

THE CHANGE IN GEAR ENGINEERING

THE GEARING OF THE FUTURE IS ELECTRIFIED, AUTOMATED AND NETWORKED.

GEARCONTROL:

i:GEAR 4.0®

GEARCONTROL-SYSTEM®

GEARCONTROL-OIL®



EISENBEISS

LEADING THE WAY IN SPECIAL GEAR ENGINEERING FOR THE MARKETS OF THE WORLD.

SETTING STANDARDS IN GEARING TECHNOLOGY
EISENBEISS



GearControl sets new standards in reliability and availability and takes a leading role in the current industrial revolution "Industry 4.0".

GEARCONTROL

EVOLUTION OR REVOLUTION?

Gears are the most efficient and thus the most cost-effective transmitter of speed and torque. Gears have just one short-coming: bearings and toothing have to be lubricated and require maintenance as a result. The electrification gives the gear a further boost in terms of reliability by means of sensor technology.

By linking gears with intelligent systems you can determine gear status at any time and prevent damage in a proactive way. This also makes gear systems the safest link in the power train even in the toughest of applications. Expensive (gear) substitution solutions such as high-pole motors or generators lose their significance as a result of this revolutionary and convincing development.

- AVOID GEAR DAMAGE
- EXTEND MAINTENANCE INTERVALS
- MAXIMISE OPERATIONAL RELIABILITY
- PLAN DOWNTIME

i:GEAR4.0®

GearControl-System®

GearControl-Oil®

“Eisenbeiss, headquartered in Enns, Austria, has developed in GearControl a new type of gear support system which, unlike condition monitoring systems, not only gives a warning when a problem has already occurred but also prevents damage and therefore maximises both the service life and the efficiency of the plants.

Besides vibration supervision GearControl additionally supervises lubrication oil supply, lubrication oil quality and oil condition, plus temperature development. Such multi-parameter analyses enable you to form better opinions about current gear condition and individual components. The combination of all the measuring data available reduces the risk of incorrect diagnosis at the same time.

Eisenbeiss is a globally active manufacturer of special gear systems and, with GearControl, enables its customers to make use of the producer's know-how not only in the design phase but also throughout the entire service life of the gear.”

GearControl-Oil®

GEAR ENGINEERING WILL NOT WORK IN FUTURE WITHOUT SENSOR ENGINEERING!

INNOVATIVE MEASURING TECHNOLOGY TO ENSURE CONDITION-ORIENTED OIL CHANGE INTERVALS AND PROPER LUBRICATION.

GearControl-Oil® is a multi-parameter sensor and measured data storage unit all in one. It continuously measures six specific oil condition parameters and identifies any impermissible status of the oil reliably and early on. The plant

operator avoids any "flying blind" between laboratory analyses and can, as a result, take action without delay before any severe damage to the gear system occurs.



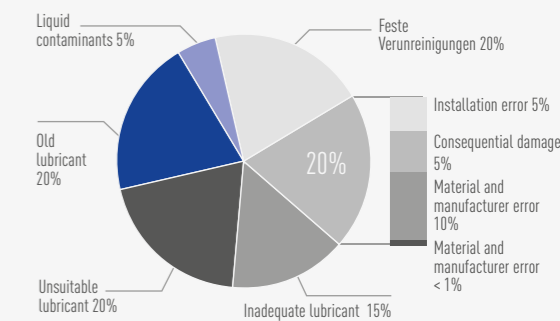
THE BENEFITS

GearControl-Oil® at a glance

- Evaluation of impurities, water content, soot formation, air content, oil ageing, acidification
- Measuring of medium temperature, ambient temperature, relative moisture, transmission, electrical conductivity, relative permittivity
- Configurable warning/alarm thresholds
- Continuous data recording and determination of real operating hours
- Controls signalling equipment and is integrated in existing control systems
- Autonomous battery operation for 2 years
- Extensive configuration, monitor and analysis software
- Easy and intuitive operation

GearControl-Oil® is available as a pure measuring unit in the Monitoring Edition and with a comprehensive scope in the Expert Edition.

The Expert Edition is a worry-free package including application-specific parameterisation of threshold values, generation of condition-dependant maintenance intervals and advice from gear experts.



80% of gear damage can be traced back to improper lubrication and advanced oil ageing and can be avoided.

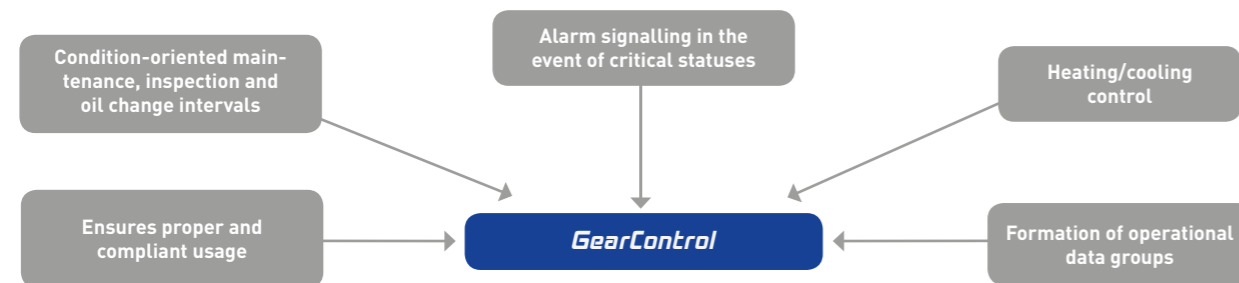
The intelligent assistance system GearControl-Oil® is the ideal aid to ensure at all times that the oil is in a satisfactory condition.



GearControl-System®

THE NEW EARLY IDENTIFICATION SYSTEM – YOUR WORRY-FREE PACKAGE!

AVAILABILITY, RUNNING COSTS AND MAINTENANCE COSTS ARE CONSIDERABLE FACTORS IN THE COST-EFFECTIVENESS OF GEARS.

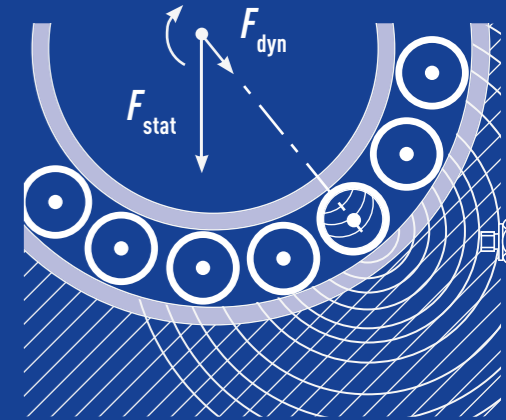


GearControl records the condition of the gear throughout its entire service life from the testing phase at the manufacturer's and during the whole period of operation and stoppage. The measuring data gathered from this and information collected in combination with the models

of the gear development are used to signal alarm statuses, prevent gear damage, optimise operating conditions and to determine condition-oriented maintenance, inspection and oil change intervals.

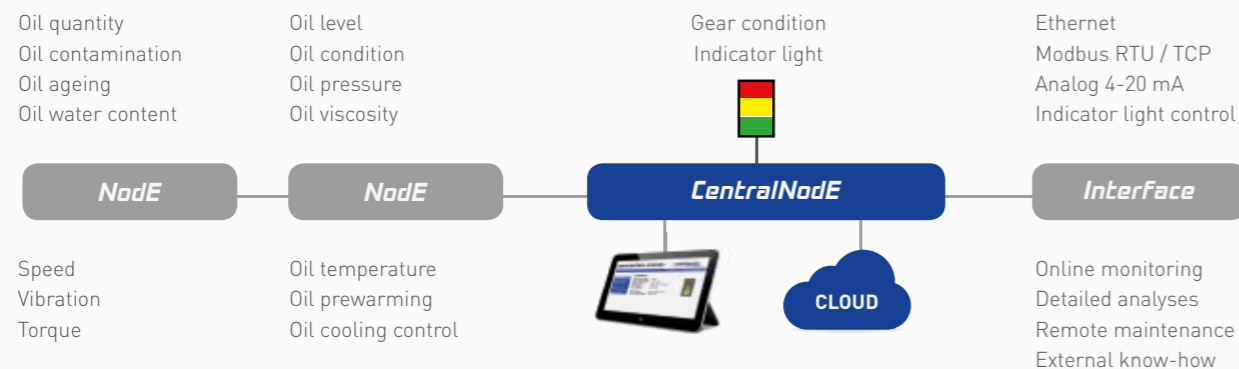
THE BENEFITS

- ▮ Early identification of problems and damage prevention
- ▮ Analyses and optimisation potential
- ▮ Clear action recommendations
- ▮ Top operational reliability
- ▮ Maximum reliability and availability
- ▮ Unbeatable cost-benefit ratio
- ▮ Gear and condition monitoring know-how
- ▮ Ready to use and easy to work with
- ▮ Remote maintenance and support

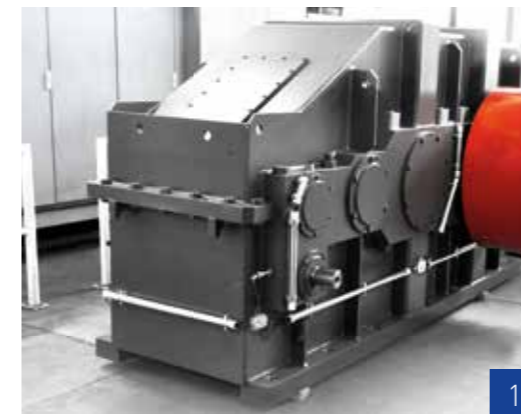


Different damage pictures of bearings and toothing parts show characteristic patterns in the frequency spectrum of vibration signals. This makes a reliable trend analysis and assignment to the appropriate components possible. GearControl forms parameters for all damage possibilities, follows their development and gives a specific alarm for any signs of damage which may arise.

HOW THE GEARCONTROL-SYSTEM® WORKS.



EVALUATION OF THE INDIVIDUAL MEASURING PARAMETERS IS NOT NECESSARY.



“LITTLE EFFORT
GREAT EFFECT.”

- 1) Diagnosis and control of gear condition
- 2) Indicator light system gives a clear signal regarding gear condition
- 3) Condition information via Ethernet, signal indicator light and industry field buses

i:GEAR 4.0®

i:GEAR 4.0® = EISENBEISS GEAR + GEARCONTROL

EISENBEISS IS THE FIRST GEAR MANUFACTURER IN THE WORLD TO COMBINE INDUSTRIAL GEARS WITH A COMPREHENSIVE GEAR SUPPORT SYSTEM.

EISENBEISS OFFERS DRIVE SOLUTIONS AND SUPERVISION FROM A SINGLE SOURCE – A GLOBAL FIRST!

You receive an optimally tuned drive system including supervision and integrated engineering know-how from gear development. This means that i:GEAR 4.0® can analyse its operating conditions independently and signal any potential improvements.

Increased service life and maximum plant availability with minimal operating costs are the result.

i:GEAR 4.0® ensures the cost-effectiveness of your plants with a fast ROI!



SMALL INVESTMENT BIG RETURN

i:GEAR 4.0® GEAR MANAGEMENT

Everything from a single source

Your gear system and supervision from a single source. Our competent experts are at your disposal around the clock.

Know-how

Take advantage of the up-to-date know-how concerning condition monitoring and perfective servicing every time.

Service life maximisation

Thanks to the constant evaluation of the load-carrying capacity of the lubrication film and operating conditions you can directly influence the service life of your components and maximise it.



With i:GEAR 4.0® an alarm is given automatically in critical situations and you can avoid routine checks.

This enables you to spend more time on your key tasks (your economical and innovative production processes).



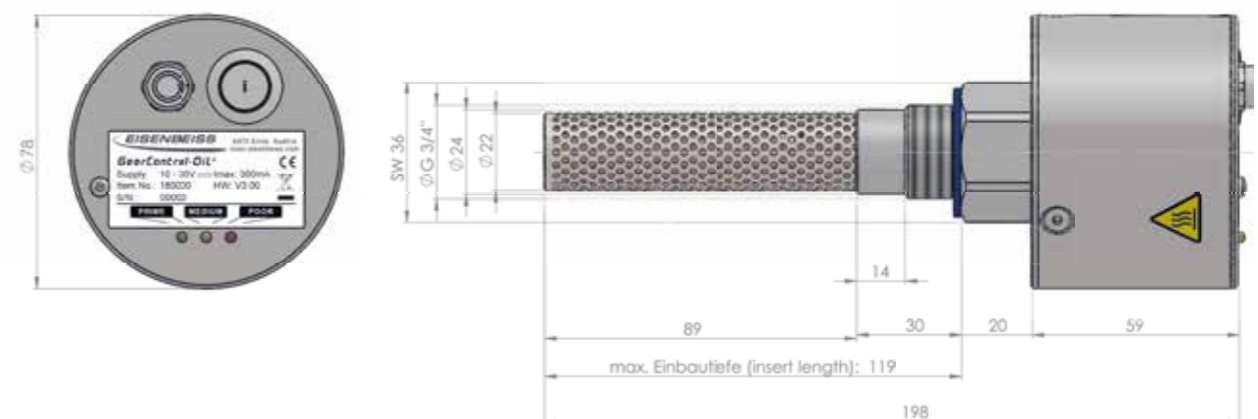
Gear condition and recommended action now also via **tablet or smartphone**.

	GEARCONTROL-OIL®	GEARCONTROL	i:GEAR4.0®
Oil condition monitoring	X	X	X
Lubrication monitoring		X	X
Stress monitoring		X	X
Operating parameter monitoring		X	X
Gear condition monitoring		X	X
Operating parameter control		X	X
Remote maintenance		X	X
Operating parameter optimisation			X
Perfective servicing			X
Optimised maintenance intervals			X
GearControl-Care			X

EQUIPMENT DATA (CENTRAL EVALUATION UNIT)		GEARCONTROL	
Type designation	GearControl-CentralNode®		
UMGEBUNGSBEREICH BETRIEB			
Temperature	-20...+50	°C	
Protection class	IP66 (if mounted as specified in IP66 control cabinet)		
POWER SUPPLY			
External supply	90-264 (47-63 Hz) / 120-370	VAC / VDC	
External power	< 1	A	
PIN ASSIGNMENT PLUG CONNECTOR			
Indicator light	M12 4-pole	1...Green Pull-Down 2...Yellow Pull-Down 3...Red Pull-Down 4...24 VDC	
System Bus	M12 8-pole	1...0 VDC 2...24 VDC 3...RB 4...RA 5...An_SA 6...An_SB 7...Ab1_SA 8...An2_SA	
USER I/O	M12 12-pole	1...0 VDC 2...24 VDC 3...RS485 B 4...RS485 A 5...4-20 mA (channel 1) 6...4-20 mA (channel 2) 7...4-20 mA (channel 3) 8...4-20 mA (channel 4) 1...Green Pull-Down 2...Yellow Pull-Down 3...Red Pull-Down 4...Digital Input	
INTERFACES			
Signal indicator light	Green, yellow, red	Gear condition	
Bus interfaces	RS485 Ethernet	Modbus RTU TCP-IP	
Analog outputs	4 x 4 - 20 mA power output	Variable parameterisable measured value output	
DIMENSIONS			
Control cabinet	300 x 300 x 150	mm	

EQUIPMENT DATA		GEARCONTROL-OIL®	
Type designation	GearControl-Oil®		
Max. operating pressure	15	bar	
Operating temperature range liquid	-20...+90	°C	
AMBIENT RANGE OPERATION			
Temperature ^[1]	-20...+60	°C	
Protection class	IP54		
Measuring medium	Gear oils based on mineral oil according to DIN 51517 Teil 3 - CLP		
Moistened materials and sealing materials	Polyurethane, FR4, Au, lead-free solder, Klingersil® sealing ring, stainless steel [1.4571]		
POWER SUPPLY			
Autonomous operation with batteries ^[2]	Battery pack 4 x 1,5 V DC		
External supply	10...30	VDC	
Current draw with external power supply ^[3]	< 300	mA	
OPTICAL DISPLAY / OUTPUTS			
Optical display	3 x LED (green, yellow, red)	Oil condition value, battery status	
Bus interface	RS485 - (USB via converter)	Log: Modbus RTU	
Digital switching signals	2 transistor outputs open collector, galv. separated Vin max. 30 V DC 20 mA	Oil condition value (OK, warning, alarm, malfunction)	
CONNECTING DIMENSIONS			
Screw-in thread	G 3/4"	Outer thread	
Width across flat (AF)	36	mm	
MEASURING RANGE / ACCURACY			
Electrical conductivity	0...5000 / ± 2 5000...50.000 / ± 2	pS/m / % (FS), bei 25°C oil temperature pS/m / % (FS), bei 25°C oil temperature	
Transmission (turbidity)	0...100 / ± 3	% / % (FS)	
Relative permittivity ^[4]	1...10 / ± 2	- / % (FS)	
Relative moisture	0...100 / ± 3	% / % (FS)	
Temperature medium	-20...+120 / ± 1	°C / % (FS)	
Temperature ambient	-20...+120 / ± 3	°C / % (FS)	
Time	0...2 ³² / 50 ppm	s (time & date 01.01.2000 to 31.12.2134)	

DIMENSIONS



[1] In the case of battery operation, ambient temperature should remain < 50°C otherwise this will have a negative impact on battery life; a switch to external supply is recommended!

[2] IMPORTANT: use batteries recommended by the manufacturer, do not overheat batteries, do not throw into fire, do not recharge and do not use with incorrect polarity!

[3] Observe national regulations, only use authorised power supply equipment (SELV, PELV) – the connection is to be carried out exclusively by trained and professional electrical engineering specialists! [4] Measuring of permittivity within specified accuracy up to conductivity of max. 5,000 pS/m



YOU DON'T WANT ANY PROBLEMS FROM GEARS?

GEARCONTROL LETS YOU KNOW IN GOOD TIME WHEN YOUR GEAR NEEDS YOU.

YOUR COMPETENT PARTNER.

EISENBEISS GmbH

Lauriacumstraße 2
4470 Enns, Austria

Tel.: +43 7223 896-0 / DW 737

Fax: +43 7223 896-85 / DW 92

Email: gearcontrol@eisenbeiss.com