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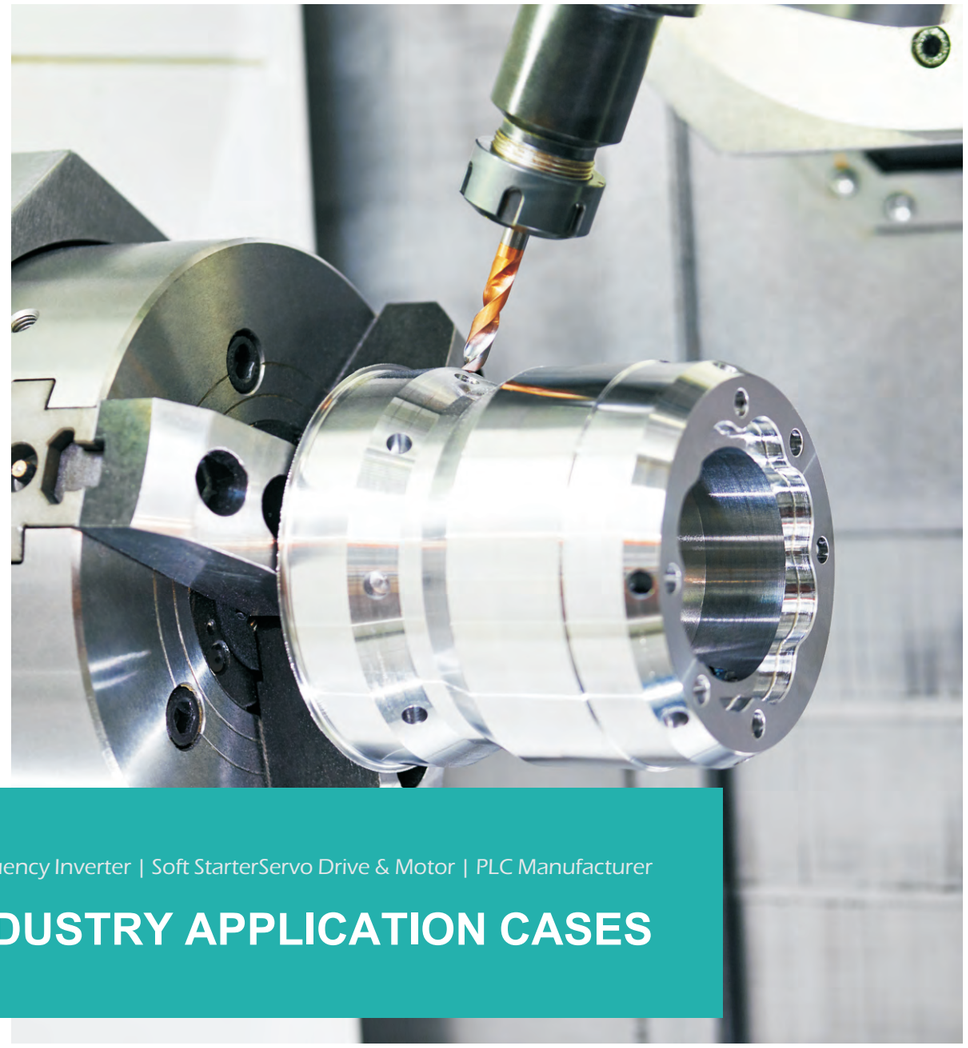
K-DRIVE



Frequency Inverter | Soft StarterServo Drive & Motor | PLC Manufacturer

INDUSTRY APPLICATION CASES

Energy efficient, Beautiful environment

K-DRIVE

Energy efficient,beautiful environment

COMPANY PROFILE

Shenzhen K-Easy Automation Co.,Limited is a professional manufacturer, specialize in R&D And production of AC drives. We have built up a comprehensive product family. Frequency inverters' power covers the range from 0.4kW to 630kW, and voltage range is between 220V and 480V. More than inverters are running smoothly 300, 000 units at different industrial sites.

JOIN US,
ENJOY THE BUSINESS.

We believe “quality is life ”,so we will test all products before shipment,All Module of our VFD will be used quality is life with Infenion only, With years of persistence, the total failure ratio of Our frequency inverters has been controlled below 1%. We never lose a customer because of the quality problem;

With Strong R&D and Engineer Team, makes our after-service very easy, For all doubts and requesting for technologies supporting, We can offer detailed Solution without delay, so for us,“Not Only Products, But also solutions”;

All our products will be offered with 24 months Warranty Period instead of 18 months.

OUR TEAM

- Problem Rate Less Than 1%;
- Support OEM Service;
- Strong Engineer Team.

OUR SERVICES

- 24 Months Warranty Time;
- Very Good After Sales-Service, Best;
- Provide solutions within 2 hours.

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CONSTRUCTION ELEVATOR INDUSTRY

The traditional material elevator is very simple in overall design. It depends on steel wire rope for lifting. It has no safe parking device and extremely low safety factor. With the continuous development of the construction site industry, KD600 series cargo construction elevators are applied.

Application of KD600 Series Frequency Converter in the Field of Freight Construction Elevator

Case Overview

The traditional material elevator is very simple in overall design. It depends on steel wire rope for lifting. It has no safe parking device and extremely low safety factor. With the continuous development of the construction site industry, KD600 series cargo construction elevators are applied. Compared with the traditional construction material elevator, it has the characteristics of beautiful shape, light structure, convenient disassembly, safety, reliability, strong applicability, and wide use. It can be combined into various forms as required, including regular section and irregular section, with a lifting capacity of 1000kg and a running speed of 26m/min. It can realize 0-26m/min stepless speed regulation and automatic layer selection and leveling to meet the needs of different users. It has better technical performance, more safe and reliable working mechanism, and more compact structure. Now it has gradually replaced the traditional basket and wire rope material hoist, and is widely used in the construction of low and middle buildings.

APPLICATION SITE PICTURES

Scheme Advantages

- The door panel display is rich: the operating frequency and load information are displayed on the door pa-nel in real time, and all limit, handle input and brake output states are prompted by separate indicator lights;
- Rich voice functions: the content of voice broadcast is rich, and there are separate voice prompts for common faults. With the display information of the door panel, the efficiency of on-site fault diagnosis is greatly improved;
- Braking resistance short circuit protection: the built-in braking unit has the function of braking resistance short circuit protection;
- Short circuit protection function of brake coil: monitor the current value of brake coil in real time, cut off the input immediately in case of abnormal conditions, and protect the brake coil and internal components;
- Multiple installation methods: wall mounted, semi embedded and fully embedded installation methods can be used;
- Pre authorization function: the system has a built-in perpetual calendar clock, which can set three periods of equipment authorization time, and can set independent passwords for three periods of time, so that users can manage equipment installment collection;

- Automatic leveling function: reduce the working intensity of the operator, automatically operate in place after entering the floor, and the leveling position is accurate (≤ 5mm);
- Wireless video monitoring: fish eye camera is used for the first time in the industry, and there is no dead angle in the elevator cage monitoring in all directions;
- Human shape monitoring and detection: fish eye camera is used to detect the human shape in the elevator cage in all directions without dead angle;
- Wireless voice intercom: video monitoring has its own voice intercom function, so the operator can know the operation in the cage in real time, facilitate timely communication with on-site workers, and improve the transportation efficiency of the elevator;
- Floor pager control function: after meeting the elevator operation conditions, press the floor pager of the corresponding floor, and the elevator will automatically run to the floor. After the workers carry things, close the discharge door, press the floor pager of the floor, and the elevator will automatically run to the first floor.

System commissioning

Name	KD600-K1 variable frequency drive			KD600-K4/5 operation box	
	Function code	Left cage (set value)	Right cage (set value)	Function code	Setting value
Channel	P1-40	Channel value on nameplate		U0-00	Channel value on nameplate
Address	P1-41	Address value on nameplate		U0-01	Address value on nameplate
Rate	P1-42	8	8	U0-02	8
Forward error correction	P1-43	1	1	U0-03	1
Left and right cage settings	P1-45	0	1		

- The channel, address, rate and forward error correction parameters of the left and right cage variable frequency drives of the same machine and the operation box shall be the same;
- Steps to enter the U group parameters of the console: press and hold the "Start" and "Bell" keys for more than 3 seconds at the same time, enter the password "258", and press the "OK" key to enter the U group parameters (if the console is a combination of left and right cages, operate and modify it on the left keyboard;
- The application of Chuang KD600 frequency converter on the site of the cargo construction elevator not only enhances the safety and reliability of the equipment, but also hardly feels the impact between the mechanical systems during the start and stop process, greatly improving the stability and comfort of the elevator during operation, greatly improving the production efficien-cy of the system, facilitating operation and maintenan-ce, saving operating costs for customers, and improv-ing work efficiency, It is worth popularizing and using extensively.

Application of KD600 Series Frequency Converter in Construction Elevator Site

Case Overview

The construction elevator is an essential and important construction equipment for the modern high-rise construction to cooperate with the large tower crane. Especially in the construction of high-rise and super high-rise buildings, it plays an irreplaceable role in ensuring the construction period and safety, reducing construction costs and reducing labor intensity. It is also an important symbol of the equipment level of the construction team. According to the general experience, each tower crane for high-rise buildings shall be equipped with at least one construction lift. The traditional construction ladder adopts relay contactor control mode, which directly starts and mechanically holds the brake for forced braking. The impact of starting and braking is large, and the comfort is poor, which greatly affects the service life of the mechanical structure. In recent years, the frequency conversion construction ladder has become the industry development trend.

Scheme Advantages

- High starting torque: low frequency starting torque is large, and the rated torque can reach 180% at 0.5Hz;
- Multiple protection mechanisms: brake short-circuit protection, brake resistor short-circuit protection, motor overheating, overload protection, etc;
- Easy to use: parameters can be used after startup without debugging;
- Intelligent integration: integrating overload protection, voice broadcast and status indicator panel;
- Safety: The frequency conversion speed regulation system has fault protection such as undervoltage, overvoltage, over torque, and over-current protection, ensuring the reliability and safety of the entire electric control system.

System commissioning

One operation cycle of hoisting machinery and equipment is divided into five processes: startup, acceleration, operation, deceleration and shutdown. In the starting stage, the driver is required to have a large output torque to make the equipment start steadily without sliding. The time to open the holding brake should be appropriate. The time to open the holding brake is too early. The machine has not yet had enough torque to drive the operation of the equipment. Under the action of gravity, the machine slides. If the holding brake is opened too late, the machine has a large torque output. After the holding brake is opened, the acceleration is too large, and the starting is not stable. In the acceleration and deceleration stages, the speed change is required to be smooth, and the acceleration should not be too large. Equipment such as construction elevators will make people feel overweight or weightless. During stable operation, the machine shall maintain constant output and operate at a speed close to uniform speed. The difference between ascending and descending is that when ascending, the equipment should overcome the gravity of the object and provide upward traction; When descending, it is necessary to balance the influence of some gravity to make the equipment descend and balance. Common parameters are as follows:

Function code	Name	Setting value	Remarks	
P0-03	Control mode	0	Open loop vector control 1	
P0-04	Command source selection	1	Terminal command channel	
P0-06	Primary frequency source X selection	4	Analog quantity setting (set according to the actual situation)	
P0-23	Acceleration time 1	3s		
P0-24	Deceleration time 1	2s		
P4-01	Motor rated power	Model determination	The setting corresponds to the actual value of the motor. For example, if one driven three is 11KW, then the rated power of the motor is set as 11 * 3 = 33KW	
P4-03	Number of motor poles			
P4-04	Motor rated current			
P5-00	DI1 terminal function selection	1	Forward running (FWD)	Change the multi-function terminal function according to the actual application
P5-01	DI2 terminal function selection	2	Reverse operation (REV)	
P6-00	Relay 1 output selection	18	Holding brake frequency output of lifting equipment	
P6-01	Relay 2 output selection	2	Fault relay output	
PE-00	Forward rotation (DI1 is connected) band type brake	1.50Hz	Frequency when DI1 is connected (default forward rotation) and alarm is opened	
PE-01	Forward rotation (DI1 on) opening delay	0.0s	Di1 connection (default forward rotation) alarm opening delay	
PE-02	Forward rotation (DI1 on) closing band type brake	1.30Hz	Frequency when DI1 is connected (default forward rotation) and the alarm is closed	
PE-03	Forward rotation (DI1 on) closing delay	0.0s	Di1 ON (default forward rotation) trip alarm closing delay	
PE-04	Reverse (DI2 on) open band brake frequency	1.50Hz	Frequency when DI2 is connected (default reverse) and the alarm is open	
PE-05	Reverse (DI2 ON) open delay	0.0s	Di2 ON (default reverse) trip opening delay	
PE-06	Reverse (DI2 on) closing band type brake frequency	-1.50Hz	Frequency when DI2 is switched on (default reverse) and the alarm is closed	
PE-07	Reverse (DI2 ON) close delay	0.0s	Di2 switch on (default reverse) alarm closing delay	
PE-08	Whether the holding brake torque feedback protection function is effective	0: Invalid 1: Valid	Used to detect whether the torque reaches the PE-09 value when the band brake is opened	

CONSTRUCTION MACHINERY INDUSTRY

The traditional material elevator is very simple in overall design. It depends on steel wire rope for lifting. It has no safe parking device and extremely low safety factor. With the continuous development of the construction site industry, SC100 series cargo construction elevators are applied.

Application of CM Series Three Phase AC Permanent Magnet Synchronous Motor Controller on Small Excavator

Case Overview

The traditional material elevator is very simple in overall design. It depends on steel wire rope for lifting, has no safe parking device, and has a very low safety factor. With the continuous development of the construction site industry, SC100 series cargo construction elevators are applied. Compared with the traditional construction material elevator, it has the characteristics of beautiful shape, light structure, convenient disassembly, safety, reliability, strong applicability, and wide use. It can be combined into various forms as required, including regular section and irregular section, with a lifting capacity of 1000kg and a running speed of 26m/min. It can realize 0-26m/min stepless speed regulation and automatic layer selection and leveling to meet the needs of different users. It has better technical performance, more safe and reliable working mechanism, and more compact structure. Now it has gradually replaced the traditional basket and wire rope material hoist, and is widely used in the construction of low and middle buildings.

APPLICATION SITE PICTURES

Scheme Advantages

- In most cases, there is no fatal interference to peripheral devices during operation;
- Fast and accurate control, fast response to load changes;
- Low noise, large low-frequency torque; Strong carrying capa-city and energy saving;
- Simple operation and good stability.

QUARRYING SAND INDUSTRY

In many production lines, belt conveyors are needed, which can quickly transfer products and accessories in the production process, and can greatly improve the output, production and production efficiency.

The Application of KD600 Vector Frequency Converter in the Belt Production Line of Quarry

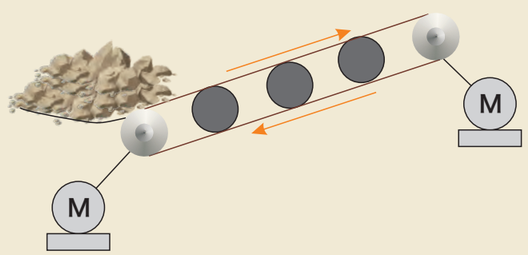
Case Overview

In many production lines, belt conveyors are needed, which can quickly transfer products and accessories in the production process, and can greatly improve the output, production and production efficiency. KD600 series frequency converter is a flexible and affordable variable frequency speed regulation device, which can be used in various speed drive systems, and the power range can range from 315W to 0.2KW. In the belt conveyor control system, KD600 is the best choice as the driving device.

Scheme Advantages

- Improve the production efficiency. By setting the frequency of the inverter, the speed of the bed belt feeding production line can be contr-olled, so as to improve the produ-ctivity;
- Superior soft start and soft stop characteristics;
- The effect of automatic speed regulation and power saving is obvious;
- Reduce equipment maintenance and improve system power factor;
- It can realize PID regulation, quantitative and constant speed transportation.

Application of KD600 as driving device in belt conveyor control system

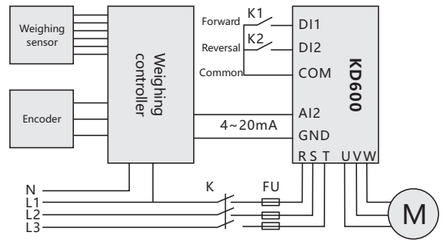


System commissioning

KD600 series frequency converter, speed control potentiometer, motor, transmission roller, transmission belt, control button, and belt conveyor have excellent control performance because of this drive device. The KD600 variable frequency drive device integrates such standard functions as starting and stopping along the slope curve, high-precision speed setting value, fixed speed (frequency) setting value, etc. can be selected through simple settings; Flexible control mode, extended integrated protection function, and other functions. At the same time, the KD600 series inverter can also suppress the fixed frequency with a certain bandwidth. This is a very simple method to avoid resonance interference, which often aggravates the damage of components. In addition, the KD600 inverter runs very smoothly because of its high modulation pulse frequency. The control of conveyor is divided into automatic control and manual control. When the start button is pressed, the conveyor starts to work. The speed of the conveyor is controlled by the potentiometer at the analog input end of the converter, so that the frequency of the converter can be changed, that is, the conveyor can be adjusted steplessly. In addition, the moving direction of the conveyor can be changed by pressing the forward and reverse buttons. Press the stop button to stop the conveyor. The manual button is the inching button of the conveyor. When the button is pressed, the conveyor starts to work. When the button is released, the conveyor stops working.

This system uses buttons and potentiometers to control the frequency converter. The parameter setting of the frequency converter is very simple. There are mainly several parameters that need to be set:

Function code	Name	Factory value	Set value
P0-04	Source of operation instruction	0	1
P0-06	Selection of main frequency source	1	2
P5-00	DI1 terminal function	1	1
P5-01	DI2 terminal function	2	2
P5-02	DI3 terminal function	9	4
P6-00	Relay control selection	2	2



CRANE INDUSTRY

Bridge crane, commonly known as "traveling crane", is a kind of lifting machinery widely used in industrial and mining enterprises. Its operating mechanism consists of three basically independent driving systems: cart driving system, trolley driving system and hook driving system.

Application Scheme of KD600 Series Frequency Converter Traveling Before and After

Case Overview

Bridge crane, commonly known as "traveling crane", is a kind of lifting machinery widely used in industrial and mi-ning enterprises. Its operating mechanism is composed of three basically independent driving systems, namely, cra-ne driving system, trolley driving system and hook driving system. Chuang'an inverter has successfully transformed the above three driving systems. The following is mainly about the transformation process of the front and back traveling system in traveling crane.

APPLICATION SITE PICTURES

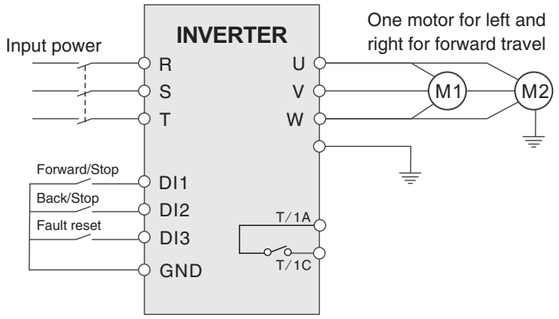
Scheme Advantages

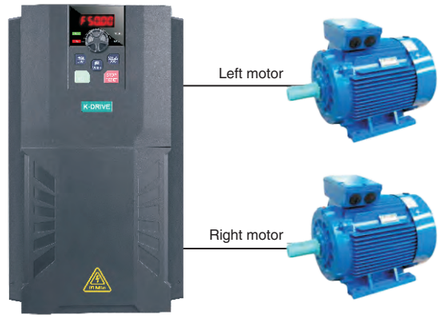
- Field oriented current open-loop vector control, fully decoupled motor variables, large low-frequency torque, fast response, etc;
- KD600 adopts PG free open-loop vector control mode and vectorized V/F mode, and amplifies the power level configuration of the first gear;
- Frequency range: 0.5-600Hz segment setting, stepless continuous adjustment;
- Working voltage range: 380V ± 20%, and the bus voltage drops to 360VDC instantly for trouble free operation;
- Overload capacity: 150% of rated current, 1 minute allowed; 200% rated current, 1s allowed;
- Torque characteristics: starting torque, greater than 2 times of rated torque; Low frequency torque, greater than 1.6 times of rated torque at 1HZ; The braking torque is greater than the rated torque.

Operating characteristics

- The crane lifting mechanism has a large starting torque, which usually exceeds 150% of the rated torque. If overload and other factors are considered, at least 200% of the rated torque shall be provided during the starting and accelerating process;
- When the lifting mechanism runs downward, the motor will be in regenerative power generation state and must be energy consumption braking or regenerative feedback to the grid;
- The load of the lifting mechanism changes dramatically when the lifted object leaves or touches the ground, and the frequency converter shall be able to control the impact load smoothly;
- As the traveling speed of the front and rear traveling mechanism of the crane is not high during the mechanical design, the converter can be used for proper overspeed to improve the working efficiency.

Simple wiring diagram





Parameter setting and description (left and right motor traveling parameters)

Parameter setting	Explain	Parameter setting	Explain
P0-00=0	VF control	P5-00=1	forward
P0-04=1	External terminal start stop	P5-01=2	carry out later
P0-06=1	Digital frequency setting	P6-00=2	Relay 1 fault output
P0-14=60.00	Maximum frequency	P4-01=1.6KW	Connected motor power
P0-16=60.00	Upper limit frequency	P4-02=380V	Motor rated voltage
P0-11=60.00	Digital setting frequency	P4-04=3.3A	Motor rated current
P0-23=3.0s	Acceleration time	P4-05=50Hz	Rated frequency of motor
P0-24=2.0s	Deceleration time	P4-06=960R/Min	Rated speed of motor

Note: When one frequency converter is used with two motors, it is strongly recommended to install a matching thermal relay at the front end of each motor to protect each motor.

Operation effect analysis

KD600 series frequency converter has carried out frequency conversion transformation on the traveling system, and the tr-ansformation effect is relatively ideal, mainly shown in:

- The soft start and soft stop during startup are realized, which reduces the impact on the power grid;
- After using the frequency converter, the original shift contactor and speed regulating resistor are omitted, which not only saves the maintenance cost, but also reduces the downtime for maintenance, thus increasing the output;
- When the main hook works at 5Hz~30Hz, the energy saving effect is very obvious;
- The frequency converter is used to control the front and rear traveling, and the left and right traveling mechanism series can realize the over frequency work. Under the premise of ensuring safety, the work efficiency is greatly improved, and the maintenance workload of the traveling equipment due to frequent replacement of AC contactors is also reduced.

Application of KD600 series 710kW/660V frequency converter on the steel rolling forming machine

Case Overview

The process of rolling and pressing steel is formed by drawing at the front stage, extruding at high temperature and pressing at the back stage, and then winding into a circle. In the starting control process, the motor needs to have a large torque output. At the same time, in the whole operation process, the requirements for speed stability accuracy are relatively high, otherwise, the extruded steel structure is uneven and the thickness is unstable, affecting the product quality. Both the front stage forming and the rear stage forming are driven by KD600 frequency converter by PG free vector control. The dominant frequency of both is given by AS1, and the terminal is used to control the start stop and the forward and reverse rotation of the motor.

APPLICATION

SITE PICTURES

KD600/660V series frequency converter is used for energy-saving transformation of equipment, which is characterized by simple structure, convenient transformation, obvious energy-saving effect and short investment recovery period.

After using the frequency converter, the equipment can start and stop soft, reduce the mechanical impact of the equipment, extend the service life of the equipment, and reduce the maintenance cost of the equipment.

Scheme Advantages

- KD600 vector control inverter without PG can output 200% of rated torque at 0.1Hz;
- High speed accuracy, error control within ± 0.2%, and fast dynamic response;
- The power board and control board of the frequency converter adopt special insulation treatment, with strong corrosion resistance;
- The radiator adopts a unique air duct design, which can work stably under high ambient temperature.

Parameter setting

Parameter	Parameter
P0-03=1	P0-04=1
P0-06=2	P0-14=60.00
P0-16=60.00	P0-23=5
P0-24=10	P4-05=60.00
P4-06=1200	P5-00=1
P5-02=4	P7-00=2.2
P7-01=2	P8-01=3

LOGISTICS INDUSTRY

Logistics mechanical equipment is one of the main operating tools of modern enterprises, and is the basis for reasonable organization of batch production and mechanized flow process.

Application Scheme of KD600 Series Frequency Converter on Transportation Equipment in Logistics Industry

Case Overview

Logistics transportation equipment refers to the material materials required for various logistics activities, such as mechanical equipment and appliances, which can be used for a long time and basically maintain the original physical form in use, excluding buildings, loading and unloading platforms and other logistics infrastructure. Logistics machinery and equipment are logistics labor tools and the material and technical basis of the logistics system.

Logistics mechanical equipment is one of the main operating tools of modern enterprises, and is the basis for reasonable organization of batch production and mechanized flow process. For third-party logistics enterprises, logistics equipment is the material and technical basis for organizing logistics activities, which reflects the size of the logistics capacity of enterprises. Logistics equipment is the material basis of the logistics system. With the development and progress of logistics, logistics equipment has been continuously improved and developed. In the field of logistics equipment, many new equipment are constantly emerging, such as four-way pallet, overhead forklift, automatic sorter, automatic guided carrier (AGV), container, etc., which greatly reduces people's labor intensity, improves logistics operation efficiency and service quality, reduces logistics costs, plays an important role in logistics operations, and greatly promotes the rapid development of logistics.

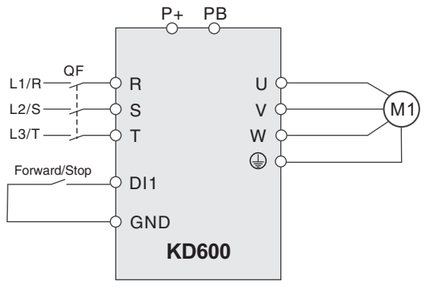
APPLICATION

SITE PICTURES

Scheme advantages

- In most cases, there is no fatal interference to peripheral devices during operation;
- Real open-loop vector control technology, large low-frequency torque;
- Properly increasing the operating frequency of the motor can increase the output of the equipment and improve the production efficiency;
- Simple operation and good stability;

Inverter wiring diagram



Logistics equipment problems

The rapid development of logistics has enabled the application of advanced logistics equipment. However, the development of logistics equipment in China as a whole cannot meet the requirements of the new logistics task in the new century. Specifically, the following aspects are involved:

- Diversified investment in logistics infrastructure construction is too little. For a long time, China's logistics infrastructure investment is less and the development is relatively slow. Although some advanced warehousing and logistics facilities have also been built in recent years, on the whole, there are many low-end applications.
- China is still in the initial stage of the development of logistics equipment. There is neither industry standard nor industry organization, which leads to the disunity of various logistics equipment standards and poor connection and matching.
- There are a large number of logistics equipment suppliers, but the scale is generally small and the development is not standardized.
- Logistics enterprises only pay attention to the quality and selection of single equipment, without considering how to optimize the whole system.
- Most logistics enterprises still regard price as the primary factor in the selection of logistics equipment, while ignoring the inspection of internal quality and safety indicators.
- Some logistics enterprises lack sufficient understanding of the role of logistics equipment, and have blindness in system planning and design, resulting in inconvenience in use or waste of resources.
- The management of logistics equipment has not been widely included in the content of logistics management. The utilization rate of logistics equipment is not high, and the idle time of equipment is long.

Parameter setting

Parameter setting	Explain
P0-03=2	V/F mode
P0-04=1	External terminal start stop
P0-06=1	Given speed of local panel
P0-23=5.0	Acceleration time
P0-24=5.0	Deceleration time
P0-26=3.0	Carrier frequency

Development trend

With the development of modern logistics, logistics equipment, as its material basis, has shown the following development trends.

- Large scale and high speed;
- Practicality and lightness;
- Specialization and generalization;
- Automation and intelligence;
- Complete set and systematization;
- Green.

FABRIC
TEXTILE INDUSTRY

The coating machine needs to uniformly stick glue or ink on the surface of aluminum foil, plastic film or cloth textiles, which requires high coating technology. It requires not only uniform coating height but also high-speed non-stop roll change to improve production efficiency.

Application of KD600 Vector Frequency Converter in Coating Machine

Case Overview

The coating machine needs to uniformly stick glue or ink on the surface of aluminum foil, plastic film or cloth textiles, which requires high coating technology. It requires not only uniform coating height but also high-speed non-stop roll change to improve production efficiency.

The steps of the coater are generally divided into: constant tension unwinding, multi-level synchronous control of the coating process, and constant tension winding. It is required that the substrate tension is constant, the linear speed is constant, and the starting and stopping process is smooth during normal production. Therefore, in the control of the mechanical and electrical performance of the coater, the key is to control the tension of the coater system. Because the tension directly affects the quality and quantity of products, too much tension will damage the physical properties of coated paper and affect the service life and quality of paper; The tension is too small, the winding is too loose, and the paper feeding is not smooth, which will also affect the product quality of the subsequent process. During the whole process, no matter the startup acceleration or shutdown deceleration, the constant speed operation under any linear speed requires the coating roller, the composite roller and the traction roller to keep the running linear speed synchronized, otherwise, there will be abnormalities such as paper breaking, winding displacement, aluminum foil wrinkles or printing breaks. In this process, the compound coating motor is required to have fast speed regulation response, accurate speed control and small tension fluctuation.

APPLICATION
SITE PICTURES

Traditional scheme

The tension control of the system is to control the tension stability by controlling the linear speed of the system to be constant. At present, the industry mostly uses high-end PLC for constant linear speed control, sends the feedback signal of the winding traction and swing roll potentiometer of the winding and unwinding device to the PLC, conducts PID control and roll diameter calculation through the PLC, and transmits the results to the vector converter through analog quantity. The frequency converter is only an actuator in the whole control system. This requires that the PLC has a fast operation speed and needs to expand more A/D and D/A modules. Because of the influence of the PLC operation speed and signal transmission, the dynamic response of the system becomes slower. Therefore, only the most high-end brand of the vector converter can be used. It requires that the analog input port of the converter has a higher resolution, the dynamic response of the converter is fast and the speed stability accuracy is high, to compensate for the delay caused by insufficient solutions.

Frequency converter scheme

KD600 series vector control inverter is a domestic high-grade inverter newly launched by our company in recent years. It mainly includes KD600 universal vector inverter and KD600 special vector inverter for tension control. KD600 has powerful functions and can realize closed-loop vector control, which can meet the requirements of most industries on the functions and performance of frequency converters. KD600 is a special inverter controller for tension, which mainly integrates the special functions of tension control such as roll diameter calculation, tension taper, etc., and realizes the simplification of tension control. The tension control of KD600 includes torque mode and speed mode. The speed mode is generally used in situations where the tension control accuracy is required to be high, and the torque mode can be used in situations where the tension control accuracy is not required to be high. The system structure is simple and convenient for debugging.

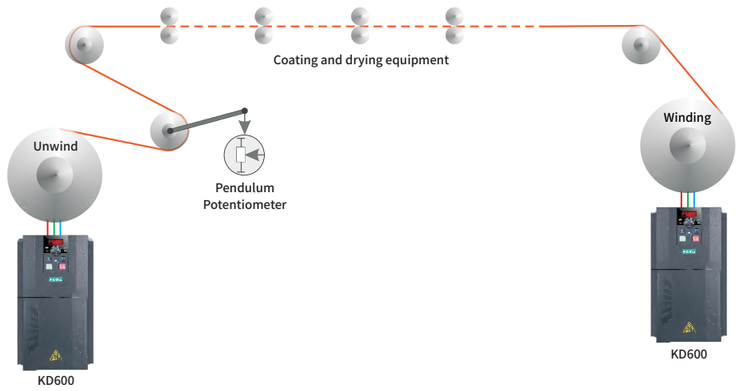
The linear speed of each section is required to be constant, but because the winding diameter is constantly changing during the winding and unwinding process, the PID adjustment must take into account the speed change caused by the change of the winding diameter, otherwise the physical characteristics of the coated paper will be damaged, and the service life and quality of the paper will be affected. In this way, the speed stability accuracy is required to be high, and the respo-nse speed of the system in dynamic state is fast.

Structure description

At the base material unwinding stage, a KD600 series power winding frequency converter is required, which mainly aims at the constant tension of the base material, adopts automatic PID closed-loop control, and the winding speed changes with the change of the drawing speed; When loose thread occurs, the take-up speed changes with the loose thread speed; In case of wire break, the pay off reel is required to stop running immediately. Since the pay off reel has a brake device, the inverter shall be set to free stop when stopping, and the whole unwinding process shall operate independently.

In the coating and drying stages, multiple open-loop vector control frequency converters are required. Proportional linkage control is adopted. During the production process of the coating machine, the main signal and the fine adjustment signal operate in superposition. Realization method of linear speed synchronization: Take the multi-level synchronization control of multiple coating processes as an example, in order to keep the linear speed synchronized, the method of superposition of main frequency rate and auxiliary frequency is adopted. In synchronous control, the main frequency of the first frequency converter is transmitted to the second through RS485 communication, and so on, until the last one, the operating frequency is transmitted through communication, which can avoid the attenuation of analog signals in the transmission process. The auxiliary frequency of each frequency converter is the fine tuning frequency of its own frequency converter, which is realized through the rising/falling operating frequency of the frequency converter. Fine tuning frequency accuracy is up to 0.01Hz.

In the winding stage of finished products, a KD600 special inverter for tension control is required, which is mainly aimed at keeping the tension of finished products constant. Open loop control is adopted to automatically calculate the taper and roll diameter. No external tension devices are required to track the winding stage of finished products produced by the coater.



PAPER INDUSTRY

At present, there are many paper manufacturers in China, but there are generally some problems such as low automation control level, high energy consumption, and limited paper quality and output to a certain extent.

Application of KD600 Frequency Converter in Synchronous Drive Control System of Paper Machine

Case Overview

At present, there are many paper manufacturers in China, but there are generally some problems such as low automation control level, high energy consumption, and limited paper quality and output to a certain extent. With the rapid development of social economy, people have higher and higher requirements for the consumption quantity and quality of paper, which requires paper enterprises to constantly improve the production process and automatic production level, so that paper products can meet the growing economic needs.

Scheme advantages

- Reduce energy consumption and save at least 30% of electricity bills;
- Digital management is realized and the operation is simple;
- Soft start and stop of frequency conversion to reduce mechanical wear;
- Reduce labor intensity of workers and save maintenance costs;
- Reduce paper break debugging, reduce paper break rate, and improve output and efficiency.

Introduction to control system

The paper machine is generally composed of headbox, wire section, pressing section, drying section, calendering section and winding section. The transmission system is a speed chain coordination system composed of multiple transmission points. Using the frequency conversion control system can make the drive system have very convenient and accurate speed regulation function:

- A fixed transmission ratio can be maintained between the transmission points of each part, so that the line speed of each transmission point is consistent. It is convenient for the equipment to speed up and slow dow-n, so as to avoid paper breaking due to large difference in linear speed between transmission points;
- Continuously and smoothly drag the paper machine to run;
- With smooth acceleration and deceleration function;
- Each point can be started and stopped separately, and can be fine tuned separately, with crawling and acceleration functions;
- There is a speed chain relationship between each point, that is, "when the speed changes in the fro-nt section, the latter will automatically follow".

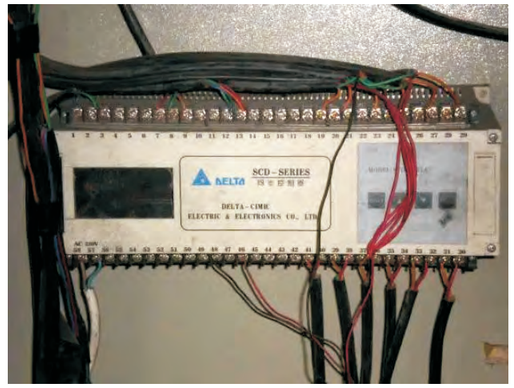
Four synchronous control modes of paper machine

1. Multiplication speed control box+slip speed control motor

This method is widely used in the early paper machine production line. Because the use of electromagnetic slip speed regulating motor wastes a lot of electric energy, it has been gradually eliminated.

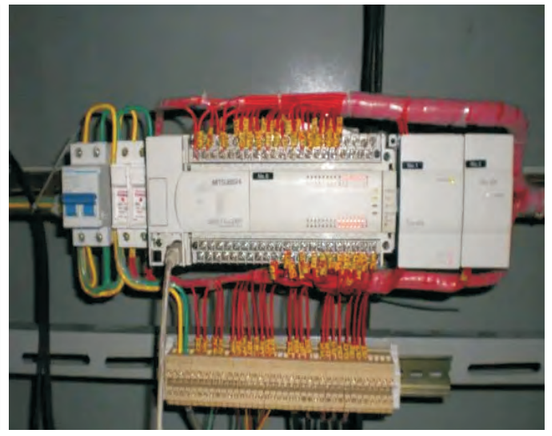
2. Synchronous controller+KD600 frequency converter+squirrel cage Y series asynchronous motor

Adjust the synchronous controller with multi turn high-precision potentiometer (2.2K), set the speed chain mode in the synchronous controller, and then control each inverter with 4~20mA/0~10V analog signal output by the synchronous controller. Advantages: simple transformation and low cost. Disadvantages: analog signal is easy to be interfered, with low accuracy, easy to break paper, and service life of about one and a half years.



3. PLC host+D/A module+KD600 frequency converter+squirrel cage asynchronous motor (Y series/4-pole)

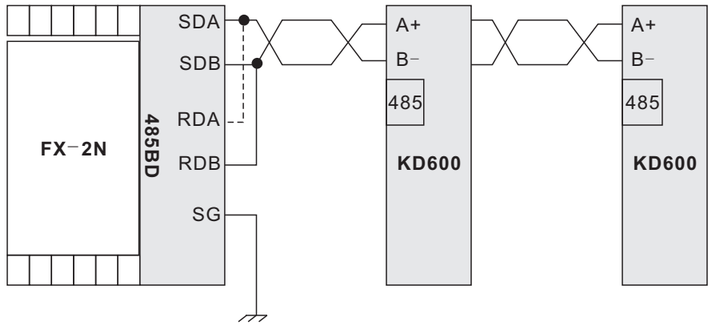
The switching value (such as button) signal is sent to the PLC for BIN integer/floating point binary operation, and then the 0-4000 digital value is converted into 4~20mA or 0~10V analog signal through the D/A module and output to the frequency converter. Advantages: The linear speed accuracy is higher than that of the synchronous controller. Power failure can keep memory. Replace the potentiometer with a button. The accuracy is guaranteed. Disadvantages: The cost of engineering transformation is high. There is still a problem of low accuracy of analog quantity. (The figure below shows that the six point synchronous analog output control system uses two D/A modules)



4. Master slave communication between PLC and KD600 frequency converter

The Modbus communication mode of KD600 frequency converter adopts the query corresponding mechanism of master slave mode. Only when the master station sends a query, the slave station can give a response, and the slave station cannot actively send data. As the master station, PLC receives external signals (such as buttons), communicates with each frequency converter as the slave station through 485 communication port, sends commands and receives data. And real-time monitoring can be carried out through the touch screen.

Due to the master-slave communication mode, the synchronization accuracy is high and there is almost no interference. And the D/A module used in the traditional control mode of the paper machine industry is omitted.



Scheme advantages

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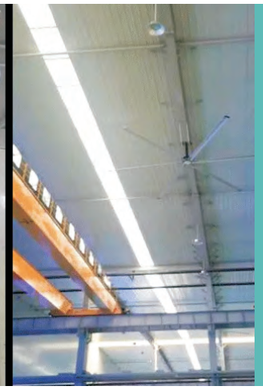
INDUSTRIAL FAN INDUSTRY

Industrial fan "is a kind of general industrial equipment widely used in tall indoor spaces such as factory buildings, warehousing and logistics, waiting halls, etc., as a natural ventilation of indoor space and cooling of staff.

Application of KD600 Frequency Converter in Synchronous Drive Control System of Paper Machine

Case Overview

Industrial fan "is a kind of universal industrial equipment widely used in tall and large indoor spaces such as factory buildings, warehousing and logistics, waiting halls, exhibition halls, stadiums, shopping malls and supermarkets. It is used as a natural ventilation for indoor spaces and a cooling device for staff. The industrial fan can draw a lot of cyclone separators out to the road surface to produce a horizontal fitness exercise with a certain length width ratio of the cyclone separator layer on the road surface to promote the overall gas circulation system. Its advantages depend on the multi-directional road surface coverage and the three-dimensional gas circulation system. The body feels 3-6 degrees of cooling, which is as comfortable as a hair dryer. It is not easy to feel dizzy after the traditional small electric fan has been blown for a long time. 1.5kW can drive a lot of gas, with two-way effects of natural ventilation and cooling.



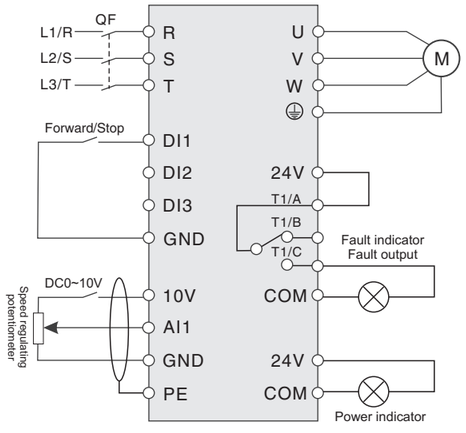
APPLICATION

SITE PICTURES

Scheme advantages

- Easy to operate in practice: easy to operate in practice, key in the main parameters of the motor to carry out static data or dynamic (please confirm the motor and load air conditioner when identifying the dynamic) identification of the main parameters can be applied;
- Excellent characteristics: small starting current, smooth starting without impact, no reverse rotation, increasing the service life of machinery and equipment;
- Energy saving: wide speed change coverage, can complete the automatic control system of exhaust air volume. Minimize energy consumption;
- Safety precautions: perfect reverse and overvoltage protection measures to ensure the service life of the motor.

Inverter wiring diagram



Parameter setting

Function code	Name	Factory value	Set value
P0-04	Source of operation instruction	0	1
P0-06	Primary frequency selection	1	2
P4-01	Motor rated power		1.5
P4-02	Motor rated voltage		380
P4-04	Motor rated current		3.6
P4-05	Rated frequency of motor		18.33
P4-06	Rated speed of motor		55
P4-20	Back EMF of motor		275
Input P4-00=1 static self-learning			
P3-11	Torque current regulation KP		2000
P3-12	Torque current regulation Ki		900
P3-13	Excitation current regulation KP		2000
P3-14	Excitation current regulation Ki		900