

# Drive and automation solutions for crane technology



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# Drive solutions that inspire.

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**For an industry that gets things moving.**

We have a comprehensive portfolio of solutions for crane technology – from project planning and design, co-engineering, gear units, motors and frequency inverters to after sales service, with SEW-EURODRIVE as your partner, everything is available from a single source.

**Our thoughts and actions take account of the big picture:**

- As an owner-operated family business, which takes quality and responsibility personally.
- As a driver of innovation, whose pioneering ideas set trends and help shape the future of drive technology.
- And as a reliable partner, who supports you with comprehensive advice and services no matter what your requests and requirements.



## You will find cranes everywhere. And SEW-EURODRIVE too.

With more than 19 000 employees and a uniquely extensive network of production, service and sales locations, we are always close by, no matter where you are – in Germany, Europe or around the world. Whether you need to redevelop a system or require

competent service, whether you are looking for spare parts, repairs or professional advice:

**The solution is just a call away!**



52 countries



> 19 000  
employees



110 000  
active customers



20 mill. spare  
parts/month at  
> 100 locations



Available to you  
525 600 minutes  
a year



Solutions for  
a whole host of  
industries

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# Our solutions for crane technology

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Mankind has always faced the challenge of overcoming his own physical limits in order to lift heavy loads. There is a wide range and variety of technology available to enable mankind to build big.

In this brochure, we would like to use three examples to show you how SEW-EURODRIVE products can be used for cranes and the benefits these bring in each scenario.

We have consciously chosen three different levels of automation. These should be considered independently of the crane type.

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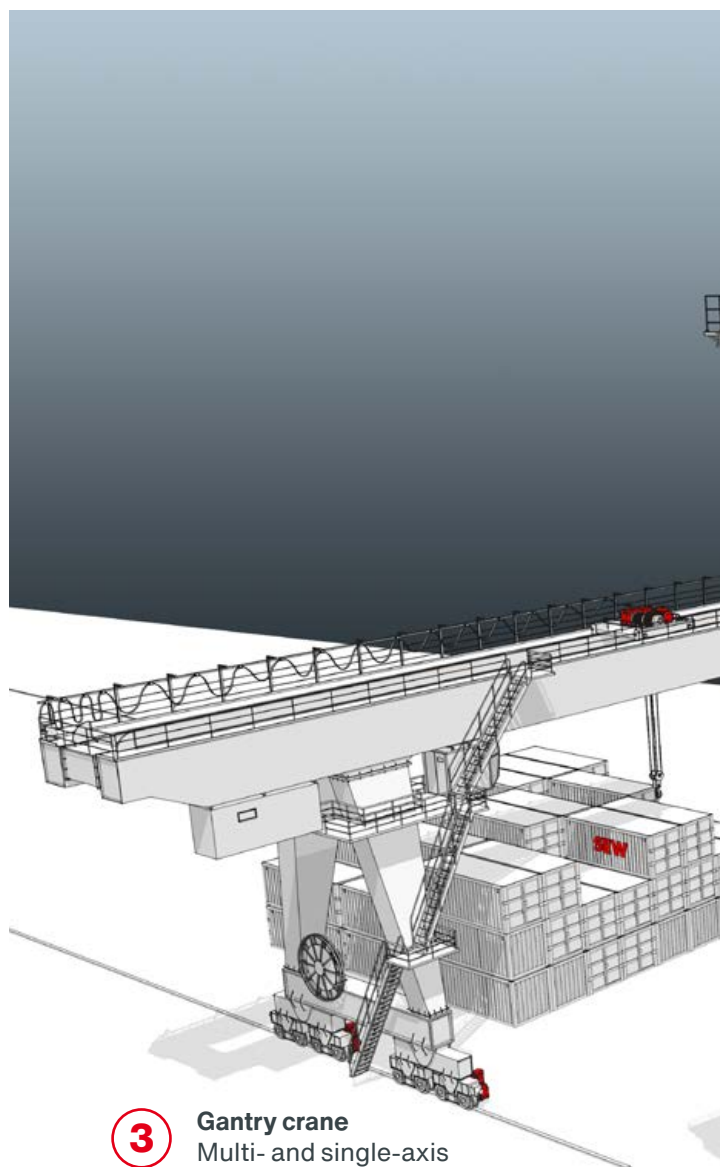
## 1 Jib and tower crane

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## 2 Bridge crane

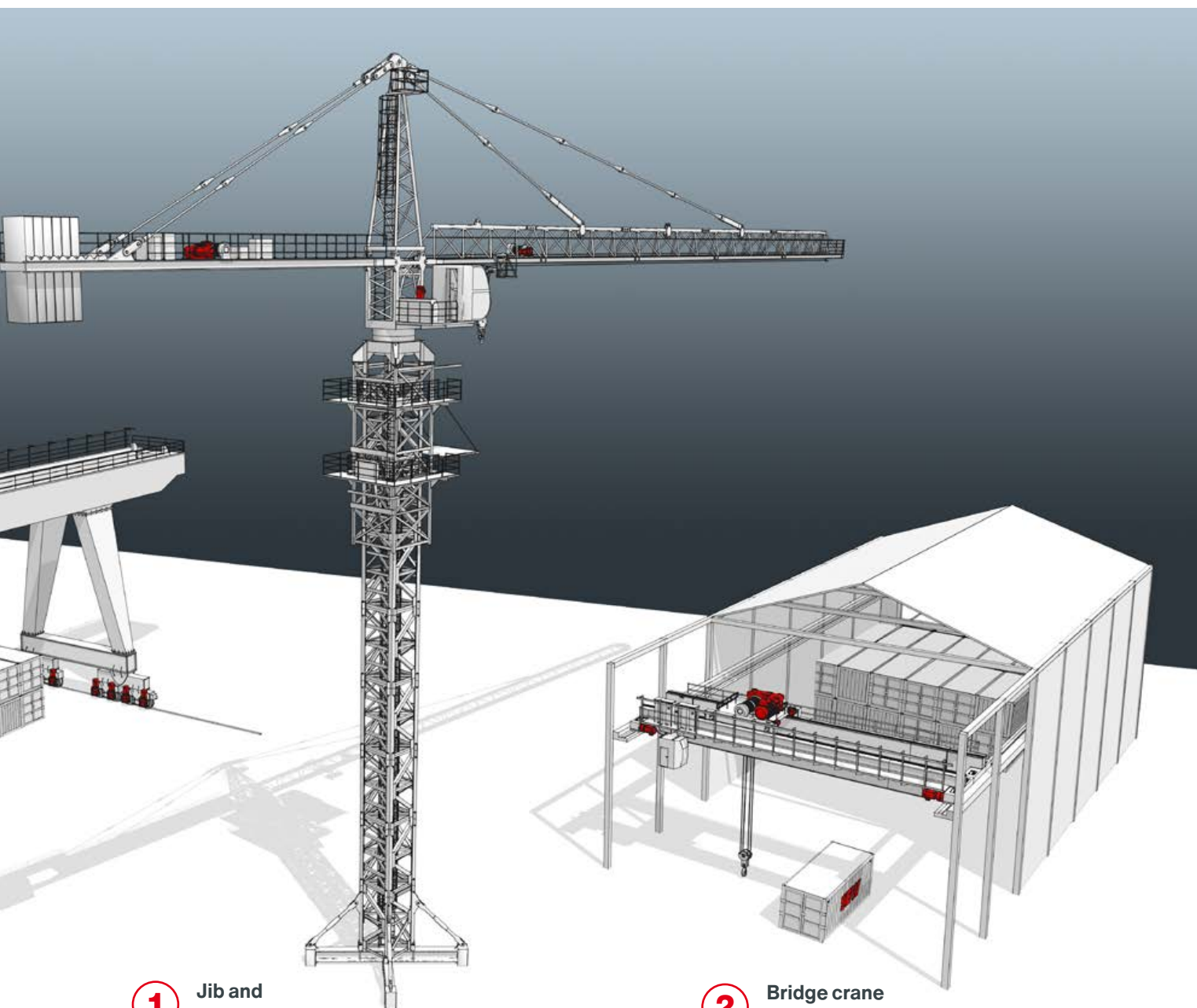
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## 3 Gantry crane



- 3 Gantry crane**  
Multi- and single-axis system with DC link connection, controller for coordinating axes in the world coordinate system, visualization, capture of operating data and communication with the higher-level enterprise resource planning system.



**1****Jib and tower crane**

for manual operation. Individual drives ensure delivery of power. The inverters are controlled in a binary manner or via a fieldbus system.

**2****Bridge crane**

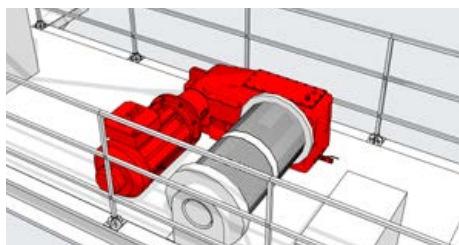
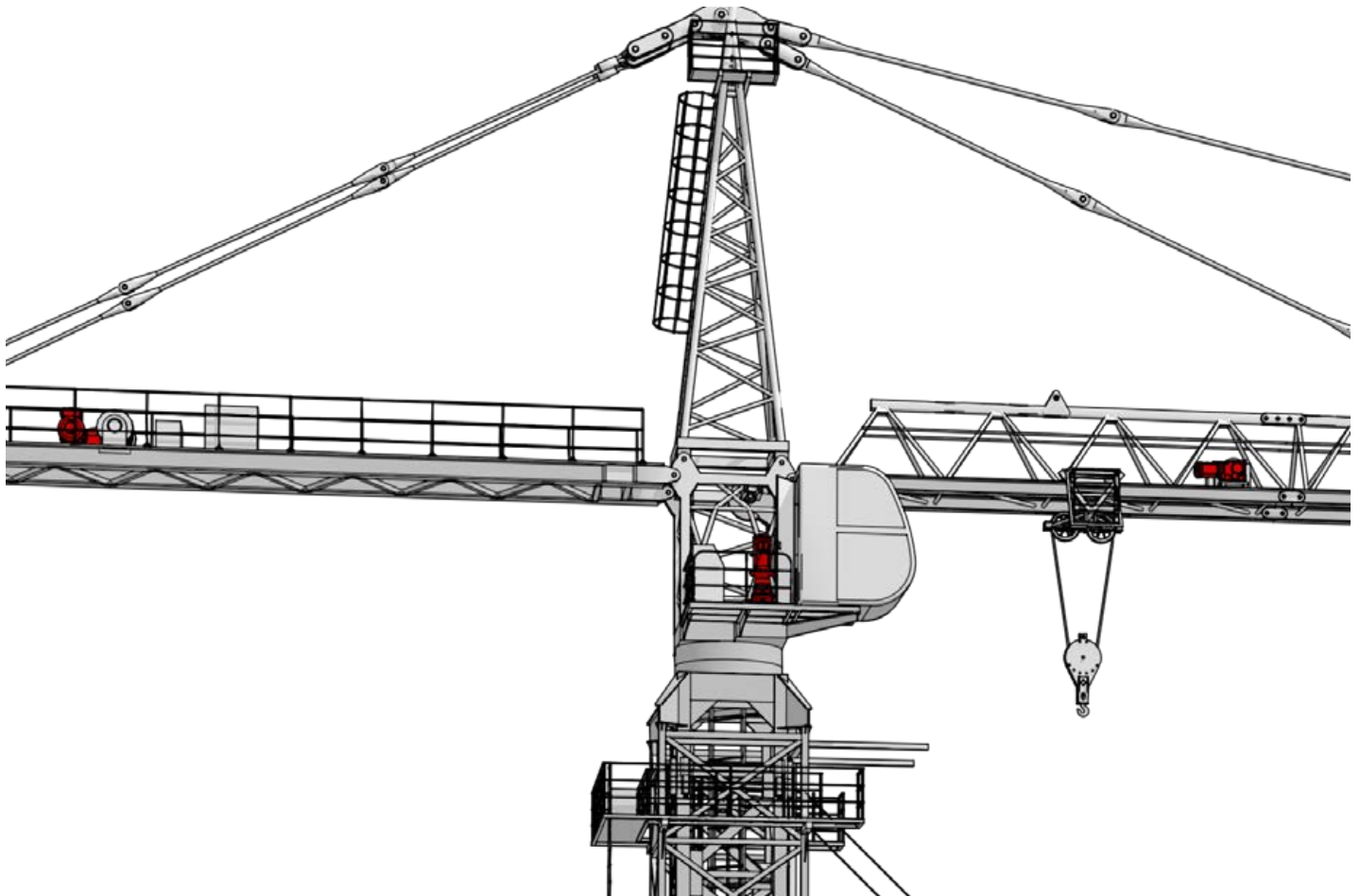
Several drives are linked to a higher-level controller via a fieldbus connection. Industrial gear units ensure delivery of the motor power.

# Jib and tower crane

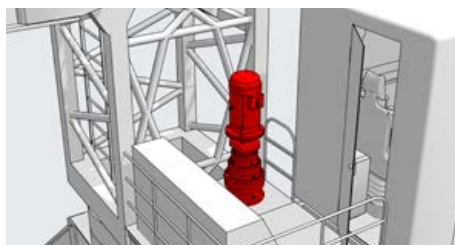
Tower cranes are usually mobile lifting systems, which are set up and made ready for use within a short time frame. To minimize the dead weight and reduce wind load, the pillar and jib take the form of a frame made of lightweight tubing.

## Key goals

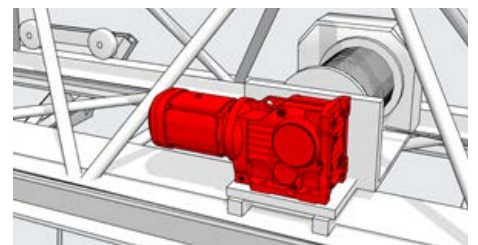
- high planning and design flexibility
- compliance with technical safety requirements
- high availability
- energy-efficient drive solutions



Hoist unit



Slewing gear



Trolley travel unit

## MOVIDRIVE® technology inverter technology



The MOVIDRIVE® technology application inverters are available as single-axis application inverters with rated outputs of up to 315 kW and an overload capacity of up to 250% in protection classes IP20 and IP54.

Asynchronous AC motors without/with encoder as well as asynchronous motors with LSPM technology.

The recently developed CFC and VFCPLUS control modes allow virtually all encoder and motor types to be operated. A large number of adjustment options permit field weakening operation at up to four times the nominal speed and a high overload capacity.

- various software modules can run on the inverter itself: from MOVIKIT® Velocity for speed control to MOVIKIT® Table Positioning for table positioning
- various option cards for flexible device adaptation: fieldbus interface, extended safety technology, encoder interface and keypad
- multi-encoder interface for TTL, SSI, HIPERFACE® or SEW-EURODRIVE's own DDI protocol
- the inverter supports all common fieldbus protocols (e.g. PROFINET, EtherNet/IP, POWERLINK).

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## CSA31A safety technology



The STO safety function is already integrated as standard in PL e in all inverters of the MOVI-C® series. More than 15 additional safety functions can be incorporated using safety option cards.

- Plug-in cards for extended safety functions

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## Gear units and gearmotors



**Hoist unit:**  
Helical gear units of the X.e series with DRN.. AC motor

The helical gear units of the X.e series are also available with an extended center distance. The large center distance provides sufficient free space to arrange the motor and rope drum on one side of the gear unit. The brake carrier also allows drum brakes to be fitted with ease.

- makes oversizing due to a lack of space unnecessary
- everything from a single source: motor, gear unit and auxiliaries such as couplings and drum brakes



**Trolley:**  
K..DRN.. helical-bevel gearmotor

The compact combination of gear unit and motor gives designers and users a great degree of freedom. The extensive modular design and large number of options and accessories ensure that the setup can always be perfectly adapted to the requirements of the application in hand.

- no compromises: the huge flexibility afforded by the modular design always ensures the right drive solution
- robust and low-maintenance for maximum crane availability



**Slewing gear:**  
Planetary gear units of the PPK series with DRN.. AC motor

With its high power density, the PPK series is perfect for all heavy-duty applications where robust design, high gear ratios and compactness count.

- compact design for drive tasks in tight spaces
- high reliability thanks to the infinite fatigue strength according to DIN3990

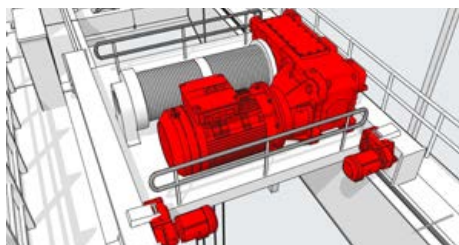
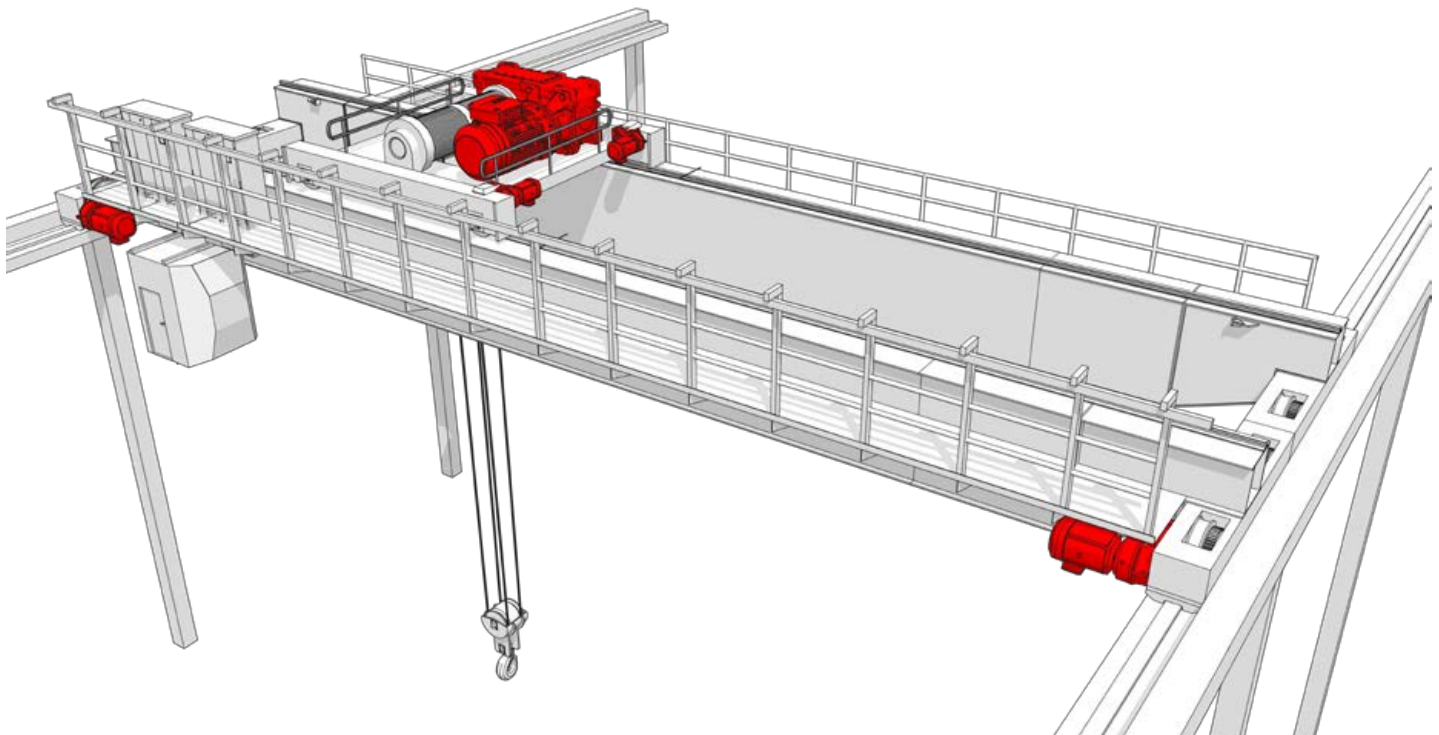
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# Bridge crane

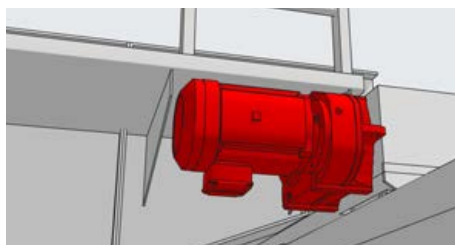
Bridge cranes make optimum use of the space available within the hall to achieve the largest possible work envelope.

## Key goals

- flexibility and safety in terms of planning and design
- drive functions matched perfectly to the design
- high system availability
- reduced risks and security of investment
- energy-efficient solutions



Hoist unit



Horizontal drive



Compact control cabinet with MOVIDRIVE® modular



## Control technology: MOVI-C® CONTROLLER UHX45



The controllers in the MOVI-C® modular automation system are used for challenging motion control and automation tasks with an average number of axes. However, it is the integrated software that really provides the added value for reducing complexity: parameter setting instead of programming. This software translates into more flexibility and less programming work for you, the user.

- huge number of drive functions with short response times
- high-performance link to system and fieldbus
- central data storage on the controller
- integrated web visualization

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## Inverter technology: MOVIDRIVE® modular

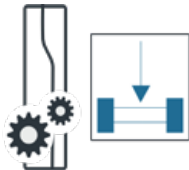


Multi-axis system with DC link coupling as single-axis application inverters with rated outputs of up to 315 kW and as modular multi-axis systems incorporating single-axis and double-axis modules with rated currents of up to 180 A. They exhibit an overload capacity of up to 250% for dynamic motion.

- space in the control cabinet thanks to use of double-axis modules
- long drive cables, can be flexibly adapted to requirements
- perfectly designed for the operating data

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## Software modules: MOVIKIT® MultiAxisController



RTOS -

Real Time Operating System

MOVIKIT® software modules are pre-configured to allow drive functions to be realized with ease. The "Multi-Axis Controller" category includes modules for central control of coupled drives.

- widely used, tried and tested drive functions
- optimized for MOVI-C® inverters and control technology
- software modules and add-ons can be added

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## Gear units and gearmotors



**Hoist unit:**  
Helical and bevel-helical gear units of the X.e series with DRN.. AC motor

With a wide gear ratio range and finely graduated sizes, the X.e series is the preferred solution for crane hoist units.

- robust design permits reliable crane operation in all power classes
- everything from a single source: motor, gear unit and auxiliaries such as couplings and drum brakes



**Trolley:**  
F..DRN.. parallel-shaft helical gearmotor

The compact combination of gear unit and motor gives designers and users a great degree of freedom.

- no compromises: the huge flexibility afforded by the modular design always ensures the right drive solution
- robust and low-maintenance for maximum crane availability



**Monitoring the hoist gear units with the DriveRadar® IoT Suite**

The DriveRadar® IoT Suite can be used to continuously monitor drives of relevance to the process, such as those found in the crane hoist unit.

- avoidance of unscheduled crane downtime
- reduction in the costs of downtime

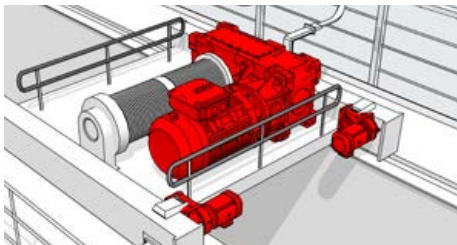
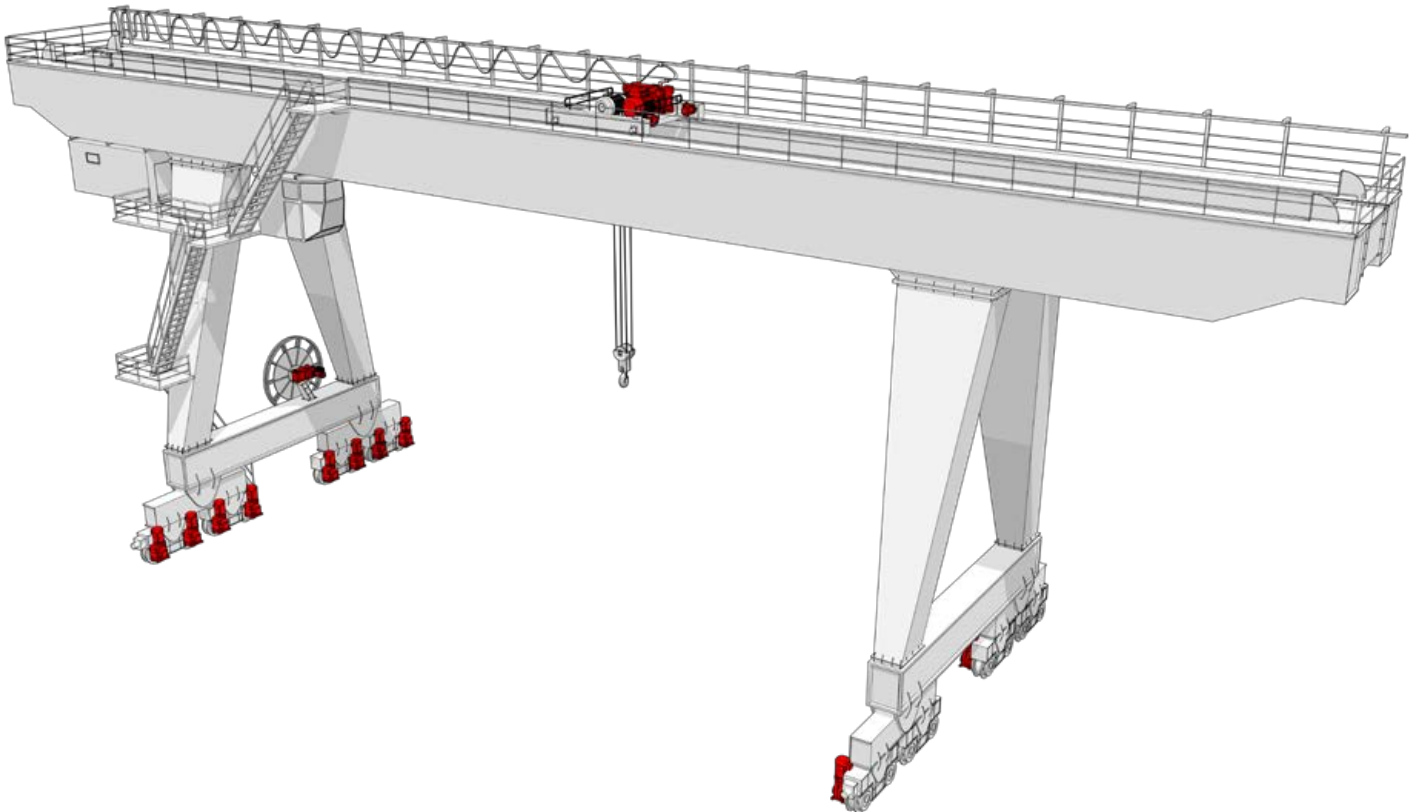
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# Gantry crane

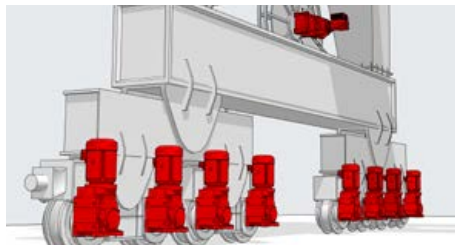
In gantry cranes, the travel drives are located on the ground and the crane is raised in the shape of a gantry. The cranes are usually moved on rails. Cranes with tires offer greater flexibility. Areas of use include moving containers in shipping and freight services or transporting materials in steel processing and logistics.

## Key goals

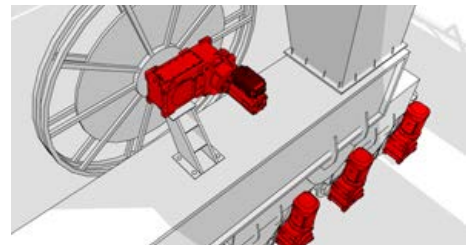
- high availability even in adverse ambient conditions
- short cycle times and rapid motion cycles
- good connectivity with higher-level systems
- smooth startup



Hoist unit



Gantry drive



Cable drum

## Control technology: MOVI-C® CONTROLLER UHX65A



UHX65A progressive is used for complex motion tasks such as multi-axis controls and robotics as well as automation tasks such as visualization or for connecting IT (Information Technology) and OT (Operational Technology).

- rapid response times thanks to high-performance hardware
- Windows operating system for customer-specific applications
- interchangeable memory cards for central data storage
- numerous interface options allow all common fieldbus systems to be connected

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## Inverter technology: MOVIDRIVE® modular + Power and Energy Solutions



Inverter technology from SEW-EURODRIVE provides maximum reliability but is still easy to use. Devices from the Power and Energy Solutions series ensure high energy efficiency.

- long cable lengths
- high overload capacity
- the option of sealed printed circuit boards for harsh environments

→ Continued on pages 16 and 23

## Software modules: MOVIKIT®



MOVIKIT® software modules can be started up quickly and easily. Following parameterization, the source text is automatically generated and transferred to the controller. Clear user interfaces help with control and troubleshooting.

- synchronization of several drives
- multi-motor drive
- interchangeable drive profiles
- programming according to IEC 61131-3
- drive simulation
- operation mode optimized for traction

→ Continued on page 20

## Gear units and gearmotors



**Hoist unit:**  
Helical and bevel-helical gear units of the X.e series with DRN.. AC motor

With a wide gear ratio range and finely graduated sizes, the X.e series is the preferred solution for crane hoist units.

- reliable crane operation in all power classes
- everything from a single source: motor, gear unit and auxiliaries such as couplings and drum brakes



**Travel Gantry:**  
K..DRN.. helical-bevel gearmotor

As a group drive, the K..DRN.. helical-bevel gearmotors are a space-saving solution for all gantry drives.

- suited to operation under harsh ambient conditions
- including patented TorqLOC® clamp connection – for simple assembly and disassembly



**Trolley:**  
F..DRN.. parallel-shaft helical gearmotor

The compact combination of gear unit and motor gives designers and users a great degree of freedom.

- no compromises: the huge flexibility afforded by the modular design always ensures the right drive solution
- robust and low-maintenance for maximum crane availability

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# Service and Product details



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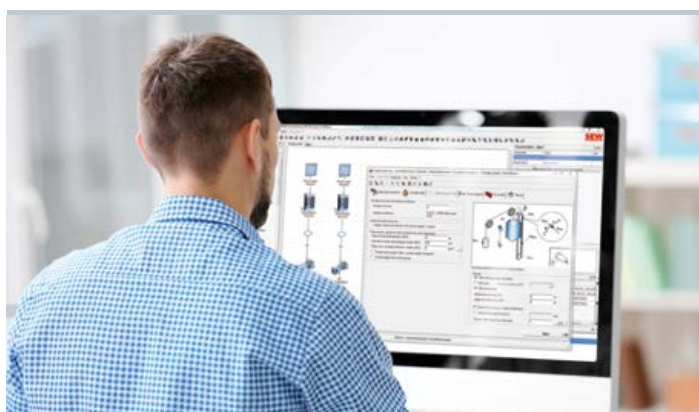
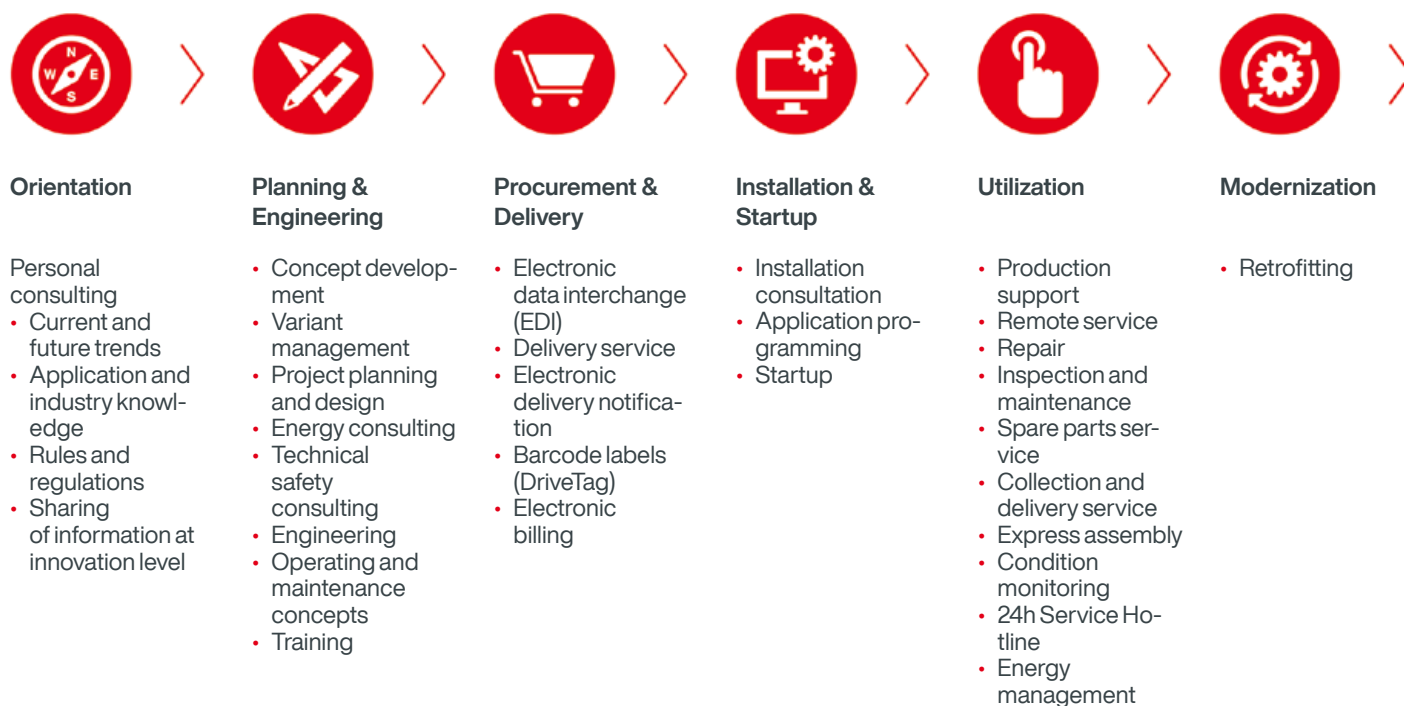
**23** Power and Energy  
Solutions



# Life Cycle Services

For us at SEW-EURODRIVE, Life Cycle Services encompass services, tools and resources throughout the entire system life cycle. This begins in the initial orientation phase and continues all the way through

to the operation and modernization of your crane. Below you will find an overview of selected service solutions associated with cranes.



## Configuration and planning

We want to offer you optimum planning during the configuration and design phase – before you even place your order. You will be supported by technical experts who have an in-depth understanding of your industry and applications. We can offer you personal assistance and answer all your project planning and engineering questions.

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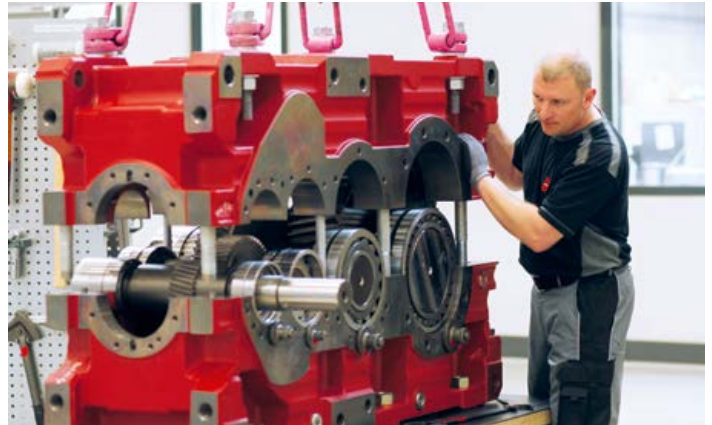
# Life Cycle Services

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## Repair

Our **repair** services come in different formats, such as emergency repairs, functional repairs and as-new repairs with a 24-month warranty for defects covering the drive as a whole. This also applies to products from other manufacturers. And if speed is of the essence: you can request a rush order or our on-site service to get your repair carried out faster. What's more, modifications and adjustments can also be made as part of our repair services if your drive technology has to cope with new system conditions.



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## Inspection and maintenance

Our **inspection and maintenance** service improves your operating reliability and system availability, e.g. through an examination with an inspection scope to assess the gear unit and rolling bearing gearing and an oil analysis to assess the gear unit lubricant.

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## System modernization and retrofitting

With our decades of experience and expertise, we help you **modernize and retrofit your systems**. In doing so, we take account of both framework conditions such as regulatory specifications and technical standards, and requirements relating to productivity, performance and the availability of systems and parts.

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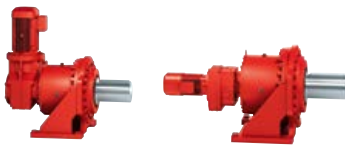

## Free 24h Service Hotline

The **free 24h Service Hotline**, which can be reached on 0800 7394357, is staffed by trained technicians and engineers who are there to give you immediate assistance with any questions or problems you may have. We are on hand round the clock, whenever you need technical information or have to place rush orders for repairs, express assembly work or spare parts.



# Motors and gear units

- extensive portfolio for all crane technology drive tasks
- delivery of entire drive packages including auxiliaries such as couplings and drum brakes
- gear unit selection according to EN 13001 as well as according to individual load collectives
- CAD drawings and 3D models can be accessed online in a flash
- global serviceability
- spare parts are available from SEW-EURODRIVE Online Support with short delivery times

	X.e helical and bevel-helical gear units			P planetary gearmotor		PPK planetary gear unit
						
<b>Type</b>	X.F.. helical gear units	X.K.. bevel-helical gear units	X.T.. bevel-helical gear units	P.RF.. helical gear units	P.KF.. bevel-helical gear units	Coaxial planetary gear units
<b>Nominal torque <math>M_{N2}</math></b>	6.8 – 475 kNm	6.8 – 475 kNm	6.8 – 175 kNm	25 – 631 kNm	25 – 631 kNm	10.7 – 17.6 kNm
<b>Gear ratio <math>i</math></b>	6.3 – 450	6.3 – 450	12.5 – 450	100 – 4000	140 – 4000	65 – 390

## Gearmotors

Gear units			
<b>Type</b>	R.. helical gear units	F.. parallel-shaft helical gear units	K.. helical-bevel gear units
<b>Size</b>	R07 – R167	F27 – F157	K19 – K187
<b>Mamax gear unit</b>	50 – 20 000 Nm	130 – 20 000 Nm	80 – 53 000 Nm
Motors			
<b>Type</b>	DRS2.. motor	DRN.. motor	DRU.. motor
<b>Energy efficiency class</b>	IE1	IE3	IE4
<b>Power range</b>	0.09 – 53 kW	0.12 – 375 kW	4 – 45 kW






# Drive electronics

With our MOVI-C® modular automation system, you have a uniquely wide range of drive electronics at your disposal for control cabinet-supported or decentralized installation. From a compact servo inverter to a modular servo inverter. From a motion controller for individual positioning tasks through to a powerful automation controller for comprehensive machine automation. And thanks to smart software modules, you can perform even complex automation tasks extremely easily. Together with our mechanical drives, we can therefore always give you a seamless solution from a single source.

- large range of solutions
- single-axis to multi-axis system
- wide power range from 0.25 kW to 350 kW



## MOVI-C®: inverters for crane technology

Hardware		MOVITRAC®		MOVIDRIVE®		
		LTP-B	advanced	technology	system	modular
		Basic inverter	Standard inverter	Application inverter	Application inverter	Multi-axis system
						
Power	Power	0.75 – 160 kW	0.25 – 315 kW	0.55 – 315 kW	0.55 – 315 kW	2 – 180 A
	Overload capacity	175%	150%	200%	200%	250%
Special features		Robust technology for use even in adverse environments with protection class IP20/IP55, especially for simple single-axis applications, e.g. lifting tackle, rope drums.	Device constructed as a monolith, very easy to use with good motor control, can be used for single-axis applications with defined requirements.	Adaptable inverter for single-axis applications with stringent requirements in terms of dynamics and overload capacity.	Device for combination with MOVI-C® CONTROLLER and MOVIDRIVE® modular as a single device for special requirements, for example in terms of power or motor cable length.	Multi-axis systems with single- and double-axis modules for dynamic, coordinated movements such as kinematics, robotics etc.



# Safety technology

## → Universal!

- All safety cards should be parameterized in an identical manner, all parameters have the same operating principles and identical significance.

## → Flexible!

- Support for a huge range of encoder concepts – from the simplest sin/cos encoders in combination with numerous distance encoders.

## → User-friendly!

- Simple startup and parameterization using the startup wizard. The inverter parameters in the safety-related component can be transferred.



Hardware	CSB21A	CSB31A	CSS21A	CSS31A	CSA31A (new)
Safe inputs	4	4	4	4	4
Safe outputs	–	2	2	2	2
Safe stop functions	STO, SS1-t	STO, SS1-t, SBC	STO, SS1-t, SBC	STO, SS1-t, SBC	STO, SS1-t, SBC
Safe movement functions	–	–	SOS, SS1-r, SS2, SLS, SSR, SLA, SSM, SDI	SOS, SS1-r, SS2, SLS, SSR, SLA, SSM, SDI	SOS, SS1-r, SS2, SLS, SSR, SLA, SSM, SDI
Safe positioning functions	–	–	SLI	SLI	SLI, SLP, SCA
Safe communication	PROFIsafe, FSoE, CIP Safety™	PROFIsafe, FSoE, CIP Safety™	PROFIsafe, FSoE, CIP Safety™	PROFIsafe, FSoE, CIP Safety™	PROFIsafe, FSoE, CIP Safety™
Process value via safe communication	–	–	Speed	Speed	Speed, position, SCA status
Additional multi-encoder input	–	Yes (non-FS)	–	Yes (non-FS)	Yes (FS)
Encoder for functional safety	–	–	FS motor encoder	FS motor encoder	Motor encoder (sin/cos) + SSI

The new CSA31A safety card guarantees discerning safety solutions even for systems affected by slip with a huge range of motor and distance encoder combinations.

# Control technology Visualization

Numerous visualization options:  
Alongside interfaces such as OPC-UA, web visualization on the controller itself is also possible.  
In addition, SEW-EURODRIVE also offers various displays and monitors through to keypads.

- modern control and visualization platform
- independent of fieldbus
- can be programmed based on IEC61131-3



The Hypervisor concept allows two operating systems to be run on one piece of hardware at the same time. This makes it possible to run a Windows operating system with application-specific programs in parallel to motion control.



### Windows operating system

- Your application, e.g.:
- recording of operating data and load collectives
  - visualization
  - remote condition monitoring
  - distancing
  - communication with higher-level ERP

### Real-time operating system

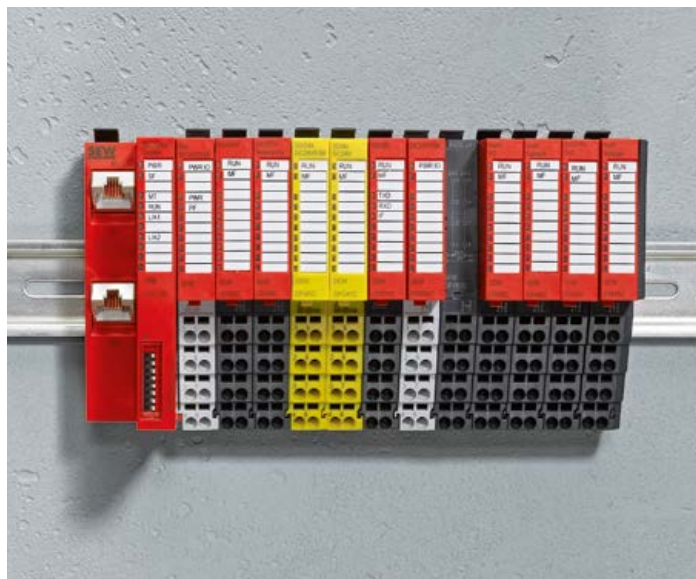
- sequence and motion control
- drive synchronization
- load compensation
- vibration suppression
- kinematic calculation

## Properties of the UHX25A – UHX85A

Power class	standard	advanced	progressive	power
Memory	512 MB SD card	512 MB SD card	2 GB CFast memory card	2 GB CFast memory card
CPU	DualCore ARM Cortex-A7, 1 Ghz	DualCore ARM Cortex-A7, 1 Ghz	Intel Atom E3815 1.45 Ghz Intel Atom E3815 2 × 1366 Ghz Intel Atom E3845 4 × 1.91 Ghz	Intel Core 2 Duo 2.2 Ghz
Number of interpolated axes	2	8	16	32
Number of non-interpolated axes	8	8	16	32

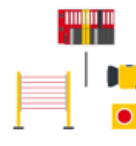
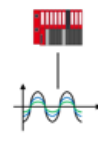
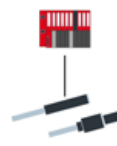
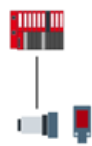
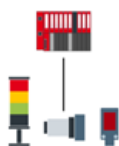
# Control technology I/O system

- Universal!
  - Safe and non-safe I/O modules with various functions
  - Avoidance of combinations
- Ease of maintenance!
  - Ease of assembly and maintenance thanks to incredibly simple and fast assembly
- Scalable!
  - Up to 64 modules possible with an additional power supply module
- Space-saving!
  - Thanks to the step-shaped wiring level with spring clamp technology



Presence check / reference initiators	Height check / distance measurement	Evaluating encoder signals	Load cell/ strain gauge	Serial interfaces	Temperature measurement	Energy-measurement	Hazardous point protection with hand and presence detection
Binary signal	Analog signals	Counter modules, SSI module					Functional safety

ODIxxC ODOxx	OAIxxC OAOxxC	OSM12C OSM13C OSM14C	OSM11C	ORS11C	OAI45C	OEM12C	OFI41C OFO41C
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Optoelectronic sensors, ultrasound sensors, inductive/capacitive sensors, laser light sensors, print mark sensors, light columns and fluid sensors	Optoelectronic distance measuring devices, ultrasound sensors and inertial sensors	Rotary encoders and encoders	Strain gauges	Laser light sensors, optoelectronic distance measuring devices, optical identification sensors and RFID	Pt100, Pt1000, Ni100 and Ni1000 temperature sensors	Three-phase grids	Safety light grid, safety scanner, safety switch, safety locking device and emergency stop
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# MOVIKIT®

- Perfectly adapted to the hardware components
- Configure rather than programming
- Clear depiction in MOVISUITE®
- Data storage on the controller
- Motion simulation



## Overview of MOVIKIT® software modules



**Communications**  
Software modules for various communication services



**Drive**  
Software modules for positioning applications



**Motion**  
Software modules for standardized motion control



**MultiAxisController**  
Software modules for centrally controlling any number of mechanically coupled drives



**MultiMotion**  
Software modules for universal motion control of interpolating axes



**Robotics**  
Software modules for robot control



**Power and Energy Solutions**  
Software modules for energy management



**Single Axis**  
Software modules for standardized single-axis functions



**StackerCrane**  
Software modules for storage/retrieval systems



**Visualization**  
Software modules for graphic depiction of controller data



# MOVIKIT®

## MultiAxisController

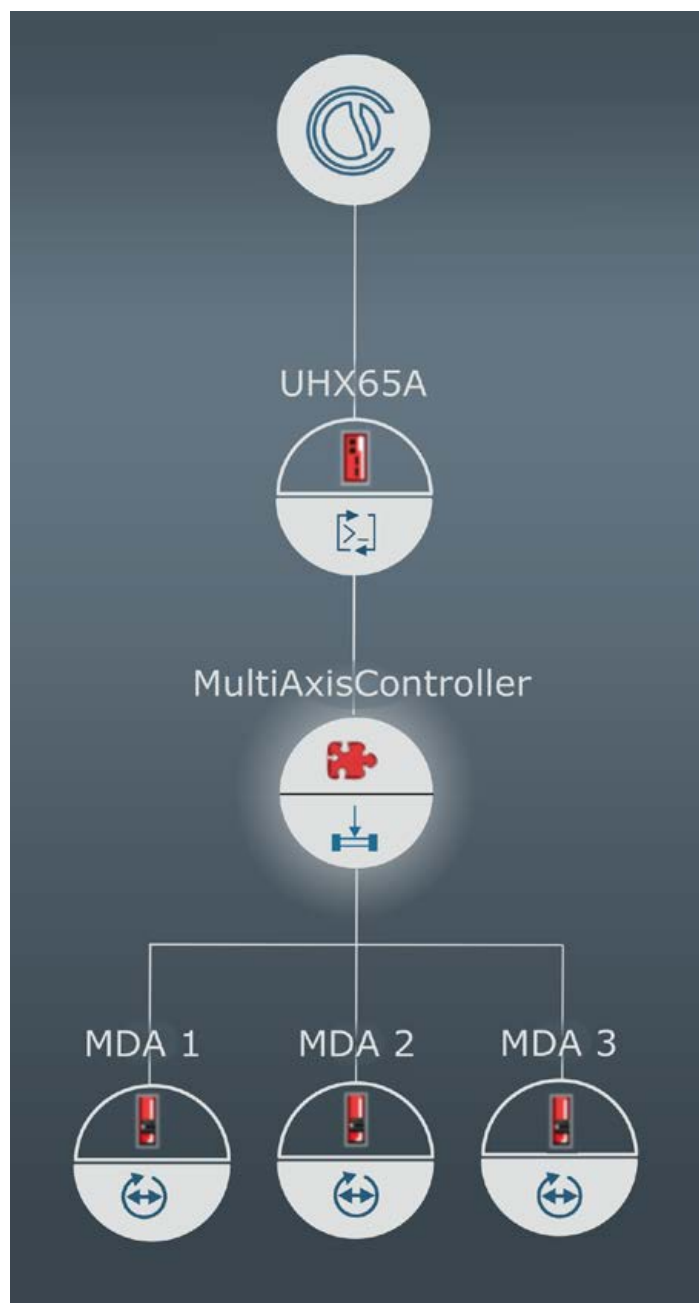
The MOVIKIT® MultiAxisController software module allows for implementing mechanically coupled drives (loose or rigid coupling) by means of a software module. It is possible to choose between correcting skewing and equalizing the torque of two drives. The software module replaces the conventional master/slave operation and offers expanded functionality compared to the position-slave setup.

### Overview of the features of the software module

The software module is easy to start up using MOVISUITE® and can be flexibly combined with other MOVIKIT® software modules and add-ons. Control takes place via a defined fieldbus interface.

The functions which can be implemented include:

- coupling of drives
- dynamic load distribution
- anti-slip control
- electronic differential with inhibiting function
- multi-axis alignment after an error
- elimination of clearance by means of mutual bracing
- compensation of diameter errors on drive wheels
- joint referencing of the axis group
- various modes for limit switch evaluation



# MOVIKIT®

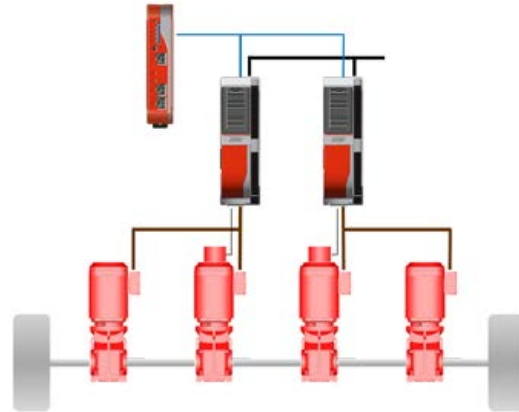
## MultiAxisController

### Available add-ons

MOVIKIT® MultiAxisController add-on FourAxes: Extends the range of functions to include the option of using the software module to control four drives.

MOVIKIT® MultiAxisController add-on Cascading: Extends the range of functions to include the option of using the software module in a nested manner.

Nesting (cascading) is required, for example, if each side of a gantry crane is equipped with two drives. The two drives on one side are each to be balanced using the "Torque priority" operating mode. At a higher level, the two sides are to be balanced in "Skew priority" operating mode.



Both multiple drives and group drives can be realized with the MOVIKIT® MultiAxisController.

### MOVIKIT®

## MultiAxisController Torque

MOVIKIT® MultiAxisController Torque enables compensation of torque between mechanically coupled drives.

#### Overview of functions:

- Synchronization with torque distribution
- Torque distribution
- Load distribution
- Rigid coupling of drives
- Load compensation
- Speed synchronism
- Torque follower
- Torque coupling
- Load distribution between drives can be configured online
- Tension between drives can be configured online
- Electronic differential
- Parameterizable differential lock
- Deactivation of any axis group element for maintenance purposes

### MOVIKIT® MultiAxisController

## Skewing

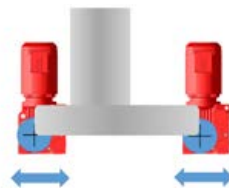
MOVIKIT® MultiAxisController Skewing enables the correction of a skew between mechanically coupled drives.

#### Overview of functions:

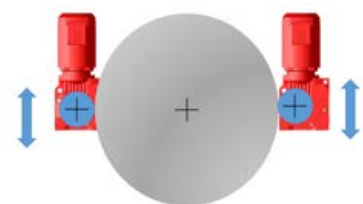
- Phase-synchronous operation
- Alignment function can be used continuously
- Overload guard: prevents asynchronicity in case of a catastrophic failure

#### Solution for the following problems:

- loosely coupled drives
- double spindle drives that tilt or jam quickly when in a different position



Coupled positioning drives



Load distribution for rotary drives

# Power and Energy Solutions



- Scalability!
  - Distributed DC and AC infrastructure in any combination
- Cost reduction!
  - Auto-configuring components
  - Strongly reduced peak power demand of the application
  - Reduction of energy costs thanks to storage capacitors in the DC link
- Reliable!
  - High availability of individual production cells.
  - Reduced harmonic load in the grid
  - Uninterrupted system operation in the event of a power failure
- Flexible!
  - Faster changes in the factory layout

With SEW-EURODRIVE, you get the components for your Power and Energy Solutions as a modular system from a single source. This allows you to make better use of energy in your production setup, create complete transparency and detailed monitoring of grid and consumption data.



**Power supply module with controlled MDP92 DC link voltage**

- Nominal line voltage: 3 × AC 200 – 500 V
- Controlled DC link voltage: DC 0 – 800 V
- Nominal power: 25 kW



**MDS switched-mode power supply module with AC and DC supply**

- Input voltage: 1 × AC 200 V – 3 × AC 500 V or DC 150 – 800 V
- Nominal output voltage: DC 24 V
- Nominal output current: 22.5 A



**MDC capacitor module DC link energy module**

- Voltage range: DC 0 – 800 V
- Typical energy content: 2 kW connection via DC rail
- Option for parallel connection



**LSUM EDLC energy module Capacitor cabinet with EDLC modules**

- Voltage range: DC 0 – 800 V
- Energy content up to: 3000 kW
- Options for both parallel and series connection

# DRIVING THE WORLD



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