

The Instruction Manual of Vacuum Lifter

This Instruction Manual applies to type DFDX Vacuum Lifter

A product of
Alco International Co.,Ltd.



The equipment you purchased may not match the picture above,
but the installation and usage procedure of the equipment are the same.



安装使用该设备前 请认真阅读说明书

Please read the Instruction Manual carefully before installing and using the equipment.



安全警示 Safety Warning



操作人员必须穿戴具有防护功能的鞋子，该鞋子应能够在搬运玻璃时对操作人员的脚部起到保护作用！

Operators must wear shoes with protective functions, which should be able to protect the operator's feet when handling the glass!



真空吸吊设备搬运时，工件下方严禁站人或将手脚伸入！

Do not stand under the workpiece or put hands or feet into the workpiece when the vacuum lifter is working!



吸盘破损时严禁吸吊工件！

Do not lift the workpiece, when the vacuum lifter is damaged!



电量不足或真空指示灯报警时立即采取安全措施！

Take safety measures immediately when low power or vacuum indicator lights alarm!



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Take safety measures immediately when low power or vacuum indicator lights alarm!



操作人员必须经过培训，并且按照操作说明使用该设备！

Operators must be trained and use the equipment according to the Instruction Manual!



工件不能超过真空吸吊设备额定参数！

The workpiece shall not exceed the rated parameters of vacuum lifter!



禁止使用未装配完毕、已损坏或配件不全的真空吸吊设备！

Do not use the vacuum lifter that has not been assembled, damaged or has incomplete parts!



吸吊时将真空吸吊设备的中心尽量靠近工件中心！

The center of the vacuum lifter should be as close to the center of the workpiece as possible!



该真空吸吊设备只适于吸吊表面平整、致密的工件！

The vacuum lift is only suitable for the workpiece with flat and non-porous surface!



不能吸吊有毒、易燃、易爆物品！

It is prohibited to suck or hang poisonous, flammable and explosive articles!



直流设备每次使用完毕，需关闭电源，节省电量！

After each use of the DC equipment, the power should be turned off to save power!



当电量显示器绿色格用完，需及时进行补充充电（由于不同的使用环境及温度差异，电池存量过低会导致充电器无法进行补充充电，如电池用到极限，电池内电阻会无穷增大，即电池会报废。）

When the green grid of the battery indicator is used up, it is necessary to replenish in time. (With the differences in use environment and temperature, low battery stock will lead to failure in replenishment of the charger. If the battery reaches its limit, the resistance of the battery will increase infinitely, which means the battery will be scrapped.)



禁止非授权人员的维修，禁止使用非原有或非厂家推荐的部件替换损坏的部件！

Unauthorized maintenance is prohibited, Replacing damaged parts with parts that are not original or not recommended by the manufacturer is prohibited!



禁止雨天使用此设备！

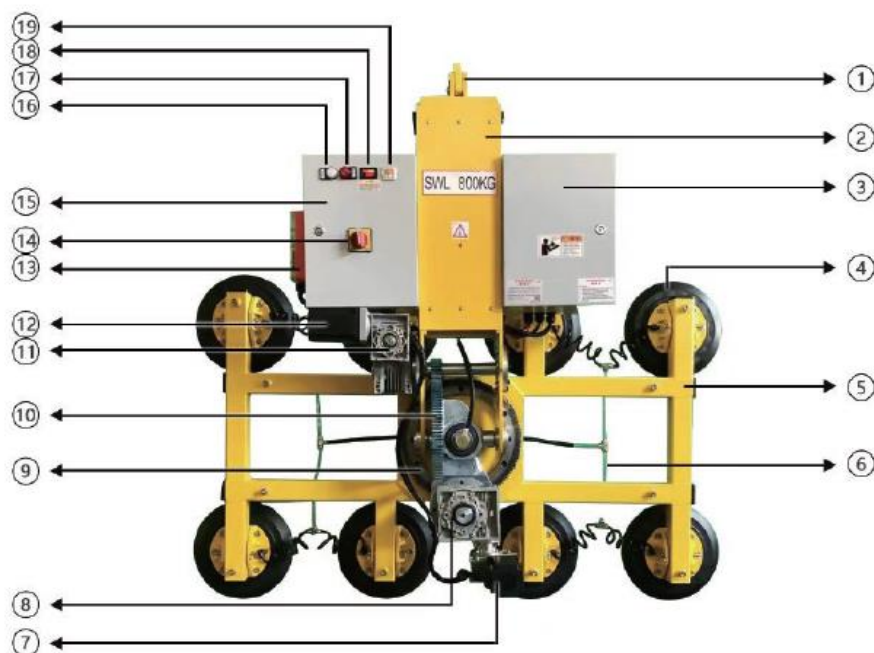
Do not use this environment on rainy days!



按照规定进行维修保养，必须至少每半年做一次专业的保养与检修！

According to the provisions of maintenance, the professional maintenance and overhaul should be done at least once every six months!

一、真空吸吊设备组件说明 Component Descriptions



序号 NO.	名 称 Name	功能 Function
1	吊耳 / 环 Lifting Ring	与起重设备的吊钩连接 Connected with the hook of lifting equipment
2	蓄电池控制箱 Battery Control Box	四块 12V 22Ah 蓄电池串联为设备提供电源 Four 12V 22Ah batteries in series to provide power to the equipment
3	真空系统 Vacuum System	真空系统的动力源，包含真空泵，电磁阀，过滤器等电器元件 Power source of the vacuum system, including the vacuum pumps, solenoid valves, filters and other electric elements
4	真空吸盘 Vacuum Suction Cup	与工件实现密封，用以吸附在工件表面，橡胶与工件接触，确保不会对工件表面造成损伤 It is used to be attached on the surface of the workpiece. The rubber contact with the workpiece to ensure that there is no damage to the surface of the workpiece
5	主框架 Main Frame	卷板材质的国标方管，真空吸吊设备的承载结构 National standard square tube of sheet material, bearing structure of vacuum suction cup and workpiece
6	真空气管 Vacuum Hose	用于连接分管与吸盘的管路 A line used to connect a shunt to a suction cup

7	旋转无刷电机 Rotary Brushless Motor	48V 直流无刷电机，驱动旋转减速机 48V brushless DC motor, driving the rotary reducer
8	旋转减速机 Rotary Speed Reducer	带动齿轮实现 0-360°电动旋转 Driving the gear to rotate electrically 0-360°
9	旋转齿轮组 Rotary Gear Set	通过旋转减速机带动实现旋转功能 Rotating through the rotary reducer
10	翻转齿轮组 Turn-over Gear Set	通过翻转减速机带动实现翻转功能 Turning over through turn-over reducer
11	翻转减速机 Turn-over Reducer	带动翻转齿轮组实现 0-90°电动翻转 Turning over electrically 0-90°through turn-over gear set
12	翻转无刷电机 Turn-over Brushless Motor	48V 直流无刷电机，驱动翻转减速机 48V brushless DC motor, driving the turn-over reducer
13	无线遥控接收器 Remote Receiver	接收无线遥控器信号的装置 Device receiving remote control signal
14	电源开关 Power Switch	真空系统的通电开关 Power switch for vacuum system
15	电动系统 Electrodynamiac System	整套设备的电路控制系统：包括翻转旋转动作及真空系统的电路 Electronic control systems: including circuits of flip rotation and vacuum system
16	真空指示灯 Vacuum Indicator Lamp	用来显示真空吸吊设备是否具备吊装条件 Used to show whether the vacuum lifter can work
17	蜂鸣报警灯 Alarm Lamp	发出声光报警，提示操作人员机器工作状态 Audible and visual alarm to remind the operator of the working state of the machine
18	电量显示器 Power Indicator	用来显示真空吸吊设备电池电量使用情况 Used to display the battery usage of vacuum lifter
19	真空压力开关 Vacuum Pressure Sensor	显示吸盘 / 蓄能器内的真空度，自动检测系统压力，控制真空灯显示报警信号 Display the vacuum degree in the whole vacuum system. It can automatically detect the system pressure and control the vacuum light to display the alarm signal

二、真空吸吊设备系统特点 System Characteristics

1、安全系数 SAFETY FACTOR

钢结构主体大于2.0，真空系统计算压力值为60% 真空度下测定。

THE MAIN BODY OF THE STEEL STRUCTURE IS GREATER THAN 2.0, AND THE CALCULATED PRESSURE VALUE OF THE VACUUM SYSTEM IS DETERMINED AT 60% VACUUM DEGREE.

吸放气采用双按钮控制，防止误操作，更安全。

SUCTION AND DISCHARGE ADOPTS DOUBLE BUTTON CONTROL, WHICH PREVENTS MIS-OPERATION AND MAKE IT SAFER.

2、压力报警 PRESSURE WARNING

真空吸吊设备上装有真空压力开关和真空灯报警单元，真空系统压力未达到设定压力值时，或者发生真空泄漏时，

真空灯无法由红色变为绿色或频繁红绿交替闪烁，即提示操作人员及时处置。

每台真空吸吊设备都至少装备有一个真空压力开关：

- 直观显示系统真空压力。

- 自动检测系统压力。当数显压力低于-58KPa 时，真空灯会由绿色变为红色，真空泵会自动启动；当数显压力

大于-66KPa 时，真空灯会由红色变为绿色，真空泵自动停止工作。

真空吸吊设备搬运时，操作者应经常观察真空压力开关的压力指示数值。

THE VACUUM LIFTER IS EQUIPPED WITH VACUUM PRESSURE SENSOR AND VACUUM LAMP ALARM, WHEN THE PRESSURE OF THE VACUUM

SYSTEM DOES NOT REACH THE SET PRESSURE VALUE, OR WHEN THE VACUUM LEAKAGE OCCURS, THE VACUUM LAMP CANNOT CHANGE FROM RED TO

GREEN OR FLASH FREQUENTLY AND ALTERNATELY, WHICH PROMPTS THE OPERATOR TO DEAL WITH IT IN TIME.

EACH VACUUM LIFTER IS EQUIPPED WITH AT LEAST ONE VACUUM PRESSURE SENSOR:

- INTUITIVE DISPLAY OF SYSTEM VACUUM PRESSURE.

- AUTOMATIC DETECTION OF SYSTEM PRESSURE. WHEN THE DIGITAL DISPLAY PRESSURE IS LOWER THAN - 58KPA, THE VACUUM LAMP WILL

CHANGE FROM GREEN TO RED, AND THE VACUUM PUMP WILL START AUTOMATICALLY; WHEN THE DIGITAL DISPLAY PRESSURE IS GREATER THAN

-66KPA, THE VACUUM LAMP CHANGES FROM RED TO GREEN, AND THE VACUUM PUMP AUTOMATICALLY STOPS WORKING.

WHEN HANDLING VACUUM LIFTER, THE OPERATOR SHOULD ALWAYS OBSERVE THE PRESSURE INDICATION VALUE OF VACUUM PRESSURE SENSOR.

3、每个吸盘均配备有手动球阀控制启闭，以适用于各种规格的玻璃。

EACH SUCTION CUP IS EQUIPPED WITH A MANUAL BALL VALVE TO CONTROL THE OPENING AND CLOSING, SO AS TO ENSURE THAT THE SAME

EQUIPMENT CAN BE SUITABLE FOR VARIOUS DIMENSIONS OF THE GLASS.

4、吸盘座内部设计有弹簧缓冲，玻璃不平或有弯曲时可以更好的贴合；同时弹簧还起到缓冲作用，可以使吸盘受

力均匀，从而保证真空吸吊设备的安全可靠。

THE SUCTION CUP SEAT IS DESIGNED WITH A SPRING INSIDE, WHICH CAN BE BETTER FITTED WHEN THE GLASS IS UNEVEN OR BENT; AT THE

SAME TIME, THE SPRING ALSO PLAYS A BUFFER ROLE, WHICH CAN UNIFORM THE STRENGTH ON THE SUCTION CUP, SO AS TO ENSURE THE SAFETY AND RELIABILITY OF VACUUM LIFTER.

三、真空吸吊设备（连接）安装 Connection

设备全部运达、装配完毕并等待安装，在机器的初始操作之前必须检查完整性及运输途中是否有损坏，若有任何损坏必须立即以书面形式报知。

THE EQUIPMENT IS FULLY TRANSPORTED, ASSEMBLED AND WAITING FOR CONNECTION, COMPLETENESS AND DAMAGE IN TRANSIT OF THE EQUIPMENT MUST BE CHECKED BEFORE INITIAL OPERATION, AND ANY DAMAGE MUST BE REPORTED IMMEDIATELY IN WRITING.

1、结构连接 STRUCTURAL CONNECTION

将真空吸盘组安装在主框架与副框架上，且连接对应的真空气路，拧紧卡箍

INSTALL THE VACUUM SUCTION CUP GROUP ON THE MAIN FRAME AND THE CROSSBEAM, CONNECT THE CORRESPONDING VACUUM HOSE, AND TIGHTEN THE CLAMP.

2、机械连接 MECHANICAL CONNECTION

将行车的吊钩扣紧真空吸吊设备的吊耳即可。

FASTEN THE LIFTING HOOK OF THE WORKSHOP CRANE TO THE LIFTING RING OF THE VACUUM LIFTER.

3、气密性检查 AIR TIGHTNESS INSPECTION

启动真空吸吊设备并将其放置在一个平面上，用致密的材料进行测试，当真空灯由绿色变为红色，也就是数显压力开关压力由-66KPa 降至-58KPa 时，所消耗的时间应大于10 分钟。

START THE VACUUM LIFTER AND PLACE IT ON A FLAT SURFACE WORKPIECE, TEST IT WITH NON-POROUS MATERIALS, WHEN THE VACUUM LAMP CHANGES FROM GREEN TO RED, THE DIGITAL DISPLAY PRESSURE DROPS FROM -66KPa TO -58KPa, THE TIME CONSUMED SHOULD BE MORE THAN 10 MINUTES.

四、真空吸吊设备操作控制说明 Control Instructions

1、真空吸吊设备的启动 STARTUP OF THE VACUUM LIFT

使用前将吸盘表面及工件表面擦拭干净，旋转控制箱上的电源开关（见图一），即设备通电，观察电池电量表（见图二）电量是否充足（红色代表严重亏电，黄色代表亏电，绿色代表电量充足），当绿色格消失，显示黄色格时表示电量不足需要充电，当仅剩红色格时严禁使用必须充电。充电时，将充电接头插入设备充电接口处（见图三），确认插牢固后，将充电器电源插头插入100-240VAC 进行充电。

（当设备工作一段时间后请及时充电，如电量完全耗尽，电池内电阻会无穷增大，即电池报废。）

CLEAN THE SUCTION CUP SURFACE AND THE WORKPIECE SURFACE BEFORE WORKING, PRESS THE POWER SWITCH ON THE CONTROL BOX (SEE FIGURE 1), OBSERVE WHETHER THE BATTERY CHARGE METER (SEE FIGURE 2) IS SUFFICIENT (RED REPRESENTS SERIOUS POWER LOSS, YELLOW MEANS LOSING ELECTRICITY,

GREEN REPRESENTS FULLY CHARGED), WHEN THE GREEN GRID DISAPPEARS, YELLOW GRID MEANS ELECTRICITY SHORTAGE AND IT NEEDS TO CHARGE, WHEN ONLY RED GRID IS LEFT, IT IS STRICTLY PROHIBITED TO USE AND IT MUST BE CHARGED, WHEN CHARGING, INSERT THE CHARGING CONNECTOR INTO THE CHARGING INTERFACE OF THE DEVICE (SEE FIGURE 3), AFTER CONFIRMING THAT THE CONNECTOR IS FIRMLY INSERTED, INSERT THE POWER PLUG OF THE CHARGER INTO THE 100-240VAC FOR CHARGING. (WHEN THE BATTERY WORKS FOR A PERIOD OF TIME, PLEASE CHARGE IT IN TIME. IF THE BATTERY REACHES ITS LIMIT, THE RESISTANCE OF THE BATTERY WILL INCREASE INFINITELY, WHICH MEANS THE BATTERY WILL BE SCRAPPED.)

2、吸吊设备定位 POSITION OF VACUUM LIFTER

控制起重吊机运动，使真空吸吊设备贴近玻璃表面，并尽量放置于玻璃中心，吸盘应与玻璃表面充分贴合密封。

CONTROL THE VACUUM LIFTER TO MAKE IT CLOSE TO THE SURFACE OF THE PLATE, AS FAR AS POSSIBLE IN THE CENTER OF THE PLATE, THE SUCTION CUP SHOULD BE FULLY FITTED WITH THE PLATE SURFACE.

3、玻璃吸附 GLASS ATTACHING (LIFTING)

确保此时吸盘与真空系统接通，也就是开关球阀属于打开状态（见图四），操作无线遥控器（见图五）按下吸气按钮，真空泵开始启动，真空灯（见图六）初始处于红色状态，当真空压力开关（见图七）面板上数值由-0KPa 升至-66KPa 时，真空灯由红色（见图六）变为绿色（见图八），真空泵停止工作，此时真空吸吊设备处于就绪状态。表示可以进行搬运，此过程大约需要10-15 秒左右，真空灯（见图六）处于红色状态禁止起吊；玻璃吸附完成后，可操作无线遥控器（见图五）上的翻转按钮与旋转按钮，进行玻璃的翻转与旋转操作，翻出，翻回 对应的翻转电机动作，按住翻转电机动作，松开停止动作，正转，反转，对应的旋转电机动作，按住电机动作，松开停止动作。

MAKE SURE THE SUCTION CUP IS CONNECTED TO THE VACUUM SYSTEM, THAT IS, THE SWITCH BALL VALVE IS OPEN (SEE FIGURE 4), PRESS THE ATTACH BUTTONS ON REMOTE CONTROL (SEE FIGURE 5), THE VACUUM PUMP STARTS TO WORK, THE VACUUM LAMP (SEE FIGURE 6) IS INITIALLY IN THE RED STATE, WHEN THE VALUE ON THE PANEL OF THE VACUUM PRESSURE SENSOR (SEE FIGURE 7) RISES FROM -0 KPA TO -66 KPA, VACUUM LAMP CHANGES FROM RED (SEE FIGURE 6) TO GREEN (SEE FIGURE 8), THE VACUUM PUMP STOPS WORKING, AND THE VACUUM LIFTER IS IN THE READY CONDITION. THIS PROCESS TAKES ABOUT 10-15 SECONDS. THE VACUUM LAMP (SEE FIGURE 6) IN RED STATE IS PROHIBITED TO LIFT.

WHEN THE PLATE IS ATTACHED, THE TURN-OVER AND ROTATION BUTTON ON THE REMOTE CONTROL (SEE FIGURE 5) CAN BE USED TO TURN OVER AND ROTATE THE PLATE, TURN OUT, TURN BACK THE CORRESPONDING ACTION OF THE TURN-OVER MOTOR, PRESS AND HOLD THE MOTOR AND IT WILL WORK, RELEASE THE HOLD AND IT WILL STOP, FORWARD TURN, REVERSE TURN, THE CORRESPONDING ACTION OF THE TURN-OVER MOTOR MOTOR, PRESS AND HOLD THE MOTOR AND IT WILL WORK, LOOSE THE PRESS AND IT WILL STOP.



4、玻璃提升/放料搬运 PLATE LIFTING/ DISCHARGING AND TRANSFERRING 控制起重设备将玻璃搬运到放料位置。

CONTROL THE VACUUM LIFTER TO TRANSFER THE PLATES TO THE UNLOADING POSITION.

5、板材释放 PLATE RELEASE

同时按下无线遥控器上的放气按钮，使各吸盘与大气连通，则吸盘与玻璃表面间真空压力消失，玻璃与吸盘分离。

PRESS THE "RELEASE" BUTTONS ON REMOTE CONTROL TO CONNECT EACH SUCTION CUP WITH THE ATMOSPHERE, THEN THE VACUUM PRESSURE BETWEEN THE SUCTION CUP AND THE PLATE SURFACE DISAPPEARS, AND THE PLATE AND THE SUCTION CUP ARE SEPARATED.

6、重复操作 REPETITIVE OPERATION

操控行车运动到下一待搬运玻璃处，重复步骤2 即可。

MOVE THE VACUUM LIFTER TO THE NEXT PLACE WHERE THE PLATES ARE TO BE MOVED, REPEAT STEP 2.



当与葫芦配套使用时：不能超过葫芦的额定吊重！

When used in conjunction with the hoist, it could not exceed the hoist's rated lifting weight!

如果报警装置发出信号（真空灯一直变红或红绿交替闪烁）请立即放下工件。

If the alarm device emits a signal (the vacuum lamp always turns red or flashes alternately red and green), put down the plate immediately.

不要在搬运过程中按下“释放”按钮。

Do not press the "Release" button during handling.

不要在搬运过程中站在悬吊的物品下方。

Do not stand under suspended items during handling.

搬运区域内不能有人或物品存在。

There must be no persons or objects in the handling area.

吸吊额定工件工作时应将控制每个吸盘的手动球阀打开，保证所有真空吸盘与系统接通。

When the rated workpiece is working, the manual ball valve controlling each suction cup shall be opened to ensure that all vacuum suction cups are connected to the vacuum system.

五、真空吸吊设备的放置 Placement

当暂时不使用设备的时候，关闭系统电源。如果吸吊设备长期不使用时，将真空吸吊设备的四个停放支架安装到横梁上，以保证吸盘仍旧能够自由悬挂，而不会被损坏或扭曲。

TURN OFF THE POWER SUPPLY WHEN THE DEVICE IS TEMPORARILY NOT IN USE. IF THE VACUUM LIFTER IS NOT IN USE FOR A LONG TIME, INSTALL THE FOUR PARKING BRACKETS OF THE VACUUM LIFTER ON THE CROSSBEAM TO ENSURE THAT THE SUCKER CAN STILL BE HUNG FREELY WITHOUT BEING DAMAGED OR TWISTED.



严禁将吸吊设备的吸盘作为支撑来长期放置，防止橡胶吸盘因长时间机器自重挤压而变形扭曲，造成吸盘气密性的降低。

Do not place the suction cup as a support for a long time to prevent the rubber sucker from distortion due to the machine's self-weight extrusion, resulting in the reduction of sucker's tightness.

六、真空吸吊设备的维护保养 Maintenance



必须定期进行维修保养！

Maintenance must be done regularly!



维护保养时必须切断电源！

The power must be cut off during maintenance!



按照规定进行维修保养！

Carry out maintenance according to the regulations!



注意：组件的更换只能由熟练员工进行！

Note: Component replacement can only be done by skilled staff!

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维护保养列表 Maintenance List

序号 No.	保养目标/需要检查的功能（如果存在） Maintenance objectives/functions to be checked (if present)	频率 Frequency	备注/保养工作 Remarks/Maintenance work
1	<p>真空 Vacuum</p> <ul style="list-style-type: none">•吸盘的橡胶密封：检查可见的缺点 Rubber seal of suction cup: Check for visible defects•管连接：检查气管及连接是否紧密，是否破损 Pipe connection: Check whether the connection of the air pipe is tight and the air pipe is damaged•真空过滤器：检查过滤器是否堵塞或损坏 Vacuum filter: Check whether the filter is blocking or damaged•翻转旋转齿轮组：润滑脂是否缺少 Turn-over and rotating gear set: Check whether there is a shortage in grease	每周 Weekly	<p>更换失效的橡胶密封 Replace the failed rubber seal</p> <p>必要时紧固卡箍 Tighten clamp if necessary</p> <p>压缩空气吹一吹即可 Blow on the compressed air</p> <p>添加润滑脂 Add grease</p>
2	<p>安全附件 Safety Accessory</p> <ul style="list-style-type: none">•报警装置：功能测试 Alarm device: Functional test•真空压力开关：功能测试 Vacuum pressure sensor: Functional test	每天 Daily	<p>更换失效部件 Replacement of failed parts</p>
3	<p>机械 Mechanical Engineering</p> <ul style="list-style-type: none">•螺母、螺栓连接是否松开 Whether the nut and bolt connection is loosened	每月 Monthly	<p>拧紧加固 Tighten the reinforcement</p>
4	<p>电气 Electric</p> <ul style="list-style-type: none">•日常维护、检查 Daily maintenance and inspection	每天 Daily	<p>更换失效部件 Replacement of failed parts</p>

常见故障及解决 Common Problems and Solutions

故障现象 Fault Phenomenon	故障分析 Fault Analysis	消除办法 Resolution
真空压力低（即真空灯一直处于红色状态，或频繁红绿交替闪烁，真空压力开关负压数值无法达到设定压力，真空泵频繁启停） Low vacuum pressure (The vacuum lamp is always in the red state or frequent flashing in red and green alternately, the vacuum pressure sensor negative pressure value can't reach the set pressure, the vacuum pump starts and stops frequently)	所搬运物品的表面状况不适用（多孔，鳞状，锈蚀严重，多裂缝等） The surface condition of the carried item is not suitable (porous, scaly, heavily rusted, multi-crack, etc.)	必要时换用其他适当的吸盘 Switch to a suitable sucker if necessary
	吸盘没有与被搬运的物品完全接触 The suction cup is not in full contact with the object being handled	调整吸盘的放置点，再次吸附工件 Adjust the placement point of the suction cup to absorb the workpiece again
	吸盘橡胶密封损坏 The rubber seal of suction cup is damaged	更换吸盘橡胶密封 Replace rubber seal of suction cup
	真空单向阀堵塞 The vacuum check valve is blocked	清理真空单向阀或更换 Clean or replace the vacuum check valve
	真空管路破损 The vacuum pipeline is damaged	更换真空软管，紧固管箍 Replace the vacuum hose and tighten the hoop or clamps
	未使用的吸盘没有使用手动球阀关闭 The unused suction cup is not closed by manual ball valve	关闭相应的手动球阀 Close the corresponding manual ball valve
	蓄电池亏电 Battery loss	及时补充充电 Recharging in time
真空泵一直工作不停 The vacuum pump has been working non-stop	设备严重漏气，真空泵无法工作到压力开关指定数值 The vacuum lifter has serious air leakage, and the vacuum pump cannot work to the specified value of the vacuum pressure sensor 海拔过高，真空泵无法工作到压力开关指定数值 The altitude is too high, the vacuum pump cannot work to the specified value of the vacuum pressure sensor	使用排除法，检查每个吸盘回路是否有漏气情况 Using the elimination method, check each suction cup circuit for air leaks 联系赫梅尼售后，更改压力开关数值 Contact Harmony after-sales to change the vacuum pressure sensor value
工件向一端严重倾斜 The workpiece leans heavily to one end	没有吸附在工件中心 It is not attached to the center of the workpiece	调整吸盘的放置点 Adjust the placement point of the suction cup



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