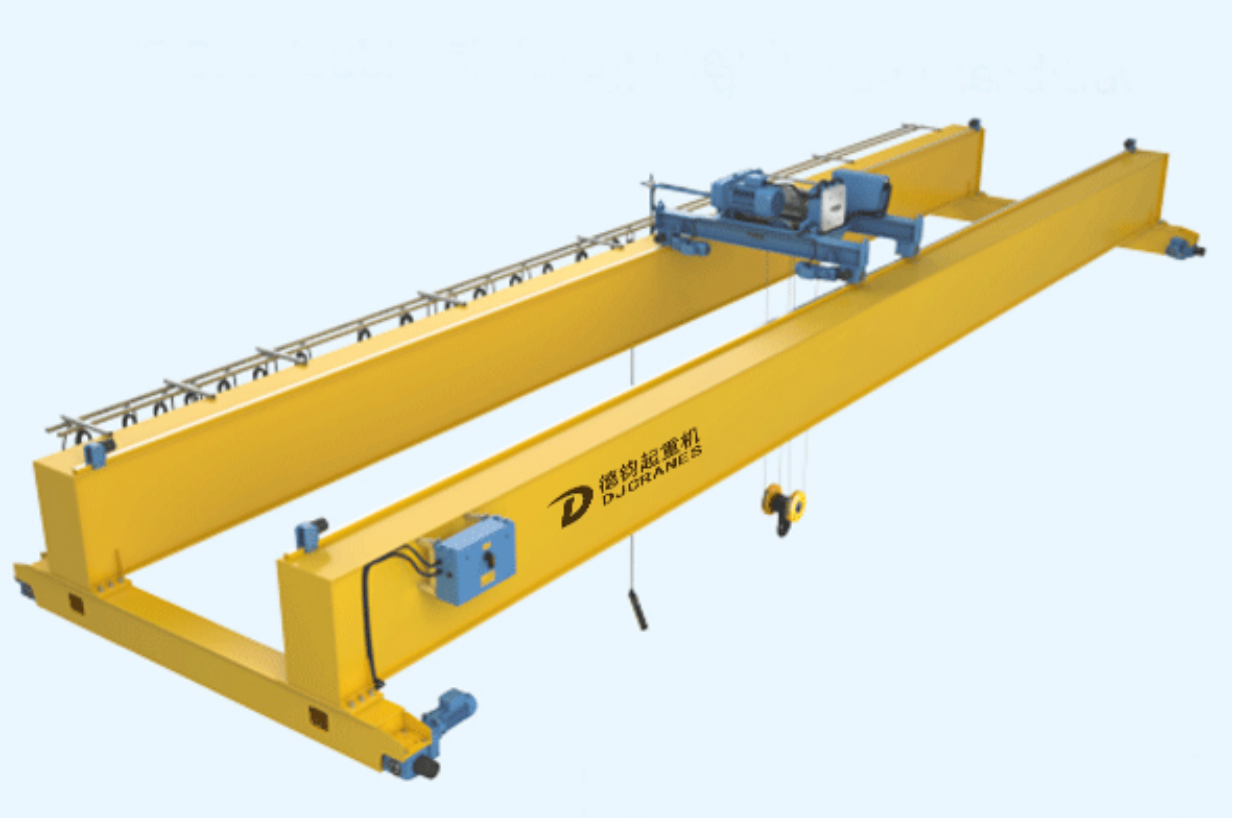
河南德钧实业有限公司

Henan Dejun Industrial Co.,Ltd

General Use Overhead Crane

Installation Manual



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请在安装、使用前仔细阅读使用说明书，并严格按照有关安全操作规程进行作业。Please read instructions carefully before installation and use, and in strict accordance with the relevant rules of safe operation in the operations

一、概述 Brief introduction

(一)起重机的主要用途 Crane main usage

适用于厂矿、企业车间、仓库等在室内或室外的固定跨间作一般装卸及起重运输工作，常用工作级别一般为 A3~A6。A3~A4 适用于设备安装维修用，A5 适用于机械加工、金属结构、装配，A6 适用于工作繁忙或经常满负荷工作的工况。该起重机不适用于吊运易燃、易爆危险物品或高温液体金属。 It is suitable for factories and mines, enterprises workshop, warehouse, etc. for the indoor or outdoor fixed span intercropping general handling work conditions. The common job level is commonly A3 ~ A6. A3 ~ A4 level is suitable for equipment installation and maintenance and A5 is suitable for machining, metal structure, assembling and A6 is suitable for the job which is busy or often full load working conditions. This crane is used for lifting inflammable, explosive dangerous goods or high temperature liquid metal.

(二)性能参数及结构形式 Performance parameters and structure form

起重机的参数包含起重机的作业能力，其主要参数有：起重量、起升高度、跨度、工作级别、工作速度、防爆等级等。Crane parameters include crane operation ability, the main parameters are: the weight, lifting height, span, work level, work speed, explosion protection level, etc.

桥式起重机的结构主要由桥架、大车运行机构和装有起升、运行机构的小车组成。其桥架由钢板焊成的箱形主梁、端梁、走台等组成。主梁上铺设供小车运行的钢轨，主梁的外侧装有走台，为安装及检修大车运行机构安放电气柜而设。空操时，在主梁下面悬挂操纵室、操纵室内装有联动控制台或凸轮控制器等，操纵室与走台之间装有直梯或斜梯，主梁连接在中间带有接头的两端梁上。Bridge crane structure is mainly composed of bridge, the cart mechanism and equipped with lifting, operation mechanism of the car. The bridge by steel plate welding into the box girders, and beam, and walk on the table, etc. The rail lays on main girder for trolley running; the outside of the main girder is set with walking board for the installation and maintenance of crane electrical cabinets. In the air operation, the main girder suspends a control room which equipped with linkage control console or CAM controller. The control room and walking board are connected with straight ladder or oblique ladder and the main girder connects in the middle with joint with the end carriages.

大车运行机构通常采用分别驱动形式，起重机大车车轮为四个、八个或十六个，车轮与带有滚动轴承的角型轴承箱（或 45º 剖分结构轴承箱）组装后安装在端梁或平衡台车上。Crane mechanism usually adopt respectively drive form, crane wheel for four and eight or sixteen, wheel and with a rolling bearing Angle type bearing box (or 45 º split structure bearing box) after assembly installed in beam or balance on the table.

起重机小车由起升机构、小车运行机构和小车架等组成。小车的供电采用悬挂式软电缆导电形式，电缆滑车所使用的轨道为工字钢。大车供电一般有单极安全滑触线、多极安全滑触线，角钢供电、软电缆供电等多种形式。大车导电处设有导电维修平台。操作形式一般有司机室操作、地面操作、遥控操作，也可以二种或三种操作形式的组合。司机室内可按合同要求附设电热器、冷风机、空调等。各配套部件如：减速器、电机、制动器、空调等，使用维护请参阅配套厂的说明书。Crane trolley is made by lifting mechanism,

trolley operation mechanism and the car frame, etc. The car power supply suspension cable conductive form, cable block the use of orbit for beams. Cart power supply usually have a single safety sliding contact line, multi-polar safety sliding contact line, Angle power supply, soft cable power supply, and other forms. Cart conductive place with conductive maintenance platform. Operation method usually has a cab operation, ground operation, remote operation, can also be two or three operation forms of combination. The driver cabinet can be made according to contract requirements for electric heater and cooling fan, air conditioning, etc. The supporting components such as: gear reducer, motor, brake, air conditioning, the use of maintenance; please refer to the manual of the boiler manufacturers.

注：起重机的技术参数、结构形式详见随机图纸。Note: crane technical parameters, structure as shown in the delivery drawing documents.

二、安装与调试Installation and adjusting

(一)安装前准备及注意事项 Before the installation preparation and the matters needing attention

1、起重机卸车搬运，应特别注意避免发生起重机受到扭、弯、撞击等事故。起吊时至少须有两个吊点，吊点的捆扎处须有衬垫物，捆扎以车轮或主梁本身为限，并尽可能选在桥架的两端即主梁与端梁的连接处，不得捆扎在走台处。Crane unloading handling should be paid special attention to avoid crane twisting, bending and such impact accidents. When lifting at least must have two lifting point, lifting point strapping place must have the underlay, strapping to wheel or girder itself in the limit, and as far as possible choose in both ends of the bridge is the joint of the girder and end beam, and shall not be binding in the walk in Taiwan.

2、起重机搬运应利用加长汽车或平板拖车拖动，禁止在地面上或滚架上拖动。Crane handling should use lengthen a car or platform trailer drag, ban on the ground or rolling shelf drag.

3、起重机存放时应安置平稳，用枕木放平垫实。枕木要对称放置，地面应坚实，不得日久下沉，致使桥架发生变形。Crane should be stored for smooth, with the tie set level pad real. Sleeper to symmetric place, the ground should be solid, not time sinks, the bridge occur deformation.

4、起重机长时间存放，露天存放应有防雨措施，传动部件及电气设备应有防水、防锈、防腐蚀、防碰、防盗等保护措施。Crane long time storage, open storage should be rain proof measures, transmission parts and electrical equipment should be waterproof, rust and corrosion resistance, prevent touch, security and protection measures.

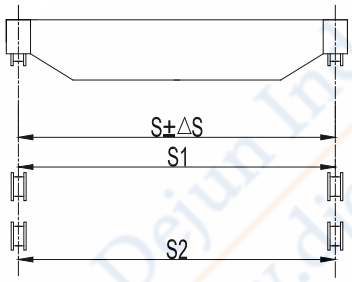
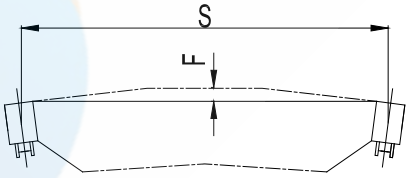
5、起重机安装前应组织有关人员认真研究图纸，根据技术要求清除由于搬运不当或存放不妥造成的变形和缺陷，特别对金属结构部件的变形，必须得到校正后才能安装。Crane before installation should organize relevant personnel study drawings, according to the technical requirements clear due to improper handling or improper storage caused by deformation and defects, especially for metal structure parts, the deformation of the must be adjusted to install.

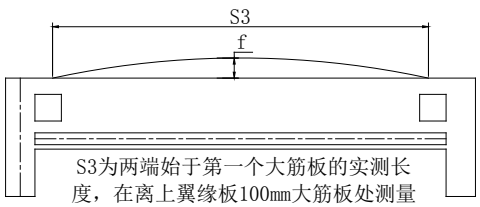
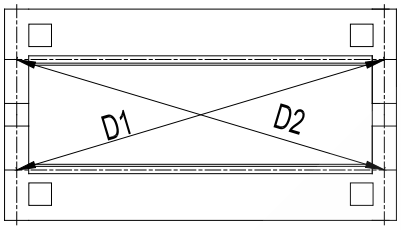
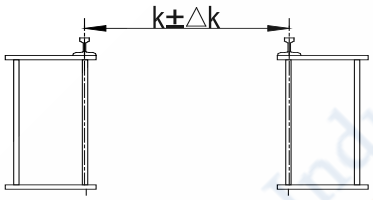
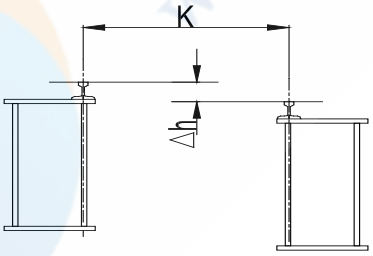
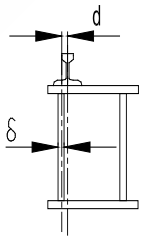
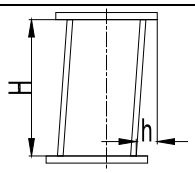
6、起重机安装人员在进场开始安装之前，应会同安装单位及制造单位的代表一起开箱，按照随机所带的装箱单，清点核对交货物与装箱单所列的零部件数量是否相符，有无短缺和损伤，随箱文件是否齐全，对照安装架设附加图和有关技术文件中的技术要求，认真研究安装方案和安装架设的具体程序。Crane installation personnel in the approach to start the installation before, should jointly with the installation unit and manufacturing unit with representatives of unpacking, according to the random with the packing

list, inventory check goods listed in the packing list and the number of component parts are in accord, have shortages and damage, with the box if the file is complete, the contrast erectness additional diagram and related technical documents of the technical requirements, seriously study installation plan and erectness specific program.

7、起重机是分部件运输的大型设备，难免在长途运输及保管过程产生变形及其它缺陷，因此需在安装前进行地面预装，检测合格（见表 2-1）后方可吊装，若发现用户难以解决的问题，立即与制造厂联系并及时解决。否则吊装架设后发现问题，制造厂也难以解决。Crane is a transportation division of large equipment, hard to avoid in the long distance transportation and storage process is to produce deformation and other defects, therefore need before installation ground installed, testing qualified (see table 2-1) rear can lifting, if discover the user is difficult to solve the problem, immediately and factory contact and timely solve. Otherwise the discovery after lifting erection, factory is also difficult to solve.

表 2-1 安装偏差表 Installation deviation list

序号 No.	项目 item	简图 sketch	允许偏差（mm） Allowed deviation
1	1. 跨度偏差 Span deviation △S 2.由端梁两端车轮处量出的起重机跨度 crane span from the end carriage wheel S_1；S_2 跨度相对差 Span relative difference $\lvert S_1-S_2 \rvert$		△S=±5 $\lvert S_1-S_2 \rvert \leqslant 5$ 主动轮的跨度值与被动轮的跨度值之差不得大于 5mm Driving wheel span value and passive wheel span the difference value shall not be greater than 5 mm
2	架设完成后的主梁上拱度（在端梁上翼缘半的四个基准点上测量，即车轮支撑中心顶点） After completion of erection of the girder camber (in the end of the beam flange half of the four reference point on measurement, namely wheel support center vertices)		无日照温度下用水平仪测量 No sunshine temperature with level measurement F≤0.9~1.4 S /1000

3	主梁的水平旁弯 The level of the main girder bending side		f≤1.0S /2000
4	以车轮为基点测量的桥架对角线偏差 To wheel as the base measurement bridge diagonal deviation $\lvert D_1-D_2 \rvert$		主梁和端梁焊接连接的桥架 Main girder and end beam welding connection bridge $\lvert D_1-D_2 \rvert \leqslant 5$
5	小车轨距偏差 Car track deviation		在轨道端部 in rail end △K 为±2， 在轨道中部 in rail medium， 轨道长度 rail length ≤19.5 m 时，△K 为+1~+5， 轨道长度 rail length >19.5m 时，△K 为+1~+7， △K 偏轨箱形梁 Slant orbit box beam ±5
6	小车轨道高度差（在同一断面上）Trolley track height difference (in the same section)		K≤2m 时，△h=4.2 K＞2m 时， △h≤2.0k，且△h≤8
7	轨道中心线离承轨梁设计中心线的位置偏差 Rail line from support rail beam design center position deviation		偏轨箱形梁：Partial rail box beam δ≥12，d≤1/2δ
8	箱型梁结构的垂直倾斜（此值应在长筋板或节点处测量）Box beam structure of vertical tilt (this value should be in long		箱型梁腹板的垂直偏斜值 Box beam web vertical deflection value h ≤H/200，单腹板梁及桁架梁的垂直偏斜值 Single web beam and truss beam

	reinforcing plate or node place measurement)		vertical deflection value h ≤H/300。

（二）起重机的安装 Crane installation

1、桥架 bridge frame

起重机架设时，根据起重设备的能力，可整体架设也可分部架设。整体架设除操纵室外，将桥架装好，把小车捆牢在桥架上 ，待起升到比操纵室稍高后就将操纵室安装在桥架上，然后一起吊上厂房承轨梁。分部架设即将桥架从端梁连接处拆开，把两根主梁分别架到厂房承轨梁上，把两主梁靠拢，将端梁连接好以后，再把小车起升到稍高于主梁，放在主梁轨道上。起重机在吊装时，为减少高空作业，在起吊能力允许的情况下，推荐优先选用整体吊装方案。Crane erection should be carried out according to the lifting equipment ability, can the whole erection can also set up branch. The whole set up in addition to control outside, will bridge installed, the car frap in bridge frame, wait for lifting to slightly higher than the control room after will be installed in the control room on the bridge, and then a lifting on plant support rail beam. Branch set up the bridge from beam joint apart, put two root girder were frame to plant support rail beam, the two main girder together and will end beam connection good later, again car lifting to a little higher than main girder, in the main girder orbit. Crane hoisting, to reduce overhead working in lifting ability that allows, recommended priority choose integral lifting scheme.

①安装方法与要求 Installation method and requirements

地面组装时应将起重机支承在按起重机跨度临时搭起的架子上，使主梁离开地面。如果架子上可以铺设钢轨，则大车车轮可直接放在钢轨上，否则应把支架垫在主梁的下盖板靠近主梁两端变高处，无论采用哪种方法垫，均需用水准仪找平。铺钢轨的以钢轨上平面为基准找水平；垫在主梁下的，在端梁宽度中心线上，距小车轨道中心线如图 2-1 的 A、B、C 和 D 四点上测量桥架的水平。The ground should be assembly will be crane bearing in the crane span makeshift shelf, make the girder from the ground. If the shelf can be laid rail, the cart wheel can be directly on the rail, or should be the support pad in the main girder under cover near the girder ends become high, no matter use which kinds of method mat, all need level leveling. Spread the rail to rail on the plane as a benchmark for level; Mat in the main girder, and in the end beam width center online, is apart from the trolley track centerline as shown in figure 2-1 A, B, C and D on the four measuring bridge level.

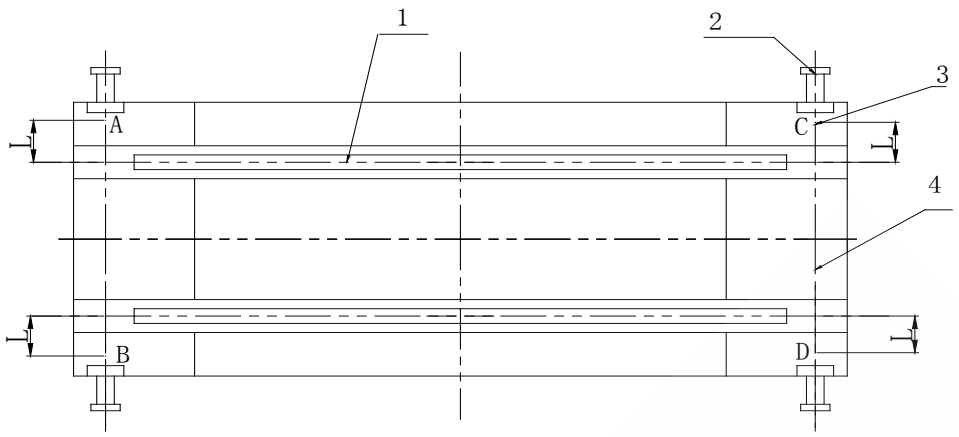


图 2-1 找水平示意图 Find level diagram

1.小车轨道中心线 2.缓冲器 3.等距离点 4.端梁中心线

1. The car rail line 2. Buffer 3. Equidistance point 4. End of the beam line

在测量水平位置之前，应将端梁按图样规定的方法(用铰制孔螺栓或用铰轴)连接好。有锥形踏面的车轮，应使钢轨的侧面与轮缘接触，以免影响水平的准确性。In the measurement of horizontal position before, should will end beam according to the provisions of the design method (with articulation hole bolt or hinged) linked. A cone on the wheel, should make rail profile and rim contact, so as not to affect the level of accuracy.

②组装桥架的质量要求 Assembly bridge quality requirements

支承点设在车轮下的桥架，可按表 2-1 的规定，逐项检查桥架的安装质量，如果是垫在主梁下，则除主梁上拱度一项外，其余项目均可检查，同时还可以检查大车运行机构的安装质量。Bearing point is located in the wheel of the bridge, according to the provisions of the table 2-1, item by item check bridge installation quality, if it is mat in the long-term, then in addition to main girder camber a outside, the rest of the project all can check, also can check the cart mechanism installation quality.

2、小车 trolley

中小吨位的小车在制造厂已经组装完成并经过试运行，在稍经调整消除运输变形后就可以直接装在桥架上。在桥架安装符合有关技术条件的情况下，小车不得存在三条腿的情况（即小车轮只有三个与轨道接触，另一个悬空），否则，要在悬空车轮的轴承箱下或是轨道下进行加垫调整，加垫只能加一层，轨道下加垫时必须置于主梁筋板处，两端点焊固定。需解体的大吨位小车，组装前按联接部位标号图进行组装，然后整体吊装到桥架上。Medium and small tonnage car in the factory has been fabricated and after commissioning, in a little after adjustment to eliminate transportation after deformation can be directly put on the bridge. In the bridge installed in accordance with the technical conditions, the car may not have any of the three legs (i.e. only three small wheel and rail contact, another impending), otherwise, the impending wheel bearing box or track down to add cushion adjustment, add pad can only add a layer, track and pad must be in main girder reinforcing plate place, both ends fixed spot welding. The disintegration of the need of large tonnage car, before assembly according to the connection parts label diagram, assembly, and integral lifting to bridge frame.

3、大车运行机构 crane travel mechanism

大车运行机构已由制造厂组装在桥架上，并试运转合格。大车运行机构在起重机组装完成后，应根据下列要求进行安装检查，也适用于大修后的验收检查。Cart mechanism has the factory assembly on the bridge, and running in qualified. Cart mechanism in crane assembly is completed, should be based on the

following requirements for installation check, it can also be used to maintenance after the acceptance inspection.

①检查基准：检查运行机构时，应以主动轮外侧为基准。Check the reference: check the working mechanism, should be the driving wheel for reference.

②车轮端面的水平偏斜如图 2-2，每个车轮的水平偏斜 P≤ 1/1000L(L 为测量长度)，且同一轴线上的两个主动(或被动)车轮的不平行方向应相反，如图 2-3 所示的任何一种组合形式者是符合要求的。Wheel end level deviation as shown in figure 2-2, each wheel lateral deviation P acuities 1/1000 L (L for measuring length), and the same axis of the two active or passive) wheel is not parallel direction should be on the contrary, as shown in figure 2-3 shows a combination of any of the forms are to meet the requirements.

③测量跨度 measure span：见表 2-1

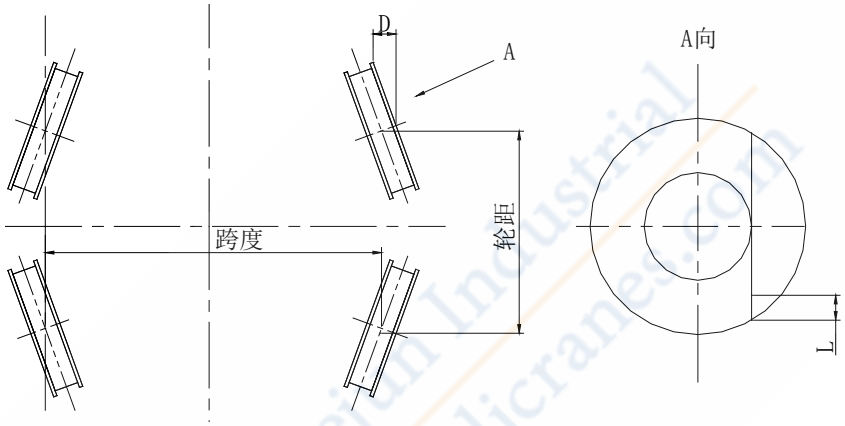


图 2-2　车轮水平偏斜图 Wheel lateral deviation chart

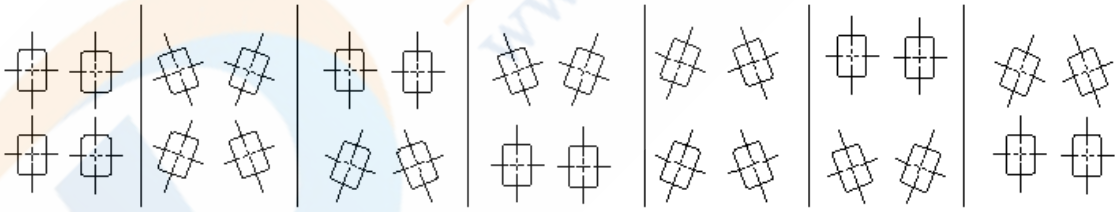


图 2-3　车轮水平偏斜图组合形式 Wheel lateral deviation chart combination form

④车轮找正：车轮找正包括平行度、垂直度及同位差。Wheel alignment: wheel alignment including parallelism and perpendicularity and with a difference.

a.平行度：用 0.6-1.0mm 尼龙线，在车轮下部拉上两条平行线，看车轮内外侧面与平行线接触的情况，如果平行线在车轮 4 个侧面上都均匀接触，这说明前后车轮平行并在同一条中心线上；Parallelism: 0.6-1.0 mm nylon line, in the lower wheel pull two parallel lines, check the wheel inside and outside and parallel lines contact, if parallel lines in the wheel on the four side even contact, it shows that the wheels and parallel and in a center line;

b.垂直度：车轮在垂直方向偏斜不应大于 1/400L(L 为测量长度)，且上部应向外(如图 2-4) Vertical degree: wheel in vertical direction deviation should not more than 1/400 L (L for measuring length), and the upper should be outward (as shown in figure 2-4)

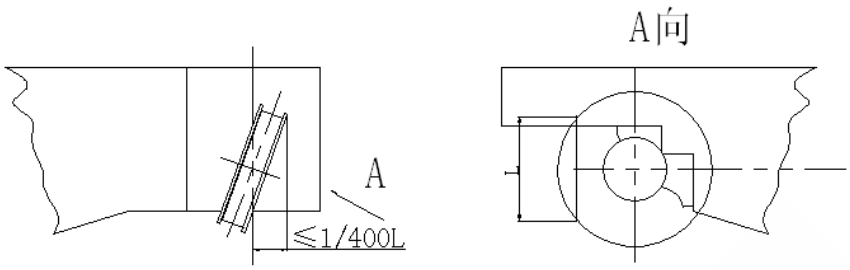


图 2-4　车轮垂直偏斜图 Wheel vertical deviation chart

c.同一端梁下车轮同位允差：2 个车轮时≤2mm，3 个或 3 个以上时≤3mm。With end under beam wheel with a tolerance: two wheels or less 2 mm, 3 or 3 or more or less 3 mm.

测量方法：在端梁外侧拉一钢丝，平行于端梁中心线，其高度接近于车轮的轮缘，测量点在车轮的垂直中心线上，测量出钢丝与各轮测量点之距离；选定一个车轮为基准，则其他车轮的同位差即可计算出来。Measurement methods: in the end beam lateral pull a wire, parallel to the beam center, its height is close to the wheel rim, measuring point in the wheel vertical center line, measure the wire and the wheel of the measuring point distance; Select a wheel for reference, the other wheel with potential difference can be calculated.

（三）高强度螺栓的使用 The use of high strength bolt

起重机重要构件的重要连接部位如解体主梁、小车架的连接等，一般采用高强度螺栓联接（GB/T1228-2006　钢结构用高强度大六角头螺栓）。高强度螺栓在安装时应注意以下几点：Crane important member of the important connection parts such as the disintegration of main girder, car frame connection, etc, generally USES the high strength bolt connection (GB/T1228-2006 steel structure with high strength hex head bolt). High strength bolt in the installation should pay attention to the following:

1、高强度螺栓连接部位的构件结合面不得有铁锈、氧化皮、油污、油漆等附着物，不得有水迹、潮湿。安装连接前结合面的防锈油应擦拭干净。High strength bolt connection parts of the member joint surface cannot have rust, scale, grease, paint and attachments, it cannot have brushes and moist. Before installation and connection with the anticorrosive, the oil should be wiped clean.

2、高强度螺栓连接处的钢板、型钢应平直，连接前应清除板边、孔口毛刺，以保证连接结合面的紧密贴合。High strength bolt connection of steel, steel should be flat, before connection should be clear edge, orifice burr, in order to ensure the close connection with joint.

3、连接施工时，螺母应能自由旋入螺栓，遇有螺栓、螺母不配套或螺纹损伤等现象，应废弃不用。Connected construction, nut should be able to free screwing in bolt, in case of bolt, nut not supporting or thread damage wait for a phenomenon, should fall into disuse.

4、连接施工时，遇有高强度螺栓不能自由穿入螺栓孔时，不得强行打入，而应扩孔修整，修整时孔的直径应不大于 1.2 倍的螺栓直径。Connected construction, in case of high strength bolt not free to wear into the bolt hole, shall not be forced into, but should reamer nap, finishing when the diameter of the hole should be greater than 1.2 times the diameter of the bolt.

5、高强度螺栓连接部位开始拼装时，应先使用普通螺栓、螺母进行临时性拼装紧固，临时使用的普通螺栓、螺母数量不少于该连接部位高强度螺栓、螺母数量的 1/3，且不少于 2 个。高强度螺栓不得作临时拼装螺栓使用。High strength bolt connection parts assembly start, we should begin with the ordinary bolt, nut for temporary assembly fastening, temporary use of ordinary bolt, nut amount not less than the connection position high strength bolt, nut number of a third, and no less than 2. High strength bolt may

not be as temporary assembly bolt use.

6、高强度螺栓在安装时需用扭矩扳手按规定的施工扭矩进行拧紧，只允许在螺母上施加扭矩。High strength bolt in installation required torque wrench in accordance with the provisions of the construction for tightening torque, the only allowed in the nut torque applied.

7、高强度螺栓的施工扭矩如表 2-2 所示：High strength bolt construction torque as shown in table 2-2

高强度大六角头螺栓施工扭矩 High strength bolt construction torque（N.m）							
螺栓性能等级 Bolt performance level	螺栓公称直径 Bolt nominal diameter（mm）						
	M12	M16	M20	(M22)	M24	(M27)	M30
8.8S	70	145	286	386	483	719	975
10.9S	85	208	403	543	702	1017	1384

三、电气控制系统Electrical control system

(一)电气控制原理 Electric control principle

3.1 电源及配电系统 Power supply and distribution system

3.1.1 电源 Power

起重机的电源采用三相四线(3P+PE)交流 380V、50HZ（出口起重机按使用国家电源种类）供电。电源由滑触线引入起重机上的主电源配电柜内，再引出动力、照明、辅助电路等电源。The power of the crane by three phase four wire (3 p + PE) ac 380 v, 50 hz (export crane by use of national power type) power supply. Power supply by sliding line into the crane's main power supply distribution hood, which leads to power, lighting, auxiliary circuit and power supply.

设有一台单独的照明变压器，变压器的原端和副端均设有断路器保护，为照明、维护插座及辅助电路提供 220、36V 电源。Equipped with a separate lighting transformer, transformer original end and vice end are equipped with circuit breaker protection, for lighting, maintenance socket and auxiliary circuit with 220, 36 v power supply.

设有专用接电线 PE，所有电气设备均用专用线与 PE 线相接，形成接地网，车体不作接地回路。A special wiring PE, all electrical equipment are siding with PE line connect, form earth mat, body not ground loop.

供电电压等级如下：The power supply voltage level is as follows:

供电电源 power supply：　三相四线 Three phase four wire AC　380V±10%、50HZ

动力回路电源 Power circuit power：　三相 Three phase AC　380V　50HZ

照明电源 lightening power：　AC　220V　50HZ

控制电源 control power：　AC　380V　220V

电源插座 power switch：　AC　220V　50HZ

AC　36V　50HZ

3.1.2 大车供电及小车馈电方式 crane power supply and trolley power supply

大车电源: 滑触线供电或拖缆 crane power: sliding wire or cable

小车导电：移动电缆滑车 trolley power supply:

3.2 配电系统 Distribution system

3.2.1 配电系统由总断路器、总电源接触及过流保护组成，从而可以使发生故障的支路被隔离维修，而不影响其它支路的操作，把故障的影响压缩到最小范围。配电控制回路中，设有整机电源的起动、停止、紧急开关、电源指示、安全开关及紧急限拉开关等环节，设有短路、过流及失压保护。当供电电源中断时自动断开总回路。各机构设有零位保护（司机室操作时有），故障恢复后，如果操作手柄没有回零位，各机构不能自动起动。Distribution system is composed of the total circuit breaker, total power contact and over current protection device, which can make the failure of the branch quarantined maintenance, and does not affect other branch operation, the influence of the fault compressed to a minimum range. Distribution control circuit, the power supply with the start, stop, emergency switch, the power indicator, safety switch and emergency limit pull off and other links, with short circuit, over current and loss of pressure protection. When the power supply power is cut off automatically disconnect total circuit. Agencies with zero protection (cab operation is), recovery, if operating handle no back to zero, organizations can't automatic starting.

串电阻调速常用图纸如下：电气系统见附图 3-1

Series resistance speed commonly used drawings are as follows: electrical system sees attached figure 3-1

3.2.2 照明通过专用照明变压器为整机桥架照明、室内照明、电铃警灯、电源插座等辅助线路及照明控制线路供电。起重机配电柜内设置 220V、36V 检修插座。Lighting system is set through the special lighting transformer for the bridge lighting, indoor lighting, bell warning light, power supply socket and auxiliary line and lighting control line power supply. Crane distribution is set with 220 v and 36 v maintenance socket.

3.2.3 司机室设有脚踏开关,司机可通过脚踏开关发出运行报警信号。The driver room is set with foot switch and the driver can send the alarm signal through it.

3.2.4 项目代号中高层代号的含意是：Project code senior code meaning is

=01 配电保护 distribution protect =02 照明讯号 lightening signal =05 主起升机构 main lifting mechanism =06 副起升机构 auxiliary lifting mechanism

=10 小车机构 trolley mechanism =12 大车机构 crane mechanism

3.3 主（副）起升机构 main and auxiliary lifting mechanism

起升机构控制方式通常有串电阻控制、变频调速控制及定子调压调速，在无指定要求情况下均为串电阻调速控制。Lifting mechanism control mode usually have series resistance control and frequency control of motor speed control and stator voltage control, in no event shall specify requirements for the series resistance speed control.

3.3.1 串电阻控制分 2 种：凸轮控制器控制、接触器切电阻控制。Series resistance control points 2 kinds: CAM controller control, contactor cut resistance control.

凸轮控制器控制一般只针对电机功率≤26KW 的司机室操作，是通过 AC380V KT 型 5 档凸轮控制器、RT 型电阻器配合分段切除电阻来抑制电机的启动电流，达到机构启动平稳。CAM controller control general only to motor power or less 26 kw driver chamber operation, is through the AC380V KT type 5 gear CAM controller, RT type resistor with piecewise resection of resistance to curb the motor starting current, achieve institutions start smoothly.

接触器串电阻控制一般是通过 LK 型主令控制器、正反转接触器、切电阻接触器、时间继电器、转子电阻器配合实现起升机构在上升下降过程中改变电机转子串入的电阻值满足工作中的不同速度需要。具体

调试方法请参照随机图纸。Contactor series resistance control is generally through the LK type master controller, and reversing contactor, cutting resistance contactor, time relay, rotor resistor fit to realize lifting mechanism in the up and down process change motor rotor into the resistance value to meet the different need work speed. Specific debugging method, please refer to random drawing.

常用图纸如下：凸轮控制见附图 3-2、主令控制见附图 3-3

Commonly used drawings are as follows: CAM control see figure 3-2, the command control see attached figure 3-3

3.3.2 变频调速控制方式 Frequency control of motor speed control mode

通过低压断路器、接触器与变频器组成控制回路驱动变频电机，利用电机轴端的增量编码器进行速度反馈，实现速度闭环控制，可以实现自定义速度控制，自定义启动停止的加减速时间设定，使机构运行更加平稳、可靠、准确。在下降过程中通过变频器制动单元、制动电阻保证电机下降时进行能量释放。具体调试方法请参照随机图纸. Through the low voltage circuit breaker, contactor and inverter control circuit of frequency conversion motor drive, using the motor shaft of the incremental encoder for speed feedback, realize speed closed loop control, can realize custom speed control, custom start stop deceleration time setting, make the operation more stable, reliable and accurate. Falling process through the converter brake unit, brake resistance of motor decline in energy release. Specific debugging method, please refer to delivery drawing.

常用图纸如下：变频控制见附图 3-4

Commonly used drawings are as follows: frequency conversion control see attached figure 3-4

3.3.3 定子调压调速控制方式 Stator regulating speed control mode

通过低压断路器、定子调压器、转子电阻组成控制回路驱动起升电机，通过控制定子回路晶闸管导通角来控制电机的定子电压，同时改变电机转子电阻来改变电机的机械特性。具体调试方法请参照随机图纸。Through the low voltage circuit breaker, stator voltage regulator, rotor resistance composition control loop drive lifting motor, through the control stator loop thruster conduction Angle to control the motor stator voltage, and at the same time, change motor rotor resistance to change motor mechanical properties. Specific debugging method, please refer to random drawing.

常用图纸如下：定子调压见附图 3-5 Commonly used drawings are as follows: stator voltage see attached figure 3-5

3.4 大小车平移机构 **The crane translation agency**

3.4.1 串电阻控制分 2 种：凸轮控制器控制、接触器切电阻控制。Series resistance control can be set in two kinds: CAM controller, the contactor cut resistance control.

凸轮控制器控制一般只针对单电机功率≤26KW（2×13Kw）的司机室操作，是通过 AC380V KT 型 5 档凸轮控制器、RT 型电阻器配合分段切除电阻来抑制电机的启动电流，达到机构启动平稳。CAM controller control generally only for single motor 26 kw or less power (2 x 13 kw) of the driver chamber operation, is through the AC380V KT type gear CAM controller, RT type resistor with segment resection of the resistance of motor starting current, stable starting to institutions.

接触器串电阻控制一般是通过 LK 型主令控制器、正反转接触器、切电阻接触器、时间继电器、转子电阻器配合实现平移机构在运行过程中改变电机转子串入的电阻值满足工作中的不同速度需要。具体调试方法请参照随机图纸。Contactor series resistance is generally controlled by LK master controller, and reversing contactor, contactor, time relay, cutting resistance rotor resistor to cooperate to achieve

translation agency in the process of running change the motor rotor series resistance value to meet the need to work in different speed. Detailed debugging method please refer to the random drawing.

常用图纸如下：凸轮控制见附图 3-7、主令控制见附图 3-8 .

Commonly used drawing as follows: the CAM control as shown in attached figure 3-7, the main control as shown in attached figure 3-8

3.4.2 变频调速控制方式 Frequency control of motor speed control method

通过低压断路器、接触器与变频器组成控制回路驱动变频电机，实现 V/F 速度开环控制，可以实现自定义速度控制，自定义启动停止的加减速时间设定，使机构运行更加平稳、可靠、准确。在减速过程中通过变频器制动单元、制动电阻保证电机能量释放。具体调试方法请参照随机图纸。Through the low voltage circuit breaker, contactor, driven by frequency conversion motor and inverter control circuit, V/F open loop speed control, speed control, can implement a custom start stop deceleration time setting, make the operation more stable, reliable and accurate. During deceleration, the braking unit and braking resistor worked to ensure frequency converter motor energy safe releasing. For detailed debugging method please refer to the random drawing.

常用图纸如下：变频控制见附图 3-4

Commonly used drawing as follows: variable frequency control as shown in attached figure 3-4

3.4.3 定子调压调速控制方式 Stator voltage regulating speed control mode

通过低压断路器、定子调压器、转子电阻组成控制回路驱动运行电机，通过控制定子回路晶闸管导通角来控制电机的定子电压，同时改变电机转子电阻来改变电机的机械特性。具体调试方法请参照随机图纸。Through low voltage circuit breaker, the stator voltage regulator control circuit drive running motor, rotor resistance, through the control of the stator circuit of thyristor conduction Angle to control motor stator voltage, at the same time change the mechanical characteristics of motor rotor resistance to change. For detailed debugging method please refer to the random drawing.

常用图纸如下：定子调压见附图 3-5

Commonly used drawing as follows: stator voltage regulation as shown in attached figure 3-5

3.5 电控系统由以下几个主要部分组成：Electronic control system consists of the following main parts:

配电综合保护柜 Power distribution ark of comprehensive protection

主起升控制柜 main lift control cabinet　电动机 motor　制动器 brake　电阻器 resistor

副起升控制柜 auxiliary lift cabinet　电动机 motor　制动器 brake　电阻器 resistor

大车控制柜 crane control cabinet　电动机 motor　制动器 brake　电阻器 resistor

小车控制柜 trolley control cabinet　电动机 motor　制动器 brake　电阻器 resistor

照明变压器 light voltage transformer

各机构控制器可独立安装或集中控制 Controller can be installed or centralized control agencies

照明讯号及安全保护装置 Lighting signal and safety protection device

小车电缆导电装置 The car cable conductive device

断路器、接触器、继电器主要电器元件采用国内知名产品。Circuit breaker, contactor, relay, the main electric elements adopt domestic famous products.

3.6 操作 operation

所有机构均由司机室凸轮控制器或主令控制器操作,控制起升、大车、小车机构的运行。司机室安装有

紧急停车按钮，按下此按钮，可供紧急情况下切断全车动力电源。All institutions from the driver's cab are CAM controller or the command controller operation, control of hoisting, crane and trolley running of the organization. Cab equipped with emergency stop button, press this button to cut off the whole vehicle available for emergency power supply.

3.6.7 保护及指示 Protection and instructions

3.6.7.1 起重机设有紧急断电开关，在紧急情况下，可切断起重机总电源，该开关设在配电柜内。Crane is equipped with an emergency power switch. In the event of an emergency, it can cut off the general power supply of the crane. The switch is located in the power distribution cabinet.

3.6.7.2 电动机配置有功能齐全的保护装置，对电动机的过流、短路等故障可进行有效的保护。Motor equipped with complete functions of protection and for the over current or short circuit fault, the motor can be effectively protected.

3.6.7.3 起重机设有零位保护（司机室控制时有），当机构准备运转或恢复供电时，必须先将控制器置于零位后，启动启动按钮，各机构电动机才能启动。Crane has zero protection control (cab control), when the organization is ready to work or when to restore power, you must first put the controller in zero stand, start the start button, then the motor can be stared.

3.6.7.4 各栏杆门均有安全电气联锁。All the rail gates have electrical safety interlocks.

3.6.7.5 设有示警电铃，通过脚踏开关进行工作提示。The warning bell works through the pedal switch.

3.6.7.6 超载负荷限制器：起重机设有超载负荷限制器，当载荷到额定 90%时，显示仪会自动报警；当载荷达到额定载荷 105%时，起重机会自动切断起升机构的电源。Overloading limit: crane is equipped with overload limiter. When the load rating to 90%, the display will automatically alarm; when load is 105% rated load, it will automatically cut the power of the lifting mechanism.

3.6.7.7 上升极限位置保护装置：吊钩起升机构装置设有限位装置，当上升到极限位置时，自动切断起升的动力电源。Rising limit position protection device: hook lifting mechanism device is equipped with the limit device, when up to the limit position, cut off the lifting power supply.

3.6.7.8 行程限位器：大车、小车运行机构两侧均装有行程限位器，当大车、小车运行到极限位置时自动切断电源，可反方向运行。Stroke limiter: cart, trolley traveling mechanism on both sides there are lead limit device, when the cart, trolley to limit position automatically cut off power supply, can be run in the opposite direction.

3.6.7.9 起重机设有失压和零位保护，司机能在方便操作的地方紧急断电。Crane is equipped with the loss of pressure and zero protection, the driver can emergency power outages, in places convenient to operate.

3.6.7.10 司机室及桥架上的仓门设有电气联锁保护装置。The driver chamber and the bridge rack warehouse door is equipped with electric interlock protection device.

（二）电气设备的安装与调整 Electrical equipment installation and adjustment

3.7 电气设备的安装和电线的敷设应按随机资料所带的电气原理图、配线图、电气设备总图进行。Electrical equipment installation and wiring installation should be according to the random data with the electrical schematic diagram, wiring diagram, electrical equipment assembly drawing.

3.8 安装前应详细地熟悉上述电气图与技术条件，了解各元件的相互作用和操纵原理，以求能迅速地处理安装及试车中所发生的问题。Before installation should be familiar with the electrical diagram and the technical conditions in detail, the understanding of the principle of interaction and manipulation of

various components, in order to quickly process occurred in the installation and commissioning of the problem.

3.9 安装前应清理和检查全部电气设备和元件。所有的电气设备和元件应无缺陷，运转应灵活，不允许有卡住和松动现象。电气设备和元件的型号、规格、触头的闭合次序等必须符合图纸。需要调整的应按图纸规定调整好。Before installation should clean and inspect all electrical equipment and components. All electrical equipment and components shall be no defect, operation should be flexible, not allowed to have stuck and loose phenomenon. Electrical equipment and component model, specification, contact the closing of the order shall conform to the drawings, etc. Need to adjust the should be specified according to drawing to adjust.

3.10 检查电动机、液压制动器、碳刷、接触器、继电器、电阻器等电气元件的绝缘性能，用兆欧表测量其绝缘电阻，如低于 1 兆欧，应进行干燥处理，经检验合格后，才能安装使用。Check motor, hydraulic brake, carbon brush, contactor, relays, resistors and other electrical components of the insulation performance, by measuring the insulation resistance by megger, such as less than 1 megohm, should carry on the dry processing, after inspection, in order to install and use.

3.11 检查电动机碳刷与滑环间的压力，一台电动机的所有碳刷压力必须一样。碳刷应与滑环全面接触，磨碳刷时不应磨圆其边缘。Check motor, hydraulic brake, carbon brush, contactor, relays, resistors and other electrical components of the insulation performance, by measuring the insulation resistance by megger, such as less than 1 megohm, should carry on the dry processing, after inspection, in order to install and use.

3.12 对液压制动器应按说明书要求注足液压油。For hydraulic brake should note enough hydraulic oil according to the requirements of specification.

3.13 检查控制器、接触器、继电器触头间的压力，是否符合各自的规定，如压力过大或过小应予以调整。Check the controller, contactor, relay contact pressure, whether to comply with the provisions of the respective, such as the pressure is too large or too small should be adjusted.

3.14 控制器操作手柄应灵活，挡位应明显。Controller operating handle should be flexible, block should be obvious.

3.15 按照电气总图或其他安装用图所示位置,安装全部电气设备和元件。According to the electrical general layout or other mounting position is shown in the graph, the installation of all electrical equipment and components.

3.16 安装在走台上的控制柜（屏）、电阻器等较重的设备应尽量使支架牢固地搭接在走台大拉筋上，安装位置允许按图示尺寸作适当调整。Installation is going on the stage of the control cabinet (screen), resistors and other heavy equipment should overlap make stand firmly on the go big brace, installation location to allow appropriate adjustments according to the size of graphic.

3.17 电阻器尽量靠近控制柜（屏），使连接导线最短。电阻器迭装时不超过 5 箱，以免电阻过热。电阻器应沿着平行主梁的方向放置（电阻元件应平行于起重机运行方向），以减少震动和利于通风。Resistor as close to the control cabinet (screen), make the wires are the shortest. Resistor packages should not be more than 5 cases to prevent resistance from overheating. Resistor should be placed along the direction

parallel to the main girder (resistance element should be parallel to the direction of crane operation), in order to reduce vibration and good ventilation.

3.18 引到电阻器的电线或电缆，其垂直部分可布置在电阻器的左侧或右侧，但不得影响电阻器的装卸。水平方向的连接线，靠电阻元件近，绝缘层容易老化，可以包以石棉绳等耐高温材料，或者将胶皮绝缘层全部剥去，另包以玻璃布等耐高温材料。Led to the resistor wire or cable, the vertical slice can be arranged in the left or right resistor, but should not affect the loading and unloading of the resistor. Resistance element close to the horizontal direction of the connection wire, insulation layer is easy to aging, can package with high temperature resistant material such as asbestos rope, or rubber insulation stripping, all the other package with high temperature resistant materials such as glass cloth.

3.19 电阻器的接线必须按提供的资料正确连接。如果发现电动机出力不足，控制手柄在规定位置不能起吊额定负载或开动大、小车，应首先检查电阻器的接线是否有错。一般情况下可根据电阻元件的规格数量作简单的判断，必要时可用电桥进行测量（此时应拆除所有与电机相连的导线）。Resistor connections must be according to the information provided is correct. If found insufficient output of the motor, the control lever in the specified location cannot be rated load lifting or moving the crane and the trolley, it should first check if there is a wrong connection of resistor. Normally according to the specifications of the resistance element number for a simple judgment, a bridge to measure if necessary (at this point should be removed all the wires connected to the motor).

3.20 双电机拖动的机构，两台电机所用的电阻器，其各段电阻值应比较接近，软化级电阻（包括连接导线电阻在内）应尽量相等（用凸轮控制器触头直接控制转子电阻的控制方式没有软化级电阻）。检查操纵室内部接线情况，如有松动或脱落等现象应予以消除，确保接触良好。Double motor, two resistor used in the electric motor, the paragraphs resistance value should be close to, the softening resistance (including connecting wire resistance should be equal as far as possible (using the CAM controller contact direct control of rotor resistance grade control way no softening resistance). Check control indoor wiring, if there are any loose or fall off wait for a phenomenon should be eliminated, to ensure good contact.

3.21 控制柜（屏）安装前，应对控制柜（屏）内的电器元件和电气线路作详细检查。元件不得有损坏，特别是接触器熄弧罩和辅助触头等。检查接触器和继电器的动作是否正常，各种连锁的准确性与可靠性，并把接触器衔铁接触面上的油垢（出厂时涂得防锈油）擦洗干净。Control cabinet (screen) before installation, control cabinet (screen) in electrical components and electrical wiring for detailed inspection. Components shall not be damaged, especially the contactor arc hood and auxiliary contact first. Check the contactor and relay action is normal, the credibility and accuracy of all kinds of chain, and the contactor grease on the surface of the armature contact (factory tu rust-proof oil) scrubbed clean.

3.22 检查各时间继电器的动作是否符合出厂技术文件所要求的整定值。Check the movement of time relay to make sure it meets the requirements of the factory technology document setting value.

3.23 屏面的倾斜度不大于 5 °，以保证屏上元件正常工作。控制柜（屏）前面的通道宽度应不小于 0.5 米（一般应保持 0.6 米），后面的间隙应不小于 100 毫米，以保证维修正常进行。Screen surface gradient is not greater than 5 °, to guarantee the normal work of the screen elements. Control cabinet (screen) in front of the channel width should be no less than 0.5 meters (generally should keep 0.6 m), the back of

the clearance shall be not less than 100 mm, so as to ensure the normal continuity for maintenance.

3.24 限位开关安装前应仔细检查开关是否灵活可靠，安装后应检查其接线是否正确并逐个进行调整。看其保护的机构到达极限位置后，触杆是否将限位开关撞开。大、小车限位开关于撞尺间的距离应调整合适，过紧将损坏开关，过松不起保护作用。对于 DZX 型开关（一般装在卷筒的尾部），必须调整触头的角度（调节范围 12°～300°）以保证吊钩上升到极限位置时断电。角度调整好后，应奖凸轮压紧，以免运行过程中松动。Limit switch before installation should check carefully whether the switch is flexible and reliable, the installation should be checked after the connection is correct and adjust them one by one. After watching its protection mechanism to limit position, feeler lever will limit switch open. Big, the distance between the limit switch of car bump feet should be adjusted appropriate, too tight will damage the switch, and can't afford to too loose protection. For DZX type switch (generally in the tail end of the drum), need to adjust the Angle of contact (the adjusting range is 12 ° ~ 300 °) to ensure that the power when the hook up to the limit position. Good Angle adjustment, should award the CAM clamping, so as not to loose during operation.

3.25 大车导电器的绝缘子必须完整无缺和没有裂缝，并且要牢固地固定在导电架上。导电器必须紧密地压在导电滑线上，如运行时发生火花即表示接触不良，其原因可能是导电器和导电滑线接触不紧密或工作表面不清洁，或两者兼而有之。Cart guide electrical insulator must be intact and without cracks, and firmly fixed in conductive frame. Guide electrical appliances must be pressure on the conductive slip line tightly, such as run time happen spark it indicates that the poor contact, the reason may be that guide electric appliance and the conductive slip line contact is not close or work surface is not clean, or both.

3.26 通常为了保证安全，操纵室一般都装在大车导电滑线对侧，若必须装置在同侧时，应加防护网保护。（防护网由用户自设）Usually in order to ensure safety, control room is generally mounted on a cart conductive slip line on the side, if the device must be on the same side, should add fence protection. Network (set by the user)

3.27 小车电缆导电装置安装时，应首先把电缆理顺，消除扭力，按图纸要求顺次排列在终点夹、电缆滑车和拖动滑车上。将小车推到离开操纵室一端的极限位置上，使电缆放开，调整拖动滑车的位置，使每段电缆的长度基本一致并保持一定的弛度，下垂夹角保持 120°左右，调整好后，用电缆夹板将电缆牢固的固定在终点夹和拖动滑车上，再把小车推到靠操纵室一端的极限位置上，调整电缆，使每段电缆的悬长基本相同，用电缆夹板将电缆牢固的固定在电缆滑车上。电缆每隔 500～700 毫米用铁皮编织并夹紧。应保证每根电缆都夹紧，为此，需在电缆夹板上垫以胶皮。然后装上牵引钢绳，调整钢绳长度，保证运行时由牵引钢绳受力，最后将电缆的两端分别接到桥架上和小车上的接线盒中。Cable car conductive device installation, should be first straightens cable, eliminate the torsion, according to the requirements of drawings in sequence on the end clamp and cable pulley and drag on a block and tackle. Push car control room to the left side of the limit position, make cable release, adjust the position of the drag block so that each section of the cable length is almost the same and keep certain sag, drooping Angle 120 °, adjust good, instead of a cast, a splint cable clip cable is firmly fixed to the end point and drag on a block and tackle, and push the car to depend on the control room side of the limit position, adjust the cable, so that each section of the cable hanging long basically the same, the cable with cable clamp firmly fixed on the cable pulley. Cable every 500 ~ 700 mm with metal weaving and clamping. It should ensure that each cable clamping, therefore, should be on the cable clamp pads with rubber. Then fitted with traction

rope, adjust the rope length, ensure runtime by traction rope force, finally respectively from the two end of cable bridge frame and junction box in the car.

3.28 常用的电缆线型号：YC 重型橡套软电缆，环境温度大于等于-15 度、小于等于 40 度，线芯最高工作温度 65 度；CEFR/DA、CEFR/SA 乙丙绝缘氯丁护套船用软电缆，耐高温，环境温度大于等于-25 度、小于等于 45 度，线芯最高工作温度 85 度；YHD 橡皮绝缘耐寒橡套软电缆，环境温度大于等于-50 度、小于等于 50 度，线芯最高工作温度 65 度；YVFB 丁腈聚氯乙烯扁型软电缆，环境温度大于等于-40 度、小于等于 70 度，线芯最高工作温度 70 度；YGGC 硅橡胶电缆，最高工作温度 180 度，最低环境温度，固定敷设-60 度。Commonly used cable types: YC heavy rubber set soft cable, the environment temperature is greater than or equal to 15 degrees and less than or equal to 40 degrees, wire core highest working temperature of 65 degrees; CEFR/DA, CEFR/SA ethylene-propylene insulating neoprene sheath Marine soft cable, high temperature resistance and ambient temperature is greater than or equal to 25, less than or equal to 45 degrees, the wire core highest working temperature of 85 degrees; YHD rubber insulation cold-resistant rubber set soft cable, the environment temperature is greater than or equal to, less than or equal to 50-50 degrees c, wire core highest working temperature of 65 degrees; YVFB nitrile PVC flat flexible cable, the ambient temperature is greater than or equal to, less than or equal to 40 degrees - 70 degrees, wire core highest working temperature of 70 degrees; YGGC silicone rubber cables, the highest working temperature 180 degrees and the lowest environment temperature, the fixed installation to 60 degrees.

四、起重机的运转试验Crane running test

起重机的运转试验，是新安装架设的起重机所必须进行的检验项目，也可作为定期检验的项目。Crane running test, it is a new installation erection crane must be carried out by the inspection items, also can be used as a regular inspection of the project.

(一)试车前的准备和检查 Prepare and check before commissioning

为保障运转试验安全、顺利地进行，试验前必须对起重设备进行认真检查，并为试验做好充分准备。In order to ensure the security of test operation, and smoothly, for lifting equipment must be carefully check before test, and fully prepared for test.

1、关闭起重机电源，检查所有连接部分的紧固情况。Close the crane power supply, check all the connection part of the fastening.

2、各传动机构装置是否精确灵活，金属结构是否变形，钢丝绳在滑轮和卷筒上的缠绕情况。Each actuator device is accurate, flexible metal structure deformation, steel wire rope on the pulley and the drum of the winding.

3、用兆欧表检查电路系统和所有电气设备的绝缘电阻是否符合要求。Using tramegger check circuit system and all electrical equipment insulation resistance meets the requirements.

4、在断开动力线路的情况下，检验操纵线路接线的正确性，检查所有操纵设备的传动部分是否灵活可靠。In the case of a disconnect power circuit, test the correctness of the control circuit wiring, check all rig equipment transmission part is flexible and reliable.

5、各润滑点加注润滑油脂，减速机、制动器的液压缸、液压缓冲器等，按规定加润滑油。All lubricating points filling grease; reducer, brake, hydraulic cylinder, hydraulic buffers, etc., add the lubricating oil according to the rules.

6、保证电气设备工作正常可靠，其中必须特别注意电磁铁、限位开关、安全开关和紧急开关的工作可靠性，注意分别驱动运行机构电动机的接线相序检查，使两电动机同向运转。Ensure proper and reliable electrical equipment, and one must pay special attention to the electromagnet, limit switches, safety switch and the work reliability of the emergency switch, pay attention to the wiring of the motor drive running institutions respectively phase sequence check, makes the direction of the motor running.

7、加强人员的安全防护，清除大车运行轨道上、起重机上以及试验区域内影响运转试验的一切物品。Strengthen personnel safety, clear crane orbit, the crane as well as the test area all items affect the running test.

8、准备好负荷试验的重物，重物可用相对密度比较大的钢锭、钢坯、条材、生铁块或大型铸造毛坯等。但必须要对质量计算准确，并应可靠捆扎好。Ready to test weight load and the weight load should be available relative density large steel ingot, billet, bar, pig or large casting blank, etc. But the quality must be to calculate accurate, reliable and should be strapped up.

（二）无负荷试验 No load test

1、用手转动各机构的制动轮，使车轮轴或卷筒轴在旋转一周时，所有传动机构都平稳且没有卡滞现象。Turn the institutions by hand brake wheel, made the car axle or when revolving drum shaft, all driving mechanism is smooth and without card lag phenomenon.

2、分别开动各机构，操纵机构操作方向应与机构运动方向相一致。先慢速试转，再以额定速度运行，观察各机构应平稳的运转，没有冲击、振动和不正常响声现象。Start the agencies respectively; operating mechanism should be consistent with the direction of the motion of the operating direction. Slow running in, and then running at rated speed, observe the agencies should be smooth operation, no impact, vibration and abnormal noise phenomenon.

3、沿行程全长，往返运行 3 次，检查大、小运行机构情况，双梁起重机主动小车轮应在轨道全长上接触。Along the stroke length, running back and forth 3 times, run large and small institutions, double beam crane active contact small wheels should be on the track length.

4、用电缆导电时，收、放电缆速度应与运行机构相协调。When using a cable of the conductive, cable release rate, should be coordinated with operating mechanism.

5、进行各种开关的试验，包括吊具上升（下降）极限位置限制器，大、小车运行极限位置限制器，各联锁保护装置，司机室的紧急开关等。For a variety of switch test, including the sling up (down) the limit position limiter, and limit position of trolley travelling limiter, the interlock protection device, the driver chamber of the emergency switch, etc.

（三）负荷试验 Load test

无负荷试验试车情况正常之后，才允许进行负荷试车，负荷试车分静、动两种，先进行静负荷试车，再进行动负荷试车。No-load test run after the normal test and that is only allowed to load test, static and dynamic load test points two kinds, first carries on the static load test and load test before going into action.

1、静负荷试车 Static load test

静载试验的目的是检验起重机及其各部分结构的承载能力。每个起升机构的静载试验应分别进行。对双小车的起重机，起重机总起重量为两个小车之和时，两个小车的主钩应同时进行,以便检验桥架的承载能力；总起重量为其中一个小车的起重量时，应分别进行。The purpose of the static load test is a test of the bearing capacity of the crane and its parts structure. Each lifting mechanism of static load test should be

performed, respectively. Of twin trolley crane, hoist total weight is the sum of two cars, two main hook of the car should be simultaneously, so that the inspection of the bearing capacity of the bridge; Total weight for one car lifting weight, respectively.

首先起升较小的负荷（可为额定起重量的 0.5～0.75 倍）运行几次，然后起升额定负荷，在桥架全长往返运行数次后，将小车停在桥架中间，定出测量基准点。起升 1.25 倍额定负荷，离开地面约 100～200mm 左右，悬停 10min，卸去负荷，分别检查起升负荷前后量柱上的刻度（在架桥中部或厂房的房架上悬挂测量下挠度用的线锤，相应的在地面或主梁上安设一根量柱），反复试验最多 3 次后桥架不得产生永久变形（即前后两次所检查的刻度值相同），然后将小车开至跨端，检查实际上拱度值在 0.7S/1000～1.4S/1000 范围内；最后使小车停在桥架中间，起升额定负荷，离地面 100mm 左右，测量主梁的下挠度，对 A1~A3 级：≤S/700；A4~A6 级：≤S/800；A7 级：≤S/1000（铸造起重机见附录 C）。试验后，如果未见到裂纹、永久变形、油漆剥落或对起重机的性能与安全有影响的损坏，连接处没有出现松动或损坏，则该项试验合格。First hoisting smaller load (0.5 ~ 0.75 times of rated lifting weight) to run a few times, and then lifting the rated load, after the bridge span running back and forth several times, parked the car in the middle of the bridge, the set measurement datum. Lifting 1.25 times the rated load, about 100 ~ 200 mm off the ground, hovering 10 min, unload, check respectively before and after lifting the load quantity column on the scale (or workshop in the central part of ancient bridge room rack hanging under the deflection measured in line of hammer, the corresponding one girder column) on the ground or girders, trial driving axle bracket a maximum of three times shall not generate permanent deformation (i.e., the first and the second check the scale value of the same), and then the car driving to the end, check actually camber values in 0.7 S / 1000 ~ 1.4 S / 1000 range; Finally makes the car stop in the middle of the bridge, lifting the rated load, around 100 mm off the ground, and measure the girder deflection, under the A1 to A3: S / 700 or less; A4 to A6: S / 800 or less; A7: S / 1000 or less (see appendix C casting crane). After test, if not see cracking, permanent deformation, the paint peeling off, or impact on the performance and safety of the crane's damage, joint no loose or damaged, then the test.

2、动负荷试验 Dynamic load test

动负荷试验的目的主要是验证起重机各机构和制动器的功能。Main aim of the dynamic load test is to verify the crane institutions and the function of brake.

起升 1.1 倍额定载荷作为动负荷试车，分别开动各机构（也可同时开动 2 个机构），试验中，对每种动作应在其整个运动范围内反复启动和制动，按其工作循环与工作级别，并按操作规程进行控制，试车时间应延续 1 小时。实验后，起重机各机构动作灵敏，工作平稳可靠，各限位开关和连锁保护开关工作可靠，没有发现机构或结构损坏，连接处无松动或损坏现象，即为合格。对起吊重物在下降制动时的制动距离（即下滑量），应不大于 1 分钟内稳定起升距离的 1/65，否则要调整制动器。Lifting 1.1 times the rated load as the dynamic load test, respectively, to start the agencies (also can start the two institutions) at the same time, experiments, for every action should be within the scope of the whole movement again and again starting and braking, according to the level of work and the work cycle, and control according to operation procedures, test time should be continued for 1 hour. , crane agencies action sensitive, work stable and reliable, the limit switch and chain protection switch work reliable, found no institutions or structural failure, joint no loose or damaged phenomenon, is qualified. To the braking distance when lifting heavy objects falling brake (that is, the decline in volume), stable lifting distance should be not greater than 1 minutes of 1/65, to adjust the brake.

ement, have been found contaminated or deterioration, and should be replaced immediately.

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Tips:
You can use the phone dimensional code recognition software to scan the right side of the two-dimensional code, to quickly and easily access our web site for more information.