



产品样本  
PRODUCT SAMPLES

**垃圾抓斗桥式起重机**

**GRAB OVERHEAD CRANE  
FOR GARBAGE**



Yuantai Crane Machinery

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产品分类  
PRODUCT CLASSIFICATION

垃圾抓斗桥式起重机  
GRAB OVERHEAD CRANE FOR GARBAGE

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本样本所供参数仅供选型参考, 如有更改恕不通知, 具体型号参数以本公司实际产品设计为准, 欢迎咨询。

The parameters provided in this sample are only for model selection reference, and are subject to change without notice.  
The specific model parameters are subject to the actual product design of our company.  
Welcome to consult.

# Product Introduction

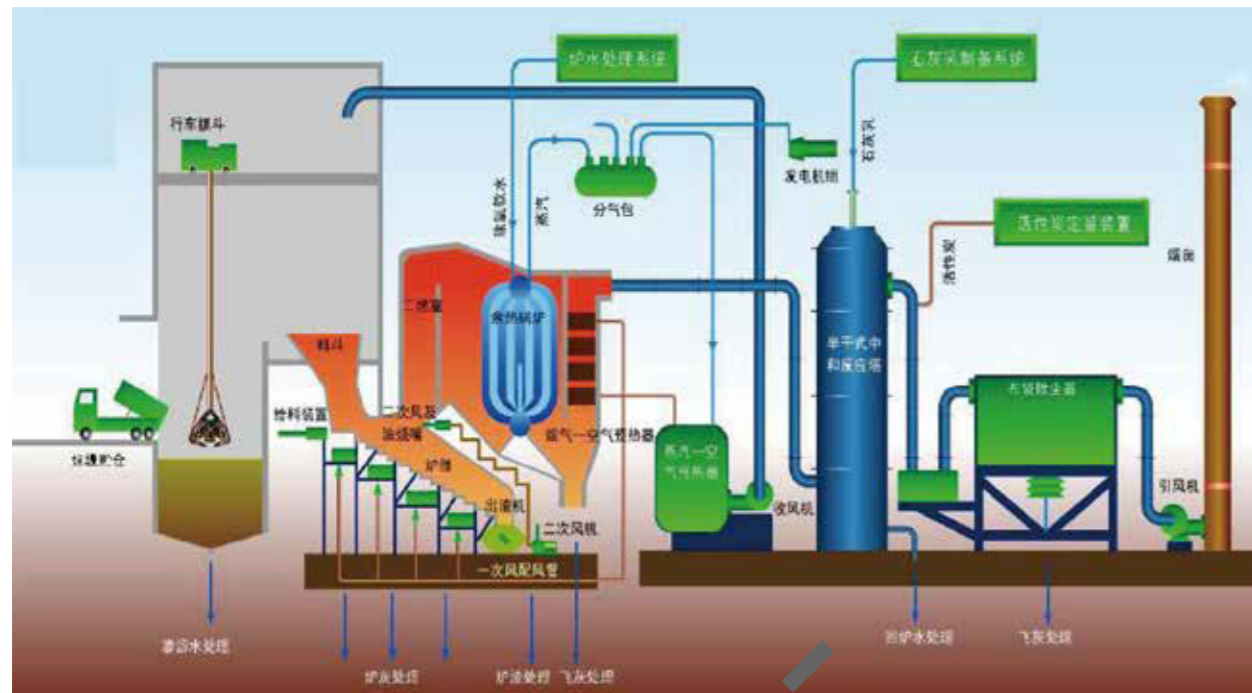
## 垃圾抓斗桥式起重机

### GRAB OVERHEAD CRANE FOR GARBAGE

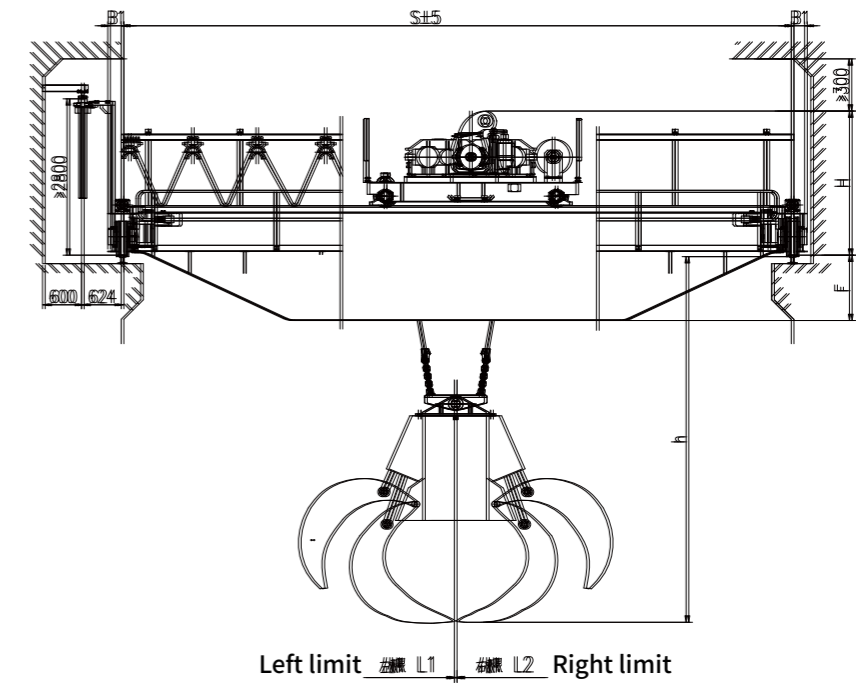
Our grab overhead cranes for garbage are designed and manufactured in accordance with GB, FEM IEC and other national and international standards. The structure is available in single-, double-, single- and double-reel sets. Integrated weighing accuracy  $\leq \pm 1\%$ . Three modes of control: manual, semi-automatic and fully automatic. The three modes are freely switchable and have a manual priority function in any of the automatic modes. At present our products are widely used in waste incineration plants with a capacity of 4800t/d, 3000t/d, 2400t/d, 1200t/d, 1000t/d, 800t/d and less than 600t/d.



## Waste incineration power generation technology



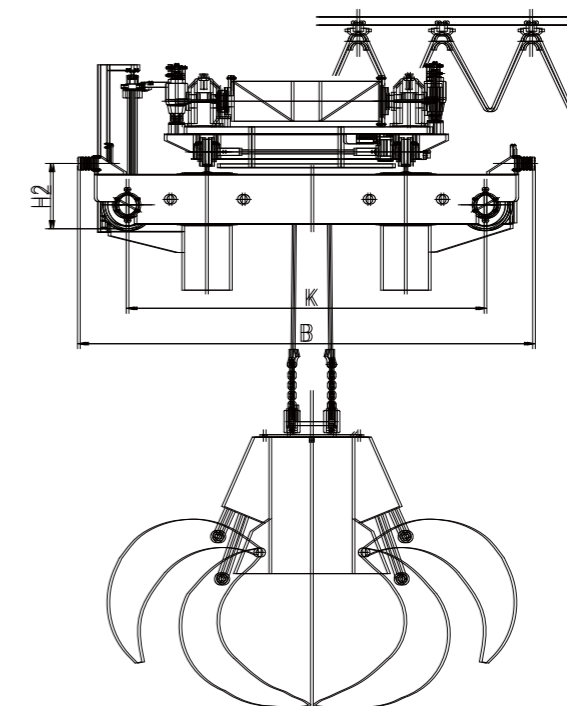
## Product drawing



## Product Standard

The manufacturing, installation and commissioning of grab crane will follow the following standards.

Crane design and manufacturing standards	FEM, VDI-3571, GB 3811
Commissioning safety specifications	GB6067
Steel structure design standards	GB/T3811, GB/T14405
Lifting& driving mechanism design standards	GB/T3811, GB/T14405
General electric equipment design standards	FEM, EN, VDE, IEC, DIN
Electrical equipment engineering construction and acceptance standards	FEM, EN, VDE, DIN
Enclosure protection levels for low-voltage switches and control devices	IEC144
Digital interface for programmable instruments	ANSI488
Terminal boards for industrial control devices and systems	NEMA-ICS4
Enclosures for industrial control devices and systems	NEMA-ICS6



Grab Bridge Crane Technical Parameters																															
Lifting capacity(t)		5					8					10					12.5					16					20				
Recommended Grab	Volume (m <sup>3</sup> )	2					4					5					8					10					12				
	Self-weight (t)	~2					~3.4					~3.6					~5.3					~6.8					~7.6				
Working Duty		A8					A8					A8					A8					A8					A8				
Span S(m)		10.5	13.5	16.5	19.5	22.5	19.5	22.5	25.5	28.5	31.5	22.5	25.5	28.5	31.5	22.5	25.5	28.5	31.5	25.5	28.5	31.5	34.5	28.5	31.5	34.5	28.5	31.5	34.5		
Recommended speed	Lifting speed	0~30					0~40					0~45					0~50					0~50					0~45				
	Cross traveling speed	0~30					0~44					0~50					0~50					0~46.5					0~50				
	Crane traveling speed	0~50					0~50					0~65					0~70					0~67	0~63				0~65				
Power	Lifting motor	30					63					90					132					160					200				
	Cross traveling motor	0.55*2					1.5*2					2.2*2					3*2					3*2					5.5*2				
	Crane traveling motor	2.2*2					4*2					5.5*2					7.5*2					7.5*2	4*4				5.5*4				
	Grab motor	15					18.5					22					30					37					45				
	Total Power	50.5					92.5					127.4					183					218	219				278				
Max. wheel load (KN)		75	80	85	90	95	125	132	141	148	157	145	155	165	175	178	188	198	208	218	124	130	138	158	163	168					
Recommended bus bar		I20					I20					I20					I20					I20					I20				
Recommended crane rails model		43kg/m					43kg/m					43kg/m					QU80					QU80					QU80				
Power Supply		3 AC 50Hz 380V																													

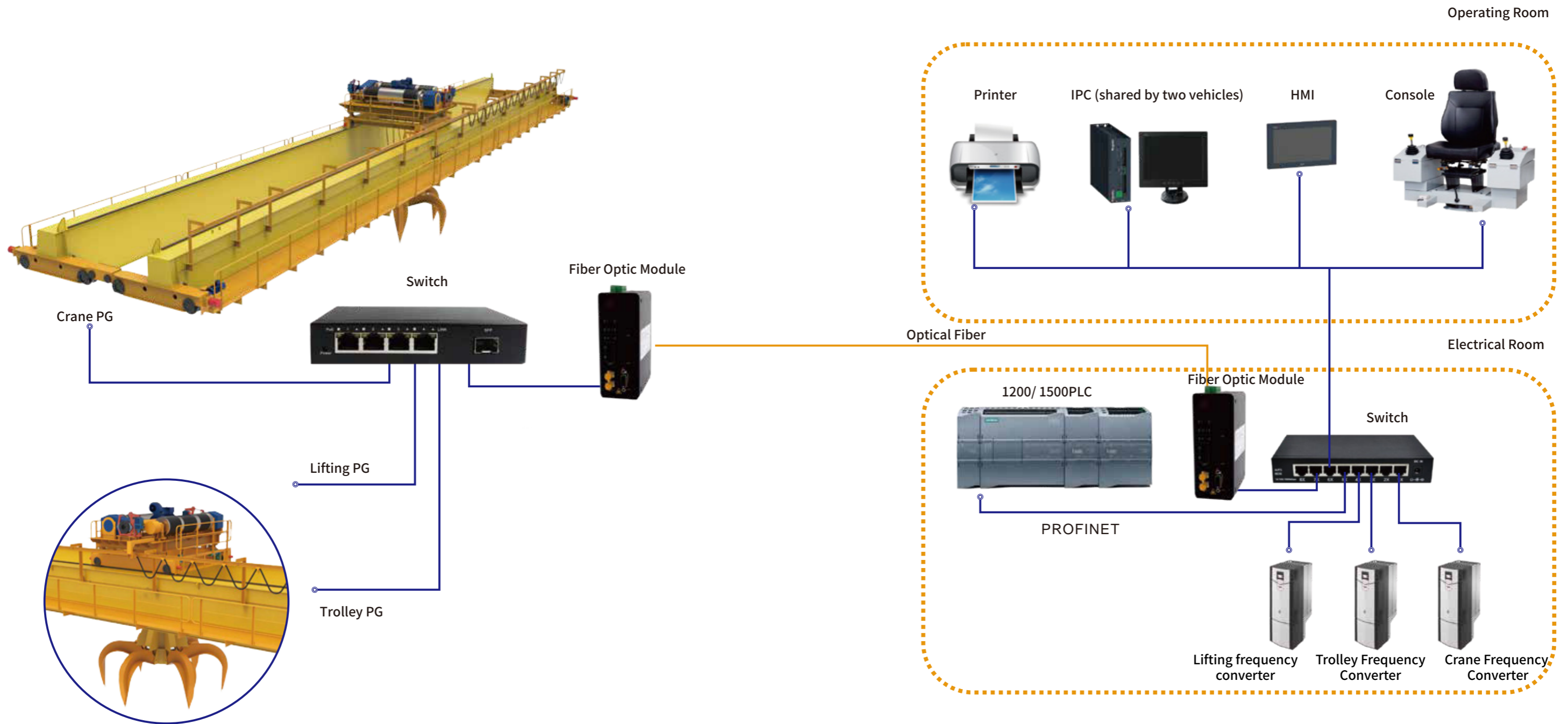
# Overall Solution

## 垃圾抓斗桥式起重机

### GRAB OVERHEAD CRANE FOR GARBAGE

Each crane is equipped with an independent PLC, which controls the crane separately  
 All movements of lifting, loading, mixing etc. are controlled in the grab crane control room  
 The electrical control adopts the system of "PLC+ touch screen + frequency conversion speed regulating device" to realize the whole crane integrated monitoring, control of high Precision speed control function.  
 All the mechanisms of the crane adopt digital frequency conversion speed regulation device, the whole machine adopts PLC control, can achieve manual/semi-automatic Dynamic/fully automatic operation.  
 It has the function of real-time dynamic garbage measurement, crane fault diagnosis alarm and remote fault diagnosis.

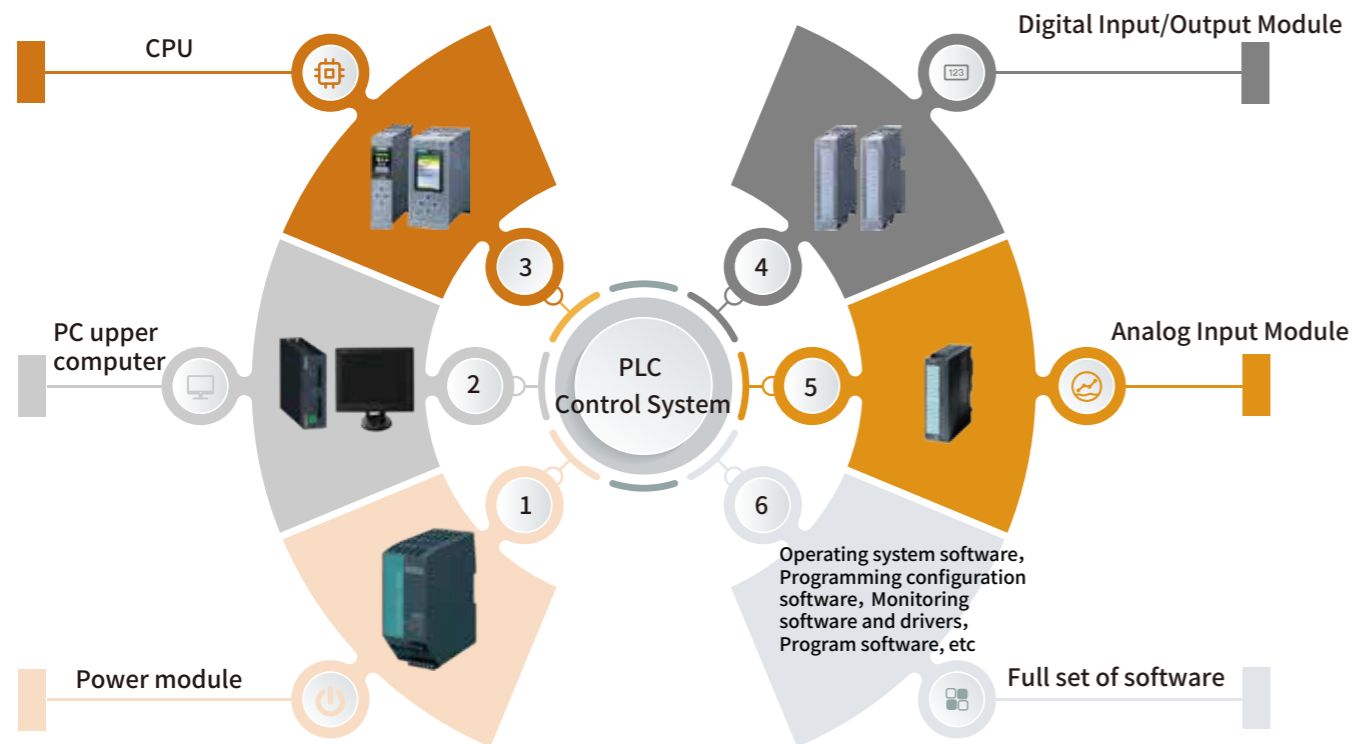
# Overall Solution



## PLC Control System



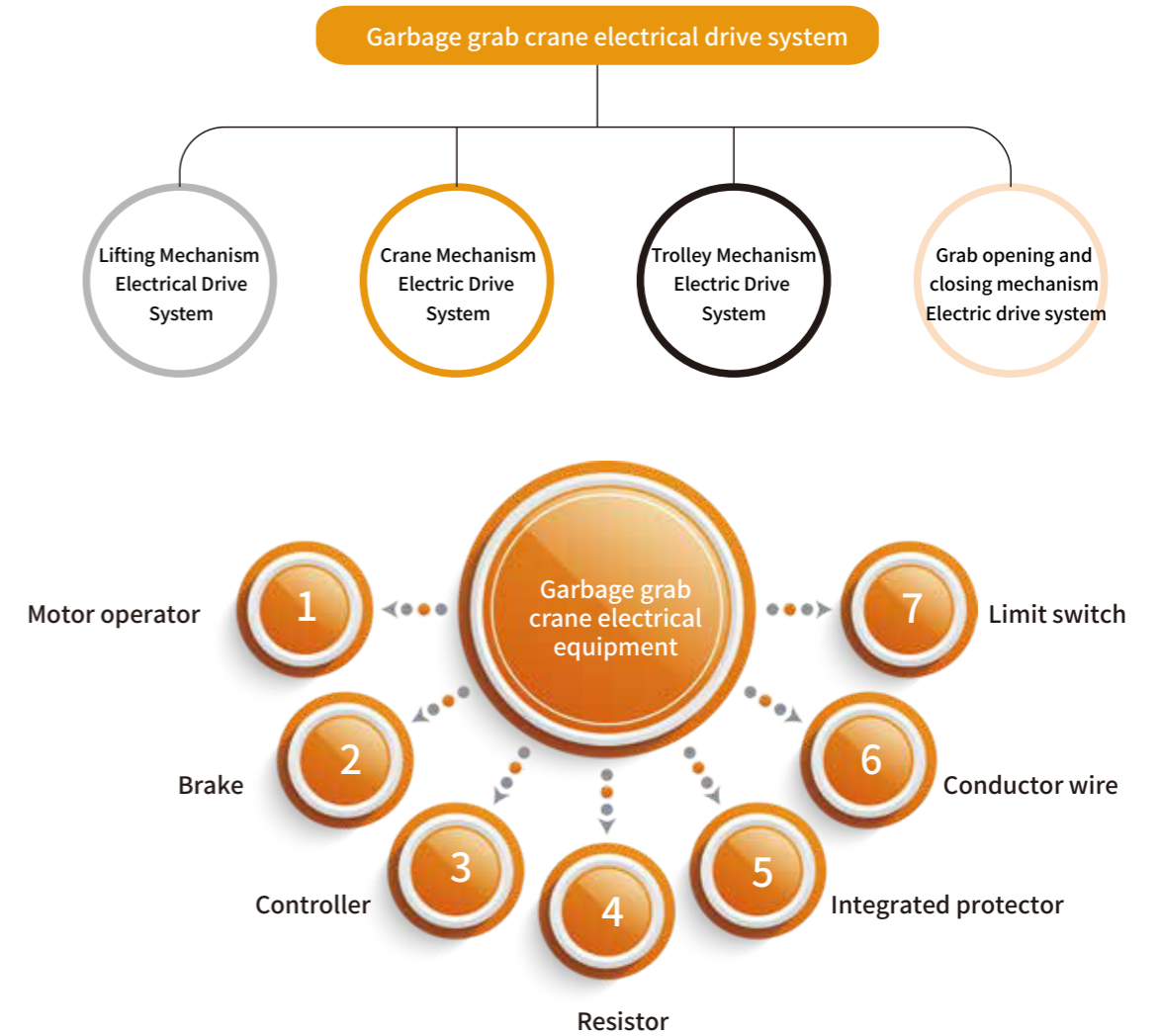
The PLC system adopts Siemens S7-1500/1200 and other brands, which can operate continuously in a working environment with large electronic noise, radio frequency interference and vibration without reducing the performance of the system.



## Electric Drive System



The electrical transmission of the lifting, cart and trolley mechanisms adopts ABB's ACS880DTC torque control frequency converter to drive the motor. The frequency converter has the function of self-learning motor parameters and good speed regulation performance and can cooperate with the work of the control system to make each mechanism of the garbage grab crane start smoothly and stop accurately.



Layout in crane and trolley cabinets

Layout in electrical room

The voltage fluctuation range of the motor is 85%-110%, and it is guaranteed to start at 85% voltage. The rated torque of the motor complies with the relevant national crane electrical equipment standards, and the protection grade is IP55.

# Control Instruction

垃圾抓斗桥式起重机

GRAB OVERHEAD CRANE FOR GARBAGE





## Control function data sheet

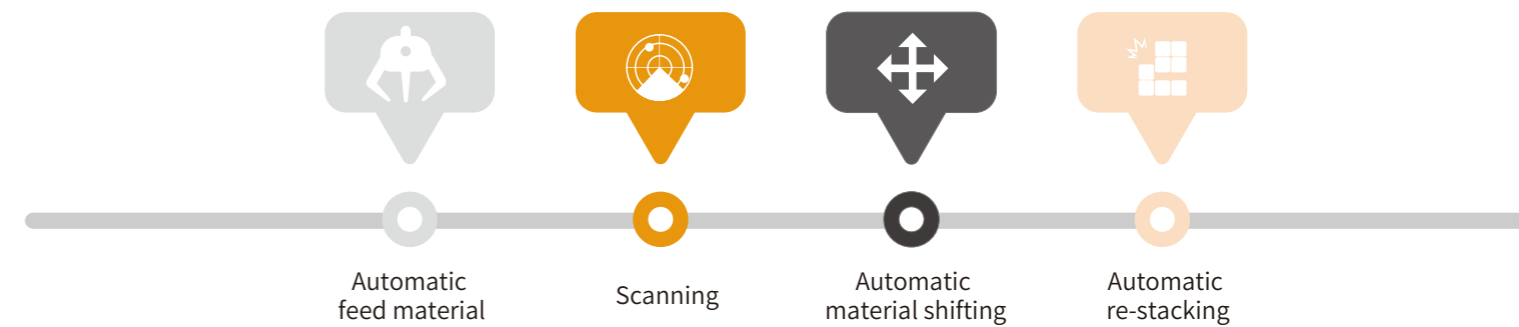
The control mode of the garbage grab overhead crane is divided into three working modes: manual, semi-automatic, and fully automatic. It can complete all actions of the crane such as moving, loading, and re-stacking. Its operation and control functions are shown in the following table:

Working Process		Control Method		
		Manual	Semi-automatic	Full-automatic
Feeding, Material transfer, Re-stacking	Material location signal	Manual Observation	Manual Observation	Automatic
	Select grab point	Manual Observation	Manual Observation	Automatic
	Select feed point	Manual Observation	Manual Observation	Automatic
	Crane start	Manual Observation	Automatic	Automatic
	Move target material	Manual Observation	Automatic	Automatic
	Grab down	Manual Observation	Automatic	Automatic
	Grab material	Manual Observation	Manual Observation	Automatic
	Grab and lifting	Automatic	Automatic	Automatic
	Lifting up	Manual Observation	Automatic	Automatic
	Move to feed point	Manual Observation	Automatic	Automatic
	Weighing metering statistics	Automatic	Automatic	Automatic
	Open grab unloading	Manual Observation	Automatic	Automatic
	Return grabbing location	Manual Observation	Automatic	Automatic
	Repeat grab working	Manual Observation	Automatic	Automatic
	Move crane to parking	Manual Observation	Automatic	Automatic
Fault automatic diagnosis and alarm		Automatic	Automatic	Automatic
Remote online diagnosis		Included	Included	Included

In any control method, there is a manual control function, and the manual control is in priority, that is, as long as the operator touches the linkage table operating handle at any time, the automatic control mode will stop immediately and transfer to the manual state.

## Full-automatic working mode

In the fully automatic mode, the fully automatic garbage grab overhead crane has four processes:



Priority: Automatic feed material > Scanning > Automatic material shifting > automatic re-stacking



If all of three button is "1", the automatic feeding is the priority, followed by feeding and scanning, and again Automatic material shifting, and finally automatic Re-stacking. Only the "automatic feeding" signal setting "1", the grabbing and retrieving area is the loading area.



If the automatic feed material is "0", Automatic material shifting and automatic re-stacking are "1", so The grabbing area is the feeding area.



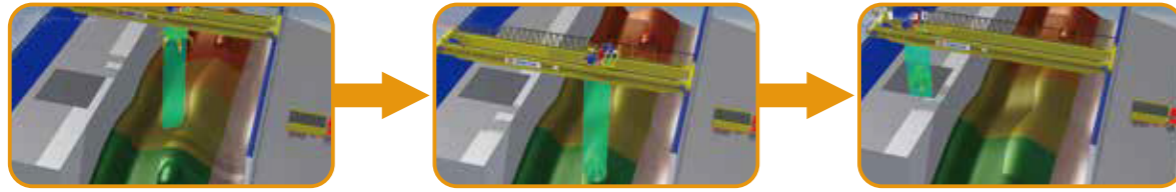
If the automatic feed material and automatic shifting are "0", automatic re-stacking is "1", so the grabbing area is re-stacking area.

The priority of the spreading area: feeding temporary storage area > re-stacking temporary storage area

As long as the signal of automatic material shifting is "1", the material spreading area is the material storage area; only when the "automatic re-stacking" signal is set to "1", the material spreading area is the re-stacking and discharging area.

## Fully automatic feeding process

Set the "Automatic Loading" button to "1", the "Automatic Material Transfer" and "Automatic Reverse Stamping" buttons to "0", at this time, the garbage crane can automatically complete the loading process.



Automatically run to the pick-up area

Automatic grabbing at the highest position

Automatic operation of feeding

If any hopper sends out a material loading request, the garbage crane will automatically take material from the loading area and automatically feed material to the corresponding hopper.

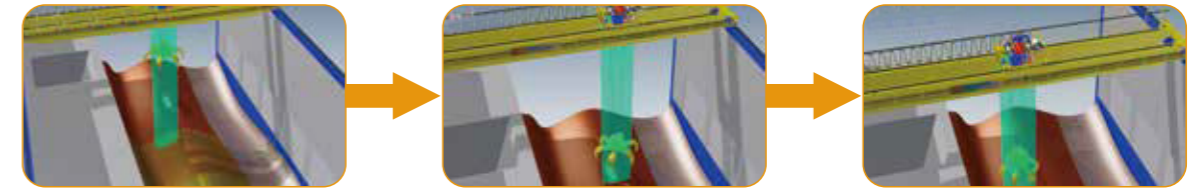
If there are multiple hoppers that send material loading request signals, the garbage crane will feed the hoppers one by one.

If there is no hopper, material loading request signal, but there is a material height scanning signal (after the feeding door is opened and then closed, a scanning signal is sent out), the garbage crane will run to the corresponding feeding door to scan the garbage Altitude, after the scan is complete, it is in a waiting state.

If there is no feeding request from the hopper, and no feeding scanning signal, the garbage crane is in a waiting state.

## Automatic back stomping process

Set the button of "Auto Reverse Stamping" to "1", "Automatic Loading" and "Automatic Transfer" to "0".



Automatically run to the reclaiming area

Automatically grab the material and send it to the mixing area

Automatic spreading of materials in low recesses

At this time, if there is no feed scanning request signal, and the height of the garbage in the reclaiming area is greater than the set value, the garbage crane will automatically grab the material from the highest point of the reclaiming area or from the grid of the reclaiming area one by one. Grab the material and automatically put it in the lowest grid in the inverted feeding area or place it in the grid one by one in the inverted feeding area;

If there is a feed scanning request signal during the process of dumping, the garbage crane will automatically scan the height of the corresponding feeding material after completing this process, and then perform automatic dumping again after completing the scanning.

## Fully automatic material transfer process

Set "Automatic Material Transfer" to "1", "Automatic Loading" and "Automatic Reversing" to "0", and the garbage crane is in the process of automatic material transfer at this time.



Automatic scanning material level height

Automatically grab materials and send them to the temporary storage area

Automatic spreading of materials in low recesses

If the feed does not send a feed scan signal, and the height of the material in the feed area is greater than the set value, the garbage crane will automatically grab the material from the highest point of the feed area or grid by grid, and automatically put it in the lowest point of the temporary storage area. within a grid or grid by grid;

If there is a feeding scanning signal, the garbage crane will automatically scan the height of the garbage at the corresponding feeding door after completing this operation.

If the height of the material in the feeding area is lower than the set value, the moving action will stop.

## Inlet scanning



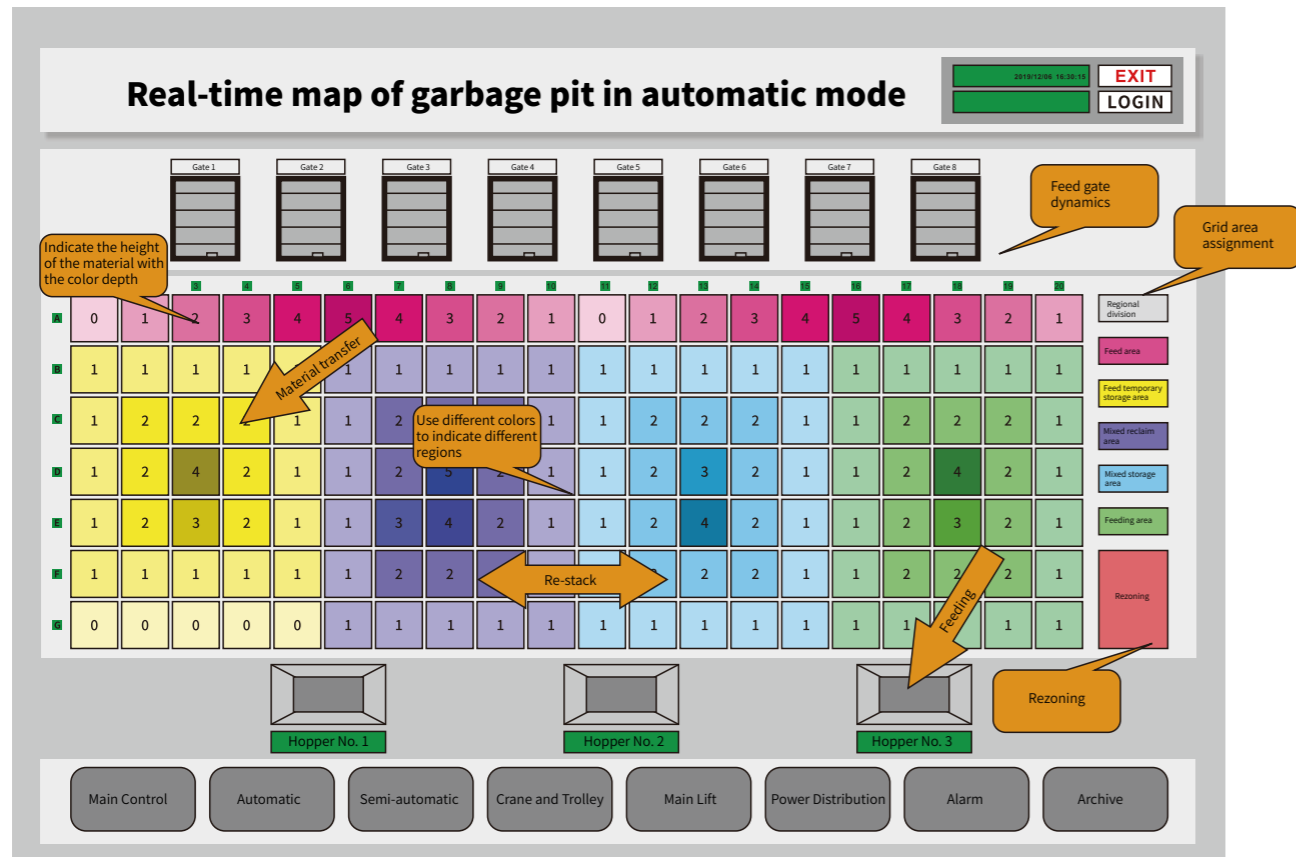
Automatically detect the opening and closing of the feeding door

Automatic operation to the feeding area

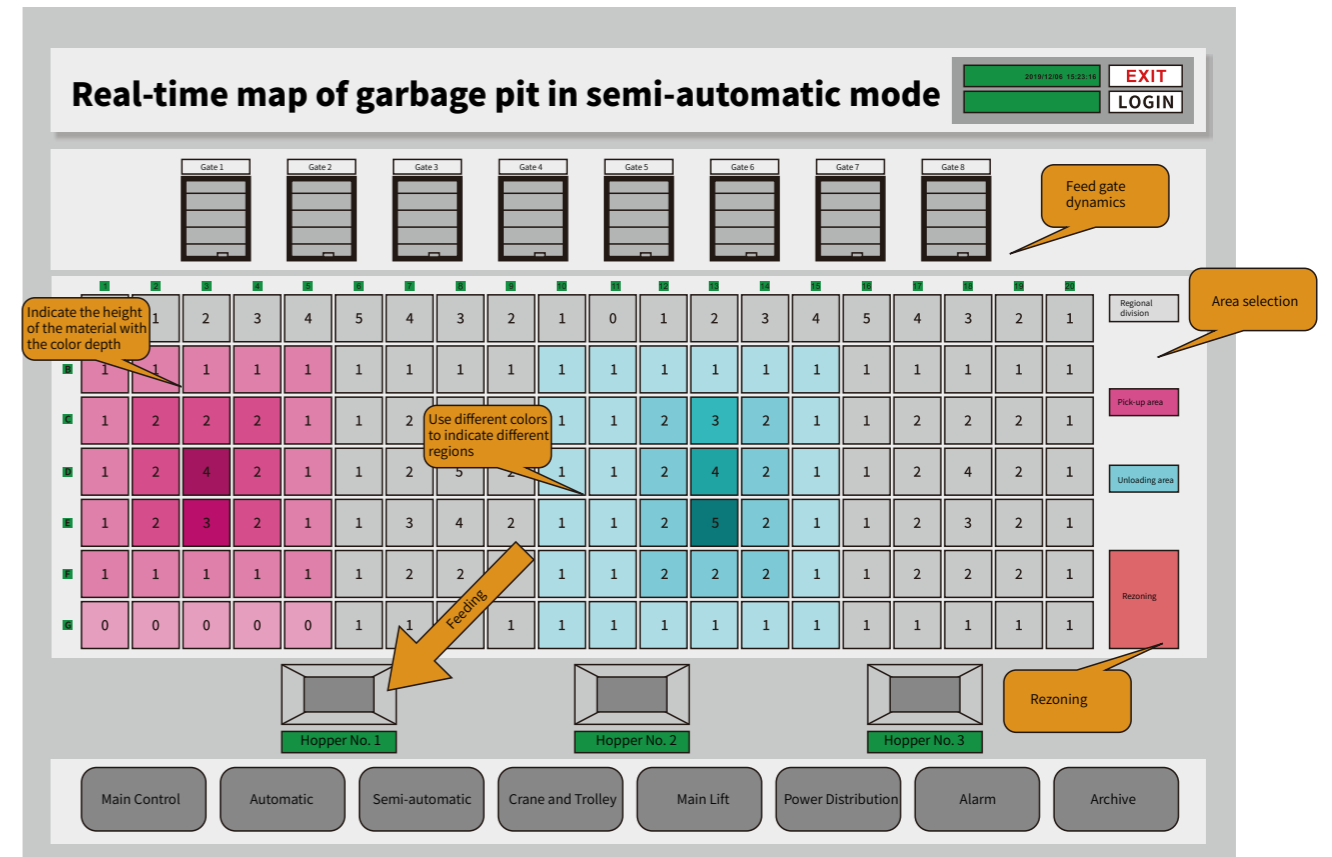
Automatically scan material height

If there is no automatic feeding signal and there is a feeding request signal, the garbage crane will automatically run to the corresponding feeding port to scan the height of the material.

## Fully automatic mode - monitoring part of garbage pit material status



## Semi-automatic mode - monitoring part of garbage pit material status



### Semi-automatic operation mode:

#### Semi-auto start

Set the "semi-automatic button" to "1", and other working mode buttons to "0". At this time, the garbage crane is in the waiting state of semi-automatic operation.

1

#### Semi-automatic manual grab operation

Manually select the grabbing position of the garbage crane on the touch screen, and the garbage crane will automatically go to the feeding area to grab the material. After grabbing the material, lift it to a certain height and wait for the next operation instruction.

2

#### Semi-automatic discharge operation

Manually select the discharge position on the touch screen, and the garbage crane will automatically run to the designated area to spread the material. After the material is spread, the grab bucket will be lifted to a certain height, and it will be in a waiting state.

3

#### Semi-automatic loading operation

The garbage crane is in a waiting state after grabbing the material. Through the loading button on the touch screen, the garbage crane will automatically run to the top of the hopper to load materials according to the specified feeding hopper. After the material loading is completed, the garbage crane will automatically move to the garbage pit, waiting for the next action.

4

#### Automatic parking

After the garbage crane performs other actions, it is in a waiting state. Set the "parking" button to "1" and then to "0", and the garbage crane will automatically run to the designated parking position.

5

## Manual operation mode



In the manual mode, the running operation of the garbage crane is completed by the operator of the garbage crane. Turn the "semi-automatic button" and "automatic button" to zero state, and the garbage crane is in manual mode at this time.

The long travel mechanism, cross travel mechanism, lifting mechanism and the opening and closing of grab bucket of the garbage crane are all controlled by the pendant or button on the linkage table. For example, to drive the crane to the left at the fourth gear, you only need to manipulate the handle of the crane to the left to the fourth gear, and the crane will run at the fourth gear speed.

The control of the lifting and cross travel mechanism in manual mode is the same as that of the long travel mechanism. The opening and closing of the grab is controlled by the aircraft head button on the lifting handle. Click "Open" to open the grab, and click "Close" to close the grab, which meets the work of manual grabbing, loading and discharging.

# Innovative Technology

## Manual work interface status

### Garbage Grab Crane CMS System 2019/12/08 15:23:16

**Electrical room IO**

- Lift code
- Cross travel code
- Long travel code
- Frequency conversion
- Cross travel frequency conversion
- Long travel frequency conversion

**Calibration signal indication**

- Operation/Setting
- Cross travel standard limit
- Long travel standard limit

**Anti-sway option**

- Anti-sway switch button

**Position origin calibration**

- Moisting origin calibration
- Cross travel and long travel origin calibration

**Weight origin calibration**

Material weight: +inf KG

- Landing calibration
- Empty bucket calibration
- Full bucket calibration

**Hoist trolley deceleration position calibration**

- Hoisting up deceleration position: +3.00
- Hoisting lower deceleration position: +27.51
- Trolley front deceleration position: +21.06
- Trolley rear deceleration position: +6.48

**Lift trolley deceleration bypass**

- Hoisting deceleration bypass
- Trolley deceleration bypass

**Feeding and parking position calibration**

	Cross travel	Long travel	Rise
Current position	+10.72	+28.17	-7.79
Parking position	+12.49	+28.84	+3.09
Hopper 1 position	+14.22	+44.62	+3.09
Hopper 2 position	+14.22	+37.91	+4.15
Hopper 3 position	+14.22	+31.83	+4.53

**Calibration instructions**

- Calibration of lifting origin: move the grab bucket to the circular plane on the grab bucket completely parallel to the plane on the small wall of the hopper platform, open the operation setting switch (key switch in the cabinet), press the lifting calibration switch, close the operation setting switch.
- Origin calibration of cross and long travel: After moving the crane and trolley to the middle of their respective calibration limit switches, turn on the operation setting switch—press the origin calibration button of cross and long travel—close the operation setting switch.
- Landing calibration: Open the grab bucket and place it on the ground. When the wire rope is not stressed, turn on the operation setting switch—press the landing calibration button—close the operation setting switch.
- Empty Bucket Calibration: When the load is only one empty grab bucket, when the suspension is stable, turn on the operation setting switch—press the empty bucket calibration button—turn off the operation setting switch.
- Full Bucket Calibration: Grab a 7T heavy object, calibrate when the suspension is stable, turn on the operation setting switch—press the full bucket calibration switch—turn off the operation setting switch.
- Calibration of the parking position: move the crane and the trolley to the preset parking space, turn on the operation setting switch—the parking setting calibration switch—turn off the operation setting switch.
- Hopper 1 position calibration: move the crane and trolley to the feeding position above the preset center of hopper 1, turn on the operation setting switch—the hopper 1 position calibration button—close the operation setting switch.
- Hopper 2 position calibration: move the crane and trolley to the preset feeding position above the center of hopper 2, turn on the operation setting switch—the hopper 2 position calibration button—close the operation setting switch.
- Hopper 3 position calibration: move the crane and trolley to the preset feeding position above the center of hopper 3, open the operation setting button—the hopper 3 position calibration button—close the operation setting switch.
- Calibration of each deceleration position: move the mechanism to be set to the position to be decelerated, open the operation setting switch—the corresponding deceleration position calibration button—close the operation setting switch.

**Warning**

- Calibration operation can only be carried out after the crane is started, and must be operated in strict accordance with the calibration process during calibration.
- After lifting or calibrating the origin, parking, and hopper positions of cross and long travel, semi-automatic operation verification should be carried out, and carefully observe whether the running path is abnormal in advance. If abnormal, immediately take a picture of the emergency stop button and re-calibrate.
- The hoisting deceleration bypass and the trolley deceleration bypass are used in emergency situations, and are not allowed to be used in normal operations. The corresponding signal lights will be with deceleration limit, and the signal light is green without deceleration limit.

Comprehensive protection

Main lifting mechanism

Cross travel mechanism

Long travel mechanism

Communication diagnosis and setting

Error alarm

Quit

## 垃圾抓斗桥式起重机

## GRAB OVERHEAD CRANE FOR GARBAGE



Anti-Sway Technology

Precise positioning technology

The physical principle of load swing and the experimental data of the crane are used comprehensively to set up the model, calculate and predict the load swing amplitude and swing phase. Based on the imitation of manual operation, the PLC high-level language programming control and on-site communication technology are used to control the running speed of the long travel and cross travel of the garbage cranes in real time, so that the amplitude of the crane load swing is significantly reduced, and the production efficiency of the garbage crane is greatly improved.

Through the real-time monitoring and feedback of the running positions of the long travel, cross travel and the grab bucket of garbage cranes, the accurate three-dimensional position of the grab bucket is obtained, and the frequency converter control and anti-sway function are used. At the same time, fixed-point adjustments are added to each mechanism to ensure the positioning accuracy. At the same time, it also greatly improves the working efficiency of the garbage crane.

## Intelligent Judgment Technology



In order to ensure that the garbage crane can automatically determine the appropriate garbage grabbing position, the garbage storage pit is virtually divided into unit grids, and the entire garbage storage pit is scanned in real time during the garbage crane operation, and the height of the material in each grid of the garbage pit is recorded, and then the height of the corresponding garbage in the grid is indicated by the change of color, and the garbage crane automatically selects and compares to calculate the optimal grabbing point.

## Data Archiving and Monitoring Technology



Use the configuration software to set up a real-time monitoring animation that can reflect the three-dimensional position of the garbage crane and the state of the grab bucket in real time, monitor the status of the key components of the garbage crane in real time and dynamically, and historical data archiving, archiving query and report printing are carried out for the main parameters and alarm information of the garbage crane.

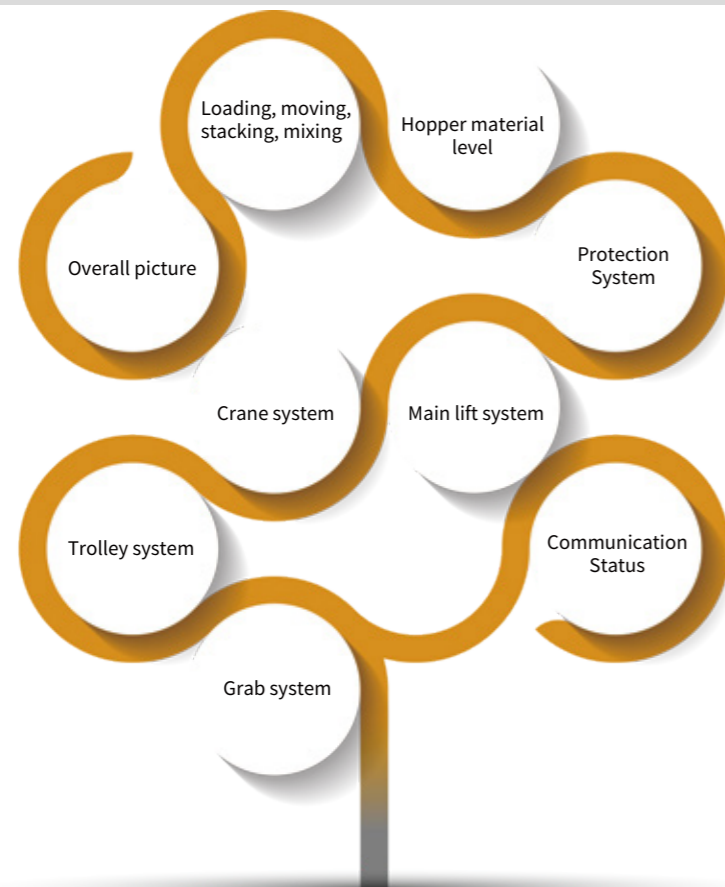
## Remote service system



In order to ensure the reliable operation of the garbage crane, the crane is equipped with a remote service system as standard, with remote monitoring and diagnosis functions through the wide area network. The remote monitoring and diagnosis function can provide customers with historical data query, rapid product failure repair service, and equipment preventive maintenance; it can provide basic data support for equipment accidents and safety accidents for regulatory authorities.

# Monitoring System

The monitoring system includes monitoring screens



**Operation and Maintenance Section**  
**运行维护部分**

显示关键元件的寿命，寿命到时发出更换报警

序号	机物名称	项目名称	单位	标准值	当前值	使用率	报警
1	配重	主钩制动器动作次数	次	300000	0	0.00	正常
2		主钩制动器动作次数	次	300000	0	0.00	正常
3		副钩制动器动作次数	次	500000	0	0.00	正常
4		停止制动器动作次数	次	500000	0	0.00	正常
5	提升	综合保护制动器动作次数	次	100000	0	0.00	正常
6		主钩限位动作次数	次	100000	0	0.00	正常
7		变频器运行时间	小时	87600	68.222221374511719	0.08	正常
8		制动制动器动作次数	次	300000	0	0.00	正常
9	副升	副钩限位动作次数	次	100000	0	0.00	正常
10		电机运行时间	小时	87600	0	0.00	正常
11		变频器运行时间	小时	87600	0	0.00	正常
12		制动器动作次数	次	100000	0	0.00	正常
13	小车	变频器运行时间	小时	87600	111.41883281983125	0.13	正常
14		制动制动器动作次数	次	300000	0	0.00	正常
15		变频器运行时间	小时	100000	0	0.00	正常
16		电机运行时间	小时	87600	0	0.00	正常
17	副升	变频器运行时间	小时	87600	0	0.00	正常
18		制动器动作次数	次	100000	0	0.00	正常
19		变频器运行时间	小时	87600	111.41883281983125	0.13	正常
20		制动制动器动作次数	次	300000	0	0.00	正常
21	小车	副钩限位动作次数	次	100000	0	0.00	正常
22		限位动作次数	次	100000	0	0.00	正常
23		变频器运行时间	小时	100000	0	0.00	正常
24		变频器运行时间	小时	87600	0	0.00	正常
25	副升	变频器运行时间	小时	87600	0	0.00	正常
26		制动器动作次数	次	100000	0	0.00	正常
27		变频器运行时间	小时	87600	111.41883281983125	0.13	正常
28		制动制动器动作次数	次	300000	0	0.00	正常
29	副升	变频器运行时间	小时	100000	0	0.00	正常
30		变频器运行时间	小时	100000	0	0.00	正常
31	副升	变频器运行时间	小时	100000	0	0.00	正常
32		变频器运行时间	小时	100000	0	0.00	正常

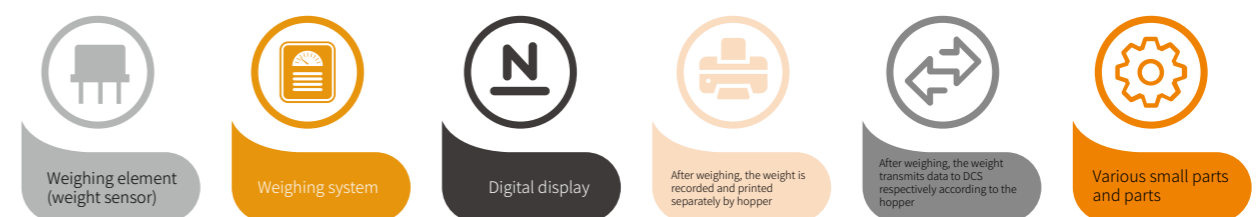
# Weighing System



There is a set of weighing device (with 4 load cells) on the crane trolley, which is used for process weighing measurement and overload protection. The weighing sensor is installed between the upper frame and the lower frame, so that the weight of the suspended object is completely acted on the sensor, which improves the weighing accuracy of the weighing system. The static weighing accuracy is better than  $\pm 1\%$ , and it also has overload Alarm function.

When the crane is above the feeding hopper, the garbage grabbed by the grab bucket is automatically weighed, and each reading includes the net weight of the garbage, feeding position and time. Each feed hopper is equipped with its own counter, and the weight readings are transmitted to the DCS system, which enables the crane to automatically record and organize the operating conditions and feeding volume, and automatically archive and form Excel or Word Chinese reports, which can be printed and copy; the report includes each incinerator and the total amount of garbage entering the furnace, and the report includes shift, daily, weekly and monthly reports. The report includes each incinerator and the total amount of garbage entering the furnace, and the report includes shift, daily, weekly and monthly reports.

The weighing system includes the following components



# Position Detection System

Sensors are installed to detect the garbage height of the garbage silo, the lifting and traversing position and the walking position of the grab crane. Detect the height of the garbage and the positions of the lifting mechanism and the large and small car mechanism respectively.

The garbage height detection adopts the laser scanning system, and the position detection of the garbage lifting mechanism and the large and small car mechanism adopts the encoder for detection.

According to the coordinate position provided by the encoder of each mechanism of the crane, the frequency converter of each mechanism of the crane drives the motor to run to this position.

Equipped with a position correction device to avoid position errors caused by wheel slippage.

A "soft limit" is designed in the program for functions such as approach protection and parking protection.



Laser scanning equipment

The laser scanning system is installed in the workshop or on the crane, scans the height of the garbage in the garbage pool in real time, transmits the height value to the PLC, and the PLC processes it, grabs the garbage at the highest point, and puts the garbage into the hopper for incineration. This is also used in the working process of stirring and transferring materials.



Absolute encoder

According to the actual situation of the garbage pool, the "stepping" method can also be used to grab materials and complete the working process of feeding, mixing and transferring materials.

# Grab Buckets



## Multi-flap hydraulic grab

The grab adopts a multi-flap hydraulic grab (Shanghai Pena/Angfeng) with a low center of gravity.

## Four-point "V" shape

The connecting steel wire rope between the crane and the grab is arranged in a four-point "V" shape to reduce the torsion during the use of the grab and the collision between the grab and the building. The transition chain is used to connect the grab and the steel wire rope.

## Anti-tipping

A sensor device is installed inside the grab, which can detect the inclination of the grab and prevent the grab from tipping over.

## Power system

The power supply voltage of the multi-flap hydraulic grab is 380V. The closing of the grab is completed by an electric motor driving the oil pump. The control system is sent to the control room through the cable on the cable drum.

## Power failure protection

The grab provides power failure protection, that is, in the case of power failure, the grab maintains the original closed state to ensure that the load stays at a certain position in the air.

## Independent control button

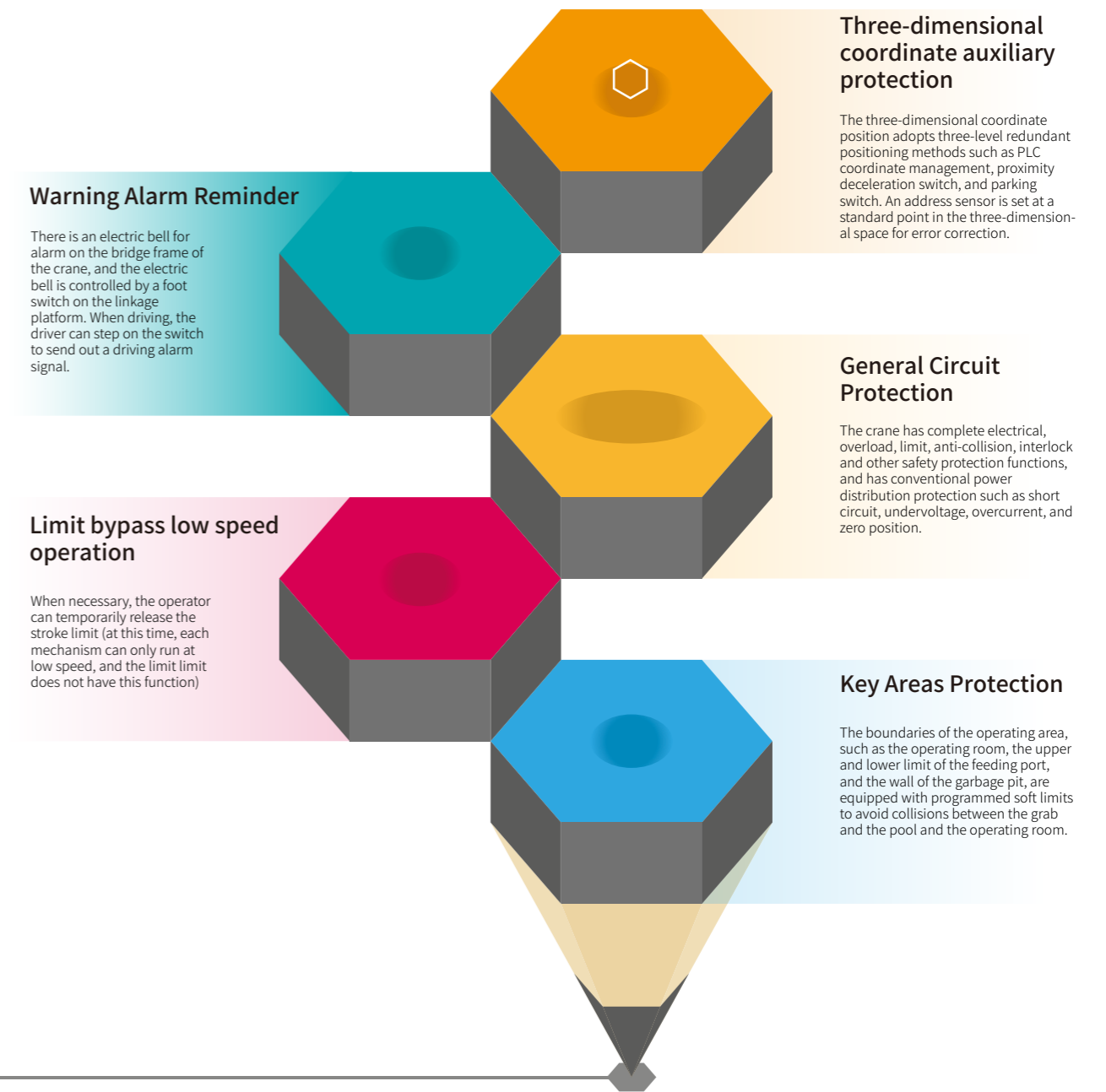
The grab has a set of independent control buttons for the control personnel to operate.

# Safe Distance



Protective measures are taken between the two grab cranes to prevent collisions. In order to maintain a proper distance between the two cranes, anti-collision devices are used. If the distance between the cranes is closer than a certain specified distance, the power supply of the crane driving the motor of the mechanism is automatically cut off. There are 2 switch off points programmed: first it cuts off full speed but allows low speed travel, and then stops according to the end switch point. The position detection error in the direction of travel can be adjusted in the crane control system.

# Protections





## Power Supply and Cable Installation

Both the power supply of the crane and the trolley are powered by cables, and the power supply uses flexible round tow cables (tow cable flat cables).



For firm and proper installation, all cables are fixed cables (CEFR cables) between the low voltage switchgear and the grab crane operating room, and between the low voltage switchgear and the main power supply box, and installed in cable ducts or inside the conduit.

## Control System and External Interfaces



### With discharge door:

The opening and closing status of the discharge door, as well as the fault signal will be sent to the crane PLC;

In the working state of the crane, the PLC transmits the working status signal of the crane and the signal (switch value) of entering the unloading door area to the unloading control system, so as to facilitate the opening and closing operation of unloading] and protect the grab.

### Crane PLC and DCS communication

Crane PLC to DCS  
The accumulative value of the feed of the grab bucket of the crane should be transmitted to the DCS

Signal from DCS to PLC  
The material level signal of each feeding hopper is connected to the crane PLC;  
The DCS transmits the working status signal of each incineration line to the crane PLC.