

Intelligent Drivesystems, Worldwide Services

PRODUCT OVERVIEW GEARED MOTORS AND FREQUENCY INVERTERS

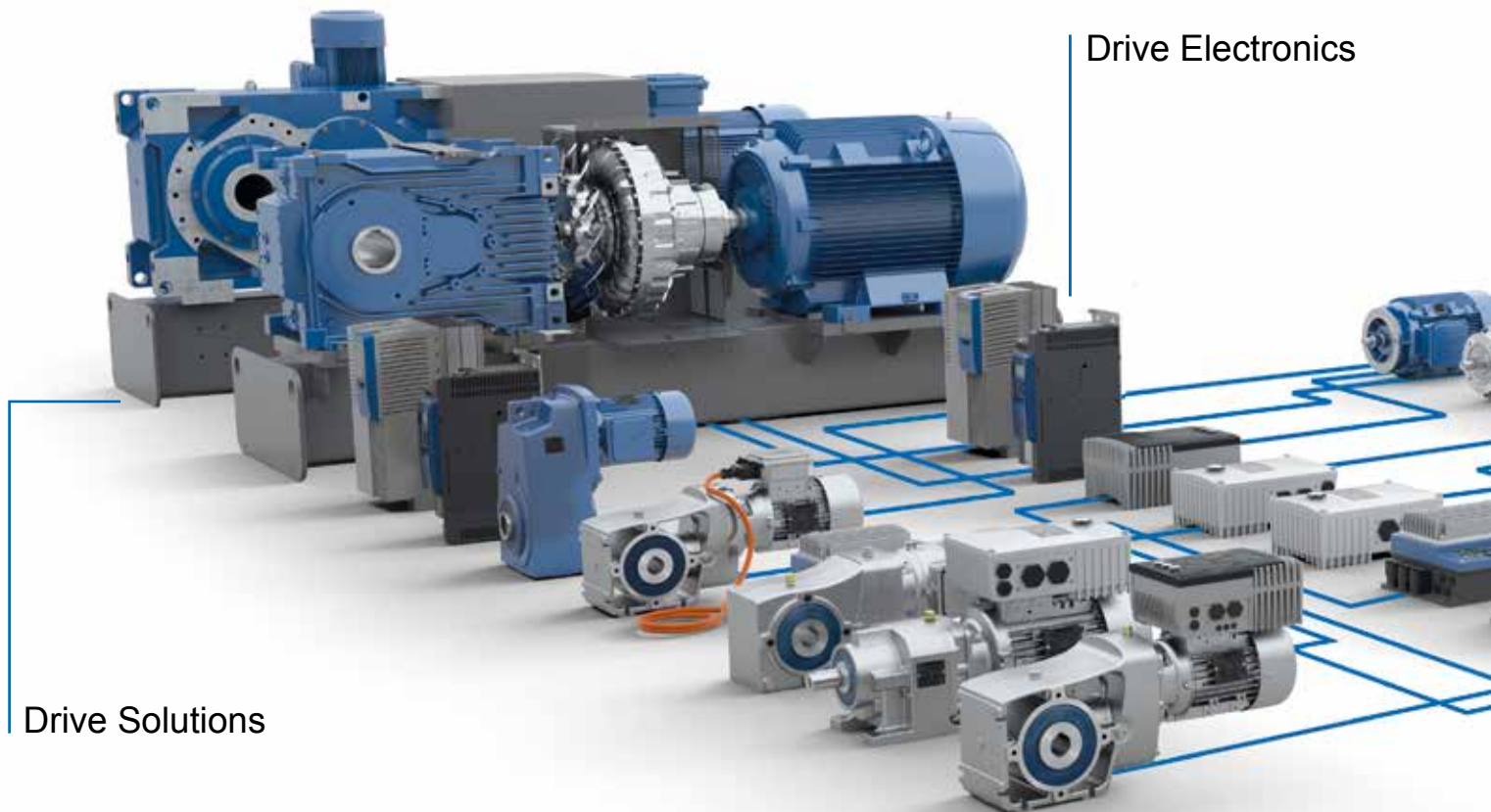


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**COMPLETE
DRIVE SOLUTIONS
FROM A SINGLE SOURCE**

NORD[®]
DRIVESYSTEMS

COMPLETE DRIVE SOLUTIONS FROM A SINGLE SOURCE



Drive Electronics

Drive Solutions



Reliable gear units with one-piece UNICASE housing can cater for any load.

- High power density
- Long service life



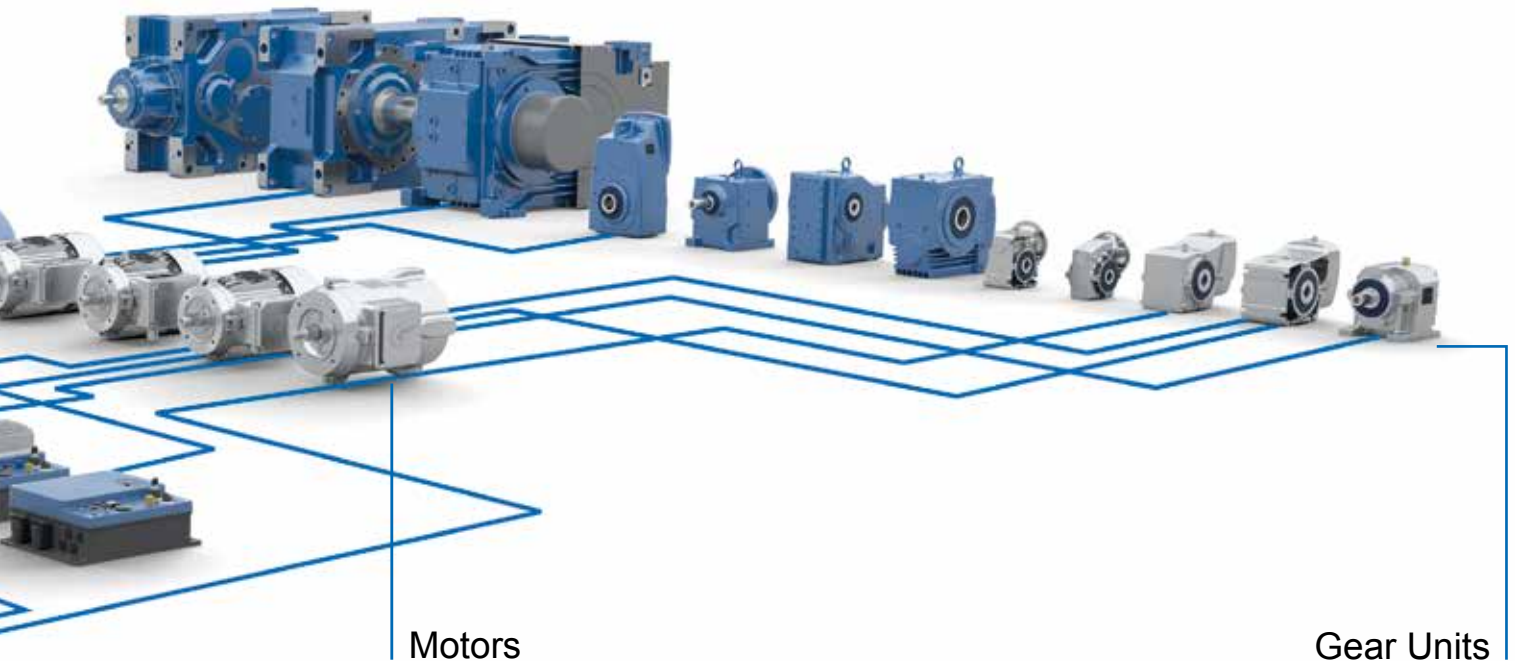
Powerful motors up to IE4 keep drive systems in motion in all operating situations.

- Designed in compliance with international standards
- High overload capacity
- Energy-efficient



Intelligent drive electronics provide exactly the control options which you need.

- Scalable functions
- Full field bus connection facilities
- Wide power range
- PLC integrated at no extra cost



An optimum and individual drive solution can be created using the modular NORD system consisting of the gear unit, motor and drive electronics. Each of the variants combine: the highest product quality, short planning and assembly times, high delivery availability, and a good price/performance ratio.



Extensive communication options enable access to drives from all levels to enable a wide variety of setting options.

- All common bus systems
- Quick and simple commissioning with plug-in control box or using NORDCON software
- Convenient hand held console for local operation
- Optionally with intralogistics options



Switches and keys are located directly on the drives and enable direct starting and stopping as well as mode switching.

- Mains switch
- Selector switch for local or remote control
- Start/Stop and Forward/Reverse switch
- Energy-efficient



All interfaces are designed for ease of use. Drives can be easily configured and installed.

- Simple Plug-and-Play with all common connection plugs
- Plug-in supply cable and motor output
- Plug-in sensors and encoders
- Pre-assembled cables
- PLC integrated at no extra cost

NORD DRIVESYSTEMS

GEARED MOTORS

As early as 1981 NORD DRIVESYSTEMS developed the revolutionary UNICASE housing. An enclosed gear unit housing which combines all elements of the gear unit is produced from a single piece of material.

- A housing block which integrates all bearing points
- Complete machining in a single step
- High output loads
- High axial and radial load capacity
- Ultimate reliability
- Long service life
- Quiet running

UNICASE helical 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
Ratio	1.35:1 – 14,340.31:1

NORDBLOC.1® 1- and 2-stage helical gear units (Catalogue G1000)



- ✓ Foot or flange-mounted
- ✓ Die-cast aluminium housing
- ✓ UNICASE housing
- ✓ Industry standard dimensions

Sizes	13
Power	0.12 – 37 kW
Torque	30 – 3,300 Nm
Ratio	1.07:1 – 456.77:1

UNICASE parallel shaft gear units (Catalogue G1000)



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

Sizes	15
Power	0.12 – 200 kW
Torque	110 – 100,000 Nm
Ratio	4.03:1 – 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
Ratio	8.04:1 – 13,432.68:1

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



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

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

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
Ratio	4.40:1 – 7,095.12:1

UNIVERSAL SI worm gear units (Catalogue G1035)



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

Sizes	5
Power	0.12 – 4.0 kW
Torque	21 – 427 Nm
Ratio	5.00:1 – 3,000.00:1

UNIVERSAL SMI worm gear units (Catalogue G1035)



- ✓ Smooth surfaces
- ✓ Universal mounting options
- ✓ Life-long lubrication
- ✓ IEC version

Sizes	5
Power	0.12 – 4.0 kW
Torque	21 – 427 Nm
Ratio	5.00:1 – 3,000.00:1

NORD DRIVESYSTEMS

MAXXDRIVE® INDUSTRIAL GEAR UNITS

Up to 250,000 Nm

NORD DRIVESYSTEMS is the only manufacturer which produces modular industrial gear units with an output torque of up to 250,000 Nm in a one-piece UNICASE housing.

MAXXDRIVE® industrial gear units (Catalogue G1050)

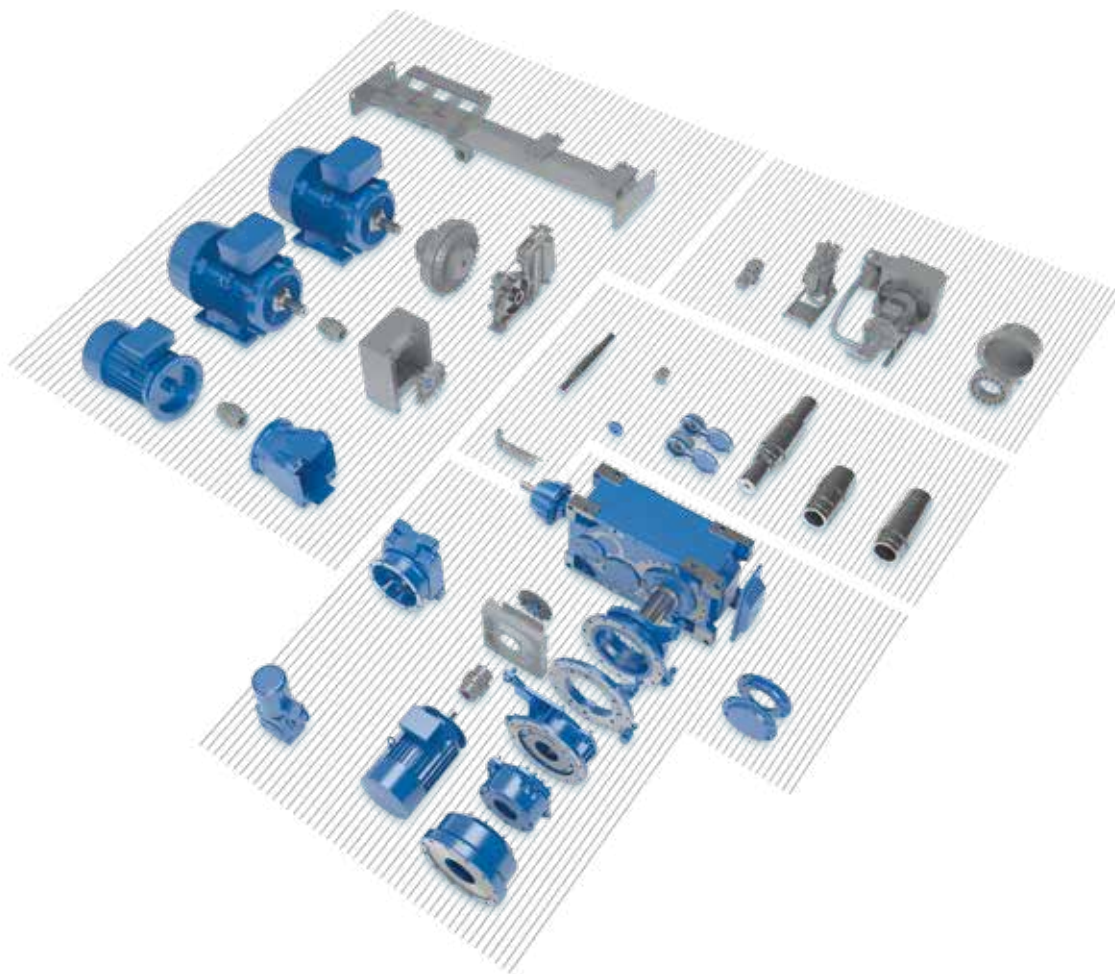


- ✓ All bearing points and sealing-surfaces are machined in a single operation
- ✓ No separating joints in the housing, therefore no sealing-surfaces subject to torque
- ✓ High-precision axis alignment for quiet running
- ✓ Long life, low maintenance
- ✓ Gear ratio range 5.60 to 400:1 with the same foot dimensions
- ✓ Parallel axis and right-angled gear units

Sizes	11
Power	1.5 – 4,000 kW
Torque	15,000 – 250,000 Nm
Ratio	5.60:1 – 30,000:1

Industrial gear unit modules

Optimally matched components form the basis of a wide variety of variants as well as great flexibility and short planning and assembly times. This enables the drive solutions to be individually tailored to the customer's requirements with short delivery times, even for large gear units.



NORD DRIVESYSTEMS

MAXXDRIVE® XT INDUSTRIAL GEAR UNITS



MAXXDRIVE® XT industrial gear units (Catalogue G1050)



- ✓ Optimised housing and surface design for maximum power at high temperatures
- ✓ No separating joints in the housing, therefore no sealing-surfaces subject to torque
- ✓ All bearings and sealing-surfaces are machined in a single process (quieter running and longer service life)
- ✓ High-precision axis alignment for quiet running
- ✓ Long life, low maintenance
- ✓ Angled gear units

Sizes	7
Power	50 – 1,500 kW
Torque	15,000 – 75,000 Nm
Ratio	6.30:1 – 22.4:1

With its symmetrical design the MAXXDRIVE® XT industrial gear units can be mounted in various installation orientations. Very high thermal limit powers are achieved through a strongly ribbed design in combination with an optimised axial fan and air guide covers.



NORD DRIVESYSTEMS

ASYNCHRONOUS AND SYNCHRONOUS MOTORS

NORD DRIVESYSTEMS develops its own motors and supplies them to all major markets throughout the world.

Our own developments ensure a high level of independence from external suppliers and therefore provides our customers with the decisive advantage of short and highly dependable delivery times.



In combination with motor and motor control systems in accordance with Ecodesign directive EN50598



Energy-saving motors (Catalogue M7000 and M7002)



Switchable pole motors (Catalogue M7000)



Single-phase motors (Catalogue M7000)



Smooth motors (Catalogue M7010)



Explosion-protected motors Gas atmospheres (Catalogue G2122)



Explosion-protected motors Dust atmospheres (Catalogue G2122)



International energy efficiency standards

- EU: IE1 – IE4 as per IEC 60034-30
- US: ee labelling as per EISA 2007 (Dept. of Energy)
- CA: CSA energy verified as per EER 2010
- CN: CEL as per GB 18613
- KR: KEL as per REELS 2010
- BR: Alto Rendimento as per Decreto nº 4.508
- AU: MEPS as per AS/NZS 1359.5

NORD DRIVESYSTEMS

FREQUENCY INVERTERS AND MOTOR STARTERS



NORD DRIVESYSTEMS – INDUSTRY 4.0 READY!

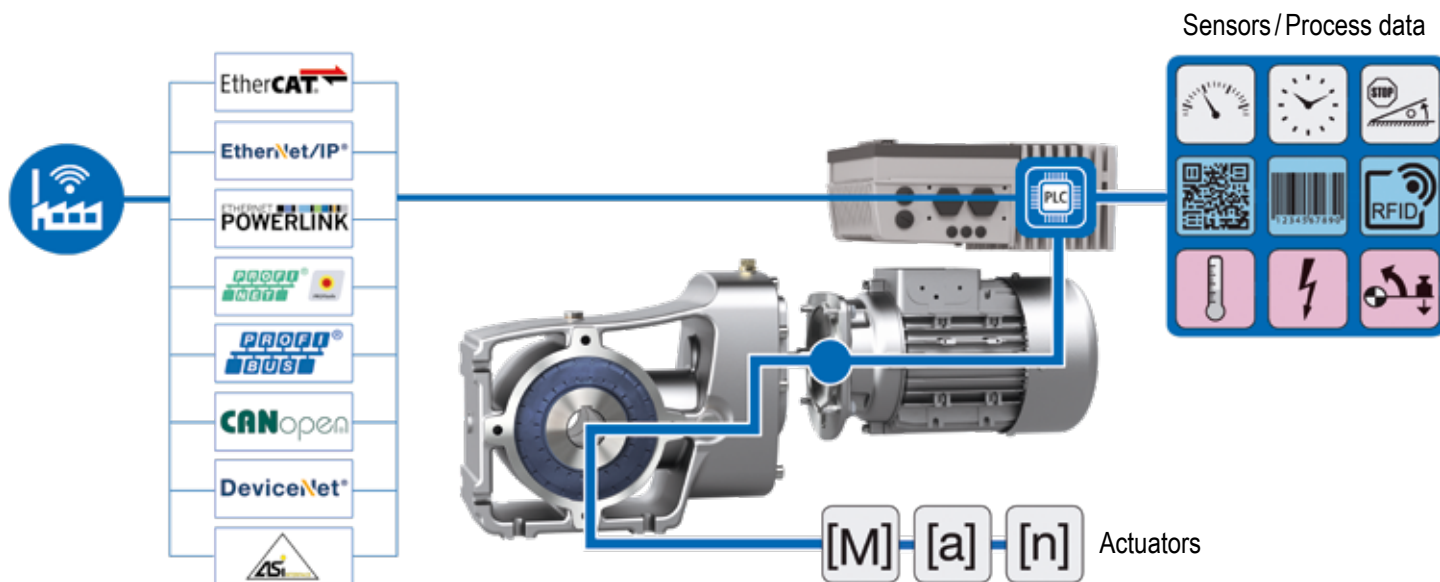
"NORD 4.0 READY!" means that NORD drive units are networked, autonomous and scalable. The key to this are the frequency inverters with their powerful processors and comprehensive equipment, interfaces and functions. They not only monitor themselves and the motor, but also their effect on the load situation in the segments of the plant and beyond.

We have the drive units for intelligent processes: Networked – Autonomous – Scalable. Intelligent drives from NORD DRIVESYSTEMS play an important role in highly networked systems in order to advance the so-called fourth industrial revolution which is based on the extensive exchange of information on all levels.

The integrated PLC processes data from sensors and actuators and if necessary initiates a control sequence and communicates high quality drive and application data to the control centre and other networked components.

For example, intelligent sequence controls can enable the drive unit to independently decide on a branch position and act accordingly. The drive units can also communicate with each other: "Attention, I am sending a package in your direction. Start your conveyor belt." A slave drive can synchronise to a master for a particular task and then return to normal operation. Hundreds of typical functions are saved as parameter sets and can be simply adopted.

As a result, the frequency inverter can coordinate both simple and complex applications independently from the plant control system, and can respond to changes to the process or remedy many process faults independently without external intervention.



NORD DRIVESYSTEMS

FREQUENCY INVERTERS AND MOTOR STARTERS

NORD DRIVESYSTEMS produces frequency inverters and motor starters for the necessary power electronics. Inverter solutions are available for conventional control cabinet installations as well as for decentralised, fully-integrated drive units.

SK 135E NORDAC *START* motor starters (Catalogue E3000)



- ✓ Integrated electronic brake rectifier
- ✓ Consistent parameter structure
- ✓ Reversing starter with soft start function

Sizes	2
Voltage	3~ 200 – 240 V 3~ 380 – 500 V
Power	0.12 – 3 kW or up to 7.5 kW

SK 180E NORDAC *BASE* frequency inverters (Catalogue E3000)



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

Sizes	2
Voltage	1~ 110 – 120 V 1~ 200 – 240 V 3~ 200 – 240 V 3~ 380 – 500 V
Power	0.25 – 2.2 kW

SK 200E NORDAC *FLEX* frequency inverters (Catalogue E3000)



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

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

SK 250E NORDAC *LINK* field distributors (Catalogue E3000)



- ✓ Frequency inverter or motor starter
- ✓ All connections in plug-in version for easy commissioning and maintenance
- ✓ PLC functionality for drive-integrated functions

Sizes	2
Voltage	3~ 380 – 500 V
Power	Frequency inverters 0.75 – 7.5 kW Motor starters 0.12 – 3 kW

SK 500E NORDAC PRO frequency inverters (Catalogue E3000)



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

SK 500P NORDAC PRO frequency inverters (Catalogue E3000)



- ✓ Precise current vector control with high overload reserves for operating asynchronous and synchronous motors
- ✓ Universal interface for real time Ethernet
- ✓ Integrated PLC for drive-related functions even in the basic device

Sizes	3
Voltage	1~ 200 – 240 V 3~ 380 – 480 V
Power	0.25 – 5.5 kW

NORDAC ACCESS BT



- ✓ Stand-alone parameter memory
- ✓ Bluetooth interface for inverter and NORDCON APP
- ✓ Data transfer to PC via USB
- ✓ Can be plugged in or disconnected during operation

NORDCON APP



- ✓ Dashboard-based visualisation for drive monitoring and fault diagnosis
- ✓ Parameterisation with Help-function and rapid access to parameters
- ✓ Individually configurable oscilloscope function for drive analysis
- ✓ Backup and recovery function for simple handling of drive parameters



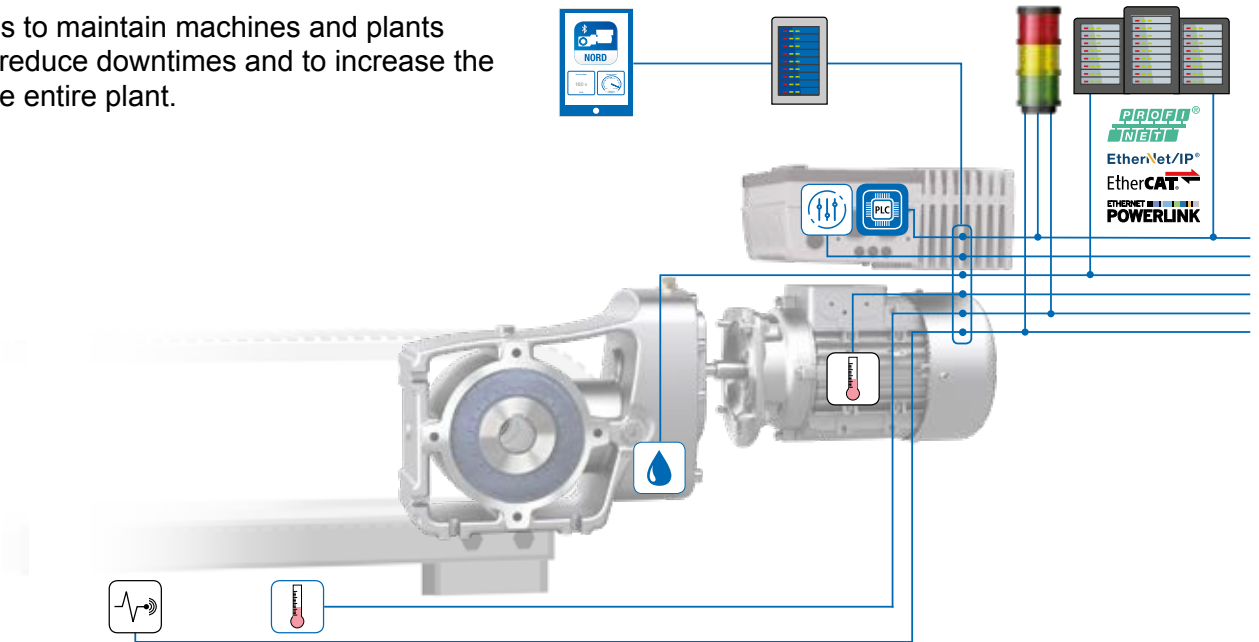
The NORDCON APP and NORDAC ACCESS BT – a mobile commissioning and service solution for all NORD drives.

NORD DRIVESYSTEMS

CONDITION MONITORING

In condition monitoring, operating and status data are regularly or continuously recorded in order to optimise the reliability and efficiency of the plant and machinery. Important information for predictive maintenance can be derived from the data analysis.

The objective is to maintain machines and plants proactively, to reduce downtimes and to increase the efficiency of the entire plant.



System vibration sensor



- NORD qualified sensors
- Connection of customised sensors (analogue/digital)

Temperature sensor



- PT1000-based motor temperature sensor
- Ambient or system temperature

Oil change



- Determination of the optimal time for oil change on the basis of the virtual oil temperature
- The algorithm is executed in the internal PLC

Drive parameters



- Readout of drive system parameters
- Basis for virtual sensors

Integrated PLC



- Pre-processing of drive-specific parameters and sensors related to the drive
- Evaluation of drive conditions

Beacon signal



- Local display of drive conditions
- Scalable display

Local data management



- Processing of drive data for drive and system analysis
- Condition monitoring

Local dashboard



- Display of drive and system data

Higher level PLC



- Processing of condition monitoring information by the customer
- Combination of the collected condition monitoring data with the process data

Drive-based approach

Information from condition monitoring can be transferred to predictive maintenance.

- Sensorless determination of the optimal oil change time based on virtual oil temperature
- Pre-processing of drive data in the integrated PLC
- Provision of data to the customer via all common interfaces

Temperature curve of the oil in the gear unit

- Gear unit parameters and specific operational parameters make it possible to precisely calculate the oil change time.
- The NORD solution is based on the fact that the oil temperature is a key factor for oil ageing in gear units.
- No physical temperature sensor, as the virtual sensor continuously calculates the present oil temperature.
- The NORD frequency inverter is used as an evaluation unit: the algorithm is executed in the internal PLC.

NORD DRIVESYSTEMS

MODULAR SERVICE CONCEPT



With its modular service concept NORD DRIVESYSTEMS provides solutions for maintaining availability and conserving the value of the drive technology. It provides various services in the form of compact modules, which range from assistance in commissioning, specific maintenance packages, and from on-site analysis to estimate repair costs. In addition, there are modernisation or optimisation measures. Last-not-least, operators can qualify their employees with various training sessions.

NORD service modules

- Installation and commissioning
- Periodic maintenance and status monitoring
- Repair, maintenance or replacement
- Spare parts logistics
- Product instruction and training
- Individual contracts
- 24/7 emergency service
- Modernisation and extension

THE ALTERNATIVE TO STAINLESS STEEL

nsd tupH SURFACE TREATMENT



NORD geared motors with nsd tupH are the optimal choice for use in challenging environmental conditions:

- Easy to clean surfaces
- Resistant to acids and alkalis (wide pH range)
- No spreading of corrosion, even if damaged
- No flaking
- Corrosion resistant, prevents contact corrosion
- Alternative to stainless steel
- Complies with FDA Title 21 CFR 175.300
- Free from chromates

The complete solution for extreme conditions:

- Surface-treated housing components
- DIN and standard components made from stainless steel
- Wash-down housing (gear unit and motor)
- Stainless steel shafts

Sealed Surface Conversion System

- Special shaft sealing rings
- Food grade oil

nsd tupH for extreme requirements:

- Food and beverage industry
- Dairies
- Pharmaceutical industry
- Water and sewage plants
- Car washes
- Offshore and coastal areas
- Chemical cleaning (Wash-down, wide pH range)

Tests performed on surface-treated aluminium housing components:

- ASTM D714 Blister formation
- ASTM D610-08 Corrosion
- ASTM D1654-08 Scratching
- ASTM B117-09 Salt spray test
- ASTM D3170 Gravelometer test
- DIN EN ISO 9227 Salt spray mist test
- DIN EN ISO 2409 Cross-cut test

Products available with nsd tupH:



NORDBLOC.1®
helical gear units
(up to Size 6)



NORDBLOC.1®
2-stage bevel gear
units



UNIVERSAL SMI
worm gear units



Smooth motors



SK 180E frequency
inverter



SK 135E motor starter



NORD smooth motor
with nsd tupH



Headquarters and technology centre
in Bargteheide near
Hamburg

Mechanical products

Gear units



Electrical products

Motors



Electronic products

Frequency inverters and motor starters



Innovative drive solutions
for more than
100 branches of industry



Gear unit production



Motor production



Inverter production

7 production locations with cutting-edge technology
produce gear units,
motors, frequency
inverters etc., for
complete drive systems
from a single source.



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Subsidiaries and sales partners in 98 countries on 5 continents
provide local stocks,
assembly centres,
technical support and
customer service.



More than 4,000 employees throughout the world
create customised
solutions.

NORD DRIVESYSTEMS Group

Headquarters and technology centre
in Bargteheide near Hamburg

Innovative drive solutions
for more than 100 branches of industry

Mechanical products
parallel shaft, helical, bevel and worm gear units

Electrical products
IE2/IE3/IE4 motors

Electronic products
central and decentralised frequency inverters
and motor starters

7 production locations with cutting-edge technology
for all drive components

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in 98 countries on 5 continents
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More than 4,000 employees throughout the world
create customised solutions.

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