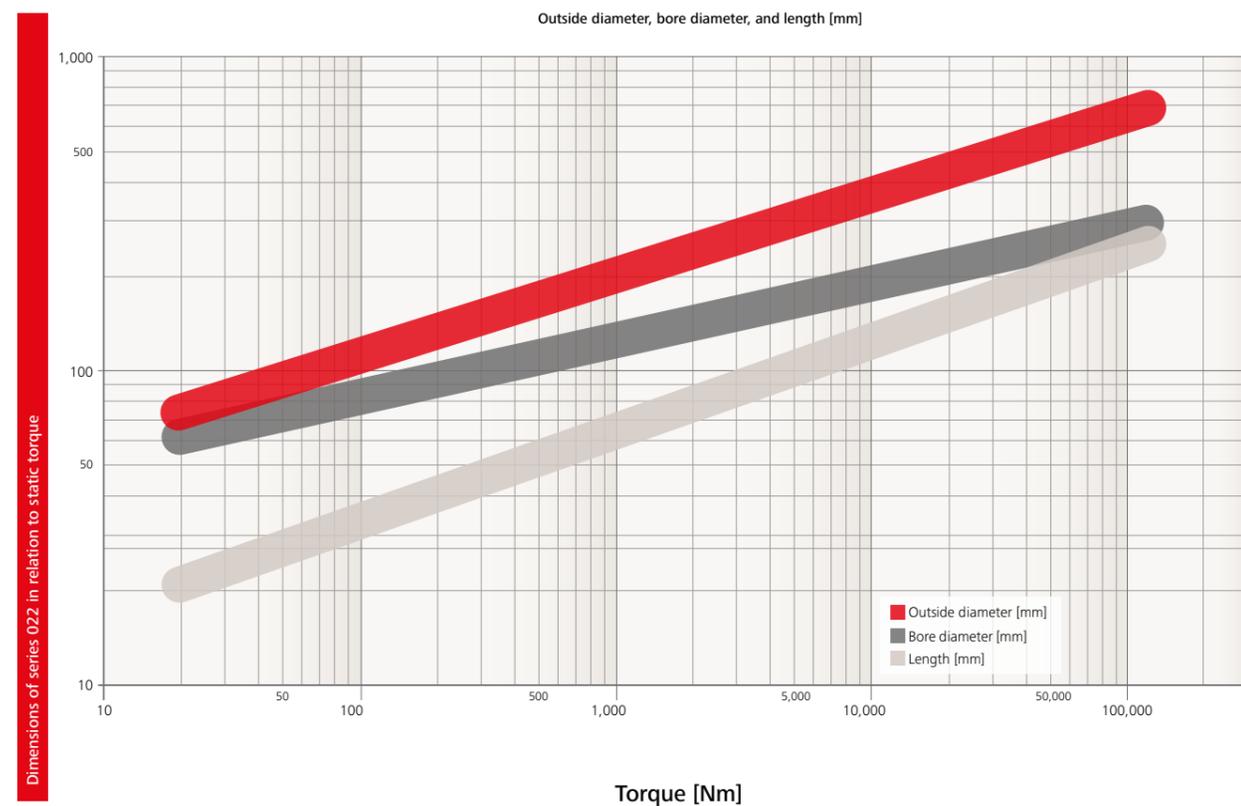
Hydraulically actuated brakes are also available as a special version. The spring-loaded brakes are safety brakes, which automatically work in cases of pressure failure. The brakes can achieve full torque even when there is no pressure.

Our series 022 conforms to the directive 94/9/EG (ATEX).

 II 2 G/D c IIB and II 3 G/D c IIB I M2 c

The advantage of these wet-running, hydraulically released and spring-applied multi-plate brakes is the high torques they achieve in compact dimensions.

Ortlinghaus slipping clutches are always used when external peak loads need to be absorbed and smoothed safely. They provide protection from peak torque and unexpected stoppages. As the release torque can be set, torque is also transferred during slipping so that no uncontrolled torque transmission takes place. A reset is not required either. Our safety clutches have proven their worth over decades of the most demanding mining use, and undergo constant further development.





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 are currently working toward 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.



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