Product note
Crane control for ABB industrial drives

Dedicated AC drives for crane applications

When used with the ABB industrial drive range - rated from 0.55 to 5600 kW, (230 to 690 V) - ABB's crane control program brings a series of functions to the hoist, trolley and long-travel movements of cranes.

Eliminating the need for an external PLC, the program incorporates all the functions commonly required in crane applications and enables stepless speed and torque control in:

– Industrial cranes
– Harbor cranes
– Tower cranes
– Marine and deck cranes

A key feature of the ABB industrial drive is its motor control platform, direct torque control (DTC). DTC enables the drive to achieve full torque at zero speed with or without the need for a encoder feedback. In addition, the torque response of the drive is fast which means the crane can react quickly to changes in movement commands. High torque levels can be reached, making the drive ideal for lifting operations. DTC delivers enhanced operational safety and accurate slow speed control.

ABB industrial drives' built-in brake choppers connect the DC bus voltage to an external resistor, where the braking energy is converted to heat.

Low harmonic drives help to maintain power-supply quality and meet the strictest harmonic standards without any need for filtering equipment.

Regenerative drives can recover energy from a process and feed it back into the network, thus saving energy.

Standalone and master-follower control

The drive can work in either standalone mode or as a master-follower.

In standalone mode, the drive is simply used to control the crane movements independently.

With a master-follower arrangement, several drives are interlinked by fiber optics, with one of the drives operating as the master to the other drives. This arrangement allows co-ordination and load sharing for different kinds of motors connected to the same system. As such the configuration can be used in speed-speed, speed-torque or speed-synchro mode.

Redundancy with crane control program

Functional programming provides the ability to switch between master, follower or standby mode. This ensures that the master and follower are no longer fixed and can be changed at will, simply by providing each drive with a selection switch. This provides a high level of redundancy to the crane application.

ABB

Crane system check

The crane system check function includes both electrical and mechanical checks. Torque proving ensures that the drive and motor are able to produce torque and that the mechanical brake does not slip before the drive releases the brake and starts operating the crane.

Antisway control

Sensorless antisway is designed for indoor crane applications and prevents unnecessary swinging of a load. It achieves this by way of a sensorless algorithm which in turn improves safety and performance.

An optional antisway control program is available for trolley and long-travel motions and is available on request.

Flexible control platform

The crane control program offers flexible interfaces for different types of analog, digital or fieldbus systems, enabling a wide range of connectivity for start, stop and reference change signals.

Mechanical brake control and torque memory

The crane control program features an integrated brake control logic that utilizes torque memory and pre-magnetizing to open and close the mechanical brake safely and reliably. The drive can generate full torque on the motor shaft before the brake is released. In addition, brake status feedback signals improve the safety when a start or stop command is given.

Adaptive programming

Function block programming - included as standard - is like having a small PLC inside the drive. Adaptive programming, as it is also called, enables the user to integrate external control logic or create new functions, so the program can be customized quickly and easily.

Load speed control

Load speed control maximizes the hoist speed for the given load and ensures that there is sufficient motor torque in the field weakening area. This minimizes operating time and optimizes crane capacity.

Safety control

The 'slow down' safety control function limits the speed to a preset level in critical zones. High and low limit sensors stop the drive at the end positions. The 'fast stop' safety control function is used in emergency situations.

Speed monitor and speed matching

The speed monitor function ensures that the crane motor speed remains within safe limits to prevent over speed. The speed matching function continuously compares the speed reference and the actual motor shaft speed to detect any possible difference. One of these functions will stop the motor immediately if a fault should occur in the operation of the motor.

For more information please contact:

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