

工业缝纫机数控交流伺服系统

Industrial Sewing Machine Digital AC Servo System

AFE 用户手册

User Manual

安全说明 Safety instructions

1. 在安装与使用本产品前，使用者须仔细阅读本用户手册。
 2. 本产品须由受过正确训练的人员来安装或操作。
 3. 安装作业时必须关闭所有电源，切记不可带电操作。
 4. 在连接电源线前，必须确定此电压低于 AC 250V，且符合本操作中的规定的额定电压值。
 5. 在电机电控连接电源时（开机状态）请不要把脚放在脚踏板上。
 6. 使用本产品请远离高频电磁波和电波发射器等，以免所产生的电磁波干扰伺服驱动器而发生错误动作。
1. Users should read the operation manual carefully before installation and use.
2. The product should be installed and operated by trained professionals.
3. Installation and operation should be performed without power being on and please note that electric operation should be avoided.
4. Voltage should be lower than AC250V before power line connection and conform to rated voltage specified by operation.
5. Do not put your feet on the pedals when the control box and motor is switched on(boot status).
6. The product should be away from high frequency electromagnetic wave and electric wave transmitter to avoid electromagnetic wave interference to servo device,resulting in malfunction.

保修期限 Guarantee Time

本产品保修期限为购买日起一年内或出厂月份起两年内。

Warranty period of this product is 1year dated from purchasing,or within 2year from ex-factory date.

郑重声明 Solemnly Declare

1. 不遵守安全使用说明操作规章，发生意外后果自负。
 2. 未经本公司授权，请勿擅自改动产品，由此而引发的后果本公司不负任何责任。
1. If you don't comply with the manual book operating regulations and the safety requirements,all accidental occurrence should be taken by yourself.
2. Without our authorization ,please do not alter our products,our company is not liable for any consequences arising therefrom.

1. 产品规格 Product specification

1.1 使用环境要求 Environmental requirement

正常工作环境温度：5°C~45°C Normal work ambient temperature: 5°C~45°C

正常工作环境湿度：10%~90% Normal work ambient temperature: 10%~90%

额定电压：220V±10% 50 (60) HZ Rated voltage: 220V±10% 50 (60) HZ

工作环境：本控制系统工作环境应不含有易爆、易燃、有毒、水雾或有腐蚀性的介质

Working environment: The control system should be free from inflammable,explosive,poisonous,spray or corrosive substances.

瞬间断电：在额定电压下，小于 20ms Power interruption:less than 20ms based on rated voltage.

系统接地：小于 4Ω System grounding: less than 4 Ω .

1.2 产品规格 Product specification

电机输出功率 (Power) : 550W Output power of motor: 550W

缝制速度 (Sewing Speed) : 100~6000r/min 可设 Sewing speed: 100~6000r/min

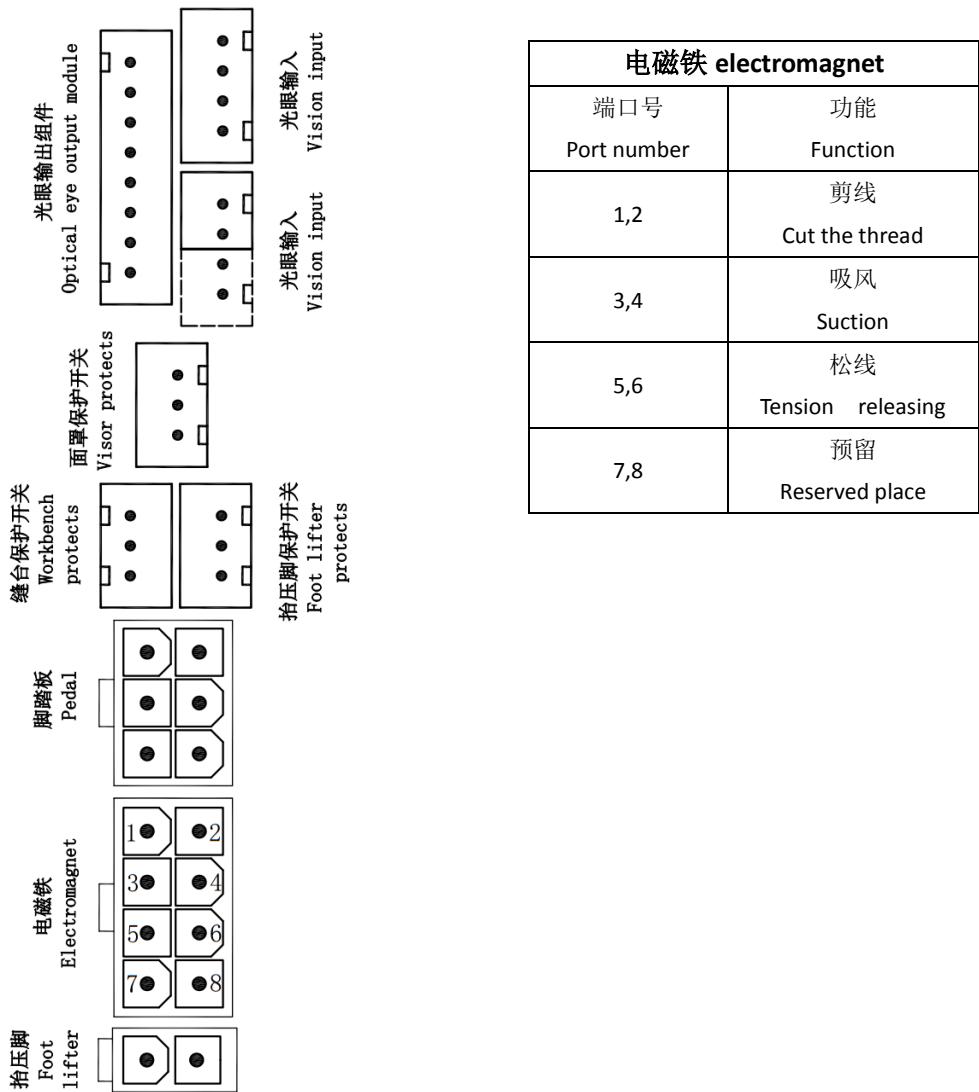
调速方法：无极变速，也可自动定速运行 Method of speed adjustment: infinitely variable speed and automatic constant speed.

电磁铁输出信号 (Solenoid Signal Output Port) : 4 路，包括抬压脚、剪线、松线、吸风电磁铁。 Electromagnet output signal: 4 channels, including presser foot lifting, thread trimming, tension releasing and air suction electromagnets.

故障保护：过流、短路、堵转等堵转保护判断时间为 3 秒。 Failure protection:over-current,short circuit and blocked rotor,etc.Protection time of blocked rotor:3 seconds..

2. 电控箱外接端口说明 Description of external port of electric control box

电控箱外接端口详见下图与表所示：The external port of electric control box is shown in the following figure and table:

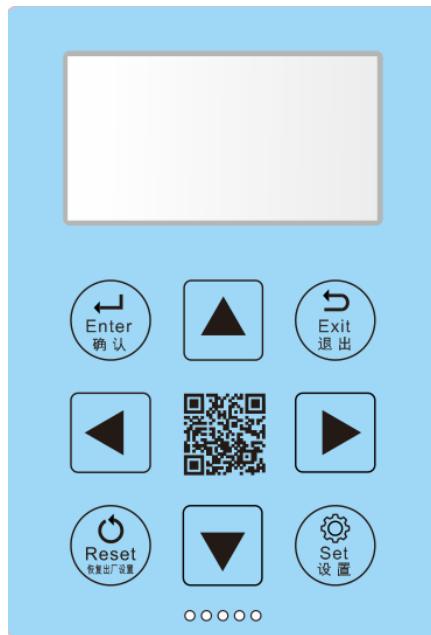


图一 外接端口示意图

Fig1: Schematic diagram of external port

3. 功能介绍 Function introduction

3.1 显示屏按键介绍 Introduction to keys of display screen



图二 操作面板

Fig2: operation panel

功能 Function	按键 Key	动作说明 Action description
设置 Set		长按该键 3S, 用户进入参数设置界面 Long pressing the key for 3S, can enter the parameter setting interface.
确认 Enter		点按该键, 可以进入下一级界面 Pressing the key, can enter the next level interface.
退出 Exit		点按该键, 可以退出当前界面, 返回上一级界面 Pressing the key, can exit current interface and return to upper interface.
左移 Move toward left		点按该键, 光标左移 Pressing the key, cursor moves toward left.
右移 Move toward right		点按该键, 光标右移 Pressing the key, cursor moves toward right.
上移 Move upward		点按该键, 光标上移 Pressing the key, cursor moves upward.
下移 Move downward		点按该键, 光标下移 Pressing the key, cursor moves downward.
恢复出厂设置 Reset		长按该键 3 秒, 再按确认键, 电控系统所有参数恢复出厂设置值 Long pressing the key for 3S, then press the enter key, all of the control system parameters return to the initial value.

4. 系统参数说明表 System Parameter Description Table

在开机状态下长按设置键 3 秒，进入参数设置界面。

When the controller is open, long press the key of "Set" for 3s, can enter the parameter setting interface.

参数代码 Parameter code	内容说明 Description of content	范围 Range	默认值 Default value	内容值名称说明与标注 Content Value Name Description and Labeling
P001	最高速度(rpm) Maximum speed (rpm)	100~7000	5500	车缝时的最高速度调整 Maximum speed adjustment during sewing
P002	停针位选择 Needle stop position selection	停上针位、停下针位、停下不提针	停上针位	缝制动作停止时针位所处位置 The needle position when the operation stopped
P003	起缝速度(rpm) Starting speed(rpm)	100~7000	4000	缝制动作开始时电机转速 The motor speed when the operation begin
P004	启动模式 Start mode	自动控制、脚控控制	自动控制	启动时设备的控制模式 The equipment control mode when start work
P005	运行模式选择 Sewing mode selection	自由缝、全人工、半自动、全自动	自由缝	四种模式可供选择 Four modes for you to choose
P007	剪线模式选择 trimming thread mode selection	无、前、后、前+后	前+后	四种模式可供选择 Four modes for you to cheese
P008	吸风模式选择 Suction mode selection	无、前、后、前+后	前+后	四种模式可供选择 Four modes for you to cheese
P009	抬压脚模式选择 Foot lifter mode selection	前、后、前+后、无	前	四种模式可供选择 Four modes for you to cheese
P010	中途抬压脚 Lifting presser foot midway	关闭、开启	关闭	开启/关闭中途抬压脚功能 Open/close the function of lifting presser foot midway
P011	剪线抬压脚 Lifting presser foot after trimming thread	关闭、开启	关闭	开启/关闭剪线抬压脚功能 Open/close the function of lifting presser foot after trimming thread
P012	半后踏抬压脚 Lifting presser foot when step half on the posterior part of the pedal	关闭、开启	关闭	开启/关闭半后踏抬压脚功能 Open/close the function of lifting presser foot when step half on the posterior part of the pedal
P013	吸风功能 Suction function	开启、关闭	开启	开启/关闭吸风功能 Open/close the function of suction
P014	照明灯的亮度调节 Brightness adjustment of light	0000~0008	0004	数值越大，灯的亮度越大 The higher the value, the greater the brightness.
P015	半自动自由缝功能 Semi automatic free sewing function	开启、关闭	关闭	开启/关闭半自动自由缝功能 Open/close the function of semi automatic free sewing
P016	半自动恒速前剪线 Semi automatic constant speed anterior trimming thread	开启、关闭	关闭	开启/关闭半自动前剪线 Open/close the function of Semi automatic anterior trimming thread with constant speed

P017	半自动恒速后剪线 Semi automatic constant speed posterior trimming thread with constant speed	开启、关闭	关闭	开启/关闭半自动恒速后剪线功能 Open/close the function of semi automatic posterior trimming thread with constant speed
P018	当前控制器软件版本号 Software version number of current controller	/	0112	显示当前控制器软件的版本号 Show the current software version of the controller
P019	光眼开关 Sensor switch	全开启、全关闭、关闭前中、关闭后	全开启	光眼开关设置的四种模式 Four set modes of the sensor switch
P020	布料选择 Fabric selection	普通、网布	普通	在布料选择界面中，按确认键，将进入光眼自适应状态。 In the fabric selection interface, press the "Enter" key, the system will run with the sensor adaptive state
P021	是否开启半自动前抬压脚功能 Whether to open the semi-automatic anterior presser foot lifting function	开启、关闭	开启	开启/关闭半自动前抬压脚功能 Open/Close the semi-automatic anterior presser foot lifting function
P022	前剪线补偿时间 Compensation time of anterior trimming thread	0000~0500	0031	数值越大，补偿时间越长。 The larger the value, the longer the compensation time.
P023	光眼模式选择 Sensor mode selection	三光眼、两光眼	三光眼	缝制时开启三光眼或者两光眼 Open three sensors or two sensors during sewing.
P024	是否开启间隔吸风 Whether to open the interval suction	关闭、开启	关闭	开启/关闭间隔吸风功能 Open/close the function of interval suction
P025	剪线后缝制针数 Sewing stitch amount after trimming thread	0000~0099	0000	数值越大，缝制针数越多 The larger the value, the more the sewing stitch amount
P026	后剪线前速度 The speed before posterior trimming thread	0100~7000	4500	数值越大，速度越快 The larger the value, the higher the speed.
P027	屏幕保护时间 How long after will the screen saver be turned on when there is no operation	10-99		数值越大，时间越长 The larger the value, the longer the time
P28	语言选择 Language selections	0、1		0: 中文; 1: 英文 0: Chinese; 1: English
P029	间隔吸风停止针数 The number of stitches the stop time of interval suction corresponds to	0000~9999	0010	数值越大，间隔吸风停止时间对应的运行针数越多。 The larger the value, the more stitches the stop time corresponds to
P030	间隔吸风运行针数 The number of stitches the running time of interval suction corresponds to	0000~9999	0003	数值越大，间隔吸风运行时间对应的运行针数越多 The larger the value, the more stitches the running time corresponds to

P031	网布选择时光眼灵敏度 The sensitivity of sensor when choose the mesh fabrics	0001~0999		数值越大，灵敏度越高 The larger the value, the higher the sensitivity
P032	前光眼灵敏度 Anterior sensor sensitivity	0000~0250	0088	数值越大，灵敏度越高 The larger the value, the higher the sensitivity
P033	中光眼灵敏度 Middle sensor sensitivity	0000~0250	0088	数值越大，灵敏度越高 The larger the value, the higher the sensitivity.
P034	后光眼灵敏度 Posterior sensor sensitivity	0000~0250	0088	数值越大，灵敏度越高 The larger the value, the higher the sensitivity.
P035	短线头光眼灵敏度 Sensor sensitivity of short wire head	0000~0050	0050	数值越大，灵敏度越高 The larger the value, the higher the sensitivity.
P036	网布移开光眼确认针数 The number of running stitches that confirmation time of sensor corresponding to when move the mesh fabrics away	0000~0050	0035	数值越大，针数越多 The larger the value, the larger the number of running stitches that confirmation time of sensor corresponding to
P037	网布移开光眼确认时间 Confirmation time of sensor when move the mesh fabrics away	0000~0050	0035	数值越大，时间越长 The larger the value, the longer the time
P038	前光眼响应时间 Response time of anterior sensor	0050~0990	0050	数值越大，响应时间越长 The larger the value, the longer the response time.
P039	前中光眼间的针数 Number of stitches between anterior and middle sensors	0001~0600	0100	数值越大，两光眼间的运行针数越多 The larger the value, the more number of the running stitches between the two sensors.
P040	中后光眼间的针数 Number of stitches between middle and posterior sensors	0001~0600	0020	数值越大，两光眼间的运行针数越多 The larger the value, the more number of the running stitches between the two sensors.
P041	无剪线时延时针数 Number of delayed stitches when without trimming thread	0001~0099	0010	数值越大，延时针数越多 The larger the value, the more delay stitches.
P042	有剪线时延时针数 Number of delayed stitches when with trimming thread	0001~0099	0001	数值越大，延时针数越多 The larger the value, the more delay stitches.
P043	前吸风开启针数 The stitches number that opening process of anterior suction corresponds to	0000~0050	0003	数值越大，开启过程所需时间对应运行针数越多 The larger the value, the more stitches the time of opening process corresponds to

P044	前吸风运行时间 The running time of anterior suction	0000~0990	0100	数值越大，运行时间越长 The larger the value, the longer the running time.
P045	后吸风延时针数 The delay stitches number that opening process of posterior suction corresponds to	0000~0999	0000	数值越大，延时针数越多 The larger the value, the more delay stitches the time of opening process corresponds to
P046	后吸风运行时间 The posterior suction running time	0100~9990	0200	数值越大，运行时间越长 The larger the value, the longer the running time
P047	剪线时间 The time for trimming thread	0010~0990	0034	数值越大，剪线时间越长 The larger the value, the longer time for trimming thread
P048	前剪线延时针数 The delay stitches number that opening process of anterior trimming thread corresponds to	0000~0999	0005	数值越大，延时针数越多 The larger the value, the more delay stitches the time of opening process corresponds to
P049	后剪线延时针数 The delay stitches number that opening process of posterior trimming thread corresponds to	0000~9999	0000	数值越大，延时针数越多 The larger the value, the more delay stitches the time of opening process corresponds to
P050	前抬压脚运行时间 The running time of the anterior presser foot lifting	0000~9990	0200	数值越大，运行时间越长 The larger the value, the longer the running time.
P051	后抬压脚运行时间 The running time of the posterior presser foot lifting	0000~9990	0120	数值越大，运行时间越长 The larger the value, the longer the running time.
P052	后抬压脚运行前延时时间 The delay time before the posterior presser foot lifting starts running	0000~9990	0050	数值越大，延时时间越长 The larger the value, the longer of the delay time
P053	抬压脚全额出力时间 Full output time of the presser foot lifting	0010~0990	0150	数值越大，时间越长 The larger the value, the longer the time
P054	抬压脚出力周期信号 Output cycle of presser foot lifting	0010~0100	0030	数值越大，周期时间越长 The larger the value, the longer time of the cycle.
P055	抬压脚放下延时电机启动时间 The delay motor start time after laying down the presser foot	0010~0990	0100	数值越大，时间越长 The larger the value, the longer of the start time
P056	抬压脚最大允许时间(单位:秒) The maximum allowable time of the presser foot being lifted	0001~0030	0010	数值越大，时间越长 The larger the value, the longer of the allowable time
P057	压脚保护开关 Protection switch	常开、常闭、关闭	常闭	三种状态可供选择 Three modes for you to choose
P058	缝台保护开关 Sewing workbench protection switch	常开、常闭、关闭	常闭	三种状态可供选择 Three modes for you to choose

P060	手动强制剪线开关：不区分有无布状态 Manual trimming thread switch: There is no need to identify the presence of cloth	开启、关闭	关闭	两种状态可供选择 Two modes for you to choose
P061	自动找上针位 Automatically find the upper needle position	开启、关闭	开启	两种状态可供选择 Two modes for you to choose
P062	上针位位置点 The upper needle position	0001~0024	0001	数值越大，位置越高 The larger of the value, the higher of the position
P063	下针位位置点 The lower needle position	0001~0024	0012	数值越大，位置越低 The larger of the value, the lower of the position
P064	测试速度 Test speed	0000~7000	3000	数值越大，测试速度越高 The larger of the value, the higher of the speed
P065	测试运行时间 Test running time	0000~0099	0003	数值越大，时间越长 The larger of the value, the longer of the time
P066	测试停止时间 Test stop time	0000~0099	0001	数值越大，时间越长 The larger of the value, the longer of the time
P067	开启/关闭自动测试 Open/close automatic testing	开启、关闭	关闭	两种状态可供选择 Two modes for you to choose
P068	电动/气动 Electric / pneumatic	电动、气动	电动	两种模式可供选择 Two modes for you to choose
P070	踏板上模拟量 The analog quantity for the pedal to lift acceleration	0000~0100	0020	数值越大，加速度越大 The larger the value, the larger the acceleration.
P071	踏板下模拟量 The analog quantity for the pedal to reduce acceleration	0000~0100	0020	数值越大，加速度越小 The larger the value, the smaller the acceleration
P072	轻后踏最长时间 The minimum time that a step on the posterior part of pedal lightly can been sensed	0000~0990	0050	数值越大，最长时间越大 The larger the value, the larger of the minimum time
P078	电磁铁错误设置 Electromagnet error prompt	0000、0001	0001	0: 关闭功能；1: 打开功能 0: Close the function; 1: Open the function
P079	保护开关正常后需要等待的时间 The waiting time after the protection switch is normal	0100~9990	1000	数值越大，时间越长 The larger the value, the longer of the time need to wait
P080	最高转速限制(rpm) Maximum speed limit(rpm)	0100~7000	5500	数值越大，最高允许转速越大 The larger the value, the larger the maximum allowable speed

5. 用户区参数的修改 User area parameter modification

1.一般参数设置 General parameter setting

当用户按住设置键  3s，进入参数设置界面，通过左移键  和右移键 ，将光标移动到参数值位置，通过上移键  或下移键  调整参数值，然后点按退出键 ，系统就会按照设置的参数运行。一般的参数均按照此方法设置即可。

When the user long press the set key  for 3s, can enter the parameter setting interface, press move toward left key  or press move toward right key  can move the cursor to the place of the parameter, then press the move upward key  or move downward key  to adjust the parameter, then press the exit key , the system will run with the new parameter.

2.快捷参数设置界面 Quick parameter setting interface

点按设置键  进入快捷参数设置界面，可以设置 6 类参数：1.剪线参数、2.压脚参数、3.吸风参数、4.保护参数、5.监控参数、6.光眼参数。系统默认的是进入剪线参数设置界面，可以通过左移键  或者是右移键  进入任一类参数设置界面，在 6 类界面中的任一类界面里均可通过上移键  或下移键  选择想要进行调整的具体参数，然后点按确认键  进入参数值调整界面，点按上移键  或下移键  调整参数值的大小，调整完毕以后点按退出键  返回上一级界面，系统就会按照设置的参数运行。

Press “Set” key , can enter the quick parameters setting interface, in this interface, you can set 6 kinds of parameters, such as: 1.Trimming thread parameters; 2.Presser foot parameters; 3.Suction parameters; 4.Protection parameters; 5.Monitoring parameters; 6.Sensor parameters. The system enters the trimming thread parameters interface by default. You need to press the move toward left key  or press the move toward right key  to enter any kind of parameter interface of these 6 kinds, in order to set the specific parameters,

you can press the move upward key  or the move downward key  to choose the parameter you want to adjust, then press the enter key  to enter the parameter value adjustment interface, then press the move upward key  or the move downward key  to adjust the value of parameter. After you complete the adjustment, press the key of exit  to return to the previous interface. Then the system will run with the parameter you set.

3. 恢复出厂设置 Restore ex-factory settings

返回主界面，长按“Reset”键  3S，进入“恢复出厂设置”界面，点按“确认”选项，屏幕显示“恢复中，请稍后”，当出现“恢复成功”字样，则恢复出厂设置成功。

Return to the main interface, long pressing the “Reset” key  for 3S, can enter the interface of “ex-factory reset”, then press the option of “confirm”, the screen will show the interface of “Recovering, please wait”, when the screen show the word of “recovery was successful”, it means it's OK.

4. 光眼自适应设置 Sensor adaptations

在布料选择界面中，按 ，将进入光眼自适应状态：1、移开布料后，按 。2、将布料覆盖所有光眼，再按  完成光眼自适应。
In the fabric selection interface, press the  key, the system will run with the sensor adaptive state:
1、After removing the cloth, press the  key, 2、Cover all the sensors with cloth, and then press the  key to complete the eyelet adaptation

6. 错误代码解析 Error Code Analysis

序号 Serial number	错误代码 Error code	处理方法 processing method
1	报“OA”错误 Report "OA" error	<p>1. 转动机头看电机手轮是否卡住？如卡住则先排除机头机械故障； 2. 如转动轻松，请检查电机编码器盘接头和电机电源接头是否松动？电机电源插头是否有插反？如有不好，请修正； 3. 如接触良好，检查电网电压是否过低或转速设置的过高？如有请调整； 4. 如正常请更换电控箱。</p> <p>1. Turn the handwheel of the head motor to see if it is stuck? If stuck, remove the mechanical failure of the machine head first; 2. If the rotation is easy, please check whether the motor encoder disk connector and</p>

		<p>motor power supply connector are loose. Whether the motor power plug is inserted reversely; if not, please correct it.</p> <p>3. If the contact is good, check whether the grid voltage is too low or the speed setting is too high. If yes, please make adjustments.</p> <p>4. If normal, please replace the electric cabinet.</p>
2	报“FF.FE”错误 Report “FF.FE” error	<p>1. 如接触良好,请更换操作面板;</p> <p>2. 如不是操作面板故障,则为电控箱损坏请更换。</p> <p>1. If contact is good, please replace the operation panel;</p> <p>2. If the operation panel is not faulty, replace the electric cabinet if it is damaged.</p>
3	报“08”错误 Report "08" error	<p>1. 电机编码盘接头和电机电源接头是否松动?如未接触好,请修正触点;</p> <p>2. 检查电压波动情况,电压波动频繁也会出现此错误;</p> <p>3. 电机故障,请更换。</p> <p>1. Are the motor code plate connector and motor power supply connector loose? If contact is not good, please correct the contact.</p> <p>2. Check the voltage fluctuation. This error will also occur if the voltage fluctuates frequently.</p> <p>3. Motor failure, please replace.</p>
4	报“09”错误 Report "09" error	<p>1. 检查电机编码盘接头是否插好?如未接触好,请修正触点;</p> <p>2. 如接触良好,用替换法更换电机,如电机坏请更换;</p> <p>3. 如不是电机故障,则为电控箱损坏请更换。</p> <p>1. Check whether the motor coding plate connector is plugged in properly. If contact is not good, please correct the contact.</p> <p>2. If the contact is good, replace the motor with a replacement method. If the motor is broken, please replace it.</p> <p>3. If it is not a motor fault, replace the electric cabinet if it is damaged.</p>
5	报“11”错误 Report "11" error	<p>1. 关闭系统电源,检查电机编码器与磁铁感应器位置间距是否合适,极性是否正确。</p> <p>2. 电机编码器或信号线坏。</p> <p>3. 电控箱损坏。</p> <p>1. Shut down the system power supply, check the motor encoder and magnetic sensor location spacing is appropriate, the polarity is correct.</p> <p>2. Motor encoder or signal line is bad.</p> <p>3. The electric cabinet is broken.</p>
6	报“14”错误 Report "14" error	<p>1. 电磁铁电流保护,电磁铁连接线破损或电磁铁坏,请更换;</p> <p>2. 电控坏,更换电控箱。</p> <p>1. Electromagnet current protection. Electromagnet connection wire is damaged or electromagnet is damaged. Please replace it.</p> <p>2. If the electric control is broken, replace the electric control box.</p>
7	报“18”错误 Report "18" error	<p>1. 瞬间电压过高,关闭控制器再开机;</p> <p>2. 电控箱内放点电阻坏,请更换电控箱;</p> <p>1. If the instantaneous voltage is too high, turn off the controller and turn it on again;</p> <p>2. The resistance of the electric control box is bad, please replace the electric control box;</p>
8	报“21”错误 Report "21" error	<p>1. 电机阻力大,检查电机机械部分是否卡住;</p> <p>2. 电机损坏,更换电机。</p> <p>1. Motor resistance is large, check whether the mechanical part of the motor is stuck;</p> <p>2. The motor is damaged, replace the motor.</p>
9	报“99”错误 Report "99" error	<p>1. 脚踏板控制器插头未插好;</p> <p>2. 脚踏板控制器插头金属顶针被顶出;</p> <p>3. 电控箱损坏。</p> <p>1. The plug of pedal controller is not plugged in properly;</p> <p>2. The metal thimble of the pedal controller plug is pushed out;</p> <p>3. The electric cabinet is damaged.</p>