

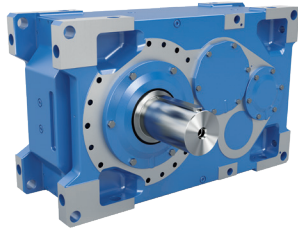


Drive solutions for the grain industry

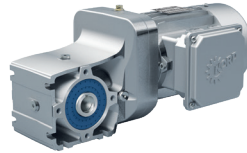
Complete drive systems from a single source



NORD DRIVESYSTEMS Group



Industrial gear units



Geared motors



Frequency inverters and motor starters

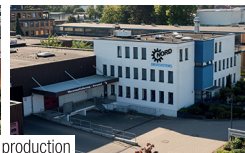
- ▶ Headquarters and technology centre in Bargteheide near Hamburg.
- ▶ Innovative drive solutions for more than 100 branches of industry.
- ▶ 7 production locations with cutting edge technology produce gear units, motors and drive electronics for complete drive systems from a single source.
- ▶ NORD has 48 subsidiaries in 36 countries and further sales partners in more than 50 countries, providing local stocks, assembly centres, technical support and customer service.
- ▶ More than 4,100 employees throughout the world create customised solutions.



Headquarters in Bargteheide



Gear unit production



Inverter production



Motor production



Production and assembly

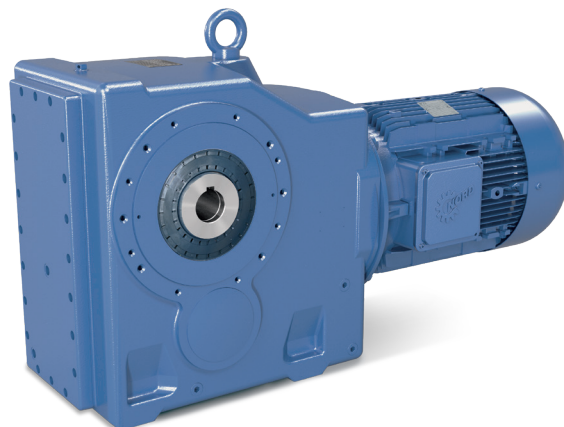


Motor assembly



Integrated solutions for the special requirements of the grain industry

- ▶ Simple commissioning
- ▶ Easy maintenance and safe, reliable operation
- ▶ Lower total cost of ownership
- ▶ Modular design
- ▶ Energy savings
- ▶ Project and product support
- ▶ Global NORD network



Drive solutions for the grain industry

1 Drag conveyors

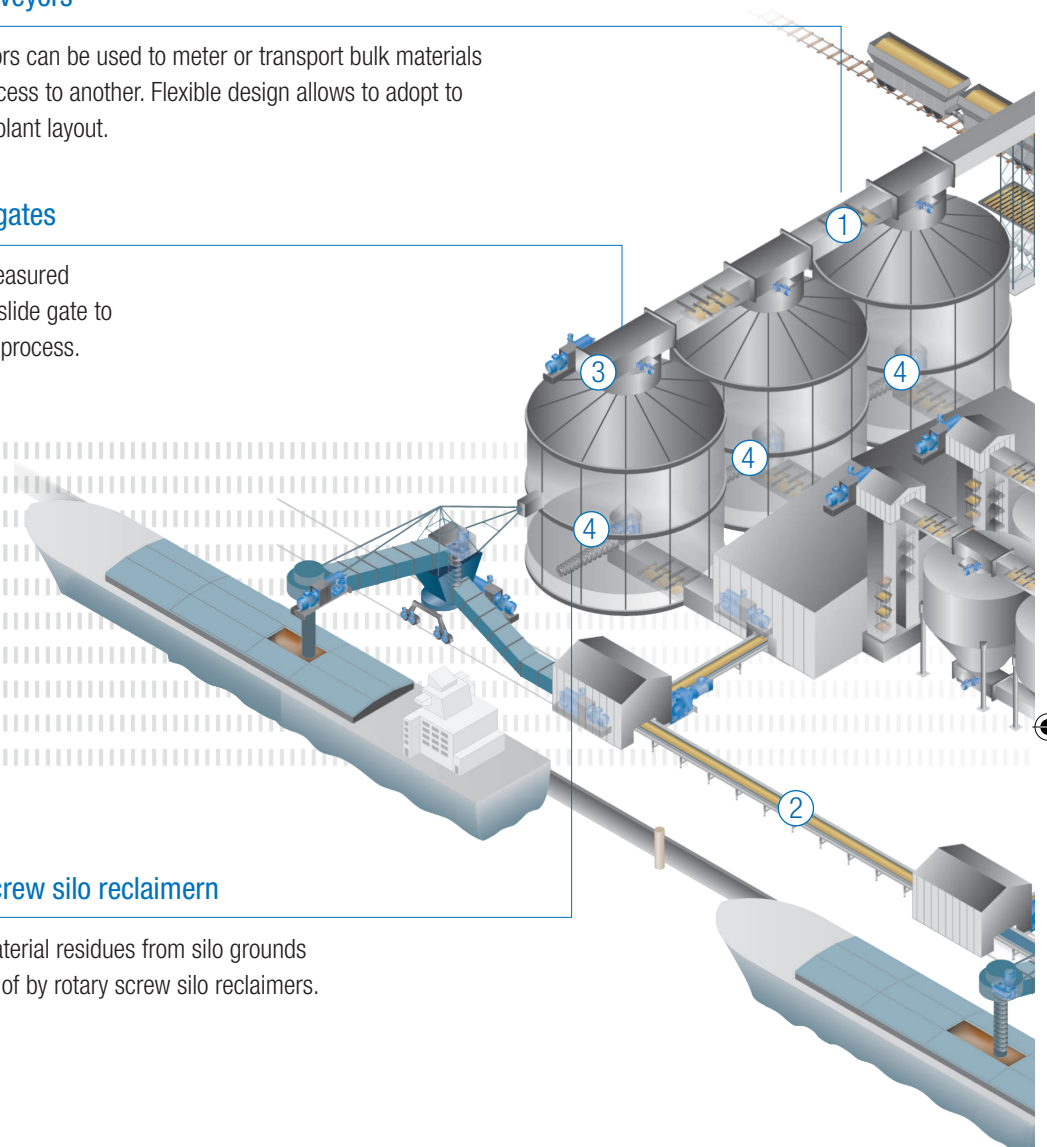
Drag conveyors can be used to meter or transport bulk materials from one process to another. Flexible design allows to adopt to nearly every plant layout.

3 Rotary valves / Feeders / Slide gates

The bulk material can be regulated, measured and dosed by a rotary valve, feeder or slide gate to ensure the correct material flow in the process.

4 Rotary screw silo reclaimers

Removing material residues from silo grounds is taken care of by rotary screw reclaimers.



NORD DRIVESYSTEMS is a globally active system provider of robust and reliable drive technology, including drives for the special environment of the grain industry. NORD designs customised and individual drive solutions, which meet the requirements of several grain production processes.

Terminals

- ▶ Filling / receiving
- ▶ Storage / conveying
- ▶ Draining / load out

Grain silo plants

- ▶ Port facilities
- ▶ Rail
- ▶ Truck

Processing

- ▶ Canola crushing
- ▶ Flour mills
- ▶ Feed storage
- ▶ Fertilizer storage
- ▶ Blending facilities



5 Screw conveyors

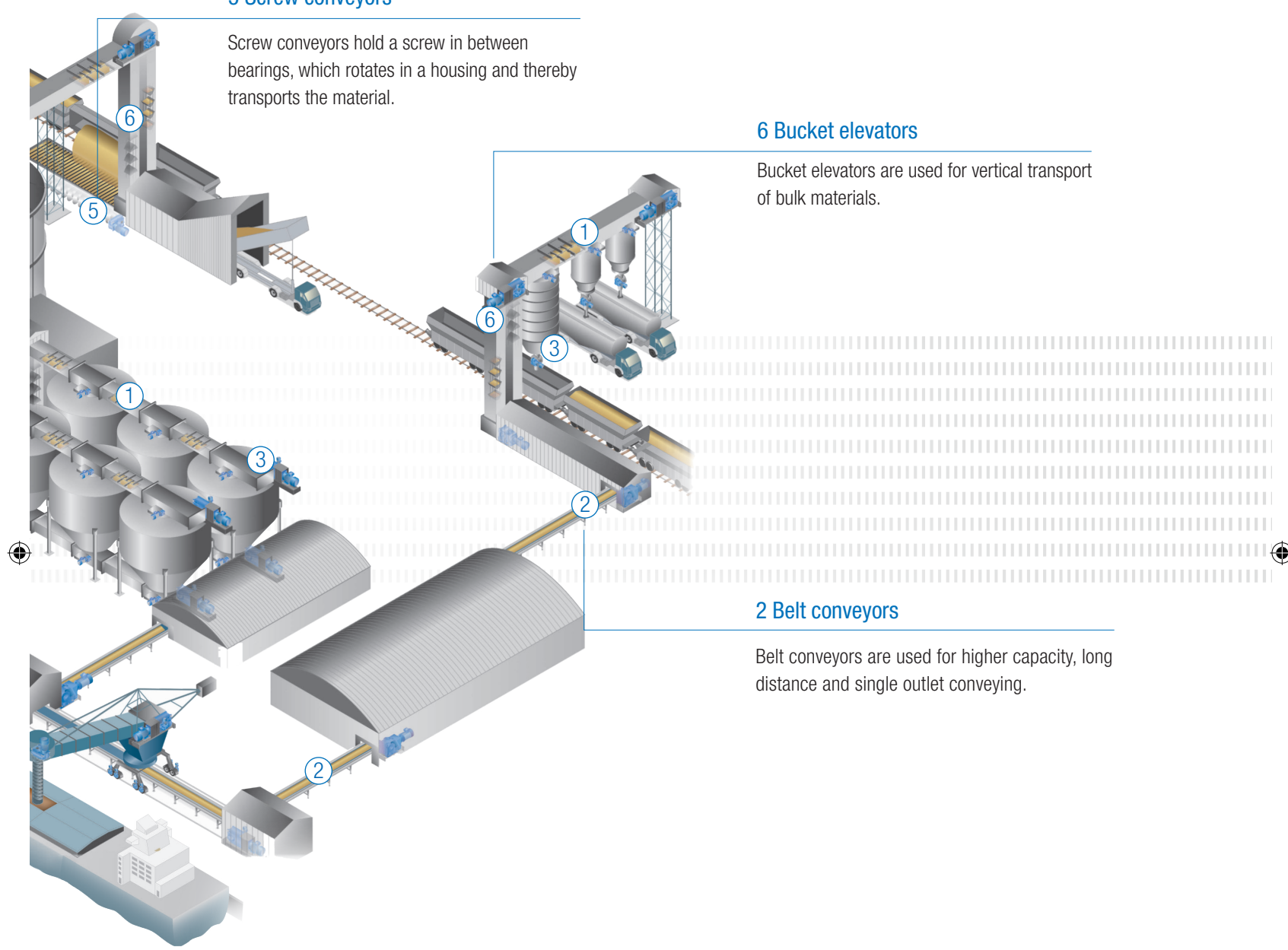
Screw conveyors hold a screw in between bearings, which rotates in a housing and thereby transports the material.

6 Bucket elevators

Bucket elevators are used for vertical transport of bulk materials.

2 Belt conveyors

Belt conveyors are used for higher capacity, long distance and single outlet conveying.



NORD DRIVESYSTEMS provides:

- ▶ Strong application knowledge and technical support
- ▶ Experience of thousands of installed units in the grain industry
- ▶ Complete drive solutions from a single source
- ▶ Strong worldwide presence and support
- ▶ Large product portfolio with high quality standards
- ▶ High reliability and robustness in certifications: ISO 9001, UL, CSA, GHOST-R, CCC and ATEX

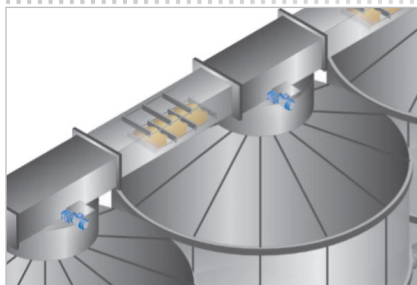


Drive solutions for the grain industry

NORD DRIVESYSTEMS develops and manufactures scalable drive solutions for all areas of the grain industry.

NORD DRIVESYSTEMS developed as early as 1981 the revolutionary block housing construction. From a single piece a closed gearbox housing is manufactured which combines all transmission elements.

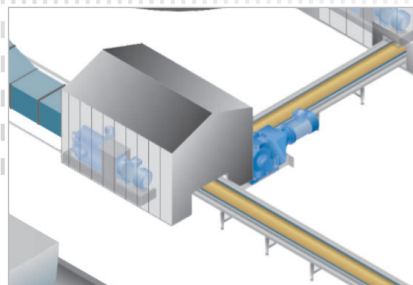
- ▶ One housing block in which all bearings are integrated
- ▶ Complete machining in one clamping
- ▶ High output torques
- ▶ High axial and radial load capacity
- ▶ Highest operational reliability
- ▶ Long service life
- ▶ Low-noise operation



Drag conveyors

Drag conveyors can be used to meter or transport bulk materials from one process to another. Flexible design allows to adopt to nearly every plant layout. They are ideal for handling dry, free-flowing materials in a fully closed design with safety and environmental advantages. Benefits of the drag conveyor include minimal product abrasion during conveying and require less horsepower per volume of material than other types of conveyors. NORD DRIVESYSTEMS compact and versatile design fits almost any plant layout.

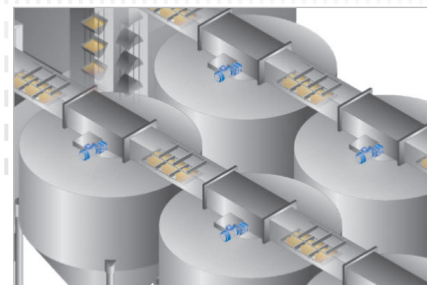
- ▶ Foot, shaft or flange mounted
- ▶ UNICASE cast iron housing
- ▶ Air breather helps prevent bearing and gear damage
- ▶ Case-hardened gears made of high-alloyed steel and high-quality bearings and shafts guarantee a long service life and allow high radial forces
- ▶ Parallel shaft geared motors are an alternative in limited space



Belt conveyors

Belt conveyors are used for higher capacity, long distance and single outlet conveying at low horsepower with static material on the belt for horizontal and/or inclined transportation of material.

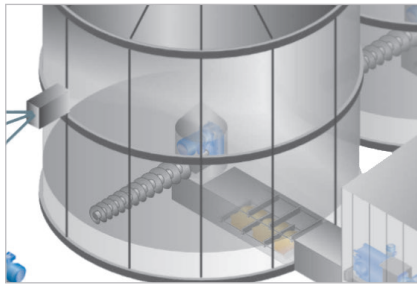
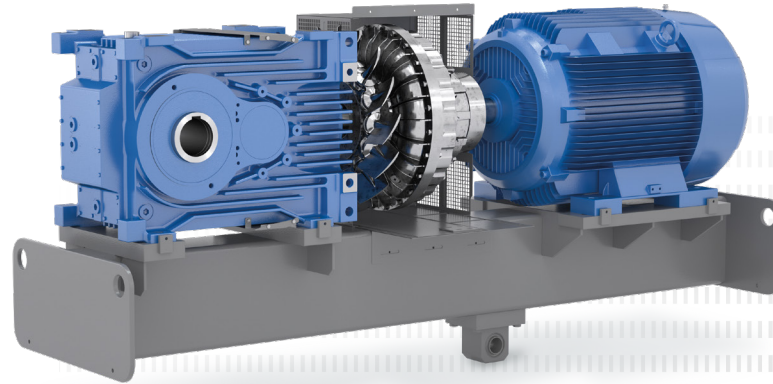
- ▶ Hydraulic couplings or inverter for soft start
- ▶ Back stop option to prevent material flow back
- ▶ Special sealing solutions
- ▶ Shrink disc for easy fixation
- ▶ Torque console, torque arms



Rotary valves/Feeders/Slide gates

The bulk material can be regulated, measured and dosed by a rotary valve, feeder or slide gate to ensure the correct material flow in the process. Exact positioning and constant but flexible speeds are important and can be regulated with NORD geared motors.

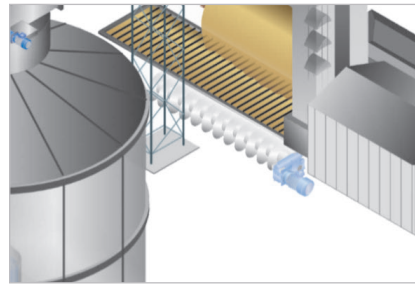
- ▶ Corrosion-resistant versions available for many applications
- ▶ Reverse operation option to remove material blockage (e.g. stones)
- ▶ Foot, shaft or flange mounted
- ▶ Space-saving design
- ▶ Special sealing solutions



Rotary screw silo reclaimers

Removing material residues from silo grounds is taken care of by rotary screw silo reclaimers. Included intelligent torque control solutions and reverse direction modes protect the application against overloads caused by bigger, harder materials.

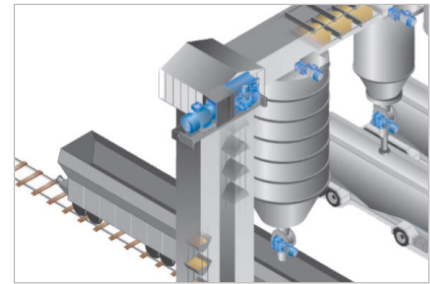
- ▶ UNICASE cast iron housing
- ▶ Foot, shaft or flange mounted
- ▶ Reinforced bearing designs for high axial and radial loads
- ▶ Intelligent drive electronics and torque control



Screw conveyors

Screw conveyors hold a screw in between bearings, which rotates in a housing and thereby transports the material. Over a specific distance, the bulk material conveyed in horizontal, inclined or vertical direction can be accurately metered through the case.

- ▶ UNICASE reducer housings
- ▶ Special shaft sealings for every environment
- ▶ Easy mounting and removal
- ▶ Eliminates the need for top motor mounting, pulleys and belts



Bucket elevators

Bucket elevators are used for vertical transport of bulk materials. NORD offers flexible solutions for torques of up to 282,000 Nm.

- ▶ Back stop option to prevent material flow back
- ▶ Auxiliary drive with overrunning clutch and incremental encoder available for maintenance mode
- ▶ Special sealing solutions
- ▶ Hydraulic couplings or inverter for soft start
- ▶ Swing base
- ▶ Direct or IEC mounted motors



Drive solutions for the grain industry

Safe, reliable and efficient drive solutions from a single source



Safe

NORD DRIVESYSTEMS efficient and reliable reducers, motors and frequency inverter contribute to a clean and safe design. By offering a neat and compact direct drive alternative, the application is free of straps and has no exposure of rotating components. The compact design is leak-free due to integrated pressure venting and easy to clean. ATEX-compliant drive solutions increase safety against unwanted gas or dust explosion.

- ▶ Optimised drive selections – designed with safety in mind
- ▶ Reduced pinch points and external rotating components
- ▶ Bolt on carriers and housing splits are eliminated

Reliable

Downtime is something unsustainable in the grain industry. To keep key operations safe and profitable, NORD DRIVESYSTEMS uniquely designed components work in unison and are highly reliable.

- ▶ Industry leading ratio range and mounting option flexibility
- ▶ UNICASE gear housings provide accurate positioning of bearings and shafts
- ▶ Air breather helps ensure a leak-free design
- ▶ Infinite-life, high quality gearing
- ▶ Exceptional durability, quiet operation and long service life
- ▶ Coupling, cooling and swing base options
- ▶ Predictive maintenance features

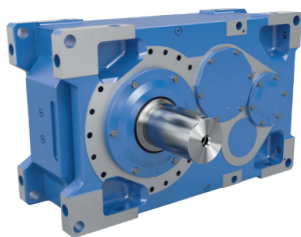
Efficient

NORD DRIVESYSTEMS supplies a wide range of electric motors, that exceed the latest global efficiency regulations and standards. The powerful and robust motors with low withstand voltage peaks and contribute with their efficiency to contribute to lower operating costs and energy requirements.

- ▶ Low inertia, inverter rated motors meet the latest global energy requirements.
- ▶ Efficient operation and optimised motor performance
- ▶ Reduced operating temperatures
- ▶ Longer service life and lower total cost of ownership



MAXXDRIVE® industrial gear units (Catalogue G1050)



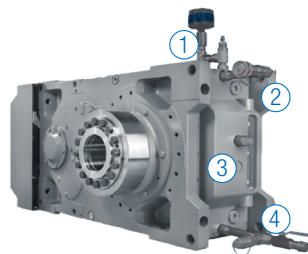
- ✓ Parallel axis and right-angled gear units
- ✓ High axial load capacity
- ✓ Long life, low-maintenance
- ✓ UNICASE housing
- ✓ Hollow or solid shaft
- ✓ Foot motor (IEC B3)
- ✓ Hydraulic clutch
- ✓ Backstop
- ✓ Brake
- ✓ All components can be mounted on a motor swing arm or a steel frame.
- ✓ High Efficiency IE3 motor
- ✓ ATEX motors for applications in explosive environments

Sizes: 11

Power: 1.5 – 6,000 kW

Torque: 15,000 – 282,000 Nm

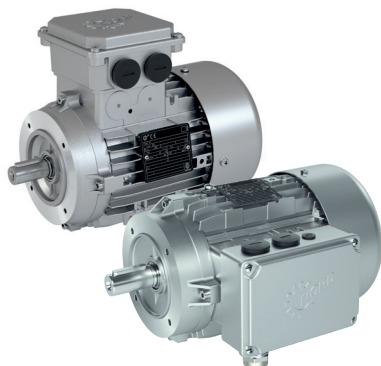
Speed ratio: 5.54 – 30,000:1



The maintenance package from NORD DRIVESYSTEMS is a combination of several protective measures that ensures your investment will have a long operating life.

- 1 Drying agent filter
- 2 Quick fit filter trolley connection
- 3 Oil inspection glass
- 4 Quick fit filter trolley connection and oil drain cock

Motors (Catalogue M7000)



- ✓ IE3 motors from 0.12 kW (Size 63)
- ✓ IE4 synchronous and asynchronous motors



Explosion-protected drive solutions

NORD DRIVESYSTEMS supplies customised explosion-protected motors and geared motors.

- ▶ Versions and equipment according to individual requirements
- ▶ Configuration processes validated according to ISO 9001
- ▶ Safe, SAP-supported modular system

Dust explosion-protected motors

- ▶ According to category 2D or 3D
- ▶ For Zone 21 or 22
- ▶ According to EN 60079-31
- ▶ Ignition protection type Ex t (protected by housing)

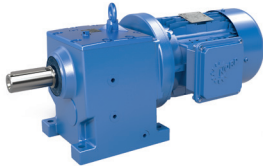
Dust explosion-protected gear units

- ▶ According to category 2D or 3D
- ▶ For Zone 21 or 22
- ▶ According to EN 13463
- ▶ Ignition protection type c (design safety)



Drive solutions for the grain industry

UNICASE helical in-line gear units (Catalogue G1000)



- ✓ Foot or flange mounted
- ✓ Long life, low-maintenance
- ✓ Optimum sealing
- ✓ UNICASE housing

Sizes: 11
Power: 0.12 – 160 kW
Torque: 10 – 26,000 Nm
Speed ratio: 1.35 – 14,340.31:1

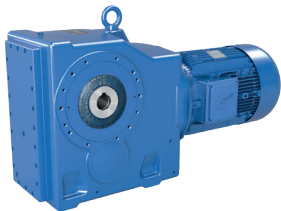
UNICASE parallel shaft gear units (Catalogue G1000)



- ✓ Foot, flange or face mounted
- ✓ Hollow or solid shaft
- ✓ Compact design
- ✓ UNICASE housing

Sizes: 15
Power: 0.12 – 200 kW
Torque: 110 – 100,000 Nm
Speed ratio: 4.03 – 15,685.03:1

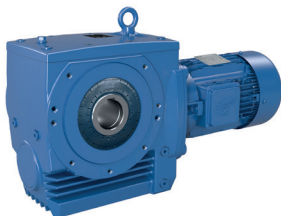
UNICASE bevel gear units (Catalogue G1000)



- ✓ Foot, flange or face mounted
- ✓ Hollow or solid shaft
- ✓ UNICASE housing

Sizes: 11
Power: 0.12 – 200 kW
Torque: 180 – 50,000 Nm
Speed ratio: 8.04 – 13,432.68:1

UNICASE worm gear units (Catalogue G1000)

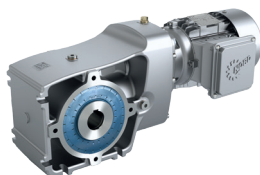


- ✓ Foot, flange or face mounted
- ✓ Hollow or solid shaft
- ✓ UNICASE housing

Sizes: 6
Power: 0.12 – 15 kW
Torque: 93 – 3,058 Nm
Speed ratio: 4.40 – 7,095.12:1



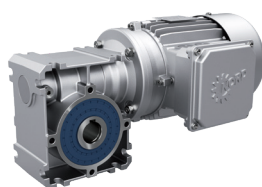
NORDBLOC.1® 2-stage bevel gear units (Catalogue G1014)



- ✓ Foot, flange or face mounted
- ✓ Aluminium housing
- ✓ Hollow or solid shaft

Sizes: 6
Power: 0.12 – 9.2 kW
Torque: 50 – 660 Nm
Speed ratio: 3.03 – 70:1

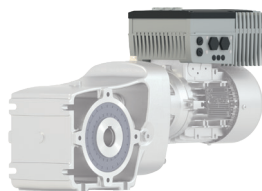
UNIVERSAL SI worm gear units (Catalogue G1035)



- ✓ Modular
- ✓ Life-long lubrication
- ✓ Universal mounting options
- ✓ IEC version

Sizes: 5
Power: 0.12 – 4.0 kW
Torque: 21 – 427 Nm
Speed ratio: 5.00 – 3,000:1

NORDAC FLEX SK 200E frequency inverters (Catalogue E3000)



- ✓ Energy-saving function
- ✓ Integrated PLC
- ✓ Integrated POSICON positioning control

Sizes: 4
Voltage: 1~ 110 – 120 V, 1~ 200 – 240 V, 3~ 200 – 240 V, 3~ 380 – 500 V
Power: 0.25 – 22 kW

NORDAC PRO SK 500E frequency inverters (Catalogue E3000)



- ✓ Stand-alone operation
- ✓ Sensorless current vector control (ISD control)
- ✓ 4 parameter sets
- ✓ Integrated PLC

Sizes: 11
Voltage: 1~ 110 – 120 V, 1~ 200 – 240 V, 3~ 200 – 240 V, 3~ 380 – 480 V
Power: 0.25 – 160 kW





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