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## Vertical circulation mechanical parking equipment



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## **1 Overview**

### **1.1 Fundamental:**

Each vehicle parked in a basket (car board), 10 hanging basket hanging in the heavy chain, heavy chain arranged in a ring (runway type), heavy chain hanging on the track, the side of the track, the track is installed in On the frame of steel structure, the heavy chain is driven by a special driving mode, and the vehicle access device is arranged at the lowermost end. When each basket rotates at the lowest end, the vehicle can be accessed and accessed. The device is controlled by a PLC Rotate vertically. The car stops on the bracket of the basket, and the basket moves up and down with the transmission system to lift the car parked to the ground for three-dimensional storage.

### **1.2 Features:**

- 1) Small footprint, easy and quick car parking (two parking spaces can park 10-16 cars)
- 2) Set flexible, can be installed in the living area next to the gap in the building.
- 3) The biggest advantage of the device is the compact layout of ten vehicles in the three-dimensional space of 4.5X6.3X11.5, without disturbing each other, saving a lot of land use.
- 4) The device is stable, vibration, operation noise is minimal, in line with environmental requirements.

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### **1.3 Main component:**

- 1) Three-dimensional space steel structure.
- 2) Stable and reliable transmission system.
- 3) Safe and efficient control system.
- 4) Fire system security system.

### **2. Garage sketch**



### 3. Basic parameters:

Model name	Vertical circulation type mechanical parking equipment		
Equipment Number	PCX-SY		
Parking equipment types and methods	Outdoor use, vertical circulation		
Parking specifications	Parking Quantity	10cars	
	Parking size (mm)	L	5200
		W	1900
		H	1550
Parking weight	≤1700kg		
Drive unit specifications	Drive motor power	7.5 KW	
	Drive reducer	Geared motors with brakes	
	Circulation speed	4.5m/min	
	Circulation way	Vertical chain according to chain and sprocket	
Tray specifications	Size	2130W*4160L	
	<b>Total weight</b>	690KG	
	<b>structure</b>	3t Bending steel	
Operation method	Press or swipe		
power supply	Three-phase 380V 50HZ		
The maximum time for the bus	100s		
Control method	PLC centralized control		
<b>Wind resistance</b>	12		
<b>Earthquake resistance</b>	7		



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## **5 Transmission structure and working principle**

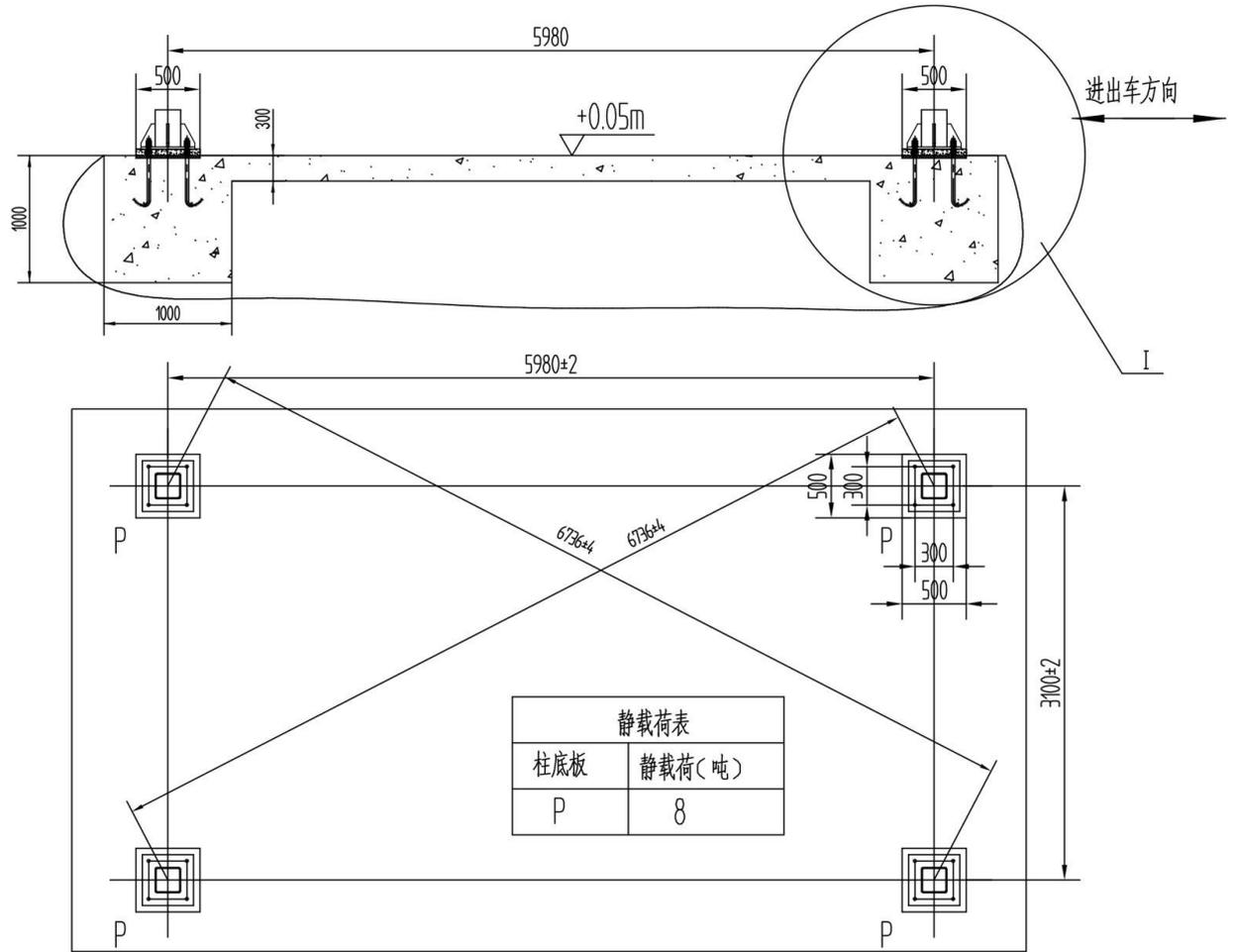
**5.1** the transmission structure from the power plant, transmission spindle, to enhance the chain, guide agencies, electrical installations and other five parts.

**5.2** Working principle:

After receiving the instruction, the power unit starts the motor and drives the driven sprocket shaft to rotate through the driving sprocket. The four-tooth sprocket on the driving shaft engages with the lifting chain to rotate, and the lifting chain is provided with a loading platform at certain intervals Car with the chain for vertical circulation, to achieve the purpose of access to vehicles. Through the PLC control system adjustment, according to the shortest distance to run to the parking spaces.

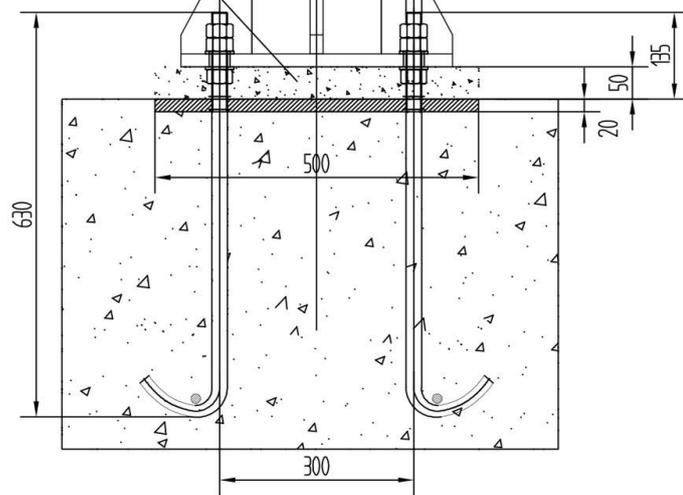
**5.3** the electrical device by the control cabinet, user interface, detection switch, PLC and contactor, warning lights and other components.

## 6. Garage anchor bolts (foundation)



间隙用垫铁垫实调平后灌入无收缩混凝土

4x4-M24



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## **7 Installation and commissioning**

### **7.1 Foundation pit construction**

In accordance with the requirements of the installation of equipment, well foundation pit construction, in accordance with the quality requirements of civil engineering pit pit quality inspection.

### **7.2 Equipment installation procedures and quality requirements**

#### **7.2.1 Steel frame installation**

(1) According to the requirements of the design drawings, put the line, positioning, check the height of the pit is the correct size and pit is horizontal, each column installation location in the same height plane. Frame column verticality of its height of 1/1000, and should be consistent with the provisions

(2) Quality requirements: Before and after the lifting chain guide arc center on the same axis and bearing seat mounting plane on the same height plane.

#### **7.2.2 Main drive shaft installation**

(1) When the drive device and the main drive shaft is installed, the perpendicularity of the driving sprocket and the main drive shaft is 1/500 of the maximum diameter of the driving sprocket;

(2) chain and sprocket meshing should be no jamming and impact phenomenon; chain parts coated with grease;

#### **7.2.3 Loading platform installation**

(1) The error between the actual parking position of the loading platform and the designed parking position should not exceed  $\pm 50\text{mm}$  range;

(2) The difference between the height of the carriage carrying the carriage and the height of the carriageway at the entrance of the carriage shall not be greater than  $\pm 50\text{mm}$ ;

(3) The horizontal clearance between the platform edge of the loading platform and the vehicle inlet and outlet shall not be more than 40mm

#### **7.2.4 In operation:**

(1) The guide wheel on the loading platform should be smoothly rolled in the guide slot without jamming;

(2) bunkering station to maintain the level of horizontal tilt of 3 degrees, vertical 1 degree;

(3) Equipment shall not be subjected to abnormal impact or noise, and noise of equivalent continuous A sound level measured at 1m height and 1.2m height outside the garage door shall not exceed 75Db (A);

#### **7.2.5 At the top and bottom ends:**

(1) guide wheel should be flexible, no jamming phenomenon;

(2) guide wheel and guide surface contact width of not less than 2/3 of the guide wheel width.

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### **7.3 Debugging requirements:**

- 1) First empty load test, check equipment positive, anti-operation, requiring operation, start the brake steady, noise-free, stop accurate;
- 2) First slowly load from a car, respectively, debugging full load, the maximum partial load, check the bike into (out) time, noise, parking board parking error, vehicle size overrun protection, power phase loss protection, electrical insulation, safety Function and so on.

### **7.4 Safety requirements:**

- 1) Equipment safety devices should be consistent with the provisions of GB17907.
- 2) Lightning: according to the user's local conditions and the requirements of GB 50057 install lightning protection device;
- 3) Grounding: All electrical equipment metal shell, metal threading pipe and equipment frame should be reliably grounded, grounding resistance shall not be greater than  $4\Omega$ . Should be set up a dedicated ground wire, not to use zero-phase three-phase power supply ground wire. Maintenance should also be grounded to ensure good.
- 4) Operational restrictions and warnings:
  - Equipment is not out of equipment, equipment can not start running;
  - Equipment should be warned before operation, in operation can enter the device door should be locked;
  - Opened garage. When people or vehicles into the equipment should automatically stop running;
- 5) Transmission chain:
  - Extension of 2.5%, it should be scrapped updates;

## **8. Electrical configuration section description:**

The main configuration of the control cabinet, the operator and the external detection switch. details as follows:

**8.1** the main electrical components within the cabinet with circuit breakers, contactors, thermal relays, intermediate relays, phase sequence controller, are used Schneider or domestic quality products.

**8.1.1** Power supply cabinet with three-phase five-wire power supply system, by all levels of short circuit protection switches, contactors, thermal relays, switching power supply, phase sequence controller and other components. In the main power phase loss, phase failure, phase reversal, short circuit, the protector will move off the main power supply to protect the motor host is not damaged.

**8.1.2** The electrical control system uses PLC, to meet the control requirements, and has a wealth of scalability.

Through the PLC control system adjustment, the car plate by the shortest route to the car parking spaces.

**8.1.3** Electrical control cabinet installed in the maintenance switch to facilitate on-site maintenance personnel.

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**8.1.4** Power-control cabinet door with power indicator to facilitate on-site staff to view the power supply.

**8.2** Electrical control cabinet installed outside the operator, warning lights, detection switch, guide light boxes.

**8.2.1** The operator has IC card swipe, key operation and fault display function; operator can automatically / manually switch to facilitate on-site operation and maintenance personnel.

**8.2.2** Warning lights are installed on the equipment. When the equipment is in operation, it will start the red rotation warning light. If the equipment fails, turn on the red rotation warning light and the electronic buzzer to warn users, pedestrians and vehicles.

**8.2.3** There is an emergency stop switch on the manipulator. When the equipment is abnormal, press this switch to stop the equipment immediately and cut off the main power of the power circuit.

**8.2.4** There is a reset button on the manipulator, press this button to reset the fault and restore the device to the initial state.

Garage using the most advanced intelligent man-machine interface operator for system operation, access to the car's full Chinese operation display, and support for credit card function; with alarm display. At the same time support, automatic operation, manual operation (garage manufacturers need to be authorized or directly from the garage staff to operate), credit card operation.

When the garage is normally used, the parking garage will be parked or accessed by a keypad or swipe card, and the system will automatically transfer the parked car to the ground. The operation is very convenient, for different customers can support different operating authority settings, public parking lot can enter the parking lot number to confirm access to the car, for private users can set the access car password protection.



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## 9. Instructions

Garage operation mode The main automatic mode.

Automatic mode: In automatic mode, press the corresponding parking button, it will rise to the appropriate location.

9.1 Check the operating mode is automatic, the emergency stop button is in normal position, the power light is always on, and the equipment is faultless.

9.2 Press the 6 button or swipe, the garage starts to move, the warning light starts to blink, and when this carrier reaches the ground floor, the warning light stops blinking.

9.3 Users enter the car inventory / car.

9.4 After the car is parked / the car is taken out, the warning light stops blinking and the operation is completed.

**Note: When emergency or abnormal noise, please press emergency stop button.**