# **Fully Automatic Parking Products**

# Plane Moving Type Shuttle Parking System (PPY)



Drive Function		Mechanical System
Car Size	L×W ×H	≤5.3mX1.9mX1.55/2m
Car Weight		≤2350kg
Motor Power	Lift	22-45 kw
Transporters	Lift	4.2kw Max 150m/min
Plane		2.2kw 30-40m/min
Operation System		Touchscreens/PLC/Vector Frequency Control

### Equipment Definition:

A mechanical parking system for the horizontal movement of vehicles on the same level using transporters or cranes, or horizontally shift parking platforms for vehicle storage and retrieval. It can also utilize a combination of transporters and elevators to achieve multi-level horizontal movement for accessing vehicles.

Applicable Environment:

Primarily suitable for complex terrain conditions, including above-ground, underground, and semiunderground.

Equipment Advantages:

It can adapt to different situations by using various combinations of lifts and transporters for vehicle storage and retrieval. Multiple entrances and exits can be set up, resulting in higher efficiency. Additionally, it can be integrated with commercial spaces to improve space utilization.



# KUST Patented Technology

No	Patent Name	Patent No
1	Anti-Corrosion Coating Technology	CN202210401151.2
2	Cable-Stayed Support Technology	CN202223354092.2
3	Transmission System Technology	CN201810039213.3
4	Circulation Mechanism Technology	CN202122038977.0
5	High-Performance Wear-Resistant Carrier Plate Technology	CN201711033848.4
6	hotovoltaic Energy Storage System	CN201210418286.6
7	Multi-Country Real-time Billing System	CN202210228256.2
8	Multilingual License Plate Recognition Technology	CN202310144905.5
9	Seismic Isolation Technology	CN201710654145.7
10	Intelligent Lifting Control System	CN202320770982.7
11	Intelligent Pressure Sensing Technology	CN202021114557.5
12	Anti-Collision Intelligent Protection System	CN202210228256.2

### Contact

Integrated Service Provider (China):

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50 Huancheng East Road, Panlong District, Kunming, Yunnan, China (at Kunming University of Science and Technology)

Tel: +8613888932718 Email: tpt@kustdri.com

Master Mechatronics Co.,Ltd 36/19 Moo I Soi Liabvaree 61 Liebvaree Rd., Kokfad Nongjok Thailand 10530

Tel: +6629569831 Email: mmctn2002@gmail.com





China and Thailand are one family, hand in hand for common development. KUST from China in conjunction with China's excellent smart parking garage manufacturers (TOPP) and Thailand's high-quality partners, take scientific and technological innovation as the engine, and resource integration as the path, to jointly build Thailand's smart parking garage project, and to become an outstanding integrated service provider for smart city construction. Together, we will open a new chapter in the development of Thailand's smart city and create a promising vision for future city life.



Mechanical Jarage Product Types Inte illigent Multilevel Technical Parking Indicators



# **Kunming University of Science and Technology Profile**

Kunming University of Science and Technology (KUST) is one of the top 100 universities in China. It has undergone continuous development and has emerged as a comprehensive university with a focus on engineering and a strong integration of science and engineering. The university is characterized by its distinct industry and regional features, and it is one of the key universities in Yunnan Province with the largest scale, all levels and categories of education.

# **KUST National Science Park Co., Ltd. Profile**

In January 2010, Kunming University of Science and Technology National Science Park Co., Ltd. was recognised by the Ministry of Science and Technology and the Ministry of Education as a national university science park, becoming the only national university science park in Yunnan Province to adopt a "one university, one park" model. Kunming University of Science and Technology National Science Park Co., Ltd. is the operating entity of the university science park, registered and established on March 24, 2009. In 2016, it was registered with the Yunnan Provincial Department of Finance with the approval of the Provincial People's Government as a provincial university science platform company.

# KUST Design & Research Institute Co., Ltd. Profile

Kunming University of Science and Technology Design & Research Institute Co., Ltd. is the only comprehensive Grade A design and research institute with a university background in Yunnan Province. The company primarily focuses on architecture, urban and rural planning. while also providing metallurgy, water conservancy, electric power, municipal, landscape, decoration, environmental engineering, and whole engineering consulting service (project management and general contracting).

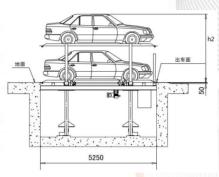
# **Semi-Automatic Parking Products**

# Simple Lift Parking System (PJS)











Drive Function		Mechanical System
	L×W	≤4.7mX1.8mX1.55m
G 6:		≤5.2mX1.9mX1.55m
Car Size	×H	≤5.3mX2.1mX1.55m
		≤6.5mX2.8mX3.0m
Car Weig	ht	≤1700kg to ≤10000kg
Motor Power	Lift	5.5/7.2/9.2 kw
Lift Speed		2.5m/min
Operation System		IC card/key board/manual
Power Supply		3N,AC,380V,50Hz

#### **Equipment Definition:**

A vertical parking system that utilizes a simple up-and-down movement of a lifting mechanism to access different levels of parking spaces.

#### Applicable Environment:

Primarily used in residential communities, government hospitals, and areas with high environmental requirements. It is commonly installed in above-ground areas.

#### Equipment Advantages:

It offers high space utilization, allowing for 2-5 times the parking capacity of the original flat parking spaces. It does not impact the surrounding environment or daylighting requirements, and it has a low failure rate.

# Puzzle Parking System (PSH)



Drive Function		Mechanical System
	L×W ×H	≤4.7mX1.8mX1.55m
Car Size		≤5.2mX1.9mX1.55m
Cur Size		≤5.3mX2.1mX1.55m
		≤6.5mX2.8mX3.0m
Car Weig	ht	≤1700kg to ≤10000kg
Motor Power	Lift	2.2/3.7/5.5/9.2 kw
motor rower	Slide	0.2/0.4 kw
Lift Speed	Lift	4-10m/min
Lift Speed	Slide	7-12m/min
Operation System		IC card/key board/manual
Power Supply		3N,AC,380V,50Hz

### **Equipment Definition:**

A mechanical parking system that utilizes vehicle platforms to lift or move vehicles vertically and horizontally for storage and retrieval.

Applicable Environment:

Primarily used in underground parking lots of real estate developments, hospitals, government buildings, etc. It can be installed in both above-ground areas and basements.

Equipment Advantages:

Due to its various types and configurations, it offers flexibility in terms of scale and number of levels, making it highly adaptable to different site conditions.

# Vertical Rotary Parking System (PCX)



Drive Function	Mechanical System
	≤4.7mX1.8mX1.55m
Car Size L×W	≤5.2mX1.9mX1.55m
×H	≤5.3mX2.1mX1.55m
	≤6.5mX2.8mX3.0m
Car Weight	≤1700kg to ≤10000kg
Motor Power Lift	18.5/22 4P 1/82
Lift Speed	7.45m/min
Operation System	IC card/key board/manual
Power Supply	3N,AC,380V,50Hz

#### Equipment Definition:

A mechanical parking system that utilizes a rotary mechanism to perform circular motion for the storage and retrieval of vehicles. Similar to the design of a Ferris wheel, it allows vehicles to be stored and retrieved in a vertical direction.

Applicable Environment:

Generally used in areas with limited space and height constraints, such as hospitals, residential communities, and public institutions. It is typically installed in above-ground areas.

Equipment Advantages:

Suitable for space-constrained areas, it maximizes the number of parking spaces within a limited height. For example, approximately 35m² can accommodate 12 vehicles. It has a short installation period and utilizes servo motors for smooth operation.

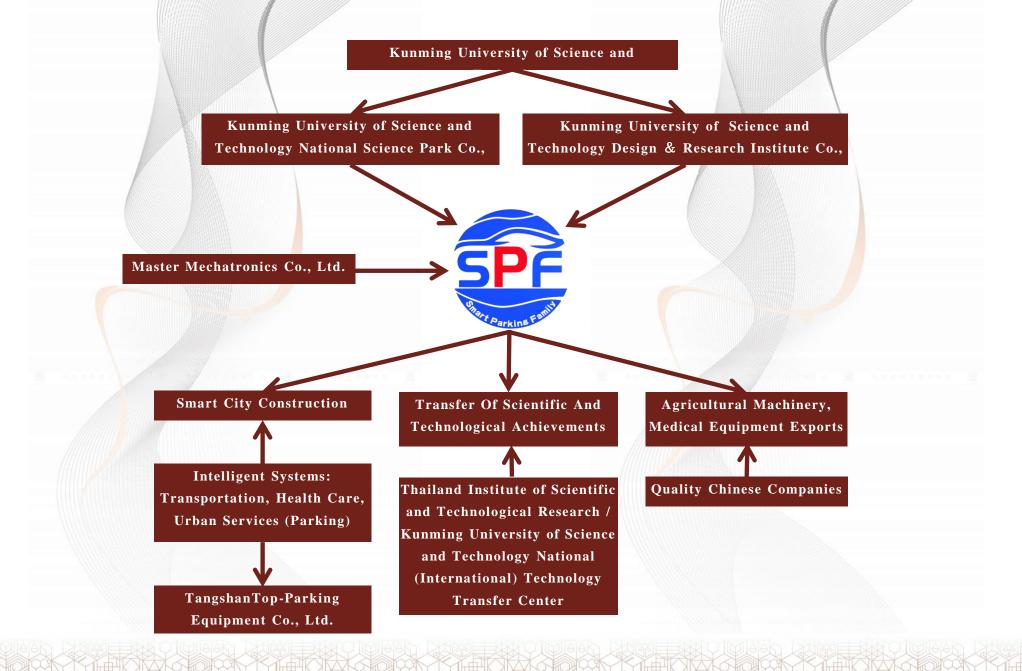




# **Smart Parking Family**

SPF (Smart Parking Family) is a collaborative initiative led by Kunming University of Science and Technology (KUST), along with Kunming University of Science and Technology Science Park Co., Ltd. and Kunming University of Science and Technology Design and Research Institute Co., Ltd., in partnership with a high-quality Thailand's collaborator (Master Mechatronics Co., Ltd.). Driven by technological innovation, following a path of resource integration, guided by a pursuit of excellence in product quality, and committed to a customer-first approach to service, they have jointly created a distinguished comprehensive service provider in Thailand. SPF mainly engages in business areas such as smart city construction, scientific and technological achievements transfer, agricultural machinery, and medical device exports. Led by KUST, Kunming University of Science and Technology Science Park Co., Ltd. and Kunming University of Science and Technology Design and Research Institute Co., Ltd. collaborate with different enterprises. For instance, in the construction of smart parking within smart city development, they partner with China's high-quality enterprise Tangshan Top-Parking Equipment Co., Ltd.. In the transfer of scientific and technological achievements, they collaborate with the Thailand Institute of Scientific and Technological Research and the KUST National (International) Technology Transfer Center, joining hands with various parties to open a new chapter in the development of smart cities in Thailand and to forge a beautiful vision for future urban life.









# Kunming University of Science and Technology Profile

Kunming University of Science and Technology (KUST) is one of the top 100 universities in China. It has undergone continuous development and has emerged as a comprehensive university with a focus on engineering and a strong integration of science and engineering. The university is characterized by its distinct industry and regional features, and it is one of the key universities in Yunnan Province with the largest scale, all levels and categories of education.

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### KUST Design & Research Institute Co., Ltd. Profile

Kunming University of Science and Technology Design & Research Institute Co., Ltd. is the only comprehensive Grade A design and research institute with a university background in Yunnan Province. The company primarily focuses on architecture, urban and rural planning. while also providing metallurgy, water conservancy, electric power, municipal, landscape, decoration, environmental engineering, and whole engineering consulting service (project management and general contracting).

# Tangshan Top-Parking Equipment Co., Ltd.

TangshanTop-Parking Equipment Co., Ltd. is the only parking company under China National Building Material Group Co.,Ltd.. It has been engaged in the intelligent parking industry since 1996. It is a professional company specializing in the research, design, production, installation and commissioning, after-sales maintenance, and import and export of parking equipment and technology for mechanical parking equipment. As a large-scale professional parking garage production base in China, its production scale and manufacturing level are both in the leading position in the industry. TangshanTop's products cover many cities in China and are also exported to the United States, Russia, Australia, Ukraine, Israel and other countries.





# Back Ground Of Kunming university of science and technology research and design Co.,Ltd

บริษัทวิทยาศาสตร์และเทคโนโลยีและสถาบันการวิจัยแห่งมหาวิทยาลัยคุนหมิง Co.,Ltd ก่อตั้งเมื่อปี 1999 เป็นสถาบันการออกแบบและวิจัยระดับเกรด A เพียงแห่งเดียวที่มีวุฒิการศึกษาระดับ มหาวิทยาลัยในมณฑลยูนาน บริษัทมุ่งเน้นด้านสถาปัตยกรรม การวางผังเมืองในเมืองและชนบทเป็น หลัก ในขณะเดียวกันก็ให้น้ำหนักกับงานโลหะวิทยา การอนุรักษ์พลังงานไฟฟ้า เทศบาล ภูมิทัศน์ การ ตกแต่ง วิศวกรรมสิ่งแวดล้อม รวมถึงการบริการให้คำปรึกษาด้านวิศวกรรมทั้งหมด (การบริหาร โครงการและรับจ้างค้านอื่นๆ)





# Master Mechatronics Co., Ltd. Profile

ได้ก่อตั้งขึ้นเมื่อปี 2545 จากการรวมตัวของทีมวิศวกรนำโดย คุณมานพ มานน้อย MD ผู้มีประสบการทางด้านระบบขนถ่ายวัสดุ โดยเน้นเรื่องรอก เครนและ ลิฟท์ ตลอดระยะเวลาที่ผ่านมา บริษัทได้ปรับปรุงและพัฒนา องค์กรอยู่ตลอดเวลา ทั้งด้านคุณภาพสินค้าและการบริการหลังการขาย จนปัจจุบัน บริษัทได้รับความไว้วางใจในแวดวงอุตสาหกรรมโดยมีการ ออกแบบและติดตั้งเครนและลิฟท์กว่า 700 ตัว











# **Factory Profile**

TangshanTop-Parking Equipment Co., Ltd. is located in Fengrun District, Tangshan City, Hebei Province, the company set the design and development, machine manufacturing, marketing, installation and after-sales service in one, is a focus on the manufacture of mechanical three-dimensional parking equipment specialized enterprises, the company is also engaged in the management of parking lot management, undertake parking lot traffic safety facilities, parking lot intelligent management system of the construction and traffic consulting services. The core members of the R&D team have nearly 20 years of experience in the R&D and manufacturing of mechanical garages. Up to now, the company has A-level qualification of special equipment manufacturing, special equipment installation, transformation and repair license, and has passed ISO9001 quality management system certification, OHSAS18001 occupational health and safety management system certification, ISO14000 environmental management system certification.











# **Factory Profile**

# Intelligent Ultra-High Precision Production Line







Fully Automatic Laser Cutting Machine

High Precision CNC Gantry Milling Machine







Robotic Welding System

Fiber Laser Cutting Machine

Realize high efficiency, high precision processing, error as low as 0.001mm, reduce the failure rate of the equipment to a greater extent, so that the processed equipment has a higher service life, and more stable operating environment.



# **Product Profile—Semi-Automatic Parking Products**

### Simple Lift Parking System (PJS)



Drive Function		Mechanical System
		≤4.7mX1.8mX1.55m
Car Size	L×W×	≤5.2mX1.9mX1.55m
Car Size	Н	≤5.3mX2.1mX1.55m
Concessional Vehicle Mass		≤1700kg to ≤3000kg
Motor Power	Lift	5.5/7.2/9.2 kw
Lift Speed		2.5m/min
Operation System		IC card/key board/manual
Power Supply		3N,AC,380V,50Hz

#### Equipment Definition:

A vertical parking system that utilizes a simple up-and-down movement of a lifting mechanism to access different levels of parking spaces.

#### Applicable Environment:

Primarily used in residential communities, government hospitals, and areas with high environmental requirements. It is commonly installed in above-ground areas.

#### Equipment Advantages:

It offers high space utilization, allowing for 2-5 times the parking capacity of the original flat parking spaces. It does not impact the surrounding environment or daylighting requirements, and it has a low failure rate.

### Puzzle Parking System (PSH)



Drive Function		Mechanical System
	L×W×	≤4.7mX1.8mX1.55m
Car Size		≤5.2mX1.9mX1.55m
Cai Size	Н	≤5.3mX2.1mX1.55m
Concessional Vehi	icle Mass	≤1700kg to ≤3000kg
Motor Power	Lift	2.2/3.7/kw
Wiotor Fower	Slide	0.2/0.4 kw
Lift Speed	Lift	4-6m/min
Liit Speed	Slide	7-10m/min
Operation System		IC card/key board/manual
Power Supply		3N,AC,380V,50Hz

#### Equipment Definition:

A mechanical parking system that utilizes vehicle platforms to lift or move vehicles vertically and horizontally for storage and retrieval.

#### Applicable Environment:

Primarily used in underground parking lots of real estate developments, hospitals, government buildings, etc. It can be installed in both above-ground areas and basements.

#### Equipment Advantages:

Due to its various types and configurations, it offers flexibility in terms of scale and number of levels, making it highly adaptable to different site conditions.

### Vertical Rotary Parking System (PCX)



Mechanical System
· ·
≤4.7mX1.8mX1.55m
≤5.2mX1.9mX1.55m
≤5.3mX2.1mX1.55m
≤1700kg to ≤2350kg
22 4P/ 30 4P
7.45m/min
IC card/key board/manual
3N,AC,380V,50Hz

#### Equipment Definition:

A mechanical parking system that utilizes a rotary mechanism to perform circular motion for the storage and retrieval of vehicles. Similar to the design of a Ferris wheel, it allows vehicles to be stored and retrieved in a vertical direction.

#### Applicable Environment:

Generally used in areas with limited space and height constraints, such as hospitals, residential communities, and public institutions. It is typically installed in above-ground areas.

#### Equipment Advantages:

Suitable for space-constrained areas, it maximizes the number of parking spaces within a limited height. For example, approximately 35 m² can accommodate 12 vehicles. It has a short installation period and utilizes servo motors for smooth operation.

# **Product Profile—Fully Automatic Parking Products**

### Plane Moving Type Shuttle Parking System (PPY)



Drive Function		Mechanical System
Car Size	L×W×H	≤5.3mX1.9mX1.55/2.05m
Concessional Vehicle Mass		≤2350kg
Motor Power	Lift	22-45 kw
Transporters Plane		2.2kw 30-120m/min
Operation System		Touchscreens/ Frequency Control

#### Equipment Definition:

A mechanical parking system for the horizontal movement of vehicles on the same level using transporters or cranes, or horizontally shift parking platforms for vehicle storage and retrieval. It can also utilize a combination of transporters and elevators to achieve multi-level horizontal movement for accessing vehicles.

#### Applicable Environment:

Primarily suitable for complex terrain conditions, including above-ground, underground, and semi-underground.

#### Equipment Advantages:

It can adapt to different situations by using various combinations of lifts and transporters for vehicle storage and retrieval. Multiple entrances and exits can be set up, resulting in higher efficiency. Additionally, it can be integrated with commercial spaces to improve space utilization.

### Aisle Stacking Parking System (PXD)



Drive Function		Mechanical System
Car Size	L×W×H	≤5.3mX1.9mX1.55/2.05m
Concessional Vehicle Mass		≤2350kg
Lift Speed		37m/min
Motor Power		11kw/4kw×2 4P
Slide Speed		54m/min
Operation System		Touchscreens/ Frequency Control

#### Equipment Definition:

A mechanical parking system that utilizes transporter in a stacker crane to place vehicles onto the stacker cranes which move vehicles horizontally and vertically to the parking or retrieving space.

#### Applicable Environment:

Primarily suitable for narrow spaces or maximizing parking capacity in underground parking lots. It can be implemented in various forms such as above ground or underground.

#### Equipment Advantages:

It reduces the impact of elevators on the number of parking spaces and provides a higher parking capacity with the same area compared to horizontal movement.

### Vertical Lift Parking System (PCS)



Drive Function		Mechanical System
Car Size L×W×H		≤5.3mX1.9mX1.55/2.05m
Concessional Vehicle Mass		≤2350kg
Lift Speed		60-120m/min
Slide Speed		6.6-10m/min
Operation System		Touchscreens/Frequency Control

#### Equipment Definition:

A mechanical parking system that utilizes the lifting mechanism of an elevator and a horizontal movement mechanism installed on the elevators to vertically and horizontally move vehicles to enable the storage and retrieval of vehicles, also called tower-type multi-level parking system.

#### Applicable Environment:

Primarily suitable for urban and commercial center areas with limited space and relatively few height restrictions. It can be implemented in various forms such as above ground, underground, or semi-underground.

#### Equipment Advantages:

In areas without significant height limitations, it can accommodate approximately 80 vehicles across 40 levels within a maximum area of 50m². It boasts high level of automation, allowing easy entry and exit of vehicles, while presenting a sophisticated and upscale overall appearance.

# Reference

 $1_{\gamma}$  Military parking garage project in BeiJing, PSH-4,4 floor, Number of Parking Lot 237





2. Residential parking garage projectin QingDao, PSH-2/3 ,2/3 floor,Number of Parking Lot 561





3、Government parking garage project in BeiJing,PSH-2 ,2 floor, Number of Parking Lot 130



4. Government parking garage project in BeiJing, PSH-4,4 floor, Number of Parking Lot 410









# Reference

5. Residential parking garage projectin BeiJing, PPY-2, 2 floor, Number of Parking Lot 387







6、Hospital parking garage projectin QingDao,PCX-9 ,9 floor, Number of Parking Lot 64





# 7. Government parking garage projectin ChongQing, PPY-7,7 floor, Number of Parking Lot 310









 $8_{\times}$  Residential parking garage projectin BeiJing, PJS , 4/5 floor, Number of Parking Lot 115





# **Product Performance**

# 1. Durability







Featuring Thermal Sprayed Aluminum And Aluminum-Iron Alloy Process to Prevent Rust.

# 3、Safety



Double-Row Chain Is Used To Double The Safety Factor, And The Drive Shaft Is Made Of Solid 45# Carbon Steel To Ensure The Durability Of The Transmission Ratio.

### 2. Aesthetic







Junction Box Made Of Galvanized
Sheet With CNC Punching And
Bending To Ensure Its Strength And
Precision.

### 4、Humanity



Visual Operating Systems
Equipped With LCD Screen,
With Automatic Fault
Retrieval Function, Not Only
Display The Fault Code But
Also Display The Fault
Content.



# **Conceptual Design**

序号	名称	规格型号及说明
NO.	Name	Specification and Description
1	车库形式	升降横移式
	Garage type	PSH
2	型号 Mode	PSH-7
3	容车规格 Dimensions Of Vehicle Suitable For Parking	5200mm*1900mm*1900mm/2000mm
4	容车重量 Concessional Vehicle Mass	≤2000kg
5	主结构防腐 Main Structure Protection	抛丸 <mark>Sho</mark> t Blasting 除锈 <b>R</b> ust Removal 喷铝 Aluminising 封孔 Spray Painting
6	控制方式 Control Mode	触摸屏 Touch Screen 感应卡式 Proximity Card 液晶显示屏 Lcd
7	电 源 Power	Tn-s 380v 50hz
8	电控设备 Electric Control Devices	控制系统、可视操作系统、安全检测 系统等 Control Systems, Visual Operating Systems, Safety Detection Systems, Etc.
9	传动方式 Driving Mode	钢丝绳 Steel Wire
10	最大存取车时间 Maximum Pickup Time	125s
12	减速机 Reducer Motor	车库专用 Mechanical Garage Only
13	设备噪音 Noise	≤65db (a)
7	钢结构 Steel Structure	立柱 Pillar: h250*250 横梁 Crossbeam: h300*150 纵梁 Longitudinal Beam: h200*100

序号	名称	规格型号及说明
NO.	Name	Specification and Description
15	载车板装置 Pallet	(1)边梁采用3.5mm镀锌钢板; Boundary Beam:3.5mm Galvanized Steel Sheet (2)载车板采用2.0mm镀锌钢板; Pallet:2.0 Galvanized Steel Sheet (3)载车板数控折弯拼装; Pallet: Cnc Bending Assembly (4)防漏水漏油设计; Leak-Proof Design (5)独有加强筋设计; Stiffener Design (6)载车板设置挡车器; Design Car Guard (7)挡车器、限位器整体拼折而成; Car Stopper And Limiters Are Folded As A Whole
16	升降系统 Lifting System	电机 Motor: 2.2kw(2-5层 2-5 Floor) 3.7kw(6-7层 6-7 Floor) 驱动链条 Drive Chain: 16alt-2、Lt80-2 钢丝绳 Wirerope: φ11 提升传动轴 Lift Shaft: 45#钢 45#Steel φ58mm实心轴 Solid Shaft 升降运行速度 Speed: 4.5m/Min 轴承座 Bearing Support: Ucp 211, Ucp210
17	横移系统 Sliding System	电机 Motor: 0.2kw 运行速度 Speed: 7m/Min
18	防坠装置 Anti-Dropping Device	安全挂钩,四点防坠落装置。 Safety Hook,Anti Dropping Device.



# **Conceptual Design**

序号	名称	规格型号及说明
NO.	Name	Specification and Description
19	螺栓连接件 Bolted Connector	采用8.8级高强螺栓连接,设备更加稳 固耐用 8.8 High Strength Bolt Connection, More Stable And Durable
20	线槽、接线盒 Junction Box	采用镀锌板,数控冲孔、折弯而成,确 保其强度、精度。 Made Of Galvanized Sheet With CNC Punching And Bending To Ensure Its Strength And Precision.
20	光电检测系统 Photoelectric Detection Device	Pf50 Nx Pl-q50 Mtpqfei
21	限位检测系统 Limiters Detection System	Sf-8107, Xckn
22	可编程序控制器 Plc (Pcl Control System)	Topp、M、s7-200 Smart
23	接触器 Contactor	Schneider-r/n, Siemens-3ts, Abb-a2x
24	热继电器 Thermorelay	Schneider-r/n、Siemens-3us、Abb-Ta
26	现场安装 Installation	设备部件在工厂内成型,现场安装时无焊接,保障结构防腐性能及设备精度。 No Welding During On-Site Installation To Ensure The Structural Anti-Corrosion Performance And Equipment Accuracy.
27	指示标志 Guide Signs	(1)容车指示牌(尺寸、重量及注意事项指示); Vehicle capacity signs (size, weight and precautionary instructions) (2)操作使用说明; Operating Instructions (3)倒车入库指示。 Reverse Into The Garage;

序号	名称	规格型号及说明
NO.	Name	Specification and Description
28	安全措施 Security Measures	(1)设置紧急制动开关; Emergency Stop Button (2)超限运行装置; Overrun Operation Device; (3)超长光电检测装置; Ultra-Long Photoelectric Detection Device; (4)设置阻车装置; Stopping Device; (5)防人、车误闯入光电检测装置,设置光电自动锁闭系统; Anti-Mislead Photoelectric Protective Device; (6)防止载车板坠落装置; Anti-Dropping Device; (7)警示灯及警示蜂鸣,设置运转信号显示; Run-Time Warning Device; (8)缺相、错相保护装置;电力过负荷保护装置; Power Load Protection Device;(9)双重上下极限开关; Upper And Lower Limit Switch; (10)Plc连锁装置; Pcl Interlocking Device; (11)断电制动装置; Power-Off Brake; (12)防触电措施。 Measures To Prevent Electric Shock.





