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Foreword

SAC/TC227 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces JB/T 10475-2004 "*Vertical lifting mechanical parking system*" in whole. The following technical deviations have been made with respect to the JB/T 10475-2004:

- The “Foreword” of the previous edition is modified;
- The “Scope” of the previous edition is modified (see clause 1);
- The “Normative references” of the previous edition is modified (see clause 2);
- The “Terms and definitions” of the previous edition is modified (see clause 3);
- The clause “Types and basic parameters” of the previous edition is modified (see clause 4);
- The subclause “Environmental conditions for use” of the previous edition is modified (see 5.1);
- The subclause “Design and configuration” of the previous edition is modified (see 5.2);
- A new subclause “The whole system performance” is added (see 5.3)
- The subclause "Manufacturing" of the previous edition is modified, and relevant requirements for hydraulic system, etc. are added (see 5.4);
- The subclause "Installation" of the previous edition is modified, and relevant requirements for electrical installation are added (see 5.5);
- The subclause "Safety and hygiene" of the previous edition is modified (see 5.6);
- The subclause 5.6 "Appearance" of the previous edition is deleted;
- A new subclause “Surface coating” is added (see 5.7);
- The clause “Test method” of the previous edition is modified (see clause 6);
- The clause “Inspection rules” of the previous edition is modified (see clause 7);
- The clause “Signs, packaging, transportation and storage” of the previous edition is modified (see clause 8);
- The clause 9 "Warranty period" of the previous edition is deleted.

This standard was proposed by China Machinery Industry Federation.

This standard was prepared by SAC/TC 227 National Technical Committee on Lifting Appliances of Standardization Administration of China.

The previous edition of this standard is as follows:

- JB/T 10475-2004.

Vertical lifting mechanical parking system

1 Scope

This standard specifies the terms and definitions, types and basic parameters, technical requirements, test methods, inspection rules, signs, packaging, transportation and storage of vertical lifting mechanical parking systems.

This standard is applicable to vertical lifting mechanical parking systems (hereinafter referred to as “systems”) defined in GB/T 26476.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 700-2006, *Carbon structural steels*

GB/T 1228, *High strength bolts with large hexagon head for steel structures*

GB/T 1229, *High strength large hexagon nuts for steel structures*

GB/T 1230, *High strength plain washers for steel structures*

GB/T 1231, *Specifications of high strength bolts with large hexagon head, large hexagon nuts, plain washers for steel structures*

GB/T 3632, *Sets of torshear type high strength bolt hexagon nut and plain washer for steel structures*

GB/T 3811-2008, *Design rules for cranes*

GB/T 4942.1, *Degrees of protection provided by the integral design of rotating electrical machines (IP code) —Classification*

GB 7588-2003, *Safety rules for the construction and installation of electric lifts*

GB/T 8923.1, *Preparation of steel substrates before application of paints and related products—Visual assessment of surface cleanliness—Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

GB/T 9286, *Paints and varnishes—Cross cut test for films*

GB/T 9799, *Metallic and other inorganic coatings—Electroplated coatings of zinc with supplementary treatments on iron or steel*

GB/T 13306, *Plates*

GB/T 13384, *General specifications for packing of mechanical and electrical product*

GB/T 13912, *Metallic coatings—Hot dip galvanized coatings on fabricated iron and steel articles—Specifications and test methods*

GB 17907-2010, *Mechanical parking systems—General safety requirement*

GB/T 26476, *Mechanical parking system—Vocabulary*

GB/T 26559-2011, *Mechanical parking system—Classification*

GB 50017, *Code for design of steel structure*

GB 50168, *Standard for construction and acceptance of cable line electric equipment installation engineering*

GB 50169, *Code for construction and acceptance of grounding connection electric equipment installation engineering*

GB 50254, *Code for construction and acceptance of low-voltage apparatus electric equipment installation engineering*

GB 50256, *Code for construction and acceptance of electric device of crane electrical equipment installation engineering*

JB/T 7828, *Specifications for packaging, storage and transportation of relays and related devices*

JB/T 11079, *Car parking chains*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 26476 apply.

4 Types and basic parameters

4.1 Types

The types of the systems are classified in accordance with GB/T 26559-2011, 3.2.

4.2 Basic parameters

4.2.1 The groups, dimensions and masses of concessional vehicles

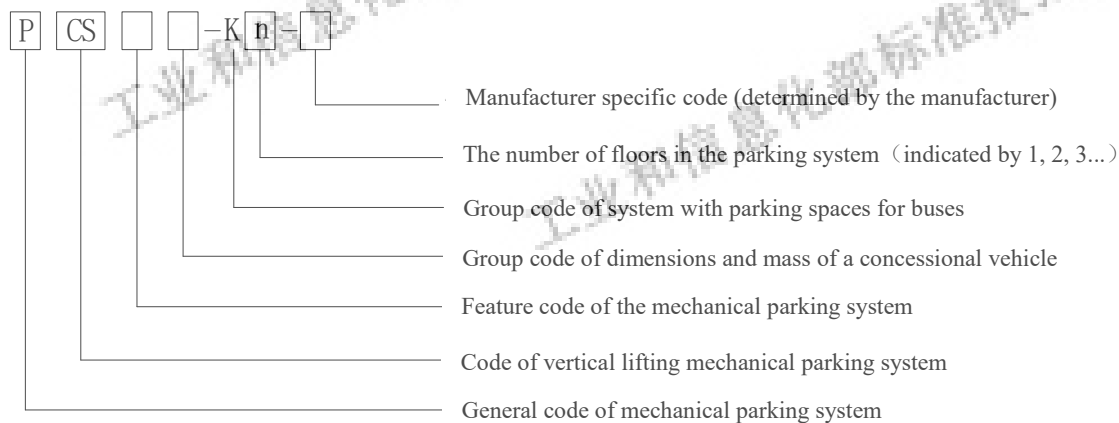
The groups, dimensions and masses of concessional vehicles shall meet the requirements given in GB/T 26559-2011, Table 2.

4.2.2 Maximum storage (or retrieval) time of single vehicle

The maximum storage (or retrieval) time of single vehicle for one single parking system shall normally not exceed 180 s.

4.3 Model designation method

It is composed of the general code, classification code, feature code, manufacturer specific code, etc. of the parking system. The designation method is as follows:



If it is not required to park buses, the K after the dash is omitted, and the manufacturer specific code is determined and marked by the manufacturer. The dimensions, masses and group codes of concessional vehicles for the system shall meet the requirements given in GB/T 26559-2011, Table 2. The feature codes of mechanical parking systems shall meet the requirements given in GB/T 26559-2011, Table 1.

Example 1:

For the vertical lifting mechanical parking system which uses chains for lifting, allows parking of sedan cars up to large size, doesn't have parking spaces for buses, the number of floors is 20, and the manufacturer specific code is A, the designation shall be PCSLD-20-A.

Example 2:

For the vertical lifting mechanical parking system which uses wire ropes for lifting, allows parking of sedan cars up to extra-large size, has a number of parking spaces for buses, the number of floors is 25, and the manufacturer specific code is W, the designation shall be PCSST-K25-W.

5 Technical requirements

5.1 Service environment conditions

5.1.1 The ambient temperature is $-5^{\circ}\text{C}\sim+40^{\circ}\text{C}$.

5.1.2 The electrical equipment shall be capable of operating correctly when the relative humidity does not exceed 50 % at a maximum temperature of $+40^{\circ}\text{C}$.

5.1.3 The altitude shall not exceed 1000m.

5.1.4 There shall be no explosive, corrosive media or media that harm insulation and conduction in the service environment.

5.1.5 The power supply is a three-phase five-wire AC with a frequency of 50Hz and a voltage of 380V. The voltage fluctuation of the power supply system at the supply point of the equipment shall not exceed $\pm 10\%$ of the rated voltage, and the voltage loss inside the equipment shall meet the requirements in GB/T 3811-2008, 7.8.4.2.

NOTE When the service environment conditions exceed the above range, an agreement shall be made between the user and the manufacturer.

5.2 Design and configuration

5.2.1 The system design shall meet the requirements in GB 17907-2010, 5.2.2 and 5.6 in this standard.

5.2.2 The basic dimensions of the system shall meet the requirements in GB 17907-2010, 5.3.

5.2.3 The design of the metal structure shall meet the requirements in GB/T 3811.

5.2.4 For the system with free-standing all-steel structure, its outer frame shall be designed in accordance with GB 50017.

5.2.5 When the load carrier bears the rated load, the deflection of its long sides shall not be greater than 1/1000 of the length of its long side.

5.2.6 The vehicle -carrying structure of the parking space shall be made of non-combustible materials, and shall have sufficient strength and stiffness.

5.2.7 When the comb-finger-frame vehicle-carrying structure design is adopted, the comb fingers shall be staggered uniformly and arranged in a coordinated manner, and the gap between the fingers shall not be less than 15mm. The strength and stiffness of the fingers shall meet the requirements for use, and the fingers shall be installed firmly.

5.2.8 The parking space shall be provided with means to prevent oil and water from dripping to the vehicles parked below.

5.2.9 Provided that there are detection measures or other means that can ensure the safety of the stored vehicles, obstacles shown in Figure 1 are allowed on the parking space, and the size of the obstacles shall meet the following requirements:

- a) If the cross-section of the obstacle in side view of the vehicle is enclosed by a rectangle, the dimensions of the two sides of the rectangle $a < 600$ mm, $b < 600$ mm, and $a+b \leq 600$ mm;
- b) If the cross-section of the obstacle in side view of the vehicle is enclosed by a triangle, the dimensions of the right-angle sides of the triangle $c \leq 600$ mm, $d \leq 600$ mm;
- c) If the cross-section of the obstacle in front view of the vehicle is only allowed to be enclosed by a triangle, the dimensions of the right-angle sides of the triangle $e \leq 300$ mm, $f \leq 300$ mm.

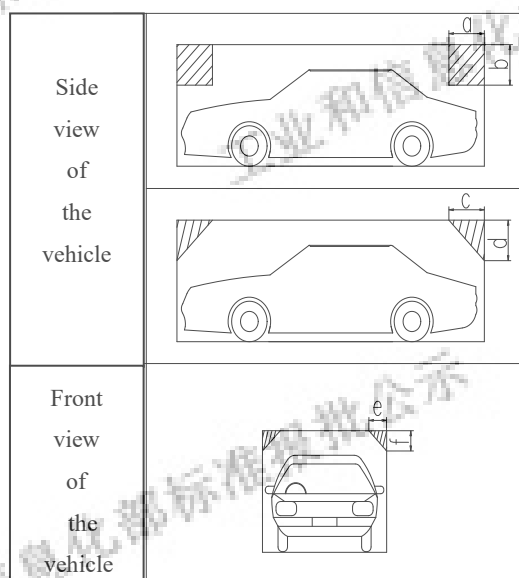


Figure 1

5.3 The performance of the whole system

5.3.1 The rated speed of the system moving mechanisms shall conform to the design value, with a limit deviation of $\pm 8\%$.

5.3.2 Each moving mechanism shall operate normally without abnormal noise.

- 5.3.3 The rollers and guiding devices shall be free from track gnawing or jamming during the movements.
- 5.3.4 The system shall run smoothly and there shall be no displacement after braking.
- 5.3.5 The leveling error of the lifting transport apparatus shall not exceed ± 10 mm.
- 5.3.6 When the system is subjected to an overload test, it shall be able to withstand a test load of 1.1 times the rated load. During the test, the system shall be able to work normally, and the safety devices such as brakes shall work smoothly and reliably. After the test, visual inspection shall be performed, the load-bearing metal structural members shall be free of cracks, permanent deformation, paint flaking, and no connection has been loosened.

5.4 Manufacturing

5.4.1 Metal structure

- 5.4.1.1 The metal structural members (such as columns and beams) shall be made of materials whose mechanical properties are not lower than those of Q235 steel specified in GB/T 700-2006, Table 2.
- 5.4.1.2 The welding of metal structures shall meet the requirements in GB 17907-2010, 5.2.3.
- 5.4.1.3 The metal structure shall be firmly connected, and there shall be no defects that affect the strength.
- 5.4.1.4 When high-strength bolts are used for the connection of the main load-bearing structural members, the high-strength bolts, nuts and washers shall meet the requirements in GB/T 1228, GB/T 1229, GB/T 1230, and GB/T 1231.
- 5.4.1.5 When sets of torshear type high strength bolt hexagon nut and plain washer are used for the connection of the main load-bearing structural members, such sets shall meet the requirements in GB/T 3632.
- 5.4.1.6 For the main load-bearing structural members, such as columns, beams, lacing members, the substrates derusting treatment shall reach grade Sa2^{1/2} as specified in GB/T 8923.1, and for other structural members, it shall reach grade Sa2 or St2 (by manual derusting).

5.4.2 Mechanisms and components

5.4.2.1 Load carrier

The load carrier shall meet the requirements as specified in GB 17907-2010, 5.4.1.

5.4.2.2 Wire ropes, drums and sheaves for lifting

5.4.2.2.1 The wire ropes, drums and sheaves used for lifting shall meet the requirements in GB 17907-2010, 5.4.2.

5.4.2.2.2 When positive drive is adopted, the design of the allowable fleet angle of the wire rope in the reeving system shall meet the requirements in GB/T 3811-2008, 6.3.3.3.

5.4.2.2.3 When traction drive is adopted, the traction conditions shall meet the requirements as specified in GB 7588-2003, 9.3.

5.4.2.3 Chains and sprockets for lifting

5.4.2.3.1 The chains and sprockets for lifting in the system shall meet the requirements as specified in GB 17907-2010, 5.4.3 and in JB/T 11079.

5.4.2.3.2 All chains and sprockets shall be easy to lubricate.

5.4.2.4 Braking system

The system shall be equipped with a braking system, which shall meet the requirements as specified in GB 17907-2010, 5.4.5.

5.4.2.5 Turntable

The turntable in the system shall meet the requirements in GB 17907-2010, 5.4.6.

5.4.2.6 Hydraulic system

The hydraulic system shall meet the requirements in GB 17907-2010, 5.5.

5.4.3 Electrical equipment

5.4.3.1 The safety requirements for electrical equipment shall be in accordance with 5.4.3.2 ~ 5.4.3.8 of this standard in addition to GB 17907-2010, 5.6.

5.4.3.2 The lifting motor should be of a continuous duty cycle, with a relatively large starting torque multiplier, and be suitable for short-time repetitive work cycles.

5.4.3.3 The motor shall have an insulation class of not lower than Class B.

5.4.3.4 The degrees of protection provided by the enclosures of drive motors shall not be lower than IP33 as specified in GB/T 4942.1.

5.4.3.5 Each wire and cable end shall be marked or numbered.

5.4.3.6 The purposes of the instruments, buttons, and operation switches shall be marked on the front of the panel (screen, cabinet, console), and the internal components shall be marked with code.

5.4.3.7 The power circuit shall be provided with protective measures against short circuit, over current, under voltage, over voltage, loss of phase, incorrect phase sequence etc.

5.4.3.8 The electrical equipment installed in the open air shall be provided with measures against the intrusion of foreign matters such as rain, snow, dust, etc.

5.5 Installation

5.5.1 The installation precision of metal structural parts shall meet the requirements in Table 1.

Table 1

in mm

Location		Items			
		Perpendicularity tolerance	Width limit deviation	Depth limit deviation	Diagonal limit deviation
Lateral		$\leq H/1000$	—	—	—
Plane		—	± 5	± 5	± 10
Column	Y-direction	$\leq L/1000$	—	—	—
	X-direction	$\leq L/1000$	—	—	—

NOTE H stands for the overall height of the metal structure frame, and L stands for the length of the single-section column.

5.5.2 After installation, the moving parts shall operate smoothly without jamming.

5.5.3 The guide rails and their accessories on the shaft or metal structure shall be firmly installed.

5.5.4 When the guide rails and their accessories are fixed to the shaft or metal structure, necessary adjustments shall be adopted to compensate for the impact caused by the sinking of the building, the deformation of the metal structure or the shrinkage of the concrete, and there shall be measures to prevent loosening of the guide rails due to loosening or rotating of the guide rail accessories.

5.5.5 Each guide rail shall have at least two brackets.

5.5.6 Parallel guide rail joints should not be on the same horizontal plane, and the staggered distance shall not be less than 500mm, and such distance shall not be equal to the spacing of load carriers, the upper and lower rollers of the counterweight, or the guide shoes.

- 5.5.7 The counterweight shall be fixed firmly.
- 5.5.8 The counterweight devices with sheaves or chain sprockets shall be provided with protective measures to avoid:
- a) the suspension rope or chain disengaging from the rope groove or chain sprocket when it is slack;
 - b) foreign matters entering the space between the rope and the rope groove or between the chain and the sprocket.
- 5.5.9 The protective measures for counterweight devices with sheaves or chain sprockets shall be installed in such a way that inspection and maintenance of the sheaves or chain sprockets will not be hindered.
- 5.5.10 The gap between the counterweight and the lifting transport apparatus shall not be less than 50mm.
- 5.5.11 The buffers shall be located at the ends of the stroke of the lifting transport apparatus and counterweight, and the buffers shall have a stroke ensuring that the lifting transport apparatus will not collide with the upper or lower structure of the equipment during the buffering process.
- 5.5.12 If the buffer runs along with the lifting transport apparatus or counterweight, a buffer support that collides with it shall be installed at the lower end of the stroke. The support shall be firmly installed and its height shall not be less than 500mm. Under the special circumstances that personnel will not enter the space under the counterweight, buffer support may not be required at the lower end of the counterweight buffer stroke.
- 5.5.13 When positive drive is used, in addition to meeting the requirements in 5.5.11, a buffer shall be provided at the upper end of the lifting transport apparatus, and this buffer shall not be active before the counterweight buffer is fully compressed. When this buffer is active, the vehicle on the lifting transport apparatus shall not be damaged.
- 5.5.14 The turntable shall be kept horizontal with an inclination not greater than 0.3%.
- 5.5.15 Electrical equipment shall be installed in accordance with GB 50168, GB 50169, GB 50254 and GB 50256.

5.6 Safety and health

- 5.6.1 The safety signs of the system shall be set in accordance with GB 17907-2010, 5.1.
- 5.6.2 When a palisade door is included, the palisade door shall be set in accordance with GB 17907-2010, 5.4.7.
- 5.6.3 When fences are provided in the working area, the setting shall comply with GB 17907-2010, 5.4.8.
- 5.6.4 The system shall be equipped with safety devices in accordance with the requirements given in GB 17907-2010, Table A.1, and the safety devices shall comply with the requirements in GB 17907-2010, 5.7.
- 5.6.5 The safety requirements of the transfer area in the system shall be in accordance with GB 17907-2010, 5.8.
- 5.6.6 The basic requirements on use and management of the system shall comply with GB 17907-2010, Clause 6.
- 5.6.7 The safety requirements on the service environment of the system shall comply with GB 17907-2010, Clause 8.
- 5.6.8 The system shall not run before the working area door is closed.
- 5.6.9 The noise emission sound pressure level of the system shall not be greater than 70dB (A).

5.7 Surface coating

5.7.1 When a galvanized protective coating is applied to the surface of the system, the hot dip galvanized coatings shall meet the requirements in GB/T 13912, and the electroplated zinc material coating shall meet the requirements in GB/T 9799.

5.7.2 When a paint coating is applied on the surface of the system, the coating surface shall be uniform, fine, bright, complete and consistent in color, and shall be free of roughness, unevenness, holiday, wrong painting, orange peel, pinholing, blister, peeling, cracking, foreign matters, sag and other defects that reduce protection and decoration. The thickness of the paint film shall be determined according to the working environment of the equipment, and the adhesion of the paint film shall meet the level 2 quality requirements as specified in GB/T 9286.

6 Test methods

6.1 Test conditions

6.1.1 Except for special requirements, the accuracy classes of measuring instruments and tools shall meet the following requirements:

- a) Mass, force, time, speed: $\pm 1\%$;
- b) Voltage, resistance, current, power: $\pm 1\%$;
- c) Temperature: $\pm 2^{\circ}\text{C}$;
- d) Length: Choose measuring instruments and tools with appropriate accuracy class according to the measuring range;
- e) Test instruments and measuring tools shall have certificates of conformity and calibration certificates.

6.1.2 Weights may be used to replace the vehicle during the test. The weights shall be placed at the positions where the front and rear wheels of the vehicle are parked, with a ratio of 6:4 of front axle load to rear axle load.

6.2 Visual inspection

Visual inspection methods include visual checks, hearing, hand touching, nose sniffing, knocking, etc., as well as measuring with instruments.

Visual inspection includes checking whether the specifications or states of all vital parts in the system comply with the requirements, such as:

- electrical equipment, safety devices, safety signs, labels, etc.;
- the metal structure and connecting parts of the system, the load carrier and the vehicle-carrying structure of the parking space, the operating state of each moving mechanism, the steel wire ropes, the chains and their fastenings, etc.;
- whether the lubrication is good, and whether the hydraulic equipment is leaking.

It is not necessary to disassemble any parts during inspection, but the covers required to be opened for normal maintenance and inspection purposes, shall be opened.

Visual inspection shall also include checking that necessary certificates have been submitted and verified.

6.3 Operation tests of the system

6.3.1 No-load operation test

Complete the simulated vehicle accessing process for each parking space. During the tests, observe the system operation according to the inspection items in 6.2, and make test records.

6.3.2 Rated load operation test

After acceptable no-load test, carry out the rated load test. The rated load test shall be carried out according to the following procedures:

- choose 5 parking spaces randomly and apply load to them according to the requirements in 6.1.2;
- complete a vehicle accessing process for each selected parking space;
- check the operation and control functions of the system during the test, and record the test data and operation status.

6.3.3 Overload operation test

The overload test shall be carried out according to the following procedures:

- choose one parking space randomly (other than the parking spaces specified in 6.3.2a)), and apply 1.1 times the rated load according to the requirements in 6.1.2;
- complete a vehicle accessing process for the selected parking space;
- check the functions and conditions of each mechanism of the system during the test, and record the test data and operation status.

6.3.4 Noise

A-weighted sound pressure levels shall be measured with a sound level meter at a distance of 1 m from the access of the system and at a height of 1,2 m from the ground while the system is lifting and horizontally moving a rated load with rated speeds. With the pulse peak value excluded, the difference between the total noise and the background noise shall be greater than 3 dB(A). The actual noise value of the system is obtained by the total noise value minus the background noise correction (see Table 2), and is the arithmetic mean of three measured values.

Table 2

in dB(A)

The total noise value minus the background noise correction	3	4	5	6	7	8	9	10	>10
Background noise correction	3	2	2	1	1	1	0.5	0.5	0

6.3.5 Maximum storage (or retrieval) time of single vehicle (measure with a stopwatch and take the average value)

The measurement of time for storing a vehicle starts from the instruction is given until the vehicle is handled from the entrance to the most unfavorable (furthest) parking space of the system, measure for three times, and the arithmetic mean of the three measured values is taken as the maximum storage time; The measurement of time for retrieving a vehicle starts from the instruction is given until the vehicle is handled from the most unfavorable (furthest) parking space of the system to the exit, measure for three times, and the arithmetic mean of the three measured values is taken as the maximum retrieval time.

NOTE: The above storage (or retrieval) time does not include auxiliary time spent on actions other than mechanical motions, for example, the driver drives the car to the pallet, gets off the car and closes the door, etc.; or the driver goes to the pallet to drive the car out of the system and closes the system security door, etc.

6.4 Tests of safety devices

6.4.1 Emergency stop switch

Activate the emergency stop switch, check whether the system stops running immediately, whether the reset of the emergency stop switch is a non-automatic reset, and whether the reset triggers or restarts any dangerous conditions.

6.4.2 Anti-out-of-limit device

Simulate the situation when failure occurs to the lifting/lowering limit switch, and check whether the device is effective.

6.4.3 Device limiting the length, width and height of vehicles

Simulate the situation when the vehicle with overall dimensions exceeding the limit accesses the system, and check whether the device is effective after an operating instruction is given.

6.4.4 Vehicle position detection device

Simulate the situation when the vehicle is not parked on the load carrier or the pallet properly, and check whether the device is effective after an operating instruction is given.

6.4.5 Main door (palisade door) interlock device

Simulate the situation when the load carrier is not at the right position, check whether the main door can be opened; Simulate the situation when the door is open, check whether the load carrier is running.

6.4.6 Anti-clamp device of automatic operated door

Simulate the motions of the anti-clamp device, check whether the automatic operated door stops closing or turns from the closed state to the open state.

6.4.7 Anti-overlapping automatic detection device

Simulate the situation to store a vehicle in a filled parking space, check whether the accessing outfit can operate.

6.4.8 Operation limit device

Simulate the situation when there is person remained inside the system, check whether the device is effective.

6.4.9 Control interlocking function

When the operation of accessing vehicles in the parking system is initiated from one control station, give accessing instructions at another control station, and check whether the device is effective.

6.4.10 Pallet locking device

Simulate the situation when the pallet is sliding from the parking space, check whether the locking device can prevent the pallet from sliding out of the parking space.

6.5 Rated running speed

Under rated voltage, rated frequency, and rated load, measure the time t (in min) it takes to travel a distance s (in m), measure three times, and take the average value.

6.6 Deflection of load carrier

Select the measurement reference surface, measure the vertical distance a from the center of the long side of the load carrier to the measurement reference surface in no-load condition, take the average value of three measurements; measure the vertical distance b from the center of the long side of the load carrier to the measurement reference surface when rated load is applied, take the average value of three measurements;

calculate the value of (a-b).

6.7 Inclination of the turntable

Under no-load conditions, measure the angle between the upper surface of the turntable and the horizontal plane, and take the average value of three measurements.

6.8 Braking system function of drive mechanism

During rated load operation test and overload operation test, stop the system while the lifting transport apparatus is working, check whether the braking system works properly and whether the lifting transport apparatus moves after braking.

6.9 Protection against phase loss and incorrect phase sequence of power supply

Use the power-on test method, disconnect any phase line of the power supply or interchange the connections of any two phase lines, and check whether the system can be started normally.

6.10 Determination of paint film adhesion

The determination method of paint film adhesion shall be in accordance with GB/T 9286.

6.11 Determination of grounding resistance

When the relative humidity of the air is not more than 50%, use a grounding resistance tester to measure the resistance value between the grounding point of the equipment and the external grounding point.

6.12 Determination of insulation resistance

Disconnecting the power supply when the relative humidity is not more than 50%, after applying a voltage of DC 500 V between the power circuit wire and the protective grounding circuit, use a 500V insulation resistance meter (megohmmeter) to measure the insulation resistance and get the value.

7 Inspection rules

7.1 Inspection classification

System inspections are classified as pre-delivery inspection and type test.

7.2 Pre-delivery inspection

Each system shall go through pre-delivery inspection, and the pre-delivery inspection items are specified in Table 3.

Table 3

No.	Items	Pre-delivery inspection	Type test	Inspection requirements	Test method
1	Visual inspection	○	○	Relevant provisions in Clause 5	6.2
2	Basic dimensions	○	○	5.2.2	6.2
3	Rated running speed	○	○	5.3.1	6.5

4	Deflection of load carrier	○	○	5.2.5	6.6
5	No-load operation test	○	○	5.3.2~5.3.5	6.3.1
6	Rated load operation test	○	○	5.3.2~5.3.5	6.3.2
7	Overload operation test	—	○	5.3.6	6.3.3
8	Phase loss and incorrect phase sequence of power supply	○	○	5.4.3.7	6.9
9	Braking system function of drive mechanism	○	○	5.4.2.4	6.8
10	Inclination of the turntable	○	○	5.5.14	6.7
11	Safety devices	○	○	5.6.4	6.4
12	Grounding resistance	○	○	$\leq 4\Omega$	6.11
13	Insulation resistance	○	○	$\geq 1M\Omega$	6.12
14	The noise emission sound pressure level of the system	○	○	5.6.9	6.3.4
15	Maximum storage (or retrieval) time of single vehicle	○	○	4.2.2	6.3.5
16	Paint film adhesion	○	○	5.7.2	6.10

Note: "○" stands for items that are required to be inspected, "—" stands for items may not be inspected

7.3 Type test

7.3.1 Type test shall be carried out under one of the following circumstances:

- trial production assessment for new or old products which are transferred to another plant for production;
- after regular production, if there is any great change in structure, material and production technology, etc. which may affect product performance;
- reproduction after production has been halted for more than 2 years;
- the pre-delivery inspection results have significant difference from those obtained in the last type test;
- the national quality supervision agency requires to carry out type test.

7.3.2 The test items for type test shall be in accordance with Table 3.

8 Signs, packaging, transportation and storage

8.1 Signs

8.1.1 Warning signs

8.1.1.1 Legible warning signs of "Parking Specifications" and "Instructions for vehicle parking" shall be set up at the conspicuous positions of the system access.

8.1.1.2 The warning signs of "Parking specifications" shall be marked with at least the following:

- basic parameters (including dimensions and mass of concessional vehicles);

- b) manufacturer's name or trademark (if any).

8.1.1.3 The warning signs of "Instructions for vehicle parking" shall normally be marked with the following content:

- a) warning words and pictorials (if any) for vehicle parking;
- b) manufacturer's name.

8.1.2 Nameplate

A legible and indelible nameplate shall be fitted in a conspicuous position on the system, and the nameplate shall be in accordance with GB/T13306. The information on the nameplate shall contain at least the following:

- a) model and name of the product;
- b) basic parameters (including dimensions and mass of the concessional vehicles);
- c) serial number and date of manufacture;
- d) manufacturer's name, address, or trademark (if any);
- e) reference of complied standards.

8.2 Packaging

8.2.1 Packaging shall meet the requirements in GB/T 13384.

8.2.2 Packaging of the control panel shall meet the requirements in JB/T 7828.

8.2.3 If it is short-distance transportation and there are no loading and unloading during transportation required, it is allowed to adopt simple packaging for the control panel upon the agreement between the supplier and buyer.

8.2.4 Each system shall be accompanied by at least the following documents before delivery:

- a) packing list;
- b) quality certificate;
- c) operation and maintenance manual;
- d) general drawing and electrical schematics;
- e) list of wear parts.

8.3 Transportation and storage

8.3.1 During transportation of the system, follow the relevant requirements for railway, highway and sea transportations.

8.3.2 Components of the system shall be stored in a dry, clean and ventilated place, and the control panel shall be stored in an environment where the relative humidity meets the requirements in 5.1.2. They shall be protected from harmful gases and shall not be stored with corrosive substances.

8.3.3 For metal structural parts, transmission mechanisms and vehicle-carrying devices, etc. effective measures shall be taken to prevent deformation caused by storage.