

SC200/200 施工升降机

CONSTRUCTION HOIST

使用说明书

OPERATING MANUAL



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一、概述 GENERAL INTRODUCTION

施工升降机（亦称外用电梯，简称升降机）广泛适用于物料垂直升降运输。在工业或民用建筑、大型桥梁或竖井中，均是不可缺少的良好运输设备。作为永久或半永久性的还可用于仓库、高塔等不同场合。该产品较之其他提升机构稳定、安全可靠，不用另设机房井道并且拆装方便、搬运灵活性强等优点。尤其在减轻施工人员的劳动强度、加快工程进度、提高工作效率中，起到明显的作用。

Construction hoist (Also named elevator outside, hoist for short) is used to convey material uprightly. It is widely used in industrial and civilian constructions, such as bridge and wells. It can also be used in warehouse and towers for permanence of semi-permanence equipments. This hoist is much stabilizer and more safety than other kinds of lifting equipments. It has strongpoint such as easy to erect and disassembly and can be transited easily from one place to another.

SC200/200 型施工升降机由济南恒升工程机械有限公司研究设计。该机设计合理，结构新颖，运行平稳，安全装置齐全可靠。安装维修方便，有以下特点：

SC200/200 Construction hoist is designed and produced by Jinan Hengsheng Engineering Machinery Co., Ltd. which with simple structure works well and equipped with reliable safety device. It has features as follows:

1、传动机构采用三电机驱动形式，使齿轮齿条受力均匀，安全平稳。

This hoist is equipped with three engines which ensure the bearing uniformity of gear and racks.

2、保证升降机安全运行，电路中设置了过载、断绳、限速等安全开关。当运行中发生上述情况时，升降机立即自动避免发生意外事故。吊笼上各门亦均有限位开关，当任何一门有异常开启时，吊笼均不能启动或立即停止运行。

There is safety switch such over load, cord break and speed limiter to ensure the hoist operating in good condition. Should troubles happened hoist will stop to avoid any accidents. There are limiter switches on every door of the cage, should there is abnormal open to one of the doors the cage can not be operated.

3、每台吊笼均配备防坠安全器，能十分有效防止吊笼坠落，确保升降机安全可靠的运行。

There is safety device equipped in the cage to ensure the hoist in safety.

4、升降机电控系统线路简单，便于操纵及维修保养，且可靠。升降机正常运行时，可在吊笼内用手柄或按钮操纵升降机运行，在任何需要停车的位置上可随时停车，在上下终端站，上、下终端限位开关控制自动停车，如果上下终端限位开关因故障不起作用时，升降机上设置的极限开关可及时切断电源使其制动。

This hoist with power circuit which easy to operate and maintenance. There is handle in the cage, by which the operator can control the hoist drive or stop at any place required. Terminal limiters in the top and bottom ends which ensure the hoist stop automatically. Should the terminal switches not works with troubles, the limiter of the hoist will cut the power and trig the hoist.

5、钢结构设计经过科学及严密的计算，达到了结构合理、强度可靠、重量轻的要求。

The structure of the steel was designed to meet requirements such as reason, reliable and small weight.

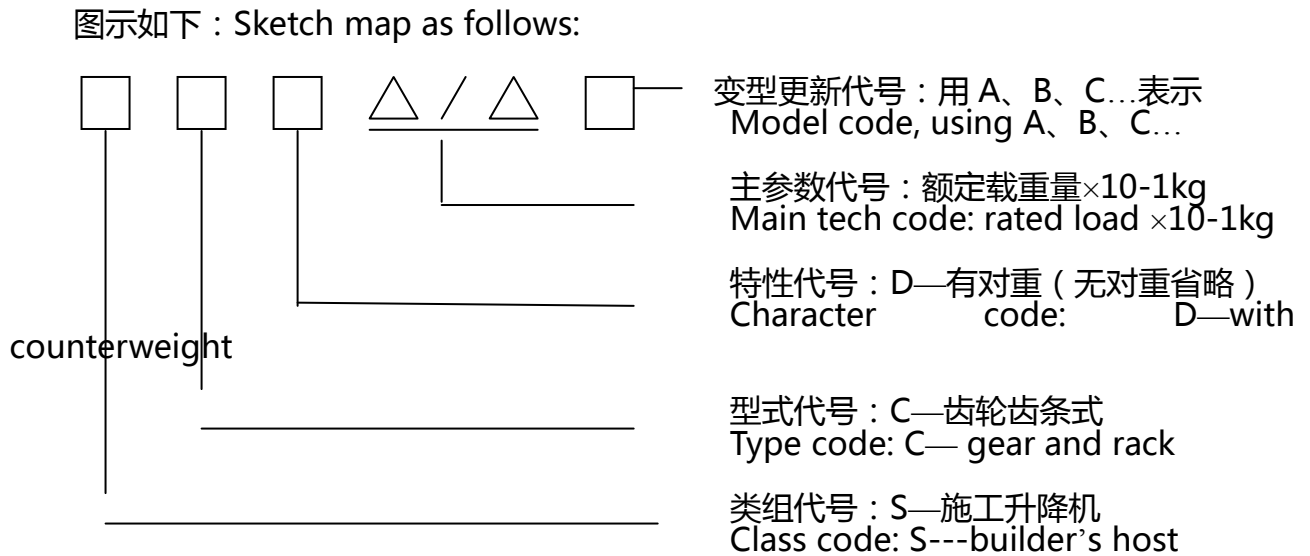
6、升降机可利用吊笼上的吊杆自行安装或拆卸导轨架。其余的各部分均可方便的安装及拆卸，零部件也易于更换。

The hoist can use its suspender to erect and disassembly guiding rail. The other parts are also easy to erect and disassembly. The fittings are easy to replace.

7、机器噪声值：传动系统噪声值 < 90 (db)，吊笼内噪声值 < 85 (db) 符合标准。
Machine noise: the noise of driving system < 90 (db) the noise inside the cage is < 85 (db) to meet the standard.

8、参照规范 consult criterion：
GB/T10054 《施工升降机技术条件》 《technical condition of hoist》
GB10054-1996 《施工升降机安全规则》 《safety rules of hoist》

附：施工升降机型号编制方法 (GB10052-88)
Attachment: model marking method of hoist (GB10052-88)
升降机的型号由类、组、型、特性、主参数和变型代号组成。
The model of hoist is made up of class group, type, character, main tech data and type changing code.



注：主参数代号包括两个吊笼的额定载重量代号，如为单吊笼，只标注一个主参数代号。
Notes: the main tech code including the rated load code of double cage, should it be single cage, there will be one main tech code.

例 1：SCD120
Example 1：SCD120
表示单吊笼、额定载重量 1200Kg、有对重的齿轮齿条式施工升降机。
Stand for gear and rack hoist of single cage, rated load 1200Kg with counter weight.

例 2：SC200/200

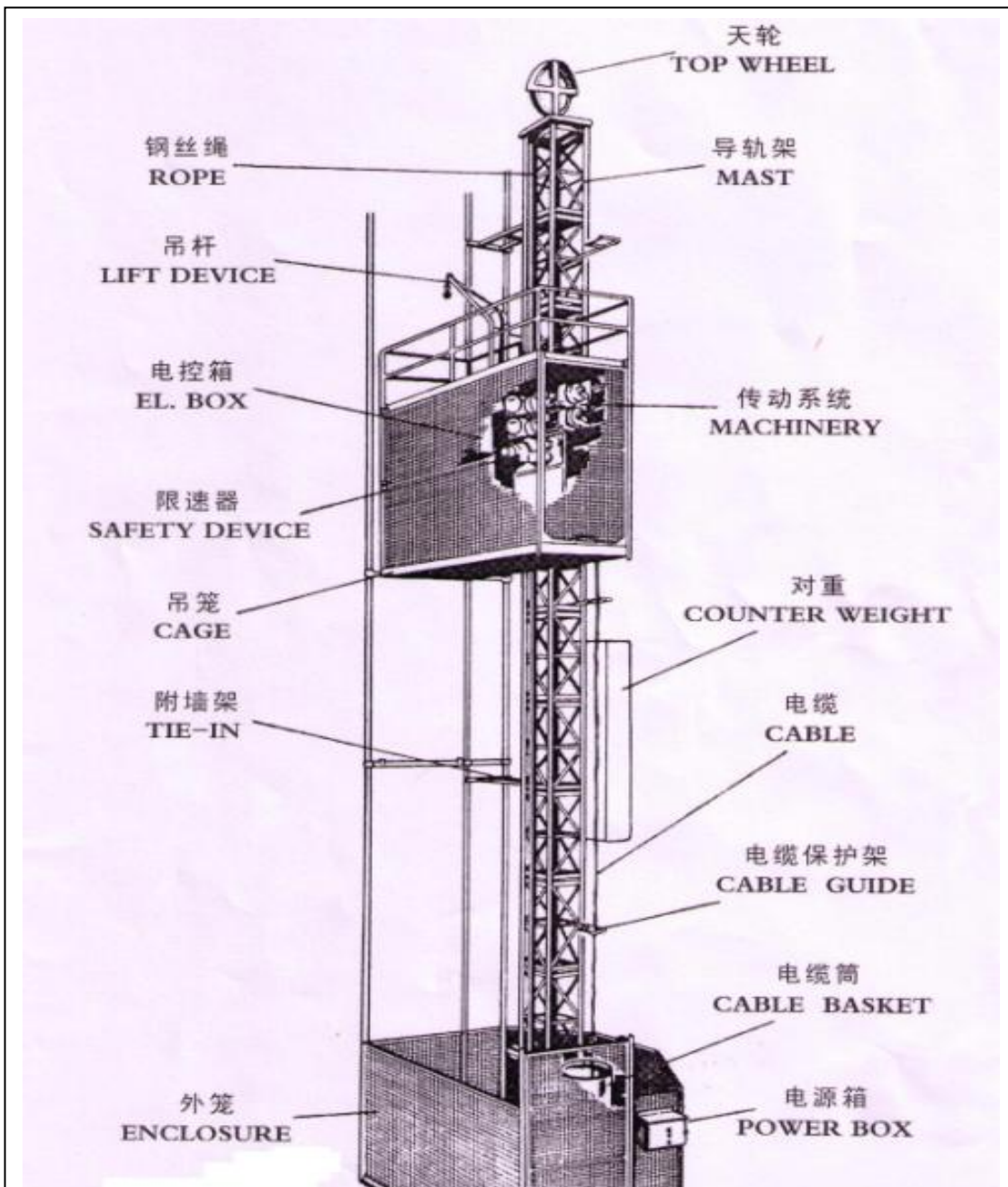
Example 2 : SC200/200

表示双吊笼、无对重、每个吊笼的额定载重量 2000Kg 的齿轮齿条式施工升降机。

Stand for gear and rack hoist of double cage, rated load 2000Kg without counter weight.

二、技术性能参数 technical performance parameters

1、整机外型图 outline



2、技术性能参数 technical performance parameters

序号 Item	名称 name	SC200/200
1	额定载荷 rated load	2×2000kg
2	最大自由端高度 max. free end height (m)	9
3	最大起升高度 max. lifting height (m)	150
4	运行速度 operating speed (m/min)	37.7
5	限制速度 speed limit (r/min)	45±5
6	电机型号 motor type	YZZ132M-4
7	功率 power (KW)	2X (3×11)
8	齿轮齿条模数 gear and rack modulus	8
9	安全装置 safety device	SAJ40-1.2 型防坠安全器 SAJ40-1.2 series safety device
10	标准节高 section height (m)	1.508
11	标准节截面尺寸 dimension of standard section (m)	0.80×0.80
12	标准节重量 weight of section (kg)	164
13	吊笼最大外形尺寸 Max. dimension of cage (m)	3×1.3×2.67
14	整机质量 total weight (t)	34.68

三、构造 conformation

1、传动系统 driving system

采用专用的施工升降机传动机构，该机构由电动机、联轴器、减速机及安装在减速机输出轴的齿轮等组成。传动系统安装在吊笼顶部，通过齿轮与导轨架上齿条啮合，使吊笼上、下运行。

Use the driving mechanism special for hoist only. The mechanism is made up of motor, coupling, reducer and the gear wheel which is installed in the output axel of the reducer. The driving mechanism is installed on the top of the cage and joggled with the guiding mast gears to make the cage up and down.

2、防坠安全器 Anti-falling safety device

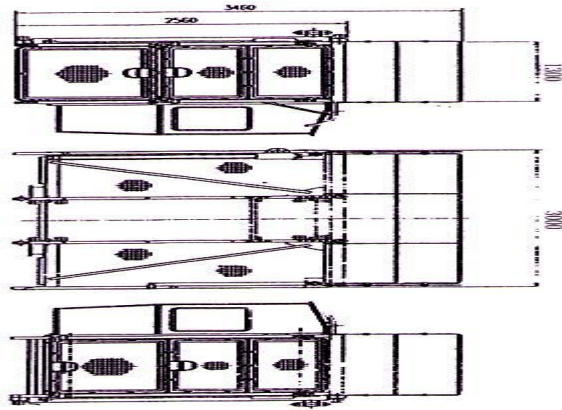
在吊笼内安装着施工升降机专用的 SAJ40-1.2A 型防坠安全器，它能限制吊笼超速运行，有效的防止吊笼坠落事故发生。当吊笼因故障而引起失速下坠时，防坠安全器开始动作并使制动力矩逐渐增大在一定距离内将吊笼平稳制动，从而保证乘员的生命安全和设备的完好无损。

SAJ40-1.2 type anti-falling safety device for hoist only is installed in the cage which can control the cage moving in the rail and avoid incidents. Should there is some trouble and the cage falling, the anti-falling device will work and stop the cage in a very distance by increasing the trig torque.

3、吊笼（见图一） cage(see fig I)

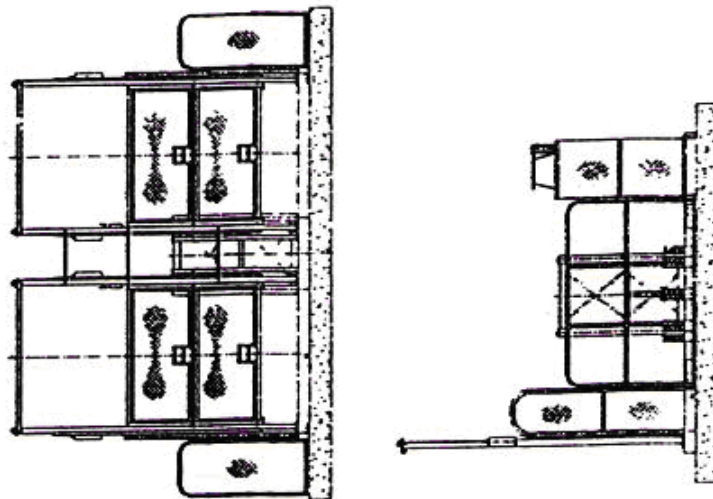
吊笼是升降机的核心部件，为一焊接钢结构体，周围有钢丝保护网，如下图所示。吊笼前后分别安装着单、双开吊笼门；顶上设有活板门，通过配备的专用梯子可做紧急出口或在顶部进行架设、维修、保养等工作；吊笼顶部还设有吊杆安装孔；为了保证人员的安全，在顶部四周设有防护栏。吊笼立柱顶端设有两组耳板，与传动机构相连；立柱中间位置设有安全器底板安装孔、导向用的滚轮组。在吊笼外侧设有操纵室，以供驾乘人员使用。

Cage is the core part of the Construction hoist. It is a steel structure with steel wire protecting web as drawings. Double and single cage door are installed on the front and back side of the cage. There is trapdoor on the top for emergency exit with ladders. There is suspender installing pole on the top of the cage. There are guarding rings at the outside of the top to make safety. There are two groups of earlike board on each end of the cage pole which connects driving mechanism. The whole for equipping safety device and guiding wheels can be on the middle of the poles. The driver's cab is installed in the outside the cage.



图一 吊笼结构图 Fig. I structure drawing of cage

4、底笼 (见图二) Base cage (Fig. II)

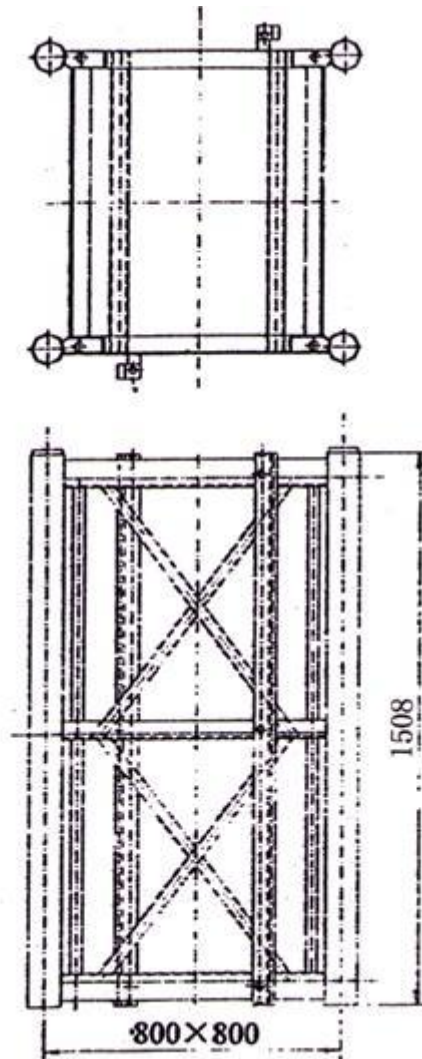


图二 地笼结构图 Fig. Base cage drawing

底笼主要由底架、导轨架底节及防护网架等组成，如下图所示。底笼底部设有地锚螺栓孔，通过地锚螺栓固定在基础上；底笼入口处设有笼门，并设有安全开关，在吊笼上升时笼门无法开启，以保证人员安全。在底架上设有几组缓冲弹簧，以保证吊笼着地时柔性接触。

The base cage consists foundation frame, guiding base section and guard web frame as the drawing as below. There are foundation bolt's holes in the foundation of the cage which fixed to the foundation. Doors equipped at the entrance of the cages and safety switches to ensure safety should the cage can not open. Buffering springs are equipped on the base frame to make the cage heating floor gentle.

5、导轨架标准节 (见图三) standard section (fig. 3)



图三 导轨架标准节结构图 fig. 3 standard section

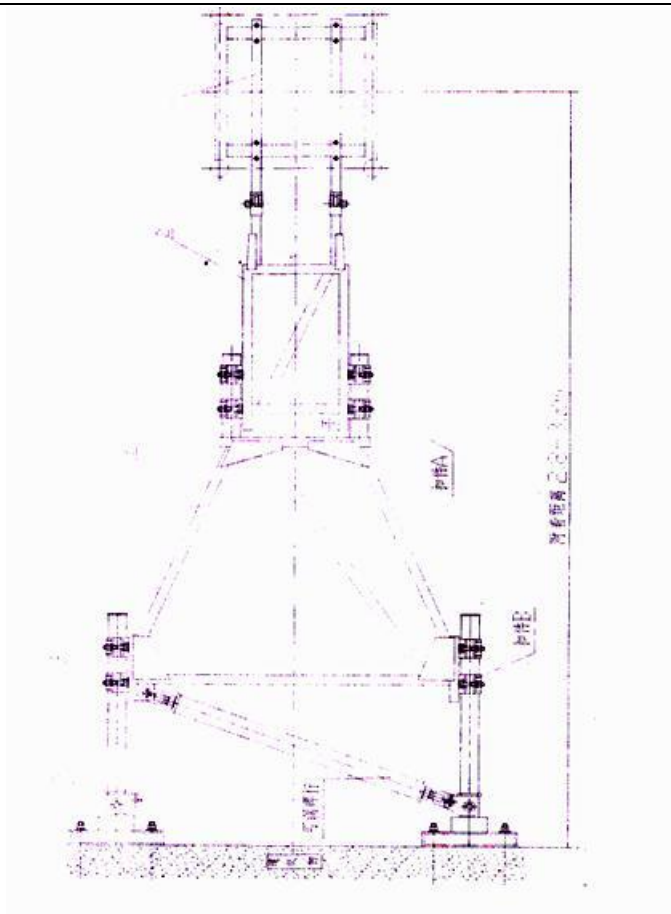
标准节结构用 $\Phi 89$ 的优质无缝钢管及角钢等组焊而成，每节高 1.508 米，安装有齿条，节与节之间用 4 个 M24 \times 240 (8.8 级) 螺栓联接，如下图所示。根据所建楼层高度可以增加标准节数量，通过附墙架与建筑物固定，四根主肢作为吊笼上下运动的导轨。

The standard section is welded of $\Phi 89$ seamless pipe in the height of 1.508m with racks equipped. Sections connects one to another by 4 pieces of M24 \times 240 (8.8 Grade) reinforced bolts as drawing below. Sections can be added and reduced as per the height of the building. The sections are fixed to the building by tie-ins and the four pieces of section mast are used as the guiding rail of the cage move up and down.

6、附着装置 (见图四) tie-in (fig. 4)

附着装置用来将导轨架于建筑物附着连接，以保证导轨架的稳定性，附着装置由 $\Phi 48$ 立管、过桥梁、前支撑架、后支撑架及电缆防护环等组成 (如下图所示)。

Tie-ins are used as the attachments which fix the hoist to the building to make the guiding rail be stable. The tie-ins are made of $\Phi 48$ upright, bridge beam, front and back stay frame as cable protecting ring etc. (see the drawing as follow)

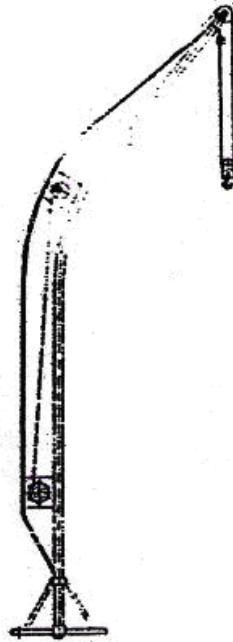


图四 附着装置结构图 Fig 4 tie-in

7、吊杆 (见图五) suspender (fig. 5)

吊杆由支撑架、吊杆、手动卷扬系统和吊钩组成，如下图所示。吊杆安装在吊笼顶上，在安装或拆卸导轨架时，用来起吊标准节或附着装置等零部件。手动卷扬系统设有棘轮装置，具有自锁功能，起吊重物时按顺时针方向摇动摇把，停止摇动并平缓松开摇把后，卷扬系统即可制动；放下重物时，抬起棘轮即可向反方向摇动。

The suspender composes of supporting frame, suspender, manual hoisting system and the hook see as drawing below. The suspender is installed in the cage top to lift sections and tie-ins as well as other spare parts when install and disassembly the guardrails. The ratchet wheel equipment is installed on the manual hoisting system to self lock itself. Rock the handle clockwise when lifting load. When stopped rocking and undo the handle, the hoisting system can be triggered. When the load be laid down, uplift the ratchet wheel can rock in the opposite way.

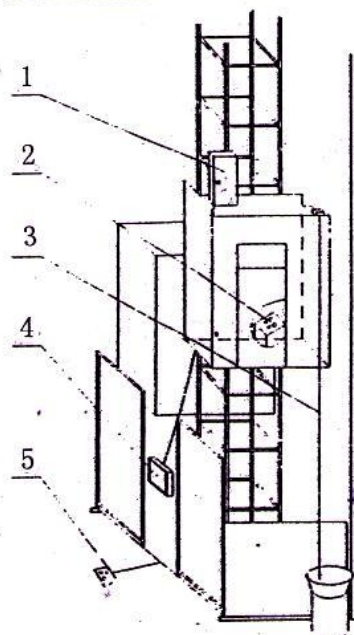


图五 吊杆结构图 Fig. suspender

8、电气设备 (见图六) power equipment (fig. 6)

升降机的主要电气装备如下图示，包括有电源箱、电控箱、操作台及安全控制系统等组成，每个吊笼有一套独立的电气装备，双笼升降机有两套各自独立的电气装备分别控制着每个吊笼。由于施工升降机应定期对安全装置进行试验，每台施工升降机还配备专用的坠落试验按钮盒。

The main power equipments of the hoist as the drawing below: power supply, power controlling box, operating platform and safety controlling system. There is a unattached electric equipment of each cage. There are two unattached electric equipment which control each cage of the hoist. Anti-falling test button box is equipped with hoist for safety testing periodically.



1.电控箱 eclectic control box 2、操纵台 operating board 3、电缆 power cable
4、电源箱 power supply box 5、坠落试验专用按钮盒 Anti-falling test button box

图六 fig. 6

电源箱位于吊笼内，变压器、接触器、继电器等电控元器件安装在电控箱内。电动机、制动器、照明灯及安全控制系统均由电控箱控制。

The power supplying box equipped inside of the cage. And the transformer, contactor and relay etc are all installed in the power controlling box. The power control box commends the power motor, arrester, light as well as the safety controlling system.

操纵盒通过软电缆接入电控箱，安装在司机室内，在吊笼顶部电控柜内有顶部操纵盒，以便在进行安装或拆卸导轨架时操作。

The operating box which connects power control box by power cable is installed in the driver's cab. There is operating box in the power control box which is on the top of the cage to operate during the install and disassembly the guiding rails.

9、安全控制系统 safety controlling system

安全控制系统由电路里设置的各种安全开关装置及其它控制器件组成。在升降机运行发生异常情况时，将自动切断升降机电源，使吊笼停止运作，以保证升降机安全。

The safety controlling system includes safety switches and other controlling elements. It will cut off power and stop the cage safely.

如下图示：吊笼的单、双及吊笼顶部活板门上均设有安全开关，如任一门有开启或未关闭，升降机都不能启动。

See the drawing as follows: safety devices are equipped on the single/double cage as well as the trapdoor on the top of the cage. Should there is a door open or not closed correctly, the hoist can not work.

吊笼上装有上、下限位开关和极限开关，当吊笼行至上、下终端站时，可自动停车，若此时因故不停车超过安全距离时，极限开关动作切断总电源，使吊笼制动，此外在限速器尾盖内设有限速保护开关，限速器动作时，通过机电连锁切断电源。电控系统参照 GB5226 等相关标准，采用一系列措施，强化了电控系统的安全，例电控柜防护等级达到 IP54。

Top and bottom limiter switches are equipped on the cage. When the cage reached the top/bottom ends will stop automatically. Should there are some troubles make the cage overrun the safety space, terminal switches will work to cut off center power and stop the cage. And over-speed devices are installed in the speed limiter tail cover which cut off power by the power lock. This power system is according to the related standards of GB5226. A lot of measures have been taken which makes the power system more safety, say, the protecting grade of power controlling box reached IP54.

四、安装与拆卸 erect and disassembly

1、安装与拆卸按说明书内有关规定执行。安装与拆卸期间操作人员不得少于八人（其中包括电工两人）。人员安排如下：

Do as the operating manual descriptions to erect and disassembly this hoist. At least eight persons are required during the erecting and disassembly works, two of them should be electricians. The persons requires as follows:

(1) 吊笼顶设三人，负责安装拆卸工作，司机一人。

Three persons on the cage top to do the erect/ disassembly work, one of them is driver.

(2) 三人负责地面标准节等附件设备搬运、清理和挂、脱钩等工作。

Three persons are charged for transiting sections and other spare parts on the ground. And they have to pay attention to the clean works, do and undo the hooks.

(3) 两名电工负责电器设备的安全运行工作。

Tow electricians are charging for the operating of the electric devices.

(4) 根据拆装的要求可另设电气焊工。

Other electricians will required according to the erecting and disassembly works.

A、拆卸人员必须对设备性能、结构、控制及操作等全面了解。

Workers should know the performance and structure, controlling and operating of the hoist very well.

B、操作者必须由经过技术培训的熟练技工操作。

The driver should be trained by master.

2、安装前的准备工作： Prepare works of erect

(1) 安装前首先确定升降机底笼和建筑物的距离，基础离建筑物的距离详见双笼总装示意图、双笼砼基础示意图。

Confirm the distance of the hoist and building. The distances please see to the drawings of erecting drawing and double cage concrete foundation drawing.

(2) 完成固定升降机底笼用的基础（见基础图）。基础表面必须找平、抹平。

Finish the foundation for fixing hoist (foundation drawing), make sure the surface of foundation should be level.

(3) 外用升降机的附近场地要干净平整并有足够场地，以便升降机就位和存放升降机附件。

Enough clearing room is required around hoist to put the hoist and other spare parts of hoist.

3、安装顺序： Orders of erecting

(1) 将升降机底笼吊运到基础上，把底笼找平（可用垫铁），按图纸要求固定在基础上，然后底笼底座用速凝砼固定紧固。

Put the hoist cage on the foundation, using stow-iron to make cage stable according to the requirements of drawings and fix the cage seat by fast cement.

(2) 在基础节上加一节带齿条的标准节，将吊笼内电机制动器拉手撬松用垫块垫实。用起重机将吊笼吊入导轨架立柱一侧，使齿轮与齿条相啮合。吊笼就位后，将制动器复位。检查限速器齿轮及变速箱齿轮与齿条的间隙是否在许可范围内，否则进行调整，通过松动传动板的靠背轮螺母来调整齿轮与齿条的间隙，一般在 0.2-0.3mm 范围内。通过调整吊笼上、下腰鼓内的偏心轴使导向滑轮与导轨架立柱之间隙达到要求，一般 1-1.5mm。

Put one racked section on the base section and loose power trigger handle of the cage and level it up by stow-piece. Lift the cage to one side of the guiding pole,

make sure the gear and rack meshed. Reposition the trigger after erecting cage. Examine distance of limiter gear and gear-box gear and the racks, adjust them by loosening the nuts on the driving board should they are not in the allowed range. The allowed distance is 0.2-0.3mm. Adjust the partiality axel of the waist drum to make the distance of guiding wheel and guiding pole to meet requirement, that is 1-1.5mm.

(3) 将电缆筒就位，给升降机接通电源。

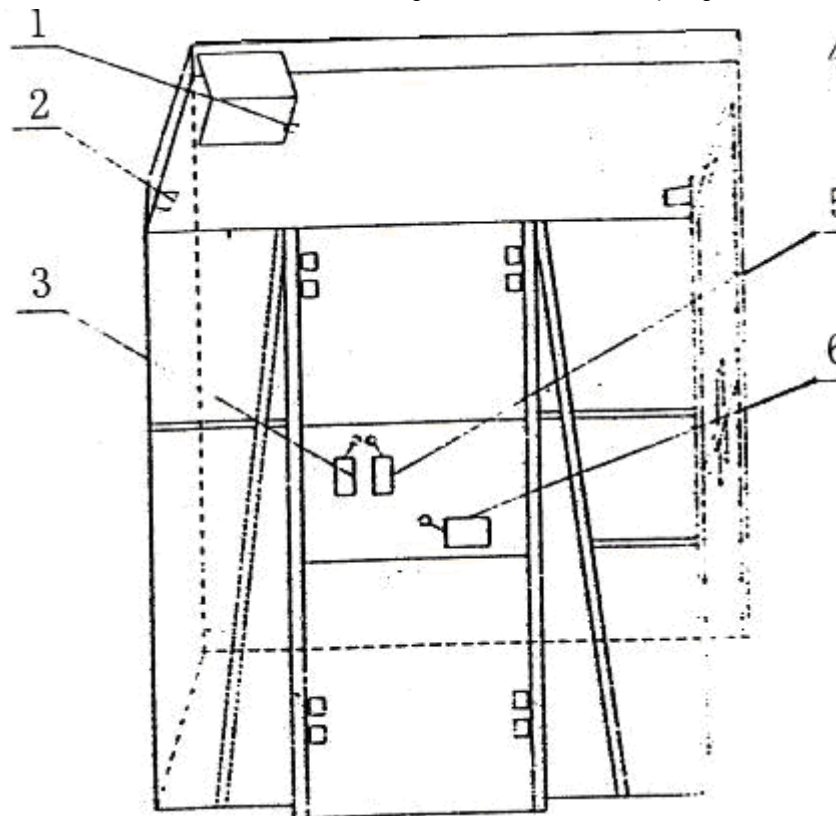
Put the cable roll in its place and put thought the power.

(4) 给吊笼通电试运行，确保各个动作准确无误后，应首先将下限位碰块和下极限碰块装好，以防止吊笼撞底。

Put thought power of cage and test it to make sure all actions acoup sur. Install the bottom and top terminal touching boards in case cage hit ground.

(5) 下限位碰块的安装位置，应保证吊笼满载向下运行时，开关触及下限位碰块后自动切断控制电源而停车后，吊笼底至地面缓冲弹簧的距离为 300-400mm，下极限碰块的安装位置应保证极限开关在下限位开关动作之后动作而且吊笼不能撞缓冲簧。(见图七)。

The place of erecting the bottom touching board should make sure that when the cage moving down, the switch touches the bottom terminal touching board and cut off power automatically and cage moving stop. The distance of cage floor to the buffer spring be 300-400mm. The bottom touching board should be erected at the very place that bottom terminal switch acts first and cage not hit the buffer spring. (see drawing VII)



1、活板门安全开关 trapdoor safety device 2、单开吊笼门安全开关 safety device of one side opening cage
3、下终端站限位开关 bottom terminal switch 4、双开吊笼门安全开关 safety device of two sides opening cage
5、上终端站限位开关 top terminal switch 6、极限开关 terminal switch

图七 Fig 7

(6) 限位开关及极限开关调整合适后, 便可进行导轨架接高及附着架、电缆导架的安装作业。此时应安装最下面一个附着架, 在距离地面 6-8m 处安装, 也可根据现场情况具体处理, 再安装下面两个电缆护架, 最下面一个距电缆筒口约 1m 左右, 上面一个与下面一个相距 3m。将所有螺栓紧固可靠。

Raise guiding frame and tie-ins, install the cable guiding frame after the limiter switch and terminal switches are adjusted. Install the button tie-in at the place 6-8m above the ground. It can also be erected according to the sites. Install the double cable protecting frame; make sure the lower one at the place 1m to the cable roller. And the upper one has a distance of 3 m to the lower one. Tighten all the bolts.

(7) 继续进行升降机的接高作业, 直到需要的工作高度。附着架的安装高度每隔 6 m-9 m 一套, 最上面一套附着架以上导轨架悬出高度不得超过 9 m。
Install sections to the height required. The tie-ins should be installed every 6-9m one set. The guiding mast over the tie-in should no more than 9m.

(8) 每次安装一套附着架, 都要用经纬仪测量一下导轨架在两个方向的垂直度, 如果超出表二要求, 必须进行校正。
Use scale to measure the vertical of the tie-in one by one.

表二 导轨架垂直度要求 Table II verticality of the guiding mast

导轨架安装高度 H (m) Installing height of the guiding mast	< 70	70--100	100--150	> 150
垂直度误差值 δ (mm) Error of the verticality	$< H/100$	70	90	110

(9) 当导轨架高度达到要求高度时, 最后需将上限位碰块和上极限碰块安装好, 首先是安装上极限碰块, 该碰块的安装位置应保证吊笼向上运行至极限开关碰到极限碰块而停止后, 吊笼底高出最高施工层约 150-200mm, 且吊笼上部距导轨架顶部距离不小于 1.5m。然后安装上限位碰块。上限位碰块的安装位置应保证吊笼向上运行至限位开关停止后, 吊笼底与最高施工层平齐。

When the guiding section to the required height, we install the upper limiter and upper limiter touching board. First, install the upper limiter touching board. The position of the touching board should be in the place that the cage moving to the limiter and touch the touching board has a distance of about 150-200 mm above the construction surface when stopped. Section, install the upper limiter touching board. The position of the upper limiter should be at the place when the cage to the limiter switch and stopped at the level of highest construction.

(10) 限位碰块安装完毕后, 应反复试验三次以校验其动作的准确性和可靠度。
Test the limiter touching board after installed.

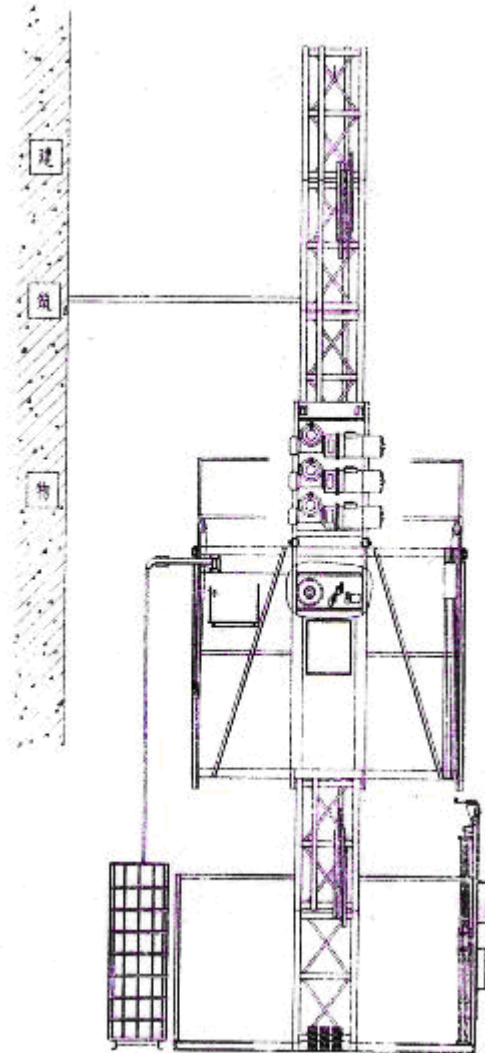
(11) 将所有的滚轮、背轮间隙调整好，以保证吊笼运行平稳。(见调整部分)

Adjust the distance of the wheel to make sure the cage move well.

(12) 当所有安装工作结束后，应检查各紧固件有无松动，是否达到了规定的拧紧力矩，然后进行载荷试验及吊笼坠落试验并将安全器正确复位。(见“安全器及其复位”)

Check all the elements after installed everything.

(13) 将地面防护围栏装好。(见图八) install the protecting ring on the ground. (Fig 8)



图八 Fig 8

4、利用手动起重机进行导轨架接高

Install the guiding mast by manual lifter

利用手动起重机安装导轨架标准节时，操作人员应站在吊笼顶部，利用控制盒操作升降机，不可在吊笼内进行操作以免发生事故，可按下面程序进行：

Install the guiding mast by manual lifter by the following way:

(1) 将吊笼开至下限位所允许到达的最低位置。

Move the cage to the lowest position

(2) 放下手动起重机的钢丝绳和吊具。

Loosen the steel and hook of the manual lifter

(3) 在地面挂好一个标准节，缓缓摇动卷筒手柄，将该标准节从地面护栏外提升至吊笼顶部并放好。(见图九)

Lift a section on the ground and lift that section to the top of the cage.

(4) 操作人员带好标准节所需的联接螺栓、力矩扳手等工具，然后在笼顶操作升降机使吊笼上升。(注意在上升过程中，应将手动起重机吊臂转至一个安全角度，确保吊笼运行时吊臂不与周围建筑物碰撞。)

Operators with all the required tools and spare parts to operate the hoist come up. (pay attention to the manual lifter to a safety direction avoiding hit the buildings surround.)

(5) 向上开动吊笼，当笼顶驱动架上方距待要接高的标准节止口距离约 250mm 时立即停止吊笼的运行。

Move the cage up and stop at the position that the cage top has a distance of 250mm.

(6) 用手动起重机吊起吊笼顶部的标准节并且高出导轨架已接标准节 20mm，缓缓转动吊杆，使标准节接口正对，此时慢慢放下标准节，使四个接口完全吻合。(见图十)

Lift the section of the cage top by manual lifter to the section of the hoist. (see Fig 10)

(7) 穿好标准节螺栓，用力矩扳手测定拧紧力矩 30kgm。

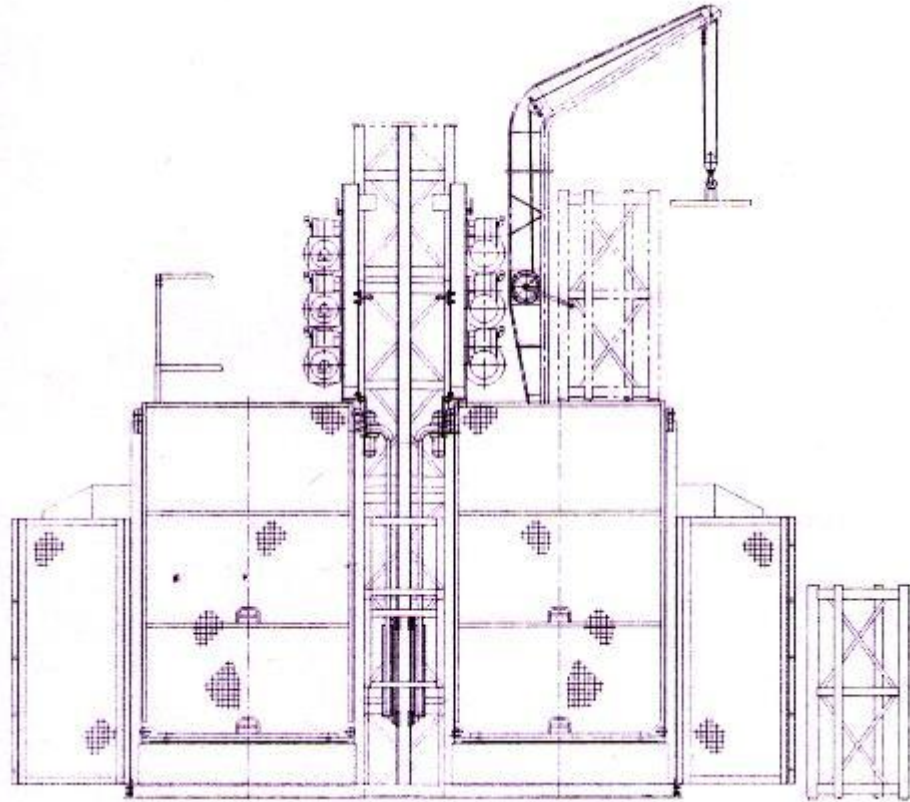
Install the bolts of the section and tighten by a torque of 30kgm.

(8) 从标准节上摘下吊具，收回钢丝绳，将吊杆转至安全方向，向下开吊笼，进行下一个标准节的接高作业。

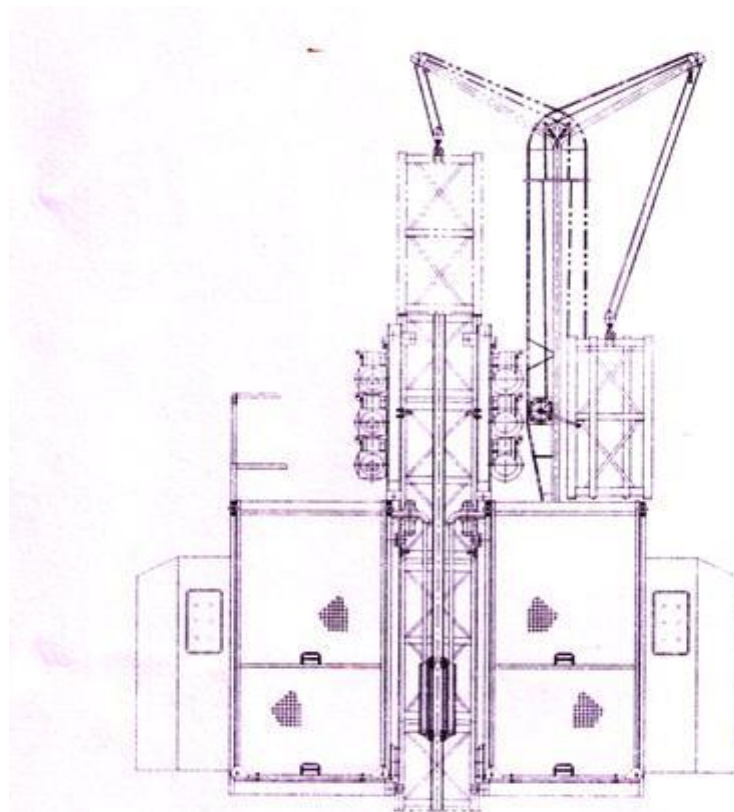
Move the cage to lift another section.

注意：每次接高时应给标准节止口涂上黄油，以免生锈。

Notes: grease every section to avoid rust.



图九 Fig 9



图十 Fig 10

5、关于附着架的安装 (见图十一) install tie in (Fig 11)

当升降机的导轨架安装高度超过 9m 时, 应当安装第一套附着装置, 该附着架距地面高度为 6-8m (也可视具体情况而定), 以后每隔 6m 安装一次附着架, 最大高度时最上面一处附着架以外悬出高度不得超过 9m。

When the guiding mast exceeds 9m, we have to install the first tie in required.

(1) 首先在需要附着的导轨架高度处将件 1 (联接杆) 用 V 型螺栓联好。

Connect a V-type bolt on the mast at the height where the tie in will be installed.

(2) 用现有的起重设备将件 2 (中间架) 与件 1 联接好。

Connect piece 2 with piece 1.

(3) 用现有的起重设备将件 3、件 4 一同和件 2 联好, 此时件 2、件 3 之间的扣件 A 先不要拧紧, 以便件 3 前后可调, 同样件 3、件 4 之间的扣件也不要拧紧, 以便于附着杆前后可调。

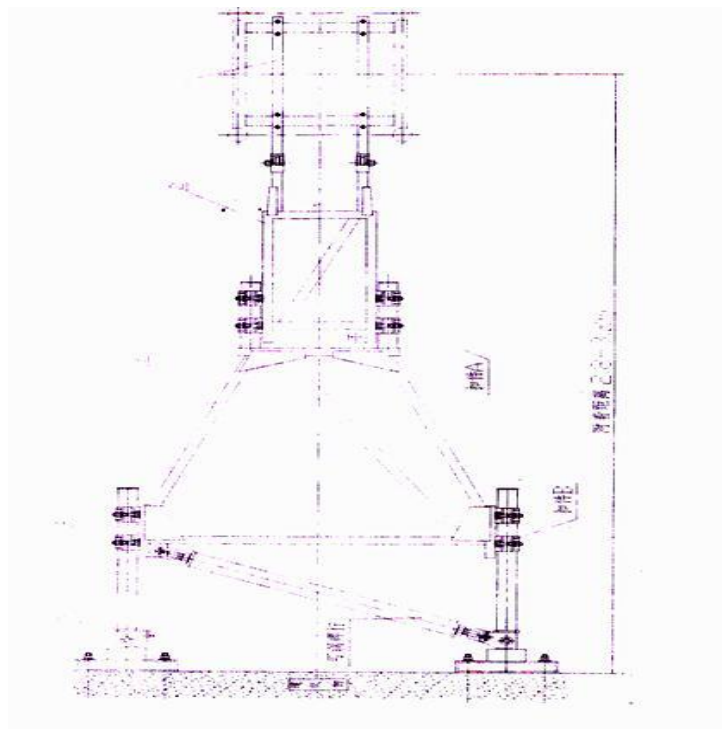
Connect piece 3, 4 and piece 2. at this time the fastener A of piece 2 and 3 have to be open to adjust the piece 3. And the fastener of piece 3 and 4 have to be open too.

(4) 将件 5 (联接槽钢) 与建筑物上预留孔和螺栓联好并拧紧, 通过经纬仪测定后确认轨架垂直度在误差要求范围之内时, 可将各处扣件拧紧。(调节可调螺杆来调节校正导轨架的垂直度)

Tighten all bolts of piece 5 and the other fasteners. (adjust the verticality of the mast)

(5) 附着架应尽量水平安装, 附着架平面与水平面的夹角不得大于 8°。

Level the tie in as far as possible.



图十一 Fig 11

五、升降机使用之前 notes before using

升降机使用之前，需检查以下几个项目

Check the following items before using the hoist.

1、检查各螺栓紧固件有无松动现象，如有松动应及时拧紧各螺栓。

Check all the bolts.

2、检查升降机电气系统工作是否正常，各交流接触点吸合情况及导线接头情况等。

Check the electric system of the hoist.

3、检查各种安全限位开关动作是否灵活，各限位碰块有无位移。

Check all the safety devices.

4、检查升降机吊笼运行通道上有无突出物，确保吊笼运行安全距离不小于 250mm。

Check the railway of the section. Make sure the safety distance of the cage be no more than 250mm.

5、检查各部位润滑情况，及时加注润滑脂（请参考升降机的润滑部分）。

Check the lubricating work of every parts.

6、检查吊笼进出门、防护围栏门等开启灵活与否，检查各限位开关动作情况。

Check the cage door, the enclosure door.

7、检查各滚轮，背轮的调整间隙及齿轮与齿条的啮合间隙是否正常，如不符合要求应及时进行调整。

Check the distance of wheels.

8、在每次安装结束后都要检查防坠安全器的动作是否可靠，这可通过吊笼坠落试验来完成。

Check the anti-falling device after the hoist be installed every time.

六、升降机操作 operating of hoist

1、升降机操作之前，应进行以下工作：preparing work before operating the hoist

(1) 当班司机必须认证阅读上班司机的运转记录，发现问题及时解决；

The driver on duty has to read the operating notes carefully.

(2) 如遇冬季天气寒冷，气温较低，而升降机启动困难时，启动后可空载上下运行几次，使减速机油温趋于正常。

In cold days with difficult when start the hoist, empty load several time to make the oil of reducer be normal.

2、升降机的操作，必须按以下操作规程进行：

Operate the hoist in the following way:

(1) 司机必须身体健康，无心脏病和高血压病；

The driver should be very healthy.

(2) 司机应受过专门训练，经考试合格后方可持证上岗；

The driver should be trained well with certification of driving.

(3) 不可超载，偏载运行，不得人货混装；

Overload, unequal load, and people with goods in one cage are forbidden.

(4) 严禁司机酒后操作或非司机操作；

No drunk driver is allowed to operate the hoist.

(5) 转载物品时，严禁物品伸到吊笼之外，以免运行时危险；

Keep everything inside the cage when hoist moving.

(6) 当风力达到六级以上时，升降机不得运行，并且将吊笼停至最低层；

No operating work allowed when the wind exceed 6 grade. And move the cage to the base.

(7) 每次下班后，必须关掉电源开关，做好当班记录，并将护栏门锁好。

Cut off the power after duty and lock the doors.

七、升降机的润滑 Lubricating of hoist

首次运行 40 小时之后，减速器必须更换润滑油，然后按下表进行：

Lubricate hoist every 40 hours of working. And change the lubricating oil the reducer as the table follows:

升降机润滑一览表 lubricating table

间 隔 period	润 滑 部 位 position	润 滑 剂 lubrication	用 量 Amount	说 明 remarks
40 工作小时 every 40 operating hours 不论时间 至少每月一次 at least once one month	1. 减 速 器 reducer	N320 涡轮润油 Turbine oil		检查油位 check the oil amount
	2.齿条 rack	2# 钙基润滑脂 Ca lubrication oil		上润滑脂时降下升降机并停止使用 2~3 小时，使润滑脂凝结 stop the host and make the oil cool by 2-3 hours
	3. 安 全 器 safety device	2# 钙基润滑脂 Ca lubrication oil		油咀加注 oil refuel
100 工作小时 every 100 operating hours 不论时间 至少一年 6 次 at least four times one year	4. 滚 轮 wheel of section	2# 钙基润滑脂 Ca lubrication oil		油咀加注 oil refuel
	5. 背 轮 wheel with safety device	2# 钙基润滑脂 Ca lubrication oil		油咀加注 oil refuel
	6. 门 导 轮 wheel on cage door	20# 齿 轮 油 pinion oil		滴注 drop in
400 工作小时 every 400 operating hours	7. 电箱门铰链 hinge of distributor	20# 齿 轮 油 pinion oil		滴注 drop in
	8.电机制动器锥	20# 齿 轮 油		滴注，切勿滴到摩擦盘上

不论时间 至少一年 4 次 at least four times one year	套 awl coat of motor brake	pinion oil		Drop in, be sure no drop on the friction board
1000 工作小时 every 1000 operating hours 不论时间 至少一年一次 at least once one year	9. 减 速 器 reducer	N320 涡轮润滑 油 turbine lubrication oil	1.5 升 liter	换油 change oil

从产品出厂时，已应用上述质量的润滑油，当然也可以使用品质相当润滑油，如减速器更换不同牌号的润滑油，第一次必须仔细清洗减速器内部。

The hoist has been lubricated when packed. Lubrication oil in the same quality can be use, say, if you want to use lubrication oil in different makes, make sure the inner side is cleaned carefully.

八、升降机的保养和维修 The Maintenance and Repair of the Hoist

8.1 升降机的正确保养，对于减少机械的故障发生率，延长机器的使用寿命至关重要。除进行日常保养外，还应按下面程序定期进行。The correct maintenance of the hoist plays a crucial role in reducing mechanical fault and prolonging life of the machine. In addition to day-to-day maintenance, the following procedures should also be carried out regularly.

间隔 Interval	部 件 Components	说 明 Instruction
40 工作小时 不论工作时间 至少每月一次 40 work hours Or at least once a month	1. 防坠安全器 Anti-falling safety	如果安全器无故上档或运行时有异常响声，应停机检查，送交制造厂检查 If the safety device stalls without reason or utters abnormal sounds when in running, user must stop the machine and check it and sent it to the supplier for inspection
	2. 标牌 scutcheon	保证机器上所有标牌清晰、完整 To make sure all scutcheons on the machine clear and complete
	3. 减速器 reducer	润滑油有无泄漏——检查减速箱油位，必要时加注润滑油 Lube is leaking or not -- check gearbox oil level add lubricant and if necessary
	4. 滚轮及背轮 trolley and back wheel	保证所有螺栓连接紧固、无松动 Ensure that all fastening bolts joined

		tightly, no loose
	5.驱动板 Driver plate	保证所有螺栓连接紧固、无松动 Ensure that all fastening bolts joined tightly, no loose
	6.电机制动器 Motor arrester	保证固定盘与旋转盘之间的间隙不小于 0.5mm，必要时更换制动盘 Guarantee the clearance between the fixed plate and rotating plate is not less than 0.5mm and, if necessary, replace the brake plate.
	7.制动距离 Braking distance	保证吊笼满载下降时制动距离不超过 0.35m When the fully loaded lifting cage is falling, ensure the braking distance is no more than 0.35 m
	8.电气系统 Electrical System	检查各接线柱及接触器等联接有无松脱 Inspect the join of connection posts and contact devices connected to contact are tight or not
	9.电缆 cable	检查电缆有无磨损或扭曲 check the cable has abrasion and distort or not
	10.齿条 rack	齿面涂润滑脂 Besmear lubricate grease on the tooth
100 工作小时 不论工作时间 至少每年 6 次 100 work hours Or at least 6 times a year	11.标准节连接螺栓 Standard section connecting bolts	检查有无松动现象，及时紧固 Check they are tight or not and fasten in time
	12.附墙架连接螺栓 F-wall connecting bolts	检查有无松动现象，及时紧固 Check they are tight or not and fasten in time
	13.限位、极限开关及其碰块 Limit, Limit Switch and its collision block	检查开关动作是否灵活，各碰块是否移动位置 sCheck whether the switch is flexible or not, and the collision block is moving or not
	14.电缆导向装置 Cable guide setting	检查电缆臂通过时顺利与否，导向固定是否牢靠，橡皮磨损情况 Check whether the cable arm passed smoothly or not, and the whether the oriented fixation is dependable, and the wear of the rubber

	15. 齿轮、齿条 Gear, Rack	按“磨损和调整极限”检查磨损量 Check the By wear state according to the wear and adjust limit
	16. 润滑间隔 Lubricating interval	按润滑要求进行 operate according to the lubricating requirements
400 工作小时 不论工作时间 至少一年 4 次 400 work hours Or at least 4 times a year	17. 滚轮 trolley	检查滚轮与立柱管的间隙及磨损量 check the interval between the wheel and pole and the wear
	18. 安全装置 Safety device	按照坠落试验要求做坠落试验 In accordance with the test requirements do fall crash test
	19. 电动机 Motor	参照“电动机”介绍部分 See the instruction of the motor
1000 工作小时 不论工作时间 至少一年 1 次 1000 work hours or at least 6 times a year	20. 联轴节橡胶块 Coupling rubber block	检查橡胶块挤压及磨损情况 check up the extrusion and wear status of the rubber block
	21. 润滑间隔 Lubricating interval	见升降机润滑一览表 See the list of hoist lubrication
	22. 腐蚀和磨损 corrosion and abrasion	检查各个设备，对于经常腐蚀的部位，必须采取相应的保护措施 Check all equipments and must take appropriate measures of protection for the regularly erode parts

8.2 维修与更换 Maintenance and replacement

8.2.1 滚轮的更换 Replacement of the roller

当滚轮轴承（型号 206）损坏或滚轮磨损超差（参考“调整与磨损极限”）时必须更换。

When the roller bearing (Model 206) damage or wear seriously (see adjusted and wear limit), it must be replaced.

方法如下：the methods are as follows：

a. 将吊笼落至地面用木块垫稳。

Lower the lifting cage to the ground and underlay it stably with wood block.

b. 用扳手松开并取下滚轮连接螺栓，取下旧滚轮。

Loosen the trolley with a wrench and removed the wheel connecting bolts the, and then removed the old wheels.

c. 装上新滚轮，调整好滚轮与导轮架立柱管之间的间隙，最后拧紧滚轮连接螺栓，拧紧力矩 20Kg.m。

Install the new wheel, and adjust the space between the wheel and the idler pulley tube, and tighten the wheel connecting bolts and the torque of 20Kg.m.

8.2.2 背轮的更换 Replacement of back wheel

当被轮轴承（型号 309）损坏或背轮外圈磨损（参考“调整与磨损极限”）超差时，必须进行更换，方法如下：

When the back wheel bearings (Model 309) damaged or the back wheel outer ring wore (see adjusted and wear limit) badly, it must be replaced. the methods are as follows:

a.将吊笼落至地面用木块垫稳。

Lower the lifting cage to the ground and underlay it stably with wood block.

b.将背轮连接螺栓松开，取下旧背轮。

Loosen the the wheel connecting bolts and removed the old wheel.

c.装好新背轮并调整好齿条与齿轮的啮合间隙，拧紧背轮连接螺栓，拧紧力矩 30Kg.m。

Install the new wheel, adjust the space between the rack and thejoggle, and tighten the wheel connecting bolts and the torque of 30Kg.m.

8.2.3 减速器驱动齿轮的更换（见图十二）Replacement of the reducer drive gear (see figure 12)

当减速器驱动齿轮齿形磨损已达到极限时（参考“调整与磨损极限”）必须进行更换，方法如下：

When the abrasion of the reducer drive gear has reached the limit (refer to "adjusted and wear limit"), it must be replaced as follows:

a.将吊笼落至地面用木块垫稳。

Lower the lifting cage to the ground and underlay it stably with wood block.

b.拆掉电机接线，松开电动机制动器，拆下背轮。然后松开驱动板连接螺栓，将驱动板从驱动架上取下，置于笼顶或地面。

Remove the electrical wiring and loose motor arrester and take part the back wheel. Then loosen driver plate connecting bolts, remove the driving plate from the drive shelf, and place on cage top or ground.

c.拆下减速机驱动齿轮外断面轴端圆螺母及锁片，拔出小齿轮。

Remove the round nuts and lock piece outside the driver gear of the reducer, and draw out the small gear.

d.将轴径表面擦洗干净并涂上黄油。

Scrub the surface of shaft clean and wipe butter on it.

e.将新齿轮装到轴上，上好圆螺母及锁片。

Put the new gear on the shaft and install the round nuts and locking pieces.

f.将驱动板重新装回驱动架上，穿好连接螺栓（先不要拧紧）并安装

Install the drive plate on the drive shelf and put on the connecting bolts (without tightening) and install its.

g.调整好齿轮啮合间隙。将背轮连接螺栓拧紧（拧紧力矩 30Kg.m）以及驱动板连接螺栓拧紧(拧紧力矩 20Kg.m)。

Adjust the interval of the gear joggle, then tighten the back wheel connecting bolts

(tightening torque 30Kg.m)and the drive plate connecting bolts (tightening torque 20Kg . m)

h.恢复电机制动并接好电机机制动器接线。

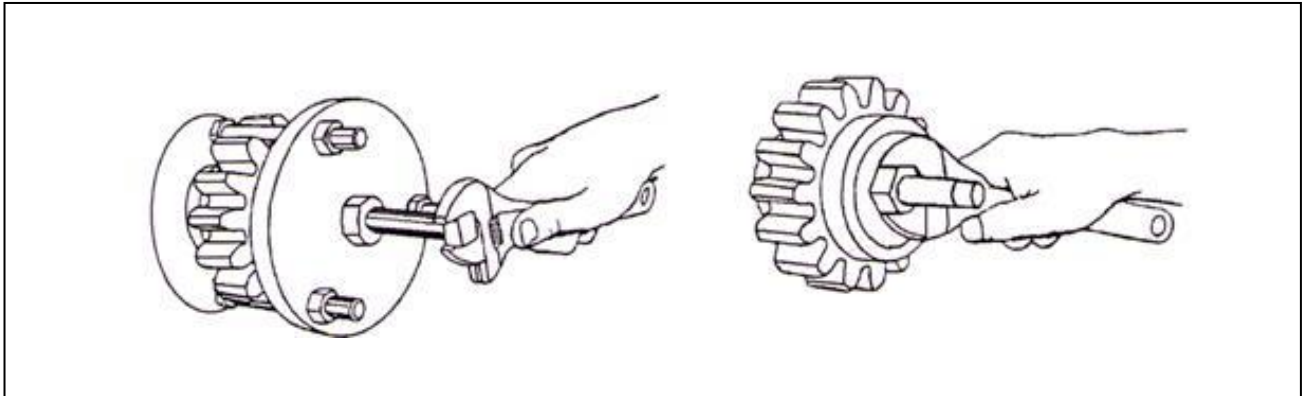
Restore the motor brake and then join the connection of the brake.

i.通电试运行

Electrify and operate

更换齿轮方法见下图：

The method of replacing gear are as the figure below:



图十二 Fig 12

8.2.4 减速器的更换 Replacement of the reducer

当吊笼在运行过程中减速机出现异常发热、漏油、梅花形弹性橡胶块损坏等情况而使机器运转出现震动或减速机由于吊笼撞底而使齿轮轴发生弯曲等故障时须对减速机或其零件进行更换，步骤如下：

If there is something wrong, abnormal heating, oil spills, damage of cinquefoil flexible rubber block, with the reducer when the lifting cage in the course of operation caused the machine shock or the gearbox bended caused by the lifting cage collide to the ground, user need to replace the reducer and its fittings, the steps are as follows :

a.将吊笼落至底护栏用方木块垫稳

Lower the lifting cage to the ground and underlay it stably with wood block.

b.拆掉电动机线，松开电机制动器，拆下背轮。松开驱动板连接螺栓，将驱动板从驱动架上取下，置于吊笼顶部或地面。

Remove the motor wire, loosen the motor arrester, then remove the back wheel. Loosen driver plate connecting bolts, take the driving plate down from the drive shelf, and put it on the top of the lifting cage or on the ground.

c.取下电机箍，松开减速器与驱动板间的连接螺栓，取下驱动单元。

Remove the motor hoop and loosen connection bolts between the reducer and driver plate, then remove the driver cell.

d.松开电动机与减速器之间的法兰盘连接螺栓，将减速器与电动机分开。

Loosen flange plate connecting bolts between the motor and reducer and separate

them.

e.将减速箱内剩余油放掉，取下减速器输入轴的半联轴器。

Let out the remain oil in the gearbox, then remove the semi-coupling of the reducer input axis.

f.新减速箱输入轴擦洗干净并涂油，装好半联轴器。注意：如联轴器装入市较紧，切勿用锤重击，以免损坏减速器。

Clean the new gearbox input shaft and anoint it, then install the semi-coupling. Notice: if the coupling is too tight, do not bang it with hammer, avoiding damage the reducer.

g.将新减速器与电机联好（注意要正确装配橡胶缓冲块），拧紧连接螺栓。

Join the new reducer with the motor (assemble the rubber buffer block correctly), then tighten the connecting bolts.

h.将新驱动单元装在驱动板上，螺栓筋骨，装好电机箍。

Install the new drivers unit on the driver board, tighten the bolts, and then fix the electrical hoop.

i.安装驱动板，用 20Kg.m 力矩拧紧驱动板连接螺栓，安装背轮，安装用 30Kg.m 力矩拧紧背轮连接螺栓。

Install driver plate, tightening drive plate connecting bolts with 20Kg.m torque, then install the back wheel, tightening back wheel connecting bolts with 30Kg.m torque.

j.重新调整好齿轮与齿条之间的啮合间隙，给电机重新接电。

Re-adjust the joggle interval between the rack and the gear, and electrify the motor.

k.恢复电动机制动，接电试运行。

Restore the motor braking, electrify and operate.

8.2.5 齿条的更换（见图十三）Replacement of rack (see figure 13)

当齿条损坏或已达到磨损极限时应予以更换（磨损标准见“调整和磨损极限”）。

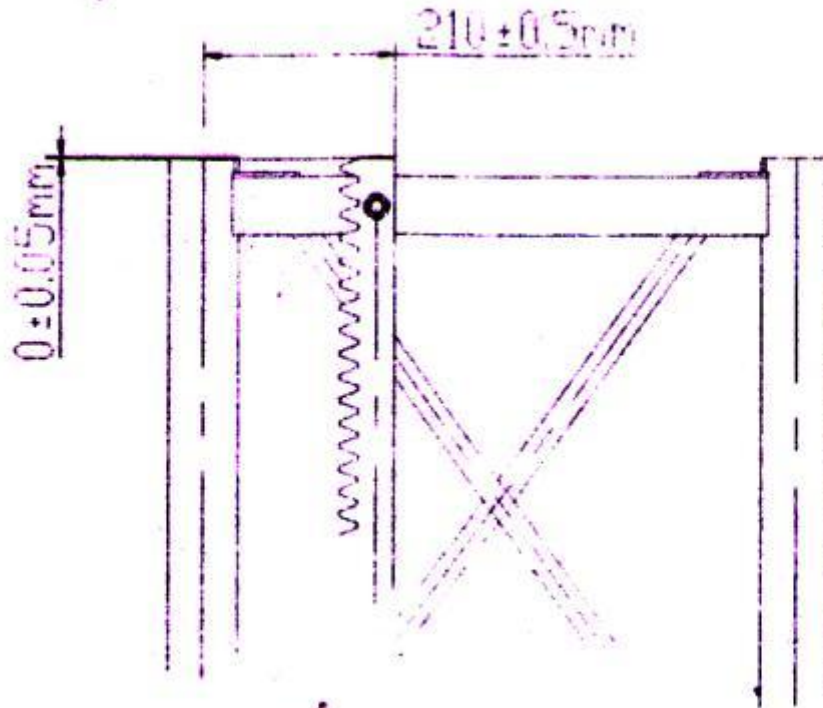
When the rack damaged or weared reaching the limit, it should be replaced (wear standard reference to the "adjust and wear limit").

a.松开齿条连接螺栓，拆掉磨损或损坏了的齿条，必要时可对齿条进行局部火焰加热，清洗齿条联接块。

Loosen the rack connecting bolts, remove the weared or damaged rack, if necessary, the rack can be heated partially, and clean the rack connecting block.

b.按图示尺寸安装新齿条，螺栓预紧力为 20Kg.m。

Install new rack according to the dimension in the picture, the bolts preload is 20Kg.m.



图十三 fig 13

8.2.6 安全器的更换 the replacement of safety device

按照防坠安全器国家标准中关于安全器报废标准的规定，报废后新安全器的更换可按下面过程进行：

According to the prescription of the rejected standard in national standards of antifalling safety device, after rejecting the replacement of the new safety device can operate as follows:

a. 拆下安全器下部开关罩，拆下微动开关接线

Disassemble the switch cover under the safety device, remove the switch wiring

b. 松开安全器与驱动板之间的连接螺栓，取下安全器。

Loosen the connecting bolts between the safety device and the driver plate, and then remove the safety device.

c. 装上新安全器，用 20Kg.m 力矩拧紧连接螺栓，调整安全器齿轮与齿条之间的啮合间隙

Install the new safety device and tightening the connecting bolts with torque 20Kg.m, and adjust the joggle interval between the safety gear and rack

d. 接好微动开关接线，装好上开关罩

Connect the jiggle switch wire, and fix on the switch switchcover

e. 按坠落实验说明进行坠落试验，检查安全器的制动情况

Test according to the instruction of falling test, and check the braking status of the safety device.

f. 按安全器复位说明书说明进行复位

Reset according to the safety device reset instructions.

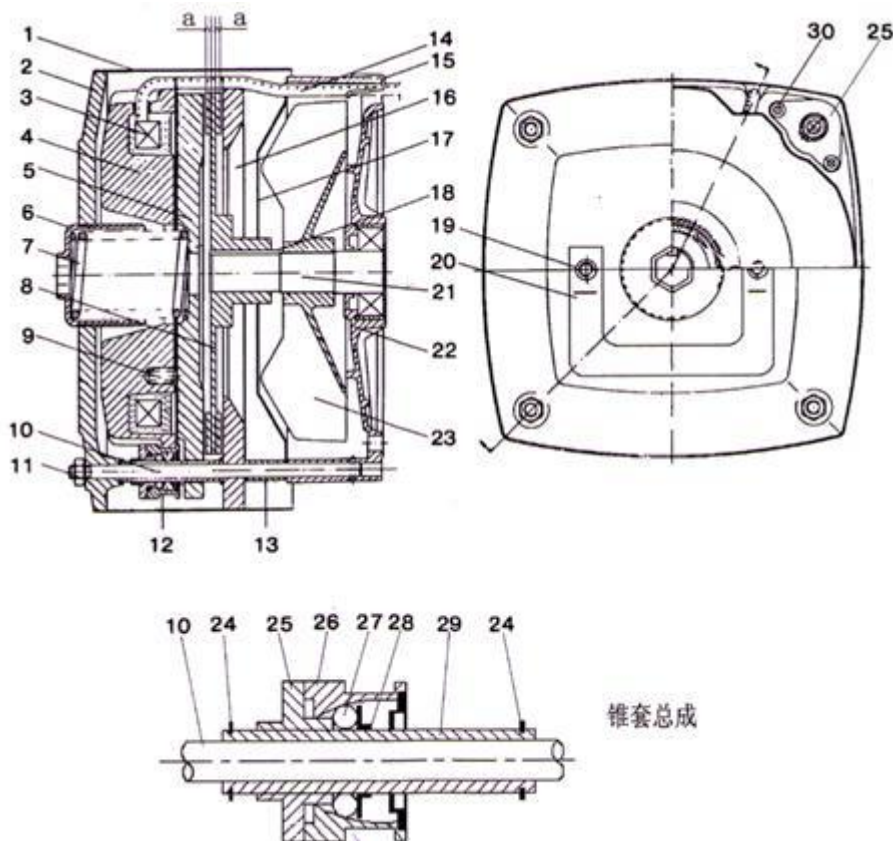
g. 润滑安全器 Lubricating safety device

8.2.7 电动机的更换 motor replace

更换电机时，拆卸过程和减速器的更换过程完全相同。注意：拆装过程中勿用锤重击。若只更换电机制动器，可按如下步骤进行：

Replace motor as the way of replacing reducer. Notes: in the dismount course, no hammer can be used. If only the brake of motor be required to replace can do it the way as follows:

8.2.7.1 电机制动器结构（见图十四） structure of motor brake



图十四 Fig 14

- 1.防护罩 cover 2.端盖 end cover 3.电磁线圈 electromagnetic wiring
- 4.电磁铁座 electromagnetic seat 5.电磁衔铁 electromagnetic armature
- 6.调整套 adjusting coat 7.制动弹簧 brake spring 8.旋转制动盘 rotary brake disk
- 9.压缩弹簧 compress spring 10.螺栓 screw bolt 11.螺母 screw nut
- 12.锥套总成 awl group 13.隔套 shield 14.线圈电缆 wiring ring power cable
- 15.电缆夹 power cable clip 16.固定制动盘 fixed brake disk 17.风扇罩 fan cover
- 18.键 key 19.制动螺栓 brake screw 20.释放手柄 handle 21.主轴 main axel
- 22.后罩 back cover 23.风扇 fan 24.轴用挡圈 axel block ring 25.托架 support frame
- 26.锥套 Awl coat 27.滚珠 balling bear 28.压簧 compress spring 29.套管 coat pipe

30.螺母 screw nuts

8.2.7.2 制动盘的更换 brake disk replace

旋转制动盘 (8) 为易损件, 当其磨损到摩擦材料单面厚度 a 接近 1mm 时必须更换制动盘。步骤如下: screw brake disk (8) is breakable parts, should it be the thickness of 1mm, it should be replaced by the way as follows:

a.卸下防护罩 (1) 和机械释放手柄 (20), 测定并记录调整套(6)的位置, 以便更换制动盘后能保持原制动力矩。

Disassembly the cover (1) and handle (20) test and make note of the position of adjusting coat (6)

b.拆下调整套(6), 取出制动弹簧(7), 松开螺母(11), 将端盖(2)取下

Disassemble the adjusting coat(6) and draw out brake spring (7) loosen screw nuts (11) and then disassemble the end cover (2)

c.拆下电磁铁座(4)和衔铁(5), 注意摩擦面向上放置, 拆下旧制动盘, 换上新盘。

Disassembly the electromagnetic seat (4) and armature (5). Let the friction side on and replace old brake disk with a new one.

d.重新装入电磁铁座(4)和衔铁(5), 并使衔铁靠近新的旋转制动盘(8)。

Reinstall the electromagnetic seat (4) and armature (5) and and make armature to the new rotary brake disc.

e.将电磁铁座(4)和衔铁(5)装到固定螺栓(10)上, 电缆凹槽要正对固定制动盘(16)上的凹槽; 慢慢旋紧螺母(11), 防止磁铁座和衔铁在螺栓上翘曲。

install the electromagnetic seat (4) and armature (5) to fixed screw bolts (10; let the channel side of the cable to the channel fixed brake disc (16). Tighten the bolts (11).

f.装好端板(2)拧紧螺母(11), 重新装好弹簧(7)和调整套(6)并旋紧到上述 1 步骤测定的位置;

install the end board (2) and tighten the nuts (11). Reinstall the spring (7) and adjusting coat (6) and tighten to the position of (1)

g.使制动器工作若干次, 检查工作是否正常;

let the brake work several time for testing.

h.最后装上防护罩 (1) 和机械释放手柄 (20), 注意 (19) 绝对不能拧紧。

Install the cover (1) and the handle (20). Pay attention to (19) as it can not be too tighten.

注意: 在投入正常使用前要对制动器进行多次试验, 如制动器不能松闸, 应检查:

Notice: before use, user has to test the arrester for several times. If it can't open the brake, it must be checked:

————— 整流桥是否正常 Whether the rectifier bridge is normal

————— 接触器是否正常 Contactor is normal or not

————— 测量线圈电压值 (额定直流电压 195 伏) 如线圈有故障, 则需要更换带线圈的电磁铁座

Measure coil voltage (rating volts DC is 195V) as a coil failure. If there is

something wrong with the loop, user need to replace electromagnet block with loop

8.2.7.3 磁铁座的更换 Replacement of the magnet Block

a.拆下防护罩(1)和机械释放手柄(20),拆下电缆(14)和电缆夹(15),测定并记录好调整轴套(6)的位置,以便重装时复位;

Remove the shield(1) and the machinery release handle (20), cables (14), and cable clamp (15), then determine and record the location of the adjustment bushings (6) for the replacement of reinstallation;

b.用六角扳手拆下轴套(6)和制动弹簧(7),拆下螺母(11),取下端盖(2)和磁铁座(4),并将磁铁座竖方;

Remove the bushings (6) and the brake spring (7) With six-angle spanner, and then remove the nut (11), Cover (2) and the magnet block (4), and put the magnet blocks erectly;

c.拆下螺钉(30),磁铁座工作面向上;

Disassemble the screw (30), with the magnet block upward;

d.拆下四个弹簧卡圈(24),取出衔铁(5),拆掉弹簧(9)。注意切勿将套管(29)从锥套(26)中拉出;

Remove the four spring coil (24), gag bit (5), and the spring (9). Do not draw the bushing(26) out of the cover(29);

e.从磁铁座上取出止退器(包括件 25,26,27,28,29)装入新磁铁座,小心别让套管拉出锥套;

Take out the from the magnet seat retreat-stopping device(including pieces of 25,26,27,28,29) and load the new magnet blocks, never draw the bushing out the cover;

f.装好弹簧(9); Install the spring (9);

g.把衔铁(5)穿在套管上,使其凹槽对着线圈电缆(14); Put the gag bit (5) on the bushing with its groove facing the coil cables (14);

h.装好弹簧卡圈(24); Install the spring coil (24);

i.把磁铁座压向衔铁(5),装上隔套(28)和螺钉(30);

Press the magnet seats to the gag bit (5), loaded the separate cover (28), and screw (30);

j.确保磁铁座和衔铁间间隙均匀,尺寸为 $1.6 \pm 0.1\text{mm}$;

Ensure the internals between the magnet seats and gag bit are equal and with the size of $1.6 \pm 0.1\text{mm}$;

k.把磁铁座和衔铁装到固定螺栓(10)上,电缆凹槽要对正固定制动盘(16)上的凹槽;

Fix the magnet seat and gag bit on the fixed bolts (10) with the the cable slot is fixed to the socket of the braking plate;

l.端盖(2)装到固定螺栓(10)上,慢慢拧紧螺母(11),防止磁铁座和衔铁在螺栓上翘曲;

Install cover (2) on the fixed bolts (10), slowly tightening the nut (11) and avoid the magnet seat and the gag bit warping on the bolts;

- m.装好制动弹簧(7)和调整套(6)，按第一步骤记下的位置旋紧调整套(6);
Install the brake spring (7) and the adjustment package (6), and tighten the adjustment package according to the place noted down in the first step;
- n.接好线圈电缆(14)，给制动器通电上闸几次检查工作是否正常;
Connect the coil cables (14), then close the brake and electrify the arrester for several times to check whether it's normal or not;
- o.装上防护罩 (1) 和机械释放手柄 (20), 注意(19)绝对不能拧紧。
Fit on the shield (1) and the machinery releasing handle (20) with never tighten the part (19).

8.2.7.4

- a.按“磁铁座的更换”中所述，拆下制动器;
Remove the arrester according to the instruction of " replacement of magnet ";
- b.从需要更换的调解机构的盘上拆下螺钉;
Remove the bolts from the adjusting outfit that need to replace;
- c.拆下弹簧卡簧; Disassembling the Spring Core-catcher;
- d.将托架压向锥套，松开套管;
Press the bracket to the cover, and loose the bushing;
- e.不要将套管拉出锥套，将衔铁取下，径向取下调节机构;
Remove the gag bit with pulling out the bushing from the cover, then radial remove the adjusting outfit;
- f.将新的调节机构装到磁铁座上，装好衔铁;
Install the new adjusting outfit on the magnet chair, then equip the gag bit;
- g.按“磁铁座的更换”装上电磁铁和其他零件。
Fit on the electromagnet and other parts according to the "replacement of magnet".

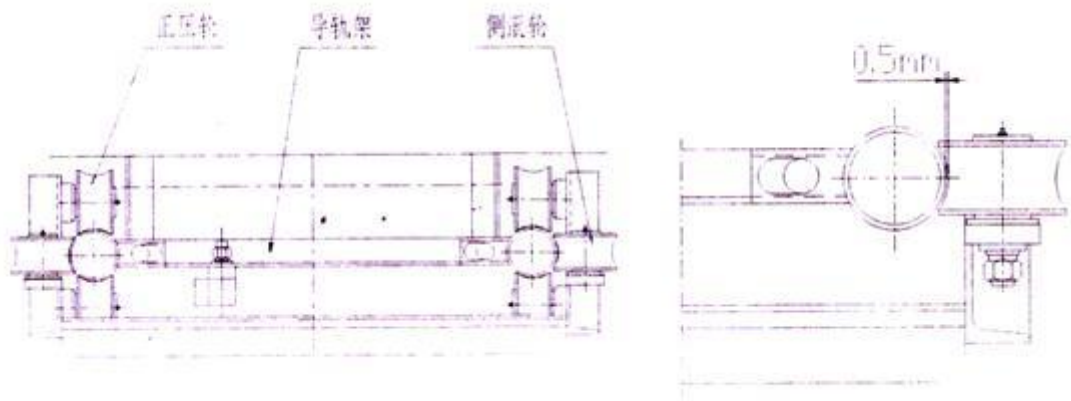
九、调整及磨损极限 Adjustment and wear limit

9.1 侧滚轮的调整 Side hoop adjustment

一定要成对调整导轨架立柱管两侧的对向滚轮。转动滚轮的偏心使侧滚轮与导轨架立柱管之间的间隙为 0.5mm 左右，调整合适后用 20Kg.m 力矩将其连接螺栓紧固。如图十六所示(as shown in Fig 16)

Make sure to adjust the corresponding wheels at both sides of the column on the guideway in pair. Turn the wheel eccentric to make a distance of 0.5mm between the wheel and column. Fasten the connecting plot with a torque of 20kg.m after adjustment.

9.2 上下滚轮的调整 (见图十五) Adjustment of upper wheel and lower wheel (in Fig 15)



图十五 (Fig 15)

可在导轨架与安全钩之间庄一把螺丝刀使上滚轮脱离轨道调整偏心，使间隙适当。

The eccentric can be adjusted by departing the wheel from its orbit with a screwdriver between guideway and safety hook in order to make a proper space.

用垫高吊笼外侧的办法使下滚轮脱离轨道进行调整，调整后用 25Kg.m 力矩将其连接螺栓紧固。

Depart the wheel from its orbit by lifting the outside of the cage and then fasten the bolt with a torque of 25Kg.m.

上下滚轮均匀受力，使驱动板上的减速箱齿轮和安全器齿轮同齿条啮合沿齿长方向不小于 50%。

The upper and lower wheels bear the force unevenly so that the speed reducer gear on drive board and tripper gear can joggle with the rack in the direction of tine length no less than 50%.

9.3 背轮的调整

Back wheel adjustment

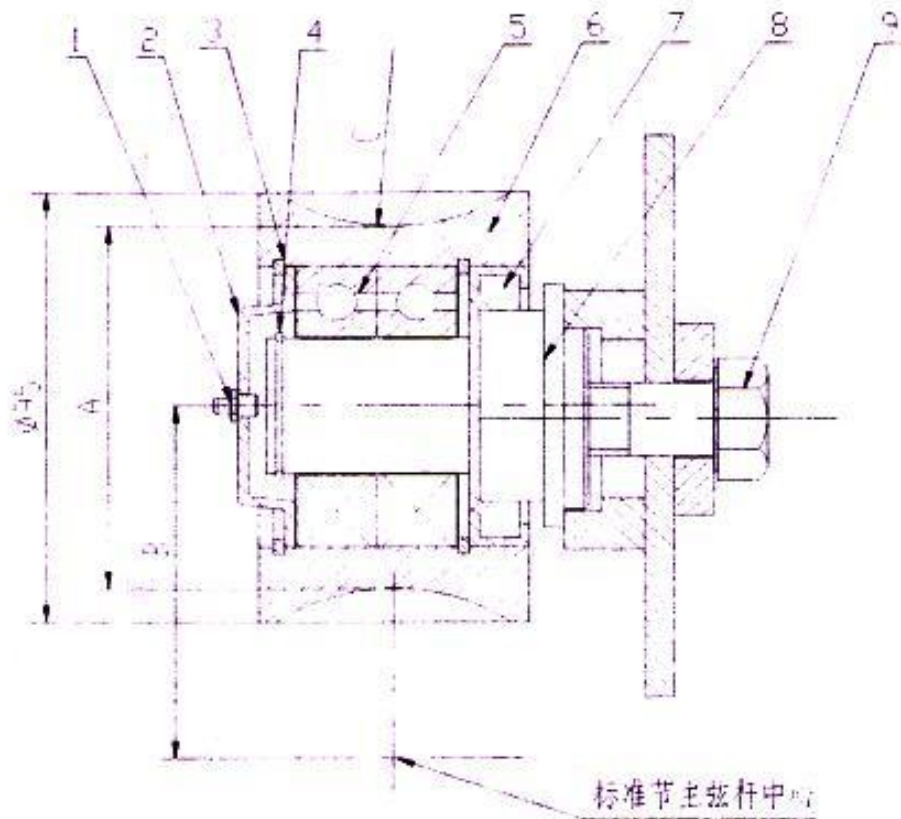
在驱动板背后的安全钩板和齿条背间插把大螺丝刀，使背轮和齿条背脱离，转动背轮偏心套调整间隙，使驱动齿条和齿条的啮合侧隙为 0.3~0.5mm，啮合接触面沿齿高不小于 40%，调整后用 30Kg.m 力矩将其连接螺栓紧固。

Insert a big screw between the safety holding-down clip behind the drive board and rack back to depart the back gear and rack back. And turn the back wheel eccentric to adjust. The distance between drive rack and rack is 0.3-0.5mm. The joggling interface is no less than 40% in the direction of tine height. Then fasten the plot with a torque of 30 Kg.m

注意：背轮、滚轮的连接螺栓绝对不准许用普通螺栓代替。

Notes: the connecting plots of back wheels and wheels can not be replaced with common plots.

9.4 滚轮的磨损极限 (见图十六) Wheel wear limit



- 1.油杯 oil cup 2.端盖 end cover 3.孔用挡圈 retaining ring for hole 4.轴用挡圈 retaining ring for shaft 5.轴承 bearing 6.滚轮 balling bear 7.油封 oil seal 8.滚轮轴 balling bear axel 9.螺栓 screw blot

图十六 Fig 16

测量方式：用游标卡尺测量 Measuring method: measure with vernier caliper

表五滚轮的磨损极限 Table 5. Wheel wear limit

测量尺寸 Measure dimension	新滚轮 New wheel	磨损的滚轮 worn wheel
A	Φ74	最小 Min. Φ72
B	75±3	最小 Min. 72
C	R40	最大 Max R42

9.5 驱动齿轮和安全器齿轮的磨损极限 (见图十七)

Wear limits of drive gear and tripper gear (Fig 17)

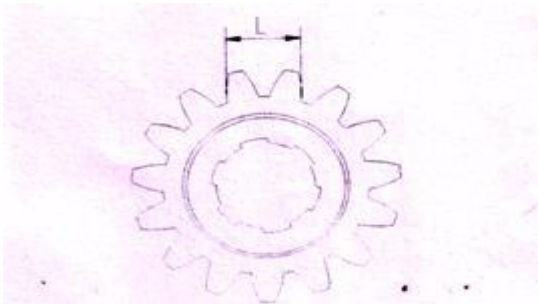
测量方式：跨测 2 齿，用游标卡尺测量

Measuring method: cross-measure 2 teeth with vernier

新齿轮 new gear	L	37.1mm
最大磨损齿轮 max. worn gear	L	35.8mm

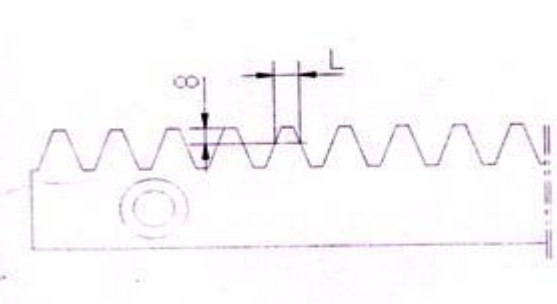
9.6 齿条的磨损极限 (见图十八)

Rack wear limit (Fig 18)



图十七 齿轮磨损极限

Fig17. Gear wear limit



图十八 齿条磨损极限

Fig 19. rack wear limit

用齿厚游标卡尺测量 Measure with thick-teeth vernier

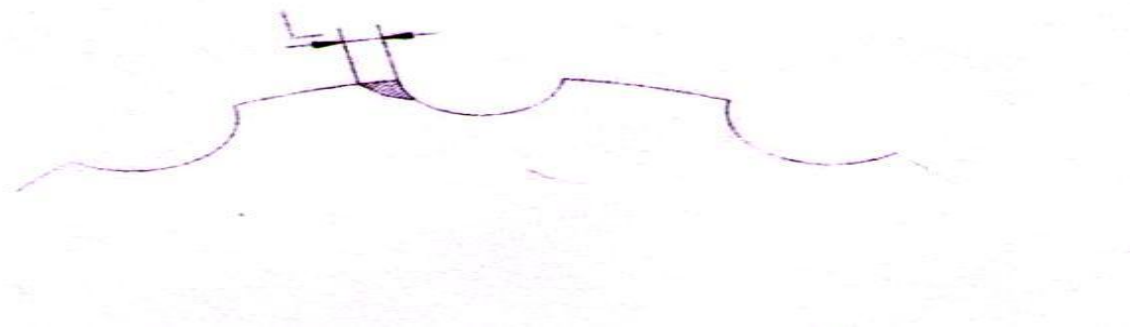
新齿条 new rack	12.566mm
最大磨损齿条 max. worn crack	11.6mm

9.7 背轮的磨损极限 Back wheel wear limit

测量方式：游标卡尺 Measuring method: vernier

新背轮外圈 outer circle of new back wheel	Φ124mm
最大磨损齿轮 max. worn crack	Φ120mm

9.8 减速器涡轮的最大磨损极限 (见图十九) Maximum wear limit of speed reducer turbine (Fig 19)



图十九 (Fig 19)

测量方式：通过减速器上的检查孔用塞尺测量

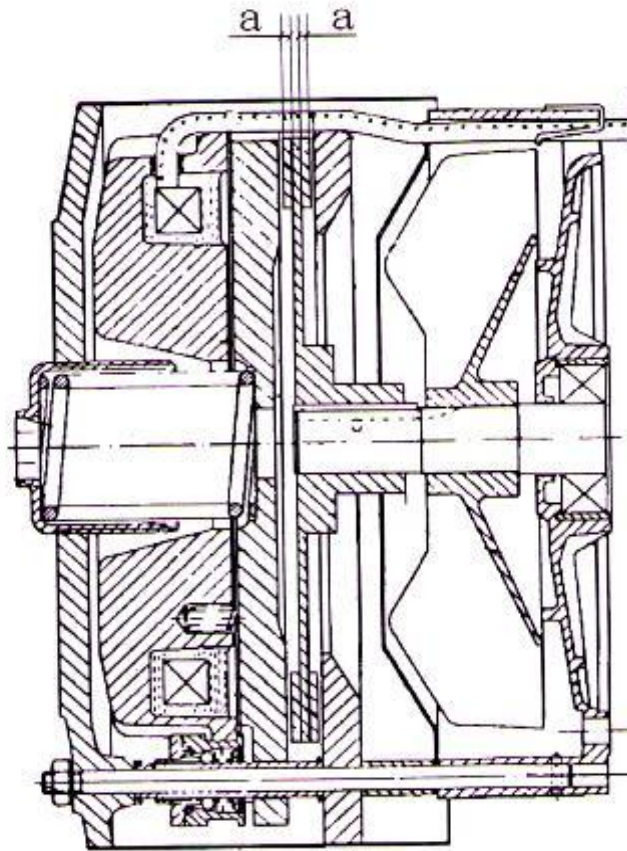
Measuring method: measure with feeler through the inspection hole of the speed reducer

允许的最大磨损量为 L=1mm

Allowable maximum wear extent: L=1mm

9.9 电动机旋转制动盘的磨损极限 (见图二十)

Wear limit of rotary brake plate on motor (Fig 20)



图二十 制动盘的磨损极限 (Fig 20) wear limit of brake plate

测量方式：用塞尺测量 Measuring method: Measure with feeler

当旋转制动盘摩擦材料单面厚度 a 磨损到接近 1mm 时，必须更换制动盘。

Replace the rotary brake plate when the wearing of its friction material approach to 1mm.

9.10 制动器制动距离的调整 Adjustment of the braking distance of detent

吊笼满载下降时制动距离不应超过 350mm,超过则电机制动力矩不足,应调整电机尾部的制动弹簧。

The braking distance should be no more than 350mm when the cage is fully loaded, otherwise the braking torque of the motor will be in shortage. Then you can adjust the braking spring at the tail of the motor.

十、吊笼的坠落试验 Falling test of the cage

凡新安装的升降机都应进行吊笼额定载荷的坠落试验，以后至少每三个月进行一次。

The falling test of cage rated load should be done in every newly installed elevator and test again at least every 3 months later.

在升降机正常工作时，安全器自发停止或发出噪声时，应立即停止操作，并通知生产厂

If the tripper stops spontaneously or makes noises when the elevator work normally, stop the operation at once and to inform the producer.

坠落试验时，吊笼内部无载人，确认升降机各个部件无故障时方可进行：

Make sure that the cage is empty and each part is fault-free before the falling test:

1、切断电源，将地面控制按钮盒的电线接入上电箱，理顺电缆，防止吊笼升降时卡断电缆。

Power off and connect the wire of ground control button box to the circuit box. Straighten out the cable in case it is cut by the elevator.

2、在吊笼内装好额定载荷 2000kg 后接通主开关，在地面控制按钮盒，使吊笼上升约 10 米停止。

Install the rated load of 2000kg in the cage and then turn on the main switch. Control the button box on the ground and stop when the cage lifts about 10m.

3、按下“坠落”按钮并保持之，此时电机制动器松脱不起作用，吊笼呈自由状态下落，达到安全器动作速度时，吊笼将平稳的停止在导轨架上。

Push the button “fall” and keep it, the motor does not work temporarily and the cage drop freely. When the falling speed reaches the act speed of tripper, the cage will stop stably at the column.

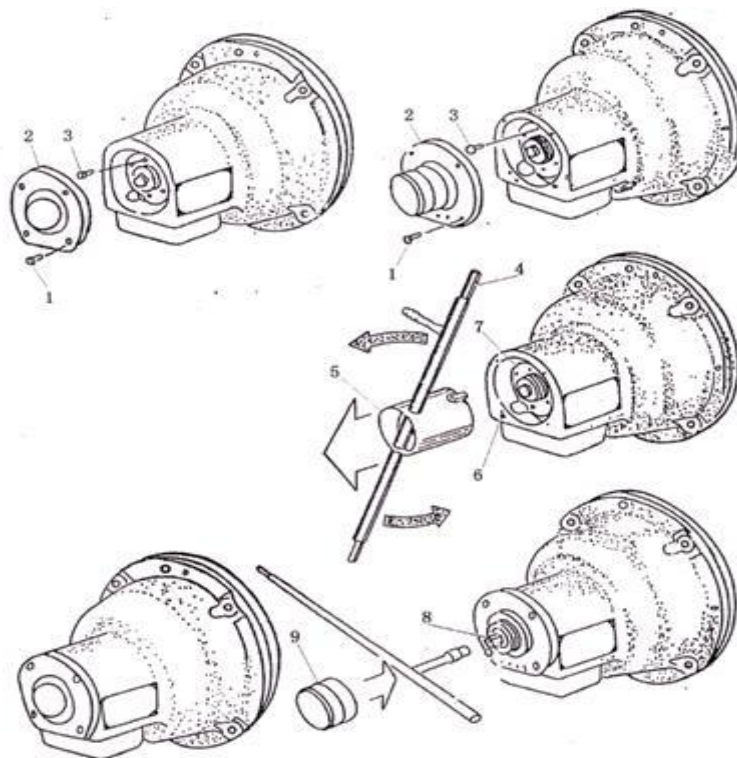
4、注意：如果吊笼底部在距地面 4 米左右时，吊笼仍未被安全器停止，此时应立即松开“坠落”按钮，使电机恢复制动，以防止吊笼撞底。

notes: If the tripper still has not stopped the cage when the cage bottom is about 4m to the ground, lose the button “fall” then the motor brake recovers in case that the cage bottom impacts on the ground.

5、试启动吊笼向上不应动作，因为此时安全器微动开关已将控制电路切断，如仍然能够动作，则应重新调整微动开关。

The cage should not work at startup for here the sensitive switch of tripper has cut off the controlled circuit. If the cage call still work, adjust the sensitive switch again.

十一、安全器的复位 (见图二十一) reposition of hoist (Fig 11)



1. 罩盖螺钉 cover bolt 2.端盖 end cover 3.螺钉 screw bolt 4.手柄 handle 5.复位专用工具 special tool of reposition 6.销轴 hinge pin 7.螺母 screw nuts 8.螺栓 screw 9.罩盖 cover

图二十一 安全器的复位 reposition of hoist

坠落试验后，应对防坠安全器进行复位。复位按以下步骤进行：

After the anti falling testing, reposition testing should be carried out as follows:

1、旋出螺钉，拿掉罩盖，取下螺钉。

Screw out the bolts, move the cover and screw bolts.

2、用专用工具和遥杆，旋出螺母，直到销的尾部和壳体端面平齐。

Use the special tools to screw the screw nuts until the end of the hinge be the level with the cover.

3、安装螺钉和罩盖，取下罩盖，用手尽可能拧紧螺栓，然后用工具将螺栓拧紧 30°，装好罩盖。

Equip screw and cover, move the cover, tighten the screw bolts by hand first and by tools to a degree of 30 and then cover.

4、接通主电后，必须向上开动吊笼 200mm 以上，以便使离心甩块与摩擦鼓脱离。

After the main power on, move the cage up 200mm to ensure safety.

十二、升降机的拆卸 **dismount hoist**

升降机的拆卸过程与安装过程正好相反。可按下述过程进行：

Dismount hoist in the opposite way of erection as follows:

1、用手动起重机将最上面的一道附着装置以上的标准节和电缆护架逐节拆下，安全运至地面。

Dismount the sections which above the top tie in.

2、将最上面的一道附着装置拆下，运至地面。

Dismount the top tie in.

3、重复过程 1，依次再将其余标准节及电缆护架拆下。

Repeat course 1 to dismount the sections and dismount the cable.

4、重复过程 2，将上面第二道附着装置拆下。

Repeat course 2 and dismount the second tie in.

5、重复过程 3、4，直到最后只剩下升降机的基本部分。

Repeat course 3 and 4 to dismount the other basic parts.

6、将吊笼底部缓冲弹簧拿掉，将下限位和下限位碰块取下并收好，然后小心地。

Dismount the spring of the cage bottom and keep the lower and upper limiters.

7、用手拉开电机制动器将吊笼滑至最低处且落实（注意：一定要小心下降，切勿使吊笼撞地）。

Move the cage to the base.

8、拆掉升降机电源线及电缆筒与极限开关之间的接线，将电缆筒和下电箱放好，将地面防护围栏拆下并放好，切勿扭曲和挤压。

Dismount the cable of the hoist and all the wires.

9、用起重设备将副吊笼、副底架与主吊笼、主底架分开，防止在安全地方。

Apart the auxiliary cage, auxiliary basic frame and the main cage, main basic frame.

松开地脚螺栓，将主吊笼连同主底架部分拆走。

Loosen the foundation bolts. Disassemble the cage with main base frame.

10、将所用部件（包括标准件和专用工具）整理收拾好，准备入库或转移至下一个工地。

十三、电气系统 electric system

1、一般要领必须由专业电气工作人员管理升降机的电气系统。备有常用的工具，如万用表、钳形电流表等。

The electric system should be administered by missionary. Tools in common use should be in stock such as multimeter, clamp current scale etc.

2、具体要求和检查办法 detailed requirement and checking methods

（1）电气出现故障时应首先查阅电气原理图，它反映电气设备的结构和功能。

Refer to the electric principle drawings which reflects the structure and functions of electric devices, should there are problems.

（2）检查供电电源的电压是否正常。

Check the voltage of power supply.

（3）当隔离开关、极限开关接通后，检查上电箱电缆进线电压是否正常。如断相与相序保护器指示灯不亮，则说明电源相序接错，将下电气箱电源线换相，指示灯即亮。

Check the voltage of the let in power of the distributor after put thought the segregate and terminal switches. Should no signal of the off-phase and phase order stands for phase order wrong. Change the wire of the lower distributor power supply to let the signal light on.

(4) 升降机不运转时，确保热继电器、安全器微动开关、吊笼门限位开关、控制线路空气开关等处于闭合状态，紧急停止按钮没有按下，主接触器应吸合。

Should no movement of hoist, check to make sure the thermal relay, safety device, terminal switch of cage door and controlling circuit to be in the state of close, emergency stop button in the state of down and in of main contactor.

(5) 检查控制吊笼上下运行的按钮信号是否能顺利到达上电气箱；上下行程限位开关信号是否能顺利到达上电气箱，用手将其动作后能否自动复位。

Make sure the button signal which controls the cage up and down, signal of terminal switch can reach the upper electric box. And see whether it can replace when placed action manually.

(6) 升降机进行上下运行试车时，应确保电机制动器彻底打开。

Make sure the motor arrester on when testing the hoist up and down.

3、电气原理图（见附图） drawing of electric principles (see attached drawings)

4、电气元件明细表（见附表） List of electric elements (see attached tables)

十四、电气及机械常见故障与分析 troubles and methods on electric and mechanism

序号 item	故障现象 trouble and problems	故障分析 analysis on troubles
1	总电源开关合闸即跳 Power off when center power on	电路内部损伤，短路或相线接地 Interior mantle of eclectic circuit, short circuit or phase line grounding
2	电源正常，但主接触器不吸合 Power in good condition but no suction of main contactor	1.有限位开关没复位 no reposition of limiter 2.相序接错 phase order wrong 3.元件损坏或线路开路断路 mangle of elements or off of opening circuit
3	操作按钮置于上下运行位置，但接触器无动作 Operating buttons in the place of moving but no action of contactor	上下限位不通 jam of top/ bottom limiter 操作按钮线路断路 circuit not thought of operating button
4	电机启动困难，并有异常响声 Troubles on motor starting with noises	制动器没有打开 off of arrester 严重超载 overload 电机缺相 lack of phase of motor
5	上下运行时限位开关不起作用，但极限开关作用 no operation on the limiter switch when moving but terminal limiter works	上下限位开关损坏 Broken of up and down limiter 限位碰块位移 Displacement of limiter 接触器粘结 contactor felt
6	交流接触器释放延时现象 AC contactor release action delay	接触器复位受阻或粘连 Suffocate of contactor reposition or conglutination
7	电路正常，但操作时又是动作正常，有时不正常 power circuit in good condition, bad when operating timely	有线路接触不好或虚接 Circuit not in good condition
8	吊笼不能起动，电动机堵转 No lift of the cage and motor stopped	制动器未打开 Close of arrester 超载、供电电压低于 360 伏或供电阻抗过大 Overload, power voltage less than 360V or resistance overmuch

9	吊笼上下运行时有自停现象 Cage stopped itself when moving	超载运行, 热继电器动作 Overloaded, heat relay works 线路接触不好 Circuit in bad condition 吊笼门未关好, 门限位开关接触不好 Cage door not closed well, contactor of door limiter in bad condition
10	传动机构温升过大 Overheat on the driving mechanism	润滑油不足或变质 lack of lubricate or out of date 吊笼运行时有异常阻力 resistance when the cage moving
11	正常运行时安全器动作 Operating of safety device when driving normally	标定速度太低 离心甩块弹簧松脱
12	电机制动器不脱开 No come away of motro arrester	升、降接触器辅助触点损坏 broken of the assistant material on ascend and descend contactor 制动器线圈损坏 broken of the arrester winding 整流桥损坏 broken of rectifying bridge
13	吊笼运行时有抖动现象 Wobbles when the cage moving	齿轮啮合侧隙太大 too much space of the gear joggle 滚轮间隙过大 too much space of trolley

十五、主要易损件明细表 List of breakable parts

序号 item	名称 name	数量 qty	规格或型号 model/type
1	驱动齿轮 driving gear	6	模数 8, 齿数 15 Modulus8, tooth 15
2	背轮 back gear	6	外径 $\Phi 124\text{mm}$ outline diameter
3	滚轮 trolley	40	底径 $\Phi 74\text{mm}$ Bottom diameter $\Phi 74\text{mm}$
4	减速机输入端油封 Oil seal on the input end of reducer	6	
5	电机摩擦盘 motor friction disk	6 个/台 6 units per set	
6	按钮 press button	6	上升、下降、急停 ascend/descend/ emergency stop

十六、主要外购件明细表 List of spare parts

序号 item	名称 name	数量 qty	型号 type
1	电动机 motor power	6 个/台 6 units per set	
2	减速机 reducer	6 个/台 6 units per set	

3	安全器 safety device	2 个/台 2 units per set	SAJ3.0-1.2
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