

Industrial Cranes

CORE OF LIFTING



WHAT IS THE CORE OF LIFTING?

At the basic level, it is the integrated component package consisting of...

MOTOR,
GEARBOX and
CONTROL SYSTEM

...that we design and manufacture in house.

SNAPSHOT CORE OF LIFTING

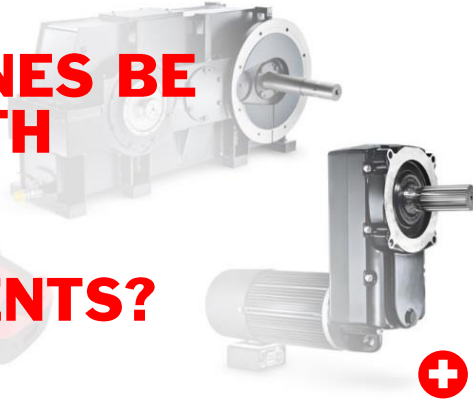
TODAY OVER
500,000
cores of lifting are
working around the
world in
Konecranes cranes

OVER
2,000,000
motors made and
delivered since
1933

OVER
1,000,000
gearboxes made
and delivered
since 1933



**CAN CRANES BE
BUILT WITH
GENERAL
PURPOSE
COMPONENTS?**



**IS CONTINUOUS
QUALITY
TESTING
IMPORTANT?**



**IS SAFETY
MORE THAN
A HELMET?**



**READY FOR
A RELIABLE
LONG-TERM
INVESTMENT?**





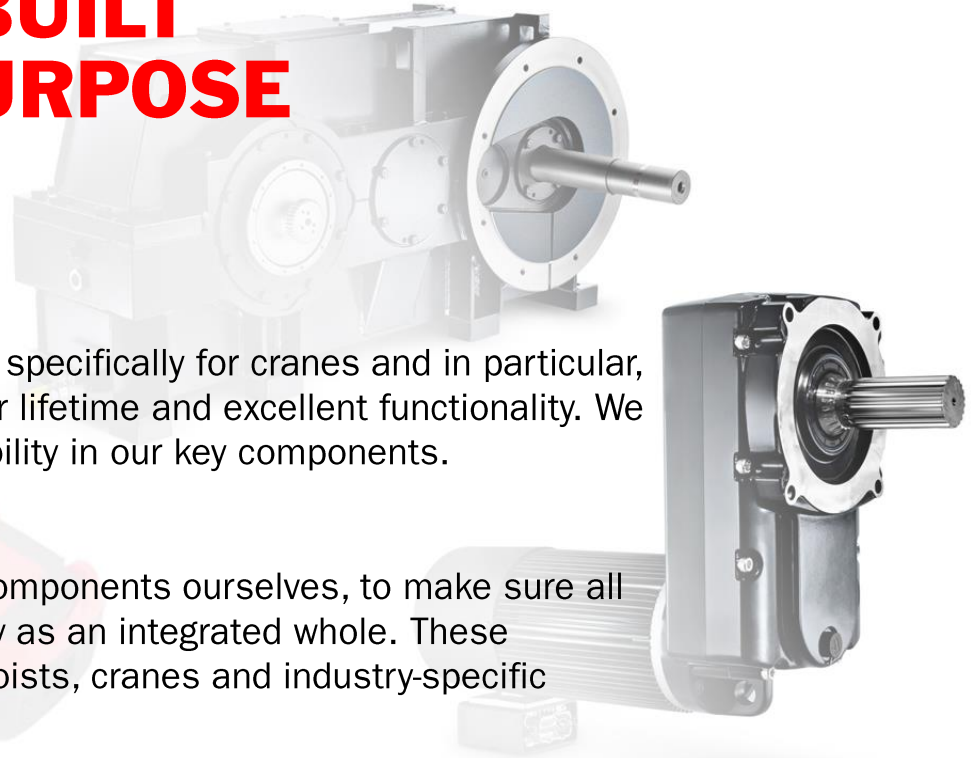
CAN CRANES BE BUILT WITH GENERAL-PURPOSE COMPONENTS?

Not at Konecranes.

Our motors, gears and controls are designed specifically for cranes and in particular, lifting motions. This gives our cranes a longer lifetime and excellent functionality. We aim for the highest levels of safety and reliability in our key components.

Carefully designed unity.

We design, manufacture and test all of our components ourselves, to make sure all parts of the cranes work together seamlessly as an integrated whole. These components provide the foundation for our hoists, cranes and industry-specific applications.





IS CONTINUOUS QUALITY TESTING IMPORTANT?

Yes, it is.

Testing individual components is crucial, but we also test our cranes as a system to make sure each component works in sync with the entire crane, as it was designed to do.

We test the quality of our products many times throughout design, manufacturing and assembly.

High quality is a driver in every single phase of the delivery process, all the way from the drawing board to the customer site.

Strict quality control and no compromise with safety means we can vouch for our products and provide reliable equipment to our customers.



IS SAFETY MORE THAN A HELMET?

For us, safety comes first, and it is definitely more than a helmet.

This is why we design and develop every aspect of our cranes, from the smallest components to full assembly, testing and delivering with safety as our top priority. With industrial equipment, safety comes from quality. Whether we are researching better material, manufacturing crane parts or providing you with training or maintenance, we always aim for the highest quality.

In our laboratories, we develop and test equipment for many different industrial applications and environments. We want to deliver equipment you can rely on, so we invest a lot of time and attention into designing I to be dependable and long-lasting.

Even so, make sure you remember to wear your helmet.

[Back to DID YOU KNOW page](#)



READY FOR A RELIABLE, LONG-TERM INVESTMENT?

If you are, we are.

We have been in crane business for over 80 years. This means that we have the experience and the know-how to make reliable equipment that lasts. With every crane, we take on true lifetime responsibility for our products and their core components.

We want to provide our customers with the best solution that is right for them.

There is no "one size fits all" in industrial lifting. We are with you every step of the process - from initial consultation all the way to delivery. Our relationship doesn't end with delivery, we'll continue to provide technical support and can help you with service, parts and training for all your lifting equipment. Our people are here for you.

CORE OF LIFTING IN INDUSTRIAL CRANES

Our products are designed around key components that we design and manufacture in-house: the Konecranes gears, motors and controls. The key component package is integrated to work in unison, as the core of the crane. We don't just design every component, we design the interaction between them specifically for crane use. This in-house approach allows us to satisfy customer-specific needs with the benefits of high-volume manufacturing.

[SEE THE CORE OF LIFTING IN ACTION](#)

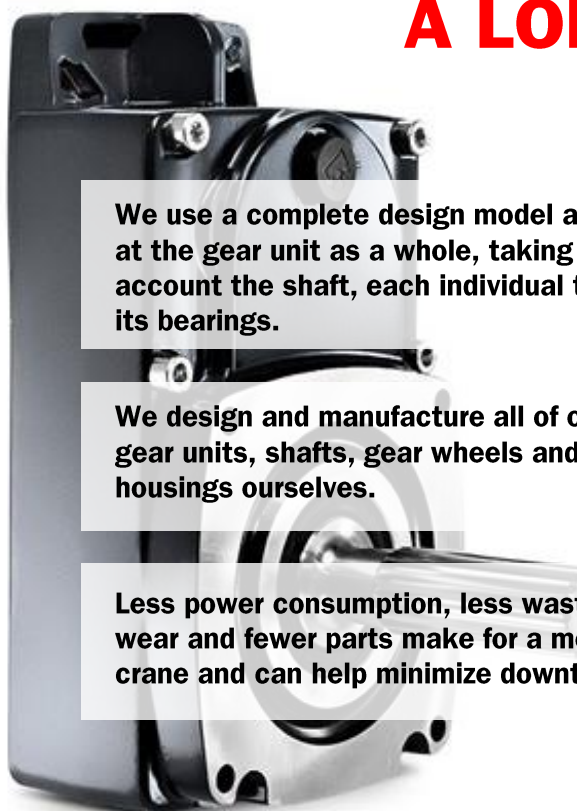


GEARS

- A longer lifetime for your crane
- The Konecranes promise of quality
- Maximizing safety with good design
- Technical details:
Helical gear structure



A LONGER LIFETIME FOR YOUR CRANE



We use a complete design model and look at the gear unit as a whole, taking into account the shaft, each individual tooth, and its bearings.

We design and manufacture all of our crane gear units, shafts, gear wheels and gear housings ourselves.

Less power consumption, less waste, less wear and fewer parts make for a more reliable crane and can help minimize downtime.

LESS ENERGY CONSUMPTION. LESS WASTE. LESS EXPENSES.

- Our gearboxes have low inertia due to low mass of rotating parts resulting in **lower energy consumption**
- Due to the small size of our gearboxes they require lower oil volumes, meaning **less waste and less expenses**
- Low noise and almost no vibration comes from grinding the teeth after heat treatment, making them even **more power efficient**
- A Konecranes gearbox has fewer parts due to careful integration
- The traveling machinery has no additional couplings or shafts between motor and gear unit or units meaning less wear on your crane and better approach dimensions due to the compact size

THE KONECRANES PROMISE OF QUALITY

From the idea to the final product we comply with international standards (EN, ISO, AGMA) and then go beyond them to ensure each component complies with our own high quality standard. You can trust that quality, because all of our gear components are made in-house.

- We use the latest design and calculation technology for 3D modelling and dimensioning to help us achieve the **optimized performance and maximized reliability**
- During development gears are tested on their geometry, housing dimensions, hardness and surface roughness
- Assembly and test run of each gear unit is done at full speed to measure bearing temperatures, complete gearbox and gearing noise and vibrations
- Oil leakage is tested with air pressure
- Gear units are checked visually by the assembler to make sure that all the gears meet our quality targets
- We also work in cooperation with universities to keep in line with the future development of materials and technologies



Every single gear is documented so it can be tracked from the factory to you, our customer. Its quality is assured throughout the entire process and its ensuing life cycle.



MAXIMIZING SAFETY WITH GOOD DESIGN

Our gears have been meticulously designed down to the smallest detail to avoid cracks, tooth fracture, stress and wear.

Case hardening makes the gears strong and durable enough for frequent, long-term use.

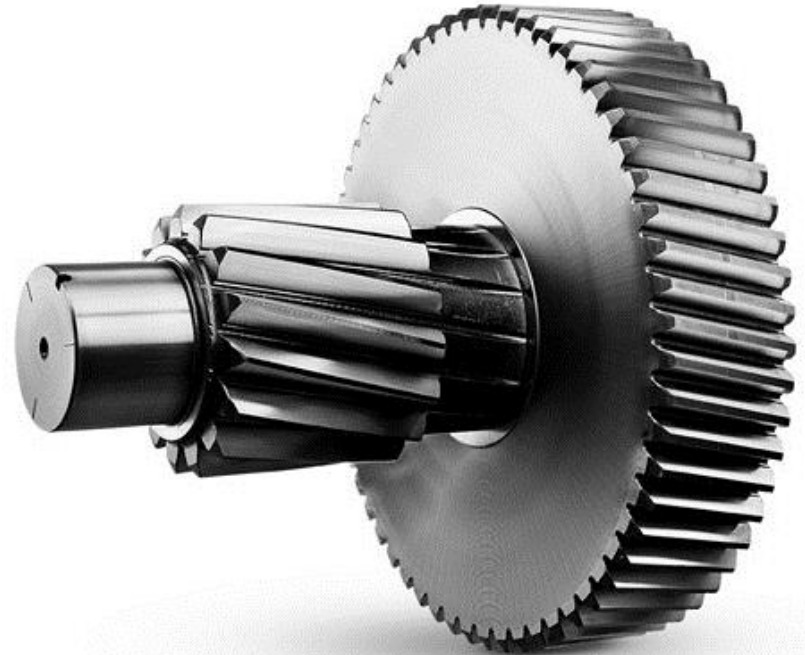
A smooth contact pattern minimizes pressure on parts, wear, and risk of damage.

We calculate, model and verify to make sure gears have the right distribution of tooth force, resulting in a very high safety coefficient against gear tooth fracture.

Our in-house design, manufacturing and testing continually maintains and develops the quality of all our gears.

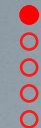
TECHNICAL DETAILS: HELICAL GEAR REDUCERS

- Gear load capacity calculations are based on standards ISO6336 (DIN3990) and AGMA 2001-D04
- Roller bearing lifetime calculation ISO 281:2007
- Gear shafts and wheels made of case-hardened steel 18CrNiMo7-6; surface hardness HRC 58-62
- Teeth ground with NC profile grinders to accuracy class ISO 5 (AGMA 13) or better
- High safety factor (SF=1.60 / ISO6336) against gear tooth fracture (General SF 1.15-1.35)
- Power efficiency of our gear units is over 99% per stage
- Material certificates are collected and filed for tracking



MOTORS

- ⊕ Motors meant for cranes
- ⊕ The right motor for the right job
- ⊕ Quality gives less downtime and better safety
- ⊕ We comply with all the international standards





MOTORS MEANT FOR CRANES

**A typical commercial motor is not optimal for crane duty.
We design our motors specifically for use in cranes.**

- A crane motor must make lots of starts and stops with anything from a full load to an empty hook
- It should be able to tolerate a high starting current without overheating
- The motor must be able to rotate in both directions
- Konecranes motors are designed to endure the various forces induced on the normal crane operating environment



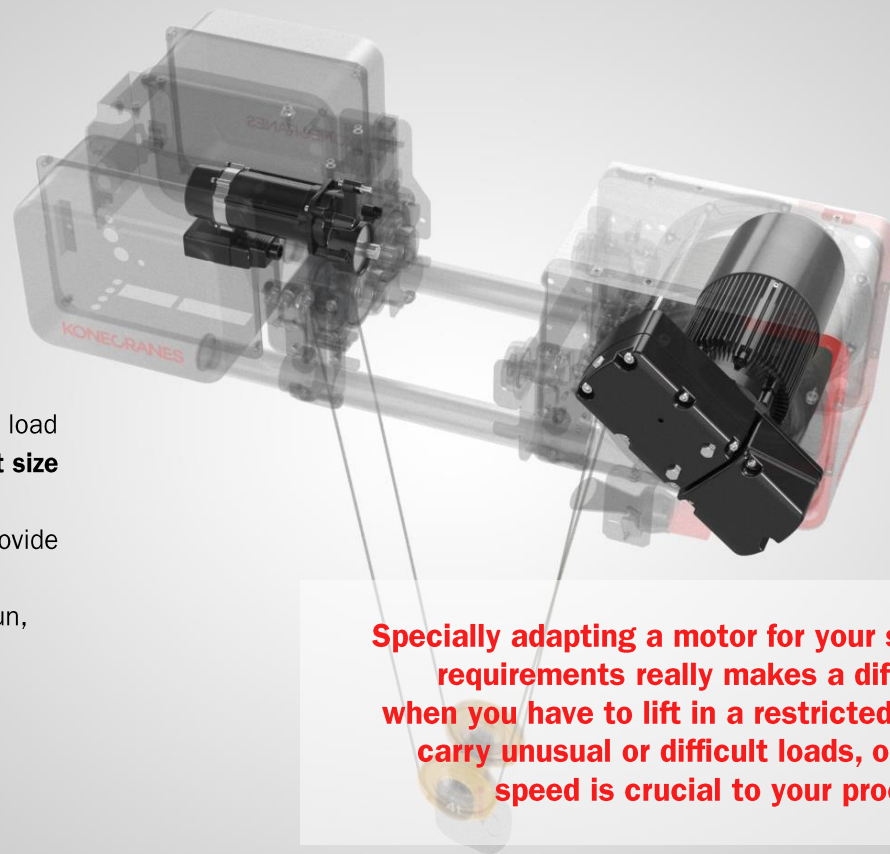
**MADE JUST FOR LIFTING IN CRANES, A KONECRANES MOTOR IS DESIGNED TO
KEEP YOU LIFTING RELIABLY AND YOUR LOADS STEADY FOR MANY YEARS TO COME.**



THE RIGHT MOTOR FOR THE RIGHT JOB

We also tailor our motors for your particular lifting tasks.

- A thinner rotor reduces the moment of inertia, so the motor requires **less torque, less current, and less energy** to lift the load
- A smaller inverter can also be used, which makes **a compact size and better approach dimensions possible**
- If the crane is to be used in a harsh environment, we also provide dust, water and heat protection
- **Lower energy requirements** save a lot on costs in the long run, and are more environmentally friendly
- The right protection keeps your Konecranes equipment functioning perfectly in any hazardous work environment



Specially adapting a motor for your specific requirements really makes a difference when you have to lift in a restricted space, carry unusual or difficult loads, or where speed is crucial to your processes.



QUALITY GIVES LESS DOWNTIME AND BETTER SAFETY

With careful quality monitoring across the whole product development process, Konecranes has a well-earned reputation for safe and reliable lifting equipment.

- We use state-of-the-art software, including FEM simulations, and we cooperate with universities for access to the latest research
- Our extensive testing is backed up by regular internal and external audits
- During development, rigorous testing in all kinds of lifting environments ensures a quality lifting product
- We maintain the same strict testing requirements when tailoring a crane for your specific lifting needs

**A well-tested crane is
a safer crane.**

WE COMPLY WITH ALL THE INTERNATIONAL STANDARDS

Our motor production covers the following standards:

- ISO 9001
- ISO 14001
- OHSAS 18001

Konecranes motors are in conformity with:

Directives:

- the Machinery Directive 2006/42/EC
- the Low Voltage Directive 2014/35/EU,
- the EMC Directive 2014/30/EU
- ATEX directive 2014/34/EU for EX motors

Standards:

- EN 60034-1
- EN 60034-5
- EN 60034-9
- EN 60034-14
- IEC 60079 series for EX motors

Certifications:

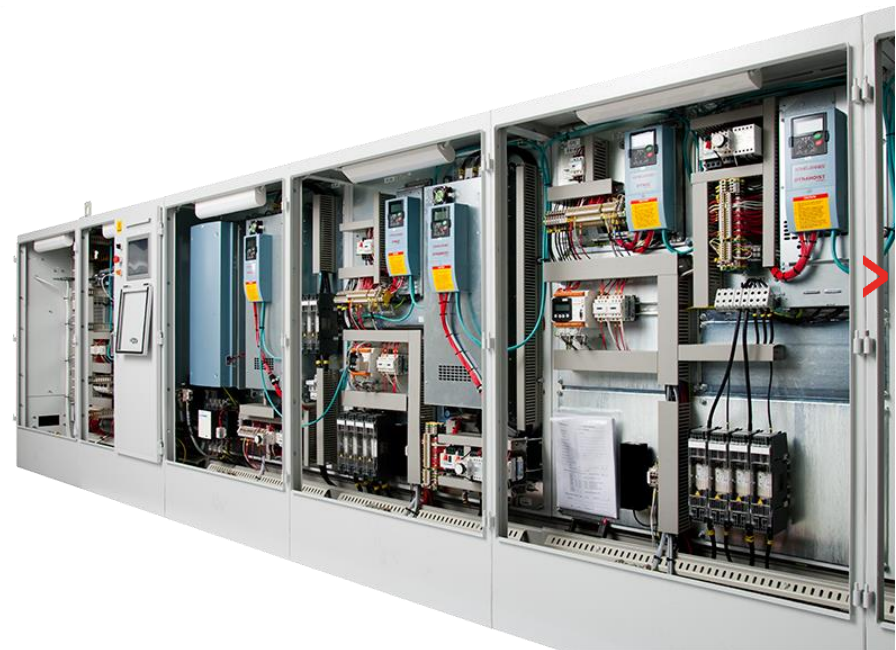
- CSA certified (Canada and USA)
- CSA C22.2 NO. 100-04
- UL 1004-1
- ATEX and IECEx for EX motors

Type of protection for EX motors

- Ex d for Zone 1
- Ex tb for Zone 21
- Ex nA for Zone 2
- Ex tD for Zone 22
- EX markings:
 - II 3 G Ex nA IIC T3 Gc
 - II 3 D Ex tc IIIC T135°C Dc IP66
 - II 2 G Ex de IIC T4 Gb or Ex IIC T4 Gb
 - II 2 D Ex tb IIIC T120°C or T135°C Dd

CONTROLS

- ⊕ Safety in every detail
- ⊕ Well-designed controls mean a safer crane
- ⊕ Excellent software makes an excellent crane
- ⊕ Smart Features for more flexible lifting
- ⊕ It gets even easier with automation
- ⊕ Motor controls just for cranes
- ⊕ Collecting, reading and understanding data



SAFETY IN EVERY DETAIL

Konecranes equipment is renowned for excellent safety, reliability and ease of use. To make sure that every one of our cranes lives up to this reputation, the mechanics, software and electronics that control the crane are designed to work in unison.

Advances in technology make our lifting equipment more sophisticated, but our user interfaces are clear and straightforward, helping operators drive the crane efficiently and aiding technicians in maintenance tasks.



WELL-DESIGNED CONTROLS MEAN A SAFER CRANE

We make our physical controls with both safety and simplicity in mind. A crane that is easy to use gives the operator full control over the load at all times. With controls carefully engineered and integrated into our cranes, load handling is safer and easier.

On basic model cranes, the control unit might only have buttons for stop-start motions like lifting and lowering loads. More advanced lifting equipment uses one or two joysticks, or even a detachable tablet computer to help use a wide range of Smart Features.



Control unit options

- Pendant controller
- Radio controller
- Cabin
- Separate control room

Konecranes control units are **ergonomically** designed for **operator comfort and ease of use**.

We take a user-centric approach, so the design is based on an explicit **understanding of users, crane tasks and operating environments**.

Our control units are intuitive, **made for the way users think**. An example of this is the diamond-shaped button arrangement in the pendant controller.



EXCELLENT SOFTWARE MAKES AN EXCELLENT CRANE

Software controls and monitors the physical movements of the crane.

The first thing to consider is safety, especially creating limits that restrict what the crane can do and where it can go. Crane software must be able to deal with any errors that might occur, and usage data and diagnostics must be reliable and secure.

AT KONECRANES, WE WRITE ALL OUR OWN CRANE CONTROL SOFTWARE.

Our industry knowledge and programming acumen give us the ability to choose the right software according to customer need. The right software can ease the daily work of operators and maintenance personnel, and improve your processes.

For example, a special lifting need might require new software routines to control an unusual mechanical assembly.

OUR SOFTWARE IS CAREFULLY TESTED BEFORE INSTALLATION.

We test our software on a simulator and a test crane with real hardware and live motors. All crane controls go through a full FAT test before delivery.



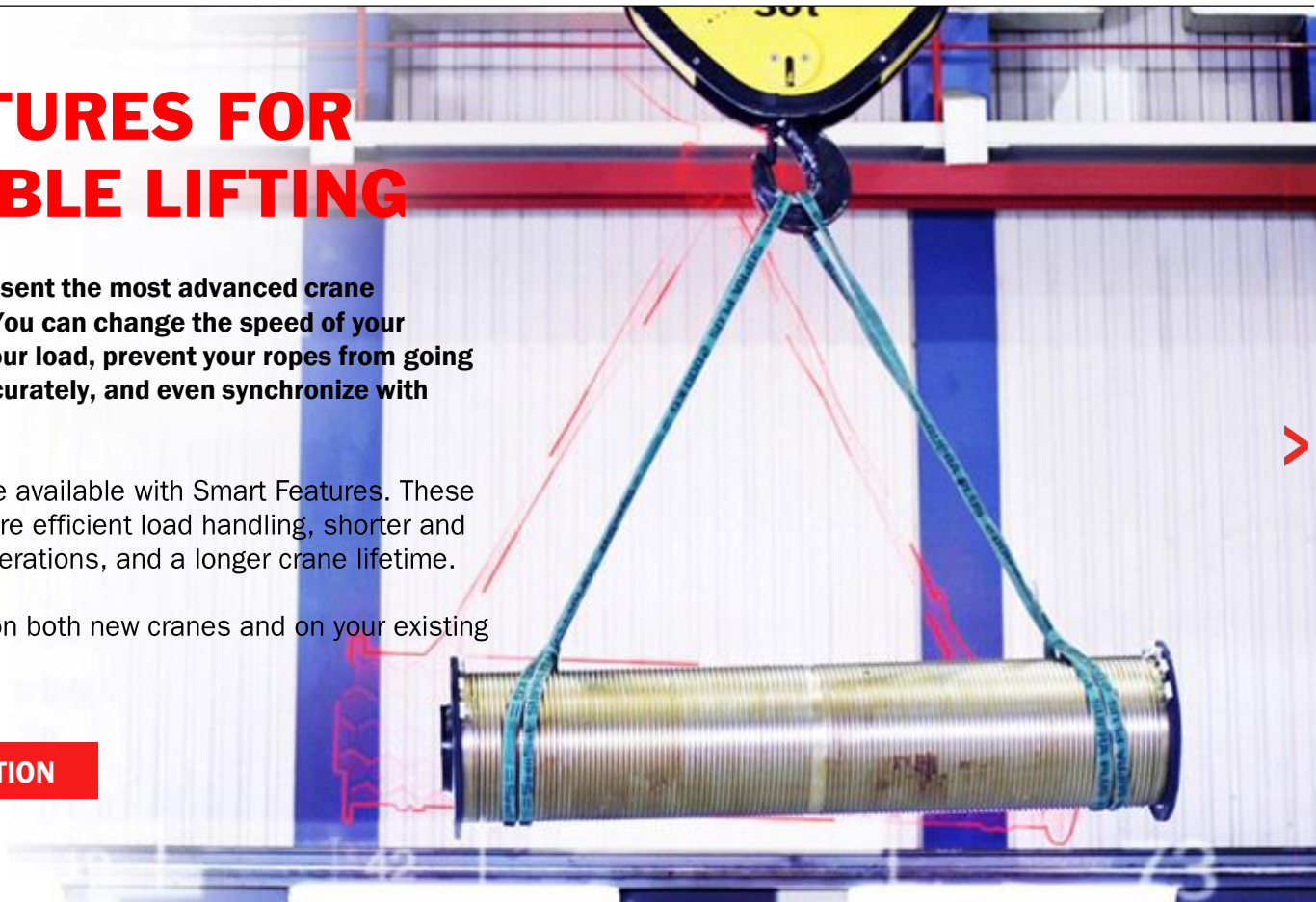
SMART FEATURES FOR MORE FLEXIBLE LIFTING

Konecranes Smart Features represent the most advanced crane technology on the market today. You can change the speed of your movement, control the sway on your load, prevent your ropes from going slack, position your load more accurately, and even synchronize with other hoists for a dual lift.

These and many other options are available with Smart Features. These features can help you achieve more efficient load handling, shorter and faster work cycles, safer lifting operations, and a longer crane lifetime.

Smart Features can be installed on both new cranes and on your existing Konecranes lifting equipment.

SEE SMART FEATURES IN ACTION







IT GETS EVEN EASIER WITH AUTOMATION

With a lot of computer technology, the logical next step is automation. The more automated the crane, the easier the work of the operator.

With fully automated processes, the crane can work without a human operator. From the earliest days of crane automation, we at Konecranes have been developing our own automated systems and driving the technology forward. This technology has been tested and field proven in thousands of applications with various customers.



General-purpose inverters optimized for use with pumps and fans just don't have the vigorous power and torque response needed for safe, reliable, and precise crane operations. We write our own crane application software, taking full advantage of our years of experience and knowledge of our customers and their applications.



Because we develop all of our key technology in-house, you can be sure of expert technical support throughout the lifetime your crane. We also have the tools for long-term software management.

MOTOR CONTROLS JUST FOR CRANES

Crane drive systems are facing ever-growing safety, productivity and availability demands. These demands cannot be met with general purpose inverters.

That's why Konecranes has created DynA technology, with built-in safety and other crane-specific application features. We have years of experience with both light-duty cranes and heavy process crane applications. This gives us the know-how to build the customized drive technology needed for today's high performance, heavy-duty process cranes.



SAFETY FIRST IN CRANE APPLICATIONS

Konecranes DynAHoist technology includes a safety device - the Speed Supervision Unit (SSU) - that constantly monitors the load speed and motor response. The SSU is integrated into the drive hardware as an option board, but runs independent of all other functions of the drive.

The power range of the DynA Vector II covers drives from 2.2 kW, up to 1MW and above. With common DC-bus and load-sharing applications, the power range of DynA Vector II covers all crane applications. Modularity is key in the DynA family. Every drive, from the smallest cross-travel drive to the largest common DC-BUS hoist drive, includes the same easy-to-replace control unit. All option boards, located neatly inside the control unit, are also replaceable in every power class. This reduces the number of spares required and makes maintenance simpler.

We have taken modularity and redundancy one step further with our common DC-bus drives. The DynAREg Vector II, a regenerative network braking unit, can be connected in parallel to allow redundancy for the regenerative units. We use the same hardware in both network braking units and in motor bridges. Typically, this reduces the number of spare parts needed for common DC-bus applications.



COLLECTING, READING AND UNDERSTANDING DATA

Technology has revolutionized the way we capture, share and consume information. Konecranes Remote Service brings the benefits of the Industrial Internet to material handling by connecting data, machines and people.

Konecranes TRUCONNECT Remote Monitoring uses sensors to collect data, such as running time, motor starts, work cycles and emergency stops, providing visibility to crane usage. It also provides brake and inverter monitoring. Your data is available at any time on our online customer portal.

TRUCONNECT Remote Support provides 24/7 access to a global network of crane experts and specialists, offering problem solving and troubleshooting to help reduce unplanned downtime.






Contact Konecranes to learn more.

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Konecranes is a world-leading group of Lifting Businesses™ offering lifting equipment and services that improve productivity in a wide variety of industries. The company is listed on Nasdaq Helsinki Ltd (symbol: KCR1V). With approximately 12,000 employees at 600 locations in nearly 50 countries we have the resources, technology and determination to deliver on the promise of Lifting Businesses™.

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