

VEICHI

Crane Solution



VEICHI

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Official Website
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About us



VEICHI Electric (stock code: 688698) has always been dedicated to the field of electrical drive and industrial control since its establishment, and now it is a high-tech enterprise engaged in R&D, production, and sales of industrial automation products in one. With R&D and production bases in Suzhou, Shenzhen and Xi'an, and a wholly-owned subsidiary in India, VEICHI now is capable of conducting its business to many countries and regions with competitive, safe and reliable products and services to customers all over the world.

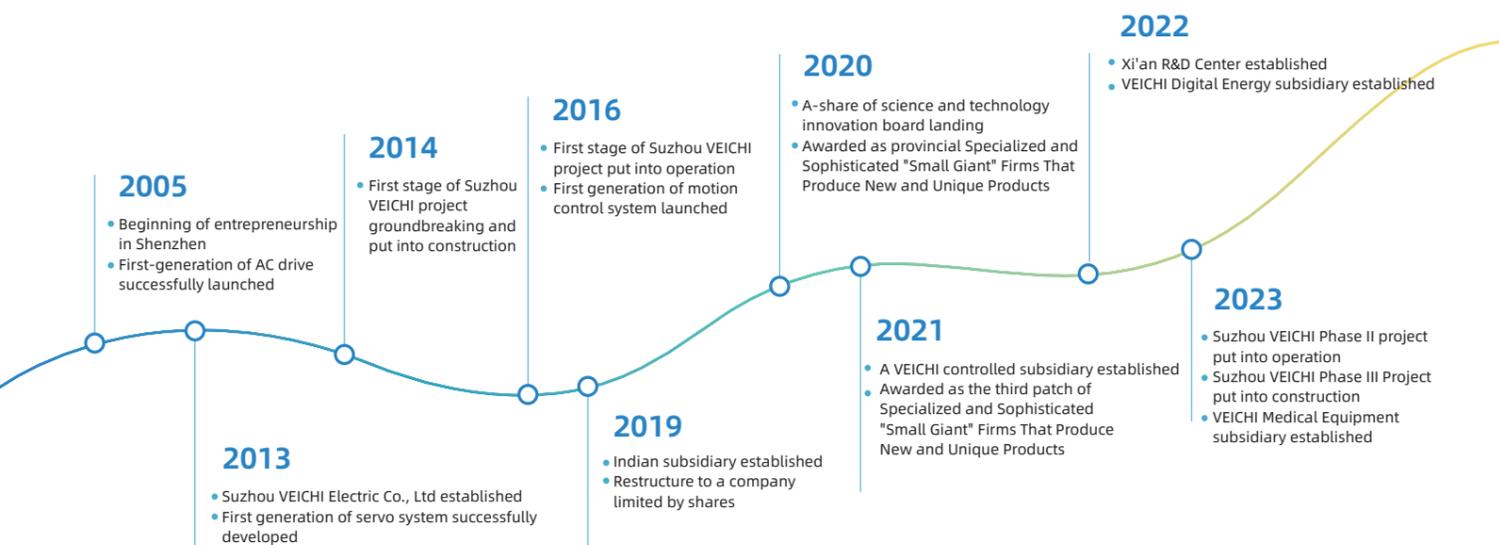
Plentiful products cover AC drives, servo systems and control systems, which are widely used in heavy industry, light industry, high-end equipment and more to facilitate the intellectualized transformation of the manufacturing industry with solutions customized to different scenarios. In the meanwhile, along the development trend of the times, VEICHI is extending its place to the emerging fields such as robotics, new energy, and medical care, and has developed products such as coreless motors, frameless motors, photovoltaic AC drives, and surgical power systems, which have deeply empowered the impressively promising industries.

On long-term and persistent independent R&D and innovation, VEICHI has successfully cultivated a series of patented technologies with independent intellectual property rights, and has mastered the core technologies of motor control such as vector control of PMSM, high-frequency pulse injection

control, field-weakening control for higher speed, scalar V/F control and vector control etc., and of silicon carbide application, motor parameter tuning and identification, motor control and protection, and motor speed tracking and start-up control. As of June 30, 2023, a total of 163 patents have been granted, including 43 patents for inventions.

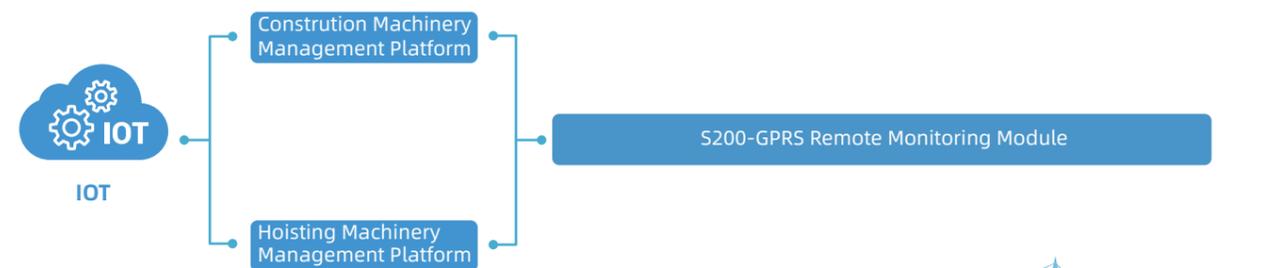
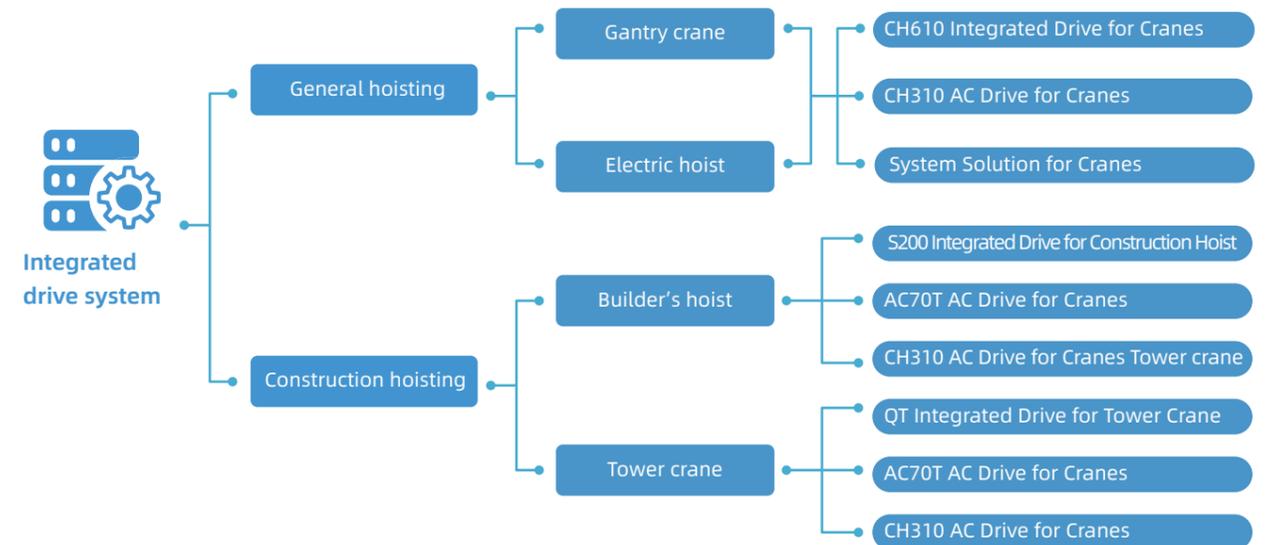
VEICHI has been developing step by step over the past 18 years with abundant honorary awards and certificates from the state and competent authorities, including "the Third Batch of Special and Sophisticated 'Small Giant' Enterprises That Produce Novel and Unique Products" "High-tech Enterprises", "Jiangsu Provincial Engineering Technology Research Center", "Jiangsu Provincial Enterprise Technology Center", "Jiangsu Provincial Industrial Internet Development Demonstration Enterprise (Benchmarking Factory Category)" and others.

In the future, VEICHI Electric will continue to uphold the business philosophy of "guided by market demand and driven by technological innovation", strengthen the key core technology research and product iteration, and constantly expand its high-performance, high-quality, high-reliability applications, contributing to the development of electrical drive and industrial control with might and main.



Product Information

VEICHI products cover crane integrated drives for cranes, construction hoists, tower cranes, and special drives for lifting, etc. They are all excellent in functions, performance and clean in design and installation, to provide perfect frequency conversion solutions for customers.



CH610 Integrated Drive for Cranes

CH610 integrated drive for cranes is an "all-in-one" product specially designed for cranes. It integrates three inverter units, a logic control unit, a weight limiter and low-voltage-electric devices in one cabinet. VEICHI also provides customers with a complete set of CH610-centered high-performance, high-security and reliable system solutions with years of industry application experience and advanced drive algorithms.

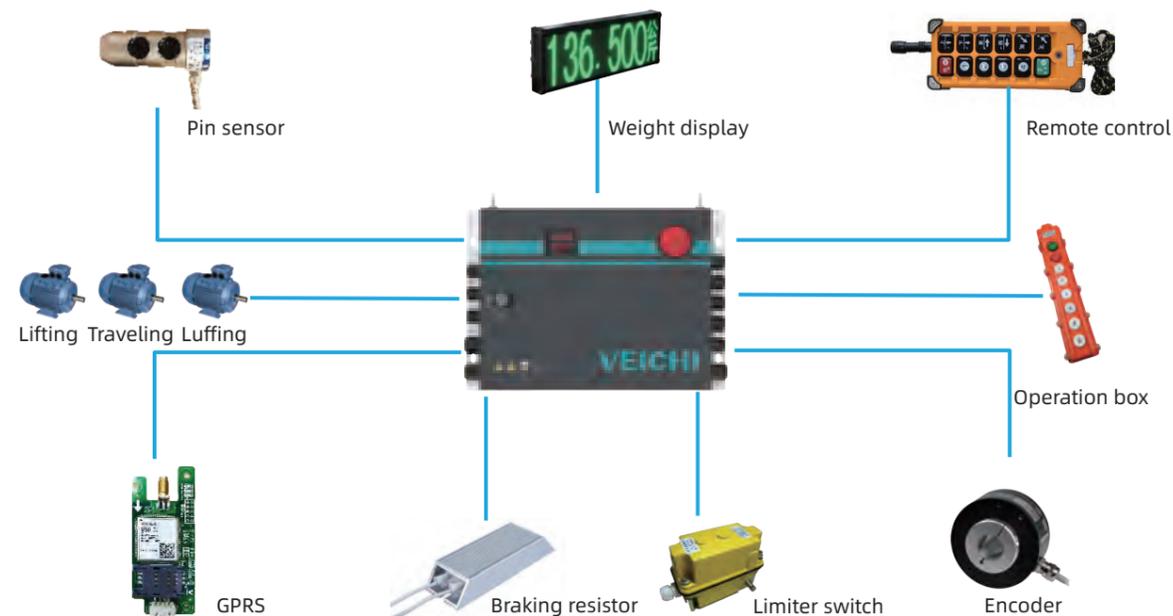


Power range

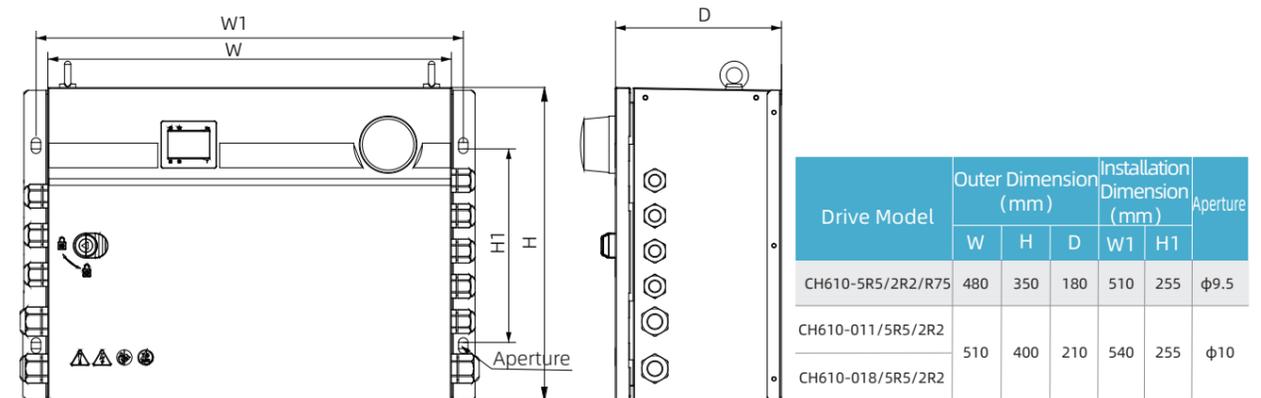
0.75kW-75kW

Max. load: 3T-50T

System Composition



Drive Installation Dimension



Product Features

Integrated design, compact size and favorable appearance

Highly integrated design with components on PCBs to reduce wiring and harnesses, 1/3 volume off compared to common control cabinets.

Operation status prompt

Corresponding status codes displayed on the panel when it is limited or does not meet the operating conditions, making it easy for quick maintenance and overhaul.

Easy installation, commissioning and maintenance

Quick-plug terminals adopted here to improve installation efficiency and simplify commissioning and maintenance.

Overload protection (integrated)

Built-in lifting capacity limiter to ensure safe operation under rated load; Reserved LED display port for real-time current load.

IOT remote module (optional)

Equipment positioning, remote monitoring, online debugging and maintenance, and equipment access management.

Dead speed/inching

Suitable for high-precision alignment, lowering the requirement for operator experience.

Energy saving and consumption reduction

Potential energy generated by the equipment fully utilized in the common DC busbar solution with only one braking resistor.

Electronic soft limit protection (in closed loop mode)

Hook overstroke prevented even when the upper/lower limit switches are disabled.

Wide voltage

±20% of the rated voltage to guarantee reliable operation of the equipment.

Abnormal torque prevention

Real-time monitoring of motor torque to apply the brake and block the output immediately when insufficient motor torque is detected.

Brake protection

Double protection functions for abnormal brake signals and dragging braking.

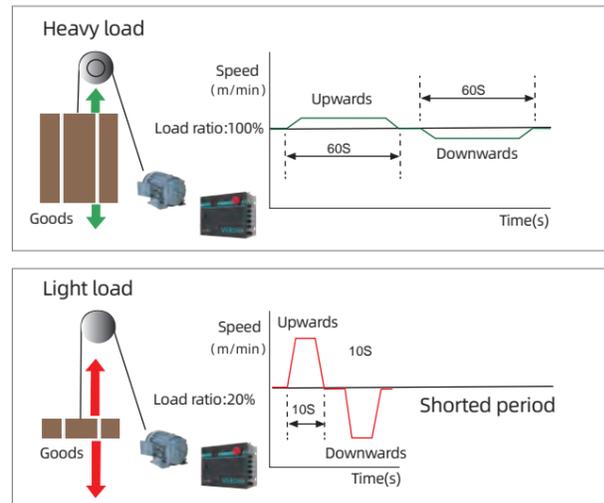
Multiple application macros

Built-in lifting and cart/ trolley-specific parameter groups for users to select according to the type of equipment and mechanism with one key.

Speed Efficiency

High speed with light duty and low speed with heavy duty

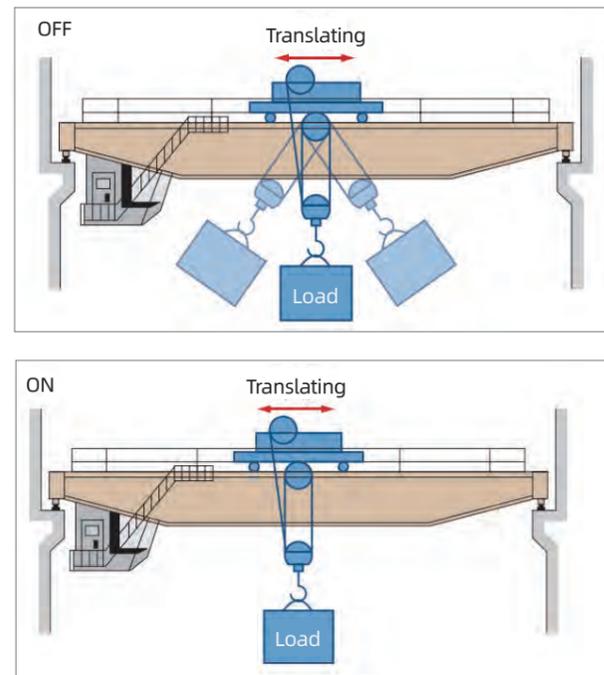
Built-in constant power control algorithm (speed change with load) automatically matches the best running speed according to the current lifting weight, 1-2 times up of the working efficiency.



Anti Swing

Open/closed loop anti-swing control algorithm with simple debugging and good adaptability reduces hook swaying caused by inertial shock from the cart and trolley and goods swing during translation to keep efficiency and safety.

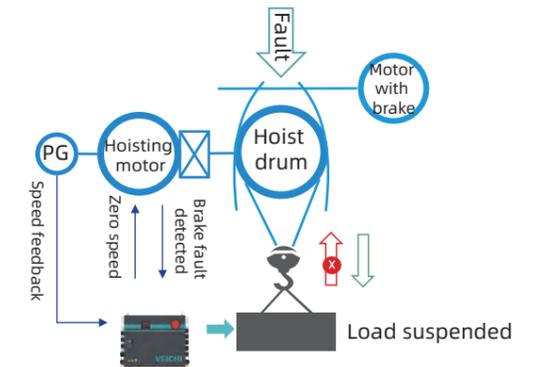
Turn it on or off by the switch.



Trustworthy Safety

Suspension & Anti-sliding (Closed-loop)

When the brake fails and there is an imminent risk of sliding, the system issues a warning and controls the motor to suspend or lower at low speed for the maximized safety.



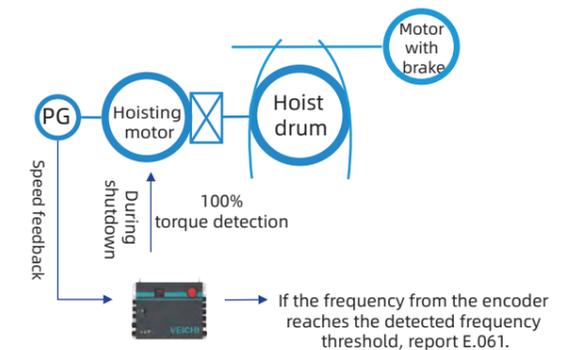
Brake torque detection

The brake torque is periodically checked to see if it meets the requirements for use.

When insufficient braking torque is detected, the system issues an alarm and prohibits operation.

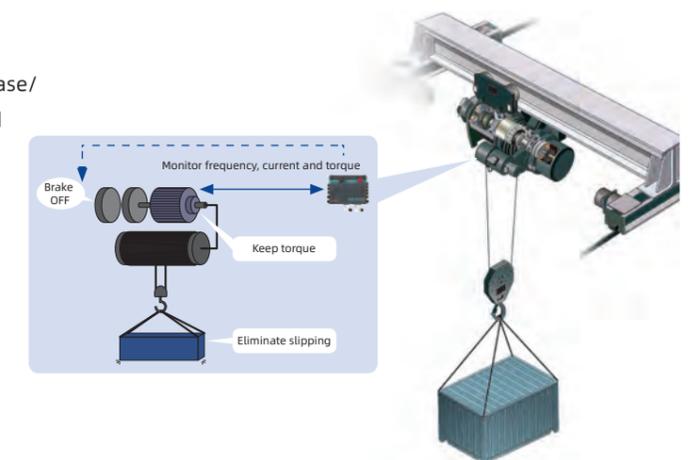
Brake drag

Check the status of the brake contactor when the hoisting mechanism is in operation, and further operation is prohibited to prevent excessive brake wear if the brake contactor is not engaged.



Brake release/apply logic control

The brake will act only when the two conditions of release/apply frequency and release/apply torque are satisfied at the same time to ensure smooth lifting and stopping without slippage.



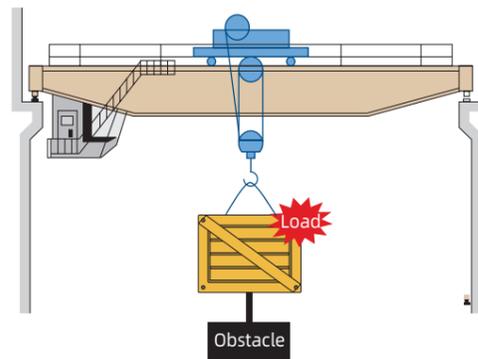
Steel wire rope protection

Speed is automatically lowered to tighten the wire rope slowly when goods are raised at high speed and the rope is slack, so as to prevent overstretching of the wire rope due to excessive tension, prolonging its service life.



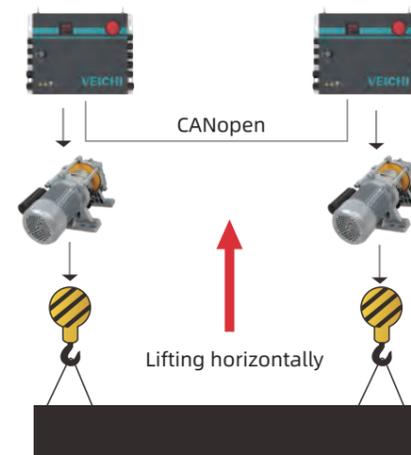
Anti Snag

When a sudden increase in load torque is detected during the hoisting process (hanging by a foreign object or being held by an obstacle), an alarm is issued and operation is stopped.



Sync control

When dual hoisting mechanism lifts at the same time, CANopen bus communication is adopted to realize independent and synchronous control of the two motors, ensuring synchronous lifting and travelling of the two cranes by easy and flexible switching and selection.



CH310 Hoisting-specific AC Drive

Based on years of experience in the industry, CH310 series features excellent torque control, reliable brake control timing, speed and torque monitoring, power optimization, position processing, intelligent deceleration and more, fully ensuring the safety, reliability and high efficiency of the hoisting appliances in harbor, ships, marine engineering, and mining.



Power range

220V/380V/660V: 0.75kW-1120kW

High standard processes for high performance and quality
high power density for better user experience

Low voltage protection for quick stop and operation
limit to ensure no hook slippage

Basic features

Software with built-in functions for cart rectification,
sync hoisting, precise positioning, grab adjustment,
anti-swing, and tower control.

Precise positioning for optimal efficiency in the
designated position without creeping

Application

Rubber tyre gantry cranes, rail-mounted cranes, gantry cranes, general cranes, tower cranes etc.

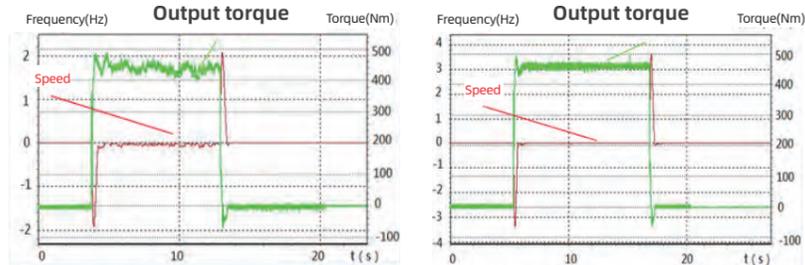


High Reliability

Low frequency and large torque

It can realize 200% of the rated torque output at 0.0Hz, and stable operation with load at the ultra-low speed under 0.01Hz. High torque output for starting ensures smooth ascending/descending process without sliding.

Stable torque output in torque control mode with linearity tolerance within 3% or less.

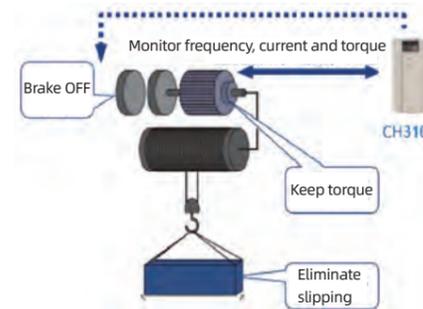


200% of rated torque (230Nm) at 0rpm in open loop 200% of rated torque (230Nm) at 0rpm in closed loop

(45kW drive for a 37kW motor with a rated torque of 230NM)

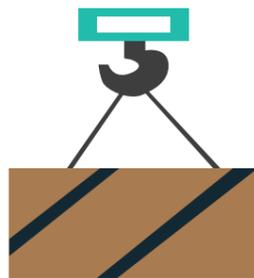
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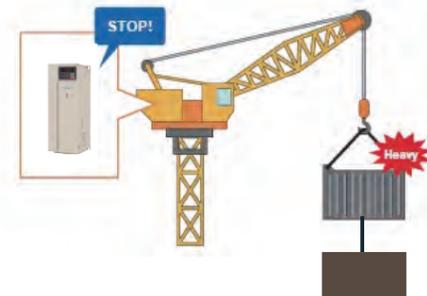
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Sync control

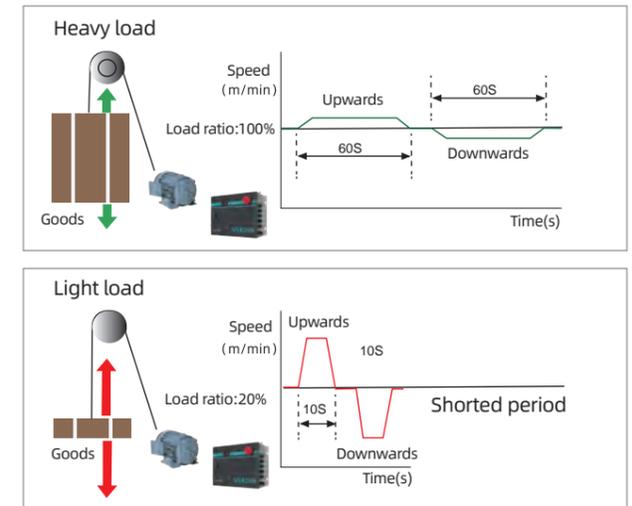
Master-slave sync control function: when the dual hoisting mechanism lifts one object at the same time, the master-slave sync control function can ensure that it is lifted synchronously to ensure safety.



Speed Efficiency

Fast under light duty and slow under heavy duty

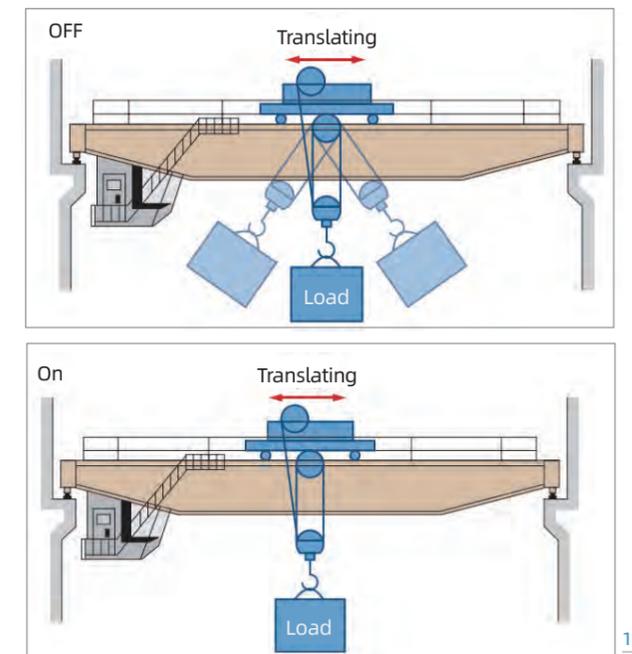
Built-in constant power control algorithm (speed change with load) automatically matches the best running speed according to the current lifting weight, 1-2 times up of the working efficiency.



Anti Swing

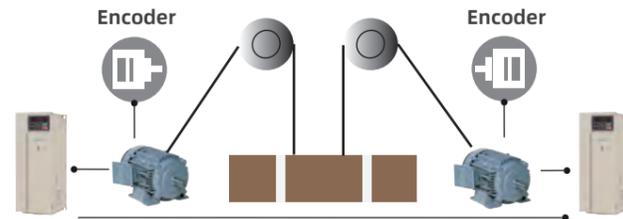
Open/closed loop anti-swing control algorithm with simple debugging and good adaptability reduces hook swaying caused by inertial shock from the cart and trolley and goods swing during translation to keep efficiency and safety.

Turn it on or off by the switch.



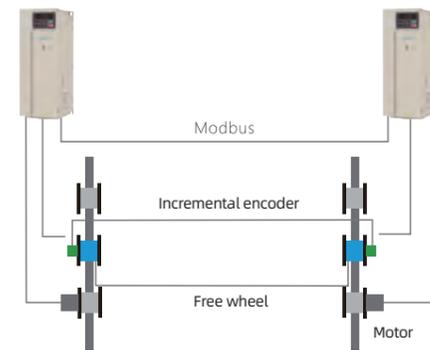
Sync control

Master-slave sync control function: when the double hoisting mechanism lifts one object at the same time, the master-slave sync control function can ensure that it is lifted synchronously to ensure safety.



Real-time correction

Real-time position correction is adopted for master and slave for traveling mechanisms with large spans to realize synchronization control.



Anti Swing (Slewing)

Low-speed slewing is smooth without "stuttering" for quick positioning.

Quick stop with reverse gear (Slewing)

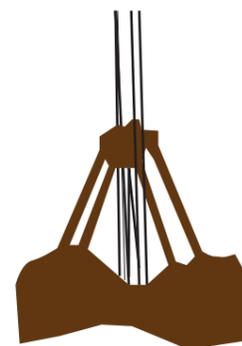
Quick stop can be realized by the reverse gear during slewing without boom shake and rebound.(for slewing mechanism of tower cranes).



Grab sync control

CH310 AC drives automatically control the grab with a single closing command, the system will close the grab automatically, then adjust tension of the supporting rope and the clamping rope until they are balanced.

Similarly, the clamping of the grab only needs a command, and the system automatically completes it. Its status is determined by the absolute rope difference between the clamping and the supporting ropes, and the deceleration zone is automatically set up to prevent the sudden impact.



High adaptability

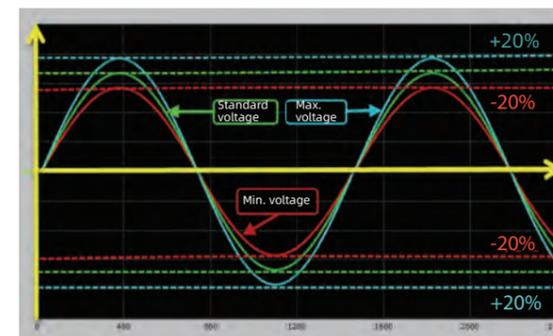
New structure



Wide tooth surface for heat dissipation and high air speed to ensure no derating under high temperature for full power.

Wide voltage

The allowable fluctuation range of input voltage is $\pm 20\%$ of the standard rated voltage to avoid its influence effectively and at the same time, the output is still qualified under harsh grids.



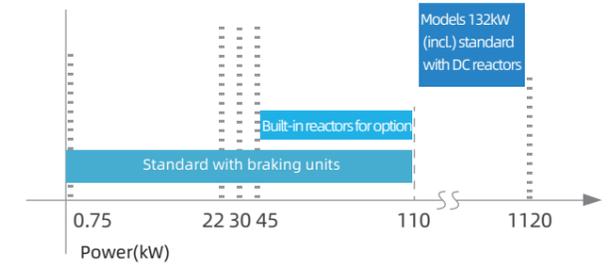
Superior overload capacity

150% of the rated current for 1 minute, 180% for 10 seconds, and 200% for 3s.

Speed change with voltage

The drive reduces the operating frequency when the supply voltage decreases to keep working.

Braking unit and reactor



- 0.75kW~110kW standard with braking units
- 45kW~110kW optional for built-in reactors
- 132kW (incl.) standard with DC reactors

Protection

It realizes all-round protection for the drives and peripheral devices including short-circuit protection to ground, internal buffer relay protection, fan protection, external 24V DC short-circuit protection, motor overload protection and more.

System error	Input phase loss	Stall	Overcurrent during acceleration	Output phase loss
Load protection 1	Overvoltage during acceleration	Fault Type	Overheat	PID feedback fault
Undervoltage during operation	Current detection fault	Excessive speed deviation	Motor overload	Motor detection fault

Multiple PG boards

CH310 series supports several encoder interfaces of collector signal, differential signal, and resolver signal for closed-loop vector control.

Expansion

Various expansions

A variety of expansion interfaces are available for customization. CH310 control board retains two SPI high-speed channels for the external expansions, and its type and parameters are automatically recognized.

Function expansions

Type	Requirement
IO	Optional for high-speed pulse and relay
Speed tracking	Optional (software tracking by default)
PG	Optional for different encoders
Simple logic board	Optional
RT Resolver	Optional
GPRS	Optional

IO expansion

Type	Terminal	Description
IO	X6/X7/X8/X10	PLC/COM
High-speed pulse input	X10	0-100kHz
DO	Expansion port Y2	DC24V/50mA
RO	Expansion relay TA2/TB2/TC2	3A/240VAC
Temp. detection	PK+/PK-	PT100/PT1000/KTY84, motor temp. detection
Common	COM/PLC2	Common port for external appliances
Change-over switch	S7	Polarity of input terminals

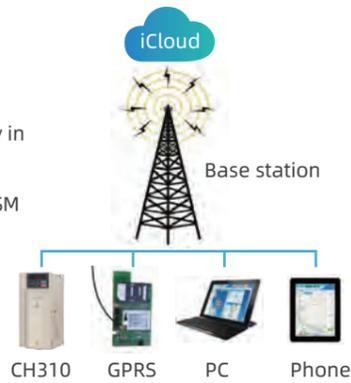
Logic board expansion

Drive can perform simple logic instead of PLC with the widely used MELSEC programmable controller program development environment integrated with general and comprehensive function blocks.



VEICHI Lot

Intelligent terminals with high positioning accuracy in small size with easy installation. GPRS and GSM dual-mode communications ensures stable operation and reliable performance. And online monitoring, and remote fault diagnosis are realized through the remote monitoring module, offering customers with a wider range of value-added services.



Communication expansion

Type	
Modbus-RTU	
PROFIBUS-DP	
CANopen	
PROFINET	

AC800 Engineering AC Drive for Multi-Motors

AC800 series products are developed based on VEICHI's high-end frequency control technology platform for one-motor or multi-motor driving. This product integrates high performance speed and torque control, system flexibility, convenient commissioning and maintenance, and high-power density coverage, which sets a new industry benchmark in terms of module structure, power density, response and accuracy, and the application range.



Power range

380V: **2.2kW~2800kW** | 690V: **55kW~5600kW**

Free configuration of hardware and software modules without code changes for various customized needs.

Tailored compatibility with all types of host computers without changing the original PLC programs

Basic features

Hardware device for ten years of stability and a number of fault handling mechanisms for quick production resumption in an average of 30min.

Professional configuration with InoDriveStudio, background PC tools and LCD keyboard.

Application

Harbor machines and other large-scale lifting appliances including shoreside containers, bridge cranes, grab unloaders, harbor gantry cranes, large shipbuilding gantry cranes, large metallurgical casting cranes and so on.



AC800-A10 Active Front End(AFE)

AC800-A10 series active front end (AFE) unit is self-developed by VEICHI Electric, which can feed back the energy generated by the motor during braking to the power grid through the AFE unit, thus recycle 95% and above of the regenerative power during effective braking.



Power range

380V~480V: 45kW~450kW	690V: 55kW~560kW
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Basic features

Excellent protection against overheat, overvoltage and overcurrent.
Low noise, low harmonic and high-power factor.



Application

Rubber tyre gantry cranes, rail-mounted cranes and gantry cranes.



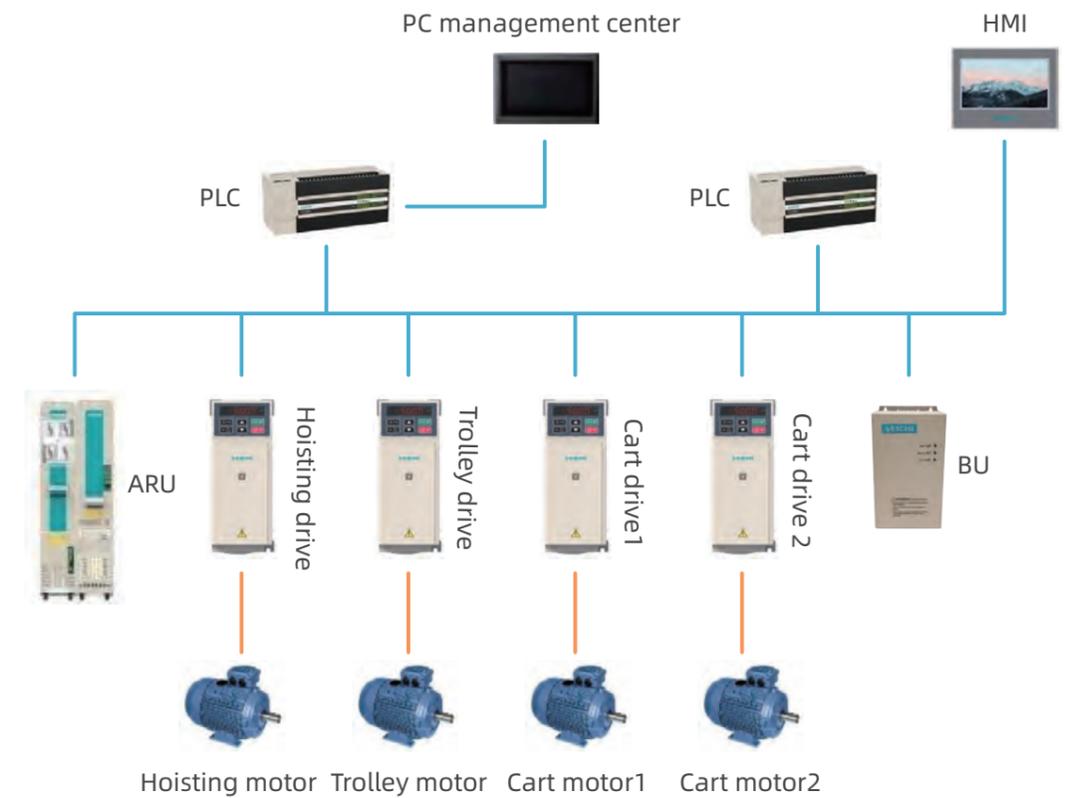
RTG/RMG Solution

Configuration

AC800A10 series active rectifier unit
CH310 hoisting-special AC drive

Advantage

Safety: brake force detection;
Reliability: dual-rectifier system for redundancy backup under both diesel and grid systems;
Energy saving: energy collected to the power grid for adjacent equipment, power saving rate of 30% or more;
Profession: elevated control macros for gate opening and closing at 0Hz;
Usability: customized parameters for simple and convenient commissioning and maintenance.



Typical Solution for Gantry Cranes

Configuration

AC800 Engineering AC Drive for Multi-Motors

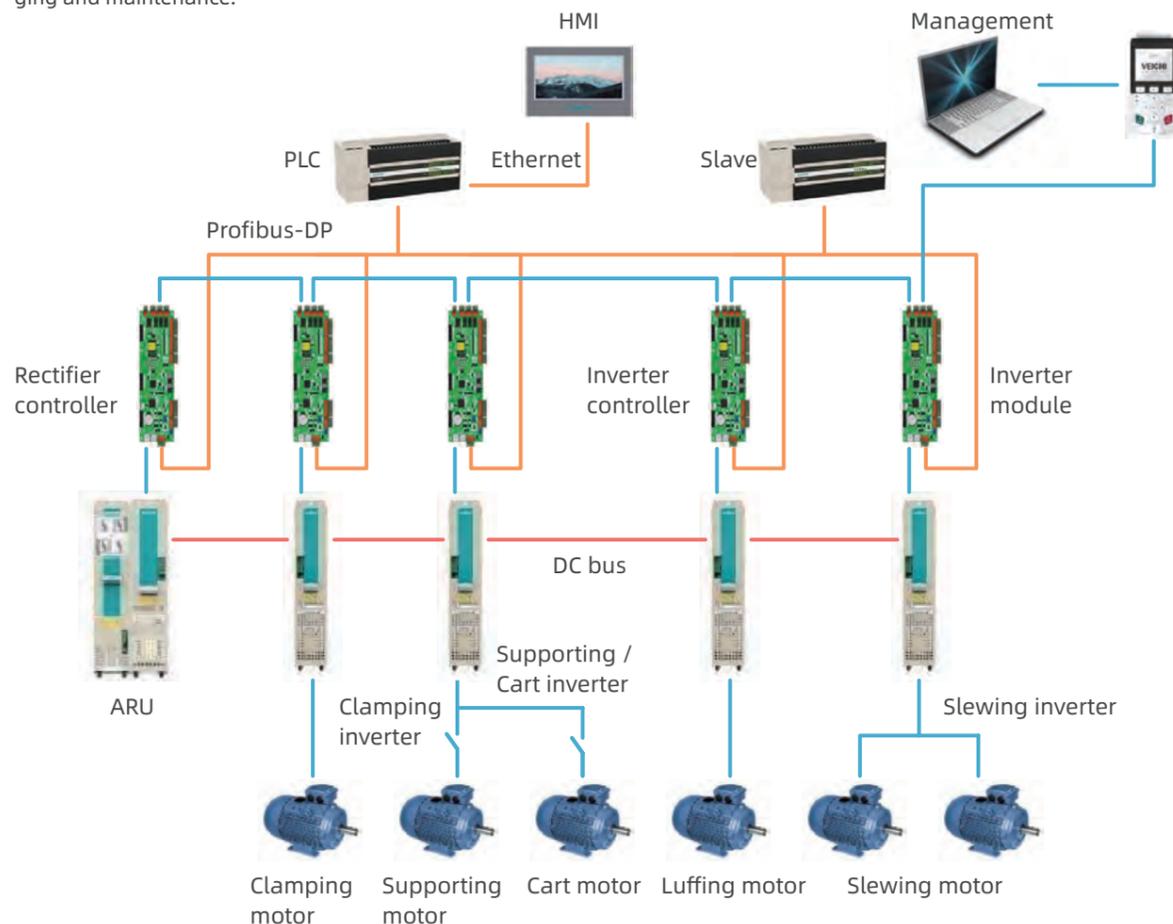
Advantage

Grab modular: integrate the grab process of digging, rope tracking and balancing into the drive with no need for programming or complicated debugging and maintenance.

Soft slewing: unique slewing algorithm solves the contradiction between high start/stop response and shakes under large inertia.

Product system: electronic control in conformity to the same standards to improve the overall compatibility.

Simplified debugging: built-in complex process to simplify debugging and maintenance.



Typical Solution for Gantry Cranes

Description

Material load and unload at bulk cargos is mainly done by drivers, which is monotonous and repetitive, while prone to collision of gantry jibs due to operation errors. This is solved by advanced detection and sensing components and control technologies. VEICHI electric semi-automatic control system solution realizes automatic loading and unloading of the gantry by manual setting the coordinates between the loading positions and unloading positions.

Configuration

CH310 + Positioning and Collision Avoidance System



Advantage

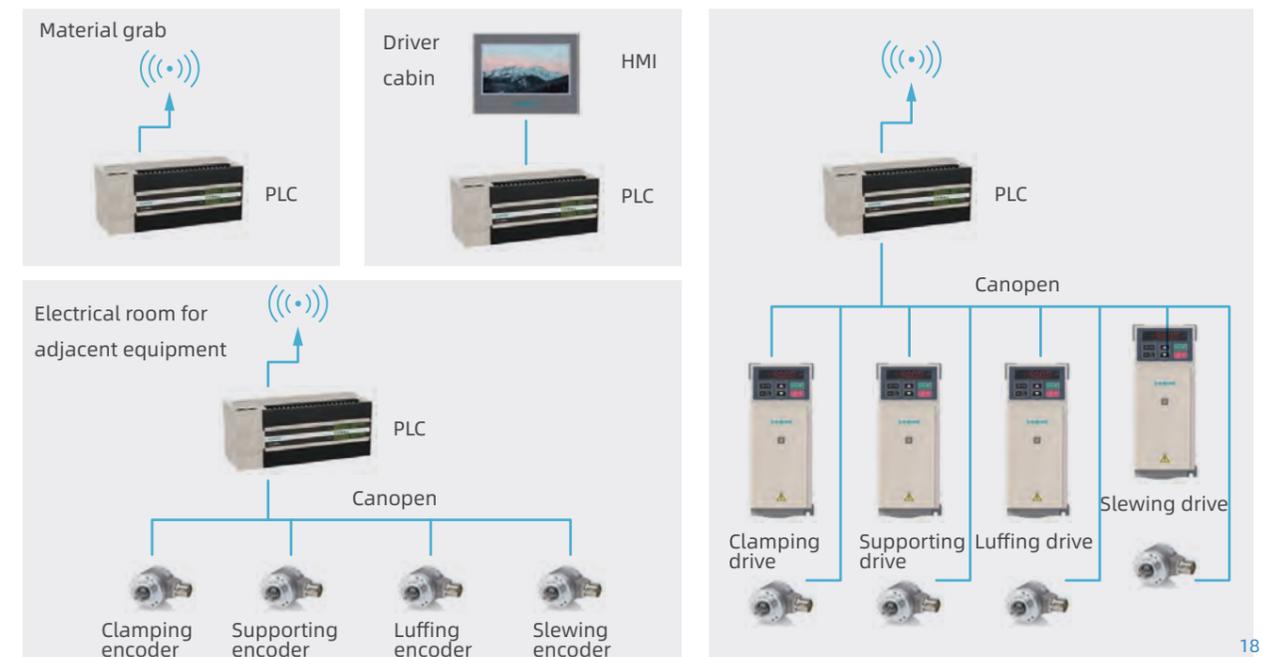
Automatic detection: three-dimensional anti-swing and wire rope torsion/breakage detection of the crane grab based on closed-loop anti-swing.

Grab control: volume control, automatic clamping of the grab and load balancing during the lifting of the closed grab without leakage of material.

Automatic anti-swing: three-dimensional anti-swing of the grab during operation through visual imaging.

Boom collision avoidance: Position detection of the two adjacent gantry cranes combined with equipment status can prevent boom and gantry crane collision, report warnings and perform automatic avoidance according to the running prediction.

Material detection: pause unload if the unloading outlet is detected to be clogged or full.



Automated Control Solution for Bridge Crane Grab

Description

In the solid line box below is the standard crane solution; while in the dotted line box is the intelligent crane solution.

Vehicle-mounted system

The vehicle mounted system mainly contains frequency control system, PLC control system, positioning system, grab control, material stack scanning system, weighing system and video surveillance system.

Ground operation system

The ground operation system includes remote control operation, remote operation system (upper computer), traveling status monitoring, equipment display under video surveillance, and other auxiliary equipment for network communication.

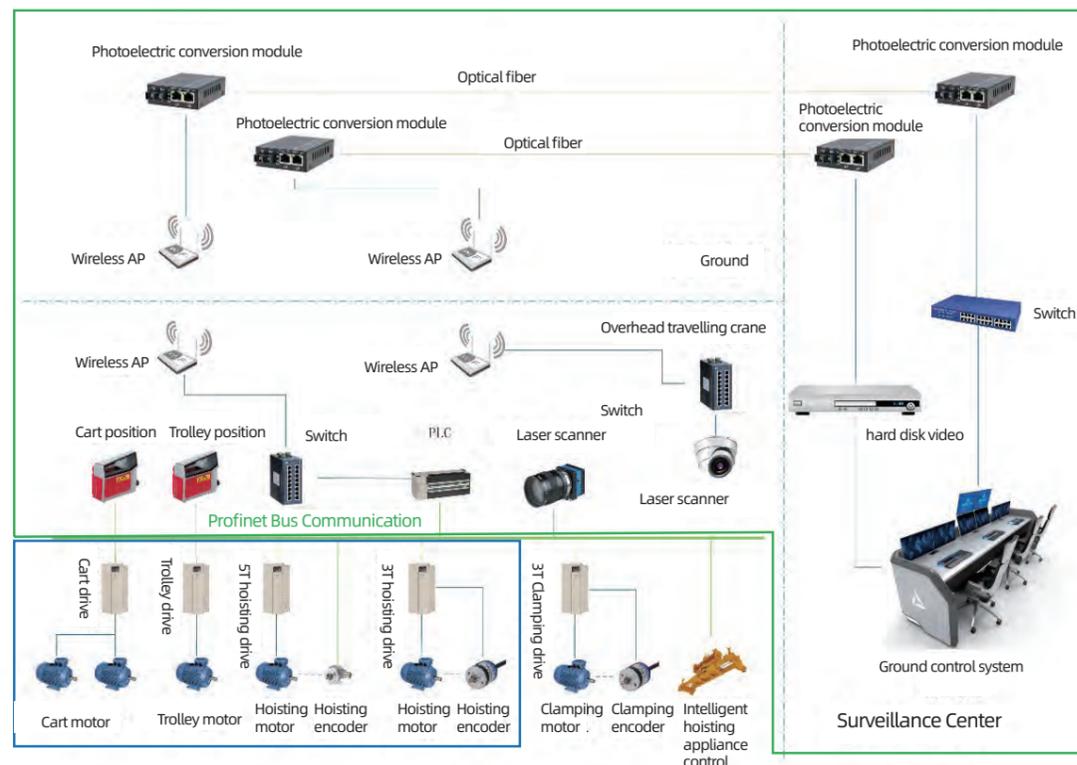
Communication system

The communication system contains two major parts, the first part is communication between PLC on PC and inverter and between positioning system and other sensor devices; and the second part is communication between PLC on PC and ground operation stations.



Configuration

CH310 + Positioning, collision avoidance, video surveillance system



Configuration

- | | | |
|----------------|---|--------------------------------|
| • Anti-swing | • Overload detection | • Video monitoring and storage |
| • Positioning | • Brake timing control against slipping and sliding | • Communication |
| • Grab control | • High starting torque | |

Key

Cart and trolley positioning

Cart: gray busbar positioning with high accuracy and easy installation and maintenance.

Trolley: laser measuring instrument with high precision and easy installation and maintenance.

3D scanning

Laser scanners combined with 3D scanning technology establishes a three-dimensional model of the material to realize the automatic gripping.

Grab control

Automatic grab clamping: position detection devices with PLC high-speed counter to calculate the rope difference to realize automatic opening and closing of the grab.

Digging: The supporting motor is switched to torque control during grab clamping. The torque value given by PLC is just enough to maintain the weight of the wire rope. When the wire rope is slack, it will automatically go up. And when the wire rope is strained, it will fall down automatically under the action of the grab's own weight to maintain a certain tension of the support rope.

Anti-shaking technology

The AC drives calculate the current speed curve of the trolley when the anti-swing function is on by obtaining the weight of the grab, the lifting torque, the change of the trolley speed and other factors in real time, to realize the open-loop anti-swing of the grab through controlling the speed of the trolley.

Solution for General Cranes and Overhead Cranes

Description

Hoisting mechanisms, carts/trolleys of general cranes and overhead cranes are all driven by hoisting-specific CH310 AC drives, which have built-in braking units and release the regenerative energy generated when the heavy loads are lowered by external braking resistors. The drives for the hoisting mechanisms adopt closed-loop vector control, and the drives for the carts and trolleys V/F control. Various operation modes are available such as driver's cabin operation, remote control operation and touch screen operation.

Configuration

CH310+remote control and other operation methods

Advantage

- Excellent closed-loop vector control for hoisting mechanism suspending at zero speed.
- Industry-specific brake logic for more accurate braking to improve start-stop smoothness and prolong the life of the brake.
- Multiple hoisting-specific protection functions for safe and efficient operation.
- A variety of communication boards for expansion including mainstream bus protocols in the market.



Service and Support

