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SC Series Construction Hoist
Operation Manual

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SC Construction Hoist User Manual

Doc.No.: SC Series Construction Hoist-138Z-B

Suitable models: SC300BZ-A, SC300/300BZ-A

SC Construction Hoist Series

Spetember 2024

Words for User

Thanks for choosing Zoomlion construction hoist. Before using the machine, please read and fully understand the contents of the manual and strictly observe the relevant provisions in the manual.

This manual provides you with detailed information on safety information, important technical parameters, installation and disassembly, and safe operation of the SC series construction hoist, designed to help you safely install, operate, use and disassemble the construction hoist.

Do not attempt to operate and service the product until you have carefully read and understood the contents of this manual. If you have any uncertainties or questions, please call your local service engineer and we will provide you with prompt and effective technical support. We will not be liable for any adverse consequences resulting from use not in accordance with this manual.

The manual is an integral and important part of the product, and when transferring this machine, please be sure to transfer this manual to the transferee.

Due to continuous product design improvements, upgrades and differences in product specifications, the details of some images and text content in this manual may differ from the product you have, if in doubt, please call your local service engineer.

We reserve the right to revise the contents of the “Construction Hoist User Manual” due to technical improvements, and we hope you will understand that the contents are subject to change without notice.

Sentences marked with should be seriously treated since they are related to the construction safety.

Thank you very much for your trust and support to Zoomlion products, and we sincerely wish you all the best.

Construction Hoist Safety Notes

1. Operation, installation and dismantling personnel must pass the examination of the relevant authorities and obtain the corresponding qualification certificate. Operation, installation and dismantling personnel must be familiar with the operating procedures, performance and status of the construction hoist.

2. Operation, installation and dismantling personnel must be physically capable of operating, installing and dismantling. It is strictly forbidden to work under fatigue, after drinking and after taking drugs that can affect people's mental condition. Operation, installation and dismantling personnel must wear safety belts, helmets and other protective equipment as required.

3. Installation and dismantling operations must be carried out by professional teams with appropriate qualifications. The installation and dismantling site, safety channel, etc. must meet the requirements. Before installation and dismantling, ensure that the parts related to assembly and disassembling are in good condition. And the installation and dismantling operation instruction must be formulated, and the inspection should be carried out in stages according to the requirements. The information of each stage and finishing inspection and acceptance records should be complete and be audited and signed by technical person in charge before delivery.

4. Installation, dismantling and maintenance must be carried out during daylight hours. Installation, dismantling and maintenance work is prohibited when,

Wind speed greater than 12m/s at the highest point of the hoist,

Fog, rain, snow, strong winds, thunder and lightning, and other severe weather.

Power outages, mechanical failures, and other abnormalities occur.

If the installation, dismantling and maintenance work process suddenly encountered the above situation, must first take measures to make the hoist to achieve a safe and stable state, ensure that the hoist components and the surrounding environment are free from safety hazards, and stop the installation, dismantling and maintenance work.

5. Installation of electrical equipment and maintenance must be carried out by electrical professionals.

6. The fixed foundation of the construction hoist must meet the technical requirements of the Builder Hoist User Manual and the construction drawings.

7. All parts and safety devices must be kept in good condition, and operation with faults is strictly prohibited.

8. It is strictly forbidden to operate and use in the environment of strong corrosion, explosive gas and explosive dust. When used in the vicinity of radio stations, TV stations or other strong electromagnetic wave transmitting antennas, protective measures must be taken to avoid the influence of electromagnetic waves on the electrical control system.

9. It is strictly forbidden to energize the lift without the installation of a leakage protection device!

10. The driver's room must be equipped with fire extinguishers suitable for oil, electrical fires, etc., and ensure that the extinguishers are in working order.

11. Before each operation, you must confirm the direction of the action and the safety of the action and ring the alarm before operating.

12. In case of typhoons, earthquakes and other forecasts, measures such as lowering of knots and reinforcement should be taken in advance to ensure the safety of the hoist.

13. In case of collision, deformation, cracking and other accidents, please contact our local service engineer immediately, and our company will send professional technicians to check the equipment and eliminate safety hazards.

14. The hoist must use our original parts. We are not responsible for builder hoist accidents caused by the use of other manufacturers' parts or the modification of our own parts.

15. It is strictly forbidden to make any measures to the equipment that may cause safety hazards or violations without our approval.

Notice: Unfinished matters must be carried out in accordance with the provisions in the Construction Hoist User Manual.

Instructions on Safety Information

The safety icons used in this Manual are explained as follows:

Danger	indicates an emergency hazardous situation that could result in death or serious injury if not avoided.
Warning	indicates a potential hazardous situation that could result in death or serious injury if not avoided.
Note	indicates a potential hazardous situation that, if not avoided, could result in minor or moderate injury.
Caution	indicates a risk unrelated to personal injury (such as property damage).

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Safety Signs

Safety Signs

1. Instructions on Safety Signs

Warning: live components!

The electrical erection and wiring works shall be carried out by professional personnel.

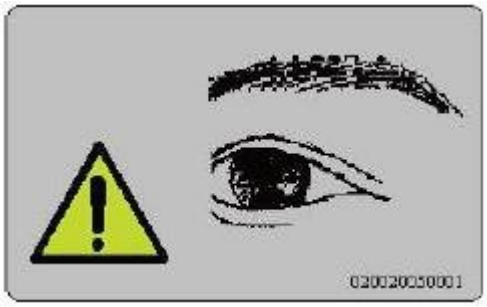
Emergency stop

No unauthorized entrance!

Rolling!

Falling!

Please fasten the safety belt!



Attention!

Before using the machine, please read the Operation Manual!

Be careful not to get you hand scalded!

Warning: Pay attention to falling article!

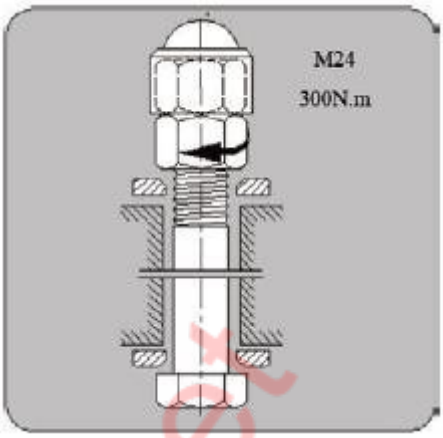
Please wear the safety helmet!

Pay attention to lubrication!

Inspect the structural member!

Inspect the wire rope!

Keep the safety device working normally!



M24 high-strength bolt!

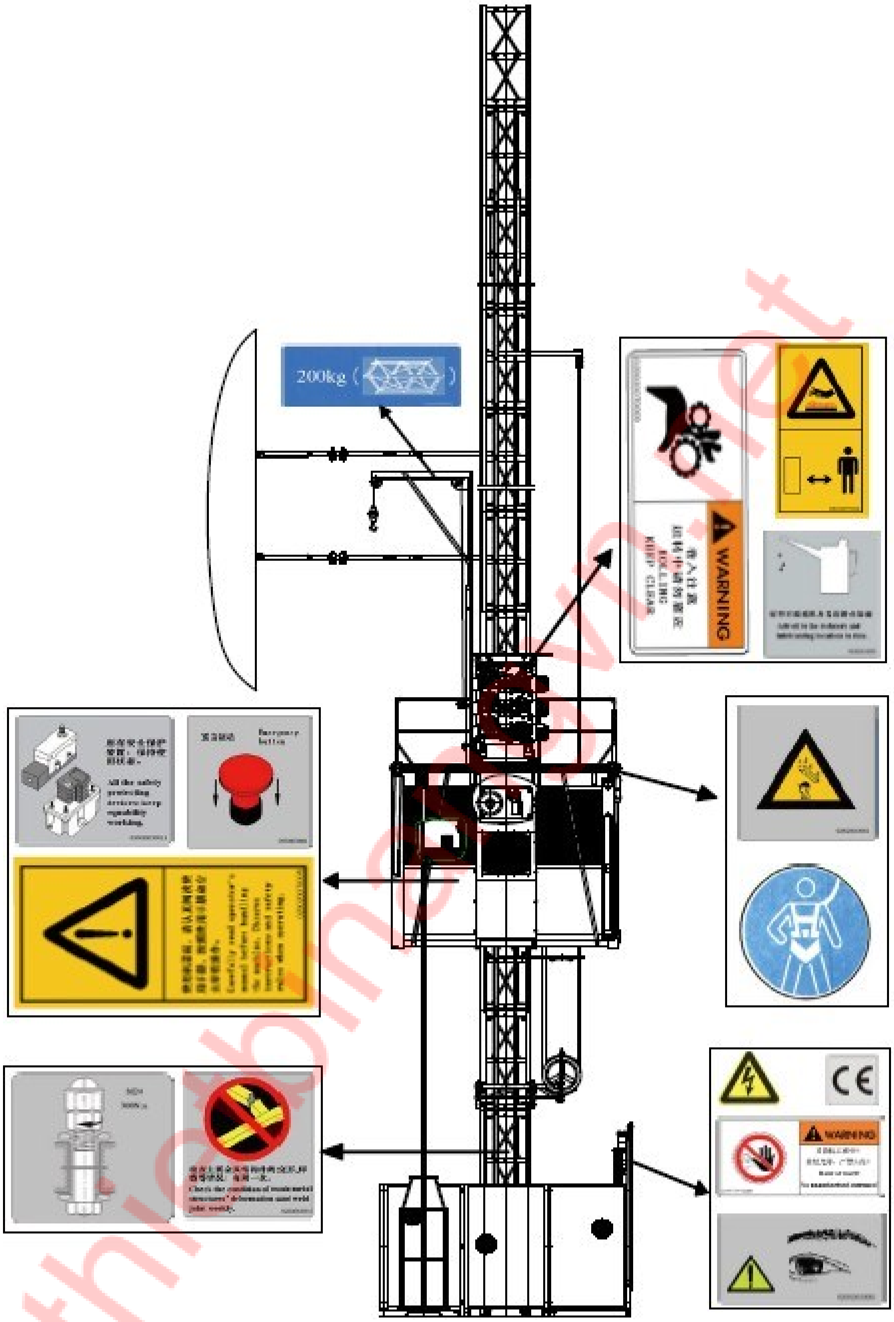
Close the movable door of platform!

Maximum permissible load of jib (to lift up the mast section)!

Please fasten the safety belt!

“CE” sign

2. Position of Safety Signs on Construction Hoist



ZOOMLION

Operation Manual of Construction Hoist

②

General Provisions

General Provisions

1. Use Rules

1.1 General Conditions for Use of Construction Hoist

The general conditions for use of construction hoist include the conditions to be satisfied for normal erection, operation and maintenance of construction hoist, namely the conditions set forth in Chapter 3 “Brief Introduction”, Chapter 4 “Preparation” and Chapter 5 “Erection and Dismantling”. As for the conditions not specified, please consult with the Company.

Some extremely important situations relating to operation of construction hoist will be explained again in the form of graphic representation in the relevant sections of this Manual.

1.1.1 Climatic and Geographic Conditions

The use conditions of construction hoist, such as standard height as well as reactive force and pressure under base plate, are all related to the reference wind velocity of the place where the construction hoist is located;

The reference wind velocity (GB50009.2001) is the average value of wind velocity measured at 10m above ground in 10 minutes.

1.1.1.1 General Conditions

(1) As for the reference wind velocity for operation of construction hoist, please refer to the “Average Wind Velocity Chart of the Country where the Construction Hoist is used”, so as to determine the reference wind velocity range;

(2) As for the reference wind velocity range of a country or region other than China, please consult with the Company.

1.1.1.2 Special Conditions

(1) There is no average wind velocity chart;

(2) There are special provisions or some situations in host country or region;

(3) The elevation is higher than the height as stated in the average wind velocity chart;

(4) Basin, valley, volcano and mountain;

In case of any of the above-mentioned special circumstances, the user shall carry out the design, so as to determine the reference average wind velocity of the place where the construction hoist is installed. Alternatively, the user may consult with the Company and provide the relevant data.

1.1.1.3 Operation of Construction Hoist

The user of construction hoist may operate the hoist only when the maximum wind velocity measured is less than 72km/h.

1.1.1.4 Erection, Dismantling and Displacement of Construction Hoist

The erection, dismantling and direction change of construction hoist may be carried out only when the maximum

wind velocity measured in the place where the hoist is located is less than 45km/h.

1.1.1.5 Ambient Temperature Measured at Cool Position

(1) The temperature shall mean the temperature measured in an enclosed and covered area, which is free from wind and rain, 2m, above the ground and within 100m away from using site of construction hoist;

(2) Unless otherwise specified in the contract (e.g., special reason in host country), the temperature range for use of construction hoist shall be: working (non-working) state: -20℃-+40℃;

(3) When the temperature is not in the range mentioned above, please stop the operation of construction hoist; otherwise it will work abnormally or will get overheated abnormally.

1.1.1.6 Humidity and Precipitation

(1) Humidity and precipitation for use of construction hoist (working or non-working state): the maximum humidity is 95% without dew (unless otherwise specified in the contract);

(2) The maximum humidity for storage of construction hoist (after being dismantled) is l00%.

1.1.1.7 Frost, Ice and Snow

(1) The frost, ice and snow will increase the weight and frontal area of structural members, will get parts damaged in the course of operation, and will, under serious circumstances, cause the falling of person from hoist.

(2) When the construction hoist is covered with frost, ice or snow, it is prohibited to operate the construction hoist.

1.1.1.8 Thunderbolt

(1) The thunderbolt may energize the structure members of construction hoist and cause electrical shock to persons who contact with the hoist directly or indirectly. For example: the persons staying on steel structure, mast tie or base frame and base enclosure of construction hoist.

(2) If the rainstorm may occur, please stop the construction hoist and set it in non-working state. During the thunderstorm, don't get on or leave the construction hoist!

⚠Danger

If there is no time for you to leave the construction hoist (The thunderstorm appears suddenly), be sure not to try to leave the construction hoist during the thunderstorm. The risk will be much smaller when you stay in the cage, but don't touch the console.

1.1.1.9 Sandstorm

(1) After the sandstorm, the sand may enter into electrical equipment and structural members and block up the gap.

(2) Before re-starting the construction hoist, please thoroughly clear away the sand in electrical equipment and structural members, and if necessary, remove the moving components of relevant mechanisms.

1.1.1.10 Flood and Tide

Unless otherwise specified in contract, these factors are not considered in design of construction hoist. In case of flood or tide, the stability of construction hoist will reduce, and thus the operation shall be ceased.

1.1.1.11 Earthquake

Unless otherwise specified in contract, no earthquake is considered in design of construction hoist.

1.1.1.12 Special Erection

Unless otherwise specified in contract, the erection on movable foundation (such as drilling platform, barge, and floating box) is not considered in the design of construction hoist.

1.1.1.13 Mast Tie

The design of mast tie shall be able to bear the force given in technical parameters of construction hoist, and the mast tie shall be fabricated strictly within the specified tolerance range.

1.1.2 Environmental Conditions

1.1.2.1 Environment with Radioactive Chemicals

Unless otherwise specified in contract, the maximum permissible concentration in the use environment of construction hoist shall be identical with the concentration in industrial area or heavy-traffic area.

1.1.2.2 Explosive Atmosphere

The construction hoist may not be used in any explosive atmosphere.

1.1.2.3 Electromagnetic Field

(1) Unless otherwise specified in contract, the construction hoist may be used in the environment where the electromagnetic field strength is less than 10V/m, for example: 100kW broadcasting or television transmitter within 500m from construction hoist; portable transmitter within 0.5m from power box or console.

(2) Just like all metal structure, the construction hoist will interfere with the transmission and receipt of Hertzian wave.

1.1.2.4 Radiation

The construction hoist can't resist radiation.

1.1.3 Conditions relating to Design

(1) The adaptability of construction hoist to construction site shall be the responsibility of user.

(2) Power supply: The power supply and fluctuation range designed for construction hoist shall be strictly followed. If the value given is not satisfied, the construction hoist will work abnormally.

(3) Working post of operation personnel: On the basis of the type selected, the operation personnel of construction hoist may control the hoist in the cab or in the cage.

(4) Safety devices: The safety devices (limit devices) of construction hoist may not be used beyond their operation scope. It is prohibited to randomly change the adjustment range of safety devices, otherwise they may

fail.

(5) The protective mechanisms/protective devices are used to prevent persons from entering into dangerous areas, and may not be deactivated under in any event. Before all protective devices (such as: safety cover, base enclosure, handrail, and cover plate) are in place, don't start the construction hoist.

(6) Conventional service life: The conventional service life of construction hoist is the minimum service life used to calculate the wearing state of construction hoist. Unless otherwise specified in contract, the conventional service life of construction hoist shall comply with the classification method as specified in relevant standards such as GB26557-2011. The said classification method respectively specifies the service life of construction hoist and structural members thereof.

- Working class of complete hoist: The conventional service life of structural member is expressed in operation periods (One operation period = one work cycle wherein the cage is moved up and down for once). The working class of structural member is A5-A6;
- Working class of mechanism: The conventional service life of mechanism is expressed in service hours of such mechanism. The class of conventional service life of mechanism is determined in light of type and operation of construction hoist. The load conditions of mechanism decide the service life. The normal working class of mechanism is M5.

(7) Advertising sign set up by user: Unless otherwise specified in contract, without the written consent from the manufacturer of construction hoist, the user may not randomly set up any advertising sign.

(8) Fire extinguisher: The provision and erection of fire extinguisher in cage or in cab shall be borne by the user.

(9) Change/welding of construction hoist: Without the written consent from manufacturer, it is prohibited to change the structure of construction hoist (e.g., addition or modification of components, cutting, welding and etc.).

(10) It is prohibited to change the adjustment device of construction hoist (such as calibration value and adjustment value).

(11) Matching of structural member/replacement of part: If any structural member/part other than those provided or recommended by the manufacturer of construction hoist is used, all consequences shall be borne by the user. It is prohibited to carry out replacement with any part which is not genuine part or is not recognized by the manufacturer of construction hoist.

(12) Supervision/inspection of construction hoist: For the purpose of ensuring the proper storage and safe use of construction hoist, please carry out inspection in accordance with the inspection frequency, inspection period and inspection items as specified in this Manual; as for inspection, if the relevant standards and provisions of the place where the construction hoist is located are stricter than the provisions in this Manual, please carry out inspection in accordance with the former. Please complete the follow-up card of construction hoist on the basis of the instructions given in this Manual.

(13) Clearing of wastes: In accordance with the standards and provisions of the place where the construction hoist is located, clear away all wastes, such as: dirty oil and waste oil.

1.1.4 Erection Conditions

In severe weather such as wind velocity higher than l2.5m/s or thunderstorm or snow, it is prohibited to install or dismantle the construction hoist.

1.1.4.1 Distance from Fixed Obstacle

Keep the specified minimum distance between projection on construction hoist and fixed obstacle. If not specified, this distance shall be at least 0.25m away from fixed obstacle.

1.1.4.2 Distance between Construction Hoist and Overhead Power Line

Please keep the safety distance between components of construction hoist and overhead power line as specified in the place where the construction hoist is located. If not specified: as for the voltage no higher than 40kV, the vertical distance shall be 4m, and the horizontal distance shall be 2m; as for the voltage is higher than 40kV, the distance shall be increased by 5cm for every 1kV increased.

1.1.4.3 Strength Requirements for Concrete Foundation

Before the erection of construction hoist, the concrete foundation shall meet the technical requirements relating to construction strength.

1.1.4.4 Requirements of Power Line and Cable

The power box of construction hoist shall be special power box, and may not be shared by any other current-consuming equipment. As for the cable used to connect the power box, its voltage and current shall meet the requirements of construction hoist and shall be reliably grounded.

1.1.4.5 Acceptance Inspection for Erection

The user shall, in conjunction with the inspection institution of the place where the construction hoist is located and in accordance with the contents of *Acceptance Inspection Report for Construction Hoist* in the *Specifications for Supervision and Inspection of Construction Hoist* (G.Z.J.G. 121.2002), test and inspect the installed construction hoist, and may use the construction hoist only after it is confirmed as qualified through inspection.

1.1.5 Auxiliary Loading/Unloading Conditions

By making use of the jib on cage roof, the auxiliary loading/unloading equipment can load and unload the mast sections, it is prohibited to use any equipment which can cause dynamic action (such as electromagnet, grab hook and bucket) to carry out the loading/unloading operation.

1.1.5.1 Loading/Unloading of Mast Section

(1) Don’t lift up any mast section which has not been firmly bound;

(2) Don’t lift up the mast section in inclined state;

(3) The lifted mast section shall be vertical to the lifting hook;

(4) Don’t add any weight to mast section which has been lifted up.

(5) When the mast section is being lifting up or lowered down by using the jib, the operation personnel shall carry out monitoring carefully.

1.1.5.2 No Carrying of Person

The jib installed on construction hoist may not be used to carry any person. If the carrying of person is permitted in the country where the construction hoist is located, all liabilities arising therefrom shall be borne by the user.

1.2 General Responsibilities

These responsibilities involve all relevant personnel, and are applicable to the manager and operator of construction hoist, and the relevant personnel shall carefully comply with them.

As for the use of construction hoist, please strictly comply with the "1.1 General Conditions for Use of Construction Hoist".

1.2.1 Provision relating to User

The manager and operator of construction hoist shall comply with the provisions of the place where the construction hoist is located relating to erection, dismantling, control and accident prevention of construction hoist.

1.2.1.1 Provisions for Manager of Construction Hoist:

(1) The duty to control and operate the construction hoist shall be delegated to qualified operation personnel:

- The age meets the provisions of the country where the construction hoist is used;
- The physical conditions meet the requirements (eyesight, hearing ability, reactivity, adaptability, and suitability for overhead operation);
- The manager shall go through the training organized by relevant institution, obtain the relevant qualification, confirm that his relevant certificates are qualified and valid, and fully understand the hazards relating to such works (electrical hazard and overhead hazard);
- No person who fails to meet the above conditions is permitted to operate the construction hoist.

(2) To define the responsibilities of operation personnel of construction hoist:

- The command for erection, dismantling, test and maintenance of construction hoist shall be delegated to qualified technical personnel;
- The human resource manager shall allocate and train the operation personnel during probation period;
- The manager shall formulate the plan for erection and dismantling.

(3) To ensure that the working personnel of construction hoist get familiar with and understand the safety provisions, and regularly inspect the implementation of such provisions. The working personnel of construction hoist shall:

- Be in appropriate clothing (e.g., coil up the hair and wear the appropriate clothing);
- Use the personal protective equipment such as safety helmet and safety shoes; and wear gloves in the course of work;

- Fasten the safety belt during overhead operation (more than 3m above the ground).

(4) To clarify and implement the special advices given in this Manual:

- The operation personnel of construction hoist shall not leave the operating console before the power supply is cut off;
- During the erection, dismantling or maintenance of construction hoist and in accordance with the relevant provisions of the place where the construction hoist is located, install the passage devices which meet the requirements (stairway, passage and platform);
- The repair and maintenance personnel shall be provided with the corresponding measurement and repair tools;
- When operating the construction hoist, the operation personnel shall pay attention to the hazards relating to work (e.g., existence of persons in upper and lower operation areas, and whistle for moving up and down).

1.2.1.2 Provisions relating to Manager of Construction Site:

(1) Inform the construction personnel of the all direct or indirect hazards which may be caused by the construction hoist (such as: impact from construction site and swinging of load caused by wind).

(2) Inform the construction personnel of the meaning of sound signals relating to operation of construction hoist (See the Section “Safety Signal”).

(3) Obtain the assistance from construction personnel in the place where the construction hoist is located, and set up the anti-falling devices on base frame and base enclosure and cage of construction hoist.

(4) The construction personnel of the place where the construction hoist is located may not climb up the mast sections of construction hoist.

1.2.2 Provisions relating to Use Conditions

1.2.2.1 Provisions relating to Construction Machinery

Please comply with the provisions relating to construction machinery of the place where the construction hoist is located:

(1) Highway transportation;

(2) Provision of fire-extinguishing apparatus;

(3) Importance attached to environmental protection;

(4) Control on transmission and receipt of radio frequency;

(5) Regular inspection.

1.2.2.2 Climatic Conditions

(1) The use shall formulate the emergency response plan (e.g.: stating the operation height, and evacuating from construction site) to be implemented under special climatic conditions.

(2) The said plan may be formulated on the basis of the climatic forecast system set up by meteorological institution of the place where the construction hoist is located.

1.2.2.3 Entry into Construction Hoist and Cab

(1) The entry into construction hoist/cab shall be carried out via the specified passage when the construction hoist is in stopped state.

(2) Keep tidy and clean the passage for entering into construction hoist/cab: Clear away all wastes, oil, spare parts, and tools; and store the tools, articles and parts in the specified place.

(3) The total weight of persons, building materials and tools carried in cage of construction hoist may not exceed the permissible rated load.

1.2.2.4 Abnormal Operation of Construction Hoist

If the construction hoist operates abnormally, please immediately stop the operation, get the hoist inspected by professional personnel, and get the hazard assessed; as for any abnormal situation which will affect the safety, eliminate such situation immediately; and record the abnormal situation in the follow-up record of construction hoist.

1.2.2.5 Safety of Power Supply

Since there may exist electricity on construction hoist, the user shall formulate the plan and procedure for contact with power supply (direct contact or generation of electrical arc), including:

(1) Don't leave the construction hoist;

(2) Don't touch the metal structure of construction hoist;

(3) Inform the external persons not to get close to and touch the construction hoist;

(4) Cut off the power supply, and then leave the construction hoist.

1.2.2.6 Visibility Conditions

(1) Use the communication tools (such as interphone or video system) suitable for the visibility conditions in construction site.

(2) Under the condition that the light is poor, the sufficient lighting devices shall be provided.

1.2.3 Provisions relating to Particular Hazards

1.2.3.1 Power Supply

(1) When power supply is not required by the construction hoist, please cut off the power supply of the construction hoist.

(2) The power box of construction hoist shall be switched off with key, and under the supervision of specific person.

(3) As for the power box equipped with variable-frequency mechanism, after the power supply is cut off, please wait at least 10 minutes, and then close the power box for carrying out operation (The capacitor in variable-frequency mechanism will discharge electricity).

1.2.3.2 Hydraulic Device

(1) Before operating the construction hoist equipped with hydraulic device, please release the pressure (Note: after the hydraulic device stops, the pressure may still be maintained). In case the oil leaks in the form of jetting, please immediately stop the construction hoist;

(2) Don't carry out the inspection on leakage with hand;

(3) Don't smoke or use any inflammable equipment near any device with oil or grease (retarder or drive system);

(4) Don't fold or knock any hydraulic hose.

1.2.3.3 Chemicals

The storage and handling of chemicals (grease, oil, paint, glue, solvent …) shall comply with the special safety provisions and instructions given on container. In particular, be sure not to store them in cab.

1.2.3.4 Article Falling

Appropriate measures shall be taken in the operation area of construction hoist, so as to avoid the falling of tool or other unfixed articles.

1.2.4 Provisions relating to various Phases of Use of Construction Hoist

1.2.4.1 Transportation

(1) In light of the transportation conditions of construction hoist and the conditions of lorry-mounted crane used to load/unload components of construction hoist (e.g., ground bearing pressure, climatic conditions, passage slope, loading/unloading place), determine the passage in erection site of construction hoist.

(2) During highway transportation, the warning signs shall be set up for excessively high components such as cage.

1.2.4.2 Site Preparation

The using site shall meet all technical performance and use conditions of construction hoist.

(1) Erection area of construction hoist

Before installing the construction hoist, please analyze the limitations relating to using site, including:

- Provisions relating to overhead limitation of public buildings, other building, roads, railways and riverway in the place where the construction hoist is located;
- Whether there is any other tower crane, airport, power line or electromagnetic wave transmitting station in surrounding areas;
- Site situations, ground bearing pressure, trench, slope, and underground building;
- Provisions relating to overhead limitation of power line, telephone line and optical cable in the place where the construction hoist is located;
- Place where the construction hoist and lifting/transportation equipment are stored, so as to

determine the optimal position of construction and facilitate the loading, overloading and use of construction hoist.

(2) Preparation for erection and dismantling

- The construction personnel in the place where the construction hoist is located shall set up the corresponding management data, listing the possible hazards in erection, dismantling and height increase of construction hoist as well as the corresponding protective measures;
- Before the erection, dismantling and height increase of construction hoist, please consult with the local institutions over meteorological conditions, and make sure that the wind velocity will not exceed the permissible maximum wind velocity;
- During the erection, dismantling, height increase and test of construction hoist, please define some safety areas (storage area, setup area), and use obvious signs to prevent the unauthorized person from entering into such area.

(3) Erection/Dismantling Process

- Please ensure that the lifting team will not use the construction hoist during the erection, dismantling, height increase and test of construction hoist;
- As for unconventional erection and dismantling, please consult with the Company.

1.2.4.3 Repair and Maintenance

(1) Repair

- When the construction hoist operates abnormally or when the repair work is carried out, please use the obvious signs to define the safety areas and prevent unauthorized persons from entering into such areas;
- In the course of repair of construction hoist, please stop the construction hoist, and set up the appropriate warning sign on main power switch, so as to prevent the construction hoist from being started.

(2) Maintenance

- In the course of maintenance of construction hoist, don't use the construction hoist;
- As for unconventional maintenance, please consult with the Company.

1.3 Safety Signal

1.3.1 Instructions

The safety or health signals are the instructions or provisions relating to safety or health which are given specially for the specific environment where the construction hoist works. In light of actual situation, the signal may be a plate, a color, a light or a sound signal.

The safety signals fall into five classes, with one class represented by one color:

(1) Prohibition (red);

(2) Warning (yellow or yellow/orange);

(3) Provisions (blue);

(4) Help or rescue (green);

(5) Apparatus or equipment used to prevent fire (red).

1.3.2 Terminology

Signal plate is a kind of signal which gives specific instruction by means of geometry, color, symbol or graph.

(1) Prohibition signal plate: It is prohibited to a certain behavior which may cause hazard;

(2) Warning signal plate: Used to warning a certain risk or hazard;

(3) Provision signal plate: specify a certain behavior;

(4) Help or rescue signal plate: Used to give the instructions relating to escape passage or rescue means;

(5) Fire-prevention signal plate: Used to give the instructions relating to the location of fire extinguishing equipment and the evacuation passage in case of fire;

(6) Additional signal plate: The signal plate which is to be used together with other signal plate for giving supplementary explanation;

(7) Symbol or graph: The graphic representation which indicates a certain situation or specifies a particular behavior and is used on a signal plate or a light emitting surface;

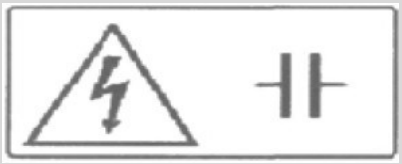
(8) Light signal: The signal which is made of transparent or semitransparent material and is lighted internally or from the rear or forms a light emitting surface;

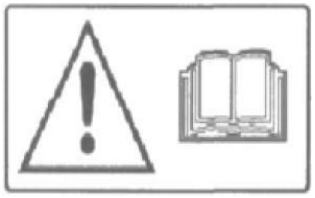
(9) Sound signal: The particular sound signal of which the sound is generated by a special device rather than artificially generated.

1.3.3 Signal Plate

1.3.3.1 Warning Signal Plate

Warning Signal Plate	Meaning	Remarks
	Danger	Safety warning

	Attention	Matters to which attention must be paid in the course of operation and use of hoist
	Electrical hazard	No intervention may be carried out before the power supply is cut off
	Fire prevention	Don't cause spark or flame, and don't smoke near inflammable substances, such as: paint, oil and glue
	Article falling	In the construction site, it is prohibited to throw any article from high place
	Drop from high place	Drop of person from high place shall be prevented in construction site
	Squeeze by operating articles	Don't enter into the operation areas above and under the construction hoist
	Discharge of electricity from capacitor	After the power supply is cut off, wait 10 minutes and then enter into the facility

	Danger of use	Before use, please carefully read the provisions in operating instructions

1.3.3.1 Prohibition Signal Plate

Signal Plate	Meaning	Remarks
	No admission to unauthorized person	Authorized person shall mean any qualified person
	It is prohibited to start	The construction hoist is in erection and adjustment, and it is prohibited to start it
	It is prohibited to close the switch	In the course of repair or maintenance of construction hoist, it is prohibited to close the switch

1.3.3 Sound Signal

The following hazards will be reminded automatically by sound warning device:

(1) Start of construction hoist: Short sound;

(2) Reach of construction hoist at upper final limit switch: Continuous sound.

1.3.4 Safety Control

The operating console of construction hoist is equipped with a mechanically-locked red emergency stop button.

⚠Caution

If this button is pressed down, all actions of the construction hoist will be stopped. The emergency stop button may only be used in dangerous circumstances!

2. Safety Rules

Before using the construction hoist, the user shall, in accordance with the relevant laws, regulations and safety standards of the country where the construction hoist is located, carry out the safety supervision in use of construction hoist.

2.1 Safety Responsibilities of User

Before using the construction hoist, the manager and relevant operation personnel of the user shall carefully read, understand and master all contents of this Manual, and carefully and earnestly comply with and implement the provisions of this Manual. The operation personnel shall meet the following requirements:

(1) Having been trained by relevant institution, obtained the relevant qualification, and confirmed that his relevant certificates are qualified and valid;

(2) Being able to understand and implement the formulated standards, provisions and safety rules;

(3) Having received the professional training, and understood and mastered all contents of this Manual;

(4) Having rich operation experience, and being able to bear the stress of operation and correctly operate the hoist;

(5) Being able to correctly and quickly make response to possible situations, so as to avoid the occurrence of accident.

2.2 Safety Requirements for erection and dismantling

2.2.1 Responsibilities

(1) The user of construction hoist shall comply with the safety requirements relating to erection/dismantling, and ensure that the works are carried out in accordance with the relevant laws, regulations and safety standards of the country where the construction hoist is located.

(2) Before installing the construction hoist, the operation personnel shall carefully read, understand and master the contents of this Manual and the detailed instructions in erection/dismantling program, shall get familiar with the mechanical and electrical performance and principles of construction hoist, and shall strictly implement various safety requirements relating to erection.

2.2.2 Safety Measures before Erection/Dismantling

(1) The erection/dismantling team of construction hoist shall hold the qualified and valid qualification certificate issued by competent authorities, so as to undertake the erection/dismantling task of construction hoist; the operation personnel shall hold the qualified and valid qualification certificate issued by competent authorities, so as to carry out the specific task relating to erection/dismantling of construction hoist.

(2) The erection/dismantling site of construction hoist shall be cleaned up, and warning signs shall be set up, so as to prevent persons other than operation personnel from entering into such site.

(3) In the course of erection/dismantling, the relevant department shall arrange the professional technical personnel to carry out the on-site safety management, supervise over the implementation of construction program and operation rules, and ensure the implementation of safety measures.

(4) The lifting equipment used shall be suitable for the load to be lifted, and shall be in good conditions.

(5) The groundwork of construction hoist shall be able to bear the specified load, and meet the technical specifications relating to groundwork of the place where the construction hoist is located.

2.2.3 Safety Measures during Erection/Dismantling

(1) In the course of erection/dismantling, the construction hoist shall be subject to command from specific person.

(2) In the course of erection/dismantling, the electrical control box shall be controlled and supervised by specific person.

(3) In the course of erection/dismantling, no person irrelated to erection/dismantling may use the construction hoist.

(4) The operation to move the cage shall be controlled via the cage roof operation box rather than in the cage.

(5) When using the jib on cage roof to carry out the erection, please note that the maximum lifting capacity of jib is 200kg, and don't get it overloaded. The load of cage may not exceed the rated load.

(6) No person may stand under the article lifted.

(7) When there is article hung up on the jib, the cage may not be started.

(8) When the cage is moving, the head and hand of persons and the goods may not protrude beyond the base enclosure.

(9) Before the main power supply is cut off, no person may stay within the scope of base frame and base enclosure, in passage of construction hoist or in the unsafe area enclosed by mast (mast section) and mast tie.

(10) If the emergency stop button on cage roof operation box is not pressed down, don't carry out the erection works on cage roof.

(11) No person without electrician qualification may carry out the electrical wiring works. When carrying out such works, make sure that the power supply has been cut off.

(12) After the mast (mast sections) of required height is installed, the cage may not be started until all connecting bolts are fully tightened up.

(13) The construction hoist shall, in accordance with the relevant provisions, be equipped with the separate grounding device and lightning arrester.

(14) If the installed height of construction hoist is more than 120m and exceeds the relevant building, the aeronautical obstacle lamp shall be set up.

2.2.4 Post-erection Safety Measures

Before the construction hoist passes the acceptance inspection, it may not be put into normal use.

2.2.4.1 Acceptance Inspection for Construction Hoist

(1) In order to ensure the safe use of newly installed construction hoist and retrofitted construction hoist, the acceptance inspection shall be carried out after the erection or retrofitting is completed and before the construction

hoist is put into normal use.

(2) The user of construction hoist is responsible to ensure that the inspection implemented indicates that the whole erection procedure meets the laws, regulations and safety standards relating to construction hoist of the country where the construction hoist is located.

(3) The inspection shall be carried out by inspection personnel under the supervision from relevant authorities.

2.2.4.1.1 General Test and Inspection of Construction Hoist

(1) The inspection on mast and mast tie shall meet the following requirements:

- In accordance with the specified lifting height, use and fix the mast section of mast;
- The position, size and bearing capacity of foundation meet the requirements;
- The mast section and rack are in good conditions;
- The erection of mast meets the relevant requirements;
- The tightening of rack meets the relevant requirements;
- The erection of mast tie meets the relevant requirements; and the tightening of connecting bolt meets the relevant requirements;
- The height of free end of mast meets the relevant requirements;
- The erection of every limit device (stopper) meets the relevant requirements.

(2) The inspection on base frame and base enclosure shall meet the following requirements:

- The internal and external position of base enclosure meets the requirements;
- The components of base enclosure are free of rust, damage and deformation, and meet the relevant requirements;
- The electromechanical interlock device of base enclosure door acts sensitively and reliably, and meets the requirements;
- The tightening of base frame fixing bolts meets the relevant requirements;
- The erection position of cable drum meets the requirements.

(3) The inspection on cage shall meet the following requirements:

- The size and bearing capacity meet the requirements;
- The structure is free of rust, damage and deformation, and meets the relevant requirements;
- The size and strength of cage door and door frame meet the requirements, and the mechanical and electrical interlocking can be opened easily;
- The erection of guide roller and safety hook meets the relevant requirements;
- The floor in cage is not damaged, and meets the relevant requirements;

• The jib is in good conditions, and its erection position and strength meet the relevant requirements.

(4) The drive system inspected shall meet the following requirements:

• The erection of drive system on cage frame meets the relevant requirements;

• The tightening of back wheel and the clearance of rack meet the requirements;

• The worm gear is in good conditions, and the designation and level of lubricating oil meet the relevant requirements;

• The brake has the specified function and meets the relevant requirements.

(5) The inspection on cable guiding device shall meet the following requirements:

• The erection position of cable guiding device is correct, and the distance meets the requirements;

• The rubber parts or leaf springs fixed on guiding device are in good conditions and meet the relevant requirements;

• The fixing of cable arm on cage meets the requirements;

• The model, specification, connection and erection of cable meet the requirements.

(6) The electrical equipment shall meet the following requirements:

• The voltage and frequency of power supply used meet the relevant requirements;

• The grounding resistance meets the relevant requirements;

• They are in safe conditions and meet the relevant requirements.

(7) The electrical equipment shall meet the following requirements:

• The main control system is in good conditions and meets the requirements;

• The erection position of every control element is appropriate, and they are sensitive and reliable and meet the requirements.

(8) The whole-stroke conditions of cage shall meet the following requirements:

• The distance between the highest position of cage in its whole stroke and the top of mast meets the requirements;

• The distance between the lowest position of cage in its whole stroke and the ground meets the requirements;

• In the course of operation, every final limit switch acts sensitively and reliably and meets the requirements.

2.2.4.1.2 Special Test and Inspection for Safety Facilities

After the general inspection procedure for construction hoist is implemented and the requirements are satisfied, please also carry out the special inspection, so as to ensure the safe use of construction hoist. The inspection items are as follows:

(1) The inspection on overspeed safety device shall meet:

- The overspeed safety device shall meet the requirement within the specified calibration period (The overspeed safety device shall, in accordance with the provisions, be calibrated by inspection institution every year, and shall be replaced every five year);
- The erection of overspeed safety device shall meet the requirements;
- The drop test under rated load shall be carried out. In the course of drop test, the sliding distance of cage before stop shall meet the requirements;
- After the hoist passes the drop test, please reset the overspeed safety device;
- The overspeed safety seal shall meet the requirements.

(2) Indicating Symbol

- The relevant warning and indicating symbols of construction hoist shall meet the requirements;
- The operator shall carry a copy of this Manual, so as to refer to it from time to time;
- The operator shall read, understand and master the meaning of the warning and indicating symbols in this Manual.

(3) Final Operation Test

- The final operation test and inspection of construction hoist shall be carried out in accordance with the instructions given in this Manual, and the requirements shall be satisfied.

(4) Final Report

- After the acceptance inspection for construction hoist is completed, the final report shall be submitted. This report shall briefly summarize all problems found through inspection, and set forth all works to be implemented before the construction hoist can be put into use.

2.2.5 Safety Measures for Acceptance Test and Inspection

During the acceptance inspection of construction hoist, appropriate safety measures shall be taken, so as to ensure the safety of operation personnel and inspection personnel. In particular, during the drop test, no person may stay in the cage or within the scope of base frame and base enclosure, and the ground operation mode shall be adopted.

2.3 Regular Inspection and Test

2.3.1 Requirements for Regular Inspection and Test

The regular inspection and test on construction hoist shall be carried out in accordance with the relevant laws, regulations and safety standards of the country where the construction hoist is located, and shall also be carried out in accordance with the following requirements.

2.3.1.1 Responsibilities

(1) Inspector

- The inspection and test works shall be carried out by qualified technical personnel.

(2) Safety measures for inspection and test

- Before carrying out the functional test, please ensure the safety of operation personnel and inspection personnel. During the load test and drop test, no person may stay in the cage or within the scope of base frame and base enclosure, and the ground operation mode shall be adopted.

(3) General inspection and test of construction hoist

- All components shall be inspected on a regular basis. If necessary, additional test shall be carried out, so as to confirm that it is in safe and usable conditions;
- The inspection and test shall be carried out in accordance with the interval and instructions given the *Maintenance Manual*;
- The adjustable worn parts shall be adjusted in time; the wearing parts which have reached the wear limit and other damaged parts shall be replaced with the spare parts from the Company, and the replacement parts shall pass the safety inspection;
- All consequences arising from use of non-genuine parts by the user without the written confirmation from the Company shall be borne by the user.

(4) As for inspection on overspeed safety device, the drop test shall be carried out at least every three months in accordance with the requirements, so as to confirm that the function of overspeed safety device meets the requirements. During the drop test, the sliding distance of cage before stop shall meet the specified requirements. In order to ensure the safety, when carrying out the drop test, please ensure safety.

- The inspection and test shall be carried out by qualified technical personnel;
- Before the test, the motor brake shall function normally;
- Before the test, move up the cage to the safety height, and ensure that in the course of test, the cage will not collide into the buffer spring
- In the course of test, no person may stay in cage and base frame base enclosure, and the ground control mode shall be adopted;
- After the test, the overspeed safety device shall be rest correctly in time.

2.3.2 Routine Safety Inspection

2.3.2.1 Responsibilities

(1) The user of construction hoist shall always be responsible for routine safety inspection of construction hoist.

(2) The works carried out shall comply with the relevant laws, regulations and safety standards of the country where the construction hoist is located.

(3) Before carrying out the routine safety inspection on the construction hoist, please carefully read and earnestly implement the detailed contents of “Routine Safety Inspection”.

2.3.2.2 Safety Measures for Routine Safety Inspection

(1) Before carrying out the routine safety inspection on construction hoist which has been subject to rainstorm or strong typhoon, please appoint the professional personnel to inspect all key components, and take the

necessary safety measures.

(2) When the wind velocity is higher than 20m/s or there is ice on mast or cable, it is prohibited to operate the construction hoist.

(3) Before the works specified in “Regular Inspection and Test” and “Maintenance and Repair” are completed, don’t operate the construction hoist.

(4) Before making sure that there is no obstacle existing in the passage of construction hoist or in nearby areas, don’t operate the construction hoist.

(5) Before the routine safety inspection on cage is completed, don’t operate the construction hoist.

(6) When operating the cage ad carrying out the routine safety inspection, please be prudent and careful.

2.4 Operational Safety

2.4.1 Responsibilities

(1) The user of construction hoist shall always be responsible for operating safety of construction hoist.

(2) The works carried out shall comply with the relevant laws, regulations and safety standards of the country where the construction hoist is located.

(3) Before operating the construction hoist, please carefully read and earnestly implement the detailed contents of “Operational Safety”.

2.4.2 Safety Measures for Operation

(1) When the wind velocity is higher than 20m/s, it is prohibited to operate the construction hoist.

(2) When there is ice on mast and cable, it is prohibited to operate the construction hoist.

(3) Before the works specified in “Regular Inspection and Test” and “Maintenance and Repair” are completed, don’t operate the construction hoist.

(4) The total weight of goods and persons carried by the cage may not exceed the rated value specified in the nameplate.

(5) No goods may protrude out from the cage.

(6) After the additional mast sections are installed, the jib on cage roof shall be removed.

(7) Neither person other than operator nor goods may be carried in the cab.

(8) Before confirming that all protective and safety devices work normally, don’t operate the construction hoist.

(9) Before confirming that no obstacle/person exists in the passage of cage, don’t operate the construction hoist.

(10) When the construction hoist is operated in the cage, no person may stay on cage roof.

(11) In case of trouble of any situation which endangers the safety, please immediately report to the on-site

safety supervisor. Before such trouble or situation is eliminated, don't operate the construction hoist.

2.5 Emergency Measure and Rescue Plan

According to the local related laws and regulations, specialized rescue team should be established to protect personal safety of constructors when erection, dismounting, operation, maintenance and take construction hoist, and to ensure emergency rescue timely when accident occurring. The members of rescue team must master the related knowledge of maintaining and operating construction hoist.

2.6 Repair and Maintenance

2.6.1 Responsibilities

(1) The user of construction hoist shall always be responsible for duly maintaining the construction hoist.

(2) The works carried out shall comply with the relevant laws, regulations and safety standards of the country where the construction hoist is located.

(3) Before operating the construction hoist, please carefully read and earnestly implement the detailed contents of "Maintenance".

2.6.2 Safety Measures for Repair and Maintenance

(1) Before carrying out any repair or maintenance work on equipment of construction hoist or in passage of construction hoist or in the surrounding areas, be sure to cut off the main power supply.

(2) Before carrying out repair on cage, drive system or safety device, be sure to stop the cage stably on buffer spring. If there is any counterweight, please lock the cage onto the mast.

(3) When testing the braking torque of motor brake, please stop the cage on buffer spring stably and cut off the main power supply.

2.7 Environmental Protection

The designation and usage of construction hoist must conform to the local related environmental laws and regulations.

ZOOMLION

Operation Manual of Construction Hoist

③

Brief Introduction

1. Overview

1.1 Explanation of Model

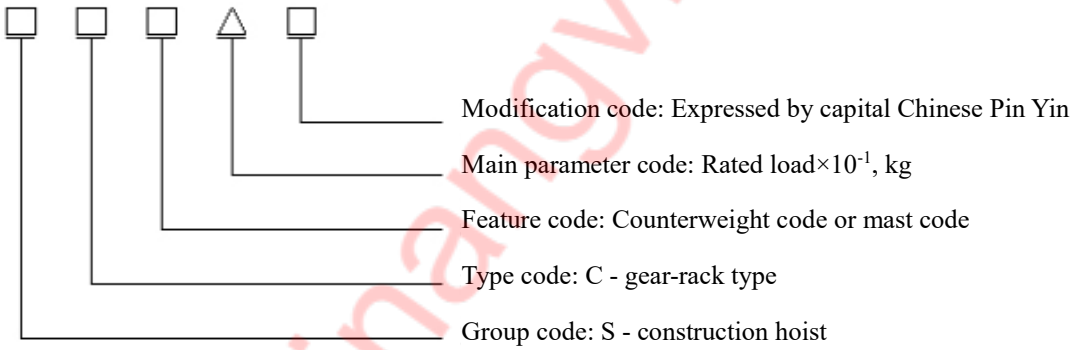
The SC construction hoist is a construction hoist driven by gear and rack and is mainly used to transport persons and goods for high rise buildings, and the working class of complete machine is A5-A6.

This construction hoist can be easily installed and dismantled, and its height may be increased as the height of building increases. On the basis of operation speed, the construction hoists fall into low-speed, medium-speed and high-speed construction hoists; on the basis of control mode, the construction hoists fall into ordinary and variable-frequency construction hoists. In addition, there are SC industrial hoists specially designed to transport persons and goods for large tower crane, steel tower and bridge.

The SC construction hoist has very reliable mechanical and electrical safety systems, and is the safe and highly-efficient vertical transportation equipment in construction projects.

The model of construction hoist is composed of group, type, feature, main parameter and modification codes.

The model is explained as follows:



(1) Main parameter code: The single-cage construction hoist is only marked with one code, and the double-cage construction hoist is marked with two codes which are separated by the symbol "/", with one code for the rated load of a cage;

(2) Feature code: The symbol indicating two main features of construction hoist;

• Counterweight code: D is marked if there is counterweight and no code is given if there is no counterweight;

• Mast code: Q is marked for inclined or curve type, and E is marked if there are two masts.

(3) Example for formulation of model:

• SC100 indicates the single-cage ordinary construction hoist of which the carrying capacity is 1000kg;

• SC200/200 indicates the double-cage three-motor ordinary construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200BD indicates the double-cage three-motor ordinary variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200E indicates the double-cage two-motor ordinary construction hoist of which the carrying

capacity of every cage is 2000kg;

• SC200/200EB indicates the double-cage two-motor ordinary variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200EB-A indicates the double-cage two-motor low-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200EB-B indicates the double-cage two-motor low-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200BZ indicates the double-cage medium-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200BZ-A indicates the double-cage medium-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200BG indicates the double-cage high-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC200/200BG indicates the double-cage high-speed variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

• SC300/300BZ indicates the double-cage high-speed variable-frequency construction hoist of which the carrying capacity of every cage is 3000kg

2. Structural Principle and Brief Introduction

2.1 Mast

The mast is the rail on which the construction hoist runs, and is composed of 1508mm mast sections connected with class-8.8 M24×230 high-strength bolts (The pre-tightening torque for bolts is no less than 300N•m). The mast section is composed of seamless steel tube or welded tube, angle steel or molded section and steel tube, the mast section is equipped with rack (one rack for single-cage mast section, and two racks for double-cage mast section), and every rack is fixed with three screws. The rack is removable and replaceable, and on the basis of the installed height, the thickness of main chord of mast section also varies.

The lower end of four main chords on mast section is equipped with a port, and the lower end of rack is equipped with a cylindrical pin, so as to facilitate the accurate positioning of mast section in the course of erection. The sectional size of mast section of SC construction hoist is 650×650mm, and the mast is connected to the building via mast ties.

2.2 Cage

The cage of SC series construction hoist has the following features,

The cage is a steel structure, runs along the mast via the rollers installed on cage, and is equipped with incoming door and outgoing door. The incoming and outgoing doors of cage are vertically-drawing door.

The cage roof is equipped with a movable door, and the specially-provided special ladder makes it easy to climb up onto the cage roof for carrying out erection and repair. During the erection and dismantling, the cage roof may serve as working platform, and is enclosed by cage roof base enclosure.

The cage is equipped with electrical interlock device, and when the cage door is opened, the cage will stop, so as

to ensure the safety of persons in cage.

On one side of the cage, the cab is installed, wherein the operator will operate the hoist. All operation switches are located in cab.

The cage is decorated with aluminum sheets, and the cab may be omitted in light of the needs of user.

According to the customer's demand, the export cage can be equipped with an optional short cage, and the short cage can be transported in a high container.

2.2.1 Cage door

There are two types of cage door—entrance door and exit door. Entrance door usually refers to vertical full height entrance door, and exit door include exit door in two parts, exit door combined with manual operated load ramp, and exit door with little ramp door inside cage. Exit door in two parts is standard configuration and others are optional, as shown in picture2.2-1.

Vertical full height entrance door is opened by moving up and down. The weight of the door is balanced by counter weight.

Exit door in two parts is composed of upper and lower door, the upper door is opened upwards, the lower door is opened downwards, the weight of door is balanced by each other when opened. The structure is simple and reliable

Exit door combined with manual operated load ramp is composed of upper door and ramp door. The upper door is opened upwards, and the ramp door turns outwards with the axis of lower end. The weight of door is balanced by each other when opened. It has the advantage that it can be used as a springboard when the cage door has a certain distance from the landing. In addition, door structure, baffle and guardrail comprise the ramp door, whose structure is generally welded by standard section steels, and the sections are connected by bolts.

Exit door combined with little manual operated load ramp inside cage is composed of exit door in two parts and little ramp door inside cage. After the opening of the exit door in two parts upward and downward, the little ramp door inside cage turns outward at the axis of lower end, working as a springboard.

（a）Entrance door

（b）Exit door with double opening

（c）Exit door with flap door

（d）Exit door combined with little manual operated load ramp inside cage

Figure 2.2-1 Cage door

2.3 Drive System

The drive system is composed of driving body and drive unit. The driving body is a component which integrates the drive devices into a structure, and it transmits the driving force generated by drive unit to the cage, so that the cage will move up and down. The connecting bolts of driving body and drive unit are class-8.8 high-strength bolts.

The drive unit is the power unit of construction hoist, which moves up and down the construction hoist and the load (or construction personnel) in cage. The drive unit is composed of driving gear, retarder, coupling and motor (with brake).

On the basis of the model of construction hoist, the reducer mainly falls into circle tooth and cylindrical worm reducer, worm gear reducer and helical gear and bevel gear reducer.

The couplings are of claw type, and there are elastic elements (polyurethane rubber) between two couplings so as to reduce the shock and vibration during operation. The retarder and motor in imported SEW and NORD drive units are in integrated structure, and are referred to as reduction motor.

The motor is lifting-purpose disc-brake three-phase asynchronous motor, the electromagnet in brake can carry out automatic follow-up as the brake disc is worn, and the braking torque is adjustable.

The drive system of variable-frequency speed-regulation construction hoist is equipped with a variable-frequency speed-regulation system, which can improve the smoothness in the course of start and braking operation; realize the stepless adjustment of operation speed within a certain range; reduce the starting current and mechanical wear, and prolong the service life of wearing parts; improve the working efficiency; save energy.

2.4 Overspeed Safety Device

As indicated in Figure 2.4-1, the overspeed safety device is mainly composed of casing, brake cone, centrifugal block, spring and stroke switch.

When the cage accidentally drops at an overspeed, the centrifugal block in overspeed safety device will overcome the pulling force of spring and drive the brake cone to rotate, and the screw connected will turn in, the brake cone

will contact with the casing, and the frictional force will increase gradually, so as to ensure that the cage is braked smoothly. In addition, the stroke switch will act and cut off cage power supply, so as to ensure the safety of personnel and equipment.

The overspeed safety device falls into single-gear overspeed safety device and three-motor overspeed safety device. The braking principle of three-motor overspeed safety device is totally same as that of single-gear overspeed safety device, but it has the relatively high braking torque, so that it is suitable for medium/high-speed construction hoist.

The activation speed of overspeed safety device has been accurately adjusted and properly sealed when it is delivered from factory, and the user may not randomly open the overspeed safety device.

The use period is stated on the nameplate of overspeed safety device, and normally the use period may not exceed one year. After expiration of use period, the overspeed safety device shall be sent to the manufacturer or testing institution for re-calibration. The service life of overspeed safety device is five years.

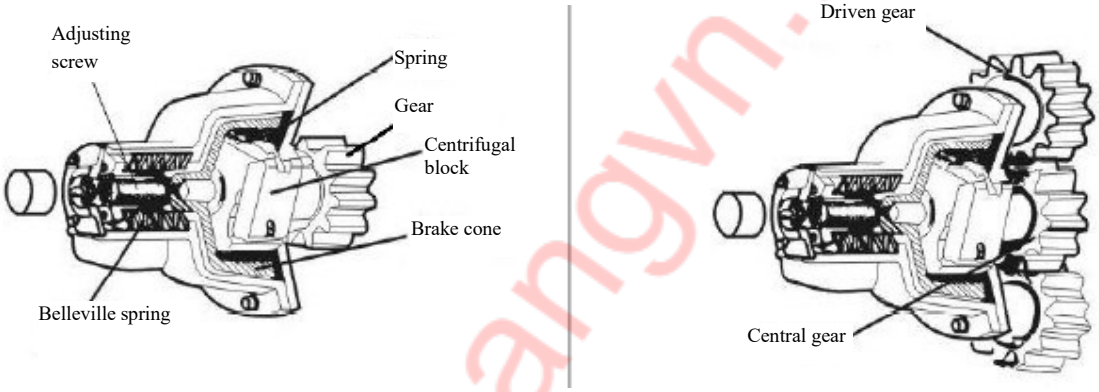


Figure 2.4-1 Overspeed safety device

2.5 Limit Devices

The limit devices include terminal stopping switches, and final limit switch, the variable-frequency speed-regulation construction hoist is also equipped with up/down deceleration final limit switch, and some variable-frequency construction hoists are only equipped with a deceleration limit.

The terminal stopping switches ensure that when the cage moves up or down to the designated position, the power supply will be cut off automatically, so as to stop the construction hoist. The up/down deceleration final limit switch is used to ensure that the construction hoist is switched over from high-speed gear to low-speed gear.

The final limit switch ensures that if the cage continues to move after moving to the upper/lower limit position owing to failure of final limit switch, the main power supply will be immediately cut off so as to stop the cage, so that the cage will not exceed the top when moving upwards and will not collide into the foundation when moving downwards.

The final limit switch can't be reset automatically, and shall be reset manually. Please inspect from time to time that the position of all limit devices is correct, so as to ensure that the final limit switches will act correctly.

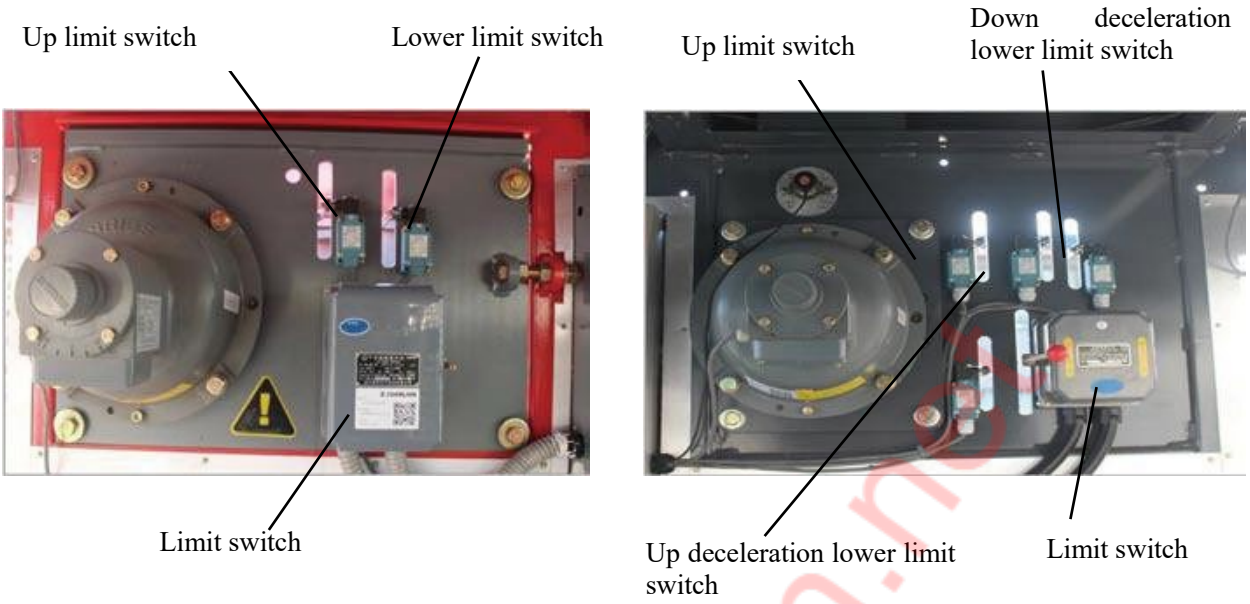


Figure 2.5-1 Limit device

2.6 Electrical Control System

The electrical system is the control interface of mechanical operation of construction hoist, and all actions of construction hoist are controlled via the electrical system. The electrical system is composed of electrical control cabinet, resistor Box, power box, operating console in cab, main control cable and various limit switches.

2.6.1 Power Box

The power box is the part which supplies power to the control system of construction hoist, and is installed on underframe guardrails.

2.6.2 Electrical Control Cabinet

The electrical control cabinet is the heart of electrical system of construction hoist, and is mainly composed of up/down operation contactor, control transformer, overheating protector, frequency converter (for variable-frequency speed-regulation construction hoist) and open-phase & phase sequence relay. The electrical control cabinet is installed in cage. As for variable-frequency speed-regulation construction hoist, the electrical control cabinet is normally installed on cage roof.

2.6.3 Resistor Box

Normally, the resistor box is fixed onto the base enclosure on cage roof, and the resistor is used to consume the energy sent by variable-frequency speed-regulation construction hoist to frequency converter in the course of downward moving. In light of the needs of user, the energy feedback unit may be used in stead of resistor, so as to send the energy back to electrical grid.

2.7 Mast tie

The mast tie is the connecting component between mast and building, and is used to maintain the stability of mast and overall structure of construction hoist.

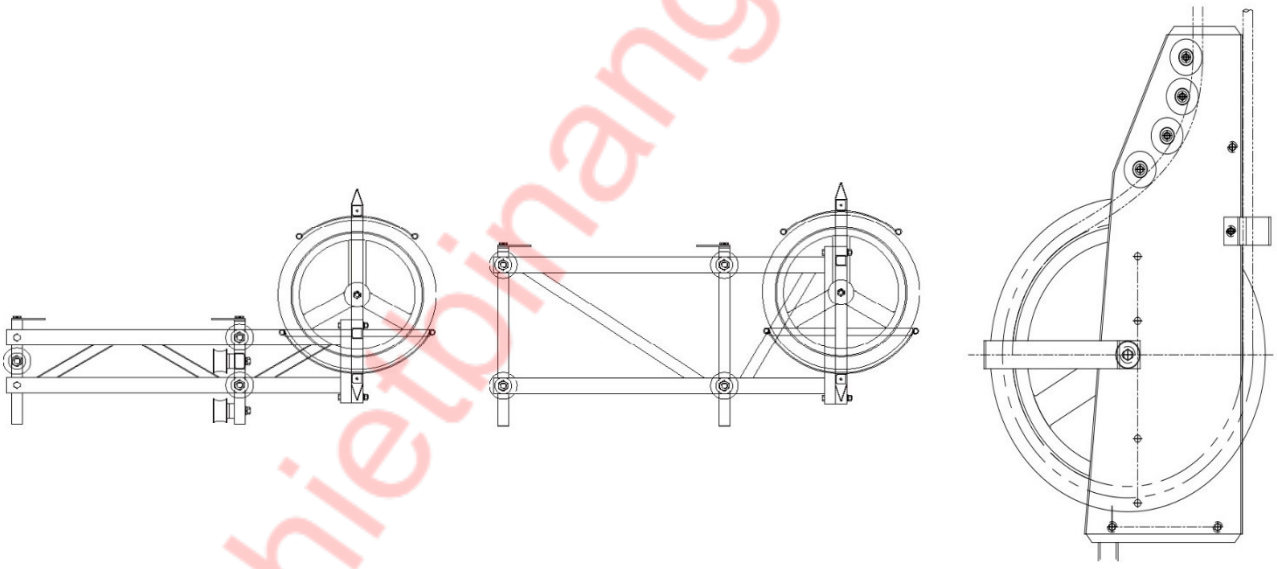
The mast tie of SC construction hoist falls into I-type, II-type, III-type, IV-type V-type and VI-type, of which IID-type is the standard configuration, and the others are optional configurations. The detail parameters can be checked in chapter 4 section3.

2.8 Cable Drum

Cable drum is the component used to release and retract the cable. Since the wind force may cause relatively great impact on cable drum, normally it is only used in the situation that the installed height is no more than 100m and the wind force is relatively low. When the cage is moving upwards, the cage will cause the main cable in cable drum to move upwards; when the cage is moving downwards, the main cable will be slowly retracted into the cable drum, so as to prevent the main cable from being piled on ground and generating hazard.

2.9 Trolley

When the erection position of construction hoist is relatively high, the impact from supply voltage, wind force and dead weight will be relatively high. In such case, the trolley may be adopted. The trolley is installed on lower portion of cage, is of simple structure, and is easy to install. The mast of this hoist is not only the running rail of cage, but also the running rail of trolley, so that it is not so seriously affected by wind force and is widely used. The existing trolley is of combined type, and the trolleys for left and right cages are interchangeable. The height of base enclosure doorsill for installing short trolley is 680mm, while is 950mm for high trolley.



(a) (b) (c)

Figure 2.9-1 Trolley

(a) Short Trolley; (b) High Trolley; (c) L-shaped cable trolley

2.10 Cable Arm

The cable arm is the device which draws the main cable up and down. As drawn by the cable arm, the main cable will safely pass through the cable ring, so as to prevent the cable from being scratched.

The cable drum type cable arm can pick the main cable out of the base frame and base enclosure, so that the main cable can be retracted into cable drum safely.

2.11 Cable Guiding Device

The cable guiding device is used to ensure the safety of cable in the course of operation. When the hoist is operating, the cable guiding device ensures that the cable is in the protective ring on cable guiding device, so as to prevent the cable from winding around any nearby equipment.

When installing the cable guiding device, please ensure that the cable arm and trolley can smoothly put through the guard ring on cable guiding device.

2.12 Slide Wire

Slide wire is another power supply mode for construction hoist. It is installed on mast, and the running height increases with the height of mast. It supplies power for construction hoist instead of cable. Using slide wire to supply power can decrease many parts, such as cable drum, cable trolley, cable guiding device, cable etc. Slide wire is usually used to supply power for high-rise construction hoist.

2.13 Electrical Jib

The jib is an indispensable component for realizing the self-served addition of mast sections to construction hoist and the self-served dismantling of construction hoist.

After the foundation of construction hoist is properly installed, use the jib to lift the mast section on cage to the top of installed mast, so as to implement the addition of mast section; in the course of dismantling, the jib may be used to dismantle the mast sections in the order from top to bottom.

⚠Warning

(1) The rated lifting capacity of jib is 200kg, overloading is strictly prohibited;

(2) When the construction hoist is operating, it is absolutely prohibited to hand any heavy objects onto the jib;

(3) After the erection/dismantling of construction hoist is completed, the jib must be removed from the cage roof.

2.14 Base frame and base enclosure

The base frame and base enclosure include base frame and protective base enclosure:

The base frame is made of steel sections and steel sheets, its perimeter is connected to ground protective base enclosure, and at the center there is the mast base. It can bear the load transmitted by construction hoist. In the course of erection, the base frame is fixed onto the embedded part of foundation with bolts.

Protective base enclosure: Composed of steel section, steel sheet and steel wire net, it encloses the host machine of construction hoist, so as to form an enclosed area and prevent any person from entering into such area when the construction hoist is running. At the entrance of protective base enclosure, there is a base enclosure door, which is equipped with the electromechanical interlock device. The rotary clamping mode is adopted between steel wire

net and steel wire net as well as steel wire net and door frame, so as to realize the quick erection.

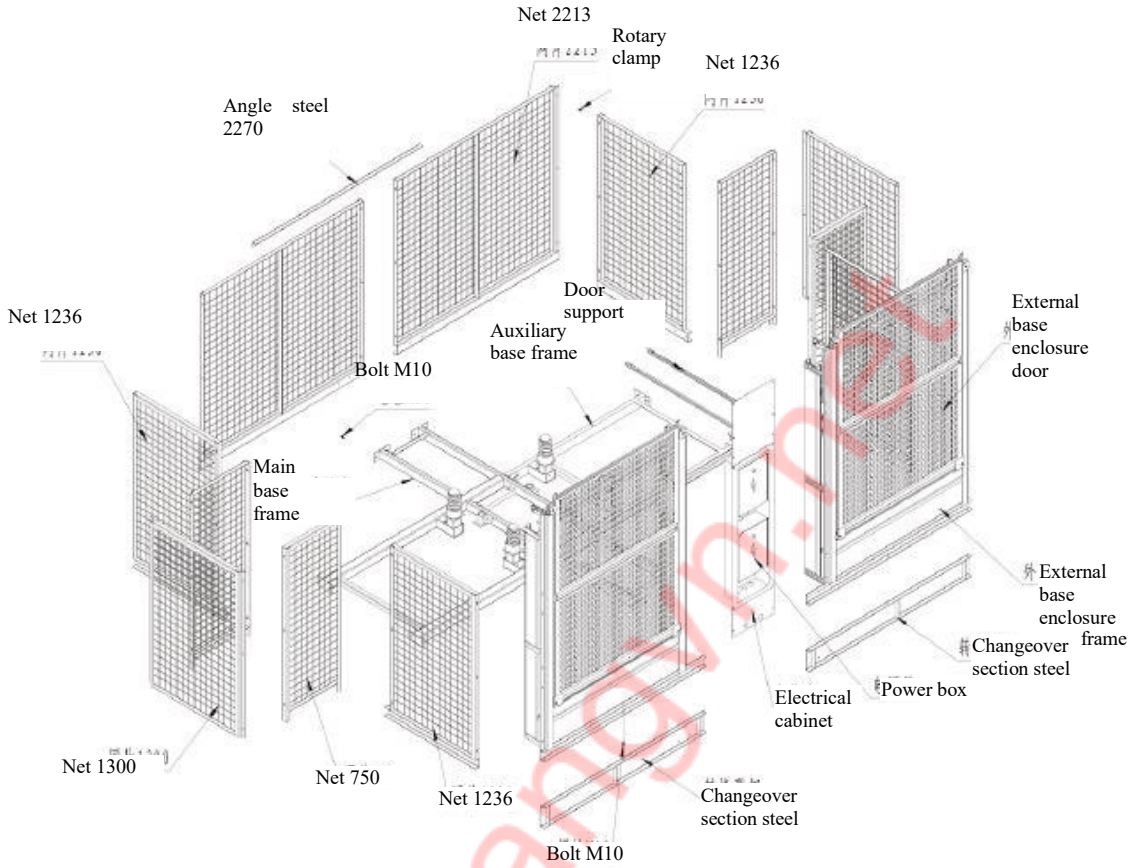


Figure 2.13-1 Assembly diagram for base frame and base enclosure

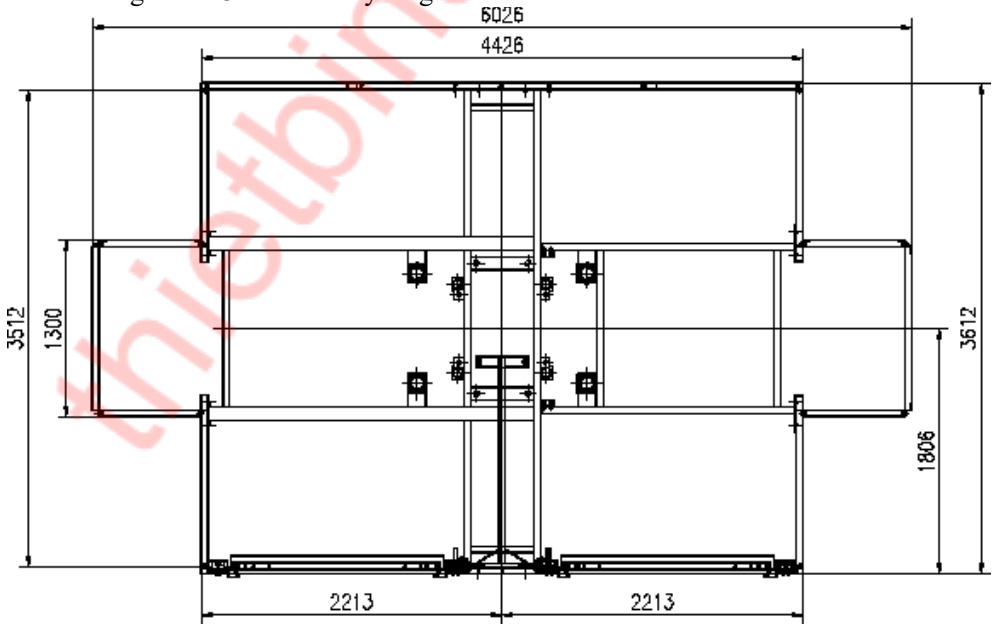


Figure 2.13-2 Vertical view of base frame base enclosure

The base frame and base enclosure of SC construction hoist is of combined type, namely cable drum type, slide

wire type and trolley type, which is interchangeable by changeover the section steel as indicated in the figure 2.13-1, and the doorsill height (450, 680, 950) is also interchangeable; the doorsill height of cable drum and slide wire is 450mm; the doorsill height of short trolley is 680mm; the doorsill height of high trolley is 950mm.

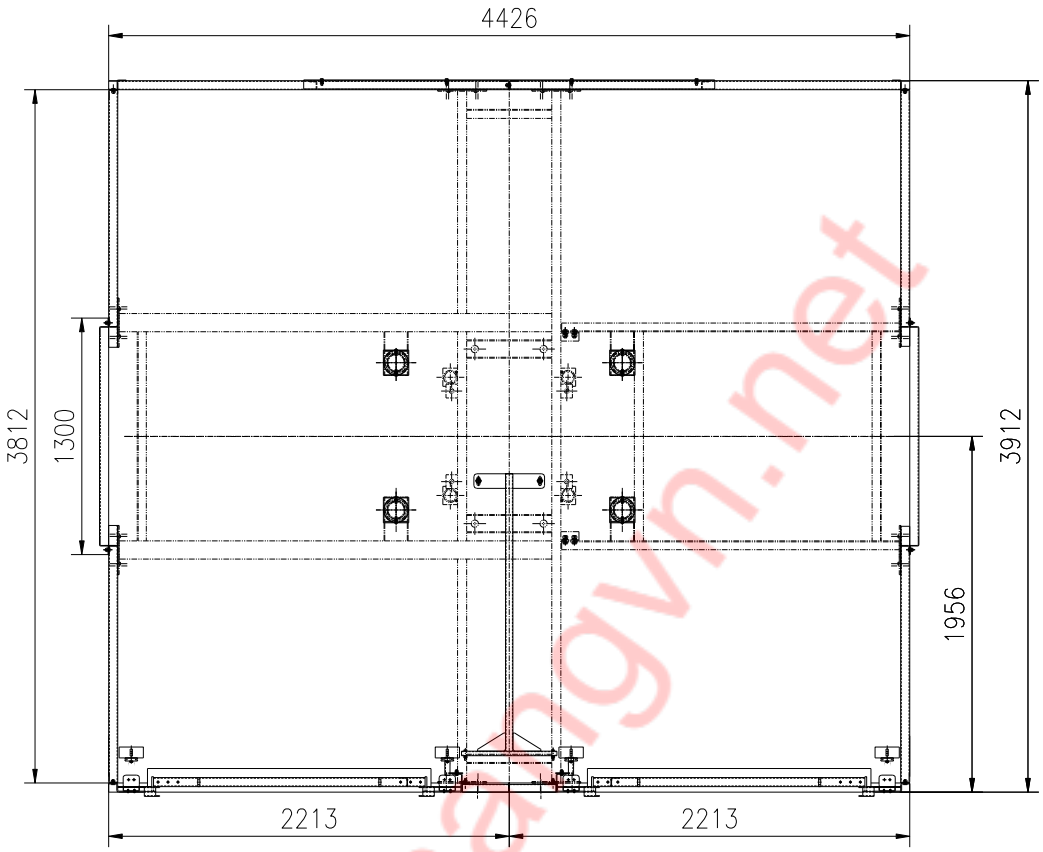


Figure 2.13-3 Vertical view of base frame base enclosure of 3.5m cage

ZOOMLION

Operation Manual of Construction Hoist

④

Preparation

Preparation

1. Setup of Foundation

Before using the construction hoist, the user should carry out load calculation and foundation setting etc. for the foundation of the construction hoist in accordance with the requirement that the foundation of the construction hoist should be able to withstand the full load under the most unfavorable working conditions.

1.1 Calculation of Load to be Borne by Foundation

The load to be carried by foundation is: P=n×mg

In the formula above, P is the load to be borne by foundation (N); in consideration of the impact on foundation from error in dynamic load, wind load and dead weight, the safety coefficient n is set as 2; m is the dead weight of cage (including the drive system) + rated load of cage + dead weight of base frame and base enclosure + dead weight of mast + weight of attachments + weight of mast tie + dead weight of counterweight (kg); g is the gravitational acceleration (9.8m/s^2).

Namely: P=0.02m (kN)

Calculation example 1:

Example: The height of mast of SC200/200 construction hoist is 150m, and the II D mast tie is adopted;

Model of foundation: CM6238 for;

Dead weight of cage (including drive system): 2000×2=4000kg;

Rated load of cage: 2000×2=4000kg;

Dead weight of base frame and base enclosure: 1300kg;

Dead weight of mast: 145×100=14500kg;

The weight of power cable, cable guiding device and fasteners is about 10% of dead weight of mast, namely 1450kg;

Weight of II D mast tie: 146×16=2336kg;

Dead weight of counterweight: 0 kg (None);

Therefore: P = (4000+4000+1300+14500+1450+2336) ×0.02=551.72kN

Conclusion: The concrete foundation shall be able to at least bear the minimum load of 552kN, which can be satisfied the operation requirement of construction hoist.

Warning

The groundwork under foundation of construction hoist must meet the following requirements:

(1) Height of mast ≤100m: the bearing capacity ≥0.10MPa;

(2) 100m＜height of mast≤300m: the bearing capacity ≥0.15MPa;

(3) 300m＜height of mast ≤500m: the bearing capacity ≥0.2MPa.

1.2 Setup Program for Concrete Foundation

The following programs are available for concrete foundation:

Program 1:

The concrete foundation is above the ground.

Advantage: No drainage is required.

Disadvantage: The doorsill is relatively high.

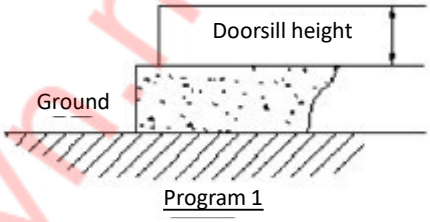


Figure 1.2-1 Program 1 for Concrete Foundation

Program 2:

The concrete foundation is at the same level as the ground

Advantage: The drainage is relatively simple.

Disadvantage: There is doorsill, but it is only necessary to set up a simple slope with wooden plate.

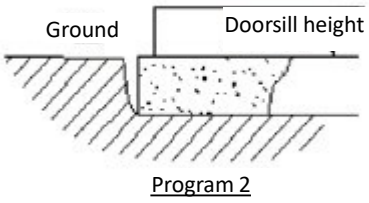


Figure 1.2-2 Program 2 for Concrete Foundation

Program 3:

The concrete is lower than the ground

Advantage: There is no doorsill between ground and cage.

Disadvantage: Since water may accumulate easily, appropriate drainage measures shall be taken, so as to prevent the foundation from getting corroded.

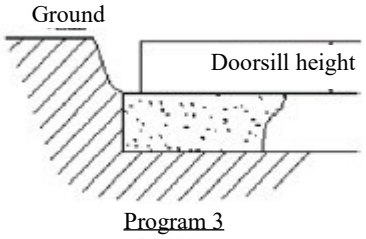


Figure 1.2-3 Program 3 for Concrete Foundation

Note

When selecting the setup program for foundation, the user shall, in light of the actual situations of

construction site, properly make decision.

(1) As for different cable guiding devices, the doorsill height will vary. As for cable drum type and slide wire type, the doorsill height is 450mm; as for short trolley type, the doorsill height is 680mm; as for high trolley type, the doorsill height is 950mm;

(2) The foundation shall be made by the use, and shall be completed at least one week prior to the erection of hoist.

1.3 Selection of Concrete Foundation

1.3.1 Selection of Foundation for SC Serials Construction Hoist

1.3.1.1 Model CM3038 (applicable to SC single-cage hoist without cab)

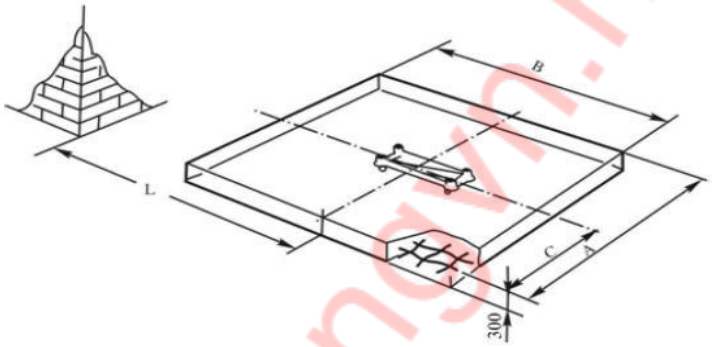


Figure 1.3-1 CM3038 Concrete Foundation

Table 1.3-1 Detailed Size of CM3038 Concrete Foundation

Model	Specification of Cage	Distance L between Foundation and Wall	A (mm)	B (mm)	C (mm)	
Single-cage hoist without cab	3.2×1.5m	I, II, III, IV, V and VI-type mast tie:	3000	3800	Left Cage	Right Cage
					2400	600
	3.5×1.5m	V-type mast tie:	3000	4100	2400	600

1.3.1.2 Model CM3838 (applicable to SC single-cage hoist with cab)

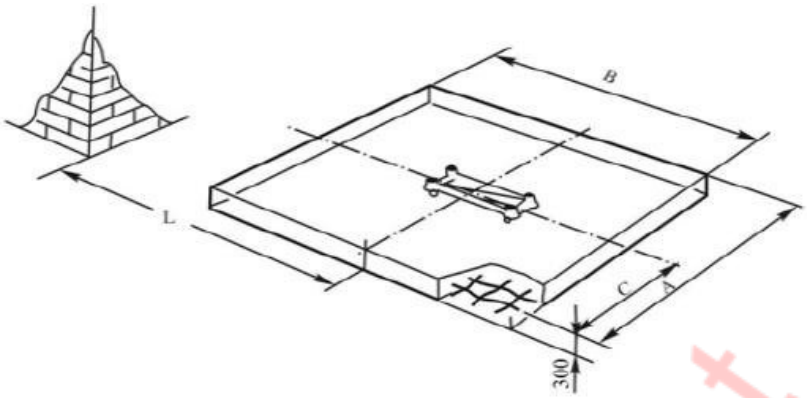


Figure 1.3-2 CM3838 Concrete Foundation

Table 1.3-2 Detailed Size of CM3838 Concrete Foundation

Model	Specification of Cage	Distance L between Foundation and Wall	A (mm)	B (mm)	C (mm)	
Single-cage hoist with cab	3.2×1.5m	I, II, III, IV, V and VI-type mast tie:	3800	3800	Left Cage	Right Cage
					3200	600
	3.5×1.5m	V-type mast tie:	3800	4100	3200	600

1.3.1.3 Model CM4638 (applicable to double-cage hoist without cab)

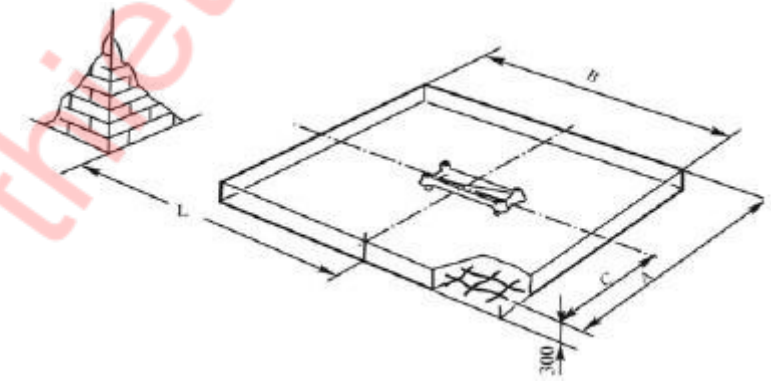


Figure 1.3-3 CM6238 Concrete Foundation

Table 1.3-3 Detailed Size of CM6238 Concrete Foundation

Model	Specification of Cage	Distance L between Foundation and Wall	A (mm)	B (mm)	C (mm)

Double-cage hoist without cab	3.2×1.5m	I, II, III, IV, V and VI-type mast tie:	4600	3800	2300
	3.5×1.5m	V-type mast tie:	4600	4100	2300

1.3.1.4 Model CM6238 (applicable to SC double-cage hoist with cab)

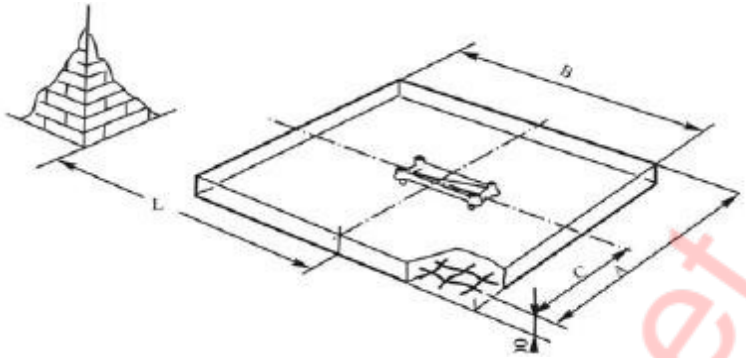


Figure 1.3-4 CM6238 Concrete Foundation

Table 1.3-4 Detailed Size of CM6238 Concrete Foundation

Model	Specification of Cage	Distance L between Foundation and Wall	A (mm)	B (mm)	C (mm)
Double-cage hoist with cab	3.2×1.5m	I, II, III, IV, V and VI-type mast tie:	6200	3800	3100
	3.5×1.5m	V-type mast tie:	6200	4100	3100

1.3.3 Diagram of the Pre-Built Frame in the Middle of the Concrete Foundation.

The intermediate embedded frame shall be set up at the center of the area where the foundation is to be formed, and its schematic diagram is given as follows:

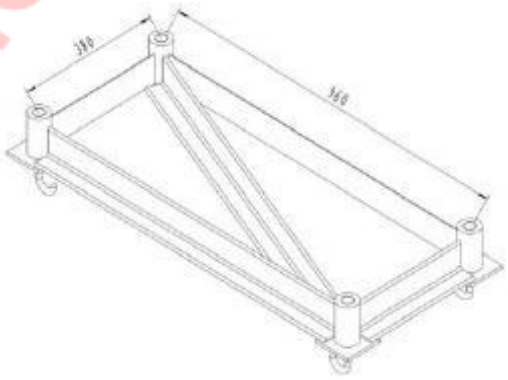


Figure 1.3-6 Schematic Diagram for Intermediate Embedded Frame

1.3.4 Diagram of the Pre-Built Bolts in the Middle of the Concrete Foundation.

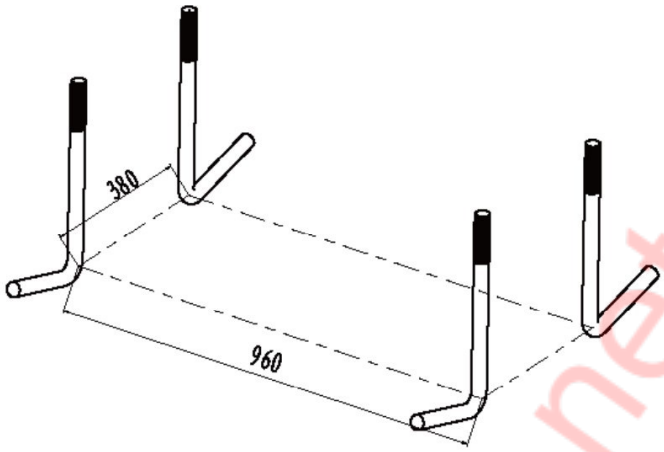


Figure 1.3-7 Schematic Diagram for Intermediate Embedded Bolts

1.4 Notices for Making of Concrete Foundation

(1) The bearing capacity of groundwork under concrete foundation shall meet the following requirements:

- Height of mast≤100m: the bearing capacity ≥0.10MPa;
- 100m＜height of mast≤300m: the bearing capacity ≥0.15MPa;
- 300m＜height of mast≤500m: the bearing capacity ≥0.2MPa;

If the above requirement is not satisfied, the groundwork under foundation should be reinforced.

(2) The drain trench shall be set up near the concrete foundation in light of the actual conditions of the construction site.

(3) The embedded seat of concrete foundation shall be connected with the reinforcing steel bar mesh in foundation.

(4) When casting the concrete, the bolt holes on embedded frame shall be temporarily covered with wooden plate or blocked with plastic plug, so as to prevent the concrete from entering into bolt holes, and its end face shall be 1mm higher than the concrete surface.

(5) The concrete foundation shall be made in accordance with the *Specification for Construction and Acceptance of Reinforced Concrete Works* (GBJ204).

- Size of reinforcing steel bars in concrete foundation: No less than l2mm; mesh: 200mm; material: HPB400;
- The designation of concrete for making foundation shall be higher than C30;
- The technical strength of concrete foundation shall meet the *Specification for Construction and Acceptance of Reinforced Concrete Works* (GBJ204) and the erection requirements of construction hoist.

(6) If the above program for concrete foundation is not applicable, the user shall refer to the relevant specifications and standards of the country where the user is located.

2. Mast

2.1 Mast Configuration

For different installed height of hoist, the configuration of mast sections is also different. The thickness of main chord of mast section will vary as the installed height increases, and the changeover section shall be set up between the mast sections with different thickness of main chord.

Example for selection of specification of mast section:

When the installed height of mast is 380m, the thickness of mast section is indicated in Table 2.1-1:

Table 2.1-1 Erection of Mast sections for Different Installed Height

	150m	260m	380m
Φ76×6.0mm	100	93 (including one changeover section)	93 (including one changeover section)
Φ76×8.0mm	0	80	80 (including one changeover section)
Φ76×10.0mm	0	0	79
Total number of masts sections	100	173	252

In order to distinguish between different thickness of mast section and changeover section, there are a figure indicating thickness of main chord and a small area with paint of different color on erection face of middle frame of every mast section. In the course of erection, please carefully distinguish from them!

The mark on mast section is detailed as follows:

(1) As for Φ76×6.0 mast section, the area surrounding the figure 6 which is used to indicate the thickness is coated with blue paint;

(2) As for Φ76×8.0 mast section, the area surrounding the figure 8 which is used to indicate the thickness is coated with orange yellow paint;

(3) As for Φ76×10.0 mast section, the area surrounding the figure 10 which is used to indicate the thickness is coated with green paint.

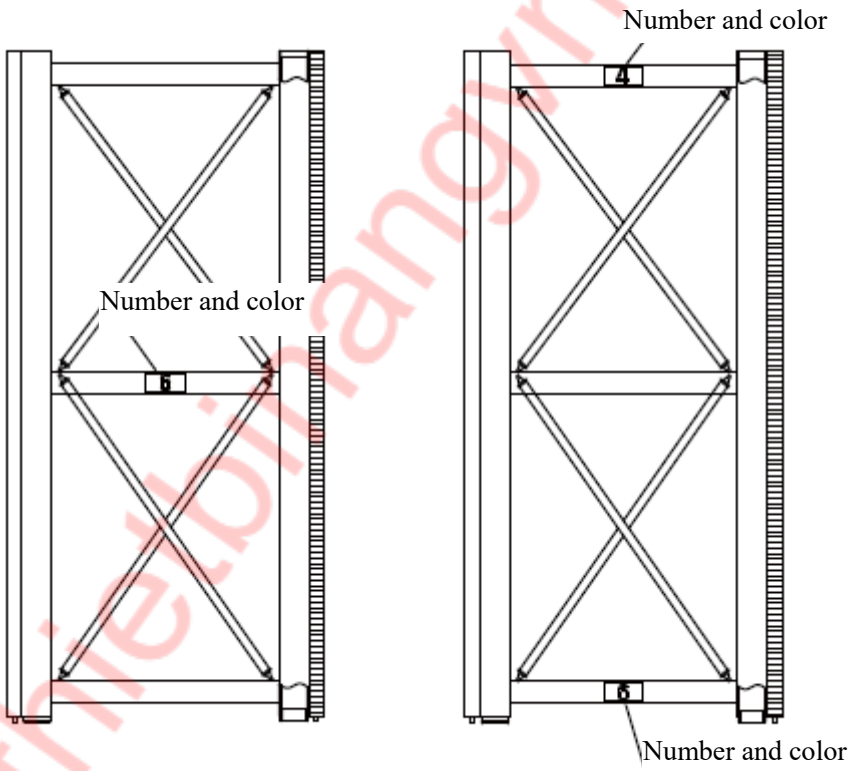
The mark on changeover section is detailed as follows:

(1) As for 4.5-6.0mm changeover section, the area surrounding the figure 4 is coated with red paint (for galvanized mast section) or white paint (for painted mast section), and the area surrounding the figure 6 is coated with blue paint;

(2) As for 6.0-8.0 changeover section, the area surrounding the figure 6 is coated with blue paint, and the area surrounding the figure 8 is coated with orange yellow paint;

(3) As for 8.0-10.0 changeover section, the area surrounding the figure 8 is coated with orange yellow paint, and the area surrounding the figure 10 is coated with green paint.

Taking Φ76×6.0mm mast section and 4.5-6.0mm changeover section as an example, the mark is indicated in the figure below:



Mast section with 6mm Thickness Changeover Section with 4.5mm-6mm Thickness

Figure 2.1-1 Schematic Diagram for Reinforcing Section and Changeover Section of SC Construction Hoist

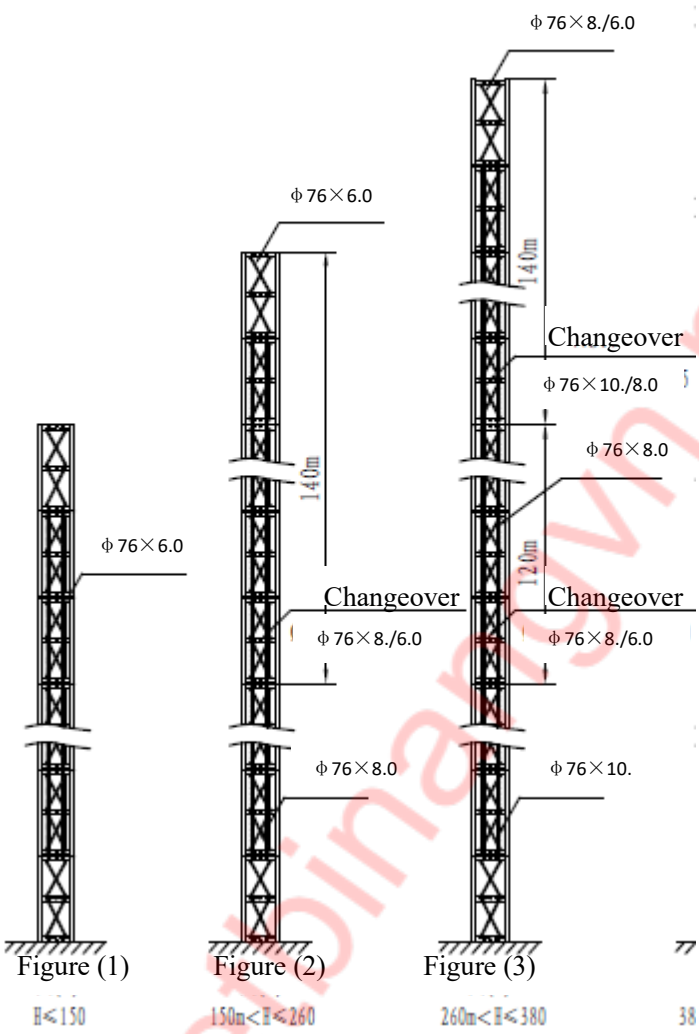


Figure 2.1-2 Thickness of Vertical Tube of Mast section

Note: H is the installed height of mast

3. Mast tie

3.1 Type and Selection of Mast Tie

In order to meet the user's actual needs for construction hoist, the mast tie for construction hoist falls into five types (Theses types may be combined into several specifications), the standard configuration offered by the Company is IID type, and the applicability scope of various types of mast tie is as follows:

(1) I-type mast tie: Only available for single-cage construction hoist;

(2) II-type mast tie: This type is available for single-cage or double-cage construction hoist with or without cab and with or without counterweight. If the construction site is equipped with scaffold or floor-connecting platform, this mast tie may be used instead of III-type mast tie;

(3) III-type mast tie: The applicability scope is as same as that of II-type mast tie. This mast tie shall be equipped with upright rod, short front support rod and bridge rod (Effect: The floor connecting platform can be directly placed on mast);

(4) IV-type and V-type mast tie: The range of application is the same with II-type mast tie, but the distance of the mast tie is shorter, namely bridge platform isn't needed between cage and unloading platform.

(5) VI-type mast tie: Mainly used in special applications such as single cage shaft construction lifts.

3.2 Overview of Mast tie

3.2.1 Overview of Mast tie of SC Construction Hoist

3.2.1.1 I-type Mast tie

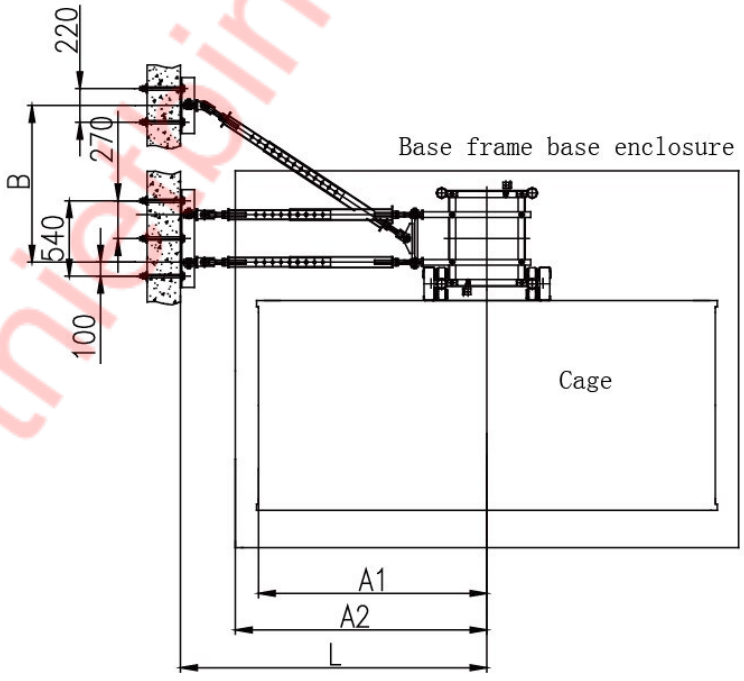


Figure 3.2-1 Schematic Diagram for I-type Mast tie

Applicability: Applicable to the single-cage construction hoist which is relatively close to wall and the carrying capacity is not high

Table 3.2-1 Connection Size of I-type Mast Tie

Specification of Cage	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2×1.5m	1800-2500	1650	1800	1000-1570
3.0×1.3m		1540	1700	1000-1570

3.2.1.2 II-type Mast Tie (IID mast tie recommended)

Table 3.2-2 Connection Size of II-type Mast Tie

Specification of Cage	Model	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2×1.5m	IIA	2800-3200	1650	1800	1500
	IIB	3000-3600			1750
	IIC	3400-4200			2000
	IID	3000-3600			1500
	IIE	2400-2800			1300
	IIG	4200-5000			2200
3.0×1.3m	IIA	2800-3200	1540	1700	1500
	IIB	3000-3600			1750
	IIC	3400-4200			2000
	IID	3000-3600			1500
	IIE	2400-2800			1300
	IIG	4200-5000			2200

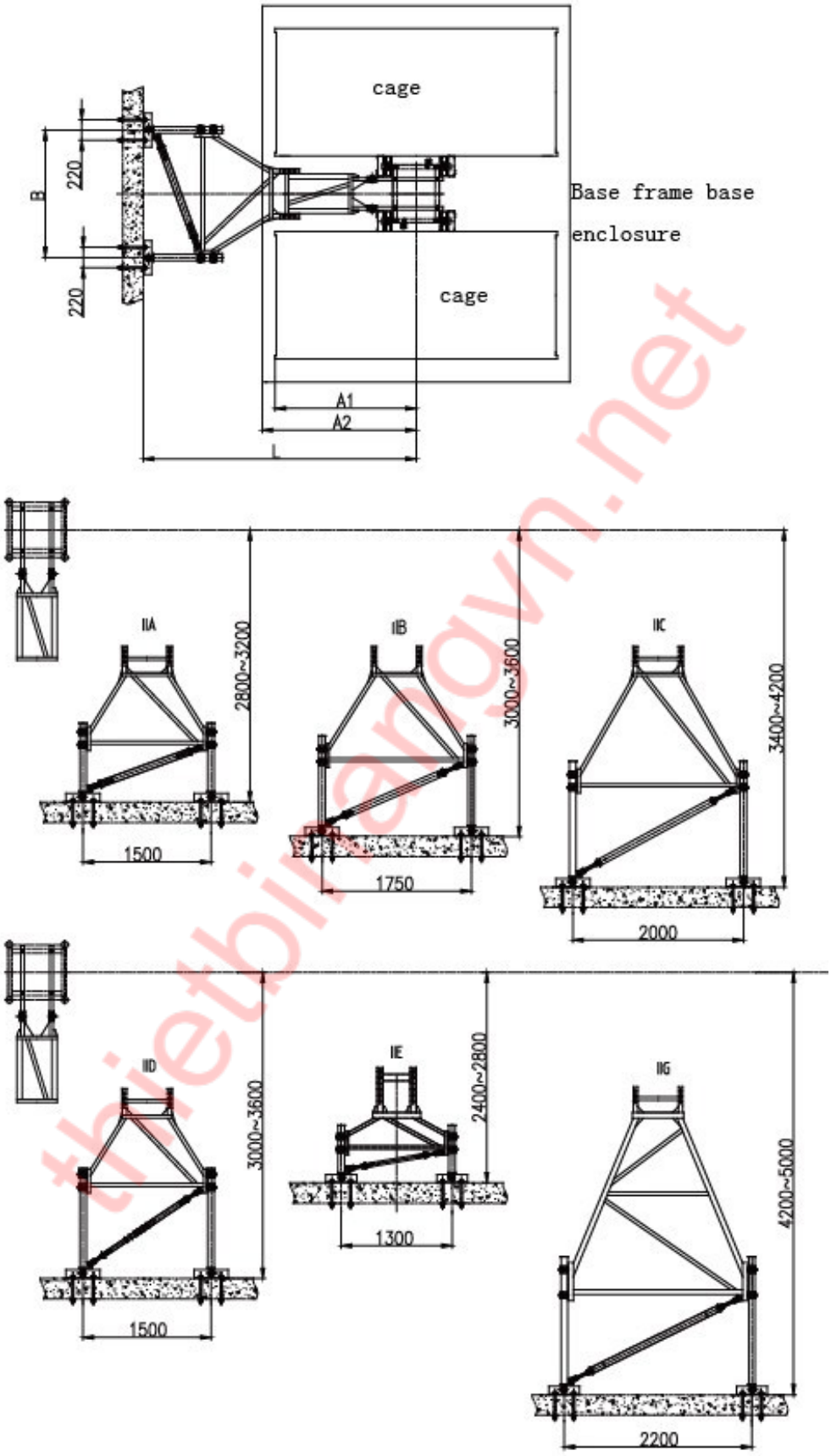


Figure 3.2-2 Schematic Diagram for II-type Mast Tie

3.2.1.3 III-type Mast Tie

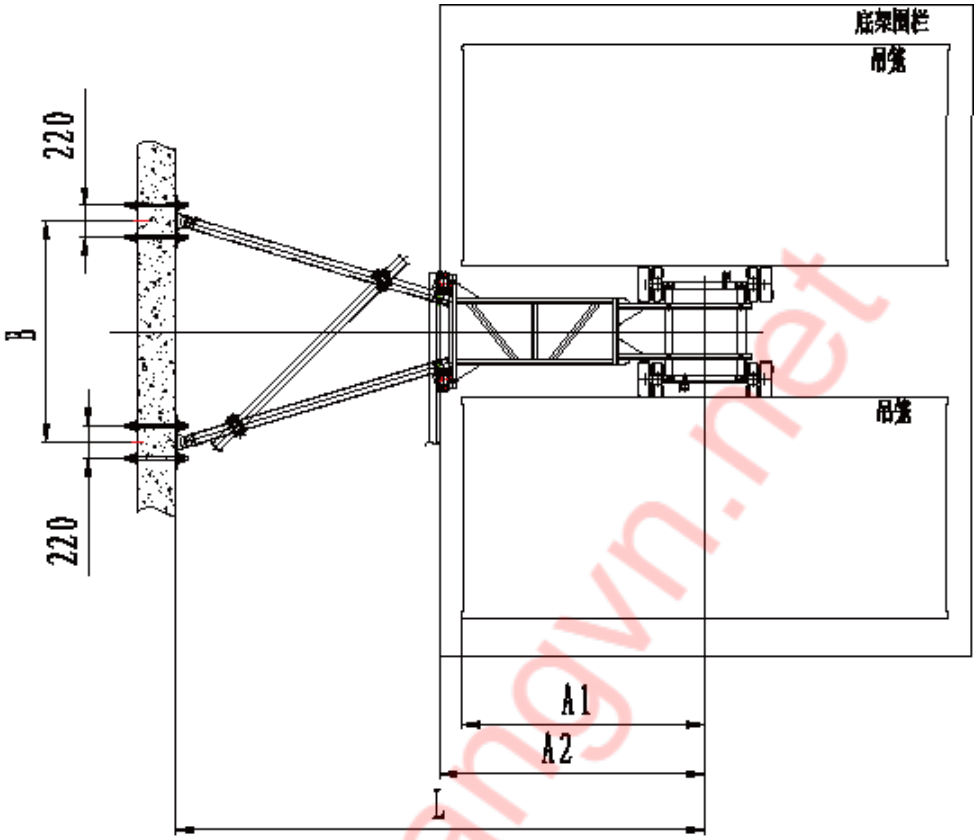


Figure 3.2-3 Schematic Diagram for III-type Mast Tie

Table 3.2-3 Connection Size of III-type Mast Tie

Specification of Cage	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2×1.5m	3000-3600	1650	1850	1200-1600
3.0×1.3m	3000-3600	1540	1750	1200-1600

3.2.1.4 IV-type Mast Tie

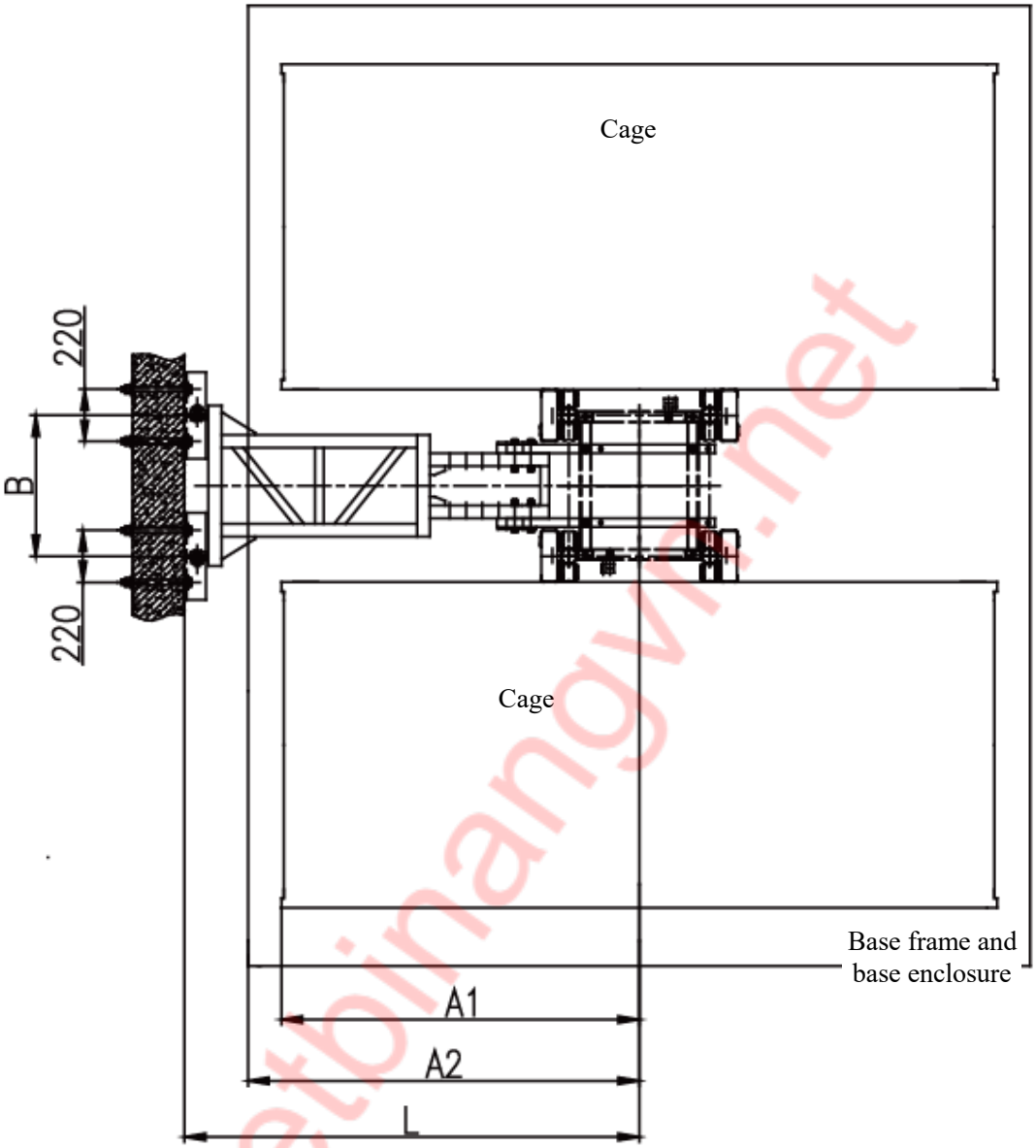


Figure 3.2-4 Schematic Diagram for IV-type Mast Tie

Table 3.2-4 Connection Size of IV-type Mast Tie

Specification of Cage	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2×1.5m	1800-2100	1650	1800	650
3.0×1.3m	1800-2100	1540	1700	650

3.2.1.5 V-type Mast Tie

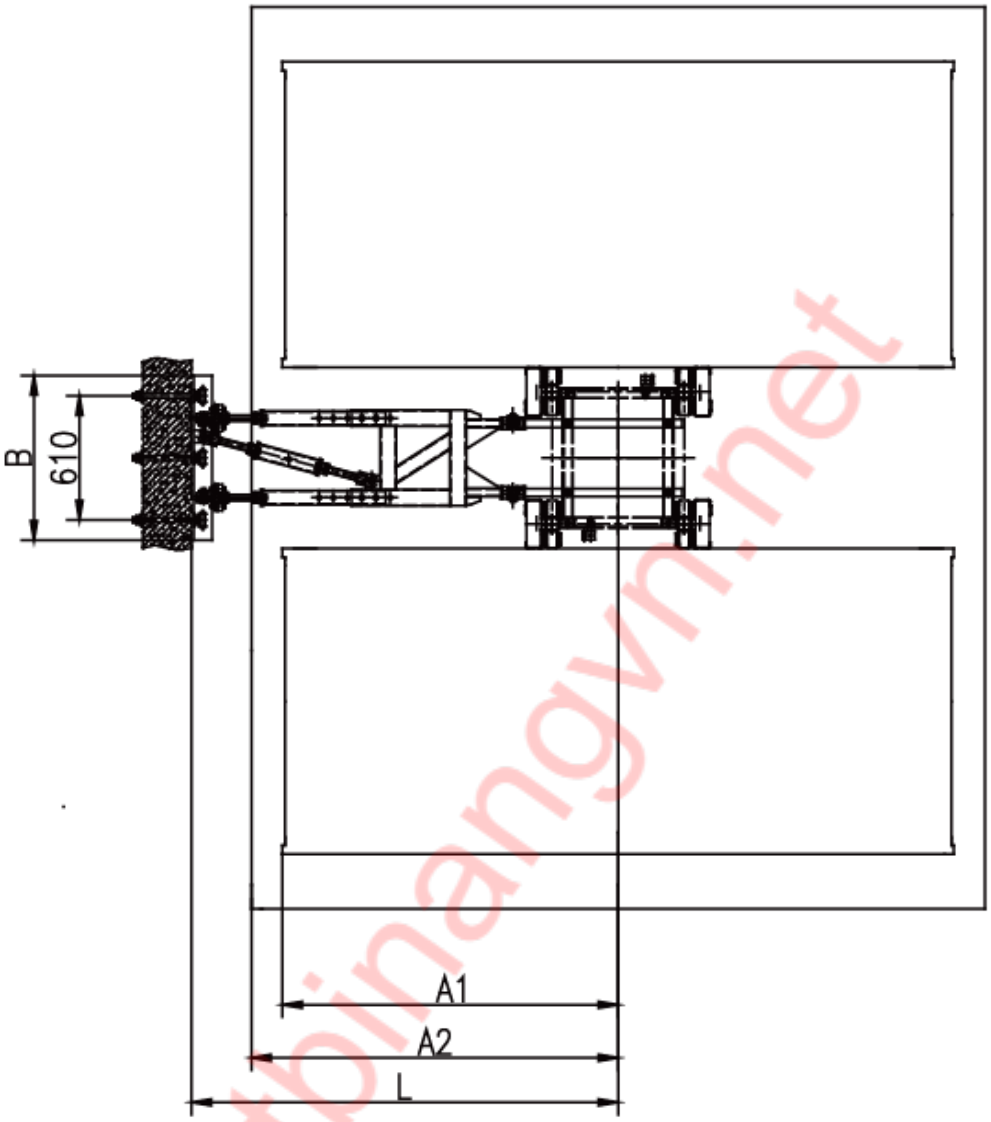


Figure 3.2-5 Schematic Diagram for V-type Mast Tie

Table 3.2-5 Connection Size of V-type Mast Tie

Specification of Cage	Model	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2×1.5m	VA	1700-2000	1650	1800	810
	VB	2000-2300			
3.0×1.3m	VA	1700-2000	1540	1700	810
	VB	2000-2300			
3.5×1.5m	VB	2000-2300	2040	2300	810

3.2.1.6 Type II D-VA Universal Attachment Units A and B

1. Type II D-VA Universal Attachment Units A

1). The distance of attached wall L=3000~3600mm, the width of wall connection is B=1500mm.

2). Remove the large coupling frame, the front coupling bar attached to the fasteners of the small coupling frame can be directly transformed into a short-attached wall frame with a wall distance L=1900-2200mm, and a wall connection width B=410mm.

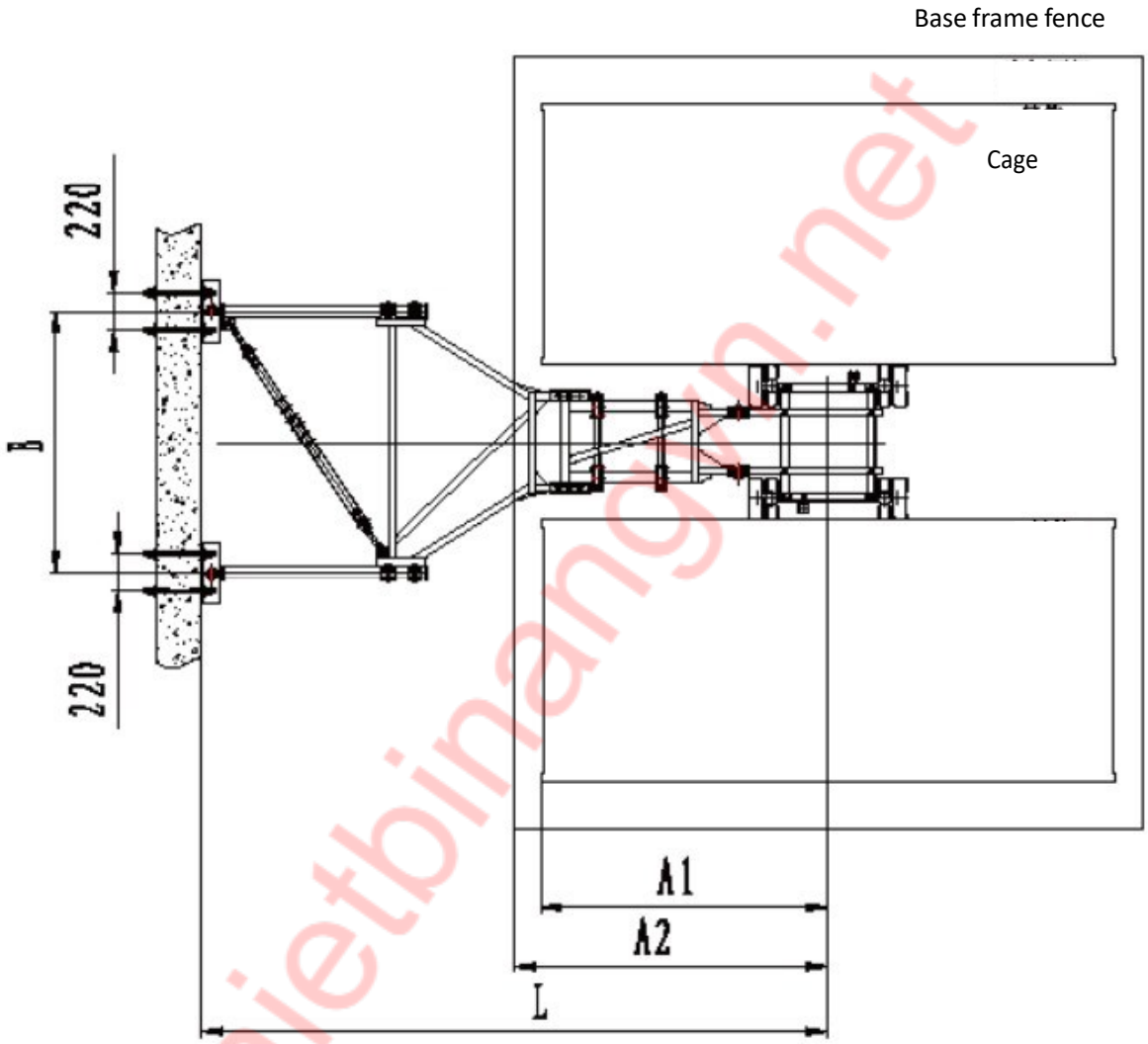


Figure 3.2.6-1 Schematic Diagram for Use with II in Type II D-VA Universal Attachment Device A

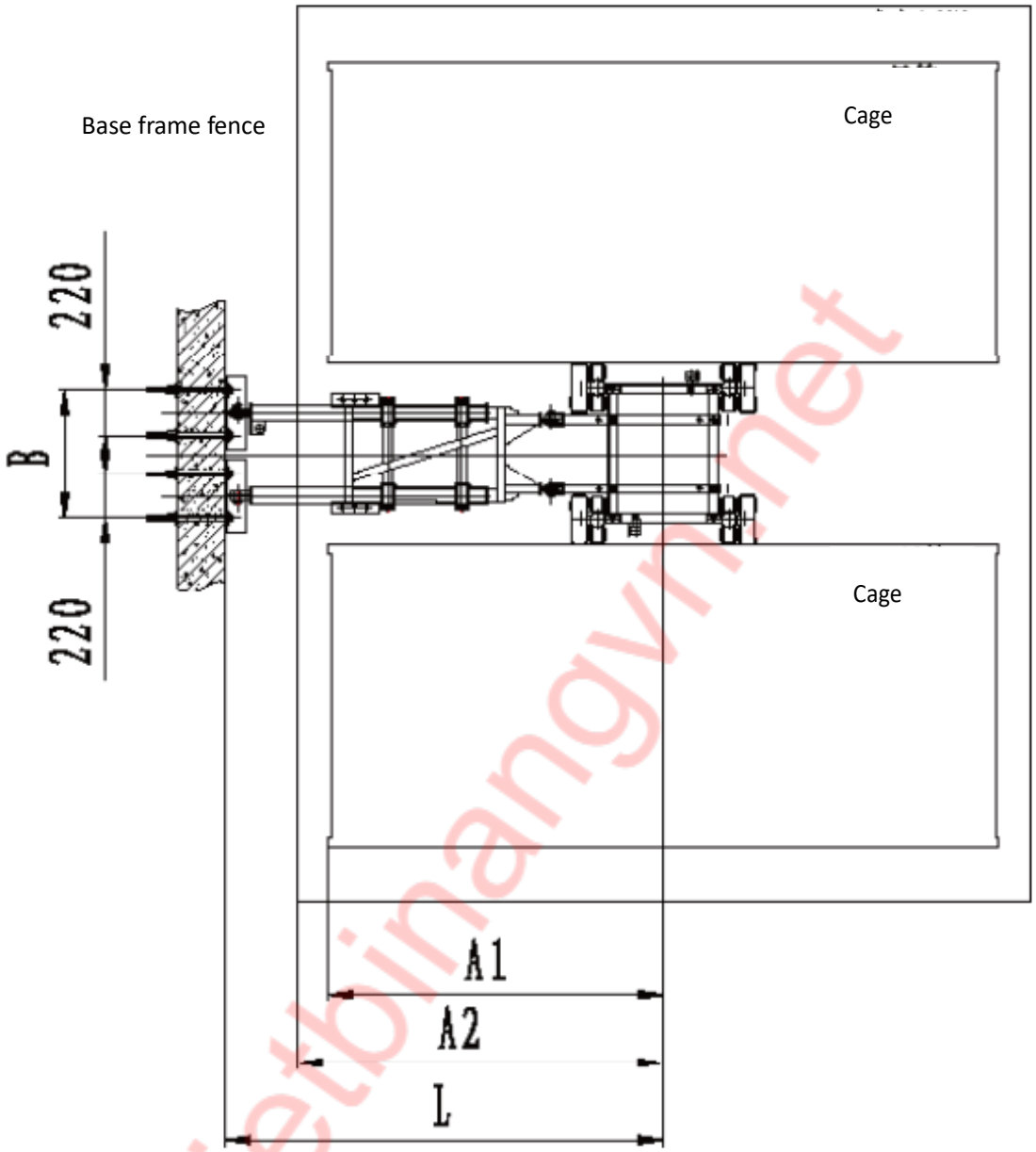


Figure 3.2.6-2 Schematic Diagram for Use with V in Type II D-VA Universal Attachment Device A

2. Type II D-VA Universal Attachment Units B

1). The distance of attached wall L=3000~3600mm, the width of wall connection is B=1500mm, as shown in figure 3.2.6-3,

2). Replace part of components, can be converted to VA type attached wall use, the original attachment device small coupling frame, rear coupling rod can be common, attached wall distance L=1700~2000mm, wall connection width B=610mm, as shown in Figure 3.2-5,

Table 3.2-6 Connection Size Type Ⅱ D-VA Universal Attachment Units VA

Cage Specification	General model	Model	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2 x 1.5m	Type II D-VA Universal Attachment Units A	II D	3000~3600	1650	1800	1500
		V	1900~2200	1650	1800	410
	Type II D-VA Universal Attachment Units B	II D	3000~3600	1650	1800	1500
		V	1700~2000	1650	1800	610
3.0 x 1.3m	Type II D-VA Universal Attachment Units A	II D	3000~3600	1540	1700	1500
		V	1900~2200	1540	1700	410
	Type II D-VA Universal Attachment Units B	II D	3000~3600	1540	1700	1500
		V	1700~2000	1540	1700	610

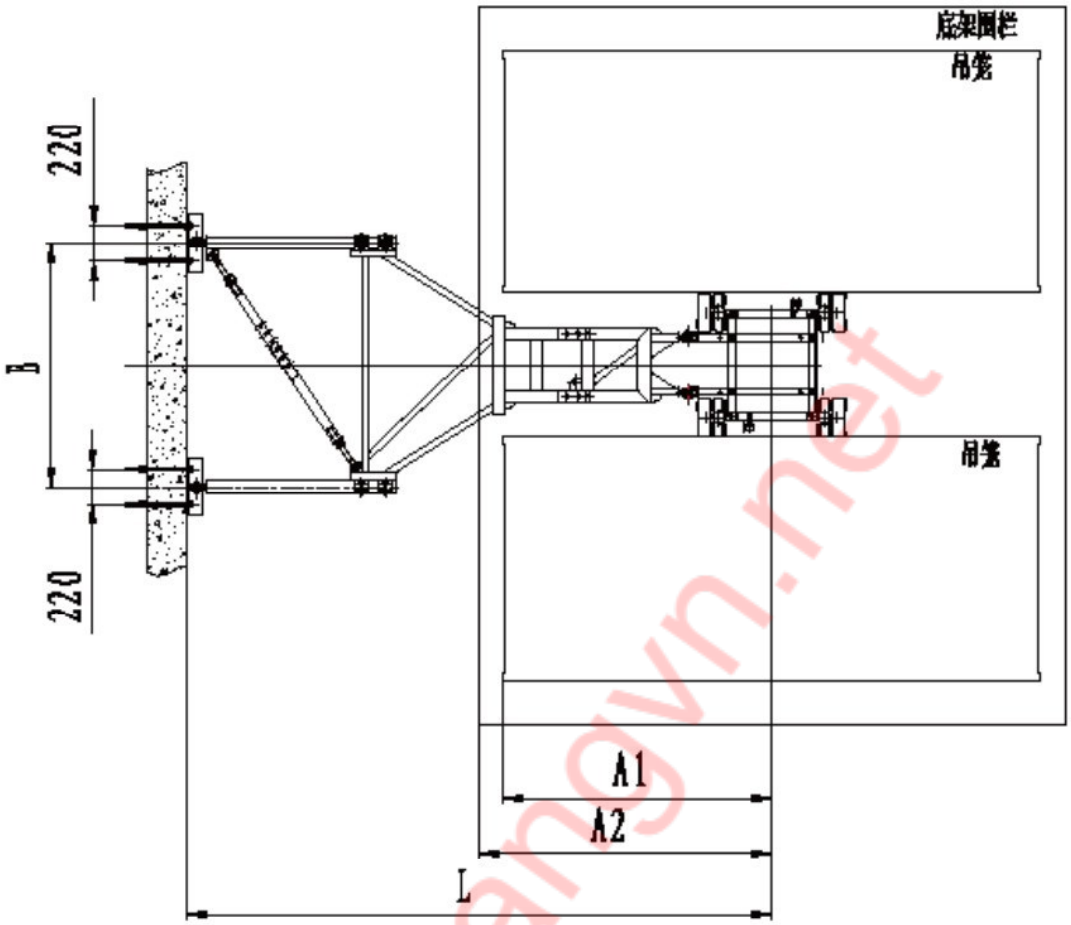


Figure 3.2.6-3: Schematic Diagram for Use with II in Type II D-VA Universal Attachment Device B

3.2.1.7 VI Type Wall Bracket

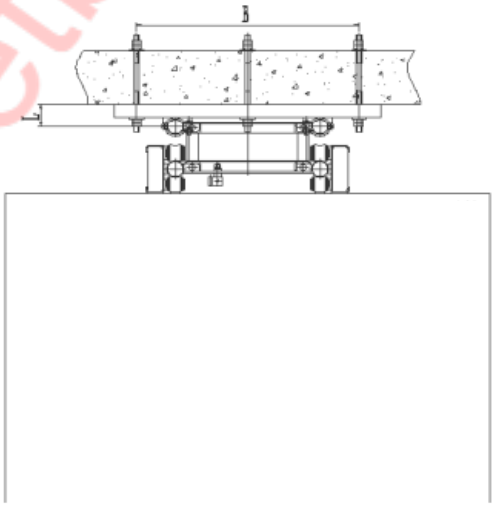


Figure 3.2-7 VI Type Wall Bracket

Table 3.2-7 Connection Size of VI Type Wall Bracket

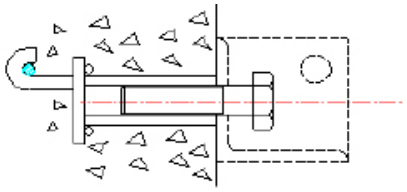
Cage Configuration	L (mm)	A1 (mm)	A2 (mm)	B (mm)
3.2 x 1.5m	111	/	/	1000
3.0 x 1.3m	111	/	/	1000

3.3 Connection between Mast Tie and Wall

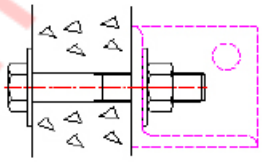
3.3.1 Connection between Wall and Mast Tie of SC Construction Hoist

The connection between mast tie and wall can be realized in the following manners:

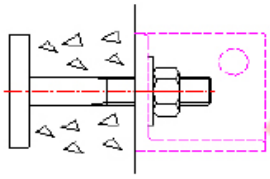
[Example 1] Connected with embedded part in wall



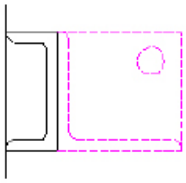
[Example 2] Fixed with wall-penetrating bolt



[Example 3] Embedded bolt



[Example 4] Welded onto steel structure



[Example] Chemical Bolt

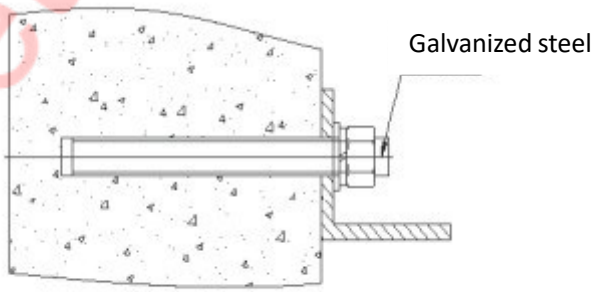


Figure 3.3-1 Mode of Connection between Wall and Mast tie of Construction Hoists

Note

(1) In light of actual needs, the user shall select the connection mode between mast tie and wall, and prepare the connecting bolts and parts, which shall be able to bear the force F calculated in accordance with the formula given in 3.5 (The M24 bolt of which the strength class is 8.8 may be selected);

(2) As for connection between mast tie and wall, it is prohibited to use any expansion bolt;

(3) If the on-site erection conditions are special, please contact us.

3.4 Maximum Installed Distance and Maximum Cantilever End Height of Mast Tie

3.4.1 Maximum Installed Distance and Maximum Cantilever End Height of Mast tie of SC Construction Hoist

3.4.1.1 Erection of I-type, II-type, IV-type and V-type Mast Tie and Cable Guiding Device (Trolley Type)

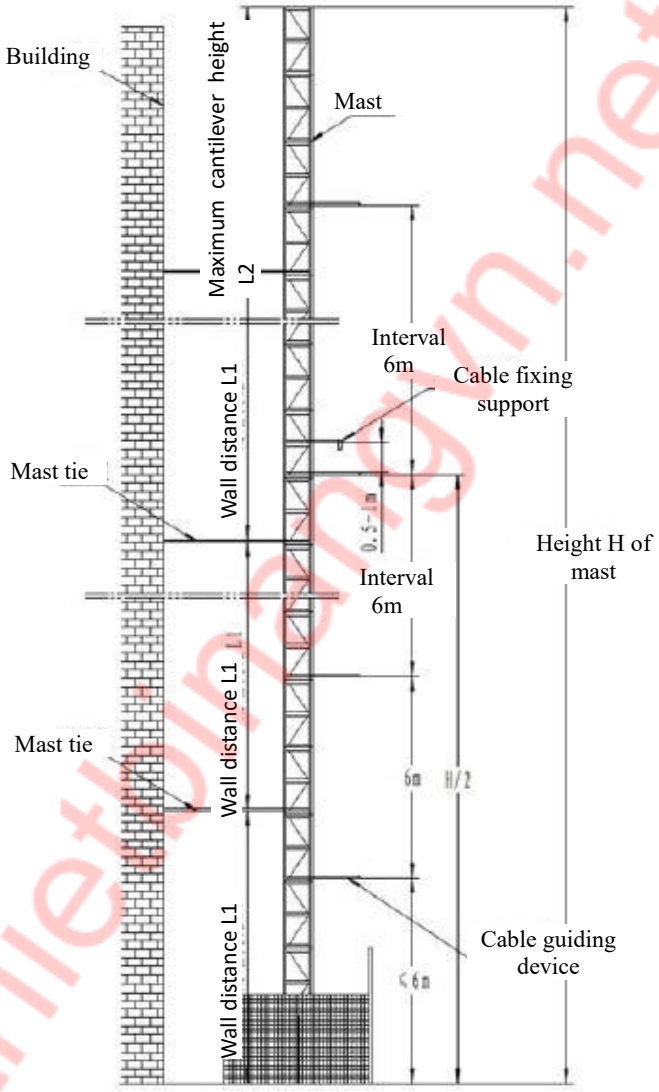


Figure 3.4-1 Schematic Diagram for Erection of I-type, II-type, IV-type and V-type Mast tie and Cable guiding device

Note

(1) The maximum distance of I, II and IV-type mast tie shall meet the requirements in Table 3.4-1;

(2) When the installed height of mast exceeds 150m, it is not advised to adopt the I or IV-type mast tie;

(3) The installed distance of cable drum type mast tie is as same as that of trolley type.

3.4.1.2 Erection of III-type Mast Tie and Cable Guiding Device (Trolley Type)

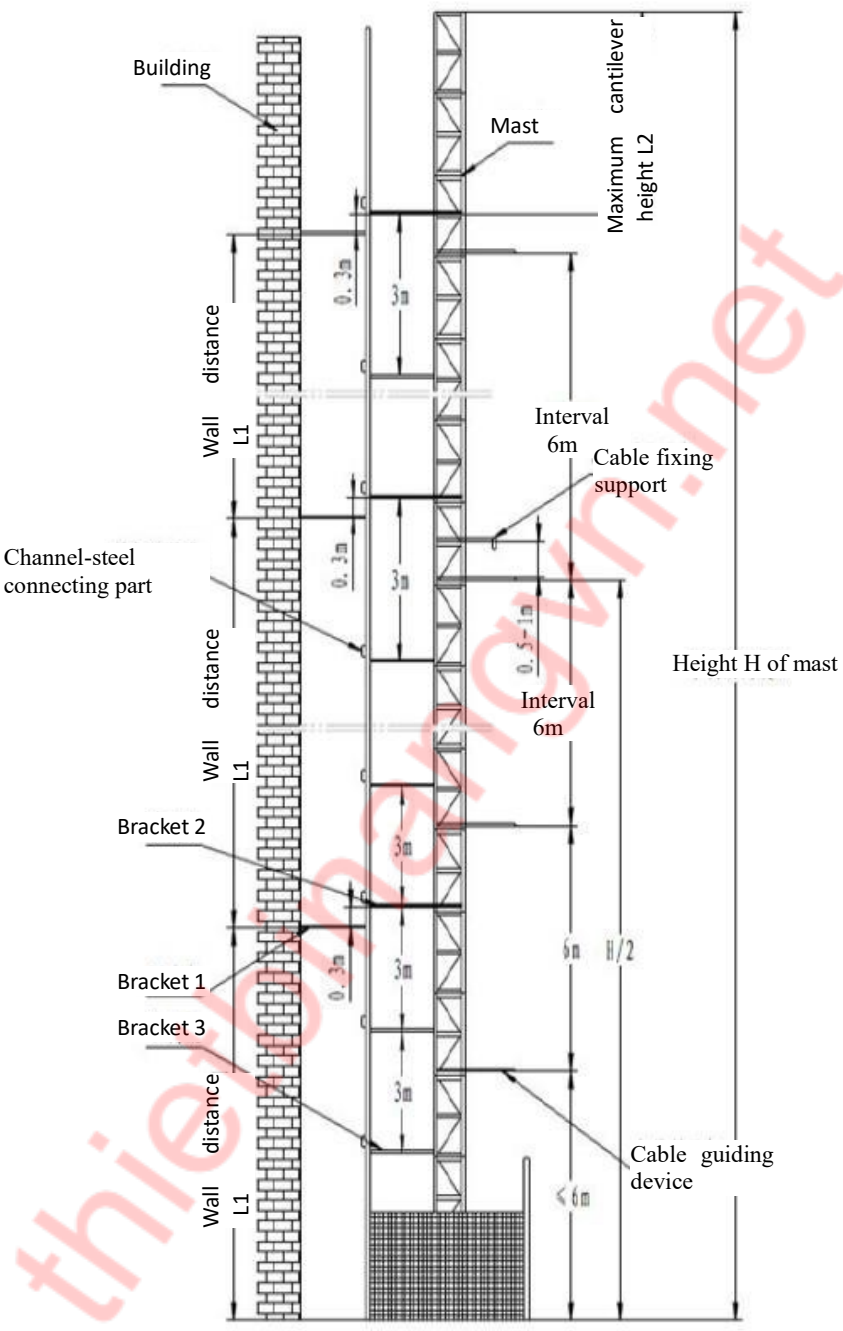


Figure 3.4-2 Schematic Diagram for Erection of III-type Mast tie and Cable guiding device

Note

(1) The maximum wall distance of bracket 1 shall meet the requirements in Table 3.4-1;

(2) When the erection height of mast exceeds 150m, it is not advised to adopt the III-type mast tie;

(3) The installed distance of cable drum type mast tie is as same as that of trolley type.

The mast tie shall be attached to the building in accordance with the specified distance, and as for every type of mast tie, the maximum installed distance L1 and the maximum cantilever end height L2 are indicated in Table 3.4-1:

Table 3.4-1 Maximum Installed Distance and Maximum Cantilever End Height of Mast Tie of SC Construction Hoist

Item \ Type of Mast Tie		I Type	II Type	III Type	IV Type	V Type	VI Type
Maximum Installed Distance L1 (m)	Height of mast ≤100m	10.5	10.5	10.5	10.5	9	/
	100m< height of mast≤150m	9	9	9	9	9	/
	150m< height of mast≤300m	/	7.5	/	7.5	7.5	/
	Height of mast ≥300m	/	7.5	/	/	/	/
Maximum Cantilever End Height L2 (m)	Height of mast≤100m	6	6	6	6	6	/
	100m＜height of mast ≤150m	6	6	6	6	6	/
	150m＜height of mast≤300m	/	6	/	6	6	/
	Height of mast≥300m	/	6	/	/	/	/

3.5 Calculation of Force Applied by Mast Tie on Wall

While setting the construction hoist in accordance with the maximum installed distance L1 and mast maximum cantilever end height L2 in Table 3.4-1 and Table 3.4-2 as well as parameters L and B of mast tie, the user shall determine the force applied by various types of mast tie onto embedded parts and bolts, so as to set up the appropriate embedded parts and bolts (Normally, the class-8.8 M24 high-strength bolts are selected). In addition, the attaching point on building (such as wall, beam or post) shall be subject to force verification, so as to ensure safety and reliability.

The acting force F can be calculated in accordance with the following formula:

$$F = \frac{L \times 60}{B \times 2.05} (kN)$$

For example:

IID-type Mast Tie of SC Construction Hoist

Wall-attaching point distance B=1500, and wall distance L＝3200,

Then F=3200×60/(1500×2.05)＝62.44kN.

ZOOMLION

Operation Manual of Construction Hoist

Safety Signs

General Provisions

Brief Introduction

Preparation

- Erection and Dismantling

Technical Parameter

Operation and Safety

Electrical Control System

Regulation

Transportation

Appendix Ⅰ

Appendix Ⅱ

⑤

Erection and Dismantling

Erection and Dismantling

1. Erection

Before the erection, please carefully read and understand the relevant contents of this Manual. The erection personnel shall be duly trained, and hold the relevant qualification certificate.

1.1 Erection Procedure

(1) Making of foundation (For the specific method, please refer to Chapter 4 “Setup of Foundation”);

(2) Preparatory works for erection;

(3) Pre-erection safety training;

(4) Erection of base frame, buffer spring and lowest four mast sections;

(5) Erection of base frame and base enclosure;

(6) Erection of cage, drive system, cage roof base enclosure and jib;

(7) Increase mast height to 15m (and at the same time install one set of mast tie);

(8) Erection of electrical control system and overload protector;

(9) Erection of lower limit stopper and electrically-driven trial operation;

(10) Commissioning of complete hoist;

(11) Drop test;

(12) Height increase of mast (erection of mast tie) and erection of upper limit stopper;

(13) Erection of counterweight device (for hoist with counterweight);

(14) Erection of cable guiding device;

(15) Erection of floor call system.

1.2 Preparatory Works for Erection

In order to ensure that the erection of construction hoist will be carried out quickly and safely, the user properly complete the following preparatory works before the installation:

(1) Please ensure that the selected erection site for construction hoist meets the requirements of relevant safety standards and codes, has been inspected by the relevant institution and has been granted the qualification certificate.

(2) Please ensure that the erection site for construction hoist has power supply, lighting and lifting equipment and other necessary tools; the road and site has the areas required for storage of transportation vehicle and components of construction hoist.

(3) The user shall use the embedded parts, mast tie and relevant standard parts provided by the Company.

(4) Before the erection, the user shall inspect and confirm that no component has been collided, deformed or otherwise damaged in the course of storage and transportation; otherwise the user shall make efforts to make up, repair or replace such components.

(5) In accordance with the relevant provisions and requirements, set up the protective grounding device, with the grounding resistance ≤4Ω.

(6) The distance between on-site power supply box and power box on base frame and base enclosure of construction hoist shall be minimized, and normally may not exceed 20m. Every cage shall be equipped with a copper cable of which the section area exceeds 25mm^2; if the distance is too long, the sectional area of cable shall be increased appropriately, so as to ensure the quality of power supply.

Note

When the construction hoist is being used, the supply voltage shall be controlled within 380V±5%.

(7) As for any re-used construction hoist, before it is put into use again, please in accordance with the relevant provisions of the *Maintenance Manual*, carry out the maintenance, and ensure that all components are in good conditions. That is: to inspect all structural members for deformation and damage; to repair or replace the components which must be repaired or replaced.

(8) Before the erection, please prepare 2-3 sets of mast tie and cable guiding devices. The connecting parts and standard parts for mast tie shall be properly prepared.

(9) If the construction site is equipped with other lifting equipment (such as tower crane and lorry-mounted crane), please assemble 4-6 mast sections with M24×230 special bolts on ground, clear away soil and other foreign matters from pipe connector and both ends of rack, and apply the lubricating grease onto pipe connector.

(10) Necessary auxiliary equipment: One 5t (or above) lorry-mounted crane (tower crane available on site), and one theodolite.

(11) Components to be prepared by user:

- Foundation made in accordance with the requirements; and some 2-12mm thick steel washers to be placed in base frame for adjusting the verticality of mast;
- Special power box provided in accordance with the requirements, and cable used to connect the special power box and power box on base frame and base enclosure. The specific requirements for cable are given in (6);
- In addition to the special tools provided together with the hoist, the user shall also prepare a set of erection tools.

Figure 1.2-1 Tools to be Prepared by User for Erection

1.3 Erection of host machine

1.3.1 Pre-erection Notices

(1) When entering into the construction site, all persons shall comply with the ten work safety rules;

(2) The safety warning area shall be set up in construction site, and specific person shall be appointed to carry out supervision;

(3) The erection personnel may not wear hard-bottom shoes or high-heel shoes, shall wear the tight-fitting and convenient clothing, and shall fasten the safety belt;

(4) When carrying out overhead operation such as erection or dismantling of mast sections, the overhead operation personnel shall find a safe and appropriate position on their respective post, fasten the safety belt, and lock up the safety hook;

(5) As for erection of hoist, it is absolutely prohibited to use any damaged fastener such as bolt, pin shaft or cotter pin; and it is also prohibited to use any discarded rope or lifting equipment;

(6) Before the erection, please get familiar with all contents of Section 2.2 “Safety Requirements for Erection/Dismantling Phase” in Chapter “General Provisions”; fully understand the mechanical function and electrical performance of various components of construction hoist;

(7) Without permission, don’t replace the electrical wiring of construction hoist;

(8) When the construction hoist is operating, the head and hand of personnel may not protrude beyond the base enclosure on cage roof, and the persons and goods carried may not lean against the base enclosure on cage roof;

(9) It is absolutely prohibited to carry out the erection at night or under drunk state;

(10) Before the erection, please remove the rust and burr from interface, pin hole and bolt hole on components to be installed such as mast section and mast tie, and apply the appropriate lubricating grease to such positions and rack, so as to ensure that the rotating components are fully lubricated and can rotate smoothly;

(11) In severe weather such as wind velocity higher than 12.5m/s or thunderstorm or snow, it is prohibited to install or dismantle the construction hoist!

(12) If there is any person working on mast or mast tie, it is absolutely prohibited to start the hoist;

(13) When installing the construction hoist, please take the operation box to cage roof, and don't carry out operation in the cage;

(14) When installing the construction hoist, please load the construction hoist in accordance with the rated load, and don't get it overloaded;

(15) When using the jib to carry out the erection, it is prohibited to get it overloaded, and the jib may only be used to install and dismantle the components of construction hoist, and may not be used for any other purpose. When the construction hoist is operating, it is absolutely prohibited to hang up any heavy article on jib;

(16) Don't forget to tighten up the connecting bolts between mast section and mast tie;

(17) The concrete foundation shall go through the specified concrete curing period.

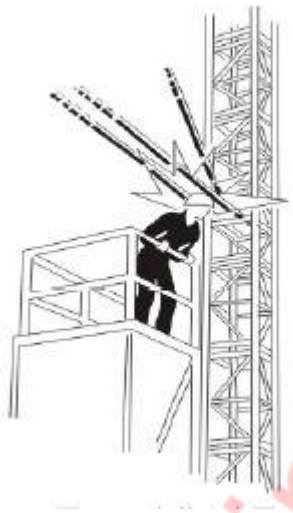


Figure 1.3-1 Notice Diagram 1 for Erection

Figure 1.3-2 Notice Diagram 2 for Erection

1.3.2 Erection of Base frame and Base Enclosure

1.3.2.1 Erection of Base frame, Lowest Mast sections and Base Frame and Base enclosure of SC Construction Hoist

(1) Clean up the surface of foundation;

(2) Transport the base frame to the erection position, determine the erection position and direction, level the base frame (by using the level meter), use M30×180 bolts to connect the base frame to the embedded parts of foundation, and don't tighten up them immediately;

(3) Install the first mast section (Normally, it is not equipped with rack; before the erection, wipe clean the pipe connectors on both ends of mast section and rack pin, and apply a little of lubricating grease; in the course of erection, pay attention to the direction of rack);

(4) Install 3-4 mast sections by using the same method, insert the steel washers between foundation base frame and concrete foundation at the position as indicated in Figure 1-6, so as to adjust the levelness of foundation base frame (to be corrected with level meter). Use the theodolite, level meter to carry out measurement, adjust the verticality of mast, ensure that the verticality of every vertical tube in two adjacent directions is no more than 1/1500, and then tighten up the connecting bolts between underpan and embedded parts of foundation with the

pre-tightening torque of 600N•m;

(5) Use M16 bolts to connect the main base frame and auxiliary base frame, and use steel washers to block up the auxiliary base frame;

(6) Fix the buffer spring device onto the buffer seat with bolts;

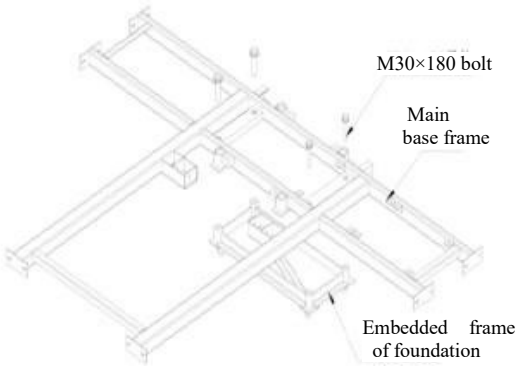


Figure 1.3-3 Erection Diagram of Base frame

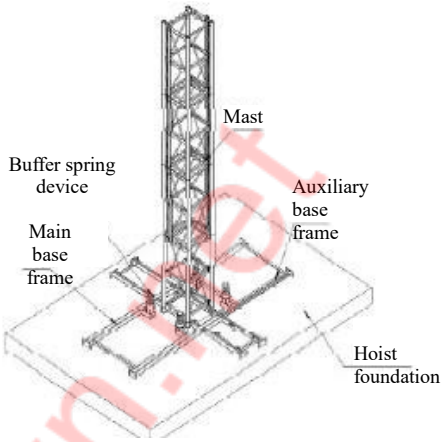


Figure 1.3-4 Erection Diagram of Mast

(7) Use M10 bolts to connect the rear base enclosure, side base enclosure, door frame and middle box with main base frame and auxiliary base frame respectively, and don't tighten up them immediately;

(8) Install the door support, adjust the verticality of door frame, and ensure that the verticality of door frame in two adjacent direction is no more than 1/1000; adjust the verticality of rear base enclosure and side base enclosure, and tighten up all clamps;

(9) Install the external base enclosure door, door counterweight slideway and door counterweight;

(10) Install the cage door stopper and external base enclosure door lock, and adjust the distance between door lock and external base enclosure door, so as to enable the door lock to lock up the external base enclosure door;

(11) Install the power box onto the middle box on base frame and base enclosure.

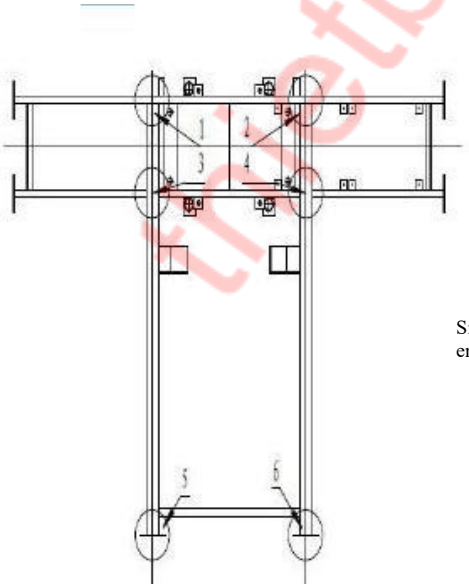


Figure 1.3-5 Adjustment Diagram of Base frame

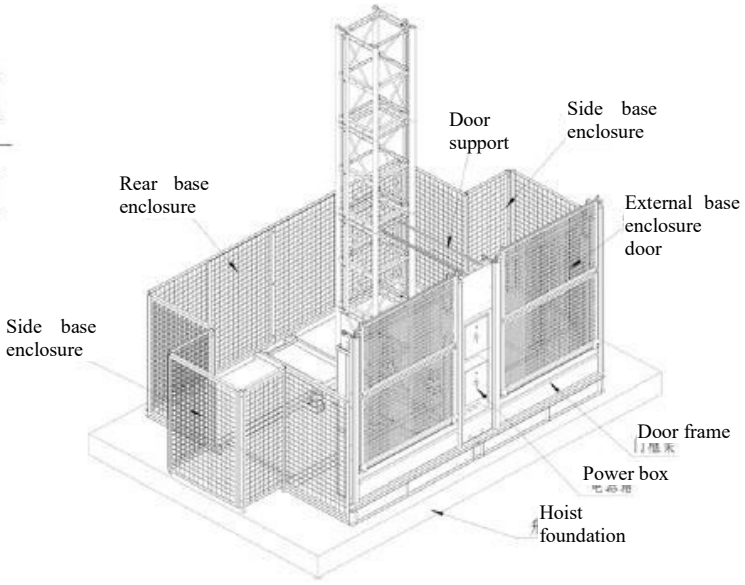


Figure 1.3-6 Base frame, Mast and Base Frame Base Enclosure after Erection

1.3.3 Erection of Cage, Drive System, Cage Roof Base enclosure and Jib

(1) Place a sleeper or other steel section on the base frame (The height shall exceed the height of spring buffer device);

(2) Arrange an erection worker to stand on the top of mast for directing the alignment between cage and drive system, use the lifting equipment (lorry-mounted crane or tower crane) to slowly lower down the cage from the top of mast slowly and stop it on the previously-prepared sleeper or steel section, and lift up another cage by using the same method;

(3) Release all motor brakes on drive system. The method is as follows: (1) As for domestically-manufactured motor: Screw in the two nuts on brake (Please ensure that the two nuts are screwed in parallelly), until the brake is released and the brake disc can be turned freely; (2) As for NORD motor, firstly screw the manual release tie bar into the threaded hole on brake, and then pull the release tie bar, turn the supporting bolt to uphold the tie bar, and ensure that the brake disc can be turned freely; (3) As for SEW motor brake, use the hexagon ring spanner to slowly tighten up the hexagonal bolt of brake, until the brake is released and the brake disc can be turned freely.

Use the lifting equipment to slowly lower down the drive system from cage roof. When the distance between plate on drive system and cage plate is 400mm, return the motor brake to normal state, and then lift up and install the other drive system by using the same method;

(4) Insert the long base enclosure, short base enclosure and end base enclosure on care roof into the corresponding tube, and tighten up the connection of base enclosures with bolts. During erection of base enclosure, the end with baffle plate shall be installed at inner side of cage;

(5) As for variable-frequency speed-regulation construction hoist, please lift the electrical control cabinet and resistor box onto the cage roof, and then fix them onto the base enclosure with bolts;

(6) Assemble the jib on ground, and then use the lifting equipment to lift the jib up and insert it into the jib hole; after it is installed, the rotating shaft of jib shall be able to rotate smoothly;

(7) Install the cable arm.

Note: The guardrail baffle shall be installed inwards

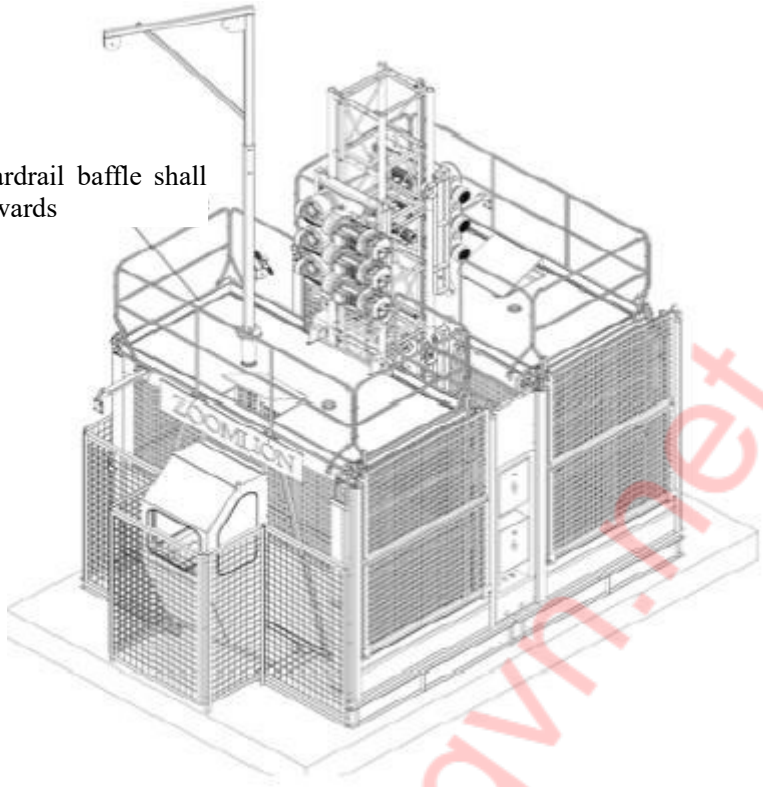


Figure 1.3-7 Erection of Main Structure (SC Construction Hoist)

Figure 1.3-8 Erection of Drive System

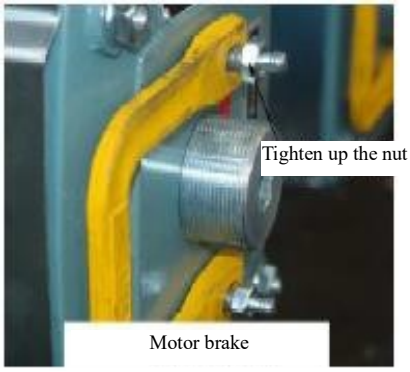


Figure 1.3-9 Domestically-manufactured Motor Brake

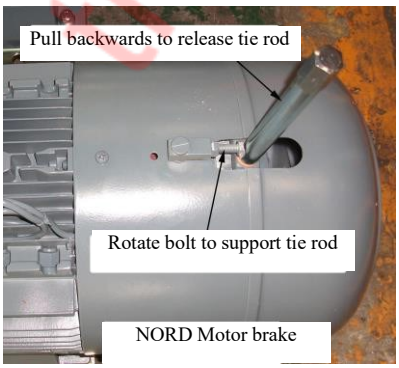


Figure 1.3-10 NORD motor brake

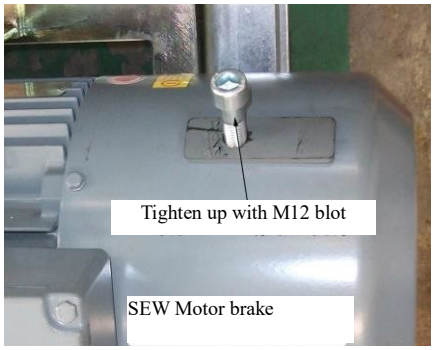


Figure 1.3-11 SEW motor brake

The connection method for construction hoist with single connection point between driven system and cage is below:

(1) Hoist the driving body to the upward side of the cage, adjust the clearance of the driving pinion and rack, the clearance between all rollers and main chord and the clearance between back rollers and the reverse side of rack, then use pin axle to connect the singe lug plate of the driving body and the two lugs plate of the connecting rod, see Figure 1.3-12;

(2) Slowly put down the driving body, and use sensor pin (weight sensor) to connect the lifting plate of cage and connecting rod, in order to finish the type-T connection of driving body and cage;

(3) Adjust the clearance of double-rollers, side rollers of cage and main chord, and pay attention to protect the signal outlet of sensor pin so as to avoid breakdown.

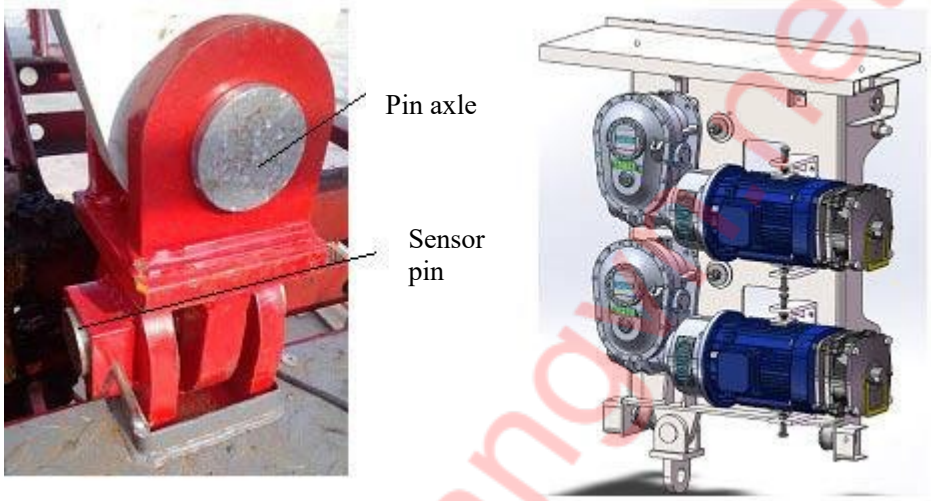


Figure 1.3-12 Schematic Diagram for Type-T Connection

Note

When testing, the adjustment requirements of clearance of pinion and rack, and the clearance of roller and main chord are as follows:

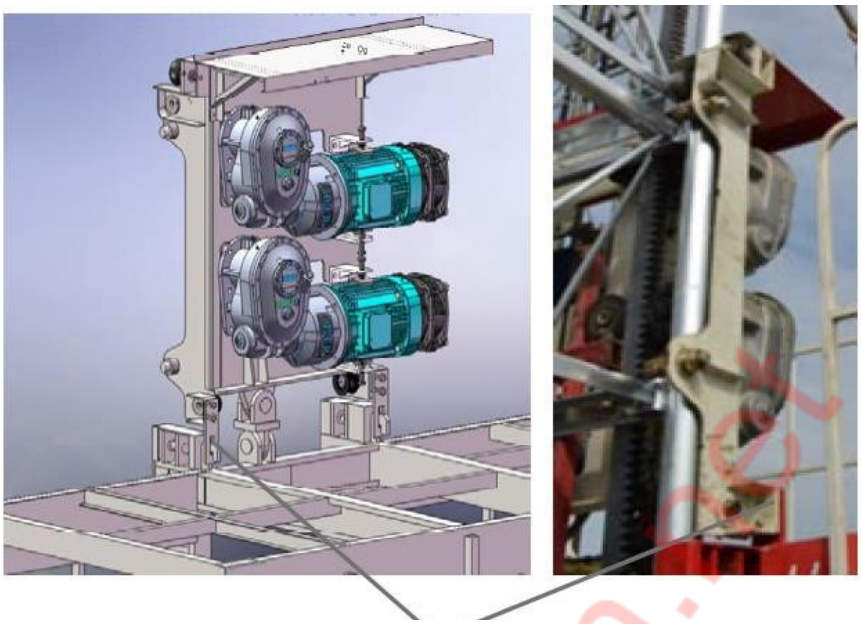
(1) The back lash between the pinion and rack shall be 0.2~0.5mm;(for construction hoist with two motors driven system, the value should be between 0.5~0.8mm;

(2) The back lash between the guide wheel and rack shall be 0.2~0.5mm;

(3) The clearance between all rollers and vertical tube of mast section shall be 0.5mm.

Warning

For construction hoist using single lifting point connection method, after the drive system connecting with cage through single hoist point, make sure the safety pulling plate is installed onto the driving bracket, using it along with the safety anchorage plate of cage to achieve the function of safety protection.



Safety pulling plate

Installation diagram for safety pulling plate

1.3.4 Height Increase of Mast

(1) Assemble three mast sections on the ground with bolts in accordance with the pre-tightening torque of 300N•m, use the lifting tool to lift it up onto the installed mast section, and then connect them with the connecting bolts in accordance with the pre-tightening torque of 300N•m;

(2) After the height of mast is increased to 10.5m, please set up the first mast tie at the position about 9m above the ground, use theodolite or other testing instrument to inspect the overall verticality of mast in two vertical directions (The error in verticality of mast shall be no more than 5mm), and then continue to increase the height to 15m.

Note

When the erection position is relatively high and the wall thickness of main chord of mast section is of different specification, the inspection on mast is as indicated in Figure 2.1-3 in Chapter 4 "Preparation".

1.4 Erection of Lower Limit Stopper on Mast and Electrically-driven Trial Operation

(1) As for in-cage operation, please operate the variable-frequency speed-regulation construction hoist with low-speed gear, move the hoist (with rated load) until the bottom of cage is at the same level as doorsill, press down the emergency stop button, install the lower limit cam and limit switch cam (Both the lower limit cam and limit switch cam are fixed onto the frame of mast section with hook-shaped bolts; the erection position of limit switch cam shall ensure that it will act before the cage touches the buffer spring).

The variable-frequency speed-regulation construction hoist shall be equipped with deceleration limit cam, which

shall be installed at the position that the lower end face of deceleration limit cam is about 200mm lower than the upper end face of lower limit cam, as indicated in Figure 1.4-2.

(2) The electrically-driven trial operation of hoist may be carried out only after the erection of overload protector and the works specified in step (1) above are completed. Just turn on the power supply, arrange the full-time operator on the cage roof to prudently operate the handle, so as to make the unloaded cage move up and down along the mast for several times, with the running height no more than 5m. It is required that the cage can move smoothly without jump and abnormal noise and the brake can work normally. Thereafter, further inspect the contact conditions between every guide roller and mast as well as the engagement condition between gear and rack.

- The clearance between gear and rack shall be 0.2-0.5mm;
- The clearance of guide wheel and back of rack shall be 0.5mm;
- The clearance between every roller and vertical tube of mast section shall be 0.5mm.

(3) After the unloaded trial operation is successfully completed, place the rated load in the cage, carry out the loaded trial operation, and inspect the heating situation of motor and retarder;

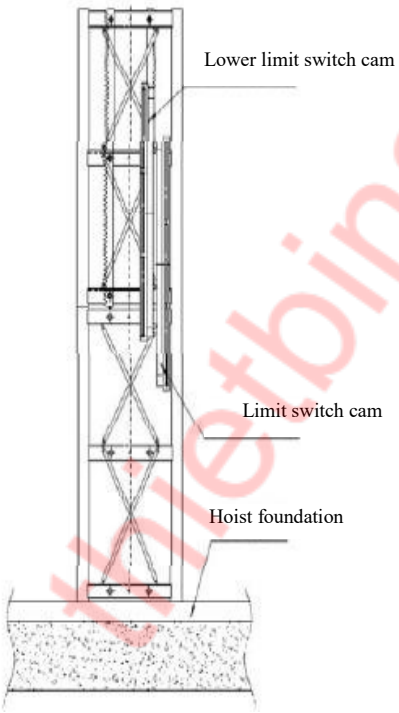


Figure 1.4-1 Erection of Limit cam of ordinary construction hoist

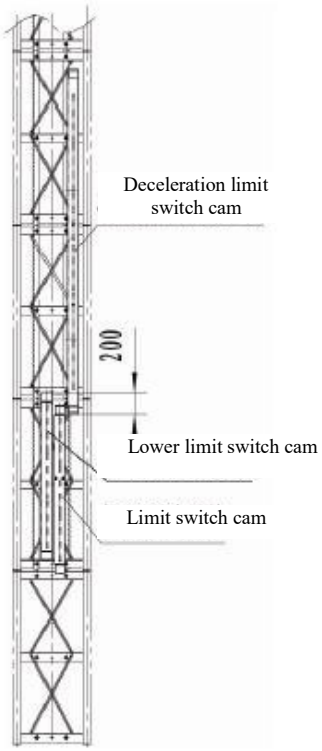


Figure 1.4-2 Erection of Limit cam of Variable-frequency Hoist

Warning

(1) In the course of trial operation, because the upper limit stopper has not been installed on the top of mast, please prudently carry out the operation;

(2) In the course of inspection, the emergency stop button shall be pressed down or the power supply shall be turned off, so as to avoid disoperation.

1.5 Commissioning of Complete Hoist

After the main structure of construction hoist is in place (The height of mast is no more than 15m), the trial operation may be carried out, so as to implement the inspection. Before the inspection, please confirm that the voltage and power of power supply in construction meet the requirements; the leakage protection devices are sensitive and reliable. The running direction of motor in cage shall be correct, and the start and stop of such motor shall be effective; the phase protector, power limiter, upper/lower limiter, door limiter and emergency cut-off switch shall be sensitive and reliable.

1.5.1 Clearance Adjustment for Guide Roller

Adjust the eccentric shaft in roller of drive system and cage, so as to ensure that in relation to mast section, two vertical posts of cage and the posts of drive system are placed symmetrically, and the clearance between every roller and vertical tube of mast section is 0.3-0.5mm, as indicated in Figure 1.5-1. After the adjustment, tighten up all bolts.

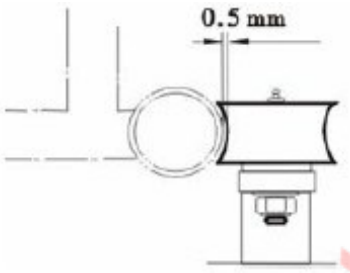


Figure 1.5-1 Clearance Adjustment for Roller

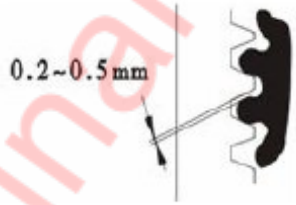


Figure 1.5-2 Adjustment of Gear-rack Backlash

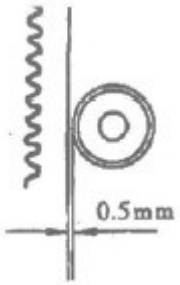


Figure 1.5-3 Adjustment of Back Rolls-rack Clearance

1.5.2 Adjustment of Gear-rack Backlash

As for every gear running on rack, please ensure that the specified gear-rack backlash is satisfied. In the course of inspection, just use the compression method to inspect the backlash, and the value shall be 0.2-0.5mm, as indicated in Figure 1.5-2. After the adjustment, tighten up all bolts.

1.5.3 Adjustment of Back Rolls -Rack Clearance

The back rolls on construction hoist shall be placed symmetrically in relation to center of back of rack. The erection clearance between back rolls and rack shall be 0.5mm, as indicated in Figure 1.5-3. After the adjustment, tighten up all bolts.

1.5.4 Adjustment of Trolley

Place the trolley of construction hoist on ground, adjust the eccentric shaft of guide wheel of trolley, and make sure that the clearance between guide wheel and rail is 0.5mm. Please ensure that, when pushing and pulling the trolley with hand, the trolley shall move smoothly without jam.

If selecting free debugging trolley, don't need to adjust the guide pulley of trolley. After installing, only need to make sure the trolley running flexibly and no blocking.

Warning

When carrying out erection or adjustment under the cage, please firstly cut off the main power supply, and then uphold the bottom of cage with a rigid support, so as to avoid the accident caused by sliding of cage!

1.5.5 Full Lubrication of Construction Hoist

The lubrication of construction hoist shall be carried out in accordance with the requirements in the maintenance manual.

Note

The contents of 1.5.4-1.5.5 shall be implemented after the complete hoist is installed.

1.6 Drop Test

1.6.1 Requirements for Use of Overspeed safety device

(1) When the overspeed safety device is delivered from factory, it has been properly adjusted and sealed up. Therefore, don't randomly disassemble the overspeed safety device;

(2) In the course of drop test, if the overspeed safety device can't act normally (i.e., the braking is not realized within the specified distance), please identify the cause or re-adjust the overspeed safety device;

(3) If any abnormal situation occurs to the overspeed safety device (e.g., any part is damaged), please immediately cease the use and replace it with a new one;

(4) After the overspeed safety device acts, please rest it in accordance with the provisions; otherwise it is prohibited to start the hoist;

(5) Don't fill any oily substance into the overspeed safety device, including lubricating oil.

1.6.2 Instructions on Drop Test

(1) As for the hoist which is installed for the first time, the hoist which is transferred from a construction site and is re-installed, and the hoist which has been overhauled, please carry out the drop test. As for the hoist in normal use, the drop test shall be carried out every three months or in accordance with the local provisions;

(2) According to the national standard of China, after one year from the date on which the overspeed safety

device is delivered from factory (The date stated on nameplate or test report shall apply) shall be sent back to the manufacturer for inspection (including those which have not been used in such one year), and thereafter be sent back to the manufacturer for inspection every year, and may be used only after it is confirmed as qualified through inspection. The service life of overspeed safety device is 5 years.

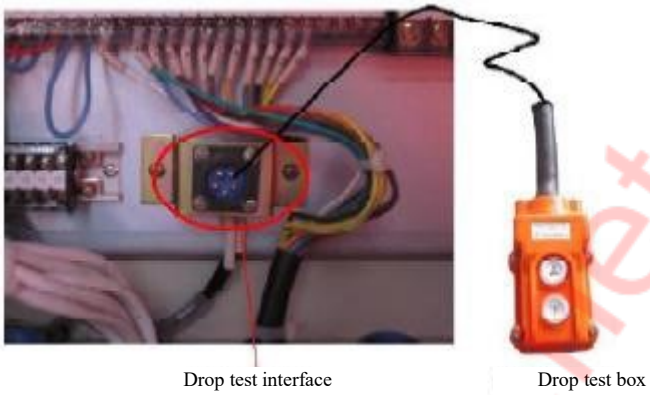


Figure 1.6-1 Interface of Drop Test

1.6.3 Method of Drop Test

(1) Increase the height of mast to about 15m, and install a mast tie at the position about 9m away from base frame 9m (applicable to SC construction hoist) or 6m and 12m from base frame respectively (applicable to SC industrial hoist);

(2) Load the rated weight on the hoist;

(3) Cut off the main power supply of power box on base frame base enclosure, use the test cable to short-connect the inching switch of overspeed safety device, and as indicated in Figure 1.6-1, insert the drop test box (5-core aviation plug) into the interface in electrical control cabinet;

(4) Pass the drop test button box through the door and place it on the ground, and ensure that in the course of drop test, the cable will not be jammed, and close all doors;

(5) Turn on the main power switch; press down the button “UP” on the drop test button box so as to move the drive system to about 10m above the ground 10m (Please ensure that the drive system will not go beyond the top);

(6) Press down and hold the “drop” button, and then the cage will drop freely. After it drops for a certain distance, the overspeed safety device will act so as to lock up the cage. Under normal circumstance, the braking distance of cage is 0.15-1.40m. In case of any special circumstance, please contact the Company;

Note

In the course of drop test, no person may stay in the cage. If the cage still does not stop when it drops freely to about 3m above the ground, please immediately release the button so as to stop the cage, and then inch the button “Drop”, so as to slowly lower the cage onto the ground, and identify the cause.

(7) Press the button “UP” and move the cage up for about 0.2m, so as to reset the centrifugal block of

overspeed safety device;

(8) Inch the button “Drop”, so as to slowly lower the cage down to the ground, and then remove the test cable. At this time, the cage can’t be started. Remove the drop test box, and reset the overspeed safety device in accordance with the method specified in 1.6.4.

Note

(1) As for every inching operation, the drop distance of cage may not exceed 0.2m; otherwise the speed limiter will act again;

(2) After the drop test is completed, please remove the test cable!

1.6.4 Resetting of Overspeed safety device

(1) After the overspeed safety device acts, please adjust the overspeed safety device, so as to get it reset. Before the overspeed safety device is rest, it is absolutely prohibited to operate the construction hoist;

(2) Except for drop test, before the overspeed safety device is reset, please firstly identify the cause for action of overspeed safety device, and also confirm that:

- The electromagnetic brake of motor shall work normally;
- The gear pair and coupling shall be in good conditions;
- The cage guide roller, back rolls and rack shall work normally;
- The gear and rack shall be in good conditions and normally engaged with each other;
- The inching switch in overspeed safety device shall work normally (Before the resetting, the cage shall not be started if the moving-up command is given).

(3) After the inspection for resetting is successfully completed, please firstly cut off the power supply, and then reset the overspeed safety device in accordance with the following procedure:

- Remove the screw 1 and cover 2;
- Remove the screw 3;
- In the direction as indicated by the sign on end of overspeed safety device, use the special spanner 5 and the pry 4 to loosen the nut 7, until the end of pin 6 is at the same level with the end of overspeed safety device. At this time, the circuit of final limit switch is closed;
- Mount the screw 3 and cover 2;
- As for the overspeed safety device which has release mechanism on its end, please also remove the cover 9;
- If possible, tighten up the stud 8 with hand, use tool to tighten up the stud 8 for another 30°, and after hearing the sound “coo” in the overspeed safety device, fully loosen the stud 8;

- Mount the cover 9;
- Turn on the power supply, and move the cage up for 0.2m, so as to return the overspeed safety device to normal state.

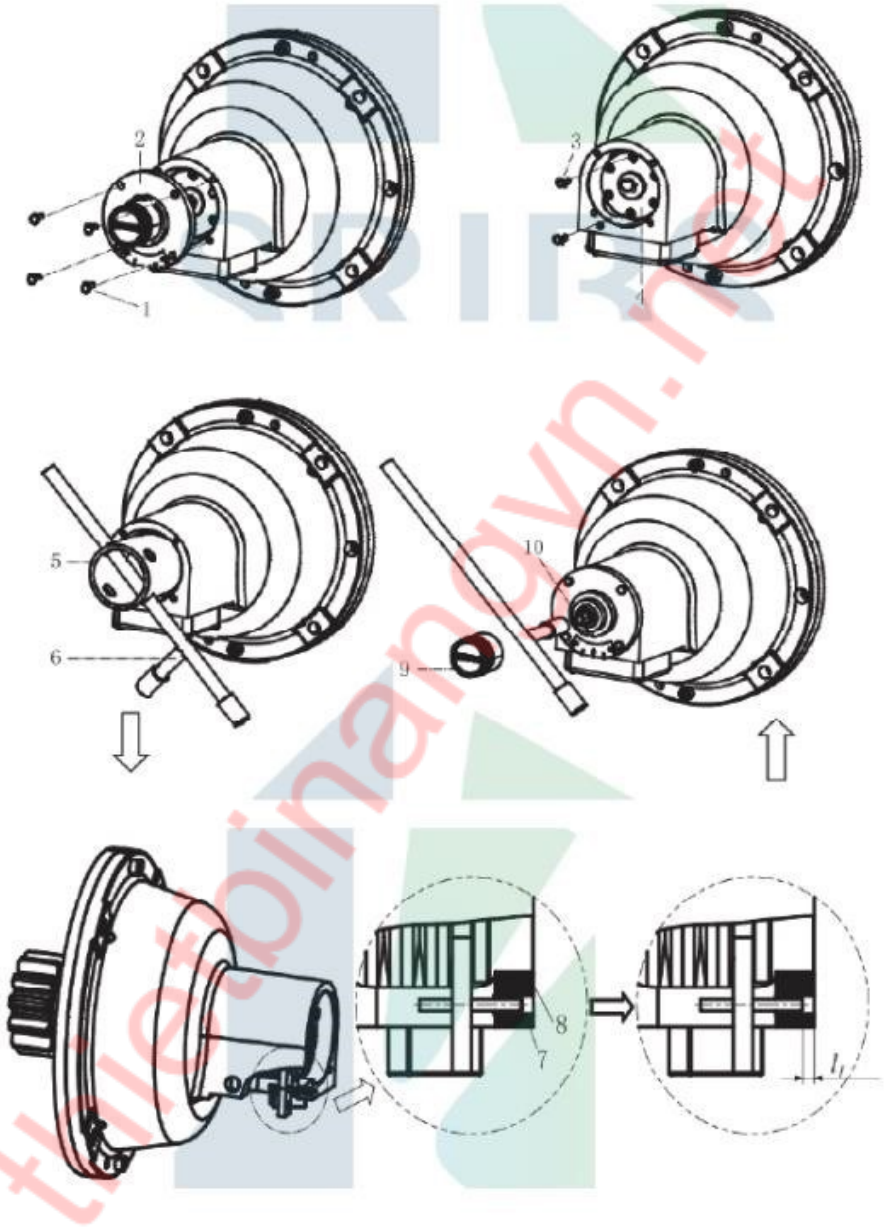


Figure 1.6-2 Diagram for Resetting of Overspeed Safety Device

Note

After the drop test is completed, disconnect the connecting plug from button box.

1.7 Height Increase of Mast (Erection of Mast Tie) and Erection of Upper Limit Stopper

1.7.1 Height Increase of Mast

After the above adjustment procedure is completed and the drop test is successfully completed under rated load conditions, the height of mast may be increased.

(1) Before the erection, please place the mast sections, the mast ties and the cable guiding devices to be installed on the solid and dry ground beside the base enclosure;

(2) If the mast sections are of different specifications, implement the height increase in accordance with the "Configuration Diagram for Wall Thickness of Main Chord of Mast section" in Figure 2.1-3 in Chapter 4 "Preparation";

(3) The height increase procedure for mast is detailed as follows:

- Insert the plug of jib into the socket on cab, lower down the lifting hook of jib, and hook up the lifting lug of mast section;
- Use the mast section lifting tool to hook up one mast section, lift the mast section onto the cage roof and properly place it (No more than three mast sections may be placed on cage roof every time);
- Start the hoist, and when the top of drive system approaches the top of mast, inch the hoist until the top of drive system is about 300mm away from the top of mast;
- Press down the emergency stop button, so as to prevent any accident;
- Lift up one mast section, and apply the lubricating grease on the interface of main pipe of such mast section. Lift up the mast section to the top of mast, align it with the connection hole on lower mast section, and tighten up all bolts with the tightening torque no less than 300N•m;
- Repeat the operation above, until the mast reached the required erection height;
  - ① When the height of mast is increased, the mast tie shall be installed in accordance with the requirements;
  - ② The upper port of four main chords on highest mast section shall be equipped with rubber sealing cover;
  - ③ If appropriate lifting equipment is available in the construction site, please assemble 3 or 4 mast sections on the ground in accordance with the requirements, and then directly lift them onto the top of mast for erection.
- Whenever the mast is increased by about 10m, please use the theodolite or other testing instruments to inspect the verticality of mast in two vertical directions. The requirements on verticality deviation are indicated in Table 1.7-1. Once the deviation exceeds the limit, please carry out adjustment in time.

Table 1.7-1 Verticality Deviation of Mast

Mast Height (m)	h≤70	70<h≤100	100<h≤150	150<h≤200	h>200
Verticality deviation (mm)	No more than 1/1000 of mast height	≤35	≤40	≤45	≤50

Note

(1) When the cage is operating, it is prohibited to hang the mast section on jib;

(2) In the course of erection, the cage roof operation mode shall be adopted;

(3) The operation personnel on cage roof shall pay attention to safety, and prevent the cage from colliding with mast tie and other components;

(4) When connecting the mast sections, please ensure that the disalignment between vertical tubes of upper and lower mast sections is no more than 0.5mm.

1.7.2 Erection of Upper Limit Stopper of Mast

After the height increase of mast is completed, install the upper limit switch cam and limit switch cam (as indicated in Figure 1.7-1). The erection position of limit switch cam shall meet the following requirements:

(1) If the rated speed is lower than or equal to 0.85m/s, the erection position of limit switch cam shall ensure that, after the limit switch is activated; there is at least 1.8m safety distance for cage roof. In addition, as for any component or equipment in cage which is higher than the cage, there shall be at least 0.3m safety distance above such component or equipment;

(2) If the rated speed is higher than 0.85m/s, the erection position of limit switch cam shall ensure that, after the limit switch is activated, there is at least $(1.8+0.1V^2)$m safety distance for cage roof, where V means the rated speed. In addition, as for any component or equipment in cage which is higher than the cage, there shall be at least 0.3m safety distance above such component or equipment;

(3) The erection position of upper limit switch cam shall meet the following requirements: In normal working state, after the upper limit switch touches the upper limit cam, the distance between the arm of limit switch and the lower end of limit switch cam is 150mm;

(4) In addition to upper limit switch cam and limit switch cam, the variable-frequency speed-regulation construction hoist shall also be equipped with deceleration limit cam, of which the erection position shall be as follows: the upper end face of deceleration limit cam is about 200mm higher than the lower end face of upper limit cam, as indicated in Figure 1.7-1.

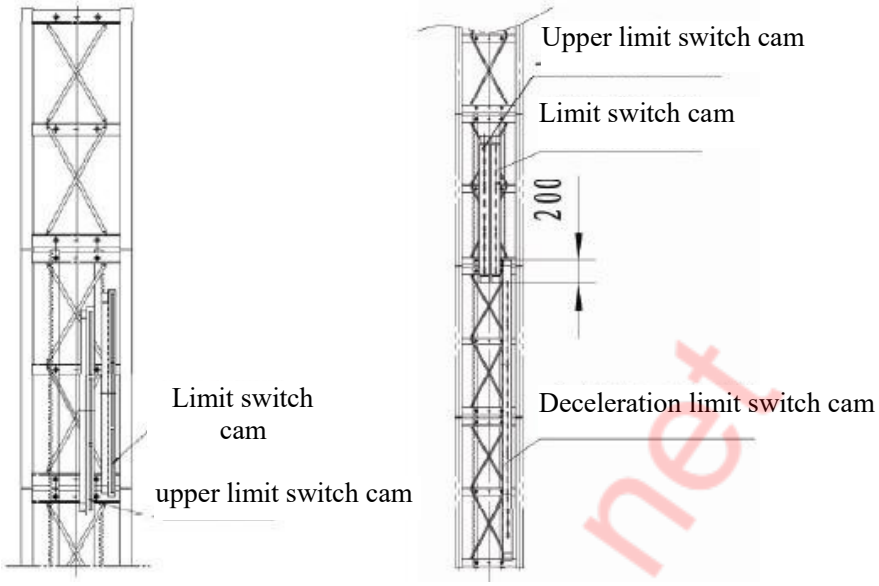


Figure 1.7-1 Erection Diagram for Limit cam

1.8 Erection of Mast Tie

The erection of mast tie shall be carried out in the same pace with the height increase of mast, and the operation personnel shall get familiar with all contents of Chapter 4 “Preparation”, understand the requirements on installed distance of mast tie and maximum free end height of cable guiding device, master the connection requirements and adjustment method for various components of mast tie to be installed.

As for the lifting method of mast tie, please refer to the lifting method of mast section, and use the jib on cage roof to lift the mast tie or use the cage to transport the mast tie. When using the cage to transport the mast tie, it is also required to adopt the cage roof operation mode.

The user may, in light of on-site use requirements, select the I-type, II-type, III-type, IV-type or V-type mast tie; the mast ties may be fixed onto steel tower, concrete floor slab of building, force-bearing wall, force-bearing beam or force-bearing steel structure, but may not be fixed onto any non-force-bearing structure such as scaffold. The erection procedures for various types of mast tie are detailed as follows.

Note

(1) When installing the mast tie, all cotter pins shall be in open state;

(2) All bolts shall be tightened up;

(3) In the course of erection, the emergency stop button shall be always pressed down.

1.8.1 Erection of Mast Ties of SC Construction Hoist

1.8.1.1 Erection of Type-I Mast Tie

(1) Use four M16 bolts or M16 U-bolts to fix the rear connecting rod of mast tie onto the angle steel on upper and lower frame of mast section (The rear connecting rod shall be placed symmetrically), and don't tighten up the bolts excessively, so as to facilitate the adjustment of position;

(2) Use class-8.8 M24 bolt to fix the erection seat of mast tie onto the building;

(3) Use M20 bolts to connect the connecting tube, rear connecting rod and rotary pin shaft with the erection seat;

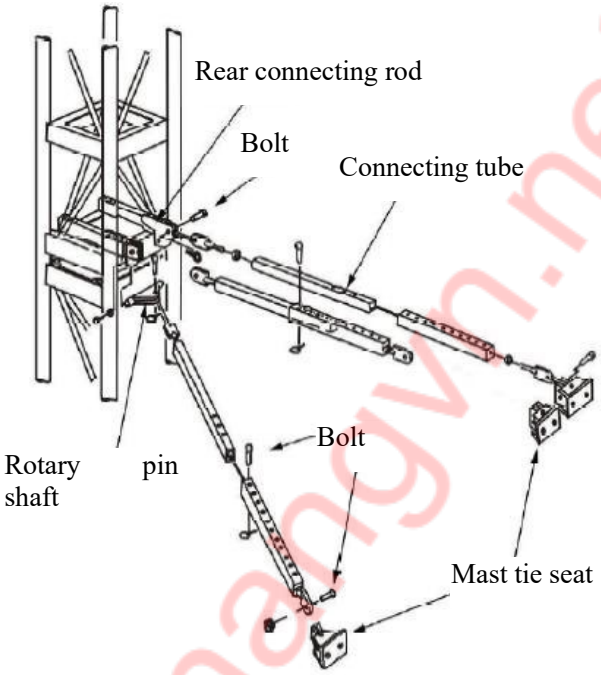


Figure 1.8-1 Erection Diagram for I-type Mast Tie

(4) In accordance with the requirements, correct the verticality of mast and the levelness of mast tie;

(5) After the correction is completed, tighten up all connecting bolts. Thereafter, slowly start the hoist, and ensure that the cage and counterweight don't interfere with the mast tie.

Note

(1) The permissible maximum horizontal inclination of mast tie is ±8°, namely 144: 1000;

(2) The Type-Imast tie is only applicable to single-cage hoist of which the installed height of mast is no more than 300m.

1.8.1.2 Erection of II-type Mast Tie

(1) Use four M16×90 bolts or M16 U-bolts to fix the rear connecting rod of mast tie onto the angle steel on upper and lower frame of mast section (The rear connecting rod shall be placed symmetrically), and don't tighten

up the bolts excessively, so as to facilitate the adjustment of position;

(2) Use the class-8.8 M24bolt to fix the mast tie seat onto the building;

(3) Use the φ24 pin shaft 2 to connect the small connection bracket with rear connecting rod, and the install D-type safety pin;

(4) Use the φ20 pin shaft 1 to connect the small connection bracket with large connection bracket, and install the cotter pin. After the erection, the cotter pins shall be in open state;

(5) Use the φ24 pin shaft 2 to connect the front connecting rod with mast tie seat, install the D-type safety pin, and connect the front connecting rod with connection bracket clamp;

(6) Install the adjustable connecting rod between mast tie seat and large connection bracket. The adjustable connecting rod shall be connected with φ20 pin shaft 1 and cotter pin, and the adjustable connecting rod, large connection bracket and front connecting rod shall be connected with φ24 pin shaft 2 and D-type safety pin;

(7) In accordance with the requirements, correct the verticality of mast and the levelness of mast tie;

(8) After the correction is completed, tighten up all connecting bolts. Thereafter, slowly start hoist, and ensure that the cage and counterweight don't interfere with the mast tie.

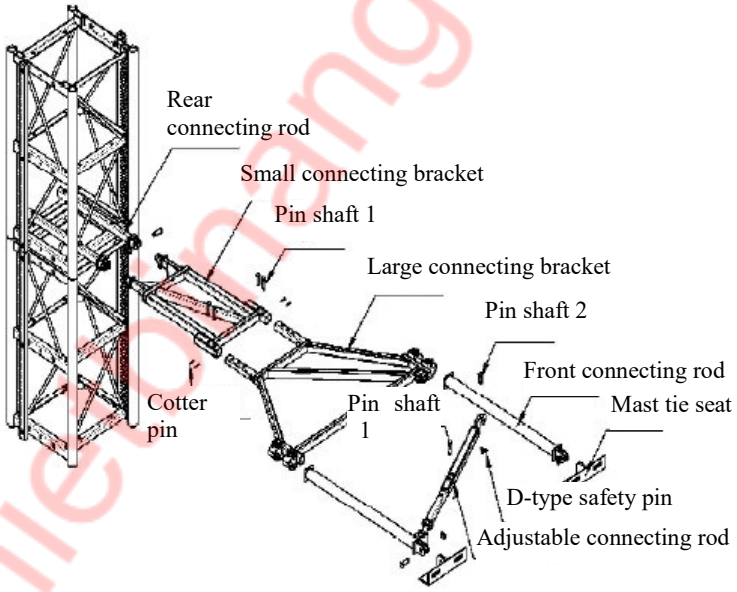


Figure 1.8-2 Erection Diagram for II-type Mast Tie

Note

The permissible maximum horizontal inclination of mast tie is ±8°, namely 144:1000.

1.8.1.3 Erection of III-type Mast Tie

(1) Install the φ76 vertical tube, make the end with gap face upwards, and insert the expansion clamp between two tubes, so as to tighten up the bolts;

(2) Install the bracket 2 between mast and φ76 vertical tube at the position about 9m above the ground, and then install one at the interval of every 9m;

(3) Between φ76 vertical tube and building at the position about 300mm above or below the bracket 2, install one bracket 1 and one sway brace at the interval of 9m;

(4) Install a channel-steel connection bracket at every floor station platform, and use the level meter to ensure the levelness. If the distance between two floor stations is too long, please ensure that a channel-steel connection bracket is installed at the interval of 3m;

(5) Install one bracket 2 or 3 at the position no more than 300mm above or below the channel-steel connection bracket;

(6) By adjusting the bracket 1, correct the verticality of mast. The pulling device such as wire rope may be used to carry out the adjustment;

(7) After the erection, please inspect and confirm that all bolts are properly tightened up;

(8) Inspect and make sure that there is no interference or collision between cage or other moving components and mast tie.

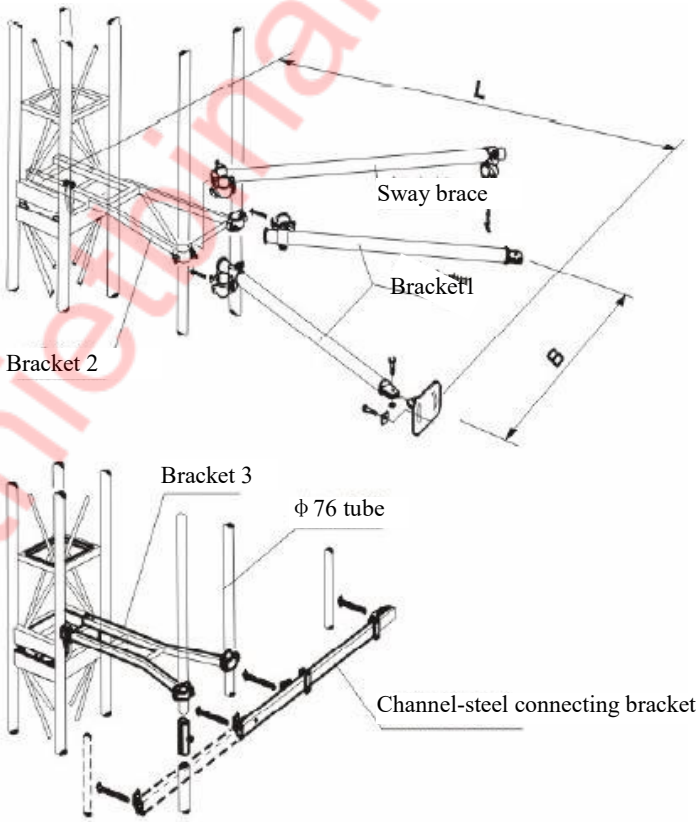


Figure 1.8-3 Erection Diagram for III-type Mast Tie

Note

(1) The permissible maximum horizontal inclination of mast tie is ±8°, namely 144:1000;

(2) If the total installed height of mast exceeds 150m, it is not advised to adopt the Type-III mast tie.

1.8.1.4 Erection of IV-type Mast Tie

(1) Use four M16 bolts or M16 U-bolts to fix the rear connecting rod of mast tie onto the angle steel on upper and lower frame of mast section (The rear connecting rod shall be placed symmetrically), and don't tighten up the bolts excessively, so as to facilitate the adjustment of position;

(2) Use M24 bolts to fix the mast tie onto the building;

(3) Use bolts to connect the connection bracket and rear connecting rod with mast tie seat. The connection between connection bracket and rear connecting rod is realized with M16 bolts; the connection between connection bracket and mast tie seat is realized with φ24 pin shaft and D-type pin;

(4) Correct the verticality of mast and the levelness of mast tie in accordance with the requirements;

(5) After the correction is completed, tighten up all connecting bolts, slowly start the hoist, and ensure that the cage and counterweight don't interfere with the mast tie.

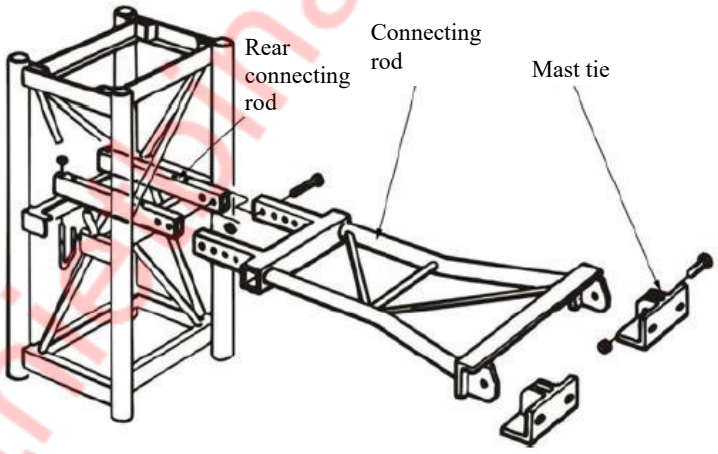


Figure 1.8-4 Erection Diagram for IV-type Mast Tie

Note

The permissible maximum horizontal inclination of mast tie is ±8°, namely 144:1000.

1.8.1.5 Erection of V-type Mast Tie

(1) Use four M16 bolts to fix the rear connecting rod of mast tie onto the angle steel on upper and lower frame of mast section (The rear connecting rod shall be placed symmetrically), and don't tighten up the bolts excessively, so as to facilitate the adjustment of position;

(2) Assembling the connection bracket of V-type Mast Tie. According to the attached distance, connecting the adjustable connecting rod I with connection bracket by pin B20x95, and locking pin B20x95 by cotter pin. Then connecting the mast tie seat with adjustable connecting rod I by pin, and locking the pin by D-type pin. Then connecting adjustable connecting rod II by pin, and locking the pin by D-type pin.

(3) Fine turning the attaching distance by adjusting the adjustable screw.

(4) Use M24 8.8 stage bolts to fix the mast tie onto the building;

(5) correct the verticality of mast and the levelness of mast tie in accordance with the requirements;

(6) After the correction is completed, tighten up all connecting bolts, slowly start the hoist, and ensure that the cage and counterweight don't interfere with the mast tie.

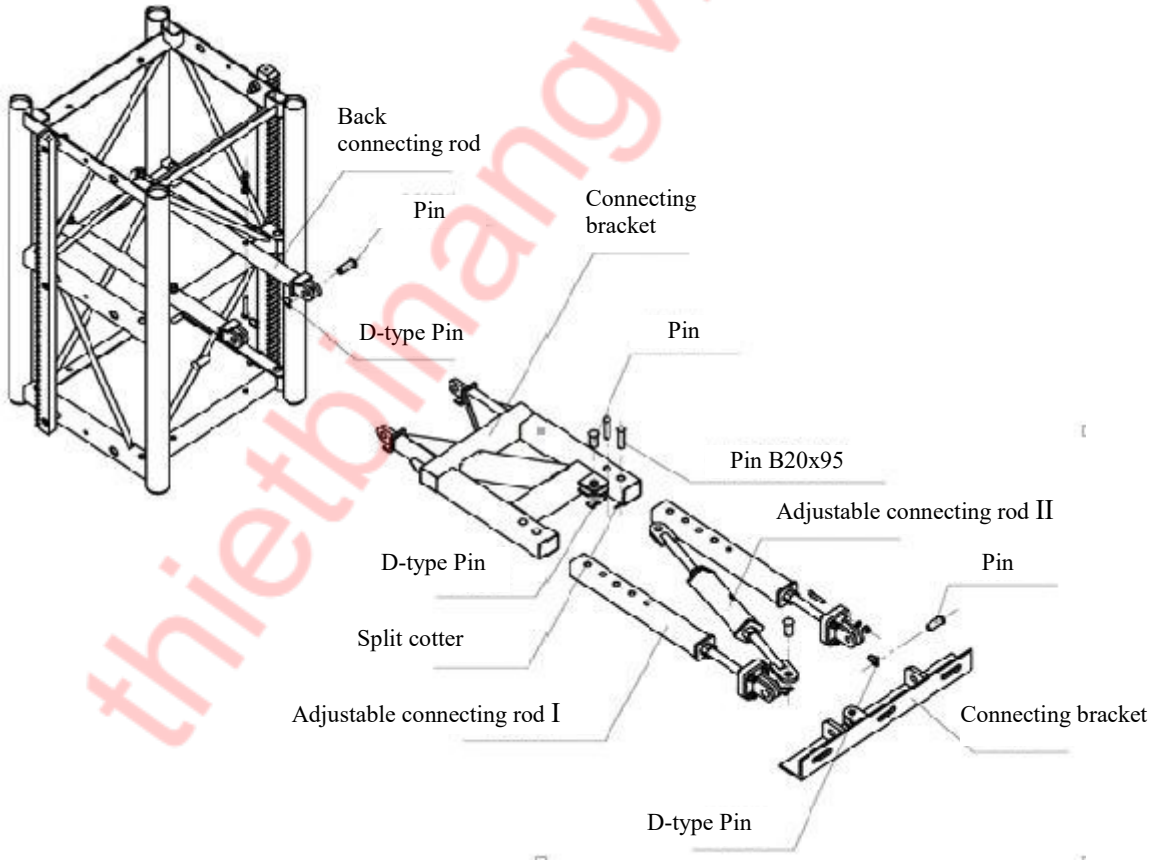


Figure 1.8-5 Erection Diagram for V-type Mast Tie

Note

The permissible maximum horizontal inclination of mast tie is ±8°, namely 144:1000.

1.9 Erection of Cable Guiding Device

On the basis of lifting height, the cable guiding device falls into the following types: cable drum type and trolley type.

1.9.1 Erection of Cable Drum and Cable Guiding Device

(1) After completing the 1.1~1.3 erection, install cable drum;

(2) Use the lifting tool to hang the cable on cable drum, as indicated in the figure below;

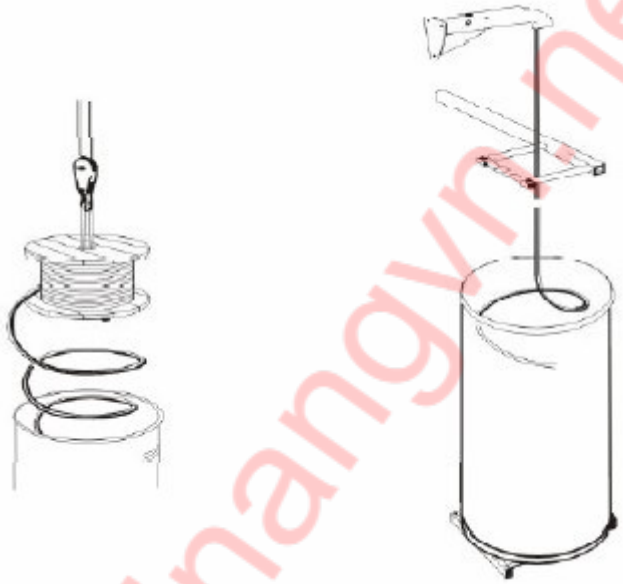


Figure 1.9-1 Erection Diagram for Cable Drum

(3) Release about 5.2m cable, so as to connect the cable to the power box;

(4) Pull out the cable from bottom of cable drum, draw it to the power box, and don't connect it immediately;

(5) Place the cable round by round clockwise into the cable drum, and make efforts to maintain every round in the same size, with the diameter slightly less than that of cable drum;

(6) Fix the cable onto the cable arm, and connect the cable connector to the corresponding connecting terminal;

(7) Connect the cable to power box, and then start the hoist, so as to inspect whether the cable is coiled as indicated in Figure 1.9-2;

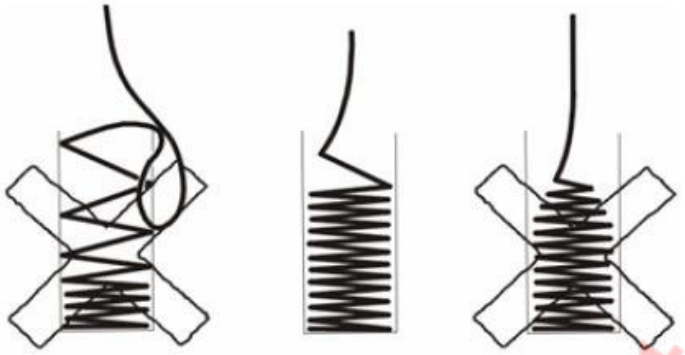


Figure 1.9-2 Diagram for Retraction and Release of Cable

(8) In the course of height increase of mast, please install the cable guards every 9 meters.

(9) Adjust the position of cable guiding device and cable arm, and ensure that the cable is located at the center of U shape of cable guiding device.

1.9.2 Erection of Trolley-type Cable Guiding Device of Single-cage Hoist

1.9.2.1 Erection Procedure under Circumstance that Power is Supplied by One Cable

(1) Complete the supply of power to cage as specified in 1.4; while installing, due to the free hanging cable in the process, personnel shall be assigned to pull and send cable on the ground in order to prevent the cable from contortion.

(2) Move the cage to the lowest position, cut off the main power supply, and disconnect the cable from external power supply;

(3) Coil up the cable, place it on the cage roof, vertically lower down one end of the cable from the cage, and connect it to the power box along the surface of underpan;

(4) Turn on the power supply, move up the cage and release the cable at the same time, and fix the cable into the mast at the interval of 1.5m;

(5) If the installed height of mast is less than one half of pre-determined total height plus 3m, just move the cage to the top of mast, and install the cable fixing support on highest mast section of mast. If the installed height of mast is no less than one half of pre-determined total height plus 3m, move the cage to the half height of mast, and install the cable fixing support at the height which is one half of pre-determined total height plus 1m;

(6) Fix the cable onto the cable-mounting bracket (Figure 1.9-3c);

(7) Slowly lower down the cage, and install a cable guiding device at the interval of 6m; When installing the cable guiding device, please make sure that the plates of trolley bracket on both sides and the cage cable arm can pass through the rubber plates of guide bracket;

(8) When the cage moves down to the same level as the doorsill, use a rigid support to uphold the cage (Make sure that erecting the trolley under cage is not dangerous);

(9) Cut off power supply, remove the end of cable from cable arm in the cage, and maintain it in freely

vertical state (If it is found that the cable can't suspend freely, the erection personnel shall straighten it up);

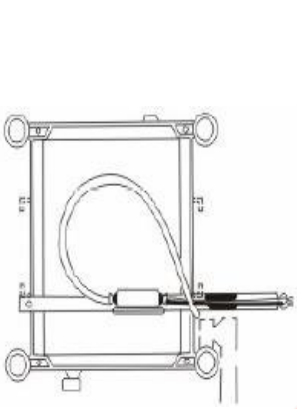
(10) On one side of the trolley, remove two rollers, and install the trolley under the cage;

(11) When re-installing the roller, just tighten up the screws with hand;

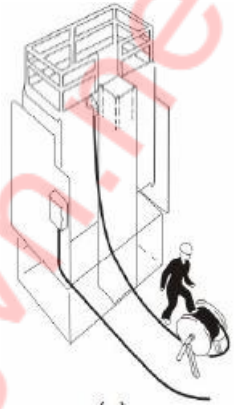
(12) Adjust the shafts of rollers, so as to maintain the clearance between roller and vertical tube at 0.5mm;

(13) Try to pull the trolley and make sure that the trolley is not jammed;

(14) Pass the free end of cable which has been straightened in step (9) through the trolley, and re-connect it into the connecting box in cage. Please ensure that the cable will not twist;

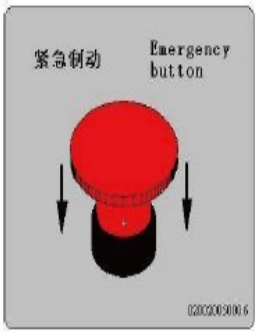


(a)



(b)

(c)



(d)

Figure 1.9-3 Schematic Diagram for Cable Guiding Device (Single-cage Hoist with Power Supplied by One Cable)

(a) Use the cable to connect the cage and power box; (b) Straighten the cable; (c) Install the cable to the fixed cable bracket; (d) Carry out trial operation

(15) Remove the support under cage;

(16) Without lifting up the trolley, pull up the cable straightly on cage roof, and then lift up the cable again,

so as to make the trolley contact with the bottom of cage. Thereafter, lower down the cable by one half of its length, and get it fixed by clamp on incoming wire bracket of cage, and fix the cable;

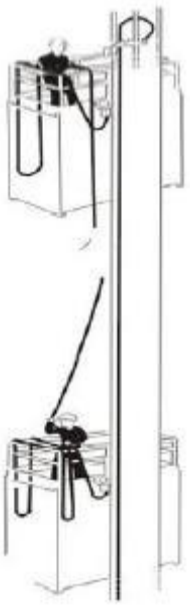
(17) Coil up the remaining cable, and fix it onto the safety base enclosure on cage roof;

(18) Turn on the main power switch, and ensure that the cable is connected correctly;

(19) Operate the hoist, and install the remaining cable guiding device.

1.9.2.2 Erection Procedure under Circumstance that Power is Supplied by Two Cables

(1) In the course of erection, it is the accompany cable which supplies power to the cage;



(2) Move the cage to the lowest position, use the jib to place the fixed cable on the cage roof, pass a shaft or tube through the cable coil and fix it on the cage roof, and make it easy for the cable to be released;

(3) Implement the step (5) in 1.9.2.1;

(4) Arrange another erection personnel to remove the accompanying cable from base frame power box at the bottom, and pull the accompanying cable onto the cage roof;

(5) Connect one end of the fixed cable to the middle connecting box, vertically lower down the other end to the underpan, and then connect the cable to the power box along the surface of underpan, and use the adhesive tape to fix the remaining cable onto the mast (position of fixed cable bracket), and ensure that the cable does not interfere with the moving components such as cage;

(6) Connect one end of accompanying cable (the end removed from power box) to the middle connecting box;

(7) Slowly move the cage downwards, install a clamp at the interval of 1.5m, fix the cable onto the mast and install a cable guiding device at the interval of 6m. When installing the cable guiding device, please make sure that the two side plates of trolley bracket and the cage cable arm can pass through the rubber plates of guide bracket;

(8) Implement the steps (8)-(19) in 1.9.2.1, and please note that the cable referred to in Steps (8)-(19) is accompanying cable.

1.9.3 Erection of Trolley Type Cable Guiding Device of Double-cage Hoist

1.9.3.1 Erection Procedure under Circumstance that Power is Supplied by One Cable

(1) Move the two cages to the lowest position, use a rigid support to uphold the right cage (Please ensure that the erection of cable pullet under the cage is not dangerous);

(2) Remove the cable of right cage, and use the lifting equipment to lift the cable of right cage onto the left cage;

(3) Start the left cage, and implement the step (5) in 1.9.2.1;

(4) Vertically lower one end of the cable to the underpan via the right cable-mounting bracket, connect the cable to the power box along the surface of underpan, and then also vertically lower the other end down to the ground;

(5) Slowly move the left cage downwards, install a clamp at the interval of 1.5m, fix the section of cable of right cage between cable-mounting bracket and power box onto the rail, and install a cable guiding device at the interval of 6m. When installing the cable guiding device, please make sure that the two side plates of trolley bracket and the cage cable arm can pass through the rubber plates of guide bracket;

(6) Move the left cage to the lowest position, implement the steps (10) -(19) in 1.9.2.1, so as to complete the erection of trolley type guide device of right cage;

(7) in accordance with the method specified in this section, use the right cage to complete the erection of left cage trolley guide device.

1.9.3.2 Erection Procedure under Circumstance that Power is Supplied by Two Cables

(1) Move two cages to the lowest position, and place a rigid support under the right cage (Please ensure that the erection of cable pullet under the cage is not dangerous);

(2) Remove the accompanying cable of right cage, and use the lifting equipment to lift up the accompanying cable of right cage and fix the cable onto the left cage;

(3) Start the left cage, and implement the step (5) in 1.9.2.1;

(4) Implement the step (5) in 1.9.2.2;

(5) Connect one end of accompanying cable (the end removed from power box) to the middle connecting box, and lower the other end slowly down to the ground along the mast;

(6) Implement the steps (6)-(8) in 1.9.2.1, so as to complete the erection of right cage trolley guide device;

(7) In accordance with the method specified in this section, use the right cage to complete the erection of trolley type guide device of left cage.

1.9.4 Height Increase of Cable guiding device

If after the height of mast is increased, the installed height of cable rack is less than one half of height of mast plus 3m, then before increasing the height of mast again, please move up the cable rack. The method is detailed as follows:

(1) Release the remaining cable which is coiled up on the cage roof (When releasing the cable, move the cage to the lowest floor), and then lock up the cable again; if the hoist uses the cable of one specification, the length to be relaxed shall equal three times the height whereby the cable-mounting bracket moves up; if the cables of two specifications are used for the hoist, the length to be relaxed shall equal two times the height whereby the cable-mounting bracket moves up.

(2) Move the cage upwards until the distance from cable-mounting bracket equals the length leased, and fix the cable and trolley onto the cable arm, so that no force is applied onto the cable-mounting bracket;

(3) Move the cage to the position of cable-mounting bracket, and confirm that the cable between cable-mounting bracket and power box is firmly fixed. If the cables of two specifications are used for the hoist,

just relax the cable which is coiled up at the position of cable-mounting bracket, with the length to be relaxed equaling the height whereby the cable-mounting bracket moves up;

(4) Dismantle the cable mounting bracket, move the cage to the new erection position of cable-mounting bracket, and then install the cable-mounting bracket;

(5) Connect the cable to the cable-mounting bracket;

(6) Slowly return the cable and trolley to free state;

(7) Slowly move the cage, and inspect whether there is interference or collision between components.

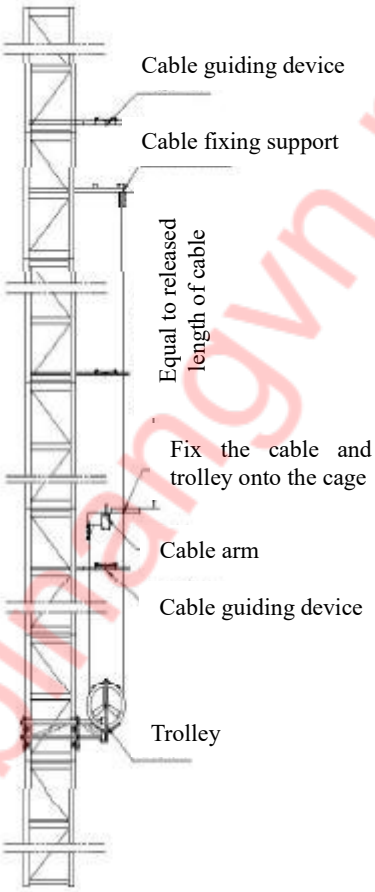


Figure 1.9-5 Height Increase of Cable Guiding Device

Warning

(1). The cage must be maneuvered up and down from the top of the cage. Installers at the top of the cage must stand in a safe position.

(2). The emergency button must be pressed at all times during installation. When wiring, the main ground power must be disconnected.

1.9.5 Erection Procedure for Cable guiding device of Special Trolley Rail

(1) On the ground, release all accompanying cables from the cable drum;

(2) Fix the cable arm onto the erection position on cage with bolts;

(3) Pass one end of the accompanying cable through the cable arm, and connect it to the connecting box in the cage; connect the other end to the power box on base frame and base enclosure (See Figure 1.9-4). In the course of wiring, be sure to cut off the main power supply!

(4) Turn on the main power switch. In accordance with the erection procedure, increase the height of mast and install the mast tie, and install the cable guiding device;

(5) Fix the first section of trolley rail to the bottom of mast with two connecting rods. Fix one end of the connecting rod with bolt and trolley rail, and fix the other end with bolt and mast section frame. Install the trolley on trolley rail, and make it stay at the bottom of mast (See Figure 1.9-6a);

(6) Increase the height of trolley rail, connect it to the trolley rail with bolts, and fix it with connecting rod and mast at the interval of 4.5m (The connection method is the same as above). If adjustment is required, the adjusting washers can be placed between connecting rod and mast frame. Before tightening up the connecting bolts of upper and lower trolley rails, please inspect the clearance of connector of trolley rail, and ensure that such clearance is no less than 1mm and no more than 3mm;

(7) Pre-tighten up the guide plates of cable guiding device one by one, until the contact force is 10.20N (when the leaf spring is used);

- As for double-cage hoist, fix the cable guiding device A/B onto trolley rail with bolts at the interval of about 3m (See Figure 1.9-6b);
- As for single-cage hoist, the installed distance between every pair of cable guiding devices A and B on trolley rail shall be about 6m;
- The erection of cable guiding devices A and B shall ensure that the cage support can pass between the two guide plates;
- Increase the height of trolley rail until it equals the one half of the maximum installed height of mast minus 4.5m.

Figure 1.9-6 Erection of Cable Guiding Device

(a) Install the special trolley rail; (b) Install the cable guiding device; (c) Carry out the trial operation;

(8) Place the fixed cable on cage roof, and release the cable which is long enough to be connected with the ground power box. Thereafter, gradually move the cage up, release the required fixed cable, and use cable clamp to fix the cable onto mast at the interval of 1.5m, until it reaches the position which is about 1.5m above the top of trolley rail. In addition, fix the end of cable onto the mast, coil up the remaining cable, hang it onto mast and bind it firmly;

(9) Install the cable-mounting bracket at the position which is 1.5m above the top of trolley rail, and connect the upper end of fixed cable to the connecting box on cable-mounting bracket;

(10) Cut off the main power supply, disconnect one end of accompanying cable from the connecting terminal of connecting box in cage, fix one end of the dismantled accompanying cable with the clamp, and connect it to the connecting box on cable-mounting bracket. Thereafter, release the accompanying cable on the incoming wire rack of the cage, and slowly make it suspended down from the cable-mounting bracket;

(11) By means of manual release of brake, make the cage move down slowly under the action of gravity, and place the hung accompanying cable into the cable guiding device B/C;

(12) Remove the other end of accompanying cable from the ground power box, and then fix the cable;

(13) Fix one end of accompanying cable removed from ground power box onto the cable arm, and then connect it to the terminal of connecting box in the cage. Stop the trolley at the position about 0.5m above the ground, bind the excessive accompanying cable onto the base enclosure on cage roof, and turn on the main power supply (See Figure 1.9-6c);

(14) On the mast above the trolley rail, a cable guiding device A shall be installed at the interval of about 9m;

(15) Lubricate the shaft of rail and trolley with grease.

1.9.6 Erection Procedure for Cable Guiding Device under Circumstance that Trolley Rail is Increased Section by Section

In the course of sectional erection of construction hoist, when the height of mast is less than one half of the expected height of mast, the installed height of trolley rail shall be 4.5m lower than the top of mast. If the first-time installed height of mast is 30m, the trolley rail shall be installed to the height of 25.5m. As for the cable guiding device installed in accordance with this height, when the height of mast is increased to 25.5+25.5-4.5=46.5m, it is only necessary to install a cable guiding device A on the mast above the trolley rail at the interval of 6m, and it is unnecessary to extend the fixed cable and accompanying cable. Only when the height of mast exceeds 46.5m, the fixed cable and accompanying cable must be extended. Similarly, the height of trolley rail shall be increased to the position which is 4.5m below the top of mast. Increase the height of trolley rail until it equals the one half of the maximum installed height of mast minus 4.5m. The detailed erection steps are as follows:

(1) Stop the cage at the top of trolley rail, slightly release the cable clamp on cable arm on cage, pull out a section of the remaining accompanying cable on cage roof, make sure that the length of pulled-out section is equal with the height of mast to be increased, and then re-tighten up the strap clamp of cable.

(2) Lower down the cage, loosen the fixed cable bound on mast, and pull the remaining fixed cable onto the cage roof. Mount the unloading tool onto the accompanying cable under cable-mounting bracket, and then hang the cable up onto the cable arm. Slight move up the cage, apply all the weight of accompanying cable onto cable arm, remove the cable-mounting bracket from mast, and place it on the cage roof (See Figure 1.9-7);

Figure 1.9-7 Cable-mounting Bracket

(3) Move up the cage section by section, use the cable clamp to fix the cable onto the mast at the interval of1.5m, until it is only 3m away from the top of mast. Thereafter, install the cable-mounting bracket, and coil up the excessive fixed cable and hang it on the mast;

(4) Remove the unloading tool of accompanying cable which is hung on the cage rack;

(5) Increase the height of trolley rail to the position which is 1.5m below the cable-mounting bracket, and install the cable guiding devices A, B and C in accordance with the original requirements.

Warning

(1) The operation of cage shall be controlled in the cage. The erection personnel on cage roof shall stand at safe position;

(2) In the course of erection, please always press down the emergency stop button; in the course of wiring, please cut off the main power supply.

1.10 Erection of slide wire

(1) Take out the buckles from the two slide wire fixed assemblies, and install them on the angle steel of the second and third mast section bottom, and install anti-dropping device on the mid of the first mast section. These fixed assemblies and anti-dropping device need to be installed in the center of the mast section.

Figure 1.10.1

Figure 1.10.2

(2) Install two slide wires on fixed assembly (big head down), and insert current collector from bottom. When installing slide wire, the junction of the two wires should be malposition to avoid interruption and convenience to maintain. When installing current collector, the arrow should be upwards. For single cage only need one slide wire.

Figure 1.10.3

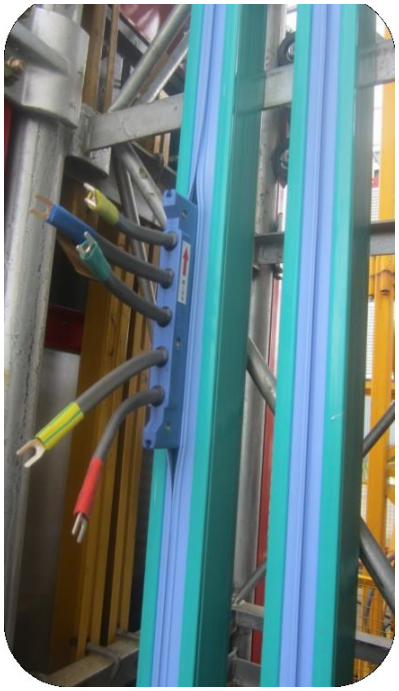


Figure 1.10.4

(3) For 16mm² slide wire: the main wire access into the terminal following the phase sequence, and insert to the bottom of the first slide wire. Then install support slide way, and adjust bolts on anti-dropping device to against it. Adjust the height of the slide wire to make sure distance between the junction position and mast section is 8~10cm, shown as figure 1.10.5 and figure 1.10.6.

For 25 mm² and 35 mm² slide wire: the main wire access into the terminal following the phase sequence. Then install support slide way, and adjust bolts on anti-dropping device to against it. Adjust the height of the slide wire to make sure distance between the junction position and mast section is 8~10cm, shown as figure 1.10.7 and figure 1.10.8.

The main wire is installed outside of the slide wire. The diagonal of the mast can't interfere with junction.

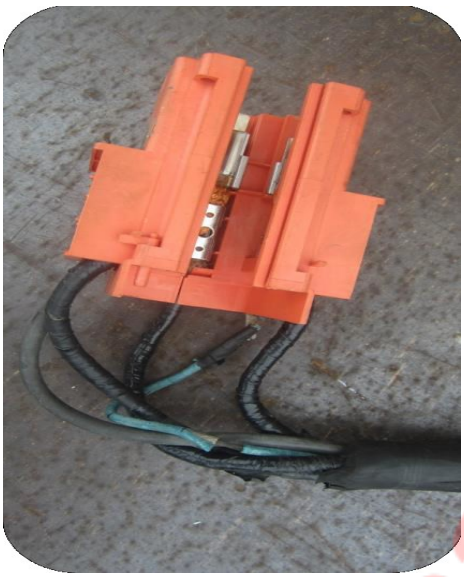


Figure 1.10.5

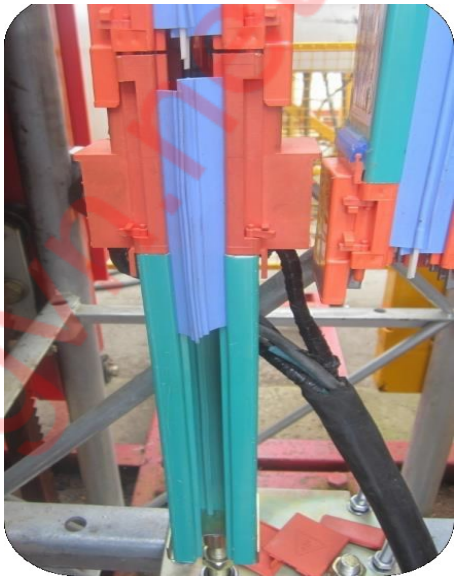


Figure 1.10.6

Figure 1.10.7

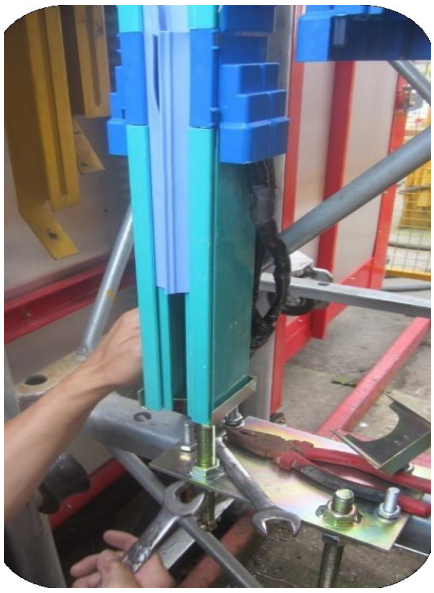


Figure 1.10.8

(4) Install the two installing plate on the column of cage, and install the junction box of guider on this plate. The current collector must be placed on the middle position of the guider installing area. And then access main wire and current collector into junction box following the phase sequence.

Figure 1.10.9

Figure 1.10.10

(5) Install fixed assemble respectively on the angle steel of the fourth and fifth mast section bottom, then install the second slide wire, and butt joint with the first slide wire. And lock waterproof strip fastening at the waterproof strip connection position.

Figure 1.10.11

Figure 1.10.12

(6) Power on and test running, no loss phase and fault phase, running up and down and current collector running smoothly and steady. When adding mast section, install fixed assembly on every mast section, and install one slide wire every two mast sections, and install anti-dropping device every 18m (six slide wires).

Figure 1.10.12

Note

(1) Guider can't press to waterproof strip, the gap between them is about 5mm.

(2) After installing junction box, the dirt board should be installed above the junction box to protect it at once.

(3) After adding mast section at every turn, the bottom joint must be covered well by waterproof cover.

2. Dismantling

2.1 Preparatory Procedure for Safe Dismantling

Before the dismantling, the construction personnel shall read, understand and master the detailed provisions in Chapter 2 "General Provisions" relating to dismantling, and implement the following procedure:

(1) All persons entering into the dismantling site shall comply with the ten work safety rules;

(2) The safety warning area shall be set up in dismantling site, and specific person shall be appointed to carry out supervision;

(3) The construction personnel may not wear hard-bottom shoes or high-heel shoes, shall wear the tight-fitting and convenient clothing, and shall fasten the safety belt;

(4) When carrying out overhead operation such as erection or dismantling of mast sections, the overhead operation personnel shall find a safe and appropriate position on their respective post, fasten the safety belt, and lock up the safety hook;

(5) As for dismantling of construction hoist, the discarded ropes and lifting equipment may not be used. The

dismantled bolts, pin shafts and cotter pins shall be properly kept;

(6) As the sections of construction hoist are reduced, it is absolutely prohibited to carry out the operation such as vertical transportation;

(7) As the sections of construction hoist are reduced, please inspect whether the guide wheel of cage and lower mast section fits closely from time to time.

2.2 Preparation Phase for Dismantling

(1) Before dismantling the construction hoist, please inspect the operation of every mechanism, and carry out dismantling only after all mechanisms are confirmed as normal;

(2) Before dismantling the construction hoist, please inspect the foundation and attachments of construction hoist, and carry out dismantling only after the foundation and attachments are confirmed as normal;

(3) Clean up the construction site, and ensure that the ground in construction site is level, firm and free from any obstacle;

(4) Make sure that there is no high-voltage cable in air within construction site. If there is any high-voltage cable, the confirmation from the relevant department shall be obtained;

(5) The dismantling contractor shall prepare the procedure documents such as *Clarification Form for Dismantling of Construction Hoist* and *Organization Program for Dismantling of Construction Hoist*, and go through the relevant review & approval formalities;

(6) The dismantling contractor shall prepare the detailed technical program for dismantling of construction hoist.

2.3 Implementation Phase for Dismantling

(1) The construction personnel shall read and get familiar with the operating instructions and dismantling program of the construction hoist to be dismantled, and ensure that the whole dismantling process is implemented in accordance with the relevant provisions relating to the construction hoist to be dismantled;

(2) Urge the relevant personnel who enter into the construction site to comply with the safety rules of construction site;

(3) In light of the on-site construction conditions and in accordance with the provisions relating to height decrease, decrease the height of construction hoist to the designated level, and dismantle the relevant attachments;

(4) In accordance with the dismantling procedure of construction hoist to be dismantled, safely carry out the dismantling of construction hoist step by step;

(5) In the course of dismantling of construction hoist, please carefully inspect the connection and tightening conditions of components, identify and eliminate problems in time, and ensure that the hoist works safely and reliably in the course of dismantling;

(6) After dismantling the construction hoist, please pack up and transport all components in time, and properly implement the works for reuse or warehousing and maintenance of such components.

2.4 Dismantling Procedure

The dismantling procedure of construction hoist is basically the reversed erection procedure (Please refer to the erection procedure in this Chapter), and only the following procedure is highlight here.

2.4.1 Dismantling of SC100 and SC200 Construction Hoists

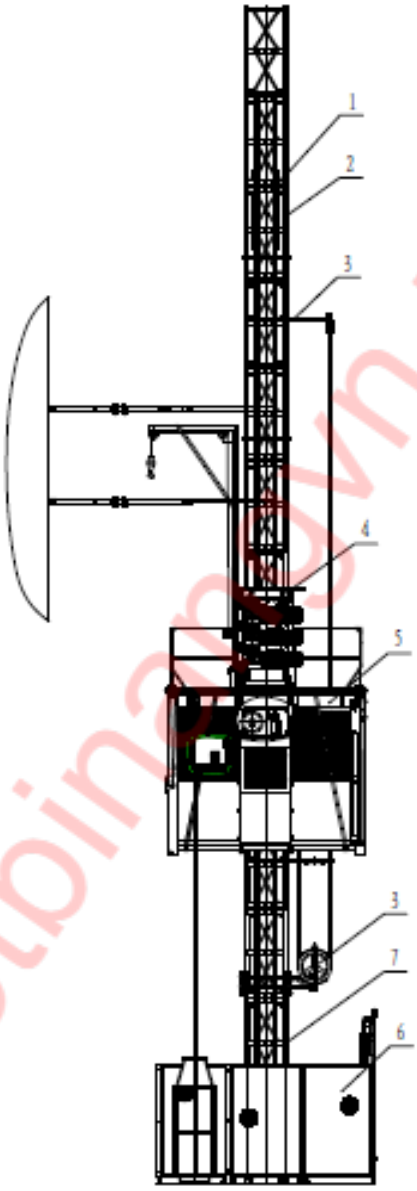


Figure 2.4-1 Diagram for Dismantling Sequence of SC100 and SC200 Construction Hoists

The dismantling steps of construction hoist are detailed as follows:

(1) Dismantle the limit stoppers on top of mast;

(2) Dismantle the mast section;

(3) Dismantle the trolley and cable guiding device;

(4) Dismantle the drive system;

(5) Dismantle the cage;

(6) Dismantle the base enclosure;

(7) Dismantle the lowest three mast sections and base frame.

2.4.1.1 Dismantle the limit stoppers on top of mast

(1) Mount the jib on cage roof;

(2) Take the cage roof operation box (The cage roof operation button of variable-frequency speed-regulation construction hoist is integrated into the electrical control cabinet on cage roof) to the cage roof for carrying out the dismantling;

(3) Move the cage to the top of mast, dismantle the upper terminal stopping switch stopper, deceleration limit stopper (variable-frequency speed-regulation construction hoist) and power final limit switch stopper.

2.4.1.2 Dismantle the mast sections

(1) Loosen the connecting bolts of mast sections;

(2) By using the electrically-operated jib on cage roof, lift the mast sections to be dismantled into the cage;

(3) As the mast is reduced, gradually dismantle the mast tie and cable guiding device;

(4) Reserve the lowest mast composed of three mast sections, and then remove the jib, dismantle the buffer spring under cage and the lower terminal stopping switch, deceleration final limit switch, and baffle plate of final limit switch;

⚠Warning

When dismantling the mast, please ensure that the guide roller at the highest position of cage is always under the connector of mast (mast sections) to be dismantled and the lifting equipment and jib are in place, and then remove the connecting bolts of mast section!

2.4.1.3 Dismantle the trolley and cable guiding device

When the mast is dismantled to the mast section where the cable-mounting bracket is installed, please dismantle the trolley and cable guiding device.

(1) Lower the cage to the lowest position, and cut off the main power supply of external power box;

(2) Dismantle the trolley;

(3) As the mast is reduced, dismantle the cable guiding device.

2.4.1.4 Dismantle the drive system

(1) Place two sleepers of appropriate height on the base frame;

(2) Refer to the method for releasing motor brakes as specified in 1.3.3-(3);

(3) Release the motor brakes one by one, so as to lower the cage slowly onto the sleepers;

(4) Cut off the main power supply of ground power box, and disconnect the cable from power box of cage;

(5) Dismantle the sensing pin of overload protector, and disconnect the drive system from cage;

(6) Prepare the lorry-mounted crane or tower crane used to lift the drive system;

(7) Align the lifting equipment with the lifting point of drive system, and then lift the drive system away from mast.

2.4.1.5 Dismantle the cage

(1) Refer to the dismantling method for drive system, align the lifting equipment with the lifting lug of cage, and then lift the cage away from mast.

2.4.1.6 Dismantle the base enclosure

(1) Dismantle the middle box of base enclosure and the power box on middle box;

(2) Dismantle the cage door stopper and external base enclosure door lock;

(3) Dismantle the external base enclosure door, door counterweight slideway and door counterweight;

(4) Dismantle the external base enclosure door frame;

(5) Dismantle the side base enclosure and rear base enclosure.

2.4.1.7 Dismantle the lowest three mast sections and base frame

(1) Loosen the connection between the lowest three mast section and the base frame;

(2) Lift away the base frame with lorry-mounted crane or tower crane, and then dismantle the lowest three mast sections;

(3) Dismantle the main base frame and auxiliary base frame.

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Operation Manual of Construction Hoist

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Technical Parameter

Technical Parameter

1. Schematic Diagram of the General Structure of Construction Hoist

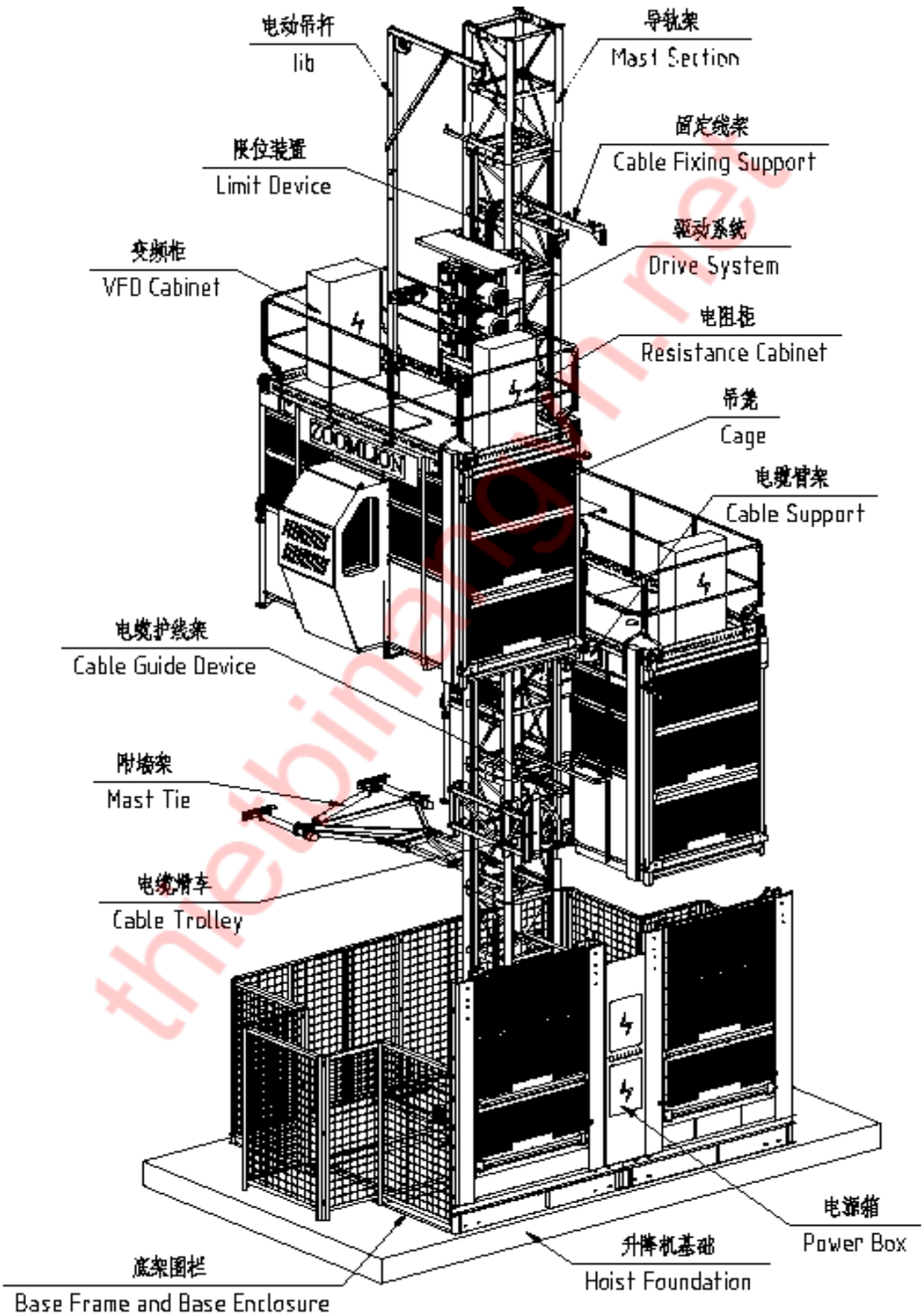

Figure 1.1 Construction (Cable Skid Type)

2. Table of Technical Parameters of Construction Hoist

Type / Parameter	SC300BZ-A	SC300BZ-A	Note
Code	4S3063	4S3063	
Rated Capacity(kg)	3000 or 24 persons		
Rated Installation Load Capacity (kg)	1000		
Rated Speed (m/min)	0~63		
Max Lifting Height (m)	380		
Cage Space (Length×Width×Height)	3.5×1.5×2.5(m)	3.2×1.5×2.5(m)/ 3.2×1.5×2.2(m)	
Power Volt (V)	380±5%		
Motor Power (kW)	3×15/26（50/87Hz）		
Consumption (kVA)	125		
Rated Current (A)	3×53		
Standard Section Weight (kg)	160		Wall Thickness 6.0mm
	180		Wall Thickness 8.0mm
	195		Wall Thickness 10.0mm
Cage Weight (kg)	2700	2500	Include weight of drive system and control system
Safety Device Model	SAJ70-1.4		

2

Table 2.1 Technical Parameter of Construction Hoist

Type / Parameter	SC300/300BZ-A	SC300/300BZ-A	Note
Code	4S3063	4S3063	
Rated Capacity(kg)	2×3000 or 2×24 persons		
Rated Installation Load Capacity (kg)	1000		
Rated Speed (m/min)	0~63		
Max Lifting Height (m)	380		
Cage Space (Length×Width×Height)	3.5×1.5×2.5(m)	3.2×1.5×2.5(m)/ 3.2×1.5×2.2(m)	
Power Volt (V)	380±5%		
Motor Power (kW)	2×3×15/26（50/87Hz）		
Consumption (kVA)	2×125		
Rated Current (A)	2×3×53		
Standard Section Weight (kg)	160		Wall Thickness 6.0mm
	180		Wall Thickness 8.0mm
	195		Wall Thickness 10.0mm
Cage Weight (kg)	2700	2500	Include weight of drive system and control system
Safety Device Model	SAJ70-1.4		

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Operation Manual of Construction Hoist

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Operation and Safety

Operation and Safety

1. Safety Inspection Before Operation

Hoist operators must be trained and qualified to operate, and be familiar with the performance of each component and operating techniques. Before operation, daily inspection of the construction hoist should be carried out.

（1）Perform prescribed routine daily inspections and lubrication in accordance with the requirements of the Maintenance Manual.

（2）Check the position of the stopper and block of each limit switch on the rail frame should be sensitive, reliable, safe and effective.

（3）Check that the electromechanical interlocking devices for the guardrail doors and cage doors are in good condition.

（4）The cage stops at the ground station and opens and closes the outer fence door, the cage feed door, the cage discharge door, and the top door one by one respectively, which should perform well, at which point the cage cannot be started.

（5）Allow the cage to run upwards and then stop at a height of approximately three meters, at which point the cage feed door and outer guardrail door should be locked and cannot be opened.

（6）Check the function of the upper/lower limit switch, the upper/lower deceleration limit switch and the power limit switch; the cage should not start when the upper limit switch, the lower limit switch and the power limit switch are disconnected; Disconnect the deceleration limit switch and the cage should be in deceleration state.

（7）For construction hoists with counterweight also check the function of the slack rope limit switch on the eccentric rope gear at the top of the cage, the cage should not start when this switch is disconnected.

（8）Ensure that the cage and counterweight aisle should be free of any obstructions and that constant attention is paid to monitoring.

（9）The mounting boom on top of the cage should be removed and running with a load on the mounting boom is prohibited.

（10）Cage top operation is required for installation conditions.

（11）All personnel should be alerted to the cage before it is started and the emergency stop button should be pressed immediately if abnormal conditions are detected during operation.

（12）If any irregularities occur in the hoist, it is important to notify the appropriate maintenance personnel in a timely manner and never allow non-maintenance personnel to move around.

（13）Each time the circuit is serviced, the main power must be disconnected and shut down for 10 minutes before servicing.

（14）It is forbidden for persons or objects in the cage to lean or squeeze the cage door.

（15）Construction hoists should be inspected by a professional engineer for all critical components after being hit by heavy rain or strong typhoons.

（16）Perform regular inspections, maintenance and fall tests as required.

Warning

（1）It is prohibited to operate the construction hoist when people are working in the prohibited areas such as inside the bottom frame guardrail, the rail frame, the attached wall frame and the top of the cage.

（2）Overloading is strictly prohibited, and it is strictly forbidden for the goods and the hands and heads to protrude from the cage.

（3）It is strictly forbidden to carry any person or cargo in the cab other than the driver.

（4）Operation of construction hoists is prohibited when wind speeds are greater than 20m/s.

（5）Do not start the construction hoist when ice is formed on the rail frame and cables.

2. Operation and Use

Before operating the construction hoist, the operator should carry out the inspection as specified in "1. Safety Inspection Before Use", and only after the inspection is confirmed to be qualified, can the hoist be put into normal operation. The preparatory work before operation is as follows,

（1）Turn on the power；

（2）Loading cargo or personnel into the cage；

（3）Close all the doors, including the cage inlet door, outlet door, top door, and outer fence door, and make sure the outlet door lock locks the outlet door in place.

2.1 Operation Method

（1）Verify that the emergency stop button on the operator console and cage top operator box is turned on, face recognition authentication is passed, and the cage top operator box transfer switch is turned to the cage；

（2）Press the electric bell first, then trigger the operating handle in the desired direction to start the cage (if it is a large operating handle with "zero" protection, you must press the micro switch of the operating handle to ensure that the micro switch remains triggered during operation), when the cage reaches the desired height, place the operating handle in the "zero" position, and the cage will stop；

（3）If working on the top of the cage, the cage top operator box must be brought to the top of the cage for operation；

（4）In operation to go to an abnormal situation such as electrical out of control, should immediately press the emergency stop button, not allowed to open before the troubleshooting.

The specific operating procedure of the 4S Elite construction hoist is shown in Figure 2.1-1.

2.2 Troubleshooting

When the cage fails to start, the following items should be checked,

（1）The ground power switch should be in the ON position and the electrical wiring to the cage should be energized；

（2）The "emergency stop" button should have been released or the electric lock should have been opened；

（3）The power limit switch should be in the ON position；

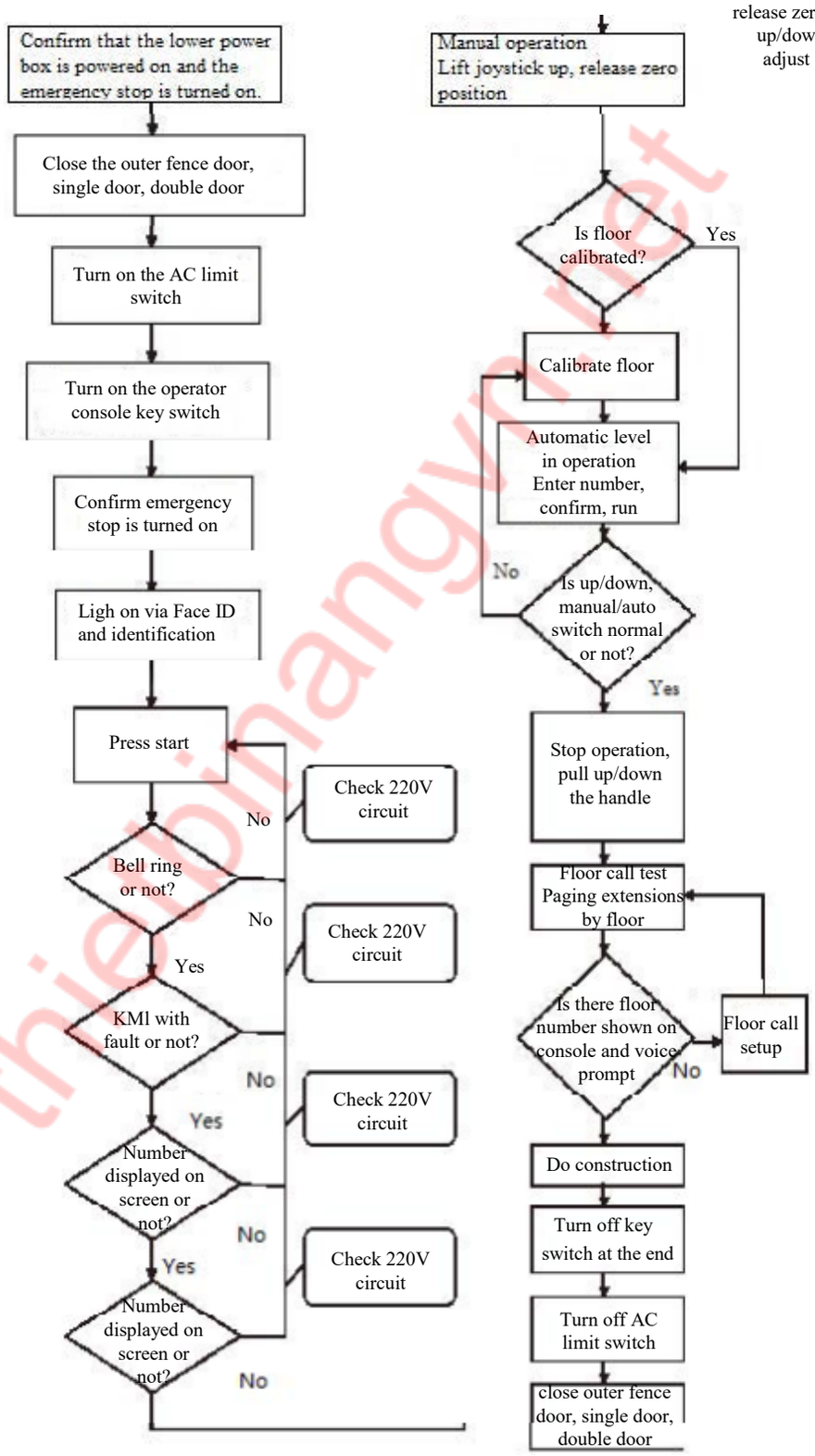
（4）Exterior parapet doors, cage doors, and overhead doors should have been closed；

（5）For hoist with counterweights, also check that the position of the slack rope limit switch on the eccentric rope gear is accurate；

6）The fuse should be intact (or the circuit breaker should be on);

If the cage still cannot be started after the above checks and the corresponding measures have been taken, see the relevant sections of the Maintenance Manual.

Electrical and Installation Operating Procedures



Manual operation
Lift joystick up, release zero position up/down shift, adjust speed.

Check 220V circuit

Figure 2.2-1 4S (Elite Edition) Operation Procedure

2.2.1 Motor Manual Release

When the construction hoist suddenly stops between stops due to a power failure or other electrical (fuse, motor thermal relay) failure in the middle of operation, it is recommended that the brake be released manually if there is no other method available, and the operation must be performed by a trained professional as follows,

（1） When there is only one motor in the drive system, pull the manual release puller or lever at the end of the motor brake slowly outward to make the cage slide slowly downward;

(2)When there are 2 or more motors on the drive system, one or more of the motor brakes need to be released by lifting the brake with the top lever, while only one motor is left for manual release operation;

During jacking and releasing one or more of the brakes, it must be done slowly, one by one; if the cage is found to be slipping during jacking and releasing, the jacking and releasing should be cancelled immediately to allow the brakes to resume braking. The likely condition at this point is that:

（1） After loosening one or several brakes, the combined braking torque of the remaining brakes is not sufficient to brake the cage, especially under full load;

（2） It is possible that some of the remaining brakes are so worn that they have even lost their braking ability. If this is the case, the first thing to do is to switch the brakes released and the sequence. If the following conditions are encountered, multiple brakes need to be released simultaneously, e.g., the drive system has 3 motors and the cage slips when the second motor is released, the operator is required to manually release 2 brakes simultaneously to slip.

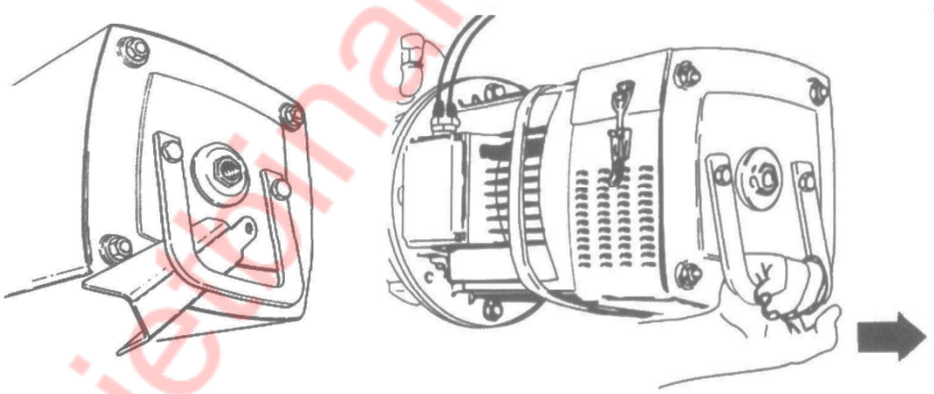


Figure 2.2-2 Manual release with brake domestic motor

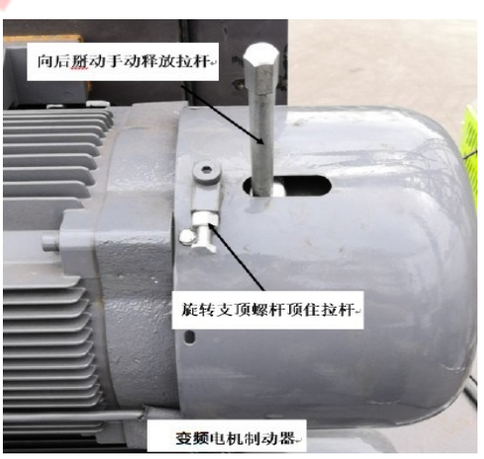


Figure 2.2-3 Manual release with brake inverter motor

Notice

The manual release of the brake should be carried out intermittently, each time only a short distance can be slid down, in order not to exceed the normal speed of the cage as the limit, in case of over speed, the fall arrest safety will act, so that the cage stops. At this time, the fall arrester must be reset before the cage can slide down again. Cage every 20 meters down, stop one minute, let the motor brake cool down, in the cage on the top of the work should pay attention to safety.

2.2.2 Limit Switch Reset

If the motor brake is worn out due to the heavy load of the construction hoist (insufficient braking torque), and the motor output torque is insufficient after the anti-fall function is enabled, the cage will fall to the position of the power limit switch action, so that the three-phase power supply will be cut off and the cage cannot run upward by electricity, then the arm rod of the limit switch needs to be rotated out a certain distance to make the limit switch reset and drive the cage up. And readjust the distance of the limit switch arm so that it can effectively contact with the limit touch iron.

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Operation Manual of Construction Hoist

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- Technical Parameter
- Operation and Safety
- **Electrical Control System**
- Regulation
- Transportation
- Appendix I
- Appendix II

8

Electrical Control System

Electrical Control System

Before using the construction hoist, the user should supervise the whole process of using the construction hoist in accordance with the laws, regulations, and safety standards of the construction hoist in the country where it is located.

1 Components of Electrical Control System

1.1 Site Power

The site power supply is connected from the distribution box to the lower electrical box at the outer fence of the lift, ensuring that the diameter of the connecting cable is not less than the minimum permissible, and that electrical installation and connection operations are carried out by suitably qualified professionals. It should be noted that when the outer fence door is open, one phase of three-phase power will be missing from the lower electrical box, at which point the lift will not be able to operate the lift, but power is still provided for the lighting, bell, and operator console display.

1.2 Electrical Control Cabinet

The electrical control cabinet is the control center of the whole electrical system, in which each electrical component device is located, mainly consisting of the following parts,

(1) AC limit switches (hoist power switch)；

(2) The transformer of the control circuit provides the control voltage.

(3) Upstream and downstream control system

The picture below shows the control cabinet,

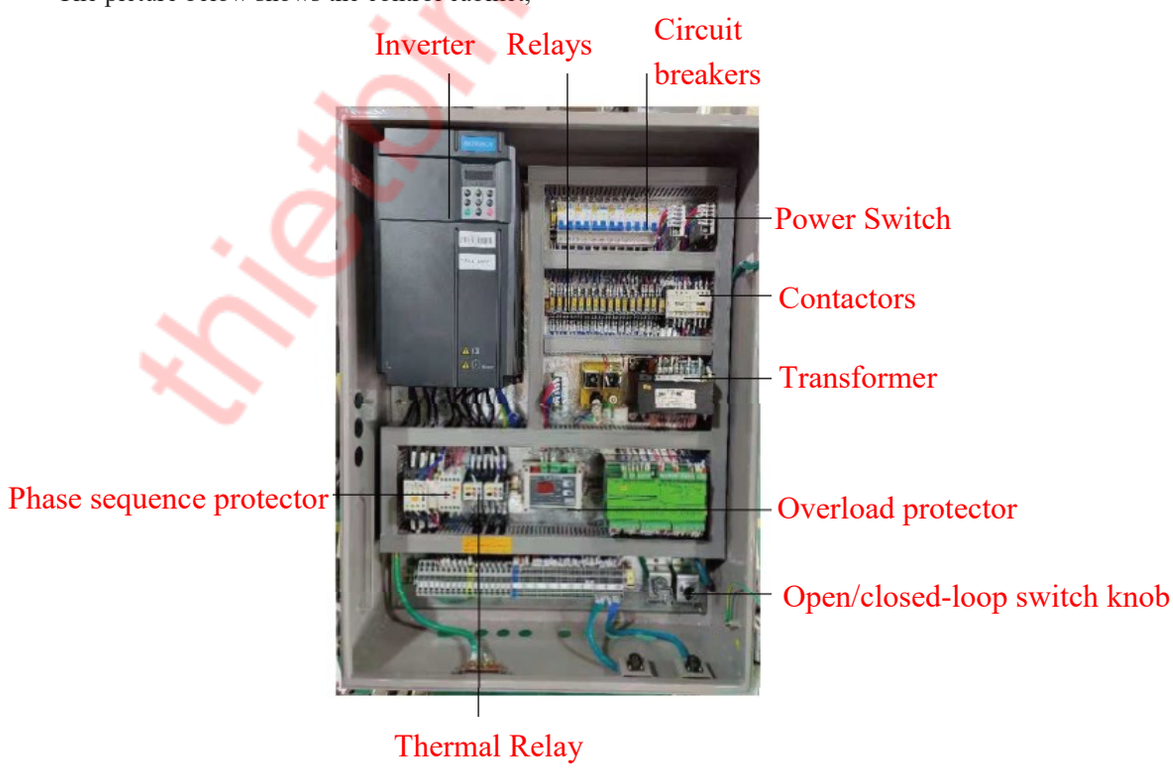


Figure1.2-1 Low-speed inverter electric control cabinet

1.3 Console

The driver's cab is the main place where the construction hoist operator works and manipulates the up and down operation of the hoist through the console. The console consists mainly of the following parts.

(1) Operation System

Including: Start button, emergency stop button, key switch, joystick (for manual lift operation), keyboard (for automatic lift operation), display, lighting switch.

(2)Driver's cab power system (220VAC)

Including Driver's cab bell, lighting circuit, and outlet power supply.

The following picture shows the 4S (Elite) console,

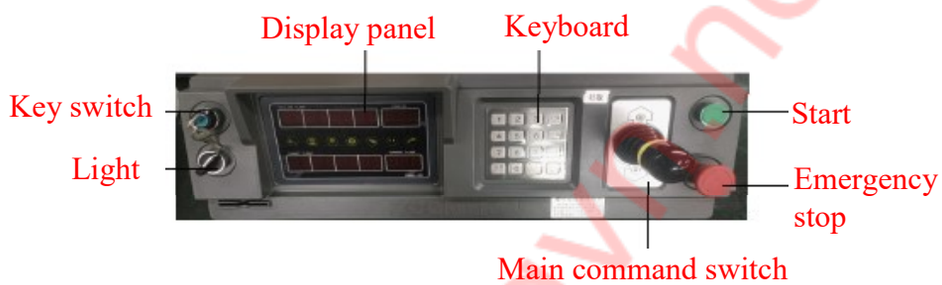


Figure 1.3-1 4S (Elite) Console

1.4 Dive System

The drive system consists of the drive body and the drive unit. The drive body is the part that interconnects the drive unit into an integral structure, which transmits the drive force generated by the drive unit to the cage so that is can run up and down. The drive unit is the power part of the construction hoist. The drive unit consists of one or several groups of power sources working together to drive the self- weight part of the construction hoist and the load in the cage (or the construction personnel) up and down.

Figure1.4-1 Drive System

1.5 Security Protection Restriction System

The security protection restriction system consists mainly of, fall arrest safeties, limit switches, upper and lower limit switches; upper and lower deceleration switches, cage door limit switches, overload protectors, etc.

1.6 Identification System

For 4S (Elite) hoist, a face reader is standard as an identification system. After power is completed and the key switch is turned on, face authentication must be performed before official operation.

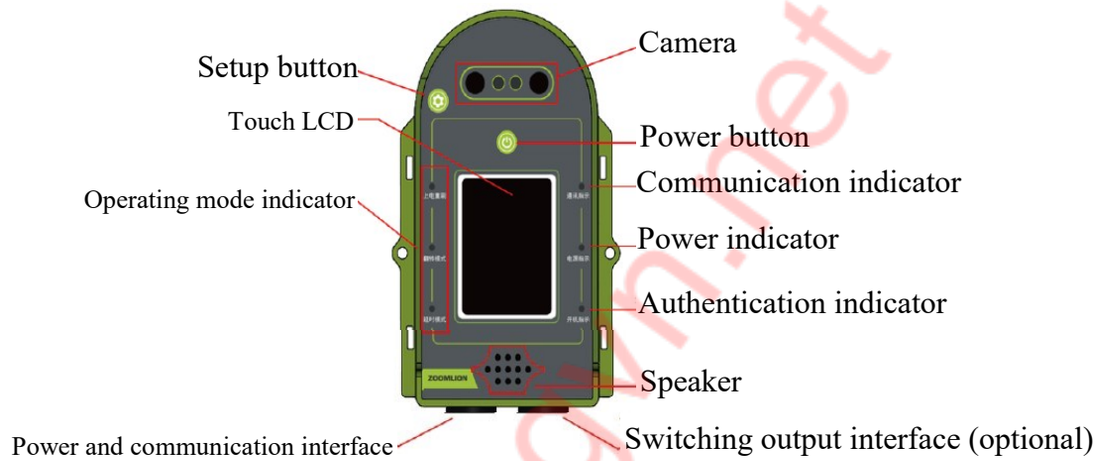


Figure1.6-1 Face Recognizer

（1）Authorization operation - Before officially using the face reader, the device owner or administrator must enter the relevant personnel information into the face reader. To edit and add users, you need to log in to the administrator account. The default administrator account is built-in in the factory, and the password is "123456". For details, please follow the procedure below.

Step 1: Press and hold the Setup button for more than 3 seconds and release it. When the system prompts for administrator authentication, click on the screen to enter password "123456" to enter the setup interface.

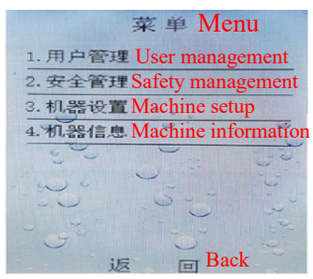


Figure1.6-2 Setup interface

Step 2: Press "User management", then click "Add new user", enter new user interface.

Figure 1.6-3 User management interface

Step 3：Set up the user phone number, face ID or password, user rights, and the group to which whey belong (default if no grouping is required). If you need to set up multiple users, repeat steps 2 and 3

Figure1.6-4 User setup interface

Click "Face ID", follow the tips to setup face ID, prompts to return to the Add User automatically when entry is complete.

The user rights are mainly divided into administrator, maintenance personnel, repair personnel, disassemblers and operators.

	Rights
Administrator	A. Perform in-cage and out-cage operations B. Perform operator card and maintenance card authorizations C. Automatic leveling floor setting
Operator	Perform in-cage operation
Maintenance, repair personnel, disassemblers	A. Perform in-cage and out-cage operation B. Automatic leveling floor setting

Notice

First time registered users must be administrators and cannot select general use permissions.

Step 4: Click "Back" until you return to the standby screen.

(2) Identification——After the identity setting is completed, the relevant personnel can enter the face recognition status by clicking on the face recognizer screen and complete the identify authentication according to the voice prompts. After the permission is successfully obtained, the operation desk identity authentication light will be on and the hoist operation can be carried out.

Figure 1.6-4 Identity authentication light

(3) Operating without identity—

1.When authentication is invalid or there is no authentication, the hoist is only allowed to operate downward；

2. When the authentication fails during operation, a duty cycle will be completed without a power failure.

1.7 Encoders

The encoder collects height and operation information during the lift by converting the angular displacement of the gear into an electrical signal, and then communicates the height and operation information to the inverter. The inverter precisely controls the operating speed according to the operating information, and controls the rise, fall and stop of the lift when automatically leveling the floor according to the height data, so that the lift can achieve accurate automatic leveling. Meanwhile, the inverter, based on the precise data fed back from the encoder, enables a hover function to prevent the cage from falling further when the cage accidentally slips

Notice

The encoder is installed at the end of the motor, and the A, B, VCC and OV items of encoder are connected to A+, B+, 5/15 and COM on the PG card of the inverter one by one through the aviation plug respectively, and the A/B must not be confused with the 24V line, otherwise the encoder will be damaged.

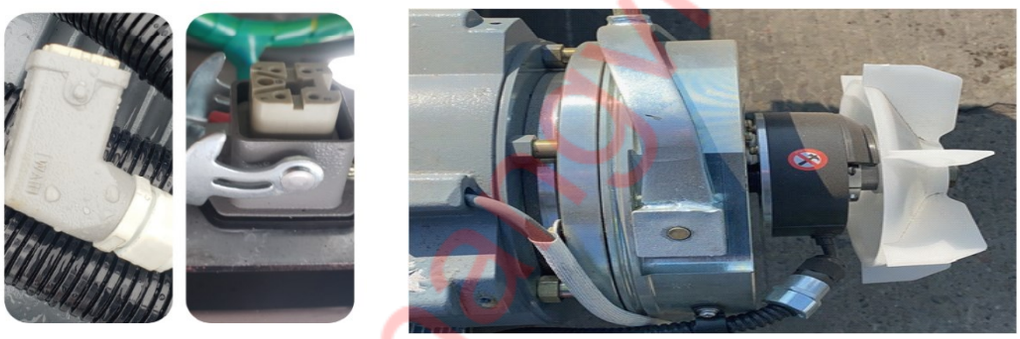


Figure 1.7-1 Encoder

2 Electrical Installation

2.1 Cable Connection from Site Power to Hoist

Connect the site cable to the screw terminals in the lower electrical box (make sure the power supply is safely disconnected and keep the molded case circuit breaker disconnected before wiring).

Figure 2.1-1 Lower electrical box breaker (break state)

2.2 Cable Connection from Lower Electrical Box to the Hoist

(1) Connect the site cable (≥25 ㎜ ²) to the site power supply box and the bottom frame guardrail power box.

(2) Connect one end of the main cable to the power box on the bottom frame guard rail and the other end to the electrical control box terminals inside the cage through the cable arm. It should be noted that the installation method of the construction hoist power supply cable and the cable guidance device used are divided into two types: cable reel type and cable skid type.

①In the case of a cable reel place the cable directly into the cable reel according to the installation method of the cable guide.

②In the case of cable skids there are two cases, as follows.

•If supplying power to one cable then proceed directly to step (2) above.

•If power is supplied to two cables with different cross-sections (the larger one is fixed to the rail frame and the smaller one runs up and down with the cable carriage), take the accompanying cable and perform step (2) above.

(3) The mains cable contains 3 phase wires, a zero wire (N) and a PE protection wire (ground), which is greenish-yellow. Any damage to the mains cable can lead to serious accidents, so the mains cable must be made of wire that is resistant to mechanical damage, and the insulation must be protected from any damage by suitable means.

Notice

When the lift main cable is connected, the AC limit switch must be kept in the state shown (disconnected).

Figure2.2-1 AC Limit Switches

2.3 Hoist Grounding

The ground wire is a yellow-green protective conductor which connects the ground terminal of each part to the grounding point. It is forbidden to use the neutral wire instead of the ground. It is forbidden to connect any disconnection device in series with the protective conductor circuit. Use grounding resistance tester to measure the grounding resistance of the steel structure of the construction hoist and the metal shell of the electrical equipment, shall not be greater than 4Ω, and use 500V megohmmeter to measure the insulation resistance of the motor and electrical components to ground shall not be less than 1MΩ.

2.4 Connection of Up/Down Travel Mechanism, Resistance Cabinet, Anti-punching Top Limit

(1)Connect the three-phase asynchronous motor(M) to the terminal block (HU/HV/HW) corresponding to the motor according to the drawing.

(2)Connect the brake(1,2,3,4/YB+,YB-)cable to the terminal block.

(3)Connect the resistance cable(PA/PB) to the terminal block.

(4)Connect the anti-punch top limit.

(5)Install the limit switch on the bottom frame guardrail and connect the cable to the lower electrical box.

2.5 Sensing Pin and Overload Protector Installation

(1) Insert the cage top operator box (7-prong airline plug) into the corresponding position of the electrical control box (the cage top operator box cannot be removed during normal operation). Turn on the lower power box power and AC limit switch and close the outer guardrail door, cage door and skylight door. Get the identity authentication of the maintainer or administrator, operate on the cage top, convert the cage top operation box to cage top mode, after the cage top is started, tap the operation box to check whether the phase sequence of the access power is correct (when tapping the up button, the drive system rises means the access pace sequence is correct, otherwise it means the phase sequence is connected in reverse, then the wiring position must be exchanged.

(2) Operate the drive system up and down at the top of the cage using the cage top operator box, dock the connecting lugs of the drive trolley to the cage, thread the overload sensing pin and insert the cotter pin and leave the cotter pin in the open position; connect the terminal of the sensing pin to the terminal of the overload mainframe.

(3) Refer to the "Overload Protector Instruction Manual" to set the overload protector, when the actual weight reaches 95% of the rated load of the cage, the warning function is realized, the warning indicator lights up and the buzzer sounds intermittently; when the actual weight exceeds 110% of the rated load of the cage (this parameter can be set), the alarm function is realized, the alarm indicator lights up, the alarm output relay operates and the buzzer sounds continuously.

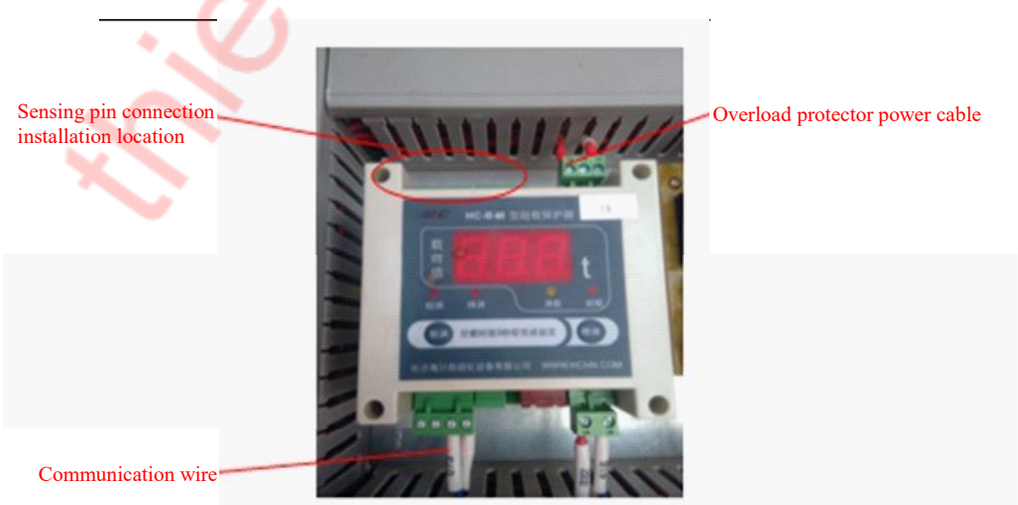


Figure 2.5-1 Overload Protector

The overload protector needs to be set to zero before use, the product has been zeroed before leaving the factory, if the display value is found to be inconsistent with the actual, it can be zeroed on site, the methods are following,

（1）Rough adjustment： press and hold the rough adjustment button for 3 seconds to complete clearing after hearing the "beep" sound.

(2)Fine adjustment with loaded.

- Press and hold rough adjustment button until hear "beep".
- Add load*t.
- Press rough and fine adjustments at the same time, then press rough adjustment to adjust the number to *t, finally confirm via pressing fine adjustment.

2.6 Trial Run

（1）Turn on the lower power box power and AC limit switch, close the outer guardrail door, cage door and skylights door. Obtain the maintainer or administrator identification to operate from the cage top, switch the cage top operator box to cage top mode, and tap the operator box to check for correct phase sequence of the connected power after the cage top is started.

(2) Check each safety control switch: including cage door limit switch, skylight door limit switch, upper/ lower limit switch, limit switch, bottom frame guardrail door limit switch and broken rope protection switch, all can reflect sensitive and open/close freely.

(3) Switch the cage top operator box to in-cage mode, exit maintainer or administrator authentication, perform operator authentication, and verify proper lift operation from inside the cage.

3 Electrical System Operation

3.1 Preparation

3.1.1 Lower Electrical Box Operation

The lower electrical box is mounted on the outer fence of the hoist for equipment distribution and control purpose. When using the box door open, push the plastic case circuit breaker (air switch) handle up to ON position, check the transformer and contactor, rotate the emergency stop button on the box door to make it release to connect, contactor suction, power through the main cable sent to the cage. When the emergency stop button is pressed, the hoist cage will noe operate; when the plastic case circuit breaker (air switch) handle is pulled down, the hoist as a whole loses power.

Figure 3.1-1 Lower electrical box plastic case circuit breaker (closed state)

3.1.2 Upper Electrical Box Operation in the Cage

（1）Operation of the AC limit switch

The AC limit switch can only be closed when the site is ready, the driver is in position and the operation is required. Before closing, the site power supply should be checked for normal voltage (i.e., the voltage value should be within 5%of 380V)

Notice

The AC limit switch must be turned off immediately under the following circumstances.
1) When encountering a critical situation and the electric control system fails (such as when the contactor burns sticky, or when the emergency stop button that is linked to close fails).
2) When the driver leaves work or leaves the cab for business.

(2) Start-up operation

The start button (green) is located on the operation panel. It is a dual function button, i.e.: start and electric siren function. Whenever the lower electric box contactor is turned on and the circuit breaker of the electric bell circuit is closed, the sounding of the electric siren can be controlled. In addition, after each cage door is closed, the key switch is opened and the face authentication is passed, the system may start only when this button is pressed (the main contactor of the main circuit is switched on). If there is no such reaction after pressing the start button, it means that the start is not successful. When the start is unsuccessful, the hoist cannot be lifted and operated.

(3). Emergency stop operation

The emergency stop button is located on the panel of the operation table, the lower electric box, the cage top operation box, a red self-locking mushroom head button. Its function is to cut off the main contactor of the main circuit, so as to make each mechanism emergency stop.

Notice

When the hoist runs into a critical situation, it is too late to stop according to the normal process, or when the operation is out of control, you must immediately press the emergency stop button! And non-emergency, it is not recommended to use the emergency stop button for normal stopping, otherwise it will produce a big impact.

3.1.3 Identification

For 4S Elite Hoist, face recognition must be performed to obtain identity authentication before operation. After correct authentication, the corresponding identity indicator light on the operation console display will be on. When the electronic control system is successfully started, the lift operation could be performed.

Figure 3.1-3 Emergency button（red mushroom shape button)

Figure 3.1-4 Console and face recognizer

3.1.4 Pre-operation Inspection

(1) After each power-on, before operation, the operator must first check whether the switch buttons (especially the "emergency stop button"), the joystick, the brake, the travel limit and the protection switch are working normally under no-load condition.

(2) Check whether each limit protection switch is well adjusted (see the relevant chapter of the instruction manual of the main machine for the specific adjustment method); whether the electric control system performs the corresponding protection function after each limit protection switch has been operated (see the contents of the front reach). If a fault is found, the machine should be immediately shut down for maintenance: before the fault or safety hidden thoughts are not removed, the lift should not be put into operation.

(3) Must ensure that all checks are up to standard, before starting the operation, otherwise it may lead to personal hazards.

3.2 Manual-auto Operation

4S Elite has two operation mode： not only manual operation but also automatic leveling operation is available.

3.2.1 In-cage Manual Operation

You can manually control the opening the lowering of the construction hoist by controlling the closed joystick. When using the operating lever, you should use your index and middle fingers to lift the sliding block inside the ball head of the lever upward to release the zero self-lock before you can push it freely. Push up when going up, push down when going down.

4S Elite Hoist have two gears for both up and down, which are low speed and high speed.

3.2.2 Automatic Floor Leveling Operation

The 4S (Elite) Hoist can also be manually controlled by the keyboard on the operator's console. However, before use, the floor needs to be calibrated on the keyboard, according to the actual height of the floor. After starting the lift and passing the certification of the face than the administrator or maintenance personnel, operate the rocker to manually test run the lift to start and stop at the lower limit.

(1) Floor calibration

1)Press and hold "Set" key (as shown in the following figure, the display panel floor calibration setting light will be on (such as the fourth light from the left in Figure 3.2-1) to enter the calibration state.

Figure 3.2-1

2) At 1st floor, enter "1" and "Confirm" to calibrate the 1st floor.

3) Operate the rocker to manually ascend to the 2nd floor position, enter "2" and "confirm", and calibrate the 2nd floor.

4) Mark each floor in turn until you reach the highest floor that can be marked.

5) Press "Cancel" to end the calibration, after which you can reach the desired floor by key operation.

6) If you need to calibrate a new floor after adding a section, repeat the operation 1) and start calibrating on the original basis, for example, if you have previously calibrated to the 7th floor, start calibrating from the 7th floor upwards.

7) If the previous calibration of a floor is not allowed, you can re-calibrate the floor at the height of the floor, without the need to calibrate all.

Notice

Before the first floor calibration operation after the installation of the new machine, you need to confirm that the floor you have calibrated is 0. If it is not 0, you need to carry out zeroing operation, see "(3) floor information zeroing" on the next page for specific zeroing operation.

Figure 3.2-1 Panel display at calibration status

(2) Automatic operation

1) Single floor operation: Press "floor number", "confirm" and "run" in turn, the lift can automatically run to the specified floor: for example, if you need to go to the 4th floor when you are on the 5th floor, then in turn input 4, confirm, run.

A Operation sequence B Panel display information after entering the floor

Figure 3.2-2 Diagram of flat floor operation

2) Multi-level operation. Enter the target number of floors and confirm (up to 4 target floors), press "Run", will reach the target floor in turn. For example, a total of 10 floors, press te successive input of 8 and confirm, 9 and confirm, 3 and confirm, 2 and confirm, press "run", open and lower the machine in accordance with the " first up, then down, from near to far" order, in order to stop 8>9>3>2.

3) Up and down operation: No need to enter numbers, you can also use the "up" and "down" buttons to achieve the lift. For example, if you want to go to the 2nd floor when you are on the 3rd floor, you can press "next floor", "confirm" and "run" in order to reach the 2nd floor smoothly.

(3) Zeroing of floor information.

Notice

Considering the safety issue, the hoist has been zeroed out at the factory.

In the following cases, the floor information must be zeroed, otherwise there is potential risk of accidents!

（1）When installing a new machine.
（2）Before disassembling the equipment.
（3）When replacing the site for reuse.
（4）When the lift is disassembled to lower the floor
（5）Encoder failure, replacement or reinstallation when used again.

Floor clearing method:

1) Get the face recognizer administrator or maintainer authority authentication, press and hold the "cancel" key directly, and keep it for more than 3 seconds, if the current floor position on the operation table flashes to show the floor number that has been calibrated, it enters the clearing state, and then press the "confirm" key can complete the zeroing operation. Note: If you want to cancel the zeroing operation after entering the zeroing state, press " Cancel" key once again.

2) The professional maintenance personnel will change the parameter B8.10 to 0 through the inverter panel, and then set the floor information according to the floor calibration steps when using the automatic floor leveling function again.

3.2.3 Manual-auto Switching

This version of the lift has a manual/automatic control system. Manual operation and automatic leveling can be freely switched between the lever and the keypad without interfering with each other, so that even if one mode of operation fails, it does not prevent the use of the other mode of operation.

Figure3.2-3 Diagram of Console

(1) Auto—>Manual
Pulling the operation rocker during the operation of automatic mode, the lift will enter manual control mode, and the construction lift will be operated according to the rocker command for stopping, starting, speed regulation, etc..

(2) Manual—>Auto

Stop the hoist in the air, enter the target floor, press the operation key, the lift will enter automatic mode operation and reach the target floor.

(3) Pause and cancel operation

1) Pause operation: When the hoist is in the process of automatic operation, if you need to temporarily pause to drive to the target floor entered at the end of the previous, you can push the handle to make the hoist pause.

2) Cancel operation: After making the hoist pause, you can choose to manually operate to stop to the target floor, or you can choose to press the "cancel" key to cancel the previous daily target floor, and then enter the target floor. For example, when the lift is running automatically from the 1st floor to the 10th floor and a call request is received for the 5th floor, the following methods are used,

option 1: The operator can operate the handle to make the lift pause and then press the "Cancel" key to cancel the target floor 10 and re-enter the target floor 5, the lift will automatically stop at the 5th floor.

3.3 Cage Top Operation

Cage top operation is carried out under only certain special circumstances, such as: carrying out standard section addition, maintenance, etc., and it is only allowed to be operated by professional personnel.

1) After the authentication of the administrator or maintainer authority through the face recognizer, the identification light on the display of the operation console turns on and the identification of the cage top operation is obtained.

(2) First turn the switch button on the cage top operation box to the cage top position, the cage top operation light on the display panel can be operated up and down, in case of emergency press the emergency stop button on the cage top operation box to cut off the total power supply. When cage top operation is carried out, the joystick inside the cage controlling the up and down line cannot operate the elevator action.

(3) Ordinary operator authority cannot operate the cage top.

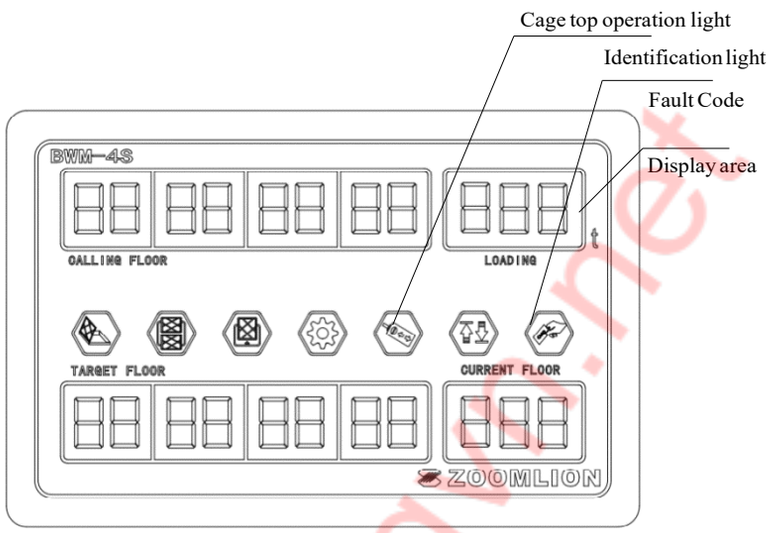


Figure 3.3-1 Diagram of Screen

Notice

If the cage operation box selector knob is in the "Cage top operation mode" position before the system starts, the cage cannot be operated inside and the "Change top operation" light flashes.

(1) If you want to operate inside the cage, you need to turn the cage top operation box selection knob to the "cage operation mode" position.

(2) If you want to operate the cage, you need to turn the cage operation box selector knob to the "Cage operation mode" position first, then turn it to the "Cage top operation mode" position before you can operate.

3.4 Falling Experiments

In the event that the hoist needs to conduct a falling experiment.

(1) After the authentication of the administrator or maintainer authority through the face recognizer, the authentication indicator light on the operation console display turns on and the authentication of the falling experiment is obtained.

(2) When the hoist is in cage mode, the falling experiment box is connected to the cage air plugged in.

(3) After the falling experiment button box is connected, the electronic control system automatically switches to the fall operation mode, the operating console joystick and cage top operation box cannot control the hoist action, only the falling experiment button box to operate the hoist up and fall

Notice

(1) If you connect the drop test box in the cage top mode, the system will send out an alarm and indicate E40 fault in the fault code display area, you need to switch the cage top operation box to the cage inside mode and reapply power to eliminate the alarm before connecting the fall test box.

(2) If the cage or cage top start, lift and other operations during the fall test, the system will issue an alarm and indicate E41 fault in the fault code display area, need to reapply power to eliminate the alarm and then conduct the fall test.

(3) The fall test is very dangerous, need to be fully prepared for safety and carried out by professional maintenance personnel.

3.5 Floor Call

3.5.1 Floor Call Setup

The new floor call receiver, with self-learning call code function, has been set before the factory. Customers need to take out the floor call receiver and install it at the bottom of the operating table, as shown in the figure below.

Figure 3.5-1 Floor call receiver installation location

The installation of floor is done in two steps.

Step 1: Enter the self-learning state; you can enter the self-learning state by the following two methods.

Methods 1 (recommended): Enter the password: 0362951 in the keyboard.

Methods 2: Long press the learning key at the bottom of the operation desk for 3 seconds to enter the self-learning state/ Floor call display area 7-8 digits show the floor to be learned.

Figure 3.5-2 Enter the self-learning state

Step 2: Complete the code self-learning

(1) New extension set floor: keyboard input need to set the floor and confirm, at this time the floor call display area 7-8 bit display to be learned floor, press three extensions to complete learning.

(2) Clear all floors: long press the run button for 3 seconds to clear all floors.(Trial installation in the elevator again, floor call extension confusion.

(3) Exit learning mode: long press the cancel button for 3 seconds to exit learning mode or no floor to code operation within 30s, the system exits learning mode. After the address code of the floor call controller is successfully entered into the electronic control system, the floor call can be made, and if there is a floor call, the number of the call will be displayed in the operation and accompanied by the voice reminder of the corresponding floor.

3.6 Maintenance Operation

The construction hoist is subject to regular maintenance (see "Construction Hoist Operation Manual" for details) and maintenance work is carried out by professional maintenance personnel.

It should be noted that the maintenance work may require the use of a cage top operator's box in the cage, which may be dangerous. For the safety and effectiveness of the maintenance work, a series of protection measures have been added to the 4S (Elite version) lift, therefore this version of the open and lower the machine maintenance work need to strictly follow the following steps to operate.

(1) Face recognition device to obtain maintenance personnel privileges, the operating console display on the identity authentication indicator light becomes bright.

(2) Carry out the corresponding special maintenance work.

(3) The completed maintenance project can be checked and confirmed in the cell phone APP, turning [to be confirmed maintenance] into [has confirmed maintenance].

Figure 3.6-1 In-app maintenance confirmation chart

4 Information Display Equipment

4.1 Display Panel

The information on the display panel of the operator console includes two types of information: numbered tube display and indicator display.

A Normal display state

B The display status when a fault occurs

Figure 4.1-1 Display panel of Elite operation console

4.1.1 Number tube display

(1) Floor call display

Up to 4 call floors can be displayed

(2) Current floor

When the local communication of the equipment is normal, i.e. when the communication between the operator console and the controller (HLC) -- cross-frequency device is normal, the specific floor number will be displayed, otherwise it will be "-", during the lifting process, the floor will change according to the change of the construction hoist height. This number tube has another function that can display the fault code of inverter class, see Table 2-1 for details.

(3) Target floor

Up to 4 target floor numbers can be entered.

(4)Load display

This number tube has several functions, not only can display the load of the construction hoist in real time, but also can be used to display the fault code when the equipment is malfunctioning.

4.1.2 Indicator light

Indicator lights from left to right are: sunroof limit, double door limit, single door limit, floor calibration setting, cage item operation, up and down limit, and face identifier authentication, details are shown in the figure below.

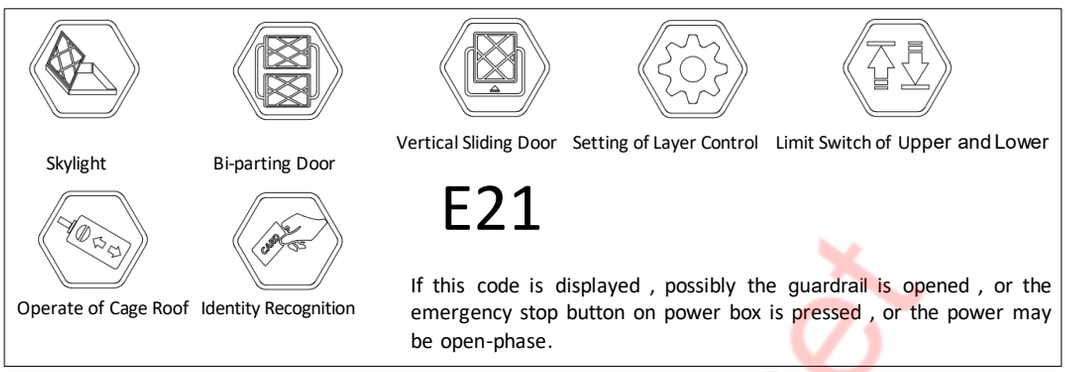


Figure 4.1-2 Driver's interior signage

4.1.3 Power Management

（1） Utility mode： When the external power supply (380v) is connected, the console enters utility mode.

A Not Start

B After normal start-up

[Or inverter communication failure, encoder failure. More than the learned floor]

（2）Battery-powered mode: If the external power supply is disconnected or the 9V DC power supply is disconnected, the operator console is changed to battery-powered mode.

C Low power mode (5 mins)

[With floor call and remote communication function]

D Deep power saving(25mins)

[Only floor call]

E Sleep mode

[Turn off all functions]

（3）Wake-up：

Activate the utility power; after activating the utility power, the operating table enters the utility power supply from the battery power.

4.1.4 Equipment Information Inquiry

If you want to know the terminal number, SIM card number, program version number and other information of the control system, you can press and hold the corresponding numeric key on the keyboard for 3 seconds to inquire, and the relevant information will be prompted in the display panel, and the inquiry content is detailed in the following table.

Figure 4.1-1 Keyboard input query table

Number Keys	Implication	First Digital tube	Second Digital tube	Third Digital tube	Fourth Digital tube	Fifth Digital tube
1	Terminal number	Terminal number				Terminal version number
2	Software number	Software version(main program)				Software Version (Start-up version)
3	CPU-ID					
4	Time	Year	Month	Day	Hour	Minute
5	SIM card number	11-digit SIM card number				
6	GPS information					GPS (won't display without GPS data)
7	Locking machine	Command lockout (0:not locked)	Permanently offline (0: not open)	Temporary offline (0: not open)	self-locking machine or not (0:no lock)	Time of poor remote communication (Hour)

4.2 Inverter Display

For the 4S Elite hoist, the display panel on the inverter can be used for functional parameter modification, working status monitoring and operation control, and can monitor working voltage, current, frequency, power and other information. In case of a fault, the corresponding code will also be displayed for easy inspection by the after-sales personnel.

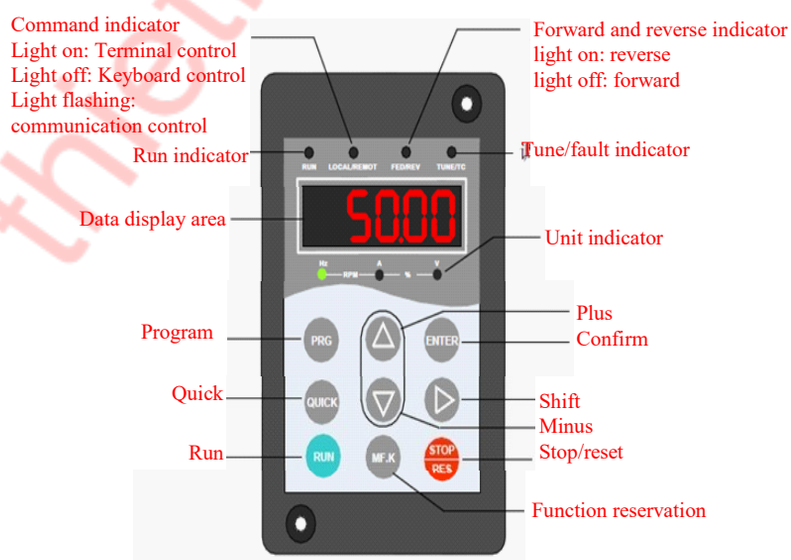
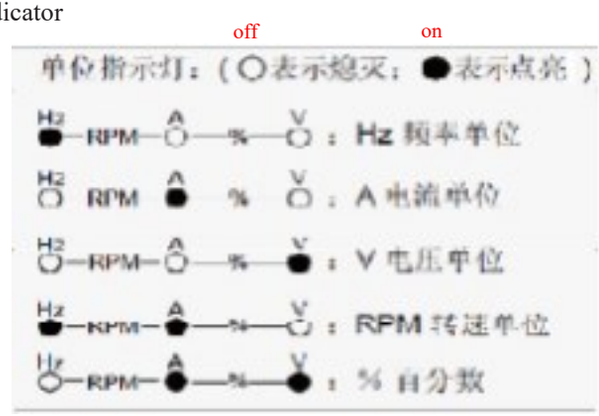


Figure 4.2-1 Display panel of inverter

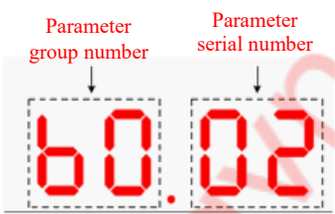
(1) Function Indicator



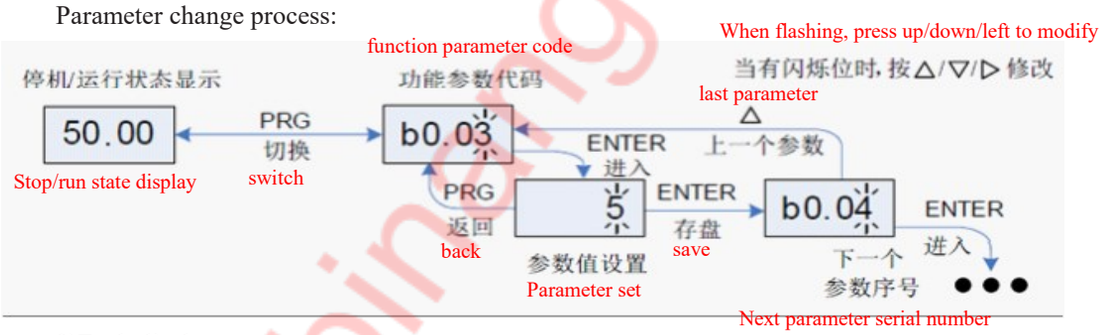
(2)Digital display area

The 5-digit LED display shows various monitoring data, alarm codes, and function parameters.

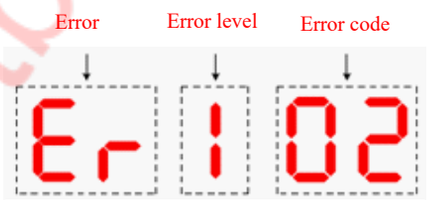
1)View parameters



Parameter change process:



2)Fault display



See Appendix 3 for the table of common fault codes

3) Limit indication display

Limit information	Code display
Encounter the upper limit	STOP1
Encounter the lower limit	STOP2
Prohibit limit	STOP3

Notice

Prohibited limit means that there is no valid input to DI10 on the inverter when the hoist is not started normally, i.e. there is no valid output to the limit output point on the HLC, and the "STOP3" display will be removed when the hoist if started normally,

4.3 HLC Controller Display

There are many signal lights on the logic controller, the lower row is for input signal points (33), the upper row is for output signal points (10), among which, the solid points are normally closed signals, and the circled points are normally open signals. HLC communicates effectively through 485 communication lines, which are displayed by special communication lights, which blink when communication is normal, from left to right, they are

(1) <CONSOLE> indicates the communication status of HLC controller and operator console.

(2) <OL> indicates the communication status between the HLC controller and the overload protector.

(3) <INV> indicates the communication status between the HLC controller and the inverter. In addition, there is the self-test protection lamp of the HLC controller itself.

(4) <Self-test> lamp when lit indicates the operation status of the self-test circuit of the HLC controller.

(5) The <Protect> lamp will be lit when there is a normal external command input.

When the input signal meets the logic requirements, the corresponding light will become lighted and the HLC will output the corresponding control command to make the construction hoist operate.

Figure 4.3-1 4S (Elite) signal light of logic controller

Notice

There are audible alarms in the HLC controller that will indicate when certain faults occur!

5 Intelligent Control System

5.1 Function of Intelligent Control System

The core component of the construction hoist control is the intelligent control system, the main functions of the 4S "Elite Edition" control system include.

(1) Hoist intelligent control system, integrated limit and electrical original status monitoring.

(2) Integrated floor call system.

(3) Hoist fault diagnosis.

(4) Full parameter long time working condition data recording.

(5) Mobile phone APP remote management.

(6) Operator face recognition identity authentication.

(7) Automatic leveling of the hoist.

(8) Speed reduction function with pressure.

(9) Anti-skid and zero-speed hovering functions.

5.2 Structure of Intelligent Control System

The structure of the control system is divided into the following 5 parts as shown in the figure.
(1) HLC controller is the electrical control limit unit of the hoist, installed in the electric control cabinet with inverter, overload protector, etc.
(2) The operating console has two kinds of command input, keyboard and joystick, and includes functions such as status display.
(3) Configuration of face recognizer for intelligent management of operators.
(4) The floor call press receiver is connected to the operation console, which is responsible for pressing and receiving the call data of the floor extensions.
(5) GPS antenna is also connected to the operation console to receive GPS positioning data.
(6) The remote server communicates wirelessly with the control system to realize the operation status of the hoist. Alarm reminding, maintenance and other information of remote monitoring, and the monitored information will be sent to the cell phone APP.
(7) High-precision encoder is installed at the end of the motor to accurately collect motor operation data.

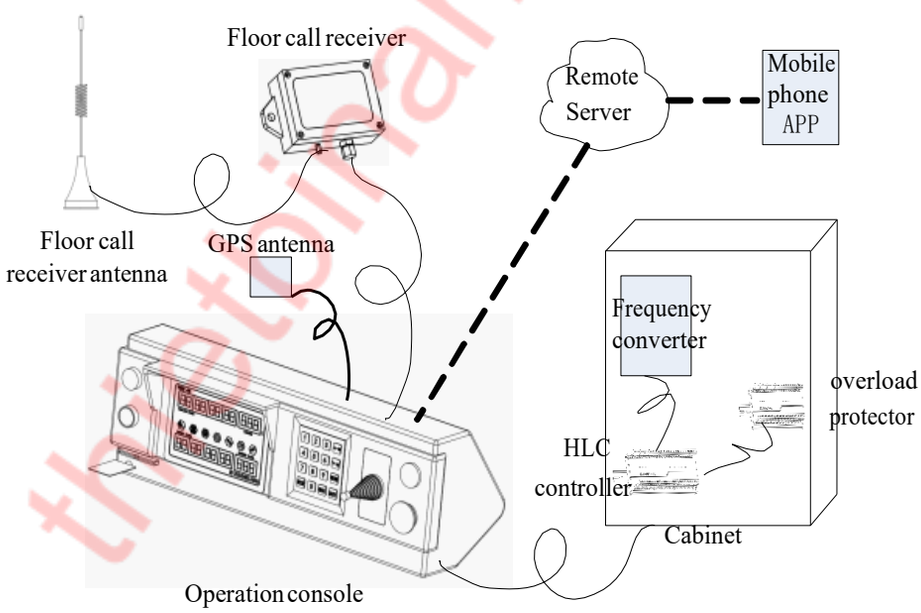


Figure 5.2-1 Structure of intelligent control system

5.3 Installation and Precautions for Intelligent Control System

(1) Before using the HLC controller, be sure to ground the special power supply for the controller correctly and reliably.

(2) Implement the wiring and be sure to turn off the power.

(3) After cutting off the power to the hoist controller, there is still a danger of high voltage existing inside the hoist controller and the contactor terminals and response output circuit, so please do not touch the internal circuit and zero components.
(4) Never modify the internal parts or wiring of the hoist controller by yourself.
(5) Never connect the non-control output terminals of the hoist controller into the control circuit (input and output cannot be reversed)
(6) The input signal is a passive dry contact, never connect a charged line to the control input of the hoist controller

5.4 Closed-loop control system

4S (Elite) control system installs a high precision encoder at the end of the motor shaft to accurately collect motor running information and feed back to the inverter, realizing the closed-loop control of→HLC controller→frequency converter→motor→inverter. Because the inverter can get the actual running data of the motor, it can control the motor more accurately and improve the smoothness of operation and the accuracy of automatic leveling. Meanwhile, the closed-loop control of the base hand has developed anti-skid and zero-speed hovering functions. When the cage falls due to the failure of the brake, the inverter can control the motor to drag the cage and hover in the air to prevent further fall.

5.5 Fault Alerts for Intelligent Control Systems

When a fault occurs in the intelligent control system, the digital tube set used for load display on the console will be used to display the corresponding fault generation (E*), and if an inverter fault occurs, the corresponding inverter class fault code (F**) will also be displayed on the current floor display digital tube. Maintenance personnel can conduct targeted fault investigation according to the system prompts, or contact the service department of Zoomlion for processing. Detailed fault code information can be found in chapter 6, appendix 5 fault description and common treatment methods.

⚠Notice

Open the cover of the inverter for inspection or wiring, etc., only after the external power supply has been disconnected for 3 minutes, otherwise the residual voltage inside the inverter may cause electric shock injury!

5.6 Emergency Use of Intelligent Control Systems in Case of Certain Failures

When a failure of the integrated intelligent control system occurs in the following cases, in order not to affect the operation, the emergency use can be referred to the instructions.

(1) When there is a functional failure in the automatic leveling mode or manual mode, you can use another mode to continue to run the hoist and promptly notify the maintenance personnel for processing.

(2) When the identity authentication function of the face reader is blocked, the identity authentication function can be temporarily closed by the management personnel with relevant authority by entering the password through the keyboard, or contact the service department of Zoomlion to temporarily release the identity authentication function, and contact the after-sales department of Zoomlion as soon as possible for processing.

(3) When there is a wireless network obstacle, the equipment will enter the countdown lock state (240 working hours), during this period the equipment can still be used, but after 240 hours of accumulated work, the system will not be able to operate, so please contact Zoomlion service department as soon as possible to deal with it.

(4) When there is a communication obstacle of the internal module of the system, the automatic leveling function will not be available, but the equipment can still use manual operation, and the system and cell phone APP will issue a fault indication, and at the same time, the equipment will enter the cumulative operation number limit mode. During this period, each device can still be used. However, if the cumulative number of operations exceeds the limit, the system will not work, so please contact the service department of Zoomlion as soon as possible to deal with it.

(5) The default mode of 4S (Elite) hoist is closed-loop, when the encoder at the end of the motor is abnormal, you can turn the open-loop/closed-loop knob in the electric control box. The control mode will be switched to open-loop. At this time, the machine can go up and down normally, but the anti-skid and automatic leveling function will be closed. You need to contact Zoomlion after-sales department as soon as possible to deal with it.

Figure 5.6-1open/closed loop switch button

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Operation Manual of Construction Hoist

9

Regulation

Regulation

For 4S (Elite) Hoist, the degree of intelligence is higher, so it is necessary to regulate the management methods of the SIM card and APP account used.

1 Construction Hoist HLC Controller SIM Card Management Method

1.1 General Provisions

(1) In order to standardize the management of HLC controller SIM card application and facilitate the use of customers, these regulations are formulated.

(2) This regulation is applicable to all customers holding Zoomlion construction hoists.

(3) The 400 call center of Zoomlion Marketing Company is responsible for the application management of HLC controller SIM card.

1.2 About SIM Card Issuance, Use and Replacement

(1) When customers purchase the equipment, the SIM card will be automatically configured in the HLC controller since the product leaves the factory, and the SIM card will be matched with the SIM card number, terminal number, electric control cabinet number.

(2) After receiving the equipment, the customer should first check carefully whether the electronic control cabinet number, equipment factory number and contract number match one by one, and sign on the "product handover list" to ensure that the equipment can be activated in time. If inconsistent, we have the right to request our service personnel to make corrections, and we will complete the corrections within 5 working days.

(3) Customers apply to our company for equipment start-up procedure through our business personnel since the date of receiving the hoist, and out company will complete the operation within 3 working days after receiving the application.

(4) SIM card role: automatic monitoring of equipment running status, collecting fault data, facilitating the realization of equipment stop and start management, personnel attendance management and other functions. Customers can apply to our company to open relevant services according to the authority of the equipment.

(5) If the SIM card cannot be used after replacement due to HLC upgrade or failure, it must be fed back to 400 by service personnel or base personnel. The call center is responsible for canceling this SIM card. If the SIM card is replaced due to failure, the corresponding information must be fed back to the 400 call center by the service personnel or base personnel, and the call center is responsible for the replacement of this SIM card.

(6) Customers for card replacement procedures, should be with the equipment certificate of conformity or supervision certificate and other valid documents to prove the equipment contact service personnel to obtain the "replacement card application form" see Appendix II for details. After verifying the information of the equipment, the integrated management personnel of the area service will initiate the relevant process for the replacement. Relevant departments of the company will follow the process requirements for timely processing. 2 working days for delivery. The new card should be reactivated before use.

The customer shall bear the loss caused by not losing the card in time. If the old card is retrieved after the replacement of the new card, the old card will be automatically invalidated and the new card and the capital fee will not be returned.

(7) Each card replacement cost is 300 RMB, which will be collected by the district service administrator and the replacement details and cost will be reported to the Parts Management Center of the marketing company.

1.3 Other Provisions

The company configures the SIM card only for the use of the device itself, and the company will not bear any legal responsibility for the failure of the device, security problems, economic losses and other problems caused by the control of the SIM card processing.

1.4 By-laws

(1) The interpretation of these regulations is the right of Zoomlion Construction Crane Branch.

(2) These regulations shall be implemented from the date of publication. It shall take effect from the date of receipt of the equipment by the customer.

2 Construction Hoist APP Account Management

2.1 General Provisions

(1) In order to standardize the management of APP (remote management system) account and facilitate the use and management of APP by customers, this provision is formulated.

(2) These regulations are applicable to all customers holding Zoomlion construction hoists.

(3) The 400 call center of Zoomlion Construction Crane Branch Marketing Company is responsible for the management of APP.

2.2 About the APP Account, Use and Replacement

(1) Customers can be recommended by salesmen to download the cell phone APP client through cell phone APP or official website QR code scanning or 400 platform SMS link.

(2) New customer account application by the customer himself, the salesman in the OA take "equipment remote management tea system (APP) account management" process, the process to 400, by 400 call center newly opened account and notify the user to use.

(3) The new device binding customer by the salesman to collect the device information and reported to the 400 call center, the 400 call center is responsible for authorization and binding.

(4) For more new equipment added to the opened account later, the 400 call center will directly bind the new equipment to the corresponding customer's account after receiving the new equipment APP account.

(5) Customers can remotely manage and monitor the geographic location and working condition of the hoist through APP, and can also report repair and feedback opinions and suggestions on the equipment, and the 400 call center will be responsible for sorting and screening the repair and feedback information and distributing them to the relevant departments for processing and reply.

(6) If the APP account is lost or the password is forgotten, you can contact the 400 call center and provide the original account number and password.

2.3 Other Provisions

(1) The APP account insured by the company is for the use of the customer only and is used to manage the hoist under the user name.

(2) The customer should keep the APP account in a safe place to prevent the account password from being leaked.

2.4 By-laws

(1) The interpretation of these regulations is the right of Zoomlion Construction Crane Branch.

(2) These regulations shall be implemented from the date of publication. It will be effective from the date of receiving the equipment by the customer.

ZOOMLION

Operation Manual of Construction Hoist

Safe Signs

General Provisions

Brief Introduction

Preparation

Erection and Dismantling

Technical Parameter

Operation and Safety

Electrical Control System

Regulation

- Transportation

Appendix I

Appendix II

10

Transportation

Transportation

1 Cautions

In order to facilitate packaging and adapt to different transportation methods, the components of the construction hoist have been disassembled into many individual units.

(1) All components must be well secured during transportation.

(2) The lighter units must be placed on the heavier units.

(3) To prevent damage to painted surfaces, place pads or wooden dividers between units.

(4) Prevent sand and mud from entering the structural holes and drive components during transportation.

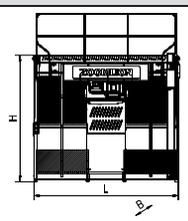
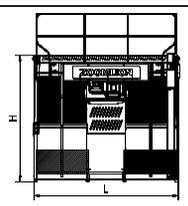
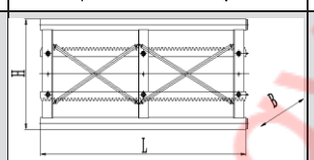
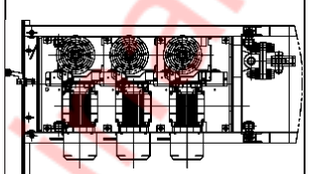
(5) Check that all ties are loosened.

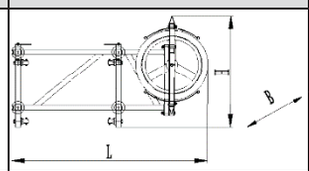
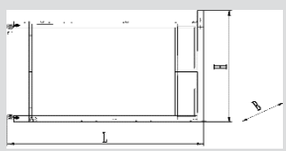
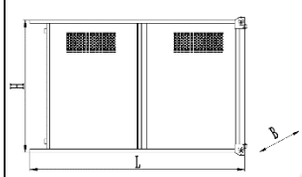
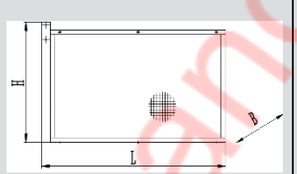
(6) Check the transport strapping.

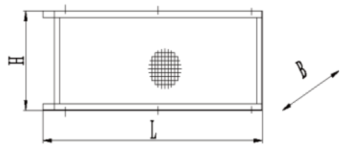
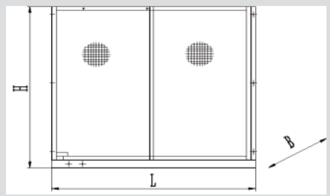
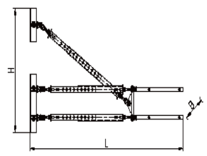
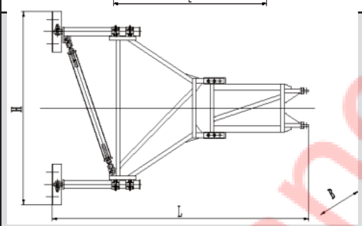
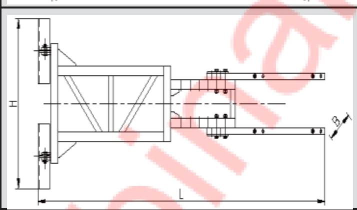
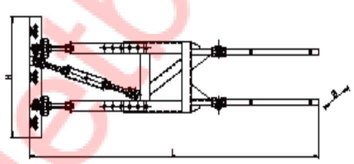
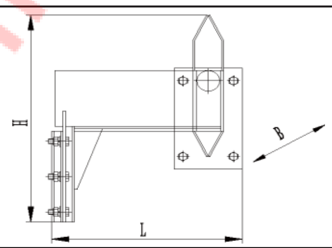
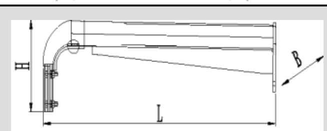
(7) When driving on public streets, pay attention to the appropriate regulations.

(8) When passing through underpasses, bridges, and tunnels, take care to leave sufficient clearance.

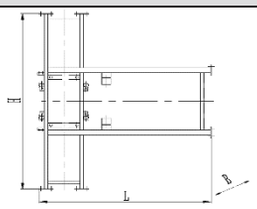
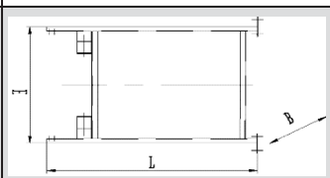
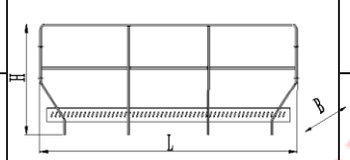
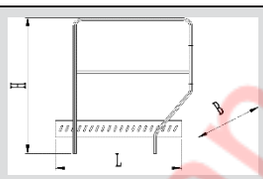
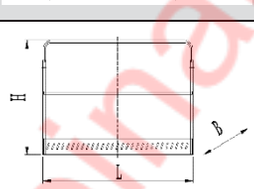
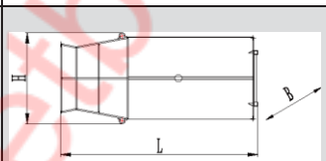
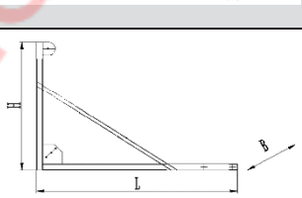
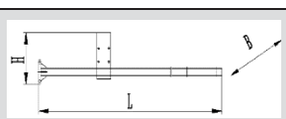
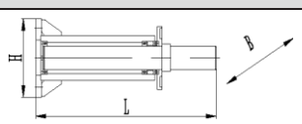
2 Transportation

No.	Name	Shape and Size	L (mm)	B (mm)	H (mm)	Weight (kg)	Note
1	Cage		3400	2600	3000	1495	With driver's cabin
			3400	2600	2540	1395	
			3650	2500	3000	1850	
	Cage		3400	1800	3000	1361	Without driver's cabin
			3400	1800	2540	1361	
2	Guiding track		1550	850	750	160	
3	Drive System		2010	620	1250	974	

No.	Name	Shape and Size	L (mm)	B (mm)	H (mm)	Weight (kg)	Note
4	Cable Pulley		1535	300	880	57	Short Pulley
			1535	300	880	60	Tall Pulley
5	External guardrail doorframe assembly		3100	350	2250	97	
6	External guardrail		2650	80	1850	57	
7	Mesh 1306		1400	50	2000	29	

No.	Name		Shape and Size	L (mm)	B (mm)	H (mm)	Weigh t	Note
8	Mesh 750			2000	50	750	21	
9	Mesh 2213			2250	50	2000	45	
10	Framework adhering (without rear conne -cting rod)	I		1400	250	800	130	
		IIA		2350	150	1850	130	
		IIB		2600	150	2100	140	
		IIC		2950	150	2350	155	
		IID		2550	150	1850	135	
		IIE		2000	150	1650	120	
		IIG		3800	150	2550	190	
		IV		1400	150	1000	80	
		VA		1400	150	810	90	
		VB		1700	150	810	95	
11	Cable Jib II			350	275	425	9	Suitable for cable pulley
12	Cable Jib III			725	120	220	8	Suitable for cable

Transportation

No.	Name	Shape and Size	L (mm)	B (mm)	H (mm)	Weigh t (kg)	Quantity
13	Main base frame		2550	100	3550	172	
	4.0m Main base frame		2550	100	4350	187	
14	Vice base frame		1900	100	1250	55	
15	Long Guardrail		1600	50	1300	16	
	4.0m Long Guardrail		2000	50	1300	18	
16	Short Guardrail		1150	50	1300	10	
	4.0m Short Guardrail		1550	50	1300	13	
17	Guardrail at both ends		1550	40	1150	11	
18	Cable reel		1950	850	900	52	
19	Upper part of boom		2150	90	1500	40	Optional
20	Middle part of boom		2450	200	450	28	Optional
21	Bottom of the boom		550	200	200	33	Optional

ZOOMLION

Operation Manual of Construction Hoist

I

Appendix

1 List of Electrical Elements of Construction Hoist

Table 1-1 List of Electrical Elements in Left Variable Frequency Control Cabinet I

No.	Name	Code	Model/Specification	Qty	Remarks
1	Accessorial Contact	1020302056	LAD-N31C	1	
2	Transformer	1021914178	LS-BK-1200-A	1	
3	Relay	1020304986	SR2HLD-D24	17	
4	Relay Holder	1020304988	SSF08F	17	
5	Terminal block fixed part	1029901814	UTD-D	1	
6	5-pin Socket	1020702703	Y2M-5TK	1	
7	7-pin Socket	1020702702	Y2M-7TK	1	
8	Switching Power Supply	1020903206	NEID-35B	1	
9	Mini Breaker	1020605199	NXB-63 1C2	1	
10	Mini Breaker	1020605194	NXB-63 2C10	1	
11	Mini Breaker	1020605197	NXB-63 2C16	1	
12	Frequency Converter	1022400137	CS200-4T55GB-ZLF	1	Suitable for SC200BZ-A（4S2063）
13	Frequency Converter	1020099338	CS200-4T90G-ZLF	1	Suitable for SC200BG-A（4S2080）
14	Contactor	1020301047	LC1D11500M5C	1	Suitable for SC200BZ-A（4S2063）
15	Contactor	1020301084	GMC-180	1	Suitable for SC200BG-A（4S2080）
16	Bell	1020403051	UC4-100 220V	1	
17	Over/Under voltage relay	1020303034	XJ3-D	1	
18	Switching Power Supply	1021904237	RS-25-24	1	
19	Switching Power Supply	1021904238	RS-25-12	1	
20	Terminal block	1029904998	2016-1207	1	
21	Terminal block	1029904982	2016-1201	1	
22	Mini Breaker	1020605418	NXB-63 1C6	1	
23	Cage-top operation box	1020810542	BZANH-4	2	
24	Drop test operation box	1020809614	TNHA1-6	1	
25	HLC Controller	1020103974	HLC-2017-06B	1	
26	Overload Protector	000408801A0001230		1	
27	Signal Light	1020402006	AD16-22D/Y23S	1	
28	Thob	1031700014	ZB2BD2C	1	
29	Contact Socket	1020300024	ZB2BZ101C	1	
30	Normally open contact	1020300026	ZB2-BE101C	1	

Note

Table 1-1 is suitable for SC200BZ-A（4S2063）, SC200/200BZ-A（4S2063）, SC200BG-A （4S2080）, SC200/200BG-A（4S2080）construction hoist.

Right cabinet has the same electrical Elements with left cabinet.

Table 1-2 List of Electrical Elements in Left Variable Frequency Control Cabinet II

No.	Name	Code	Model/Specification	Qty	Remarks
1	Plastic Case Breaker	1020511415	ABE203b 150A	1	Suitable for SC200BZ-A（4S2063）
2	Plastic Case Breaker	1020605431	ABS203B 250A	1	Suitable for SC200BG-A（4S2080）
3	Contactor	1020301047	LC1D11500M5C	1	Suitable for SC200BZ-A（4S2063）
4	Contactor	1020604219	GMC-220 AC220V	1	Suitable for SC200BG-A（4S2080）
5	Frequency Converter	1021904273	TDB-300-114	1	
6	Mini Breaker	1020605196	NXB-63 1C1	1	
7	Emergency Stop Button	1020520497	LA42J/R	1	
8	Terminal block	1029904977	2002-1201	4	
9	Button socket	1020520429	01contact+PT-ZJ	1	
10	Terminal block	1029904982	2016-1201	6	
11	Terminal block	1029904998	2016-1207	1	

Note

Table 1-2 is suitable for SC200BZ-A（4S2063）, SC200/200BZ-A（4S2063）, SC200BG-A （4S2080）, SC200/200BG-A（4S2080）construction hoist.

Right cabinet has the same electrical Elements with left cabinet.

Table 1-3 List of Electrical Elements in Left Variable Frequency Control Cabinet III

No	Name	Code	Model/Specification	Qty	Note
1	Overload connector core	1020704733	SIBAS-HE-024-FS	1	
2	Thermal Relay	1020304428	NR4-63(32-45)	3	
3	Relay	1020303114	AHN22324	3	
4	Relay socket	1020304036	AHNA21	3	
5	Overload connector suite	1020704029	HA03-M	1	
6	Overload connector suite	1020704028	HA03-F	1	
7	Cable fastening	1029901195	WNA-M32/(D18-25)	3	
8	Cable fastening nut	1029903546	WNAP-M32G/S	3	
9	Terminal block fixed part	1029901814	UTD-D	4	
10	Terminal block	1029904979	2002-1401	6	
11	SIBAS shell base	1022200067	H24B-AD-LB	1	
12	5-pin female base	1029805090	RPC-M12-FF-5CON-PG9-0.5LPUR	1	
13	3-pin male base	1029805091	RPC-M12-MF-3CON-PG9-0.5LPUR	1	
14	Cable with plug	1029805087	RPC-M12-5MS-3.0SH-M12-5MS-PUR	1	
15	Cable with plug	1029805088	RPC-M12-3FS-3.0SH-M12-3FS-PUR	1	
16	Terminal block	1029904982	2016-1201	10	
17	Terminal block	1029904988	285-135	5	
18	Breaker	1020604533	BKN 3P D16A	1	
19	Terminal block	1029904979	2002-1401	50	
20	Terminal block	1020703803	UKJ-35	10	
21	Bell	1020403051	UC4-100 220V	1	
22	5-pin Socket	1020702703	Y2M-5TK	1	
23	7-pin Socket	1020702702	Y2M-7TK	1	
24	Contactor	1020301031	LC1-D09M7C	2	
25	Contactor	1020301047	LC1D11500M5C	1	
26	Transformer	1021904178	LS-BK-1200-A	1	
27	Switching Power Supply	1020903206	NEID-35B	1	
28	Breaker	1020604675	BKN 1P C3A	1	
29	Breaker	1020602078	BKN 1P C1A	3	
30	Micro breaker	1020604806	BKN 2P C16A	1	
31	Mini breaker	1020602549	BKN 2P C4A	2	
32	Mini breaker	1020602572	BKN 2P C10A	1	
33	Over/Under voltage relay	1020303034	XJ3-D	1	
34	Accessorial Contact	1020302056	LAD-N31C	1	
35	Switching Power Supply	1020903255	CP E SNT 25W 24V 1.1A	1	
36	Switching Power Supply	1020903254	CP E SNT 25W 12V 2.1A	1	

Note

Table 1-3 is suitable for SC200BZ（BWM-3S）, SC200/200BZ (BWM-3S) construction hoist.

Right cabinet has the same electrical Elements with left cabinet.

Table 1-4 List of Electrical Elements in Left Variable Frequency Control Cabinet IV

Serial No.	Name	Code	Model/Specification	Quantity	Remarks
1	Transformer	1021904178	LS-BK-1200-A	1	
2	Plug-in female terminal	1020704564	F75-B-7.62-2P	1	
3	Plug-in female terminal	1020704562	F75-B-5.08-2P	1	
4	Relay	1020303114	AHN22324	13	
5	Plug-in female terminal	1020704557	F75-B-5.08-12P	2	
6	Relay Terminal Socket	1020304036	AHNA21	13	
7	Plug-in female terminal	1020704563	F75-B-7.62-4P	1	
8	Breaker	1020604675	BKN 1P C3A	1	
9	Axial flow fan	1021000075	KA1238HA2	2	
10	5-pin Socket	1020702703	Y2M-5TK	1	
11	Over/Under voltage suppressor	1021402370	YZG2-31/JD	3	
12	Switching Power Supply	1020903206	NEID-35B	1	
13	Strainer	1029902533	FU9803A	4	
14	Mini breaker	1020602572	BKN 2P C10A	1	
15	Mini breaker	1020602549	BKN 2P C4A	2	
16	Breaker	1020602078	BKN 1P C1A	3	
17	Mini breaker	1020604806	BKN 2P C16A	1	
18	Plug-in female terminal	1020704558	F75-B-5.08-13P	1	
19	Plug-in female terminal	1020704561	F75-B-5.08-4P	2	
20	Bell	1020403051	UC4-100 220V	1	
21	Plug-in female terminal	1020704560	F75-B-5.08-14P	1	
22	Terminal marking	1029902701	DEK5/WS 10/5	1.5	
23	Over/Under voltage relay	1020303034	XJ3-D	1	
24	Switching Power Supply	1020903254	CP E SNT 25W 12V 2.1A	1	
25	Switching Power Supply	1020903255	CP E SNT 25W 24V 1.1A	1	
26	Terminal block	1029904979	2002-1401	47	
27	Baffle	1029904934	2002-1492	1	
28	Terminal block fixed part	1029901814	UTD-D	4	

Serial No.	Name	Code	Model/Specification	Quantity	Remarks
29	Relay Terminal Socket	1020303439	AHJ3848	8	
30	Relay	1020604209	HJ4-L-DC24V	8	
31	Terminal block	1029905010	285-150	9	
32	Terminal block	1029904988	285-135	9	
33	Terminal marking	1029904957	793-501	2	
34	Logic controller	1020103549	H1U－1410MR-XP	1	
35	SIBAS shell base	1022200067	H24B-AD-LB	1	
36	Overload connector core	1020704733	SIBAS-HE-024-FS	1	
37	Shrapnel type female insert	1022202197	HE-010-FS	1	
38	Overload connector shell	1029905122	H10B-AD-LB	1	
39	Option switch	1020520587	LA42X2/B	1	
40	Emergency stop	1020520497	LA42JS/R	1	
41	Button with lamp	1020503024	ZB2-BW35C	1	
42	Emergency switch signboard	1029904974	J-I	1	
43	Contact socket	1020520436	10 contact+ PT-ZJ	2	
44	Button socket	1020520429	01contac +PT-ZJ	1	
45	Double normally open contact	1020520551	20contac +PT-ZJ	1	
46	Scale plate socket	1020806554	ZB2BZ32	3	
47	Button with lamp	1020503067	ZB2-BW33C	1	
48	Contactor	1020304706	DILM170C(RAC240)	1	
49	Exchange contactor	1020002157	DILM9-10C(220V50HZ)	2	
50	Contactor	1020304720	DILM150C-XHI22	1	
51	Contact	1029905200	DILAC-XHI22	2	
52	Frequency Converter		CS200-4T132GB-ZLP	1	

Note

Table 1-4 is suitable for SC200BG (BWM-3S), SC200/200BG (BWM-3S) construction hoist.

Right cabinet has the same electrical Elements with left cabinet.

Table 1-5 List of Electrical Elements in Power Box

Serial No.	Name	Code	Model/Specification	Quantity	Remarks
1	Air switch	1020511415	ABE203b 150A	1	
2	Contactor	1020301047	LC1D11500M5C	1	
3	Transformer	1021904136	ls-bk-16	1	
4	Breaker	1020602078	BKN 1P C1A	1	
5	Emergency Stop button	1020520497	LA42JS/R	1	
6	Button socket	1020520429	01contact +PT-ZJ	1	
7	Terminal block	1020703803	UKJ-35	6	
8	Terminal block	1029904977	2002-1201	4	
9	Terminal block	1020704804	UKJ-35(BU)	2	
10	Operation box on the top of cage	1020810542	BZANH-4	2	
11	Operation box of dropping test	1020809614	TNHA1-6	1	

Note

Table 1-5 is suitable for SC200BZ (BWM-3S), SC200/200BZ (BWM-3S) construction hoist.

Table 1-6 List of Electrical Elements in Power Box VI

Serial No.	Name	Code	Model/Specification	Quantity	Remarks
1	Terminal block	1029905010	285-150	8	
2	Terminal block fixed part	1029901814	UTD-D	4	
3	Transformer	1021904136	ls-bk-160	1	
4	Breaker	1020602078	BKN 1P C1A	1	
5	Emergency Stop button	1020520497	LA42JS/R	1	
6	Emergency switch signboard	1029904974	J-I	1	
7	Button socket	1020520429	01contact +PT-ZJ	1	
8	Baffle	1029904929	2002-1292	1	
9	End baffle	1020700530	249-117	2	
10	Terminal block	1029904977	2002-1201	4	
11	Breaker	1020602280	ABE203B 225A	1	
12	Contactor	1020304689	DILM150C(RAC240)	1	

Note

Table 1-6 is suitable for SC200BG (BWM-3S), SC200/200BG (BWM-3S) construction hoist.

2 List of Wearing Parts of Construction Hoist

Table 2-1 SC200BZ-A(4S2063), SC200/200BZ-A(4S2063), SC200BZ(BWM-3S), SC200/200BZ(BWM-3S) Wearing Parts

No.	Name	Code	Model/Specification	Qty		Remarks
				Single	Double	
1	Transmission gear	000402005A0107001	m=8,z=15	3	6	
2	Back roller assembly	000402005A0105000		4	8	
3	Side roller assembly	000402405C0104000		6	12	
4	Double support double roller assembly	000402406C0109000		4	8	
5	Drive bod hook wheel assembly	000402405C0103000		4	8	
6	Side double rollers	000402406C0105000		2	4	
7	Gear motor	1030201410	9.2kW，i=13.49	3	6	Suitable for SC200BZ(BWM-3S)
8	Motor	1020005633	18.5kW	1	2	
9	Motor	1020005633	18.5kW	2	4	Suitable for SC200BZ(4S2063)
10	Reducer		1:14.8	3	6	
11	Brake Pads	SPZ180.2-1	221C	3	6	
12	Overspeed safety device	1021500590	SAJ50-1.4	1	2	Standard speed 1.4m/s
13	Rubber strip	000400110B0100003		Determined by height		For Cable guiding device(2 for each)
14	Waist roller assembly	000402013A0101000		3	6	
15	Roller assembly	000402013A0103000		2	4	For cable trolley III
16	Pulley	000400113B0000001		1	2	For cable trolley
17	Switching Power Supply	1020903255	CP E SNT-25-24	1	2	For electric cabinet
18		1021904237	RS-25-24	1	2	
19		1021904238	RS-25-12	1	2	
20	Contactor	1020301031	LC1-D09M7C	2	4	
21	Contactor	1020301047	LC1-D11500M5C	1	2	
22	Contactor	1020301069	LC1-D65M7C/EB	1	2	
23	Transformer	1021904178	LS-BK-1200-A	1	2	
24	Master controller	1020103585	SK10-3	1	2	For operation box
25	Air switch	1020511415	ABE203b 150A	1	2	
26	Transformer	1021904273	TDB-300-114	1	2	
27	Bell	1020403051	UC4-100 220V	1	2	
28	Top Operation box	1020810542	BZANH-4	1	2	
29	terminal stopping switches	1029805103	SZL-WL-S-C01AH-Z	4	18	
30	limit switches	1029805108	JK18-125	1	2	
31	limit switches	1020519257	YBLX-K3/20S/T 3	3	6	

Table 2-2 SC200BG-A（4S2080）, SC200/200BG-A（4S2080）SC200BG（BWM-3S）,SC200/200BG（BWM-3S） List of Wearing Parts 2

No.	Name	Code	Model/ Specification	Qty		Remark
				Single	Double	
1	Transmission gear	000402005A0107001	m=8,z=15	3	6	
2	Back roller assembly	000402005A0105000		4	8	
3	Side roller assembly	000402405C0104000		6	12	
4	Double support double roller assembly	000402406C0109000		4	8	
5	Drive bod hook wheel assembly	000402405C0103000		4	8	
6	Side double rollers	000402406C0105000		2	4	
7	Gear motor	1020005097	18.5kW，i=11.4	3	6	Suitable for SC200BG（BWM-3S）
8	Motor	1020099390	26kW	1	2	Suitable for SC200BG(4S2080)
9	Motor	1020099391	26kW	2	4	
10	Reducer		1:11.98	3	6	
11	Reducer	SPZ180.2-1	221C	3	6	
12	Overspeed safety device	1099900110	SAJ50-2.0	1	2	For SC200BG(BWM- 3S) rated action speed is 1.9m/s For SC200BG(4S2080) rated action speed is 1.7m/s
13	Switching Power Supply	1020903255	CP E SNT-25-24	1	2	For electric cabinet
14		1021904237	RS-25-24	1	2	
15		1021904238	RS-25-12	1	2	
16	Contactor	1020301031	LC1-D09M7C	2	4	
17	Contactor	1020301047	LC1-D11500M5C	1	2	
18	Contactor	1020301069	LC1-D65M7C/EB	1	2	
19	Transformer	1021904178	LS-BK-1200-A	1	2	
20	Master controller	1020103585	SK10-3	1	2	For operation box
21	Air switch	1020605431	ABS203B 250A	1	2	
22	Transformer	1021904273	TDB-300-114	1	2	
23	Bell	1020403051	UC4-100 220V	1	2	
24	Top operation box	1020810542	BZANH-4	1	2	
25	terminal stopping switches	1029805103	SZL-WL-S-C01AH-Z	4	18	
26	limit switches	1029805108	JK18-125	1	2	
27	limit switches	1020519257	YBLX-K3/20S/T 3	3	6	

3 List of Externally-purchased Parts of Construction Hoist

Table 3-1 List of Externally-purchased Parts I

No.	Name	Qty		Model	Specification	Remarks
		Single	Double			
1	Reducer	3	6	SJ125-max3	i=14.8	Suitable for SC200BZ-A (4S2063)and SC200/200BZ-A (4S2063)
2	Reducer	3	6	SJ125-max	i=11.98	Suitable for SC200BG-A (4S2080) and SC200/200BG-A (4S2080)
3	Motor	1	2	1020005728	P=11/18.5kW （50/87Hz） JC=25%	Suitable for SC200BZ-A (4S2063) and SC200/200BZ-A (4S2063)
4	Motor	2	4	1020005727	P=11/18.5kW （50/87Hz） JC=25%	
5	Motor (with encoder)	1	2	1020099390	P=15/26kW （50/87Hz） JC=25%	Suitable for SC200BG-A (4S208) and SC200/200BG-A (4S2080)
6	Motor	2	4	1020099391	P=15/26kW （50/87Hz） JC=25%	
7	Gear motor	3	6	1030201410	9.2kW，i=13.49	Suitable for SC200BZ (BWM-3S) and SC200/200BZ(BWM-3S)
8	Gear motor	3	6	1020005097	18.5kW，i=11.4	Suitable for SC200BG (BWM-3S) and SC200/200BG(BWM-3S)
9	Overspeed safety device	1	2	SAJ50-1.4	Rated braking load: 50kN Rated braking speed:1.4m/s	SC200BZ-A (4S2063) and SC200/200BZ-A (4S2063)/ SC200BZ(BWM- 3S) and SC200/200BZ (BWM-3S)

Continued Table 3-1 List of Externally-purchased Parts

No.	Name	Qty		Model	Specification	Remarks
		Single	Double			
10	Overspeed safety device	1	2	SAJ50-2.0	Rated braking load: 50kN Rated braking speed: 1.7m/s Rated braking speed: 1.9m/s	Suitable for SC200BG-A (4S2080) and SC200/200BG-A (4S2080) SC200BG (BWM-3S) and SC200/200BG(BWM-3S)
11	Power cable			YC Cable	3×16+2×6	
					3×25+2×10	
12	Guide roller	20	40		Bottom DiameterΦ74mm	
13	Pinion	2	4		m=8；z=15	
14	Rack/each section	1	2		m=8；z=60	
15	Overload protector	1	2	SC-1		
16	Overload protector	1	2		50 Sensor	

4. Application Form for SIM Card

Region		Name		host processor number	
Reason for Application □ Lost □ Naturally damaged □ Damaged by human factor □ Others					
Comments of Service Personnel	Signature: Date: Seal:				
Comments of Comprehensive Management Officer	Production Costs:				
	Signature: Date: Seal:				
Date of Application		Signature by Applicant			

6. Trouble Explanation and Troubleshooting Method

	Serial No.	Trouble	Display	Possible Causes	Recommended Troubleshooting Method
HLC Trouble	1	Remote lockup	U01	The equipment is locked up	Dial 400-887-7748 and contact the 400 call center
	2	Shutdown without remote data	A00	The equipment has been separated from server for long time and thus has been deactivated	Dial 400-887-7749 and contact the 400 call center
	3	Pre-warning for shutdown without remote data, with xx days counted down	Axx	The equipment has been separated from server for long time, and is in countdown for shutdown	Dial 400-887-7750 and contact the 400 call center
	4	The communication of controller fails	E01	1. The terminals 71 and 72 are loosened or the wiring is not firm; 2. The output point COM of HLC is damaged; 3. The 12-core aviation socket of operating console is loosened or damaged	1. Inspect the wiring and HLC; 2. Ask for technical support
	5	The communication of identity recognition card reader fails	E02	1. The wiring of identity recognition car reader in operating console is loosened; 2. The identity recognition card reader is damaged	1. Inspect the wiring and card reader; 2. Ask for technical support
	6	The communication of overload protector fails	E03	1. The terminals 73 and 74 are loosened or the wiring is not firm; 2. The overload protector is damaged; 3. The HLC is damaged	1. Inspect the wiring and overload protector; 2. Ask for technical support
	7	The communication of call receiver fails	E04	1. The call receiver is damaged; 2. The aviation socket on operating console is damaged; 3. The wiring is loosened	1. Inspect the wiring and call receiver; 2. Ask for technical support
	8	The communication of frequency converter fails (485)	E05	1. The terminals 75 and 76 on HLC are loosened or the wiring is not firm; 2. The connecting terminal 485+/485- of frequency converter is damaged; 3. The HLC is damaged;	1. Inspect the wiring; 2. Ask for technical support
	9	(Reserved)	……		
HLC	Serial No.	Trouble	Display	Possible Causes	Recommended Troubleshooting Method

	10	The connection of GPRS module fails	E10	1. The GPRS module in operating console is damaged; 2. The wiring of GPRS module in operating console is loosened 3. The GPRS antenna is damaged	1. Disassemble and inspect the operating console; 2. Ask for technical support
	11	There is no SIM card	E11	1. No SIM card is inserted; 2. The card groove is loosened	Contact the Quality Service Department
	12	The PIN of SIM card is incorrect	E12	1. The password for the SIM card with PIN is wrong	1. The PIN of SIM card is wrong; 2. Ask for technical support
	13	There is no GPRS signal	E13	1. The GPRS signal is in bad conditions	1. Change the installation position of GPRS antenna
	14	The dialing fails	E14	1. The GPRS signal is in bad conditions; 2. The payment for SIM card is overdue	1. Change the installation position of GPRS antenna 2. Ask for technical support
	15	The connection of server fails	E15	1. The server signal is in poor conditions. Please contact the 400 call center	Dial 400-887-7748 and contact the 400 call center
	16	(Reserved)	……		
	17	Trouble in phase sequence	E21	1. The external base enclosure is opened; 2. The emergency stop button on power box is pressed down; 3. The phase sequence relay is connected incorrectly; 4. The HLC is damaged; 5. The phase sequence relay is damaged	1. Inspect the external base enclosure and emergency stop button on power box; 2. Inspect the phase sequence relay and its wiring; 3. Inspect the HLC; 4. Ask for technical support
	18	Overload	E22	1. The hoist is overloaded; 2. The HLC is damaged	1. Inspect the overload protector and HLC; 2. Ask for technical support
	19	Overheated motor	E23	1. The motor is overheated; 2. The red button of thermal relay is pressed down; 3. Thermal relay is damaged; 4. The wiring on HLC is loosened; 5. The HLC is damaged	1. Press the blue button to rest thermal relay; 2. Inspect the elements; 3. Ask for technical support

HLC	Serial No.	Trouble	Display	Possible Causes	Recommended Troubleshooting Method

	20	Disconnected speed limiter	E24	1. The wiring from overspeed safety device to HLC is loosened; 2. The HLC is damaged;	1. Inspect the HLC; 2. Ask for technical support
	21	Trouble in KM1 contactor	E25	1. The KM1contactor coil is burnt out; 2. The KM1 contacts are stuck to each other 3. The HLC is damaged; 4. The auxiliary contact is damaged	1. Inspect the contactor and HLC; 2. Ask for technical support
	22	Trouble in KMB contactor	E28	1. The KM3 contactor coil is burnt out; 2. The KM3 contacts are stuck to each other 3. The HLC is damaged	1. Inspect the contactor and HLC; 2. Ask for technical support
	23	Trouble in KM2 contactor	E29	As for power frequency & variable frequency hoist: 1. The KM2 contactor coil is burnt out; 2. The KM2 contacts are stuck to each other 3. The HLC is damaged	1. Inspect the contactor and HLC; 2. Ask for technical support
	24	Trouble in KMB2 contactor	E30	1. The KM4 contactor coil is burnt out; 2. The KM4 contacts are stuck to each other; 3. The HLC is damaged;	1. Inspect the contactor and HLC; 2. Ask for technical support
	25	The upper/lower limit is abnormal (The upper and lower limit input points are opened simultaneously)	E31	1. The upper and lower limits touch the limit baffle plate simultaneously; 2. The wiring of HLC terminal is loosened; 3. The HLC is damaged; 4. The limiter is damaged	1. Inspect the limiter and HLC; 2. Ask for technical support
	26	The up/down deceleration limit is abnormal (The up/down deceleration limit input points are opened simultaneously)	E32	1. The up/down deceleration limits touch the limit baffle plate simultaneously; 2. The wiring of HLC terminal is loosened; 3. The HLC is damaged; 4. The limiter is damaged	1. Inspect the limiter and HLC; 2. Ask for technical support

HLC	Serial No.	Trouble	Display	Possible Causes	Recommended Troubleshooting Method

	27	The command of main command switch is abnormal (The positive and negative rotation command input points are closed simultaneously)	E33	1. The main command switch is damaged; 2. The HLC is damaged	1. Inspect the main command switch and HLC; 2. Ask for technical support
	28	The vertical sliding door and bi-parting door limit is abnormal (The vertical sliding door and bi-parting door input points are opened simultaneously)	E34	1. The vertical sliding door and bi-parting door are opened simultaneously; 2. The wiring of HLC terminal is loosened; 3. The HLC is damaged; 4. The limiter is damaged	1. Inspect the limiter and HLC; 2. Ask for technical support
	29	The zero position of main command switch fails (The handle has neither zero position signal nor positive/negative rotation command)	E35	1. The main command switch is damaged; 2. The HLC is damaged; 3. The connecting terminal on HLC is loosened	1. Inspect the main command switch and HLC; 2. Ask for technical support
	30	The zero position and command of main command switch are abnormal (The zero position signal and positive or negative rotation command appear simultaneously	E36	1. The main command switch is damaged; 2. The HLC is damaged; 3. The wiring on HLC is incorrect	1. Inspect the main command switch and HLC; 2. Ask for technical support
	31	The cage roof operation command is abnormal (The up moving and down moving input points are closed simultaneously)	E37	1. The cage roof operation box is damaged; 2. The HLC is damaged	1. Inspect the cage roof operation box and HLC; 2. Ask for technical support
	32	The drop operation command is abnormal (The up moving and drop input points are closed simultaneously)	E38	1. The drop test box is damaged; 2. The HLC is damaged;	1. Inspect the drop test box and HLC; 2. Ask for technical support

HL	Serial	Trouble	Display	Possible Causes	Recommended Troubleshooting

No.				Method
33	The drop selection command is abnormal (The up moving or drop command appears when no drop is selected)	E39	1. The HLC is damaged;	1. Inspect the HLC; 2. Ask for technical support
34	The cage roof and drop selection command is abnormal (The cage roof and drop are selected simultaneously)	E40	1. The HLC is damaged;	1. Inspect the HLC; 2. Ask for technical support
35	The drop state is abnormal (There are in-cage and cage roof operation signals in drop mode)	E41	1. The HLC is damaged;	1. Inspect the HLC; 2. Ask for technical support
36	Trouble in frequency converter (The trouble input point of frequency converter is disconnected)	E42	1. The wiring of INVF point on HLC is loosened; 2. The relay KA9 is damaged; 3. The connecting terminals PA and PB of frequency converter are damaged; 4. The HLC is damaged	1. Inspect the connecting terminals of HLC, KA9 and frequency converter; 2. Ask for technical support
37	The overload protector is short-connected	E43	1. The overload protector is short-connected; 2. The overload protector is damaged	1. Inspect the overload protector; 3. Ask for technical support
38	Self-checking circuit failure	E44	Self-checking circuit failure	Ask for technical support
39	Self-checking circuit trouble	E45	Self-checking circuit trouble	Ask for technical support
40	Protecting circuit failure	E46	Protecting circuit failure	Ask for technical support
41	Protecting circuit trouble	E47	Protecting circuit trouble	Ask for technical support
42	Black box data store trouble	E09	Black box data store trouble	Ask for technical support

Fre	Serial	Trouble	Display	Possible Causes	Recommended Troubleshooting

No.				Method
1	There is no braking unit or resistance	F06	1. The resistance line is not firmly connected; 2. The resistance box is not connected	1. Inspect the wiring; 2. Contact the Quality Service Department
2	Undervoltage trouble	F09	Sudden power failure	1. Inspect the power line; 2. Contact the Quality Service Department
3	Open phase in frequency converter input	F12	1. The voltage on bus is too low; 2. Open phase in three-phase input of frequency converter	1. Inspect construction site voltage; 2. Inspect the wiring; 3. Contact the Quality Service Department
4	Open phase in frequency converter output	F25	Open phase in three-phase output of frequency converter	1. Inspect the wiring; 2. Contact the Quality Service Department
5	Feedback frequency is reverse to given frequency	F37	1. One motor is positively connected, and one motor is negatively connected, 2. The feedback frequency is in reverse direction	1. Inspect the wiring; 2. Contact the Quality Service Department
6	Abnormal feedback frequency and given frequency	F38	1. The wiring is incorrect; 2. The external mechanisms interfere with each other; 3. The feedback frequency is abnormal	1. Inspect the emergency stop buttons, circuit breaker, and limit switch 2. Contact the Quality Service Department
7	The positive and negative rotation commands are valid simultaneously	F44	The command of main command switch is abnormal	1. Inspect the main command switch; 2. Contact the Quality Service Department
8	Trouble in communication between frequency converter and controller	F48	1. The equipment is re-started too quickly after emergency stop; 2. The terminals 75 and 76 are loosened or the wiring is not securely fixed; 3. The INVF output point on HLC is damaged	1. Cut off the power supply for 1-2 minutes until the frequency converter stops, and then re-start it; 2. Inspect the wiring; 3. Ask for technical support
9	Encoder trouble 1	F54	1. The wiring of encoder is loosened 2. The encoder is damaged 3. The encoder can be used manually after resetting from trouble	1. Inspect the encoder and wiring; 2. Contact the Quality Service Department
10	Encoder trouble 2	F55	1. The parameters of frequency converter are set incorrectly	1. Ask for technical support

ZOOMLION

Operation Manual of Construction Hoist

- Safety Signs
- General Provisions
- Brief Introduction
- Preparation
- Erection and Dismantling
- Technical Parameter
- Operation and Safety
- Electrical Control System
- Regulation
- Transportation
- Appendix I
- Appendix II

II

Appendix II

Builders hoist installation/dismantling construction technology file

Construction unit _____

Construction site name_____

Installation unit _____

Builders hoist type _____

Equipment director _____

Formation _____

Supervise and examine _____

Date _____

Enterprise _____

Builders hoist installation table

Hoist standard (**01**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month date to month date**			**Installation superintendent**	

Personnel placement(filled by labour coordinator)

General director_____safety supervision_____driver_____electrician_____ _____

Crane man _____ _____ _____ _____ _____ _____ _____

Machine man_____ _____ _____ _____ _____ _____

Maintenance conclusion：(filled by equipment manager)

Cage **l** no distortion **2** no bend **3** no craze**1 2 3**_____base hidden works acceptance Mast___ section **1** no distortion **2** no bend **3** no craze **1 2 3**_____every operation mechanism acceptance_____

Attached rod **1** no distortion **2** no bend **3** no craze **1**_____**2**_____**3**_____all other meets installation standards_____

Notes：qualification√ ； disqualification×

Site and building plain, elevation (read the specific drawings)

Hoist installation equipment chooses_____tons automobile hoist or_____type tower hoist.

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist dismantling table

Hoist standard (**02**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month day to month day**			**Installation superintendent**	

Personnel placement(filled by labor coordinator)

General director_____safety supervision_____driver_____electrician_____ ____

Crane man_____ _ _____ _____ _____ _____ _____

Machine man_____ _____ _____ _____ _____ _____

The current status of equipment：(filled by equipment manager)

Cage **1** no distortion **2** no bend **3** no craze **1**_____**2**_____**3**_____hoist's verticality is within bounds.

Mast section **1** no distortion **2** no bend **3** no craze**1**_____**2**_____**3**_____attached device is fixed，mechanism operation normal.

Attached rod **1** no distortion **2** no bend **3** no craze **1**_____**2**_____**3**_____all others accord with dismantling standard.

Notes：qualification√ ； disqualification×

Site and building plain, elevation (read the specific drawings)

Hoist installation equipment chooses_____tons automobile hoist or_____type tower hoist;

The hoist needs to go down_____m height for removing.

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist dismantling task table

Hoist standard (**03**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month day to month day**			**Installation superintendent**	

Disclosure contents:

1. Enter the scene must comply with the 10 discipline of safety production.

2. The construction site shall be set the security alert area, and assign the special care.

3. Builders hoist can not be installed and disassembled at the wind speed over12.5m/s, thunderstorm or snow days.

4. Construction personnel are not allowed to wear hard-soled shoes, high heels; wearing tight, flexible; wearing a seat belt.

5. When high-altitude operation staff installing and dismantling mast section must search for a safe place in their job, fasten the safety belt, registered safety hook.

6. In hoist installation procedures, no defect bolt, pin, cotter pin etc are used; scrapped rope rigging and hoist should not be used.

7. The hoist in the ascending and descending process, vertically moving transport is strictly prohibited.

8. Ascending or descending mast section, must notice the cage guide wheel and a lower support closely appropriate.

9. After ascending mast section, should tighten all fastener. And check the mast section's verticality according to rule.

10. After ascending mast section, should check and ensure that every part fixture well and every safety device is complete and good.

11. Complement clarification content:

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist installation and construction organization plan

Hoist standard (**04**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month day to month day**			**Installation superintendent**	

Installation preparation period

1.Before hoist installation, should do well for maintenance, and do well in good quality confirmation procedures and visa.
2.Before hoist installation, should do well of paint service work of mast tie, mast and other steel structure.
3. Clean installation site, ensure the site is smooth, solid, without any obstacle.
4. Ground air zone have / do not have high voltage wire and cable, if have, whether or not getting the confirmation of the relevant department.
5. According to the hoist inspection standard (01)(03) procedure, do the relevant visa confirmation procedures.
6. Preparation for detailed installation construction technology program.

Installation implement period

1. Reading, familiar with the relevant provisions of installed hoist instructions and construction plan of installation technology, ensure the whole installation process is strictly carried out accordance with the operation rules.
2. Supervise the related people who come into construction site to comply with safety discipline.
3. Organize installation area, set up a strong sign of warm area, and with special care.
4. According to the installation procedure of installed hoist, follow the prescribed order, doing installation operation one by one.
5. According to the requirement of site operation, observe operating provisions of hoist ascending mast section, lift the section to specify height.
6. When the hoist reaches the very height, should installed related attached device according to the use requirement of hoist.
7. After installation, should check carefully ， should carefully check every component's connecting and fastening situation, find the problem and timely rectification, to ensure that the hoist work safety after installation.
8. According to the hoist inspection system regulation, do good acceptance of commissioning activities. According to the hoist standard (07) program, does relevant approval visa confirmation procedures.
9. Complement construction plan：_____

_____

The installation construction organization plan has been confirmed

Entry visa_____Command visa_____

Year____month_____day____ accepter_____equipment supervisor_____preparer_____

organization plan

Hoist standard (**05**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of dismantling	**month day to month day**			**Dismantling superintendent**	

Dismantling preparation period

1. Before dismantling hoist, should check the circulation of every mechanism. Can work only after making sure it is normal.
2. Before dismantling hoist, should check base part and attachment device of hoist Dismantling, only can construct after ensure it is normal.
3. Clean dismantling site, ensure the site smooth and solid, without any obstacle.
4. Ground air zone have / do not have high voltage wire and cable, if have, whether or not getting the confirmation of the relevant department .
5. According to the hoist inspection standard (02)(03) procedure, do the relevant visa Confirmation procedures.
6. Establishing details dismantling construction technique plan.

Dismantling implement period

1. Reading, familiar with the relevant provisions of dismantling hoist instructions and construction plan of dismantling technology, ensure the whole dismantling process is strictly carried out accordance with the operation rules.
2. Supervise the related people who come into construction site to comply with safety discipline.
3. Organize dismantling area, set up a strong sign of warm area, and with special care.
4. According to the site conditions, comply with the operation rules of hoist descending section, fall section to a specified height, while removing the attachment device.
5. According to disassembly procedure of disassembled hoist, follow the prescribed order one by one to do disassembly operation.
6. In the process of hoist dismantling, should be carefully check the positioning member connecting and fastening situation, find the problem and timely rectification, ensure the hoist work safety when dismantling.
7. After the hoist dismantling should timely clean-up packing, transportation. And do good jobs for transfer, storage and maintenance work.
8. Complement construction plan:

The dismantling construction organization plan has been confirmed

Entry visa_________Command visa________

___Year____month____day accepter______equipment supervisor______preparer_______

Builders hoist installation, dismantling process table

Hoist standard (**06**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Installation date	**month day to month day**			**Installation superintendent**	
Personnel / kind of work		**Working contents**			
		date		**date**	

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist installation works, attachment of acceptance certificate

Hoist standard (**07**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month day to month day**			**Installation superintendent**	

Hoist based covert acceptance:

1. Hoist foundation soil ground endurance is in compliance with the regulations on the use of hoist installation.

2. Hoist concrete foundation size is in compliance with the regulations on the use of hoist installation.

3. The rebar embedded part in the hoist concrete foundation is in compliance with the regulations on the use of hoist installation.

4. Embedded bolts or embedded ground anchor in hoist concrete foundation is in compliance with the regulations on the use of hoist installation.

The above acceptance has been confirmed.

Installed visa Command visa

Hoist attachment acceptance:

1. The wall embedded parts of hoist attachment is in compliance with the regulations on the use of hoist installation.

2. The size of hoist attachment is in compliance with the regulations on the use of hoist installation.

3. The horizontality of hoist attachment is in compliance with the regulations on the use of hoist installation.

4.After adjust the hoist attachment, the verticality of hoist attachment is in compliance with the regulations on the use of hoist installation.

The above acceptance has been confirmed.

Installed visa Command visa

Attachment; Hoist based covert acceptance report

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist installation quality acceptance table

Hoist standard (**08**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	**(m)**
Plan date of installation	**month day to month day**			**Installation superintendent**	
item	**contents and requirement**			**Self-checking**	**Recheck**
Foundation and enclosure facilities	Concrete foundation platform without platform, crack.				
	Establish drainage device around concrete foundation platform.				
	Enclosure without deformation, crack, no friction with cage Phenomenon; The buffer springs of cage and counterweight's bottom locate right.				
Cage	No deformation,crack,serious corrosion etc. working well no friction.				
	Single door start flexible , limit stopper is valid. Counterweight operate well, No friction. Cable is without worn, operates well.				
Drive system	Worm box lubricates well, operates normal is without abnormal noisy, oil leakage, over heating (the temperature of oil is not over 100℃) phenomenon.				
	Brake works flexible and reliable; The gap between fixed brake pad and rotated brake plate is not less than **0.5mm**.			Real gap:	Real gap:
	Gear and rack mesh; The max limit wear of gear is **35.1mm**(common normal line); The max limit wear of rack is **l0.6mm**.			Gear wear: Rack wear:	Gear wear: Rack wear:
	Rack fastening solid,good lubrication,friction is not exceed standard.				
	Guiding wheels fixture and lubricate well; guide flexible , without obvious heeling and run out, front wheel gap is **0.5mm**; Side wheel gap is **0.5mm**.			Front wheel gap: Side wheel gap:	Front wheel gap: Side wheel gap:
	Compress tightly the back gear, good lubrication, guiding flexible and without obvious heeling and run out, gap is 0.5mm.			Real gap:	Real gap:
	Safety device operation without noisy,no click feeling when your hand touch the shell.				

Hoist standard (**08**)

Item	Content and requirement	Self-checking	Recheck
Mast Section and attachment device	Mast section steel structure is without obvious deformation, unsolder; the deviation between every two mast sections is not over **0.5mm**; verticality refer to 6.1 mast installation verticality deviation table; Installation bolts fit standard, pre-tightening moment is right.	Real deviation: Real verticality:	Real deviation: Real verticality:
	Mast tie support must use standard product horizontality is not over±**8**°;The connection of mast tie bearing must use bolts.	Real horizontal:	Real horizontal
	The jib attachment has been removed, and has no effect for the cages operate up and down.		
Electric system	Lighting well; electric bell should be		
	Cable, power supply system and power supply voltage should be normal, working voltage tolerance is **380V±5**%.		
	Contactor, breaker contact point is good.		
	Control operation device is sensitive and reliable.		
	Every safety protection device of electric is complete and reliable.		
	Earth resistance is not over **4Ω.**	Real resistance:	Real resistance
	The insulated resistance between electric system and ground is not less than **l MΩ.**	Real resistance:	Real resistance
Safety limit insurance device	Enclosure door electric interlock is fastness, reliable and complete.		
	Cage electric interlock is fastness, reliable, complete.		
	Top, bottom limits are complete, sensitivity and reliable.		
	Top, bottom limits brake distance is accord with standard.		
	Safety device checking valid		
Commissioning operation	**Vacant load** / **Rated load** / **125%Rated load** Weight / Height / Weight / Height / Weight / Height Checking whether the drive system works smoothly, has abnormal noisy or not; whether hydraulic pressure system leak oil or not; whether operation and control system is sensitivity and reliable or not; whether steel structure has permanent deformation and crack or not; whether brake is reliable or not; must has at least three times tests after adjusting safety device(get average value).		Additional remark: Vacant load: Rated load: 125%rated Load: tester: test date:

The problem in acceptance:

Inspector: year month day

Rectification:

Rectification visa: year month day

Review suggestion :

Review visa: year month day

	Department	signature	date
Acceptance Personnel	captain		
	Installation leader		
	Safety supervisory department		
	Technical quality department		
	Equipment manage department		

____Year_____month_____day accepter_____equipment supervisor_____preparer_____

Builders hoist limit device adjusting acceptance table

Hoist standard (**09**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	(**m**)
Plan date of installation	**month day to month day**			**Installation superintendent**	
Bottom limit stopper whether it is valid——distance——**mm** inferior limit stopper whether it is valid——distance——**mm** Top limit stopper; whether it is valid——distance——**mm** superior limit stopper; whether it is valid——distance——**mm** Enclosure door limit stopper; whether it is valid——distance——**mm**					
Representation: Driver certificate: date			Representation: Debug certification: date		
Representation: Captain certificate: date			Representation: Supervisor certificate: date		

___Year____month____day accepter_____equipment supervisor_____preparer_____

Builders hoist dropping test table

Hoist standard (**09**)

Project name			**Construction site**		
Construction unit			**Construction superintendent**		
Type of hoist		**Code of equipment**		**Installation height**	(m)
Installation date	**month day to month day**			**Installation superintendent**	

NO.	**Content**	**Test requirement**				
1	**Rated load**	(1)	Cement: **kg**			
		(2)	Iron lump: **kg**			
		(3)	Others: **kg**			
2	**Counterweight**	(1)	Whether installation or not:			
		(2)	Weight: **kg**			
3	**Cage**	Lifting height when testing: **m**				
				Left cage	**Right cage**	**Other illustration**
4	**Cage Falling Dates**	(1)	**0.25m**			
		(2)	**0.35m**			
		(3)	**0.45m**			
		(4)	**0.55m**			
		(5)	**0.65m**			
		(6)	**0.75m**			
		(7)	**0.85m**			
		(8)	**0.95m**			
		(9)	**1.05m**			
		(10)	**1.20m**			
5	**Weather**	Wind speed when test: test temperature:				
6	**Signature**	Installation person:				
		Test person:				
		Operation person:				
		Safety person(builders hoist's rented company):				

___Year____month____day accepter_____equipment supervisor_____preparer_____