Intelligent Drivesystems, Worldwide Services

CONDITION MONITORING FOR PREDICTIVE MAINTENANCE

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NORD DRIVESYSTEMS
CONDITION MONITORING

NORD® DRIVESYSTEMS

CONDITION MONITORING
FOR PREDICTIVE MAINTENANCE

For CONDITION MONITORING, drive and status data are recorded periodically or continuously in order to optimise the operational safety and efficiency of machines and plants. CONDITION MONITORING can provide major information for PREDICTIVE MAINTENANCE. The objective is to maintain machines and plants proactively, to reduce downtimes and to increase the efficiency of the entire plant.

ADVANTAGES FOR OUR CUSTOMERS

- Detection and avoidance of impermissible operating states at an early stage
- Status-oriented maintenance replaces time-based maintenance
- Plannable machinery and plant downtimes based on real drive and process data
- Reduction of service and material costs
- Longer service life of components and machine
- Increase in system availability
- Avoidance of unplanned downtimes
- Plannable and cost-optimised repair

CONDITION MONITORING

The INDUSTRIAL INTERNET of THINGS (IIoT) focuses on internet usage in industrial processes and procedures. IIoT aims at increasing the operational efficiency, reducing costs and speeding up processes. Sensors and sensor data playing a central role provide the basis for CONDITION MONITORING and PREDICTIVE MAINTENANCE.

- Condition monitoring solutions for predictive maintenance systems integrated into the frequency inverter
- System is IIoT/Industry 4.0 READY!
- Available for decentralised and control cabinet solutions

Sensors

- Virtual sensors – the PLC can calculate information such as the optimal oil change time
- Interface for digital/analogue sensors

Communication interfaces

- Threshold values or general status information can be communicated externally (via normal Industrial Ethernet dialects)

Integrated PLC

- Local pre-processing of data with the integrated PLC
- Pre-processing of threshold values

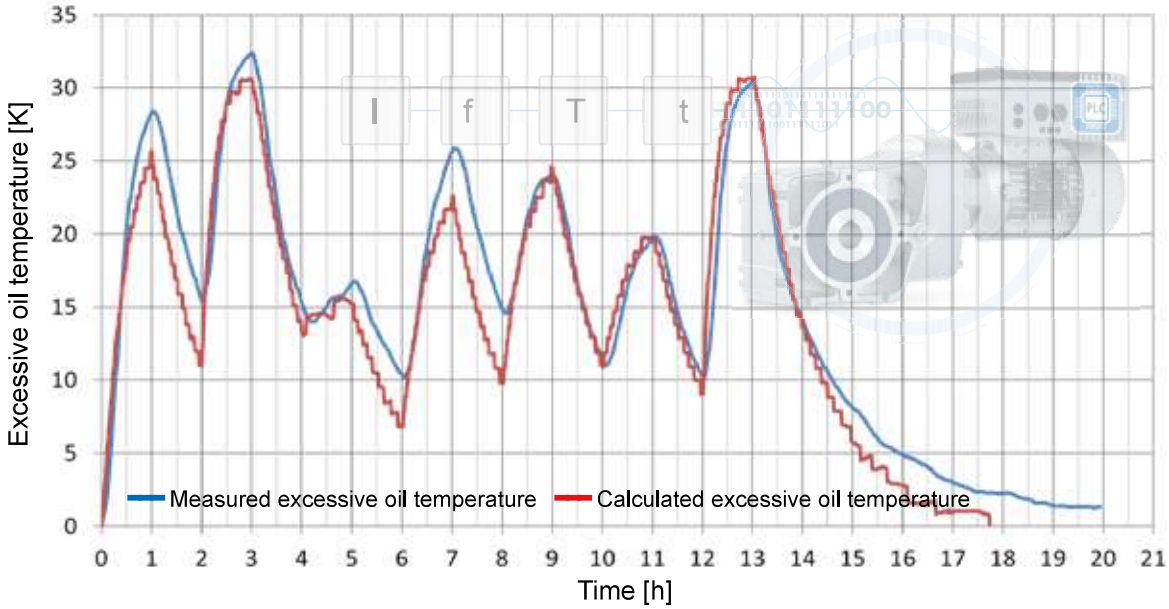
PREDICTIVE MAINTENANCE

Information from condition monitoring can be transferred to predictive maintenance.

Drive-based approach

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

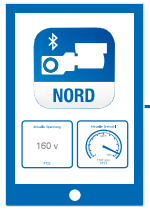
TEMPERATURE CURVE OF THE GEAR UNIT OIL

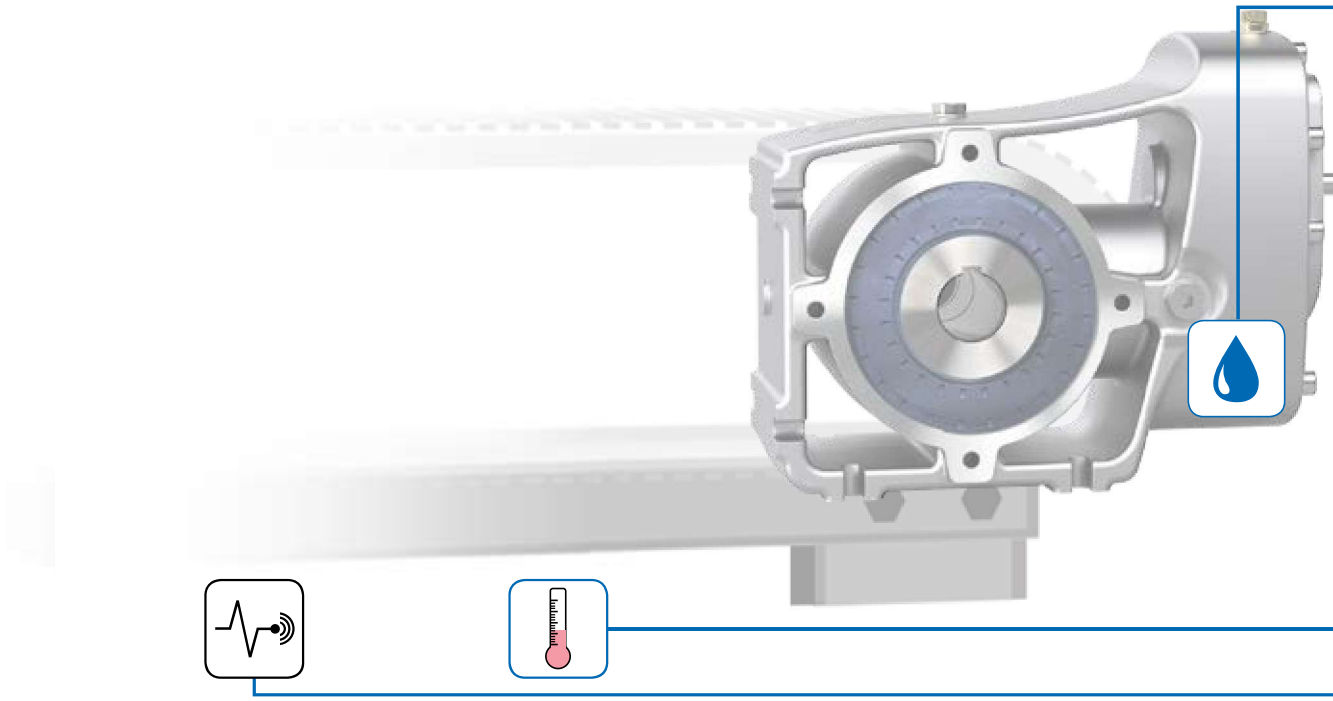


OPTIMAL OIL CHANGE TIME

- 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.
- A hardware temperature sensor is not needed because virtual sensors calculate the current oil temperature continuously by way of drive-specific parameters.
- The existing frequency inverter from NORD is used as an evaluation unit: The algorithm runs in the internal PLC.

THE INTELLIGENT DRIVE
WITH CONDITION MONITORING FOR PREDICTIVE MAINTENANCE





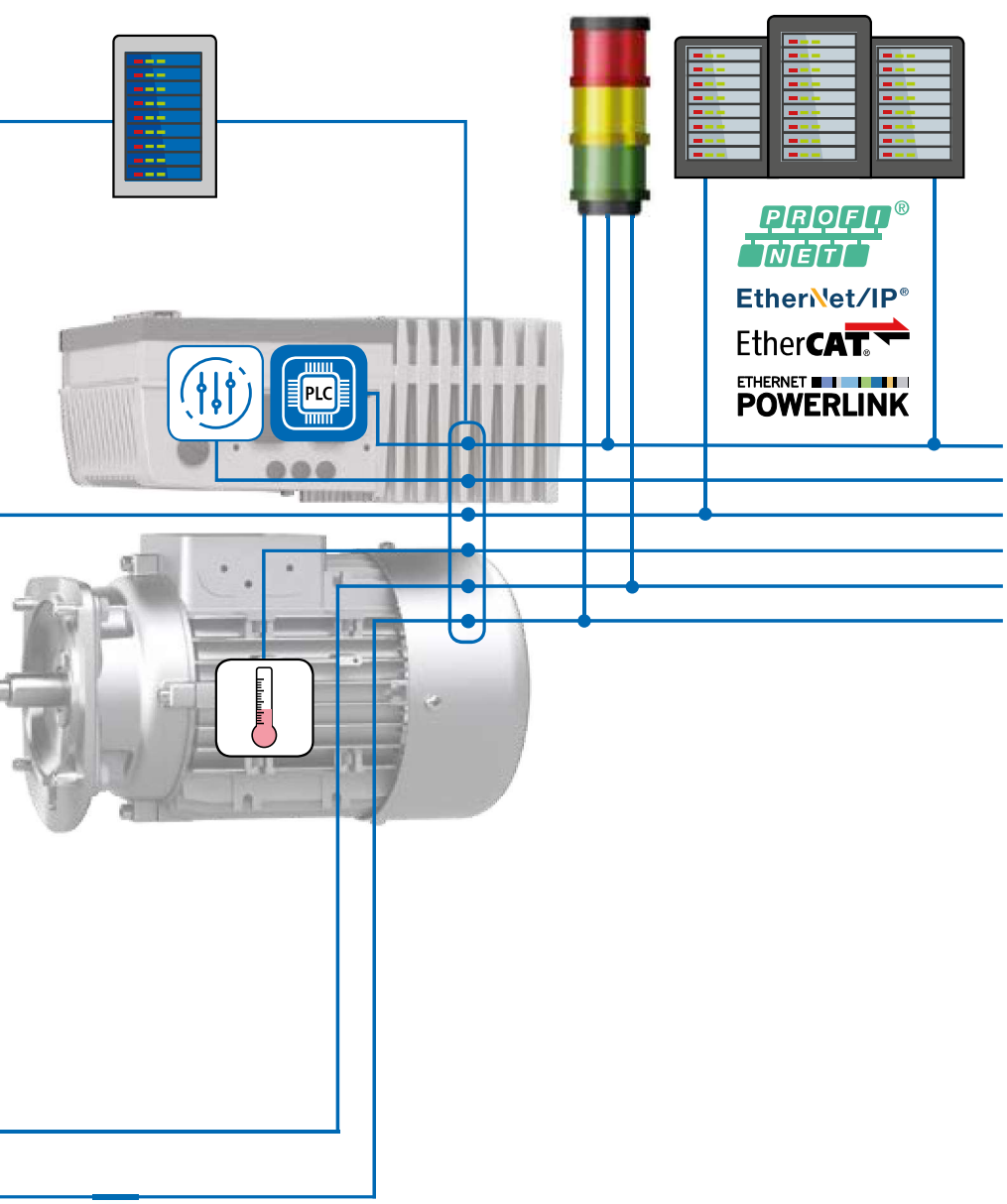
System vibration sensor
- NORD qualified sensors
- Customer-specific sensors can be connected (analogue/digital)

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
- Algorithm runs in the internal PLC

Drive parameters
- Read-out of the drive system parameters
- Basis for virtual sensors

Integrated PLC
- Pre-processing of drive-specific parameters and drive-related sensors
- Evaluation of drive conditions



Beacon signal

- Local display of drive conditions
- Scalable display

Local data management

- Preparation of the drive data for drive and system analysis
- Condition Monitoring

Lokal dashboard

- Display of drive and system data

Higher level PLC

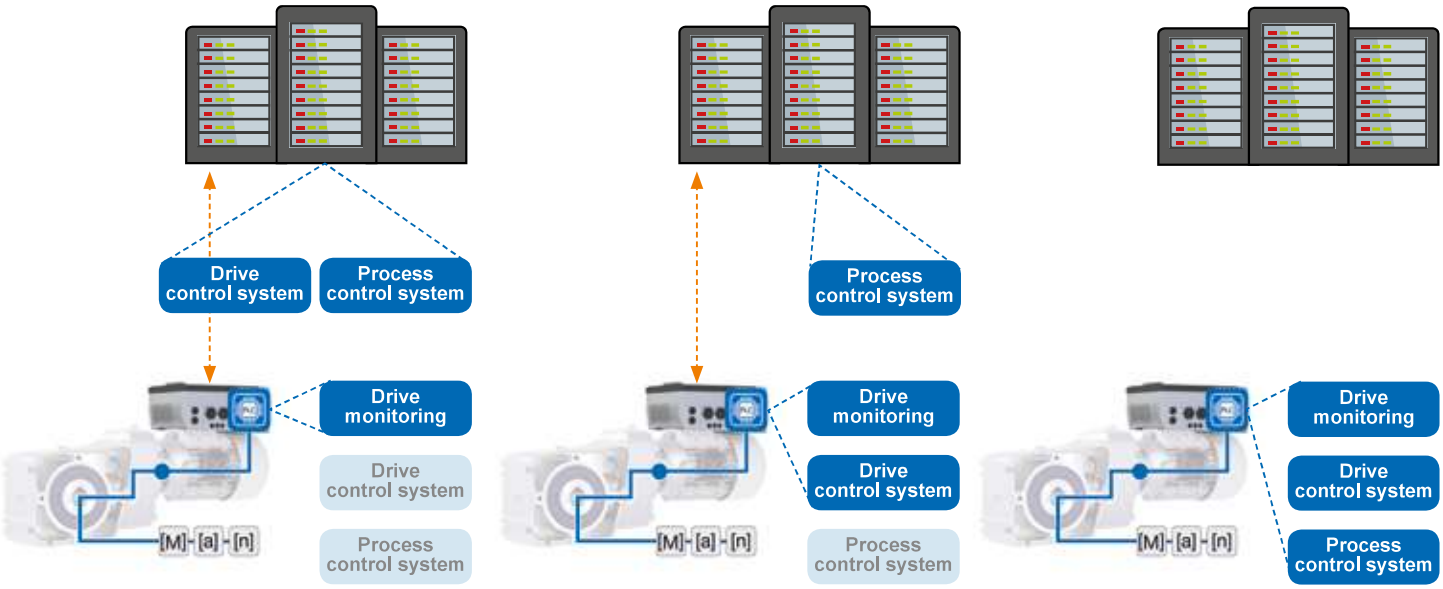
- Processing of condition monitoring information by the customer
- Merging of condition monitoring information with process data

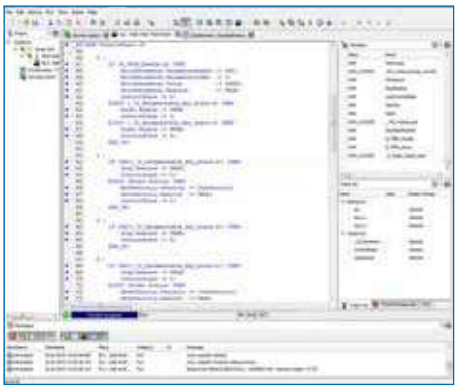
THE INTELLIGENT DRIVE
FROM NORD DRIVESYSTEMS

INTEGRATED PLC

- Available for all NORD frequency inverters and motor starters
- Runs drive-related functions
- Integrates drive-related actuators and sensors
- Parameter access
- Access to Industrial Ethernet or field bus data
- Implementation of application-specific functions

THE RIGHT PLC SOFTWARE ARCHITECTURE FOR YOUR SOLUTION





NORDCON SOFTWARE

- User-friendly parameterisation and programming of several drives
- PLC editor according to IEC 61131-3, supporting Structured Text (ST), Instruction List (IL) and PLCopen Motion Control library
- Multi-axis access via Ethernet tunnelling

NORDCON *APP*

- Dashboard-based visualisation for drive monitoring and fault diagnosis
- Parameterisation with Help function and rapid access to parameters
- Oscilloscope function

NORD MODULAR ELECTRONIC DRIVE SYSTEM
FLEXIBLE, MODULAR, INTELLIGENT

NORDAC *PRO*
Control cabinet inverters

The next generation of control cabinet inverters · Compact size, innovative and extremely flexible communication and interface concept, functional expansion with optional modules.

- Power range up to 160 kW
- Control cabinet installation
- IP20

NORDAC *LINK*
Decentralised frequency inverter

The field distributor for flexible, decentralised installation · Flexible configuration, functions and application · Fast commissioning through high level of plug-in capability, system servicing through integrated maintenance switch and local manual control facility.

- Power range up to 7.5 kW
- Field installation
- IP55 / IP66

NORDAC *FLEX*
Decentralised frequency inverter

Decentralised drive unit with versatile installation options · Simple commissioning and maintenance through extensive plug-in capability and simple parameter transfer via EEPROM.

- Power range up to 22 kW
- Wall or motor mounting
- IP55 / IP66

NORDAC *BASE*
Decentralised frequency inverter

The economical decentralised version for simple drive applications · Low installation costs as well as robust design for simple installation outside the control cabinet.

- Power range up to 2.2 kW
- Wall or motor mounting
- IP55 / IP66 / IP69K

ENGINEERED & MADE in
GERMANY

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
cabinet and decentralised frequency inverters
and motor starters

7 production locations with cutting edge technology
for all drive components

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.

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