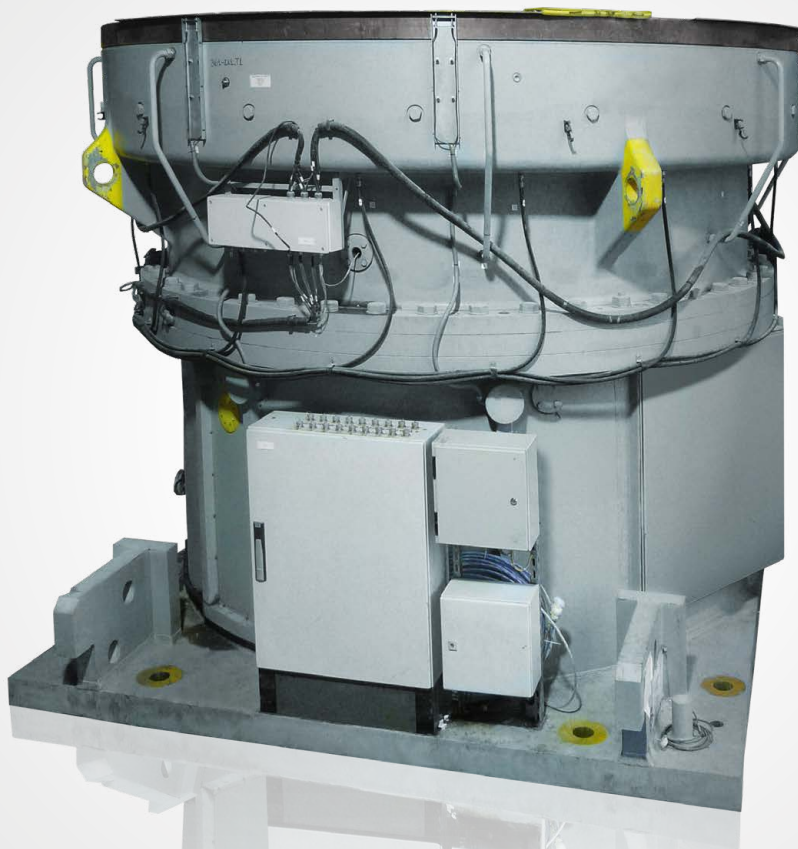


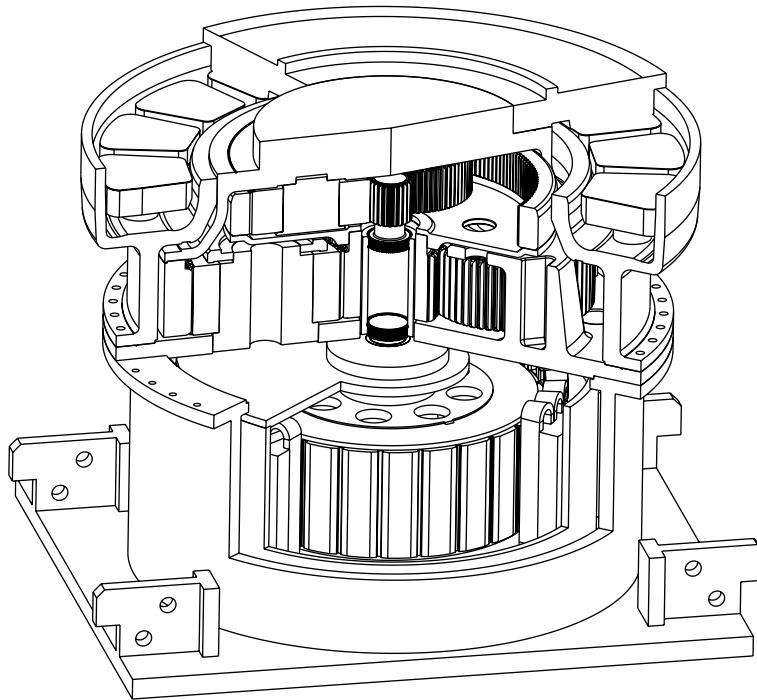
MAAG[®] Gear CEM Drive

System intelligence for vertical mills



Ingenious drive system

We achieved a new milestone in large vertical roller mills through systematic development and continuous improvement. This new product group excels in terms of: **reliability, efficiency and flexibility.**



Key benefits:



Less
vibration due
to optimised
drive control



Adaptable
to the composition
of varying
material grades



Able
to accommodate
different
materials
in the same mill



Smooth
operation
and energy
efficiency



Easy handling
and easy
maintenance



Soft start-up
of the mill



Infinitely
variable speed

Introduction

With the novel, integrated and modular CEM (central electrical motor) Drive concept, we combine the benefits of the proven MAAG technology with an innovative motor design. The result is a state-of-the-art energy-saving drive system for vertical mills combined in one casing.

The modular design of the CEM Drive system permits a power range from 4,000 to 14,000 kW drive power, with the best possible availability levels. With the variable frequency converter energising the motor, this drive system allows optimised material grinding. The flexibility of the drive enables the production process to be optimised and actively controlled.

You get the CEM Drive system from one source and therefore an optimum adjusted drive system.

New design

The CEM gear stage is the proven PV stage (double planetary stage with torque split) of the well-known MAAG WPV gearbox. The motor and the planetary stage are in the same axis and directly coupled, thus eliminating the bevel gear stage used in conventional gearboxes.

The planetary stage is fitted with smooth-running, maintenance-free sleeve bearings. This results in identical external dimensions compared to conventional gearboxes.

The CEM Drive is therefore an ideal solution for replacement and upgrading projects.

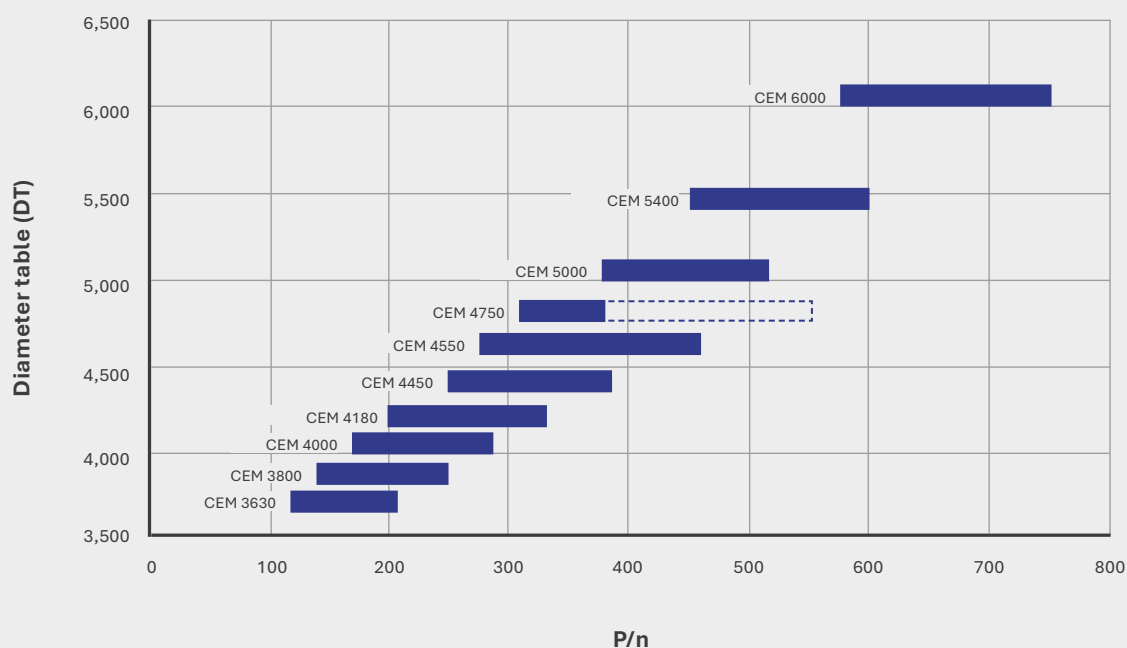
Motor

The heart of the CEM Drive is a permanent magnet synchronous motor with a loss-optimised single-tooth coil. The use of permanent magnets minimises resistive losses, in turn resulting in reduced energy costs. In combination with the frequency converter, the motor delivers constant torque over a wide range of speeds, with consistently high efficiency.

The integrated motor design brings the mill operator a host of cost benefits:

- No additional base needed, since there is no external motor
- The absence of an external main motor saves time-consuming alignment after commissioning, inspection or repair
- No auxiliary drive required for maintenance work

Selection chart for a vertical mill gear unit



Oil unit

The gear unit is lubricated by a closed-circuit oil system. The oil tank serves as a platform on which all the assemblies and components, such as motor pumps (high and low pressure), switchable double oil filter, oil cooler and instrument panel, are installed.

Frequency converter

The VFC allows the mill speed to be continuously adjusted and therefore ideally matched to the specific grinding requirements of production.

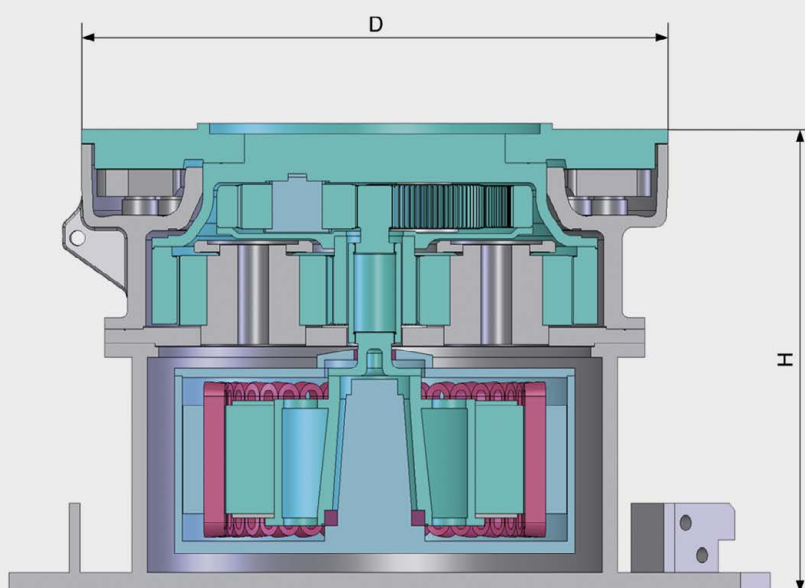
The smooth start up allows rotation at intermediate speeds to empty the mill table in a controlled way, in order to prevent overloading of the reject system, as well as slow turning and positioning of the mill for maintenance work.

The state-of-the-art drive control allows fine-tuning of speed and torque to reduce the overall vibration level and optimise the running behaviour of the mill for different operational conditions. The perfectly matched components minimise system perturbations.

Size and standard dimension (mm)

Size	D Output	H Total
CEM 3630	3,630	2,760
CEM 3800	3,800	2,880
CEM 4000	4,000	3,150
CEM 4180	4,180	3,130
CEM 4450	4,450	3,340
CEM 4550	4,550	3,475
CEM 4750	4,750	3,300
CEM 5000	5,000	3,350
CEM 5400	5,400	3,480
CEM 6000	6,000	On request

The CEM Drive concept



Returns

One time returns

The one time returns of CEM Drive System can be subdivided in the three groups below. Every involved component in a drive train undergoes these process steps. When analysing all listed process steps in detail and comparing them with the one source solution of CEM Drive, several savings can be evidenced.

Engineering	Sourcing & Logistics	Installation & Commissioning
Project management - Civil engineering - Mechanical engineering - Electrical engineering - Designmatch	Procurement - Supplier evaluation - Offer request & evaluation - P.O. issue - Expediting & quality control Logistics - Transportation	Installation - Civil work - Handling on site - Installing - Aligning - Cabling Commissioning - FAT tests - Commissioning - Final adjustments
50% savings on engineering	60% savings in sourcing & logistics	60% savings on installation & commissioning

Continuous returns

Function	Process enhancements	Maintenance
Function improvements - Increased efficiency	Process - Increased availability - Improved process control thanks to variable drive and condition monitoring system	Maintenance - Lower maintenance and spare part costs - No different lube and cooling oil required - Service & maintenance from one source
22% less energy losses	Save up to 13% on process enhancements	Reduce your OPEX by 30%

Precision is a question of quality

Our products are known for their high reliability. Manufactured in state-of-the-art production plants, enriched with many years of experience, supported by a wide range of services.

Quality policy

Our certification according to the latest ISO 9001:2008 standards and our commitment to create strong relationships with our customers, suppliers and employees has the clear target to establish us as a trustworthy, reliable and professional partner. This commitment includes providing the markets with high quality and high value solutions, products and services to support productivity and sustainability of our customer.

With our process management system, we endeavor to meet and exceed quality standards and provide adequate resources to support the quality system.

Our quality policy centers on the importance of meeting our customers' requirements. To reach that our management continuously reviews and establishes the quality objectives and our employees are committed to the company's Management System, as well to the continual improvement of the system and the entire organization. Each employee is aware of the vision and strategy we pursue and works in a culture of opportunity.

With our suppliers and external partners, we cultivate an open communication and collaborate on performance-oriented results.



Home of Precision Engineering

For more than 100 years, the MAAG® Gear brand has successfully lived up to its founding vision and values.

Evolving demands in heavy-duty industries are driving the need for more efficient, reliable, and sustainable gear technologies. At MAAG, we are dedicated to providing high-precision solutions that respond to this need and enhance the productivity, sustainability and reliability of our clients' operations in cement, mining, and beyond. With a rich history of innovation and a robust product portfolio, we stand as trusted partners, committed to our mission of driving progress through precision. Discover how MAAG can help you elevate your business.



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