



Application software libraries for
special overhead cranes

schneider-electric.com/hoisting

Schneider
Electric

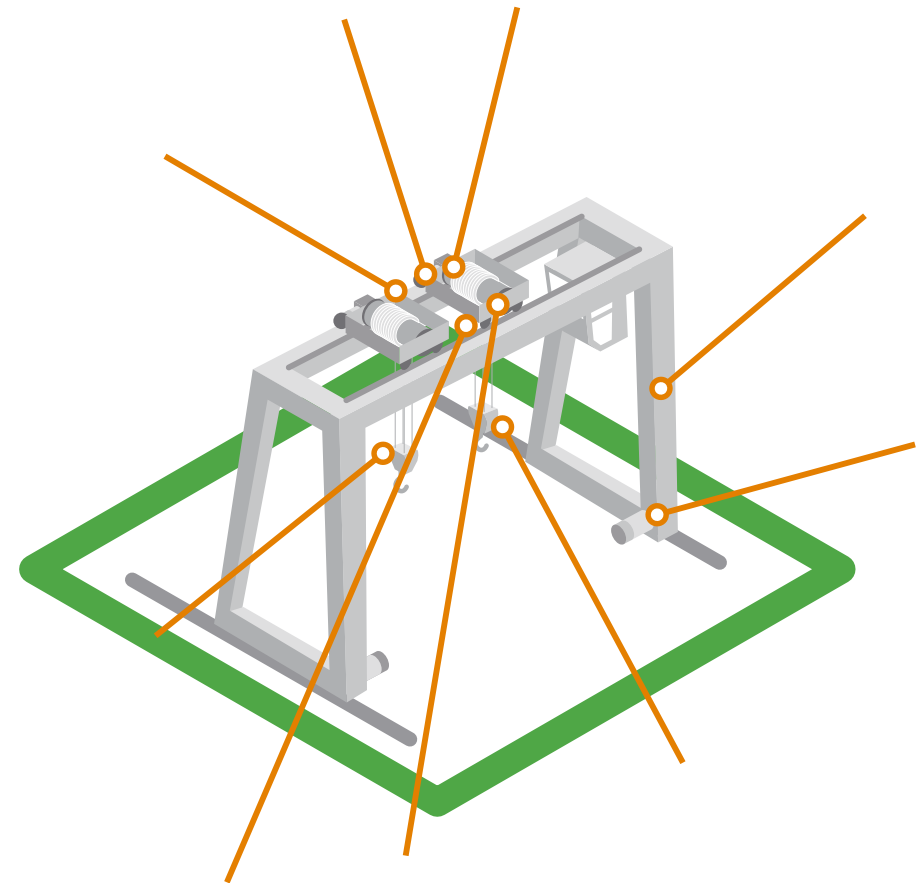


Application software libraries for special overhead cranes

Shorten your engineering time with extensively tested application software! SoMachine™ libraries provide software functionality in the form of ready-to-use function blocks (AFBs = Application Function Blocks), which are supplied for many basic common automation tasks and machine functionalities. They can be easily configured, customised, and implemented in your machine program.

Discover our smart functions dedicated to special overhead cranes and gantry cranes applications:

1. Monitoring data storage
2. Hoisting position synchronisation
3. Load overspeed control
4. Anti-crab
5. Limit switch management
6. Overload control EN 15011
7. Advanced positioning
8. Speed optimisation rope slack
9. Anti-sway
10. Diagnostic coverage



Preventive maintenance and monitoring data logging of operating parameters

The monitoring data storage function is based on a logic controller for acquiring, recording, and providing warnings on relevant and critical issues for preventive maintenance purpose. It provides information on the working safety period of the gear box, improper crane operations, and important occurrences such as overload and overspeed.

Benefits

- > Maximum use of critical equipment such as the gearbox via automatic calculation of the working safety speed.
- > Prevents problems from becoming maintenance issues.
- > Reliable and up-to-date crane diagnostics through the historical data maintenance.
- > Saves maintenance time by determining the origin of the problem before solving it.



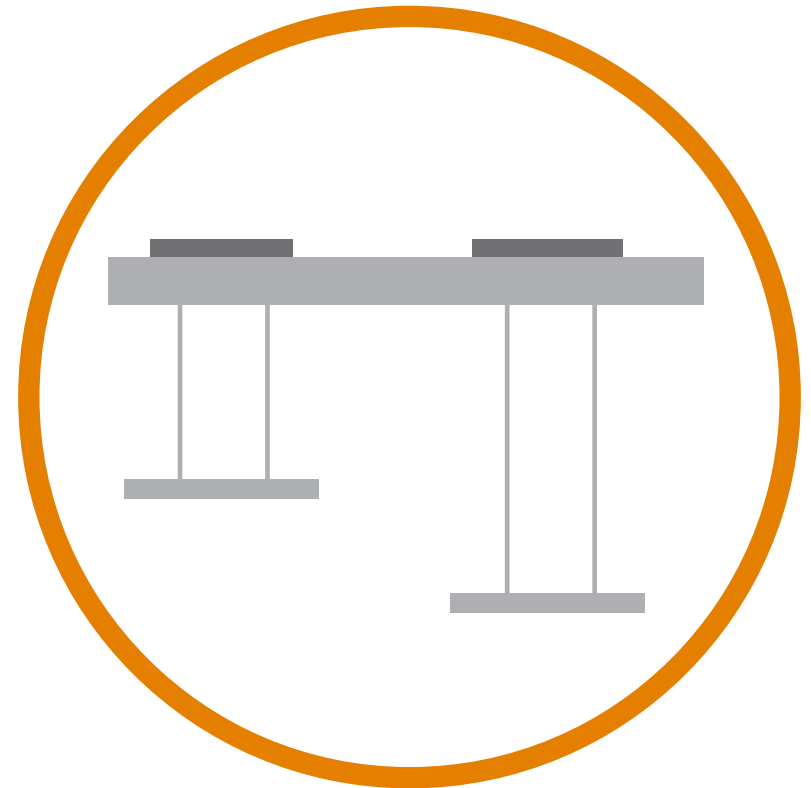
Monitoring data storage

Increase production and equipment protection while reducing risk

The goal of the hoisting position synchronisation function is to keep the position in between hoist 1 and 2 constant in relation to each other. It keeps the delta of the positions constant by adjusting both drives simultaneously. The position difference is used as a reference.

Benefits

- > Reduce working cycle time by automatically synchronising the hoisting movement of trolleys.
- > Prevent breakdown or the load from falling.
- > Avoid excessive and dangerous load unbalancing.
- > No additional devices are needed.



Hoisting position
synchronisation

Increase protection of crane equipment and reduce risks

Brake wear or handling excessive loads can generate load slipping, which can lead to an increase in load speed and associated risk. Load overspeed control is based on a sensor and a controller. When the nominal speed is exceeded, the controller must trigger an emergency stop and the function sends an alarm to control the situation.

Benefits

- > Prevent the load from falling.
- > Prevent damage to the gear box and motor.
- > A dedicated device is not required; the same controller can be used for several functions.
- > The most recent overspeed events, with time and date, are recorded as part of the preventive maintenance and monitor (ING).



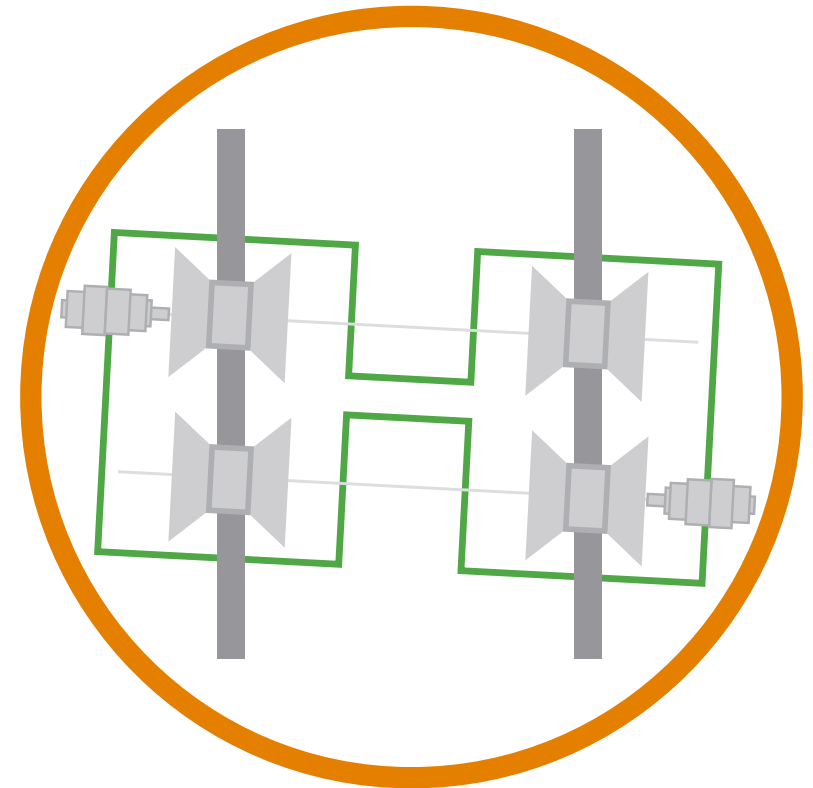
Load overspeed control

Protect equipment and increase efficiency and crane service life

The anti-crab function is an automatic realignment system that prevents skew and drift of the bridge in industrial cranes. It maintains the path and the track parallel between the two bogies independent of load position, misalignment of the rails, or initial crane assembly.

Benefits

- > Reduced wear and tear on rollers.
- > Reduced mechanical vibrations.
- > Prevent amble on plates and damaged welding.
- > Keep crane axis path in the same direction as the track axis path (antiskew).
- > Prevent the crane from moving away from its track (antidrift).
- > Absence of undercarriage motor synchronisation on start/stop operations.
- > Incorrect initial position of wheel mounting.
- > Prevents unwanted bridge motion with no centred load.
- > Prevents transversal load sway.
- > Use of only two proximity analogue inductive sensors in one of the bogies and drive or logic controller.



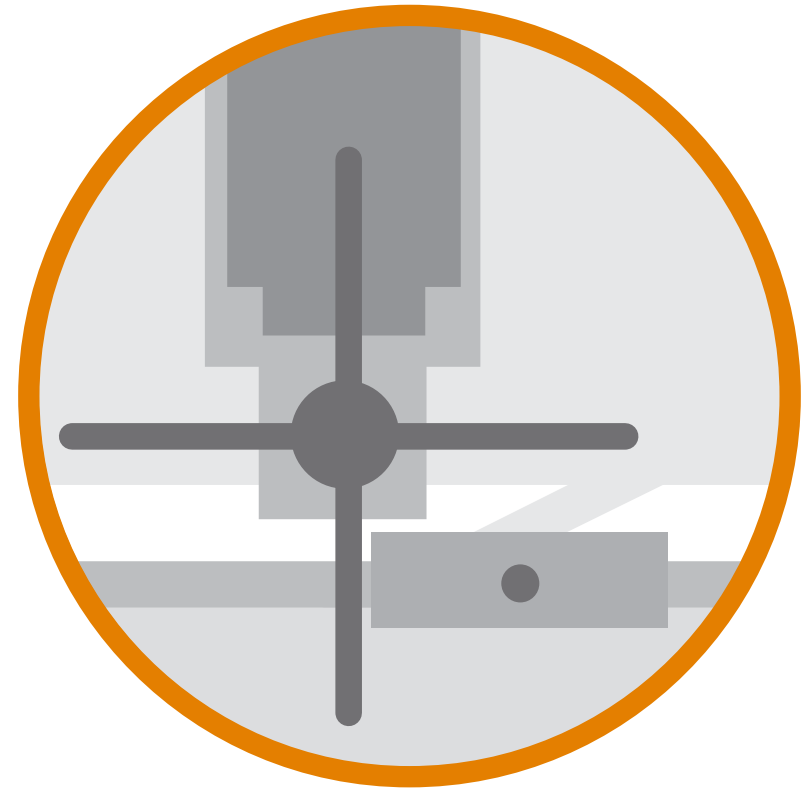
Anti-crab

Increase protection of crane equipment and reduce risks

This function manages all possible axis including hoists and slewing for building cranes. It executes the stop and slow down point by sensor input or defines the location by a distance parameter. You can also use it as an anticollision function by using a photoelectric sensor instead of a limit switch.

Benefits

- > Limit the working zone.
- > Prevents breakdown or load dropping.
- > Prevents damage to crane equipment.
- > Saves commissioning time.
- > The limit switch status can be displayed on the HMI.



Limit switch management

Prevent risk conditions due to overloading

The overload function prevents mechanical overload for machine safety and durability. Taking into account the weight of the load through the hoisting drive's torque level, this function is able to stop the ascending movement in the event of an overload and lowers it until the load reaches the floor.

Benefits

- > Prevents the load from falling and/or the crane from toppling over.
- > Prevents damage to the gearbox and motor.
- > Event reset is automatically generated by torque measurement or by calculation of travel distance.
- > Tipping prevention.
- > No additional sensors or external devices are needed.
- > Full compliance to EN 15011.



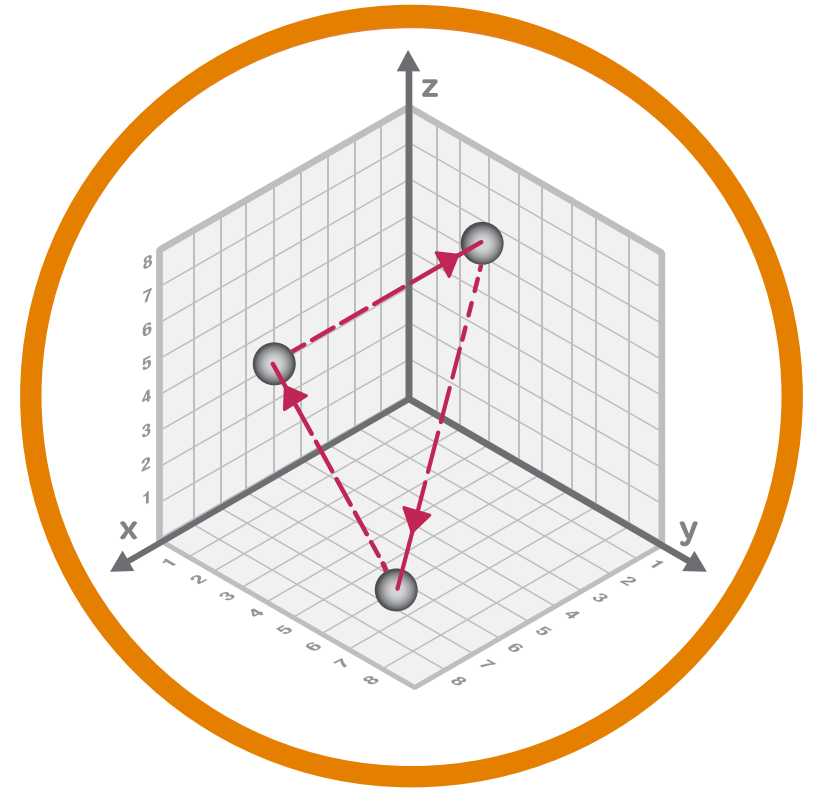
Overload control EN 15011

Advanced positioning

Although high performance positioning applications are a domain of servo drives with synchronous motors, asynchronous motors with variable speed drives offer performance that is sufficient for many applications. The function block extends the function of variable speed drives by adding a position control function.

Benefits

- > Reduce working cycle time by automated positioning with high precision.
- > Comparable positioning capabilities to a servo motor without the cost.
- > Reduce operator stress and fatigue that could lead to errors.
- > Automation of recurring sequences supports the crane operator.



Advanced positioning

Increase productivity, protect equipment, and reduce risk

The speed optimisation function reduces the work cycle time on the hoisting movement. It allows operation at constant power in order to reach a higher speed according to the actual load. The rope slack function is used to prevent high speeds on the hoisting motor when the rope is slack. At the same time, it prevents overlapping of the rope on the motor drum when the handling tool has been set down and the rope is too slack to be unrolled properly.

Benefits

- > Reduce working cycle time for hoisting movements according to the weight of the load.
- > Limits the speed of the hoist when the rope is slack.
- > Protect the equipment by preventing overlapping of rope on the hoisting motor drum.
- > No additional sensors or external devices are needed.



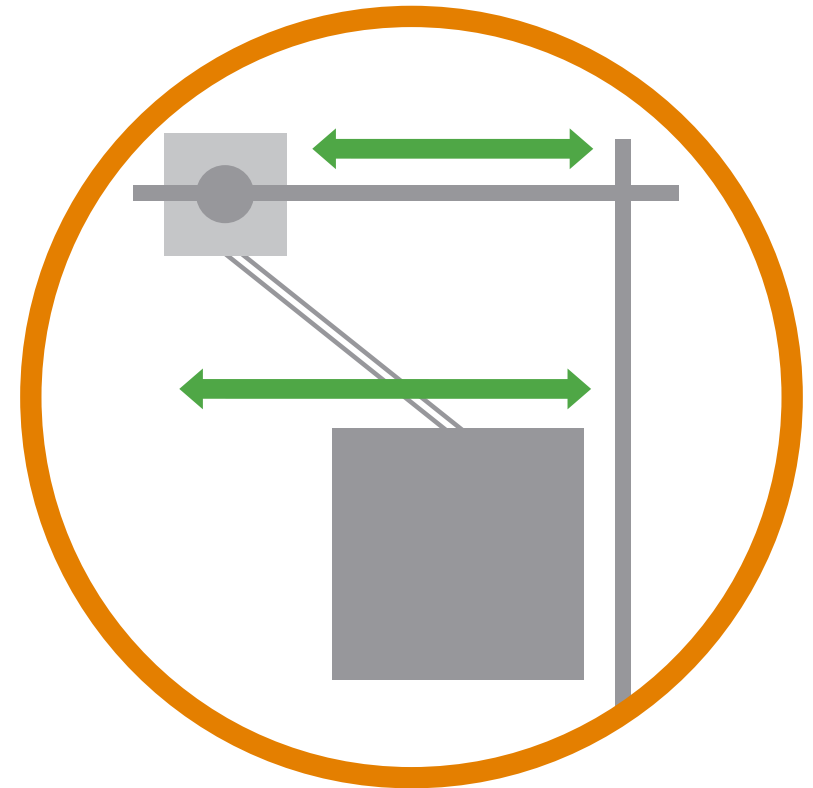
Speed optimisation
rope slack

Improve load positioning accuracy and increase crane efficiency while reducing risk

The anti-sway function prevents load sway on the crane due to acceleration and deceleration of the trolley and the bridge. The function applies the necessary adjustments to the movement automatically without any need of intervention by the operator.

Benefits

- > Reduce working cycle time and increase positioning precision by preventing load sway.
- > Reduce mechanical shocks and stress on the crane mechanism and structures due to overcorrection and pulsating during positioning.
- > Avoid an excessive and dangerous load swaying.
- > Reduce operator stress and fatigue as a source of error.
- > No additional sensors or external devices are needed.



Anti-sway (sensorless)

Diagnostic coverage

The function block compares application signature and firmware version with a configured value to detect undesired changes in the program. It also watches executions of subprograms, actual cycle time of a cyclic task, and provides interface for cross-checking of two controllers. Internally, it tests integrity of variable memory and correctness of boolean and floating point operations.

Benefits

- > Not safety-certified logic controllers reach a diagnostic coverage superior to 60 per cent.
- > This function offers a highly competitive performance/cost ratio in complying to safety standards.



Diagnostic coverage



Hoisting control solutions

www.schneider-electric.com/hoisting

©2015 Schneider Electric. All Rights Reserved. All trademarks are owned by Schneider Electric Industries SAS or its affiliated companies. • www.schneider-electric.com • 998-19131937_GMA-GB