



CRANE



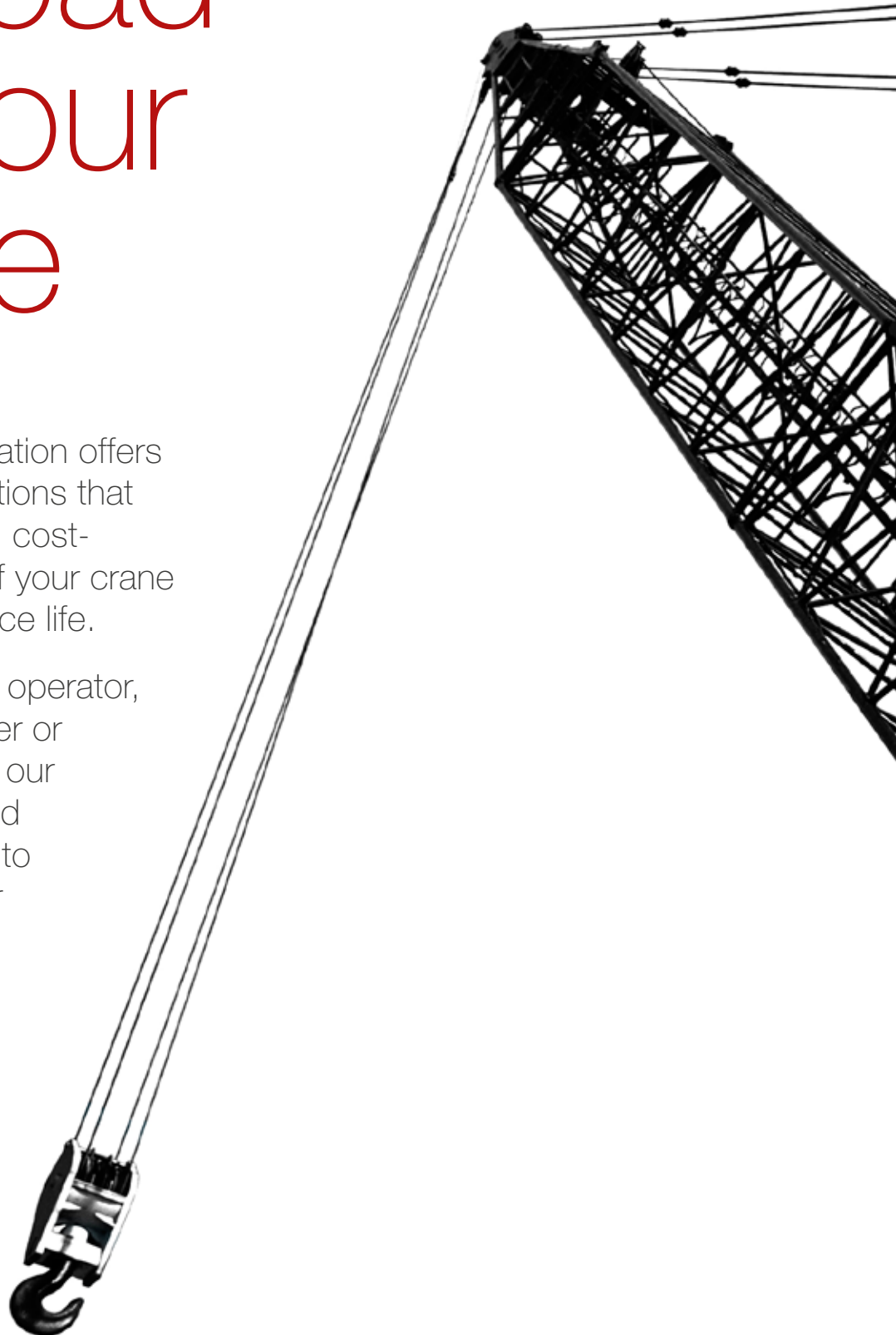
DRIVE SOLUTIONS
EMPOWERED BY EMOTRON

Ease the load on your crane

CG Drives & Automation offers complete drive solutions that ensure the safe and cost-efficient operation of your crane – and a longer service life.

Whether you are an operator, a crane manufacturer or a system integrator, our Emotron-empowered solutions add value to your crane and your business.

Simply and reliably.

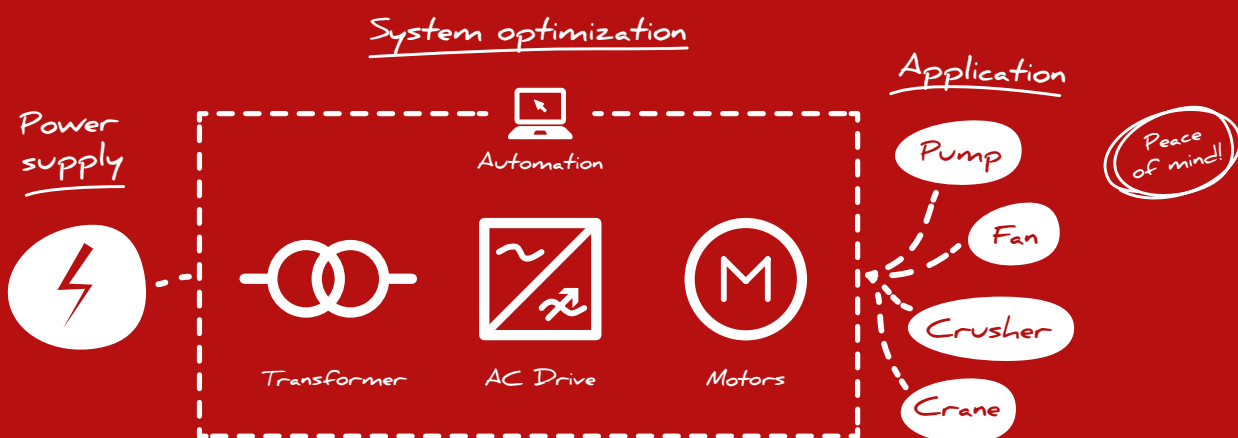




Complete drive solutions for cranes

Creating and maintaining a complete drive solution will give your crane the best total performance and give you peace of mind. We can deliver the engineering, automation, transformer, AC drive, motor and cabinets.

Our modular design philosophy lets us deliver complete solutions based on standard products – not only for cranes – but for demanding pumps and water systems as well as material handling systems.



Lifting versatility to new heights

Our crane drive solutions, based on a wide range of standard components, can easily be configured for robust service in major crane types:

Harbour container cranes (STS, RMG, RTG), grab portal cranes and slewing cranes.

Industrial EOT bridge cranes such as grab, hook and ladle cranes or portal cranes.

Tower cranes for the building construction business.



Harbour



Industrial



Building



Simplicity and reliability

Cranes demand efficient and precise control, for economical as well as for safety reasons. The challenges are: minimising cycle times, reducing mechanical wear and ensuring smooth operation. Simplicity and reliability are keywords for CG's drive solutions, for new cranes and for retrofitting.

Retrofitting gives your crane new life

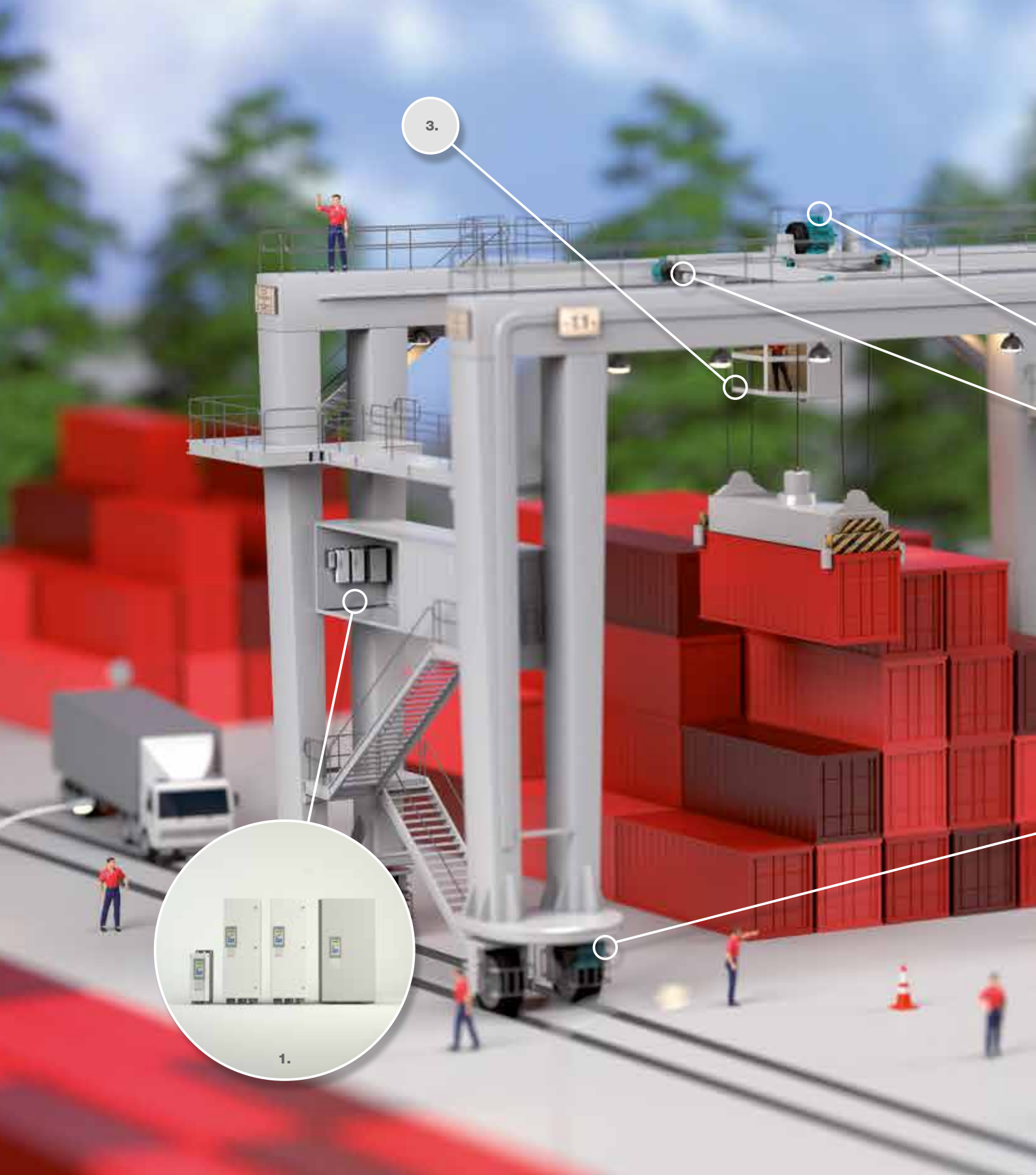
There can be several reasons for upgrading your crane: a demand for higher productivity, new safety regulations, increasing maintenance costs or the difficulty of replacing outdated components. We can help you keep your crane in operation and serviceable for another 15–20 years, with a relatively low investment.

Standardised crane control packages

We provide a complete solution where other companies need to add external equipment. This makes installation and commissioning not only easy but also cost-efficient. Standardised control packages with hardware and software offer plug-and-play solutions. Predefined crane I/O settings save further engineering time. Our crane dimensioning program can easily calculate the requirements for your drive system.

From design to commissioning

We take full responsibility for solutions, from design to installation, commissioning and maintenance. Our committed professionals are available directly when you need customer support, with a help desk on the front line. We offer high availability of spare parts and offer exchange units for major components, simplifying maintenance and repairs. We also offer field service, maintenance support and workshop repairs. Interested in training or simulation? Our crane centre in Wernigerode, Germany, lets you experience the unique functionality and user-friendliness of Emotron variable speed drives in crane control.



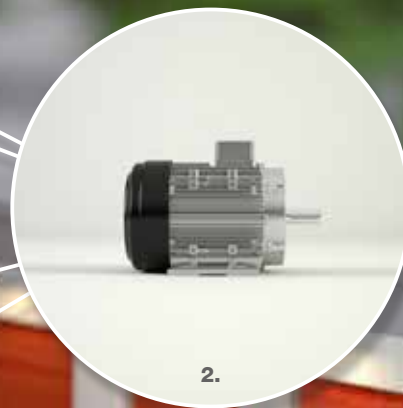
Modular solutions that fit your business

1. AC Drive. Robust, compact drives that are easy to install. Regenerative AFE drives for reduced energy use and low harmonics. Load-dependent field weakening for optimized hoist speed. **2. Motors.** Our motors provide maximum output with minimum power consumption. We

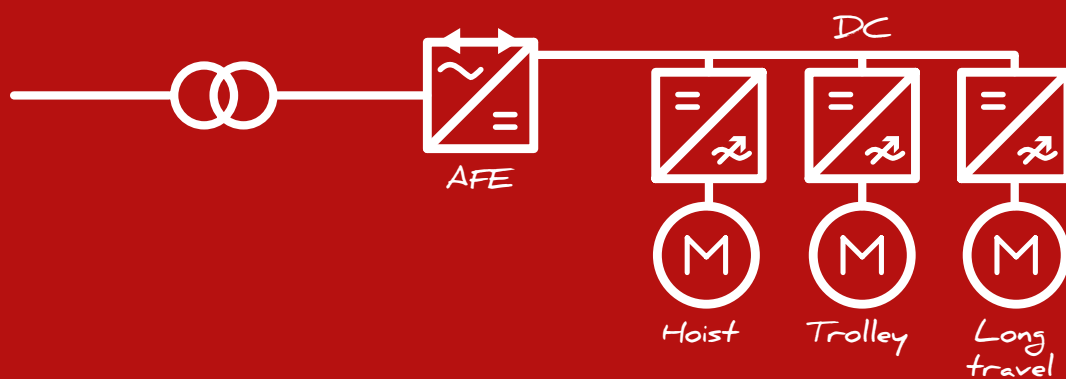
offer robust cast iron motors suitable for cranes. Productive options include brake motors and pulse encoders.

3. Operator cabin. Monitoring and information systems provide complete drive status for operators and maintenance crews. Complete drive status information available.

Optimize crane productivity with Emotron VFX drive solutions



Typical regenerative AC drive configuration





Efficient and reliable with any load



Harbour



Industrial



Building

Robust AC drives for cranes

Our Emotron line of AC drives is noted for robust design, advanced technology and easy handling. They are the basis for our crane solutions, offering trouble-free and cost-efficient operation. The range covers 0.55-3,000 kW, including motor-mountable units for 3-22 kW. Direct torque control ensures high accuracy and efficiency. Crane functions include joystick interface, mechanical brake control, limit switch control, safety monitors and hoist load-dependent automatic field weakening operation.

Safe braking without jerkiness

The direct torque control works together with the integrated brake choppers or the active front end regenerative unit to ensure the braking power will go on and off exactly when required. The required torque is maintained while speed is continuously reduced towards zero. The load is put down safely before the mechanical brake is even activated. A parallel safety system detects any threatening overload and instantly activates the mechanical brakes. Valuable time is saved and safety is increased by programming the crane to stop automatically at its end positions. Fast and precise control of speed and torque ensures the operator can drive the crane faster, knowing there will be no jerkiness causing swinging loads.

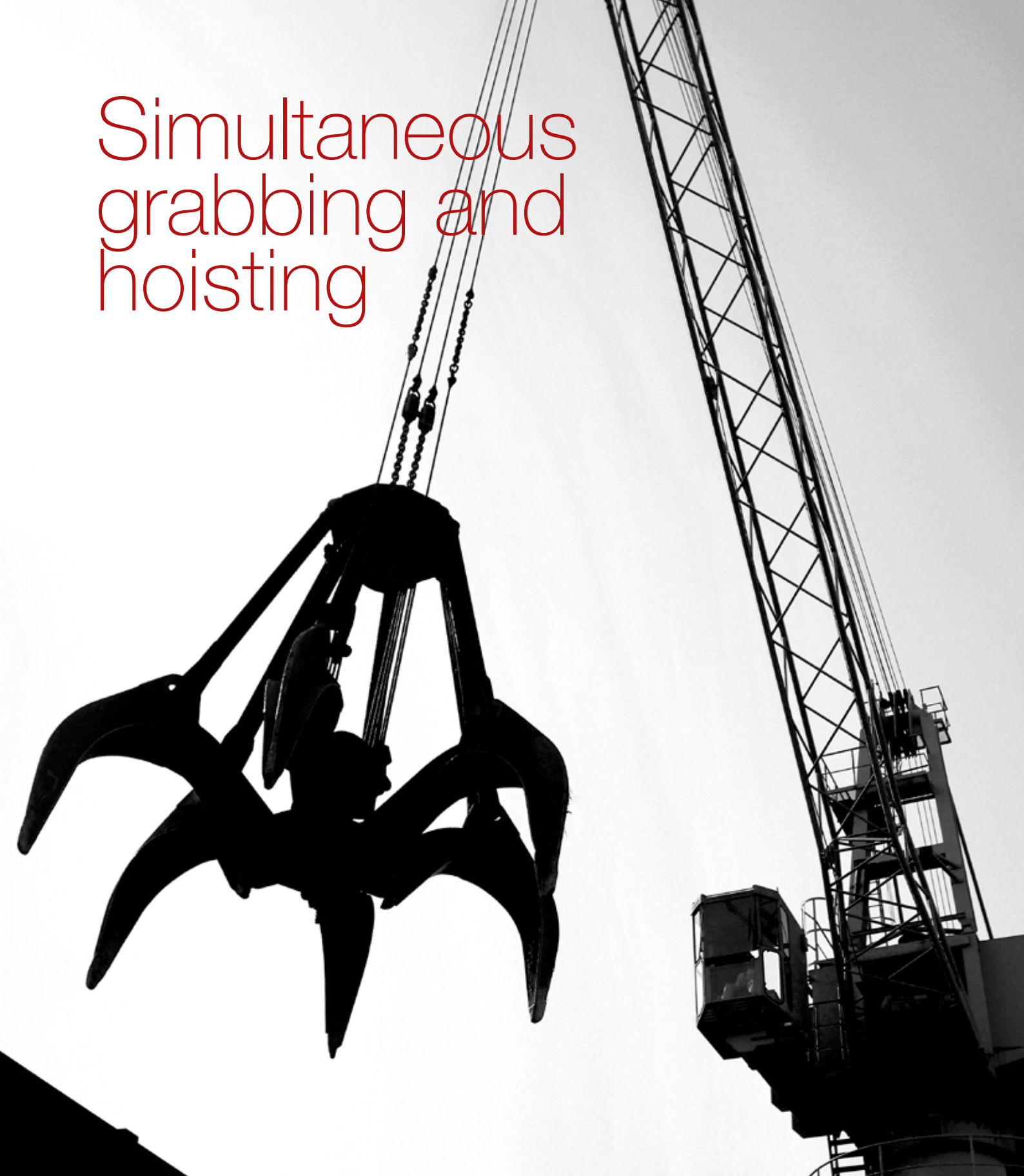


IP20-version of Emotron FDUVFX

High dynamics for accurate control

Safety for people and load is of the utmost importance, and so is high productivity. Our crane control offers efficient and reliable operation, even with heavy loads or in windy conditions. Fast yet smooth starts and stops are ensured by a highly dynamic interaction between direct torque control, speed control, pre-magnetisation of the motor and precise brake control. Response times are extremely short since the actual and required torque are compared 40,000 times a second. Full motor capacity can be utilised from standstill and zero roll-back is guaranteed.

Simultaneous grabbing and hoisting



Optimised grab control

Cranes with grabs are exposed to mechanical stress on ropes. Our grab control provides smooth and accurate operation, saving maintenance costs as well as cycle times. Configuration and installation is easy. Where other solutions require several sensors and switches, CG uses only the direct torque control and motor encoders to coordinate the grab drives. Active front end regenerative units can be used for improving energy-efficiency.



Harbour



Industrial

Maximum hoist speed

The CG four-rope grab control ensures the crane is always operated at optimum speed depending on the load. The hoist motion is faster and softer as it can begin with the grab open. If the order for hoisting is given during closing, hoisting will start automatically at the end of the closing sequence. The hoisting can also be started at a predetermined angle before the grab has been fully closed. When hoisting an empty grab, the normal full speed can be exceeded by operating the motor in the field weakening area, further improving productivity.

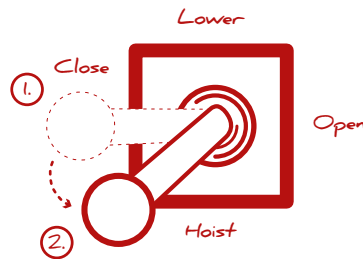
Simultaneous grabbing and hoisting

Time is saved since hoisting can start while the grab is being closed.

1. Start closing
2. Closing + Hoisting

Reduced stress on ropes

When picking up material, the grab digs itself in, utilising its own weight. The hold ropes should not rise while doing this, but should be sufficiently taut to avoid any slack rope on the drum. The grab control puts the hold motion into a state of suspension during closing. The ropes are held with a defined torque and are slowly rolled up. In order to keep the grab securely closed, the torque of the close motor is always slightly higher than of the hold motor. The correct division of the load torque between the hold and close motors is ensured when the grab is hoisted or lowered in its closed condition. The jerkiness that occurs during tightening is minimised, as is the strain from the mechanical parts.

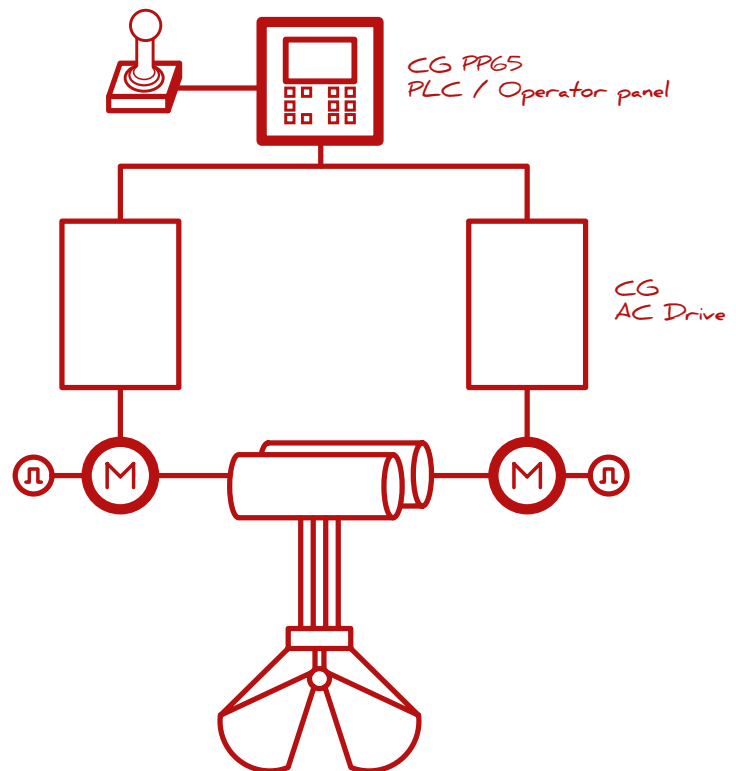


User-friendly handling

The grab control is easily configured using the CG PP65 Power Panel, a combined PLC system and operator panel. No PC is required and the system is easy to install and commission. Only four control signals are required: hoist, lower, open and close. A joystick with the corresponding contacts delivers the signals. The functions can be combined in any order. An integrated position control ensures that the two hoisting devices move at the correct rate at all times.

Grab control system configuration

The CG grab control is easily configured using a combined PLC system and operator panel. No PC is required.



Hook operation can be handled in the same system, meaning the operator can easily switch between grab and hook control. Changing grab units or ropes is quick and easy. Nominal grab positions only have to be set once by the operator, and then an intelligent embedded function automatically sets the open and close limit positions. No external expertise is required – the crane operators can handle it themselves.



20 times longer life for your crane wheels



Heavy wear on rail-mounted cranes

Rail-mounted bridge cranes are exposed to heavy wear. If the wheel pairs are only slightly out of speed synch, the wheel flanges will come into contact with the rails. The load transported might be unevenly distributed over either side of the crane, causing the motors to work at slightly different speeds and pulling the crane towards the side. Temperature variations can also cause the distance between the two rails to vary. A piercing sound betrays the serious wear suffered as the wheel flanges quickly grind themselves down. The simple solution to this is the CG electronic flange control.

Fully synchronized travel

The CG electronic flange control fully synchronizes the wheels to make the crane ride completely parallel to the rail. The crane is guided at a virtually constant distance from the rails on either side. A distance regulator calculates the ideal travel line, and the crane's offset is altered to compensate for the differences in distance. Maintenance costs and noise levels are reduced and the life span of the wheels is greatly extended, with wheel changes normally required every five years. Unsynchronized travel might require wheel changes as often as every three months, with at least a day's standstill each time.

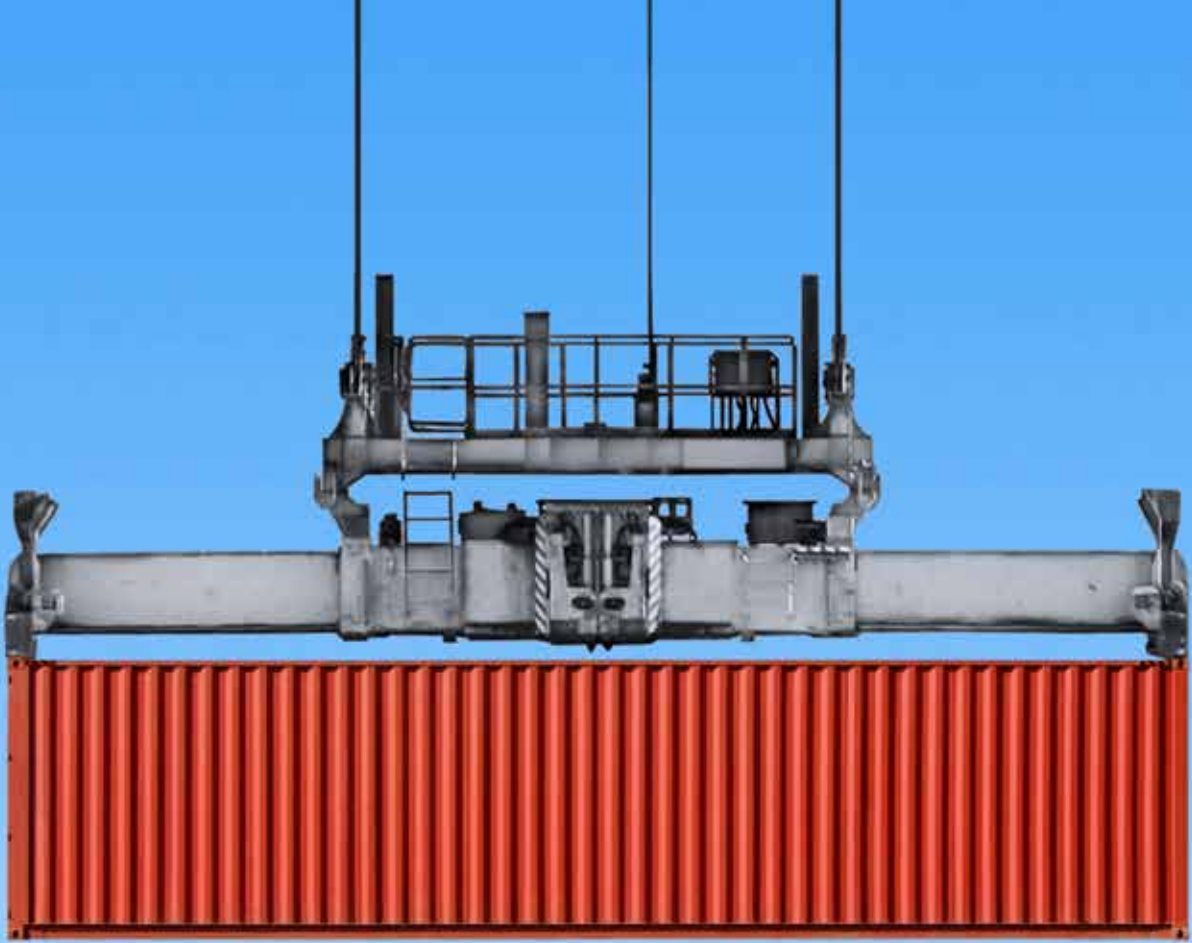


Easy setup without a PC

A plug-and-play solution facilitates configuration. Our electronic flange control is incorporated into the CG PP45 Power Panel, a combined PLC system and operator panel with a colour touch screen. Measurements from four ultrasonic distance sensors are displayed as figures and in a chart. The parameters are easily configured directly in the setup menu, and can be password protected to prevent unauthorised changes.

The CG electronic flange control reduces wear by ensuring the crane rides completely parallel to the rail.





Energy-efficiency with AFE

Emotron AC drives with Active Front End technology offers several benefits:

Energy savings. Braking energy can be fed back to the mains instead of dissipated via brake resistors. This will save energy and the cost of investing in brake resistors, equipment that has limited lifetime and require cooling or external installation. Low harmonic distortions. The AFE technology produces typically less than THDI 5% compared to 30-50% in conventional drives. Reduced power losses eliminate the need to over dimension cables and transformers. Lower distortions also cause fewer malfunctions in other electronic equipment.

Trouble-free operation

The regenerative drive is nonsensitive to voltage drops or harmonics from other equipment which could cause it to trip or break down. Voltage boosting also assures full motor power in case of mains voltage fluctuations.

Reactive power compensation. The AC drive is rated for 100% power in both directions. It provides genuine unity power factor, which allows for optimized sizing of the distribution transformer and can lower the electricity transfer tariff. It also provides the possibility of reactive power compensation.

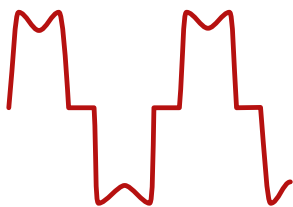


Harbour



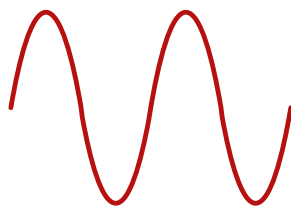
Industrial

Standard 6 pulse
AC Drive



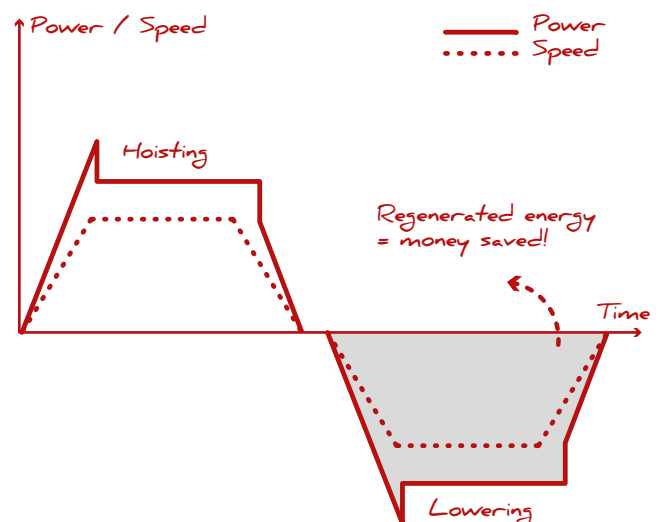
High current distortion:
THDI 30-50%

Emotron
AFE Drive

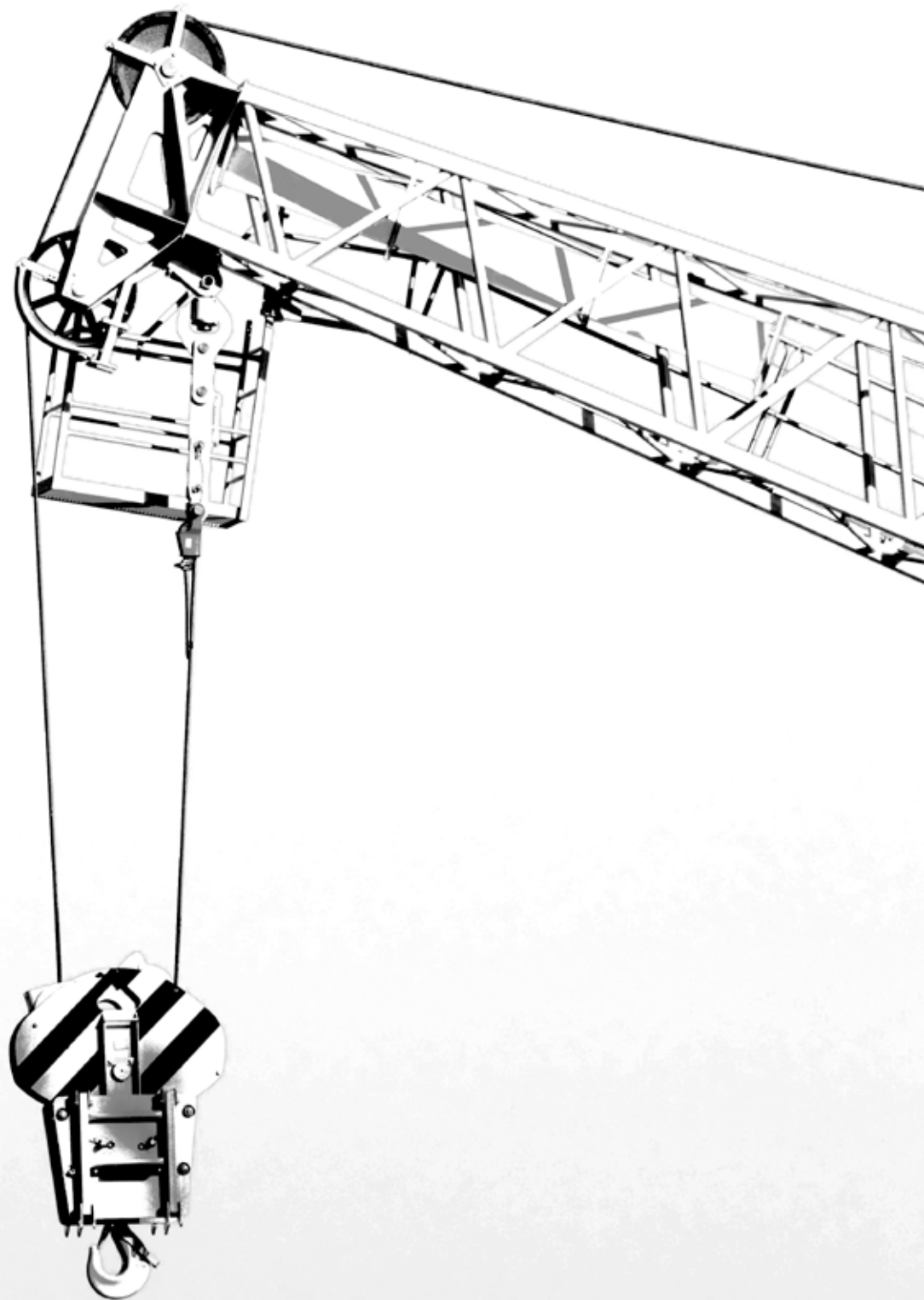


Low current distortion:
THDI < 5%

Regenerated energy saves money



Crane drive concept





AC DRIVES

- IP20/21 and IP54 enclosure**
- 0.55 – 3,000 kW**
- Motor-mountable 3 – 22 kW**
- Regenerative Active Front End**
- Built-in brake choppers**
- Profibus, DeviceNet, Ethernet**
- Encoder for speed/position feedback**
- Safe stop**



- CRANE I/O BOARD**
- Joystick interface**
 - Limit switch control**
 - Mechanical brake control**
 - Safety monitors**
 - Hoist field weakening operation**
 - Pre-magnetization of the motor**



PP65 - POWER PANEL

PLC system with integrated operator panel for implementing the CG crane control packages, including standardized hardware and software. Functions for grab control, electronic flange control and synchronization of two hoists lifting the same load.



CRANE DIMENSIONING PROGRAM
 Calculates the requirements for motor power, AC drive and brake resistor based on crane data such as nominal load, distance and speed. Available for hoist, travel, grab control and electronic flange control.same load.



- CRANE INTERFACE UNIT**
- Used together with crane I/O board**
 - I/O isolation**
 - I/O voltage adaptation**

Crane concepts around the world

Synchronised portal crane with high precision

This portal crane at Straubing lock near Donau, Germany, was modernised to allow synchronised precision control of two hoist drives and two trolley drives working in tandem. They handle a stop log gate of 80 tonnes, 27 m wide – with only 3 cm allowance on either side. The nominal load is 100 t + 50 t, with a hoisting distance of 21 m. Operations continue with no jamming of stop logs, while allowing double nominal speed of hoists in single operation with a partial load.



Harbour



Bridge cranes in the aluminium industry

CG Drives & Automation has built crane drive solutions controlling 70 cranes for NFC Metallurgical Machinery Company in Shenyang, a major player in the Chinese aluminium industry. These cranes operate in a demanding environment, with extreme temperatures and hazardous particles. Dropping a load could cause an explosion. Our Emotron-powered solutions proved to have 30% longer durability, after NFC evaluated and compared major international brands.



Industrial



Modernisation with optimised grab control

This 4-rope grab slewing crane in the port of Hildesheim, Germany, was modernised in only 14 days thanks to CG's standardised grab control. This upgrade provided maintenance savings, improved reliability, easy operation and servicing. The solution included engineering, motors, design of cabinet equipment as well as commissioning. The crane has a nominal load of 12.5 tonnes and a nominal hoisting speed of 63 m/min, carried out by two 67 kW motors



Harbour



Optimised operation and full control



Variable speed control of electric motors minimises power consumption and wear. Our AC drives offer high efficiency and reliability, whether you need to adjust a pump by varying the flow or control a crane or other highly dynamic applications.



AC Drive

EMOTRON VFX FEATURES

Globally well-proven

Robust and complete drive

High level of component integration

Smart control functions

Full control with direct torque control

Built-in DC choke and EMC filter as standard

Speed controlled fans extend equipment lifetime

Few critical parts, easily accessible

Available in IP20/21 and IP54 versions – for cabinet mounting as well as harsh environments

The new IP20/21 series is the preferred choice for cabinet or wall-mounted AC drives (up to 132 kW)

SPECIFICATIONS	Emotron VFX 2.0 Constant torque		Emotron AFE AC Drives Active Front End for regeneration and/or low harmonics
Power	11 - 132 kW	0.55 - 3 000 kW	55 - 1100 kW
Power supply	3-phase 230 - 480 V	230-690 V	3-phase 380-690 V
Rated current	25 - 244 A	2.5 - 3 000 A	109 - 1750 A
Protection class	IP20, IP21	IP54	IP23, IP54



AD
V O D

AD
V O D

AD
V O D

AD
V O D

188081
1321
MA. CW
TAT
MA. CW
C. CAP.

188081
1321
MA. CW
TAT
MA. CW
C. CAP.

188081
1321
MA. CW
TAT
MA. CW
C. CAP.

188081
1321
MA. CW
TAT
MA. CW
C. CAP.

188081
1321
MA. CW
TAT
MA. CW
C. CAP.

We put all our energy into saving yours

Commitment and positive attitude are always included.
At CG Drives & Automation we use our know-how to create the technical solutions, and our personal commitment to make them work according to your requirements. Simplicity and reliability are keywords applying to our products as well as our people.
This will save you energy in all senses of the word!

CG Drives & Automation, former Emotron, has for 35 years developed, manufactured and delivered efficient and reliable motor control equipment. Since June 2011 CG Drives & Automation is a part of Crompton Greaves (CG). CG is a global pioneering leader in the management and application of electrical energy. With more than 15,000 employees across its operations in around 85 countries, CG provides electrical products, systems and services for utilities, power generation, industries, and consumers.



DRIVE SOLUTIONS
EMPOWERED BY EMOTRON

CG Application brochure Crane 01-5471-01 2013-11

SWEDEN (Head office)
Drives & Automation
Mörsaregatan 12, Box 222 25
SE-250 24 HELSINGBORG

Phone: +46 (0)42 169900
Fax: +46 (0)42 169949

info.se@cgglobal.com
www.cgglobal.com
www.emotron.com

GERMANY
Drives & Automation
Goethestraße 6
D-38855 WERNIGERODE

Phone: +49 (0)3943-92050
Fax: +49 (0)3943-92055

info.de@cgglobal.com
www.cgglobal.com
www.emotron.de

THE NETHERLANDS
Drives & Automation
Polakkers 5
5531 NX BLADEL

Phone: +31 (0)497 389 222
Fax: +31 (0)497 386 275

info.nl@cgglobal.com
www.cgglobal.com
www.emotron.nl

INDIA
Crompton Greaves Ltd.
Drives & Automation Division
Plot. No. 09, Phase II,
New Industrial Area,
Mandideep – 462046

Phone 1 : + 91-7480 42 6433,
Phone 2 : + 91-7480 42 6440

drives.mktg@cgglobal.com
www.cgglobal.com
www.emotron.com

