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SC 节能型施工升降机

Energy-saving SC Construction Hoist

技术标书

Tender Book

(海外版 Oversea version)



中联重科股份有限公司

ZOOMLION HEAVY INDUSTRY SCIENCE AND TECHNOLOGY CO. LTD.

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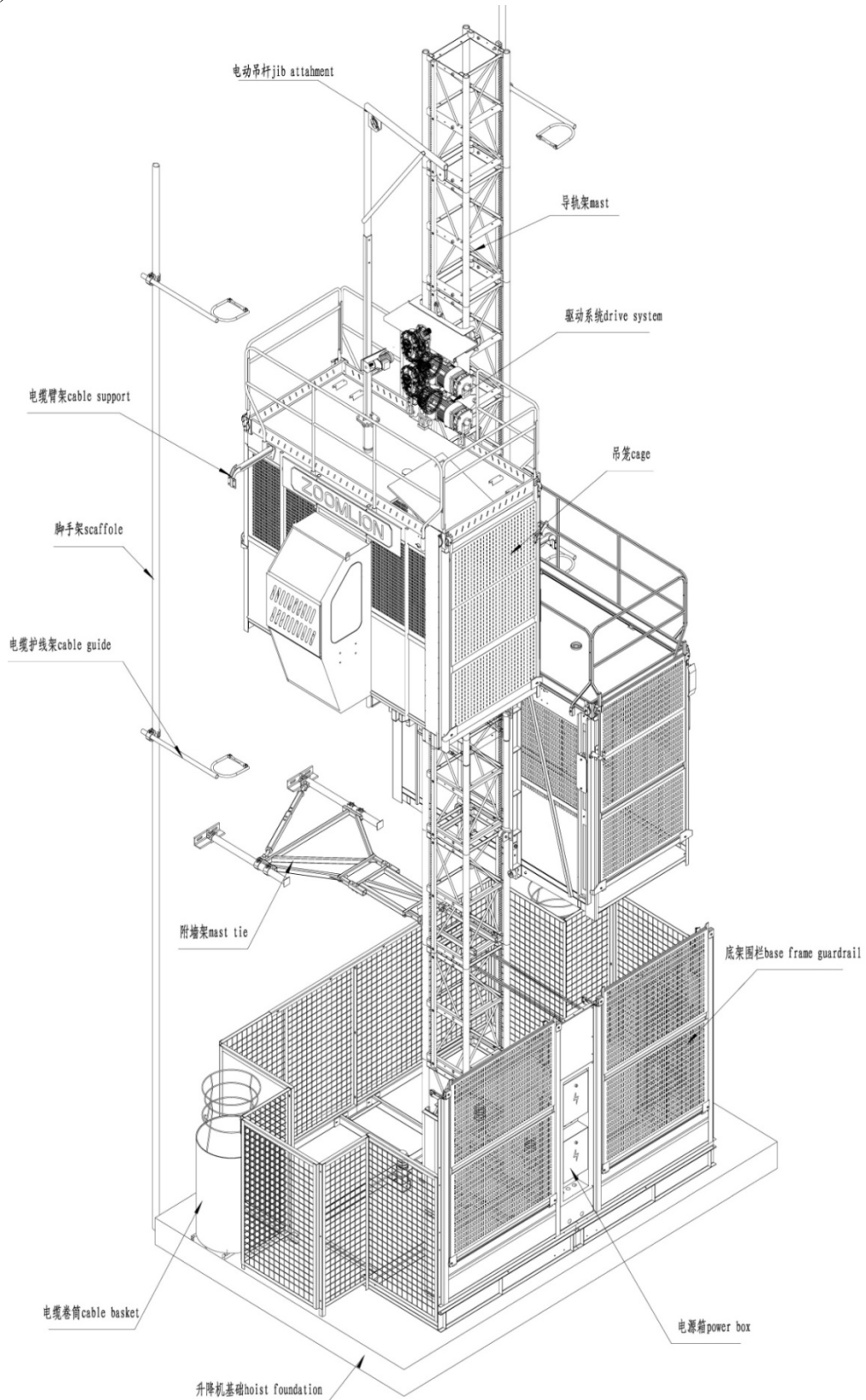
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日 期 Date: 2020.06.01

1. 简图 Overall drawing of construction hoist

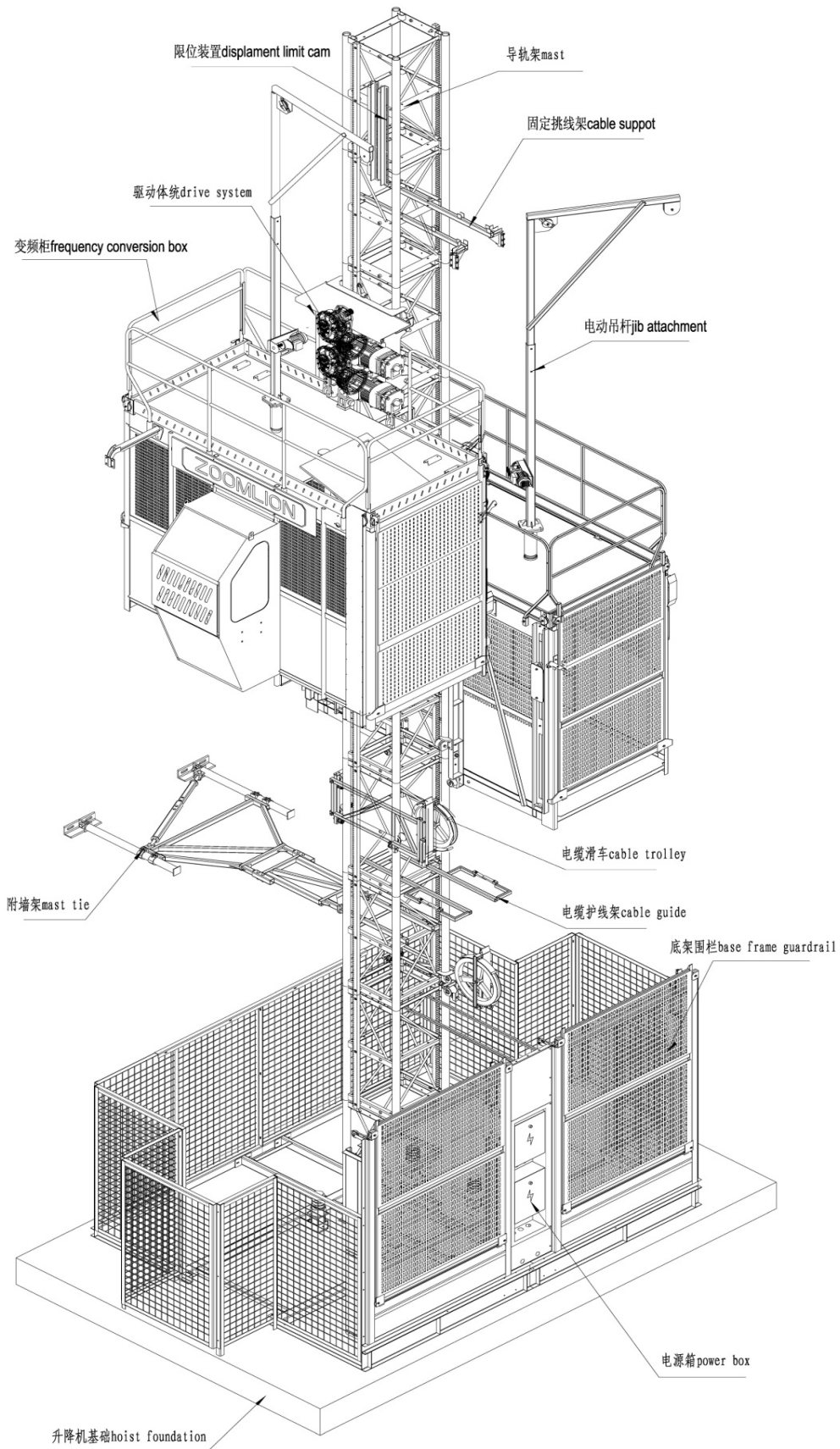
a. 节能型 BWM-3I、BWM-3S(电缆卷筒式) 示意图

Overall drawing of energy-saving BWM-3I、BWM-3S construction hoist (type of cable basket).



b. 节能型 BWM-3I、BWM-3S (电缆滑车式) 示意图

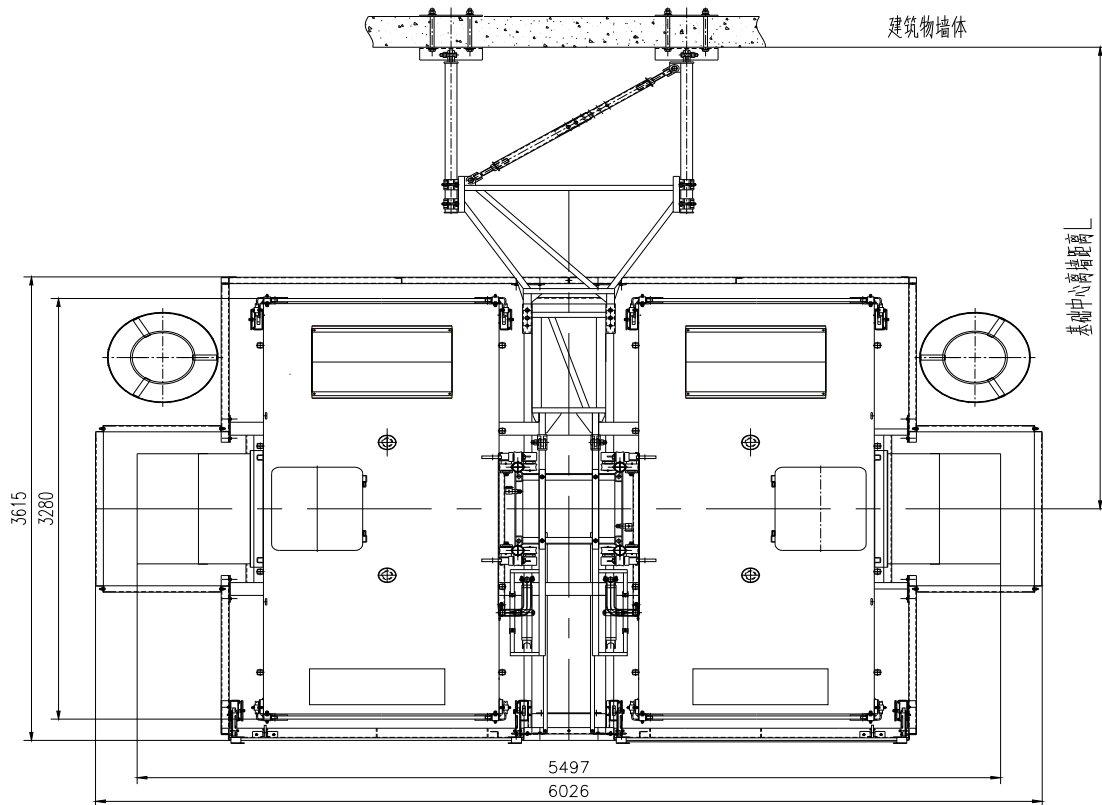
Overall drawing of energy-saving BWM-3E、BWM-3I、BWM-3S construction hoist (type of cable trolley guide).



c. 各主要部件单重: Weight of each part:

序号 No.	零部件名称 Name	重量 (Kg) Weight(Kg)	序号 No.	零部件名称 Name	重量 (kg) Weight(Kg)
1	导轨架 mast	145 (4.5mm)	6	附着装置 Mast tie	134 (IIA)
		160 (6mm)			145 (IIB)
		180 (8mm)			160 (IIC)
		195 (10mm)			140 (IID)
2	驱动单元 Drive units	187	7	吊笼总成 cage	1497
3	固定线架 Fixed cable holder	11	8	护线架 Cable protect frame	11
4	电动吊杆 Electric suspender	135	9	电缆滑车 cable guide	34
5	驱动体 Driven system	160	10	底架围栏 Base level enclosure	1270

d. 平面示意图 Top view of construction hoist



其中图中尺寸 L 根据工地实际情况选用附墙的类型而定.

L is determined by the type of mast tie according to the situation of building site.

2. 遵循的主要标准 Main standard followed

GB/T 3811—2008	《起重机设计规范》〈Design rules for cranes〉
GB 26557—2011	《吊笼有垂直导向的人货两用施工升降机》 〈Builders hoists for persons and materials with vertically guided cage〉
EN 12159-2000	《带垂直导轨式吊笼的人货两用施工升降机》（当产品铭牌标注 CE 标识时） 〈Builders hoists for persons and materials with vertically guided cage〉 (When there are CE sign on the deta plate)

3 公司简介 Introduce of Zoomlion

中联重科股份有限公司（简称中联重科）专业从事工程机械研发、制造与销售，产品覆盖建筑及工程起重设备、混凝土机械、高等级公路施工及养护设备等领域，为全球产品链最齐备的工程机械企业。中联重科携世界顶尖的行业技术、13 大类别、66 个产品系列、800 多个品种的工程机械产品和全球研发、制造和营销服务体系，为客户提供工程机械整体解决方案。公司成立 20 年来，年均复合增长率超过 65%，为全球增长最为迅速的工程机械企业，现有员工 30000 多人，2011 年在全球工程机械行业排名第七位，在中国机械工业 100 强排名第五。

Zoomlion heavy industry science and technology co., ltd (Zoomlion for short) is specialized in researching, manufacturing and selling of construction machinery, such as hoisting equipment of construction and engineering, concrete machinery, equipment for highway construction or maintenance, etc. There are 13 types, 66 series and more than 800 kinds of products in Zoomlion with advanced technical, global research, manufacture and marketing system, which is convenient to provide service for users. The compound growth rate is larger than 65% in the 20 years from the company set up. It grows the fastest in the world in construction machinery industry. There are at least 30000 employers. It ranks 7th in global construction machinery industry, and ranks 5th in 100 top mechanical industry in china.

中联重科拥有多年施工升降机设计与研究经验，是施工升降机技术归口单位，行业技术覆盖率达 80%。

Zoomlion owns rich experience in design and research construction hoist. It is specialized department of construction hoist technical. The coverage fraction of the construction hoist technical is 80% in Zoomlion.

4 概述 Summarize

节能型 BWM-3 系列施工升降机由 SC200/200 第三代施工升降机升级换代而来；该系列升降机由 28 人专业团队，历时 10 个月研发，集 18 项国家专利技术于一身。其项目核心为：高效节能；从节能、减振、免调试维护、安装便捷、安全可靠、使用方便等方面对产品进行了全面的提升。SC200/200 是中联施工升降机主打型号，而节能型 BWM-3 系列产品的诞生，将进一步扩大公司在施工升降机行业的领先地位，带给客户一种全新的感受和体验。

Energy-saving BWM-3 serial construction hoist is upgraded from 3rd SC200/200, which is researched by a

team of 28 persons last for 10 months and includes 18 items state patent. The core technical is high-efficiency and energy-saving. It is promoted in the many aspects, such as energy-saving, vibration reducing, without debugging and maintenance, easy installation, safety and reliable, convenient to use etc. SC200/200 construction hoist is the main product of zoomlion, while the burned of energy-saving BWM-3 serial construction hoist will more enlarge the leader position in construction hoist market.

4.1 型号说明: Explanation of type

SC200/200E 表示双笼，每个吊笼载重量为 2000kg 的二传动齿轮齿条式施工升降机；

SC200/200E indicates the double-cage two-motor ordinary construction hoist of which the carrying capacity of every cage is 2000kg;

SC200/200EB 表示双笼，每个吊笼载重量为 2000kg 的二传动齿轮齿条式变频施工升降机；

SC200/200EB indicates the double-cage two-motor ordinary variable-frequency construction hoist of which the carrying capacity of every cage is 2000kg;

4.2 整机配置 Configuration

中联重科“节能型 BWM-3”系列施工升降机 Energy-saving BWM-3 serial construction hoist		
机型 Type 配置 Configuration	智能版 Intelligence	精英版 Super
代号 Code	SC200/200E (BWM-3I)	SC200/200EB (BWM-3S)
定义 Designation	高效传动、智能版 HLC、智能版操作台、升降机远程管理系统 High-efficiency transmission system, intelligent HLC and operation table, remote management system	高效传动、智能版 HLC、精英版操作台、升降机远程管理系统、变频控制、自动平层(选配) High-efficiency transmission system, intelligent HLC, super operation table, remote management system, inverter control, automatic landing (option configuration)
配置升级包 configuration upgrade package		
名称 name	描述 description	升级配置 upgrade configuration
IS 升级包 IS upgrade package	智能版升级到精英版 Intelligence upgrade to super	操作台升级、变频控制系统、自动平层 (选配) operation upgrade, inverter control and automatic landing (option configuration)

参数配置表 parameter configuration		
基本参数 basic parameter		
产品型号 Type	SC200/200E	SC200/200EB
额定载重量 Rated load	2×2000kg	
吊笼尺寸 (长*宽*高) Specification of Cage (length*width*height)	3.2m×1.5m×2.2m	
提升速度 Lifting speed	36m/min	0~40m/min
电机功率 Motor power	2×2×13kw	
减速机速比 Reductor ratio	1:16	
防坠安全器 Safety device	SAJ40-1.2	
标准节尺寸 Size of mast section	650mm×650mm×1508mm	
升降机远程管理系统 remote management system		
设备管理 Equipment management	●	●
故障报警 Failure warning	●	●
状态查询 Status inquiry	●	●
维保管理 Maintenance management	●	●
机手管理 Driver management	●	●
GPS 定位 GPS location	●	●
远程监控 Remote control	●	●
工程管理	●	●

Project management		
高效传动 High-efficiency transmission system		
高效减速机 High-efficiency reductor	●	●
一体式驱动体 Integrated drive	●	●
防松背轮 Prevent loosening back wheel	●	●
防松滚轮 Prevent loosening idler wheel	●	●
吊笼 cage		
230 立柱 230 column	●	●
装饰铝板 Decorative Aluminium plate	●	●
翻板出料门 Turnover discharge door	●	●
安全器防护罩 Safety device cover	●	●
LED 照明灯 LED lamp	●	●
封闭式滑槽 Closed slide way	●	●
司机室 (带推拉窗、钢化玻璃) Cab (with sash window and stalinite)	●	●
司机室风扇 Fan for cab	●	●
舒适型座椅 Comfortable seat	●	●
工具箱 Tool box	●	●
智能控制系统 intelligent control system		
一体式电控箱 Integrated electric cabinet	●	●

工频 Power frequency	●	-
变频 Frequency conversion	-	●
工变频转换 Working frequency conversion	-	○
HLC	智能版 Intelligence	精英版 Super
SIM 卡 SIM card	●	●
超载保护器 Overload protection	●	●
防粘连功能 Anti-adhesion function	●	●
防冲顶限位装置 Prevent running to top device	●	●
里程显示 Milage displaying	●	●
运行时间显示 Running time displaying	●	●
电流电压检测 Current and voltage measuring	-	●
BWM 操作台 BWM operation table		
BWM 操作台 BWM operation table	智能版 Intelligence	精英版 Super
自动平层 Automatic landing	-	●
故障诊断 Fault diagnosis	●	●
状态提示 Status displaying	●	●
楼层显示 Landing displaying	●	●
载荷显示 Load displaying	●	●

黑匣子功能 Black box function	●	●
后备电源应急楼呼供电 Back-up source supply power for emergency landing call	●	●
集成无线楼层呼叫系统 Wireless integrated landing call system	●	●
楼层语言播报 Landing broadcast	●	●
附件 accessories		
快装式外围栏 Quick-assembled outside enclosure	●	●
新型电缆卷筒 New cable drum	三选一 choose one from the three kinds (100m 以下建议配置电缆卷筒、100m 以上配置电缆滑车式) (choose cable drum for the height below 100m, while choose tackle for the height upper 100m)	
230 红旗滑车 (门槛高度 680mm) 230 red flag tackle (height of doorsill is 680mm)		
500 红旗滑车 (门槛高度 950mm) 500 red flag tackle (height of doorsill is 950mm)		
III 型附墙(3m~3.6m) III-type mast tie (3m~3.6m)	●	●
电动吊杆 Electric suspender	●	●
维修节 Maintenance mast	○	○
涂装 Painting		
工程黄配色方案 Engineering yellow	○	○
中联红配色方案 Zoomlion red	○	○
极光绿 Laser green	●	●

电泳标节 Electrophoresis mast	○	○
热浸锌标节 Zinc immersion mast	●	●
电镀锌齿条 Electro galvanizing rack	●	●
定制服务 (配件选装) ordered serving (optional accessories)		
自动加油机 Automatic oiling machine	○	○
850 天窗 (带气动弹簧) 850 skylight (with pneumatic spring)	○	○
司机室推拉门 Sash door for cab	○	○
外围栏平推门 Horizontal sliding door for outside enclosure	○	○
说明： “●” 标配，“○” 选配，“-” 无该项配置； Note： “●” standard configuration, “○” option configuration, “-” without configuration		
整机工业设计方案： 工程黄 中联红 极光绿		
Project of industry design: Engineering yellow Zoomlion red Laser green		

4.3 主要优势: Main advantage

全新 BWM-3 节能型施工升降机除继承 SC 系列通用型施工升降机各项优点，还拥有以下几方面的优势。

Energy-saving BWM-3 serial construction hoist not only has all advantages of SC serial normal construction hoist, but also has the following advantages:

4.3.1 高效节能 High-efficiency and energy-saving

研发了高效节能减速机，减速机效率高达 95%，较目前行业传统的效率大大提升，使一台施工升降机的单笼功率降低 7kw，双笼功率降低 14kw 为用户节省使用电费一年 2 万多元；

It has high-efficiency and energy-saving reductor whose efficiency can reach 95%, which is a big promote in traditional system at present. It can reduce the power 7kW for signal cage, and 14kW for double cage. Then save electric charge 20,000 Yuan for user.

节能系统结构，使得电控系统电流冲击小，电控元件使用寿命高，故障率低；



The structure of energy- saving can reduce the current impact of electric control system, thus improve the life of electrical part and reduce the rate of failure.

节能系统结构,使得升降机在启动过程中电压适应性强,满足工地电供应不足时的低电压启动性能;

The structure of energy- saving can enhance the voltage flexibility in startup process to satisfy the lower voltage startup performance when lackage of power supply.

节能系统机构,使得减速机电机运行过程中温升低,适合高温天气的运行需求,

The structure of energy- saving can reduce the temperature rise in the process of reductor motor running to fit the high temperature weather.

4.3.2 手自一体智能化控制(自动平层选配); Manual and automatic integrated intelligent control (automatic landing option configuration)



具有自动平层功能(按设定楼层自动到达),并能手动操作;手动和自动可自由切换;

It has automatic landing function and can be manual operation. And manual and automatic can be exchanged freely.

优势: Advantages:

更轻松: 自动平层, 不用机手观察楼层位置, 降低机手劳动强度

Easier: automatic landing, don't need to observe the landing position, and reduce the driver's work load.

更可靠: 手/自动自由切换, 双系统, 万一一套系统出现故障, 另一套可操作, 双重保险

More reliable: freely exchange between manual and automatic, double systems, if one system is failure, the other system can operate.

冲击小: 减少频繁点动, 降低冲击, 提升元件寿命;

Lower impact: reduce continually inching, reduce impact, and increase parts life.

4.3.3 升降机远程管理系统 Long distance management system

可通过手机 APP 远程管理, 通过 GPS 网络技术, 进行设备管理, 进行维护保养管理提醒及跟踪, 进行机手及维保人员的日常管理. 并可进行远程故障诊断, 95%的常见故障可远程判断;

The construction hoist can be managed by long distance management system of mobile APP and GPS internet technology, which is used to reminder and follow up maintenance, daily management of diver and

maintenance person, and long distance diagnose failure. 95% failure can be diagnosed by long distance system.

- **管设备：设备位置**, 故障提醒、状态查询、工地管理、运行参数记录等；

Manage equipment: the position, failure reminder, status inquiry, site management, not running parameter.

- **管维保**: 维保指南、维保周期提醒、维保完成确认

Manage maintenance: maintenance guide, reminder of maintenance period, infirm finishing maintenance.

- **管人员机手考勤管理**、维保执行管理、工作备忘

Manage person: attendance management of driver, maintenance performed management, work to-do list.



具有身份认证功能, 可区分管理人员, 维护人员, 操作人员, 不同人员具有不同权限, (可进行不同的 操作, 如机手没有维护功能, 则不能进行笼顶操作等), 避免违规操作, 升降机更安全;

The long distance management has the identity verification function, which can manage administrator, maintenance person and operator separately. Different kinds of people have different right to operate to avoid abnormal operation, (such as divers don't have maintenance function) and which makes the construction more safety.

多功能显示屏: Multi-function display

楼层呼叫显示, 语音播报; 当前楼层和目标楼层显示, 更直观; 异常状态图示化, 故障代码显示, 大幅提升故障处理效率。

Floor call display, landing broadcast;

Current landing and objective landing display, more directly;

Unnormal status graphical representation and failure code display, which improve the efficiency of failure process.

4.3.4 安装拆卸维护方便: Convenience for installing, dismantling and maintenance



a) 方便管理：驱动系统和吊笼互换性强, 不需要一一对应, 相同机型驱动系统可互换使用, 减少用户的管理成本;

Convenience for management: driven system and cage can be freely exchanged with that of other the same type hoists, which reduce the management cost for users.

b) 方便安装：驱动体整体高度低至 1.4 米, 便于加油润滑, 安装加节;

Convenience for installing: the height of the whole driven system is 1.4m, which is convenience to add grease and mast section.



3. 免调试—防松滚轮和背轮：背轮滚轮调试完成后进行锁定, 永久防松, 用户直接安装, 不用调试;
No debug: Prevent loosening back wheel and idler wheel, locking back wheel and idler wheel after debugging and they will be locked forever, installed directly.

4. 免调试：安全器不用调节齿轮齿条间隙, 直接装配;

No debug: directly installing safety device and don't need to adjust the clearance of gear and rack.

5. 免维护——所有轴承均实现免润滑:

Reduce maintenance: all bearing are non-lubrication.

6. 方便使用——低高度红旗滑车, 使门槛高度降低到 0.68m, 运料轻松;

Convenience for using: lower height of cable trolley guide; reduce the height of doorsill to 0.68 m and easy to transport material.

7. 方便安装——底架护栏采用快装式, 方便快捷;

Convenience for installing: quick-assembly base enclosure, convenient and efficient.

8. 方便安装——850mm 大天窗设计, 方便从笼内吊装标准节;

Convenience for installing: 850mm big emergency escape to lift mast section from cage.

9. 方便使用——封闭式滑槽设计, 提高结构强度的同时可防止杂物掉入槽内。运行顺畅兼顾外形美观。

Convenience for using: closed slide groove which enhance the strength of the structure and avoid the sundries falling into slide way. Running smoothly and looking appearance.

10. 方便安装——采用一体式电控柜, 现场接线少, 降低工作量及错接线故障;

Convenience for installing: integral electrical cabinet, reduce cable connection in site, reduce work load and

failure of wrong connection.

11. 减少维护—采用新型减速机，润滑油换油周期由传统的 0.5 年 1 次减少为 4 年 1 次；

Reduce maintenance: using new reductor, the times of change the grease is reduced from 2 times a year to 1 time 4years.

12. 方便使用—照明灯：配备先进的 LED 灯，具有节能、寿命长、环保、高亮度等特点；

Convenience for using: using advanced LED lamp, which has the characteristic of energy-saving, long life, environmental protection and high light.

13. 方便使用—具有后备电源应急供电，使得升降机在底架护栏门打开时能正常供电使用；

Convenience for using: Back-up power for emergency power supply to normal work for hoist when the discharge door opened.

4.3.5. 安全可靠 Safety and reliable

a) 宽立柱设计，侧滚轮，前后勾轮均包裹在内部，并采用双支撑；安全系数高；

Width column is designed to coverside wheel inside. And adopt double bracing to increase safety factor.

b) 主令开关，自带零位保护，有效防止人为或系统误动作

Control switch with zero protection to avoid wrong action of personal or system.

c) 电控系统具有防粘连设计，增加安全冗余，防止冲顶/冲底/下坠的风险（若接触器粘连，将触发保护接触器动作，断电）

Anti-adhesion is designed for electrical control system, which adds safety redundancy function and prevents rushing out, shock underside or wrong running.

d) 采用双制动接触器进行制动，具有采用双保险，更安全

Adopt double brake contactor to brake, more safety.

e) 每个电机独立热保护，任何一个电机过流都会触发热保护，防止电机烧坏

Thermal protection for every motor separately. When motor is overcurrent, thermal protection will be touched off to prevent the motor broken.

f) 防止冲顶，保证运行安全，尤其是提高设备拆装时的安全性

Prevent rushing out device, ensure running safety, and especially improve the safety of installing and dismantling.

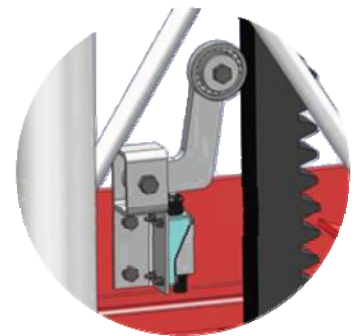
g) 下电箱正面配置急停按钮，便于在紧急情况快速切断电源

There is emergency button on the electrical box to cut off power in emergency situation.

h) 控制回路采用变压器隔离，防止因触电而发生危险；

The control circuit is insulated by transformer to prevent danger because of electric shocking.

i) 下电箱配置主控空气开关，有效防止主电缆破皮而引发安全事故



There is air switch on the electrical box to prevent accident because of main cable broken.

5 施工升降机整机介绍 Introduction of the whole hoist

SC 节能型施工升降机是中联重科精心设计及制造，国家建筑城建机械质量监督检验中心严格检验、监督、生产，技术性能国内领先的一类新型施工升降机。它具有性能稳定、安全可靠、节能降耗、搬运灵活、安装与拆卸方便、适应性强等优点，降低了施工人员的劳动强度，是建筑施工中安全高效的垂直运输设备。

SC serial construction hoist is an elaborate product of Zoomlion which has leading technical performance in state, and is tested and supervised by the State Urban Construction Machinery Quality Supervision and Inspection Center. It has many advantages, such as stability performance, safety and reliable, energy-saving, convenience to installing and dismantling, etc. Thus it can reduce the labor intensity, and is the vertically transport equipment which is more safety and high- efficiency in construction.

5.1 整机性能 Performance of the whole hoist

在工作或非工作状态均具有承受各种规定载荷而不倾翻的稳定性。

It can endure all set loads and not falling down no matter in service or out of service.

在最大独立高度时的抗倾翻力矩不小于该工况最大倾翻力矩的 1.5 倍。

The anti-overturning moment is not smaller than 1.5 times of the maximum overturning moment at the free standing height.

在动态试验时，有超载 25% 的能力。但在正常作业时，不应超载运行。

It can endure overload 25% rated load in dynamic test. But in normal working station, overload running is not allowed.

在正常工作时，防坠安全器不动作。当吊笼超速运行时，其速度达到防坠安全器的动作速度时，防坠安全器立即动作，并可可靠的制停吊笼。防坠安全器动作后，其电气连锁安全开关可靠地切断传动系统的控制电源，该安全开关以常闭的方式连接。

The safety device is not working in normal working station. But when the cage running at an overspeed, and the speed reach at the work speed of the safety device, the safety device will work soon and stop the cage.

5.2 主体结构 Main structure

5.2.1 吊笼 Cage

吊笼为一种钢结构，由安装在吊笼上的滚轮沿导轨架运行，并设有进、出口门。吊笼顶部设有活动门，通过配备的专用梯子，可方便地攀登到吊笼顶部进行安装和维修，在安装和拆卸时，吊笼顶部可作为工作平台，由笼顶护栏围住。

The cage is a steel structure, runs along the mast section via the rollers installed on cage, and is equipped with entrance and exit. The entrance and exit of cage is vertically door. The cage roof is equipped with an emergency escape, and the specially-provided ladder makes it easy to climb up onto the cage roof for carrying out erection and repair. During the erection and dismantling, the cage roof may serve as working platform, and is enclosed by cage roof safety railing.

吊笼上装有电气联锁装置，当笼门开启时吊笼将停止工作，确保吊笼内人员的安全。

The cage is equipped with electrical interlock device, and when the cage door is opened, the cage will stop, so as to ensure the safety of persons in cage.

吊笼一侧装有司机室，供司机操作时用。全部操作开关均设在司机室内。

On one side of the cage, the cab is installed, for the operator to operate the hoist. All operation switches are located in cab.

吊笼采用铝板装饰，根据用户需求可不带司机室

The cage is decorated with aluminum sheets, and the cab may be moved according to the needs of user.

5.2.2 导轨架 Mast

导轨架是施工升降机的运行轨道，由长度为1508mm的标准节通过8.8级M24×230高强度螺栓连接组成（螺栓安装预紧力矩不小于300N·m）。标准节由无缝钢管或焊管、角钢或冷弯型钢、钢管等焊接而成，标准节装有齿条（单笼标准节为1根齿条，双笼标准节为2根齿条），每根齿条通过三件内六角螺钉紧固，齿条可拆换，根据安装高度不同，标准节主弦管的壁厚配置也不相同。

The mast is the rail on which the construction hoist runs, and is composed of 1508mm mast sections connected with class-8.8 M24×230 high-strength bolts (The pre-tightening torque for bolts is no less than 300N·m). The mast section is composed of seamless steel tube or welded tube, angle steel or molded section and steel tube, the mast section is equipped with rack (one rack for single-cage mast section, and two racks for double-cage mast section), and every rack is fixed with three screws. The rack is removable and replaceable, and on the basis of the installed height, the thickness of main chord of mast section also varies.

标准节四根主弦杆下端焊有止口，齿条下端设有圆柱销，便于标准节安装时准确定位。SC系列施工升降机标准节的截面中心尺寸为650×650mm；SC系列工业电梯标准节的截面中心尺寸为650×200mm，导轨架通过附墙架与建筑物联接。

The lower end of four main chords on mast section is equipped with a port, and the lower end of rack is equipped with a cylindrical pin, so as to facilitate the accurate positioning of mast section in the course of erection. The central dimension of mast section of SC construction hoist is 650×650mm; the central dimension of mast section of SC industrial hoist is 650×200mm, and the mast is connected to the building via mast ties.

5.2.3 附墙架 Mast tie

附墙架是导轨架与建筑物之间的联接部件，用以保持施工升降机导轨架及整体结构的稳定。

The mast tie is the connecting component between mast and building, and is used to maintain the stability of mast and overall structure of construction hoist.

我司采用快装式设计，原来采用M24×90螺栓连接的位置全部升级为Φ24销轴2和D型保险销，安装更加快捷，提升作业效率，同时可避免因螺栓头上有水泥等杂质而导致无法拆卸的问题。

The mast tie adopts quick-assembled design, the connection position is upgraded from M24×90 bolts to Φ24 pins and D-type safety pin. And it is convenience to assemble. At the same time it can avoid the dismantling problems because of some impurity such as cement on bolts head.

5.3 驱动系统 driven system

驱动系统包括驱动体和驱动单元，驱动体是将传动装置相互联接成整体结构的部件，它将驱动单元产生的驱动力传递给吊笼，使之能够上下运行。驱动体与驱动单元的连接螺栓采用8.8级高强度螺栓连接。

The drive system is composed of driving structure and drive unit. All drive units are installed on the driving structure which transmits the driving force generated by drive unit to the cage, so that the cage will move up and down. The connecting bolts of driving body and drive unit are class-8.8 high-strength bolts.

驱动单元是施工升降机运行的动力部分，该机由一组或几组动力源同时工作，共同作用，带动施工升降机自重部分及吊笼内载荷（或施工人员）上下运行。驱动单元由驱动齿轮、减速器、联轴器（梅花形弹性元件）、电动机（带制动器）等组成。

The drive unit is the power unit of construction hoist, which moves up and down the construction hoist and the load (or construction personnel) in cage. The drive unit is composed of driving gear, reductor, coupling and motor (with brake).

SC节能型施工升降机驱动系统设置在吊笼顶部，大大降低了笼内噪声等对乘员的直接影响。采用二电机、二减速机驱动，二套装置各自独立，每台电机均装有直流电磁制动器，且制动磨擦副具有自动跟踪、调整制动间隙的功能，从而改善了制动性能，使该系统平稳可靠；减速机采用蜗轮蜗杆及锥齿二级传动，结构紧凑、传动效率可达95%、运转平稳、噪声低、免维护、使用寿命长等优点；电机与减速机之间的联轴节采用特制的梅花型弹性联轴节，其结构合理、性能优良，具有减小起、制动冲击的功能；

The driven system is installed on the top of cage, which reduce the noise in cage. It has double motors and reductors, and the two devices are separate. Every motor has DC electromagnetic brake, and the brake friction pair has the function of automatic tracking and adjusting the brake clearance, which can improve the brake performance to make the system more steady and reliable. The reductor adopts two-stage drive of worm and gear and angle gear, which has the advantages of structure compact, transmission efficiency high (reaches to 95%), running steady, lower noise, maintenance free and long lifetime. The couplings connecting motor and reductor are of claw type, and there are elastic elements (polyurethane rubber) between two couplings so as to reduce the shock and vibration during operation.

BWM-3S施工升降机驱动系统配置变频调速系统，能提高启制动的平稳性；降低启动电流及机械磨损，延长易损件寿命；提高工作效率；节约能源。

The drive system of variable-frequency speed-regulation construction hoist is equipped with a variable-frequency speed-regulation system, which can improve the smoothness in the course of start and braking operation; realize the stepless adjustment of operation speed within a certain range; reduce the starting current and mechanical wear, and prolong the service life of wearing parts; improve the working efficiency; save energy.

5.4 电气控制系统 Electrical Control System

施工升降机的所有动作都是由电气系统操纵运行。电气系统包括电控箱、电阻箱、电源箱、司机室操纵台、主控制电缆及各种限位开关等。

All actions of construction hoist are controlled via the electrical system. The electrical system is composed of electrical control cabinet, resistor Box, power box, operating console in cab, main control cable and various limit switches.

5.4.1 电控箱 Electrical Control Cabinet

电控箱是施工升降机电气系统的核心部分，内部主要配有上、下运行接触器、控制变压器、过热保护器、变频器（变频调速施工升降机）及断相与相序保护继电器等。电控箱装于吊笼内部。

The electrical control cabinet is the heart of electrical system of construction hoist, and is mainly composed of up/down operation contactor, control transformer, overheating protector, frequency converter (for variable-frequency speed-regulation construction hoist) and open-phase & phase sequence relay. The electrical control cabinet is installed in cage. As for variable-frequency speed-regulation construction hoist, the electrical control cabinet is normally installed on cage roof.

5.4.2 电源箱 Power Box

电源箱是施工升降机控制部分的电源供给处，安装于底架护栏上。

The power box is the part which supplies power to the control system of construction hoist, and is installed on baseframe and base enclosure.

5.4.3 电阻箱：Resistor Box

电阻箱一般固定在笼顶围栏上，电阻用来消耗施工升降机在下降过程中的能量。

Normally, the resistor box is fixed onto the base enclosure on cage roof, and the resistor is used to consume the energy in the course of downward moving.

5.5 安全保护装置 Safety protection device

5.5.1 防坠安全器 Safety device

SAJ防坠安全器主要由外壳、制动锥鼓、离心块、弹簧和行程开关等组成。当吊笼意外超速下降时，防坠安全器里的离心块克服弹簧拉力逐渐增大摩擦力，确保吊笼平稳制动停止在导轨架上，同时行程开关动作，切断控制电源，确保人员和设备的安全。

SAJ safety device is mainly composed of casing, brake cone, centrifugal block, spring and stroke switch. When the cage accidentally drops at an overspeed, the centrifugal block in safety device will overcome the pulling force of spring and drive the brake cone to rotate, and the screw connected will turn in, the brake cone will contact with the casing, and the frictional force will increase gradually, so as to ensure that the cage is braked smoothly. In addition, the stroke switch will act and cut off cage power supply, so as to ensure the safety of personnel and equipment.

5.5.3 超载保护器 Overload protection device

SC-1超载保护器由控制主机和称重传感器两部分组成。称重传感器将吊笼内的重量值转换成电信号送往控制主机。控制主机负责处理来自称重传感器的模拟信号。控制主机内部的中央处理器根据设定的参数对采集到的信号自动进行转换、计算、比较，将需要显示的数据送往显示部分，控制信号则通过固态继电器转换方式输出。

SC-1 overload protection device is composed of main controller and weighing sensor. Weighing sensor can transfer the weight data in cage to electrical signal and send it to main controller. Main computer is responsible for processing that single. The gathered single is transferred, calculated and compared by the CPU in the control computer according to the given parameter. After that send the display data to display and the control single is

outputted by solid-state relay.

控制主机将传感器所采集的重量信号与设定的吊笼额定载重量相比较。当实际重量达到吊笼额定载重量的95%时，预警功能实现，预警指示灯点亮，蜂鸣器发出断续响声；当实际重量超过吊笼额定载荷的105%时，报警功能实现，报警指示灯点亮，蜂鸣器发出连续的响声，升降机不能工作运行。

The gathered weight single is compared with the rate load of cage by control computer. When it reaches to 95% rate load, the warning function will be expression. Warning light is on and buzzer makes intermittent sound. When it reaches to 105% rate load, the warning function will be expression. Warning light is on and buzzer makes continuous sound, at the same time the hoist can't run until the weight release to allowable.

5.5.4 限位装置 The limit device

限位装置包括上、下减速限位开关，上、下限位开关及极限开关。

The limit devices include terminal stopping switches, and final limit switch, the variable-frequency speed-regulation construction hoist is also equipped with up/down deceleration final limit switch, variable-frequency construction hoists are only equipped with a deceleration limit.

吊笼上、下减速限位开关保证施工升降机从高速档减为低速档。上、下限位开关保证吊笼运行至上、下指定位置时自动切断电源使施工升降机停止运行。

The terminal stopping switches ensure that when the cage moves up or down to the designated position, the power supply will be cut off automatically, so as to stop the construction hoist. The up/down deceleration final limit switch is used to ensure that the construction hoist is switched over from high-speed to low-speed.

极限开关保证吊笼在运行至上、下限位后，因限位开关故障失灵而继续运行时立即切断主电源，使吊笼止停，保证吊笼往上运行不冒顶、往下运行不撞底。

The final limit switch ensures that if the cage continues to move after moving to the upper/lower limit position owing to failure of final limit switch, the main power supply will be immediately cut off so as to stop the cage, so that the cage will not exceed the top when moving upwards and will not collide into the foundation when moving downwards.

5.6 电缆导向系统 Cable guiding device

5.6.1 电缆卷筒 Cable Basket

电缆卷筒是用来收、放电缆的部件。因受风力影响较大，通常只用于安装高度不大于100m及风力较小的场合。当吊笼向上运行时，吊笼带动电缆卷筒内的主电缆向上运行；当吊笼向下运行时，主电缆缓缓收入电缆卷筒内，防止主电缆散落在地上被轧坏而发生危险。

Cable basket is the component used to storage the cable. Since the wind may cause relatively great impact on cable basket, normally it is only used in the situation that the installed height is no more than 100m and the wind force is relatively low. When the cage is moving upwards, the main cable in cable basket will move upwards; when the cage is moving downwards, the main cable will be slowly retracted into the cable basket, so as to prevent the main cable from being piled on ground and causing hazard.

5.6.2 电缆滑车 Cable Trolley

当施工升降机安装高度较高时，此时受供电电压、风力及自身重力的影响较大，可选用电缆滑车，电

缆滑车安装在吊笼的下部，结构简单、安装方便，该升降机的导轨架不仅是吊笼的运行轨道也是电缆滑车的运行轨道，因而受风力影响较小，使用场合非常普通，现有电缆滑车为组合式，左右笼可以互换。

When the erection weight of construction hoist is relatively high, the influence from supply voltage, wind force and dead weight will be relatively high. In such case, the trolley may be adopted. The tackle is installed on lower portion of cage, is of simple structure, and is easy to install. The mast of this hoist is not only the running rail of cage, but also the running rail of tackle, so that it is not so seriously affected by wind force and is widely used. The existing trolley is of combined type, and the tackles for left and right cages are interchangeable.

5.6.3 电缆臂架 Cable Arm

电缆臂架是拖动主电缆上下运行的装置，主电缆由电缆臂架拖动，安全地通过电缆护圈，防止电缆被刮伤而发生危险。

The cable arm is the device which draws the main cable up and down. As drawn by the cable arm, the main cable will safely pass through the cable ring, so as to prevent the cable from being scratched.

电缆卷筒式的电缆臂架可将主电缆挑出底架护栏外，使主电缆安全地收入电缆卷筒内。

The cable drum type cable arm can pick the main cable out of the base frame and base enclosure, so that the main cable can be retracted into cable drum safely.

5.6.4 电缆护线架 Cable Guiding Device

电缆护线架是确保电缆运行安全，当电梯运行时保证电缆处于电缆护线架的护圈之内，以防止吊笼在运行过程中电缆与附近其它设备缠绕发生危险。

The cable guiding device is used to ensure the safety of cable in the course of operation. When the hoist is running, the cable guiding device ensures that the cable is in the protective ring on cable guiding device, so as to prevent the cable from winding around any nearby equipment.

安装电缆护线架时，应确保电缆臂架及电缆滑车能够顺利地穿过电缆护线架上的护圈。

When installing the cable guiding device, please ensure that the cable arm and trolley can smoothly put through the guard ring on cable guiding device.

5.7 其它结构 Other Structure

5.7.1 底架护栏 Baseframe and base enclosure

底架护栏包括底架和防护围栏两部分：

The baseframe and base enclosure includes baseframe and protective base enclosure:

底架由型钢和钢板拼焊而成，四周与地面防护围栏相联接，中央为导轨架底座。它可承受由施工升降机传递的全部载荷。安装时，底架通过螺栓与基础预埋件紧固在一起。

The baseframe is made of steel profile and steel sheets, its perimeter is connected with base enclosure, and the center is the mast base. It can bear the load transmitted by construction hoist. In the course of erection, the base frame is fixed onto the embedded part of foundation with bolts.

防护围栏：由型钢、钢板及钢丝网焊接而成，将施工升降机主机部分包围起来，形成一个封闭区域，使施工升降机工作时人员不得进入该区域。在防护围栏入口处设有护栏门，门上装有机电联锁装置。钢丝网与钢丝网，钢丝网与门框之间的连接采用旋转卡扣，实现快速安装。

Protective base enclosure: Composed of steel profile, steel sheet and steel wire net, it encloses the whole machine, so as to prevent any person from entering into area. At the entrance of protective base enclosure, there is a work door, which is equipped with the electromechanical interlock device. The rotary clamping mode is adopted between steel wire net and steel wire net as well as steel wire net and door frame, so as to realize the quick erection.

通用可调式外围栏门槛，高度国内最低：电缆卷筒式450mm，电缆滑车式950mm。

The height of normal adjustable doorsill of protective base enclosure is the lowest in domestic: 450mm for cable drum, 950mm for cable tackle.

5. 7. 2吊杆Electric suspender

吊杆是实现施工升降机自助加节和自助拆卸不可缺少的部件。

The electric suspender is an indispensable component for realizing the self-served addition of mast sectionsto construction hoist and the self-served dismantling of construction hoist.

当施工升降机的基础部分安装就位后，即可用吊杆将吊笼顶上标准节吊运至已安装好的导轨架顶部进行加节作业；当进行拆卸作业时，吊杆可以将导轨架标准节由上至下顺序拆下。

After the foundation of construction hoist is properly installed, use the electric suspender to lift the mast section on cage to the top of installed mast, so as to implement the addition of mast section; in the course of dismantling, the electric suspender may be used to dismantle the mast sectionsin the order from top to bottom.

6. 主要技术参数 Main technical parameter

项 目 \ 类 别	SC200/200E		SC200/200EB		备注 Remark
	BWM-3I		BWM-3S		
额定载重量 (Kg) Rated load (Kg)	2×2000或2×24人 2×2000 or 2×24people		2×2000或2×24人 2×2000 or 2×24people		
额定安装载重量 (Kg) Rated installing load	2×1000		2×1000		
额定速度(m/min) Rated speed(m/min)	36		0~40		
减速器速比 ratio	1:16				
最大提升高度(M) Max. hoist height	450		500		
吊笼空间(长×宽×高)(m×m×m) Cage size (length×width×height)	3.2×1.5×2.2				
电源电压(V) Supply voltage	380±5% 50Hz				
电机功率(kW) Motor power	2×2×13				JC=25%
额定工作电流(A) Rated working current	2×2×27				
电源容量(kVA) Power capacity	2×37				
标准节重量(Kg) Weight of mast section	δ4.5	δ6	δ8	δ10	650×650×1
	145	160	180	195	508mm
吊笼自重 (含驱动系统) (Kg) Dead weight of cage(including driven system)	2×2000				
安全器型号 Type of safety device	SAJ40-1.2				

7 电气系统配置表 Configuration of electrical system

SC200/200E 型 BWM-3I 施工升降机

SC200/200E type BWM-3I construction hoist

序号 No.	名称 Designation	图示号 Code on drawing	品牌 brand	备注 remark
1	变压器 Transformer	BK1	国产 Made in China	
2	变压器 Transformer	BK2	国产 Made in China	
3	空气开关 Air Switch	QF	LS	
4	继电器 Relay	KA1~KA7	松下 Panasonic	
5	变频器 Frequency Converter	无 No	/	
6	热断路器 Thermal Circuit Breaker	KCE	正泰 Zhengetai	
7	接触器 Contactor	KM, KM1, KM2	施耐德 Schneider	
8	接触器 Contactor	KM3, KM4	施耐德 Schneider	
9	控制器 Contactor	HLC	长沙海川 Changsha haichuan	
10	开关电源 Switch Power Supply	AC/DC	魏德米勒 Weidmuller	
11	断路器 Circuit Breaker	QF1~QF4	施耐德 Schneider	
12	相序继电器 Phase Sequence Relay	KAP	施耐德 Schneider	
13	主令控制器 Master Controller	YGK8	国产 Made in China	
14	坠落试验盒 Dropping Test Box	TNTA1-6	国产 Made in China	
15	旋转开关头 Rotating Switch Head	SB	施耐德 Schneider	

16	IC 卡 IC Cord		长沙海川 Changsha haichuan	
17	急停按钮 Emergency Button	STP1~STP3	施耐德 Schneider	
18	带灯按钮 Illuminated Pushbutton	SB2	施耐德 Schneider	
19	行程开关 Travel Switch	SZL-WL-S-C01 AH-ZL	霍尼韦尔 Honeywell	

SC200/200EB 型 BWM-3S 施工升降机

SC200/200EB type BWM-3S construction hoist

序号 No.	名称 Designation	图示号 Code on drawing	品牌 brand	备注 remark
1	变压器 Transformer	BK1	国产 Made in China	
2	变压器 Transformer	BK2	国产 Made in China	
3	空气开关 Air switch	QF	LS	
4	继电器 Relay	KA1~KA7	松下 Panasonic	
5	变频器 Frequency converter	CS200-4T30GB- ZLP	汇川 Huichuan	
6	热断路器 Thermal Circuit Breaker	KCE	正泰 Zhengtai	
7	接触器 Contactor	KM, KM1, KM2	施耐德 Schneider	
8	接触器 Contactor	KM3, KM4	施耐德 Schneider	
9	控制器 Contactor	HLC	长沙海川 Changsha haichuan	
10	开关电源 Switch Power Supply	AC/DC	魏德米勒 Weidmuller	
11	断路器	QF1~QF4	LS	

	Circuit Breaker			
12	相序继电器 Phase Sequence Relay	KAP	施耐德 Schneider	
13	主令控制器 Master Controller	YGK8-II	国产 Made in China	
14	坠落试验盒 Dropping Test Box	TNTA1-6	国产 Made in China	
15	旋转开关头 Rotating Switch Head	SB	施耐德 Schneider	
16	IC 卡 IC Cord		长沙海川 Changsha haichuan	
17	急停按钮 Emergency button	STP1~STP3	施耐德 Schneider	
18	带灯按钮 Illuminated Pushbutton	SB2	施耐德 Schneider	
19	行程开关 Travel Switch	SZL-WL-S-C01 AH-ZL	霍尼韦尔 Honeywell	

8 主要易损件清单 Spare parts list

序号 No.	名称 designation	零件编码 Part number	型号规格 type	数量 QTY	备注 Remark
1	传动齿轮 Transmission gear	000402005A0107001		4	
2	背轮总成 Back wheel assembly	000402005A0105000		4	
3	安全器背轮 Back wheel for safety device	000402006A0119200		2	
4	双滚轮总成 Double idle wheel assembly	000402006A0118000		8	
5	侧滚轮总成 Side idle wheel assembly	000402006A0106000		8	
6	勾轮总成 idle wheel assembly	000402005A0102000		12	

7	电机 Motor	1020004397		4	
8	减速器 Redactor	1030201647		4	
9	防坠安全器 Safety device	1999901428		2	
10	盘式刹车片 Disc brake pad	5ZJ.275.038	铜基丝末石棉 Copper-based asbestos	4	电动机用 Used for motor
11	缓冲八角胶 Buffer octagonal colloid	103040001031	ML8	4	联轴器用 Used for coupling
12	胶条 Block gine	000402011A0100001			
13	腰滚轮总成 Waist idle wheel assembly	000402013A0101000		6/8	III型滑车 6 个, IV 型滑车 8 个 Six for III type cable tackle, eight for IV type cable tackle
14	滚轮总成 idle wheel assembly	000402013A0103000		4	电缆滑车用 Used for cable tackle
15	滑轮 Pulley wheel	000402013A0100004		2	电缆滑车用 Used for cable tackle
16	开关电源 Switching power supply	1020903206	NEID-35B	2	
17		1021904237	RS-25-24	2	
18		1021904238	RS-25-12	2	
19	接触器 Contactor	1020301031	LC1-D09M7C	2	
	接触器 Contactor	1020301069	LC1-D95M7C	2	
21	热继电器 Thermorelay	1020304360	NR4-63 20-32A	4	
22	变压器 Transformer	1021904137 1021904136	LS-BK-1000-A LS-BK-160	2	

23	主令控制器 Master controller	1020103561	SK10-3	2	
24	空气开关 Air switch	1020601030	ABE203B 125A	2	
26	电铃 bell	1020403051	UC4-100 220V	2	
27	笼顶操作盒 Operator box on the top of cage	1020810542	BZANH-4	2	
28	行程限位 Travel limit	1029805103	SZL-WL-S-C01AH-Z	12	
29	极限开关 Limit switch	1029805108	JK18-125	2	
30	防冲顶限位 Anti-rushing out of the device limiter	1029805104	SZL-VL-S-D	2	
31	编码器 Encoder	1021403251	EI38S6-50-CR30Y3-2 m	2	

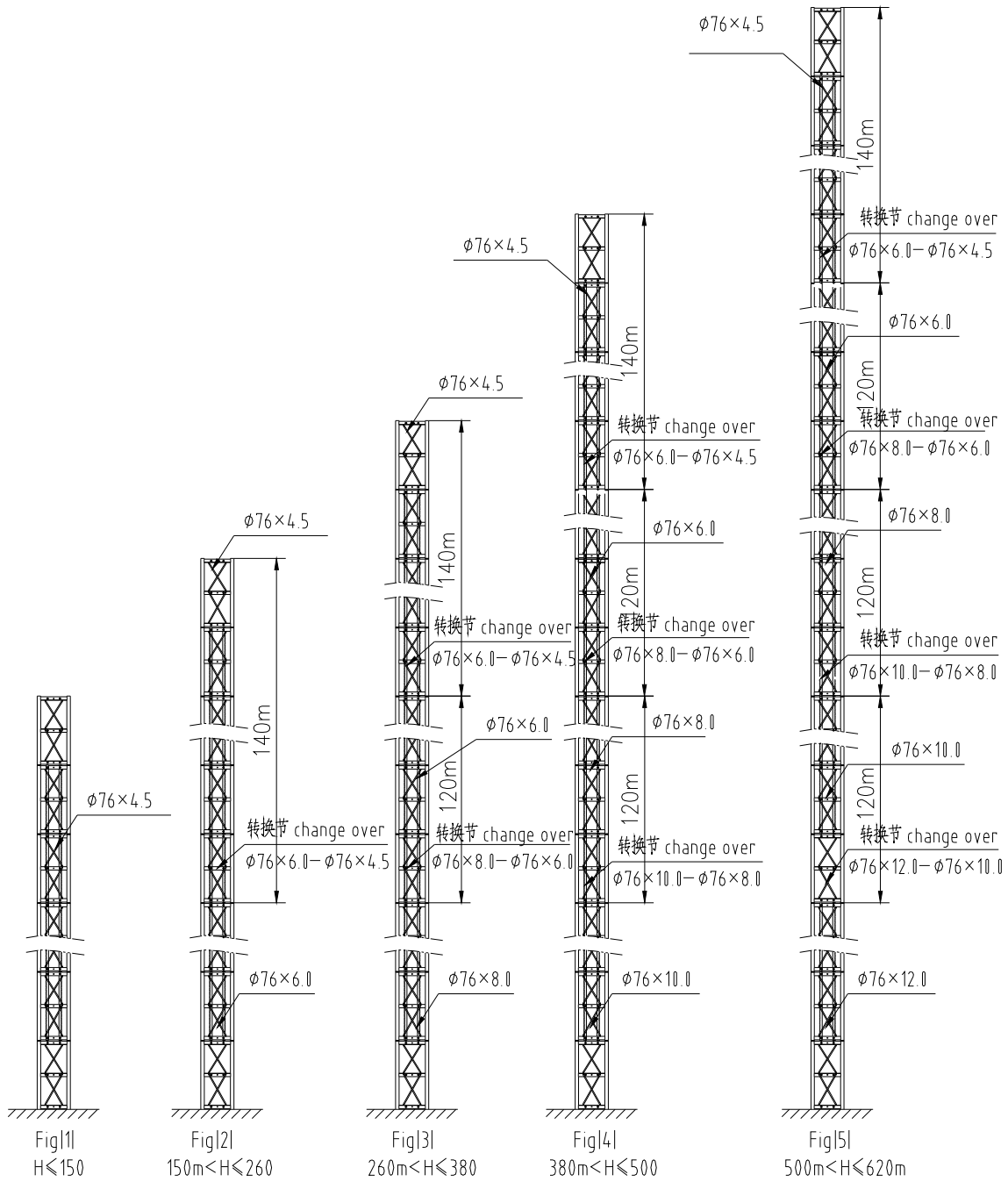
9 随机文件清 File list

序号 No.	名称 designation	数量 QTY	备注 remark
1	产品合格证 Product qualification certificate	1	原件 Original copy
2	特种设备制造许可证 Special equipment manufacturing license	1	复印件加盖公章 Copies with official seal
3	使用说明书 Operation manual	1	印刷品 print
4	电气原理图 Electrical	1	复印件 Copies
5	基础图 Foundation drawing	1	复印件 Copies
6	超载保护器合格证 Overload protection qualification certificate	2	原件（吊笼电控箱内） Original copy (in cage cabinet)
7	防坠安全器合格证 Safety device qualification certificate	2	原件 Original copy

8	防坠安全器检测报告 Safety device test report	2	原件 Original copy
9	防坠安全器使用说明书 Safety device operation manual	1	印刷品 print
10	发货清单 Shipping list	1	原件 Original copy

10、标准节主弦管壁厚配置图

The configuration for thickness of main chord of mast section



注：H 为导轨架安装高度

Note: H is the installed height of mast.