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Answers for industry

SIMOCRANE in SINAMICS

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of HL size), maximum 3 lines.

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Drive-Based Technology for crane applications



Simpler - Low engineering effort

The drive based functionality for crane application is realized in two software solutions:

- SIMOCRANE Drive-Based Technology
- SIMOCRANE Drive-Based Sway Control.

Both are integrated in the SINAMICS drive system and provides the function blocks needed to control the motions of crane drives. The function blocks are integrated in the drive control by pre-configured standard applications for hoist, trolley or gantry. This means that only basic knowledge of the SINAMICS drive system is required to start up a crane drive. STARTER, the user-friendly software commissioning tool used by SINAMICS, is used here unchanged.

Faster - Productivity increase

Load-dependent field weakening for hoist applications is a functionality integrated in SIMOCRANE Drive-Based Technology. It increases crane productivity since, compared to operating at full load, the maximal speed for lifting and lowering are raised automatically as a function of the current load. With this functionality a lift cycle with partial-load / no-load is even faster.

With SIMOCRANE Drive-Based Sway Control the load sway is damped during trolley or gantry traveling. Without the load sway a faster and easier traveling and positioning of the load is possible. No additional waiting time or additional operation for damping the load sway is necessary.



Drive-Based Sway Control for crane applications



SIMOCRANE meets SINAMICS

The SINAMICS S120 drive offers the optimum drive for each and every drive application – and all of the drives can be engineered, parameterized, commissioned and operated in a standard way.

Now SINAMICS, the universal drive platform launched on the worldwide market, is integrated with SIMOCRANE Drive-Based Technology and Drive-Based Sway Control, a crane technology platform representing an entry-level solution for both single-axis (AC/AC) and multi-axis (DC/AC) drive systems. It is designed for simple crane applications in all industrial sectors.

Modular

According to the factory infrastructure SINAMICS S120 makes it possible for single-axis (AC/AC drive system) as well as multi-axis (DC/AC drive system) configurations. Both systems have a modular design.

The AC/AC drive system comprises a Control Unit (CU 310) and Power Module (PM) for the power range from 0.55 kW to 250 kW. The DC/AC drive system includes a Line Module, a Control Unit (CU320) and Motor for the power range from 1kw to 800kw. Active Line Modules can return regenerative energy to the supply system.

The SIMOCRANE function can be applied modularly on demand. SIMOCRANE Drive-Based Technology can be used with optional SIMOCRANE Drive-Based Sway Control.

Safety Integrated

As in the SINAMICS, the crane Smart features is supplemented by integrated safety functions. They support the simple implementation of innovative safety concepts which conform to standards.

As safety functionality is integrated, they respond very rapidly in critical situations to prevent damage to man and crane. The Basic Functions are license-free. The Safety Integrated Extended Functions require the optional license for each drive.

Simple startup

Via Basic Operator Panel (BOP20) or even Web Browser a commissioning can even be started by using 'Ready-to-Run' solution on CF-Card without any engineering effort.

In case of 'Ready-to-Apply' the crane function are switched internal automatically by simply selecting of the axis function (either hoist, trolley, or gantry) and of the set value channel (via PROFINET or I/O configuration).

The crane functions are then integrated in the drive parameterization. The default parameterization is individually adaptable using the STARTER software or BOP20 or Web Browser.

Drive-Based functionality for crane applications

Functionality of SIMOCRANE Drive-based technology

Manual mode with individual fine feeling (Analogue Master Controller)	Enables drive movement with high precision via a directly connected master switch for manual positioning.
Smart-slow-down (selectable limitation)	Allows you to limit the drive speed when reaching a predefined prelimit switch.
Load sag prevention (Start pulse)	Prevents "load sag" when starting hoist gear with a suspended load.
Adaptive speed to operate at peak performance (Load-dependent field weakening)	Calculates additional speed setpoints, depending on the load. Partial loads automatically run at a higher speed than full loads.
Current distribution monitoring	Compares the current setpoints or actual values of the master and slave and sends a message if a specified value is deviated.
Overspeed monitoring	Monitors overspeed or detects deviations between the speed setpoint and actual values.
Digital Master controller	Up to 4 speed levels can be defined for simple operation
Possible add-on with DBSC	Performance enhancement with sway control function

Scope of delivery

SIMOCRANE Drive-Based Technology V1.0 SP1 (Order-No. 6GA7270-1AA20-0AA0) for SINAMICS Control Unit CU310-2 (single-axis) and CU320-2 (multi-axis)

- Compact Flash Card with standard Firmware V4.8
- CD-ROM with Cranes DCC Blocks, standard applications for single-axis, multi-axis and documentation

SINAMICS S120 for crane applications

Functionality of SIMOCRANE Drive-based technology

Manual mode	Sway is damped during manual traveling. After the axis has stopped or reached a constant velocity, no load sway remains.
Positioning mode	Both sway damping and required accuracy are considered in positioning procedure.
Changing target on the fly	The target position can be changed during the movement.
Switching Operation Mode on the fly	With activated sway control the Manual Mode can be switched to Positioning Mode during the movement and vice versa.
Safer behavior in limit switch	The sway control is automatically disabled in area of limit switch.
Single axis solution	With AC/AC drives (CU310-2) and corresponding SINAMICS Power Modules PM240-2 and Chassis.
Multi-axis solution	With DC/AC drives (CU320-2) and Sinamics Motor Module (Book size and Chassis).
Ready to run	With pre-configured application on CF-card for trolley or gantry. Control via onboard-I/O signals, only parameterization is needed.
Ready-to-apply	With standard application example and description.
Standalone or based on DBT	Combinable with DBT.

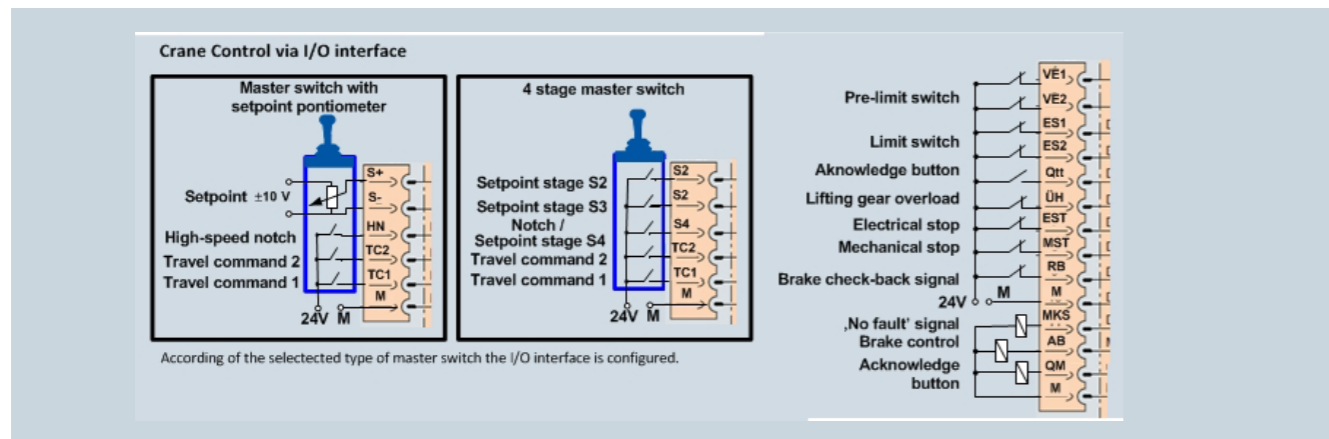
Scope of delivery

SIMOCRANE Drive-Based Sway Control Technology for CU310-2 (single-axis) with operation mode manual (Order-No. 6GA7280-1AA10-0AB0) or with operation mode manual and positioning (Order-No. 6GA7280-1AA10-0AB0)

- Compact Flash Card with standard Firmware V4.8
- CD-ROM with Cranes DCC Blocks, standard applications for single-axis and documentation

SIMOCRANE Drive-Based Sway Control Technology for CU320-2 (multi-axis) with operation mode manual (Order-No. 6SL3077-6AA00-2AB0) or with operation mode manual and positioning (Order-No. 6SL3077-6AA00-3AB0)

- License (paper)
- via Internet download Cranes DCC Blocks, standard applications for multi-axis and documentation.



SIMOCRANE in Drive

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Application example for simple single-axis solution

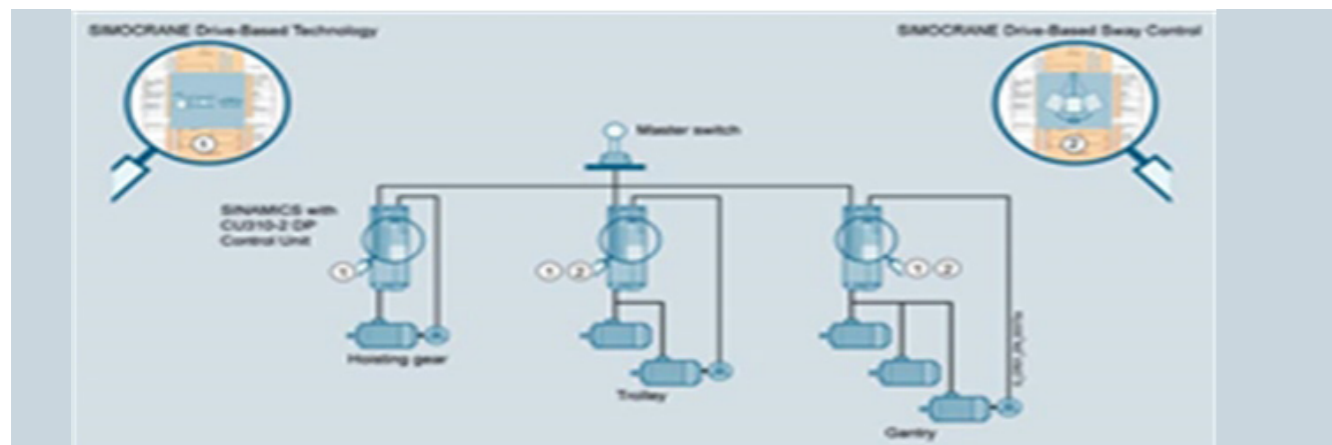
The example shows a typical hardware configuration used in mid-performance crane applications. The topology of this overhead bridge crane (OHBC) has three AC/AC single-axis drives, controlled by using onboard-I/O signals of SINAMICS Control Unit (CU310-2).

The SIMOCRANE Drive-Based Technology provides crane-specific functions, e.g. Load sag prevention and adaptive speed to operate at peak performance for hoist, and digital master controller and Smart-slow-down function for all axes. Furthermore, the SIMOCRANE Drive-Based Sway Control can damp sway in manual operation for trolley and gantry. It allows even trolley and gantry in positioning operation to reach the user defined accuracy. The combination of both products meets the challenge of most applications in mid-performance market.

For hoist applications, an encoder is requested for safety reasons and for providing pendulum length to cross travel (trolley) and long travel (gantry). For sensorless sway control no encoder is required by manual operation. Only for positioning operation encoders are required for trolley and gantry.

A Ready-to-Run solution is provided for such a configuration with pre-configured application on CF-card for trolley or gantry. As soon as the installation is completed, the commissioning can be started without any engineering effort. One can use Basic Operator Panel or Web Browser for getting started.

The SINAMICS AC/AC single axis drives cover the power range from 0.55 kW to 250kW. The more information refer to the catalogue D21.4 (Chapter 7)



Application example for challenged multi-axis solution

This overhead bridge crane has 100 ton load carrying capacity. A configuration using SINAMICS S120 provides a topology with multi-axis drives with regenerative Line Module, Motor Modules, and Control Unit (CU320-2). The crane is controlled by PLC via PROFINET communication.

SIMOCRANE Drive-Based Technology provides crane specific motion control functions for Hoist, short travel and long travel. The SIMOCRANE Drive-Based Sway Control is added to short travel and long travel for sway damping in both manual mode and positioning mode. It reaches the best performance with positioning accuracy at the longest pendulum length up to 0mm.

A Ready-to-Apply solution is a standard application example with a mask for user to select its configuration of each required axis. After selection the script file behind this mask carries out the required engineering effort automatically.

The PROFINET communication combines the field bus and Ethernet advantages. The ProfiSafe telegram makes possible to enable the SINAMICS integrated Safety function by PROFINET communication. The communication network is easy for customer to extend the existing configuration either in hardware or in HMI for enhancing productivity.

The SINAMICS DC/AC multi axis drives cover the power range from 1,6 kW to 800kW. The more information refer to the catalogue D21.4

