KONECRANES®
Lifting Businesses™

Superior Crane Drive Technology

DynA Vector II

DynA Vector II
THE SUPERIOR CRANE DRIVE TECHNOLOGY

The every-increasing safety, productivity and availability demands set new requirements on crane drive systems. These requirements cannot be fulfilled with general purpose inverters.

That is why Konecranes has created DynA Technology with built-in safety and other crane-specific application features. We have strong experience not only in process crane applications, but also in cost-effective, light-duty cranes and harbor and shipyard crane projects. This gives us the core know-how to build the tailored drive solutions needed in today's high performance, heavy-duty process cranes.

Customized Taylor-made for the crane applications is the keyword for us

General purpose inverters optimized for use with pumps and fans just don't have the robust power and torque response needed for reliable, safe and precise crane operations. Our crane application software is built in-house, taking full advantage of our years of experience and knowledge of customer needs. This also ensures in-house development of all key technology, lifetime technical support and guaranteed tools for long-term software management. It means quality.

Safety first in crane applications

Every DynAHoist includes a safety device that supervises the load speed and motor response at all times. We call it SSU, Speed Supervision Unit. SSU is integrated into the drive hardware as an option board, but runs independent of all other functions of the drive and also includes a separate processor.

The power range of DynA Vector II covers drives from 2.2 kW up to 1 MW and above. With common DC-bus and load-sharing applications, the power range of DynA Vector II covers all crane applications.

Modularity has been a major target in the DynA family. Every unit – from the smallest cross travel drive to the biggest 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 between any power classes. This reduces the amount of spares and makes life a lot simpler for the maintenance people working with the drives.

With common DC-bus drives, we have taken modularity and redundancy one step further. Regenerative network braking units, DynAReg Vector II's, can be connected in parallel to achieve redundancy also for regenerative units. Common DC-bus drives have optimized power units in the power range of 110 kW all the way to 1 MW covering only 3 different hardware platforms. The common DC-bus units below 110 kW are similar than complete frequency converters. Typically this reduces the number of spare parts needed as well as the spare parts delivery times for common DC-bus applications. The same hardware is used in network braking units and in motor bridges.

This is the Future of Crane drives. This is The Cutting Edge. This is DynA Vector II.

Developed in-house for crane use

- Long-term experience in crane technology
- Loaded with new features
- More than an inverter
- Options for all cranes
- Suplified structure
- Pre-tested solution
- Smoother and more accurate starts/stops
- Improved, optimized brake control
- DynABus II
- 24-hour product support
- Comprehensive drive repair facilities on 3 continents
- Stocking depot: Components and complete drives
- Aftersales and technical support
- Training

WORLDWIDE EXPERIENCE IN CRANE TECHNOLOGY

CRANE-SPECIFIC FEATURES

Superior brake control ensures smooth and precise starts and stops
> Brake opening delay detection sequence
> Magnetizing time detection sequence
> Optimized start delays due to advanced magnetizing and brake opening control
> Closed loop zero-speed function and load floating ensures immediate response to repeated driving requests
> Stop magnetizing allows big motors to restart faster
> Closed loop brake slip supervision option

Limit switch functions for every purpose
> S11, S21, S21, S22 - slow down and stop limits
> Smart, common slowdown limit switch
> Second speed limit functions
> Distance dependent speed limitation on slowdown area
> Adjustable operation on end stop limit
> Distance dependent automated stop on slowdown area
> Duplicate end stop limit inputs. Limits switch information combination from inputs and Profibus with synchronous operation supervision

Advanced ramps functions
> Pre-designed ramp wave forms
> S-curve smoothing
> 2nd acceleration and deceleration ramps
> Adjustable stop and direction change ramps
> Advanced reverse plugging

Versatile Extended Speed Range activation
> Digital information via terminal or Profibus-DP
> Load feedback from overload device
> Automated load detection in closed loop

Closed loop load related functions
> Programmable slip
> Adjustable torque limit
> Slack cable detection
> Output for external load display
> Overweight detection

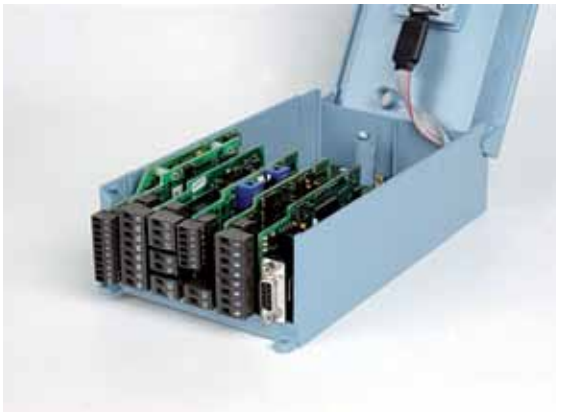
Special feature
> Load sway control
> PLC/Profibus connection
> Positioning functions
> Area limitation functions

DynABus II
> DynABus II is based on the Profibus-DP fieldbus and it ensures full monitoring and control features
> Communication transmit 10 words (16 bit) data each direction maximum on 20 ms time level
> For HMI monitoring, the DynABus II transmits drive status words, actual values and fault codes
> DynABus II also enables full control of all functions and reference values through the Profibus-DP

Other built-in features
> With two motor sets, it's possible to use one inverter with two totally different motor types, including load sway control settings
> Multicare function for cross locking two drives to work together in simple hoist applications
> Micro Speed digital input function moderate joystick maximum reference request to e.g. 20% of nominal. The reduced speed enables operator to perform accurate and precise crane movements safely
> Inching command allows user to move inch-by-inch. This is another good solution when accurate and high-precision movements are requested
> Brake feedback digital input monitors mechanical brake status feedback and instantly stops motion in the event of a mechanical brake malfunction


DYNAHOIST

MODULAR STRUCTURE



The control unit can be installed separately from the power module. The control unit has five extension board slots. The same control unit can be used with all sizes of inverters. The front cover of the control unit can be opened and the board connections are covered by the removable cover. The CPU board is included in the control unit. The Konecranes application software is loaded in the memory of the CPU board.

SOFTWARE FEATURES

Software functions

- Open loop V/f-control and flux vector speed control
- Closed loop speed and torque control
- Electronic motor potentiometer with 2 steps (AP) or 3 steps (EP3), analog voltage references from potentiometer (PO) or from radio (AU) and multistep speed references via digital inputs
- Slow down and stop limitswitch both directions
- Stopping method (Ramp/Brake)
- Brake relay output
- Thermistor input
- Amount of digital inputs 11
- Extended Speed Range (ESR)
- 2-hoist synchronizing
- Simultaneous start control “Multicare”
- 2-motor parameter sets
- Control method changing during run
- Intelligent ramps
- S-curve
- Field bus
- Correction input
- Second ramps
- Second speed limit
- Torque limit
- Micro speed
- Brake feedback
- Distance dependent slowdown limit switch function
- Inbuilt AC-choke and integrated EMC filter
- Load sway control
- Optimized speed and stoplimit functions

Plain English text display

All parameters can be changed with a keypad. Basic parameters can be accessed without a password. Different levels of parameters can be accessed through the corresponding passwords.

Application tools

Application programming tools

- Konecranes application software is be done with IEC1131-3 based tools
- Application software is specified and programmed by Konecranes

Konecranes provides free diagnostics and parameter management tools for PC computer

- Manage drive parameters
- Detailed drive information in electronic format
- Fault history, fault time actual data and fault counters for maintenance purposes
- Monitoring the drive actual values with oscilloscope and data logger

D2C & D2H in-built functional features:

- D2H Synchro
- Sway Control
- Inching
- Slack Cable detection
- Overweight detection
- Load Display
- Automatic ESR (Extended Speed Range)
- Torque Control
- Advanced Reverse Plugging
- Multicare - simple common hoist supervision
- Brake Supervision
- Brake Slip - safety feature
- Load Float
- Micro Speed Function
- SSL Second Speed Limit
- Slow Distance (Smart limits)
- Master Follower

DynAReg & COMMON DC-BUS

Redundancy
> Decreases crane downtime
> Modular design: Simplifies the lay-out of the electrical system

No need for external braking resistor circuit
> Braking resistors need maintenance
> Braking resistor circuit is very vulnerable in some environments

Makes standardization easier
> With D2R it is possible to raise the DC-bus voltage level 10-25%, i.e. it is possible to use 500V motors with 400V supply

Energy savings
> Optimal power supply due to the sinusoidal load current
> Consumes and returns clean, low harmonic power from the network
> Handles more severe supply line voltage fluctuations: power supply voltage drop does not directly effect motor current

Benefits
> Offers sophisticated control and monitoring via Profibus control
> Ease of redundancy
> Energy savings
> Resistor maintenance eliminated
> Handles more severe supply line voltage fluctuations
> Power supply voltage drop does not directly effect motor current
> Extends lifetime of VF drives
> More useful diagnostics
> Simplify system architecture

HARDWARE FEATURES

Assembly and cubicle
> Through-panel mounting for optimal dissipation of thermal power losses
> Pre-designed mechanical construction for standard enclosures
> Full range options for extreme environment conditions
> Pre-designed optional redundancy system for additional reliability
> Pre-engineered electrical room concept

Main circuit designed for cranes
> Accurate current feedback from all three phases
> Brake chopper dimensioned for 100% duty
> Sophisticated intermediate circuit charging
> Latest semiconductor technology
> Built-in filter decreases radiated electromagnetic emissions. No need for shielded motor cables in industrial environment
> Separate power units for grounded network and non-grounded network (IT)
> Common DC-bus with regenerative network bridge for high-end applications

Crane documentation
> Drive is fully integrated into crane documentation
> Some modular electrical draws are linked to a continously updated database
> All documentation available in electrical format upon request

Device name
> D2C DynAC Vector II
> D2H DynAHoist Vector II
> D2R DynAReg Vector II

Supply voltage
> F 380-500VAC, 50/60 Hz, 3 phase
> K 525-690VAC, 50/60 Hz, 3 phase

Allowed voltage fluctuation +/- 10% and frequency fluctuation +/- 5%

Control voltage
> Y 42VAC, 50/60 Hz
> P 48VAC, 50/60 Hz
> T 115VAC, 50/60 Hz
> V 230VAC, 50/60 Hz

Allowed control voltage fluctuation +/- 10% and frequency fluctuation +/- 5%. Control voltage transformer power minimum 50 VA per inverter.

Ambient conditions
> Ambient temperature: operating -10…+55C, storage -40…+60C. Common DC-bus and all units above 132 kW have lower operating temperature -10C…+40C. Derating required in higher ambient temperature. Consult factory
> Humidity: <95%RH. No condensation allowed
> Altitude: Maximum 100 m at In (rated current). Above 1000 m In reduces 1 % per each 100 m. Above 3000 m consult factory
> Vibration: Maximum displacement amplitude 1 mm at 5-15.8 Hz and maximum acceleration amplitude 1 G at 15.8-150 Hz. Common DC-bus and all units above 132 kW have maximum displacement amplitude 0.25 mm at 5-31 Hz and maximum acceleration amplitude 1 G at 31-150 Hz

Rated output specification
> Max. output voltage is equal to supply voltage
> Output frequency range 0 ... 250 Hz
> Max. output current is 1.5 x In (1 min time during 10 min period)
> Braking torque 150%

External output filter for new inverter motor protection is required if number of motor is >4 or total motor cable length is greater than 200 m (650 ft). Consult factory in case of lower voltages or old motors.

AFTERSALES SUPPORT

Fulfilled safety and EMC standards

Safety

> D2C/D2H fulfill the safety requirements defined in the standards EN 50178 and EN/IEC 60204-32

LV and EMC directives

> Conforms to the relevant safety provisions of the Low Voltage Directive (2006/95/EC) and EMC Directive (2004/108/EC)

Immunity

> D2C/D2H fulfill the immunity requirements defined in the EN/IEC 61800-3: 2004 for the second environment. EN 61000-6-1 (residential, commercial and light industry) and EN 61000-6-2 (industrial environment)

Emissions

> D2C/D2H fulfill the emission requirements of the EN/IEC 61800-3: 2004 for the second environment

Second environment

> According to EN/IEC 61800-3: 2004, if the rated current of the crane supply is less than 400 A, the inverters are in the C3 category; otherwise, they belong to category C4. Complex systems, e.g. systems with D2R, belong to category C4

Power supply

> 0 unlimited, non-grounded network (IT), category 4
> N limited, grounded network, category 3

DynABus II

> Profibus-DP field bus
> Data frame based on Profidrive PPO5 specification, which is completed for crane applications
> Crane terminology and wide status information
> Full crane control features
> Possibility for redundant signals via Profibus and terminals
> DynAC Vector II & DynAHoist Vector II
> Versatile crane monitoring applications available

Global drive repair services

Our customers are able to get globally different levels of services in fixed price. All repairs includes needed software installations. To make it easy we have defined different repair service categories to get best possible services.

> Standard repairs: in-house repair target time is less than 5 days (+logistic time)
> Express repairs: in-house repair target time is less than 2 days (+logistic time) or we will send a repaired spare part to site ASAP
> On site repairs for large drives can be also select as a standard or express repair

Our factory certified global repair centres are located in USA, China and Finland. If you need any help, just call to the nearest local Konecranes service branch to get more information.


INDUSTRIAL CRANES


NUCLEAR CRANES


PORT CRANES


HEAVY-DUTY LIFT TRUCKS


SERVICE


MACHINE TOOL SERVICE

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 OMX Helsinki Ltd (symbol: KCR1V). With over 10,000 employees at more than 570 locations in almost 50 countries we have the resources, technology and determination to deliver on the promise of Lifting Businesses™.

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www.konecranes.com