平面四点口罩切片机

Flat Mask Cutting MACHINE

使用说明书

User Manual

2020年7月17日

目录 Content

一、设备简介

Device Introduction

平面口罩切片机是一种高效集成型设备，主要用于四层以下无封边外耳式平面口罩的焊接工序。

The Flat Mask Cutting Machine is a highly efficient integrated device, mainly used for the cutting and forming production of flat masks with outer ear loop less than four layers.

本设备采用传送带结构设计，利用超声波焊接技术，具有技术先进，结构小巧，运行稳定，操作方便等特点。

This equipment adopts conveyor feeding structure design and uses ultrasonic welding technology. It has the characteristics of advanced technology, small size, space saving, stable running and convenient operation.

1. 设备适用材料 Equipment applicable materials

无纺布、超细聚丙烯纤维熔喷布、超薄聚丙烯熔喷布、卫生纱布、压光布、活性炭布、过滤纸等无纺布材料均可以用此设备进行口罩生产。

Non-woven fabrics, ultra-fine polypropylene fiber melt-blown cloth, ultra-thin polypropylene melt-blown cloth, sanitary gauze, calendered cloth, activated carbon cloth, filter paper and other non-woven materials can be used for mask production.

2. 设备使用功能 Device Function

（1） 超声波口罩主体切片 Ultrasonic cutting and forming the face mask body

3. 适用产品 Applications

（1） 2~4层平面口罩（口罩规格 17.5x9.5cm）

2~4 layers of plane masks (mask size 17.5x9.5cm)

4. 设备主要参数（仅供参考）Main Equipment Parameters (for reference only)

Model	IH-FA01C
SIZE (mm)	L3932*W917*H1988mm
Net Weight	393kg
Face Mask Size	17.5×9.5cm(Adult)
Air Pressure	0.6~0.8 Mpa
Voltage	50/60Hz, AC220V
Efficiency	120-150 pcs/mins

二、操作说明 Manual

为使设备更好的发挥性能，请您在操作使用前仔细阅读产品说明书，遵守安全注意事项，严格按照规范设置技术参数，操作设备。有任何疑问请及时与我们联系，我们将竭诚为您服务！

In order to make the equipment play better performance, please read the product manual carefully before operation, observe the safety precautions, set the technical parameters in strict accordance with the specifications, and operate the equipment. If you have any questions, please contact us in time, we will serve you wholeheartedly!

请妥善保管各项说明书和相关技术资料，以备随时查阅！

Please keep all manuals and related technical information properly for future reference!

危险：**CAUTION:**

***必须单独使用可靠的接地线，否则有被漏电，静电击打的危险！**

A reliable grounding wire must be used alone, otherwise there is a danger of being hit by electric leakage or static electricity!

***各工位运转时严禁调整触摸，否则有卷入压伤切断的危险！**

It is strictly forbidden to adjust the touch when each station is in operation, otherwise, there is a risk of being caught in the pressure and cutting off.

***高温部件（如超声波平台）通电使用后禁止触摸，否则有烫伤的危险！**

*** It is forbidden to touch high-temperature parts (such as ultrasonic platform) after power on, otherwise there is a risk of burns!**

第1节 安全 Safety

1-1. 安全装置的功能 Function of safety device

装置 Device	功能&描述 Function & Description
紧急开关EMO (Emergency Mechanical Off) 	EMO 按钮 (红色的): 当EMO按钮被按下的时候，所有的机械运 动将会立刻停止。钮扣能顺时针方向旋转松开，在钮扣被释放之后，所有的动作需重新初始化。 EMO button (red) When the EMO button is pressed, all mechanical movement will stop immediately. The button can be rotated clockwise to release. After the button is released, all actions need to be reinitialized.
总电源开关 Main Power Switch 	在ON位置的时候，请非专业 人员勿打开电气箱门。 Please non-professionals DO NOT open the door of the electrical box when it is in the ON position.
速度控制器 Speed control 	按stop的时候，将会终止操作。 When press STOP, it will terminate the operation.

1-2. 潜在危险 Potential Danger

当危险发生时，应立即按下紧急停止按钮（EMO），使机器停止运动。

In case of danger, press the emergency stop button (EMO) immediately to stop the machine.

组件 **assembly**	移动部分 **Move part**	潜在危险 **Potential danger**
滚轮机构 Roller mechanism		生产过程中有异物卷入会导致滚轮损坏 The roller will be damaged if foreign matters got stuck in the production process.
链条传动机构 chain transmission		生产过程中有异物卷入会损坏传动系统 Foreign matters get stuck in the production process will damage the transmission system.
超声波平台 Ultrasonic platform		生产过程中，异物进入会损坏超声波平台 In the process of production, the entry of foreign matters will damage the ultrasonic platform.
输送带 Conveyor belt		生产过程中有异物卷入会损坏输送机构 The entry of foreign matter will damage the process of production.

1-3. 安全预防 Safety & Prevention

1-3-1. 机械方面 Mechanical aspect

- 穿着合适的工作服。
- 操作或者维修设备的时候不要戴领带，项链或宽松的衣服。
- 穿着必需的保护装置，例如：无尘帽、口罩等。
- 操作设备之前，要考虑操作的步骤。
- 不要屏蔽安全互锁，除非你是有资格的人员。
- 在设备旁演示任何操作的操作之前，总是要先停止所有的活动的部件。

*Wear appropriate work clothes.
*Don't wear neckties, necklaces or loose clothes when operating or maintaining the equipment.
*Wear necessary protective devices, such as dust-free cap, mask, etc.
*Before operating the equipment, consider the operation steps.
*Do not shield the safety interlock unless you are a qualified person.
*Always stop all moving parts before demonstrating any operation beside the equipment.

1-3-2. 电气方面 Electrical Aspect

- 设备的电源面板和接线端总存在电气危害，为了避免任何的触电和死亡的事故发生，在维护设备时，要先切断主电源，并且只有有资格或经过训练的维护人员来维护和维修设备。在演示维修电气线路之前一定要关闭主电源。
- 在电气箱内做任何修护之前请关掉主电源，严禁带电操作。只有经过训练的人员才允许带电维护或调整。
- 检查并且确定设备/系统已经正确地接地。 一般的维护将不仅仅保证稳定和可靠的操作，也会会延长设备的使用寿命。
- 对设备/系统进行任何操作或修护时， 标准安全程序应该被严格的执行。这样可以避免任何的不必要的意外事故发生。
- 了解并记住所有的安全装置的位置例如EMO,POWER 等。

*There are always electrical hazards in the power supply panel and terminal of the equipment. In order to avoid any electric shock and death accidents, the main power supply should be cut off first when maintaining the equipment, and only qualified or

trained maintenance personnel will maintain and repair the equipment. Be sure to turn off the main power supply before demonstrating the repair of electrical circuits.

*Please turn off the main power supply before doing any repair in the electrical box, and live operation is strictly prohibited. Only trained personnel are allowed to maintain or adjust on line.

*Check and confirm that the equipment / system has been properly grounded. General maintenance will not only ensure stable and reliable operation, but also prolong the service life of the equipment.

*The standard safety procedures should be strictly implemented when carrying out any operation or maintenance on the equipment / system. This can avoid any unnecessary accidents.

*Understand and remember the location of all safety devices, such as EMO, power, etc.

1-3-3. 操作人员 Operators

- 操作员必须在培训考核合格后才能上岗作业。
- 操作人员在穿3层布、鼻梁条、耳线时注意手与机器的位置，小心擦伤。
- 机器运行时禁止手接触折叠、成型、切片、剪刀、超声波平台等危险位置。

*The operator must pass the training examination before taking up his post.
*The operator should pay attention to the position of hand and machine and be careful of abrasion when wearing 3-layer cloth, nose bridge strip and ear line.
*When the machine is running, it is forbidden to touch the dangerous positions such as folding, forming, slicing, scissors, ultrasonic platform, etc.

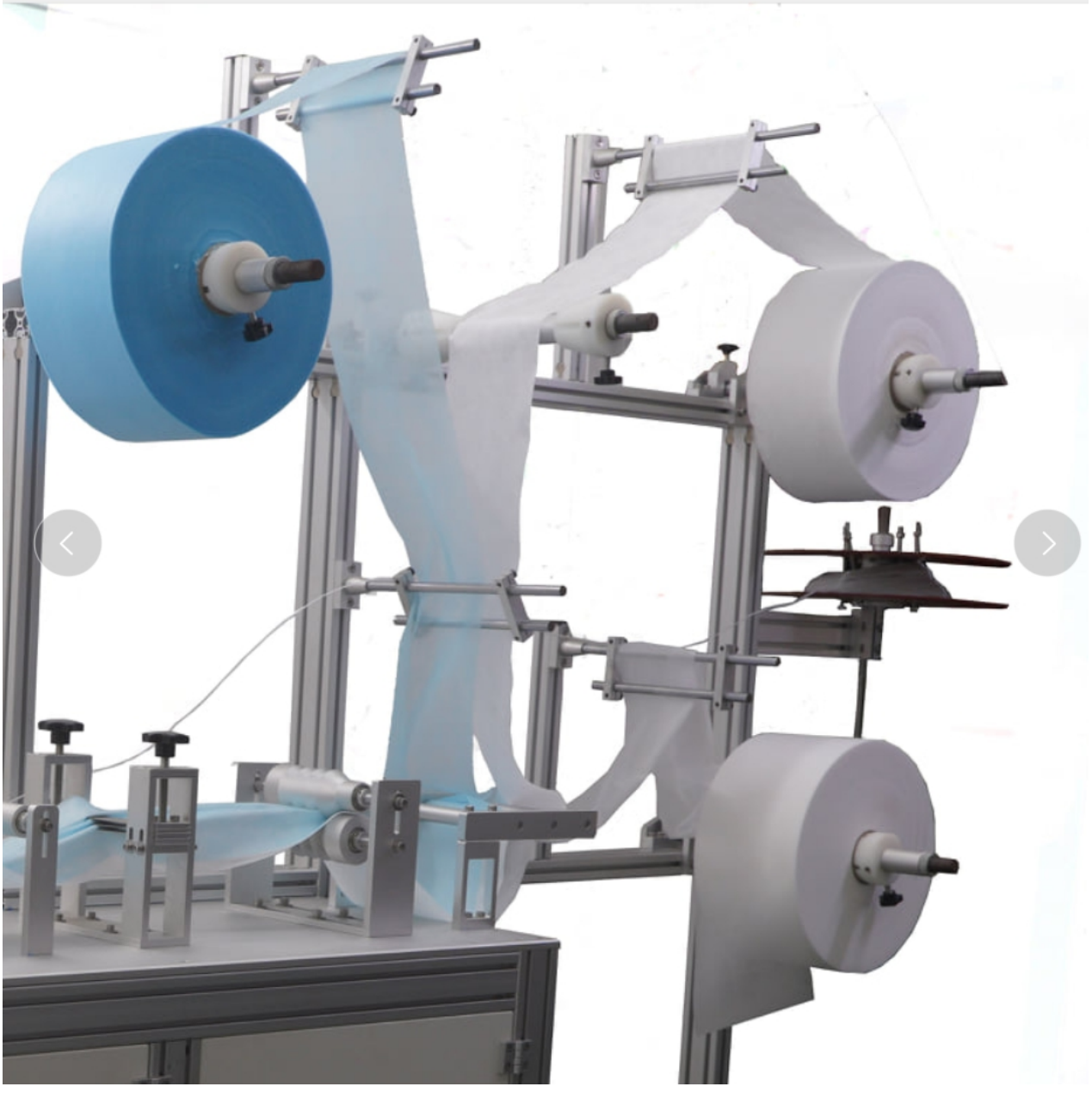
1-3-4. 耳线焊接机 Mini Ear Loop Welding Machine

- 送料机构：运送口罩本体物料至后站；
- 口罩切片机构：通过超声波将布料切片成口罩本体；
- 出料机构：将成品口罩出料

* Feeding structure: transport mask material to next station.

* face mask cutting structure: using ultrasonic power to cut the face mask body.
* Output structure: output finished mask.

口罩切片之前整形褶皱：**fabric forming before cutting**



第 2 节 安装 Installation

2-1．设备需求 Device requirement:

工作电源Power：220VAC，50/60HZ
工作气源Air：0.6-0.8Mpa，流量约50L/min ()

2-2．设备的安装

步骤 Step	内容 Content
1	将各分体机构按照整线分布拼接完成，调整水平调整螺丝使机器达水平状态，将连接处固定好。 Complete the splicing of the split mechanism according to the whole line distribution, adjust the horizontal adjusting screw to make the machine reach the horizontal state, and fix the connection.
2	将各分体通讯线连接好。 Connect the split communication lines.
3	将压缩气源接入各设备总进气口。 Connect the compressed air source to the main air inlet of each equipment.
4	调整气源三联体旋钮，使气源气压输入正确。 Adjust the air source triad knob to make the air pressure input correct.
5	使用万用表检查设备线路是否安全，有无短路，接地是否可靠。 Use a multimeter to check whether the equipment circuit is safe, whether there is short circuit and whether the grounding is reliable.
6	接入主电源：220VAC，50/60Hz，通电前使用电表ACV档检查电源是否相符并稳定，相符并稳定才可接上电源。 Connect the main power supply: 220 VAC, 50 / 60 Hz. Before power on, use the ACV gear of the electric meter to check whether the power supply is consistent and stable. Only when the power supply is consistent and stable can the power supply be connected.
7	打开各设备总电源凸轮开关。 Turn on the main power supply cam switch of each equipment.

第3节 电源开启 / 关闭流程
Power on / off Process

3-1．内容：Content

在开启和关闭设备前，了解所有的机械的和电气的安全措施，检查各部分电源的开关情况，开关设备电源。

Before switching on and off the equipment, understand all mechanical and electrical safety measures, check the switching condition of each part of the power supply and the power supply of the switching equipment.

3-2. 开启电源检查表 Power on checklist

序号 NO.	检查内容 checklist	是/否 Y/N
1	确定主电源与设备需求相一致，220VAC。 Make sure that the main power supply is consistent with the equipment demand, and it is 220 VAC.	
2	检查气源 (气源气压) 设定是否正确，气压设定适当才能使设备正常运行 (不低于5 kgf/cm2)。 Check whether the air source (air pressure) is set correctly. Only when the air pressure is set properly can the equipment operate normally (no less than 5 kgf / cm2).	
3	按工艺要求设置超声波成型处的工艺参数 Set up the process parameters of ultrasonic molding according to the process requirements.	
4	清理设备内杂物，确保所有的门和防护栅栏已经被关好。 Clean up the sundries in the equipment and ensure that all doors and protective fences have been closed.	
5	按照正确的流程开启电源。 Turn on the power according to the correct procedure.	

3-3. 关闭电源检查表 Power off checklist

序号 NO.	检查内容 checklist	是/否 Y/N
1	确定设备已经停止或操作完成，才能退出程序。 Make sure that the device has stopped or the operation is completed before exiting the program.	
2	停止设备操作之前将未做完成的产品从设备上取走。 Remove the unfinished product from the device before stopping operation.	
3	所有的门和防护栅栏已经关好。 All the doors and fences have been closed.	
4	按照正确的流程关闭电源。 Turn off the power according to the correct procedure.	
5	在退出程序、离开设备之前，检查设备电源是否已经切断。 Before exiting the program and leaving the device, check whether the power supply of the device has been cut off.	

3-4. 开启设备流程 Start device process

步骤 step	内容 Content
1	为设备接上220VAC 电源。 Connect the equipment to 220 VAC power supply.
2	插上设备的气源连接插头。 Plug in the air supply connection plug of the equipment.
3	闭合断路器 (MCB)。 Close the circuit breaker (MCB).
4	打开主开关。 Turn on the main switch.
5	系统回原点。 The system goes back to the origin.
6	打开超声波电源，检查超声波是否正常，切换成自动模式。 Turn on the ultrasonic power supply, check whether the ultrasonic is normal and switch to the automatic mode.
7	上物料，将物料穿好。 Load the material and put it on.
8	操作系统初始化完成， 设备可以开始运行。 The initialization of the operating system is completed and the device can start running.

3-5. 停止设备流程 Stop device process

依据关闭电源检查表进行操作。
Operate according to the power off checklist.

第4节 手/自动运行操作
Manual/Automatic Operation

4-1-1. 耳线机人机操作面板 Ear Loop Welding Machine Panel：

After the device is powered on, press the <power switch>  on the machine and it will turn red after being pressed.

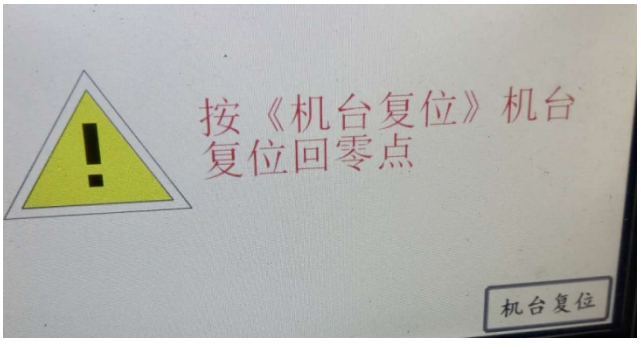
开机界面 Main Interface：

电源开后，触摸屏就出现以下界面,进入耳带机开机界面

After the power is turned on, the following interface appears on the touch screen, choice the “EN”(English)/“中文”（Chinese） to enter the system.

点击“进入系统”后运行界面显示如下（自动运行界面）After clicking "EN", the

running interface is displayed as follows：

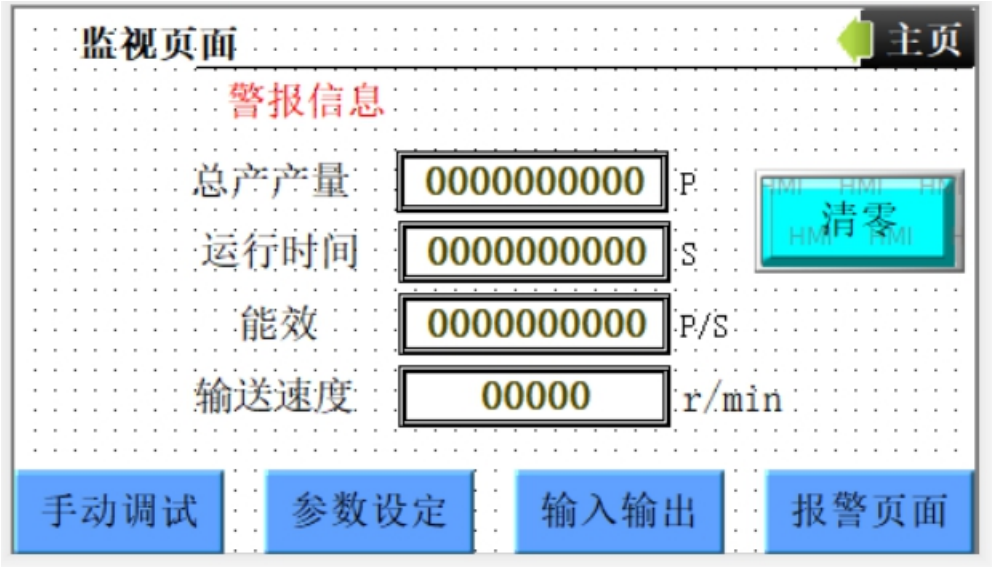


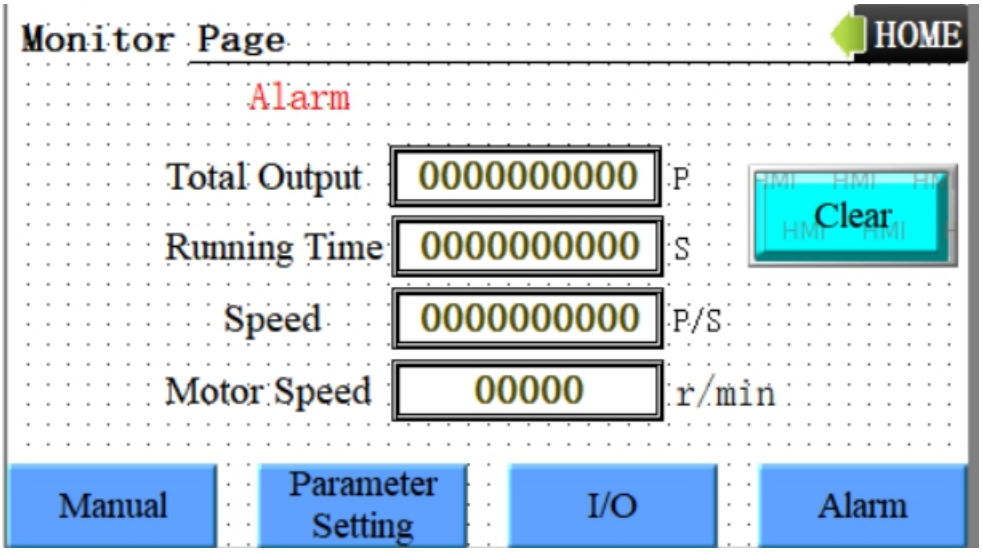
Press “machine reset” to rest the machine actions.

按“机台重启”后，

After reset the machine, the display as below:

监视界面： **Monitoring Page**





- 总产产量： 显示全部生产数量统计（按【清零】可归零）；

Total capacity: display the statistics of total production quantity (reset to zero when press “clear”);

- 运行时间： 显示持续生产时间统计（按【清零】可归零）；

Running time: display the statistics of continuous production time period (reset to zero when press “clear”);

- 能效：衡量系统运作在当前情况下的效率。

Power efficiency: measure the efficiency of current system operation.

- 输送速度： 口罩输送进入切片的速度；

Feeding speed: enter the ear loop threading state after pressing down, ear loop pressing device will lift up (this function can only be used in the shutdown state);

- 手动调试： 按下后进入手动操作界面，可进行各电气部件的点动操作；

Manual: press the button to enter the manual operation interface to carry out the separated operation of various electrical components;

- 参数设置： 按下后进入参数设置界面，设置各详细参数；

Parameter set: press to enter the parameter setting interface to set the detailed parameters;

- 输入输出： 按下后进入I/O监控界面，查看各I/O的目前状态；

I/O: press to enter the I / O monitoring interface to view the current status of each I / O;

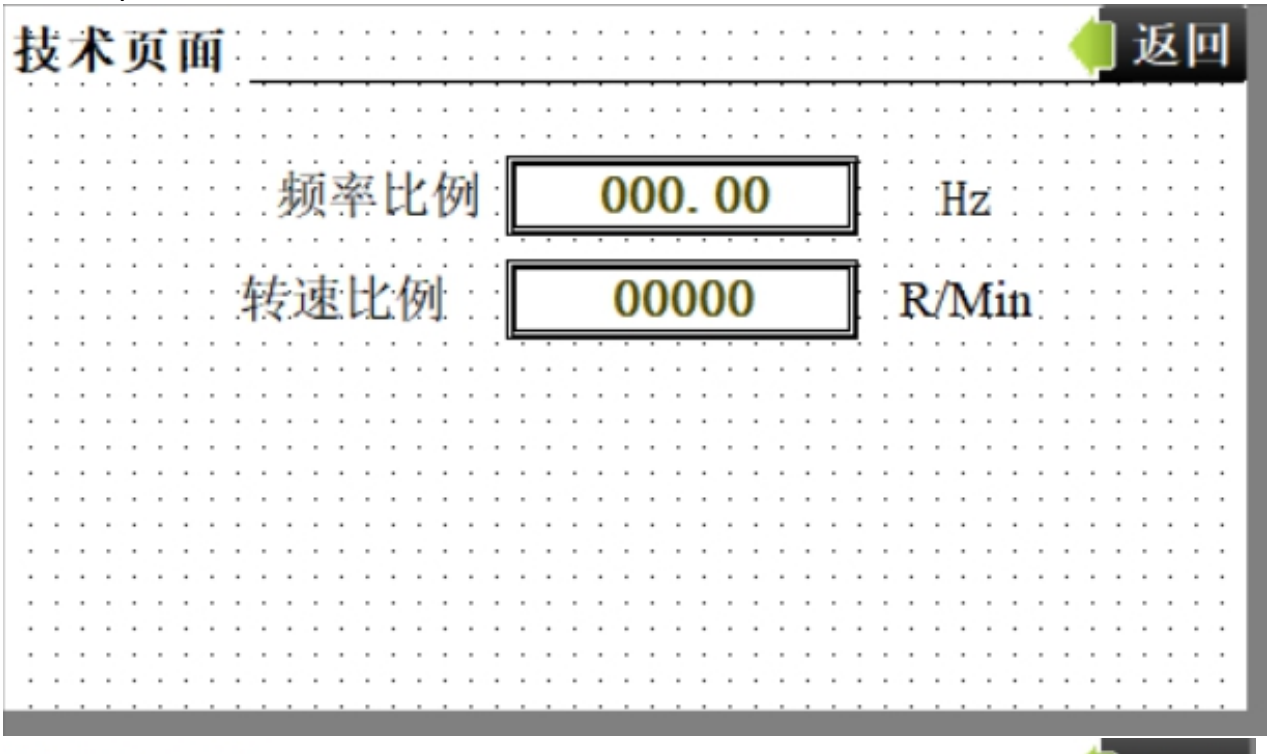
- 报警设定： 按下后进入报警设定界面；

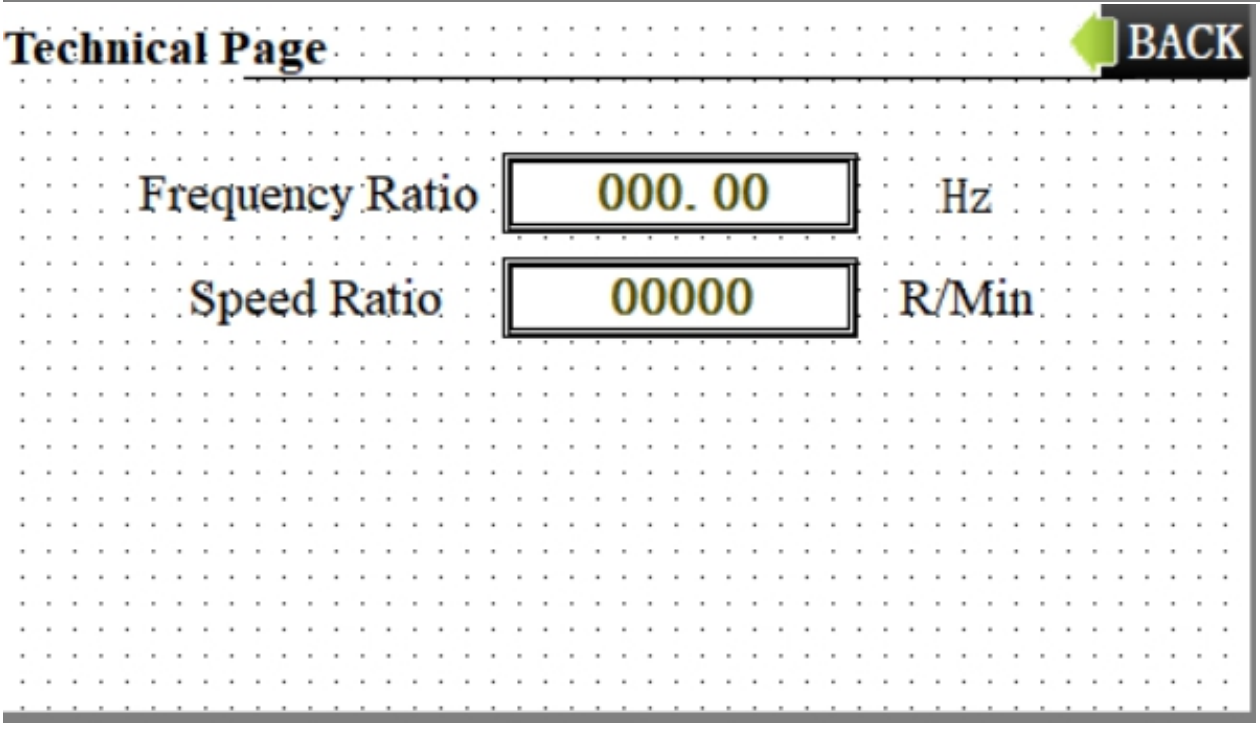
Alarm set: press to enter the alarm setting interface;

注意Attention

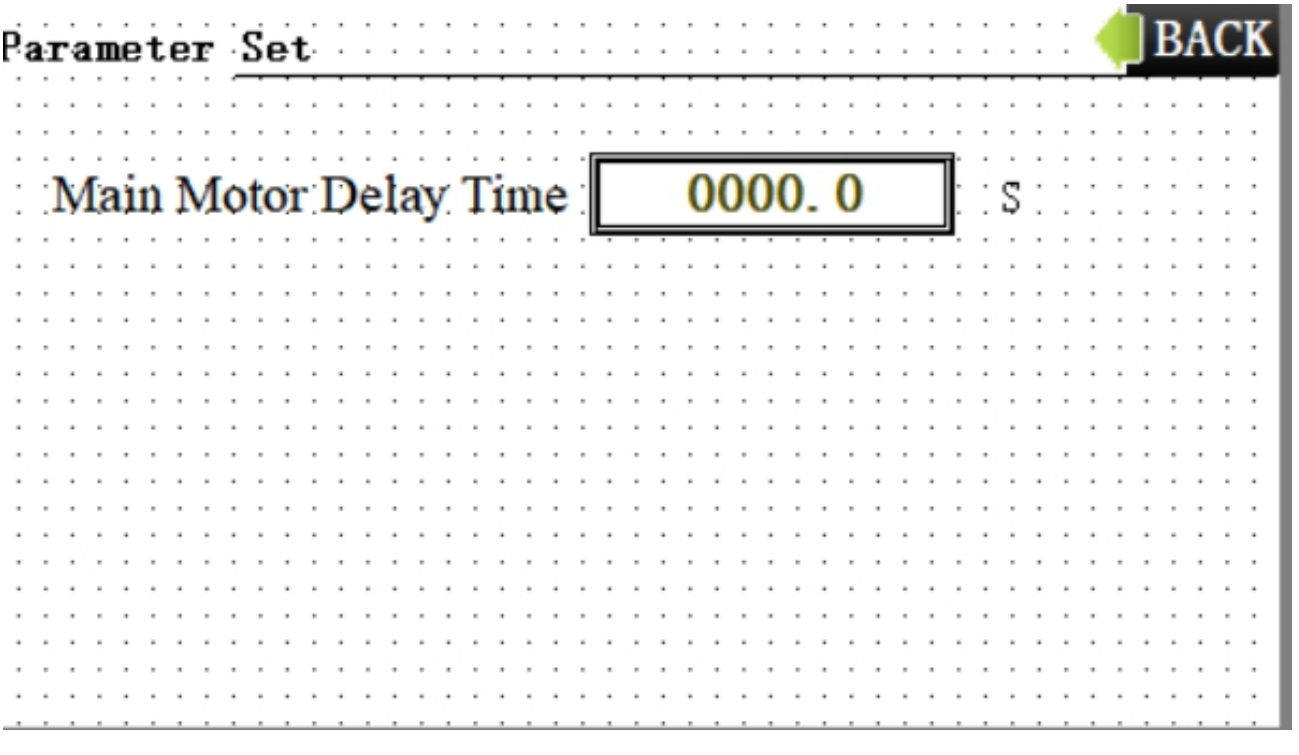
技术参数：想要密码才能进入控制系统的参数设定，需要调整时请联系我方售后的销售和技术人员远程协助。

Technical parameters: password is required to enter the parameter setting of the control system. If adjustment is needed, please contact our after-sales sales and technical personnel for remote assistance.





参数设置界面：parameter setting interface



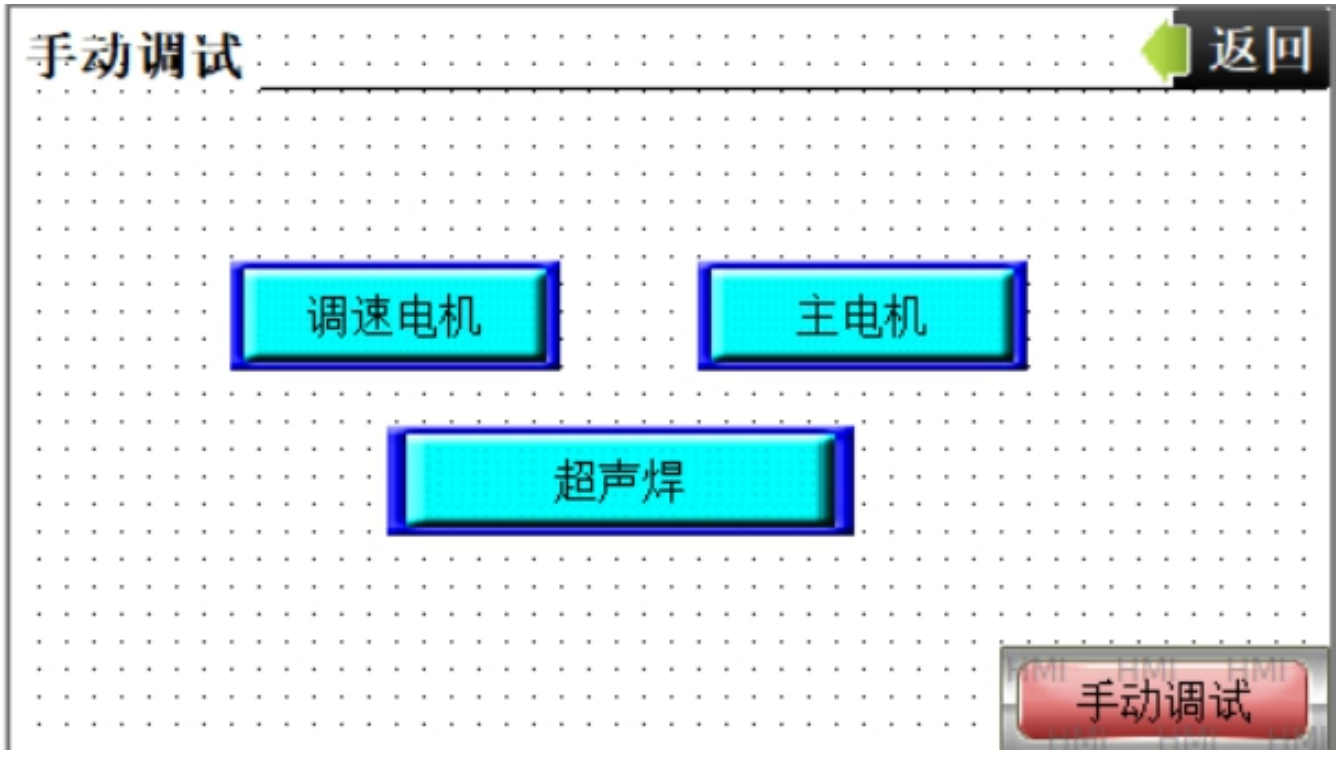
参数设置界面 Parameter Set：

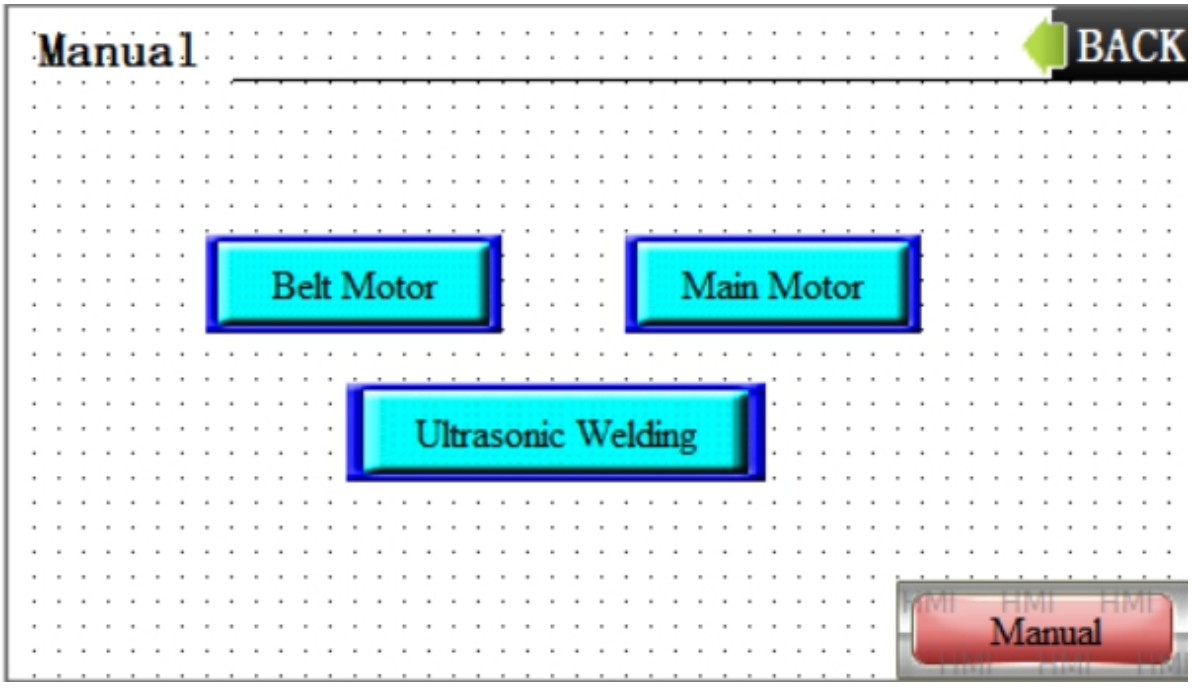
注意：“延时”是为了配合机器前后操作命令的配合，使得机器按照既定顺序而做设定，显示时间是并非耗费的时间，而是整体操作命令的序列时间。通常根据

出厂设定即可，如需调整，则在不熟悉机器特性的情况下，根据前后动作的协调性进行±0.1的微调，多测试几次后进行相应调整。

Remark: “Delay”is to cooperate with the before and after operation commands of the machine, so that the machine can be set according to the given order. The display time is not the time consumed, but the sequence time of the overall operation command. Generally, it can be adjusted according to the factory settings. If it is necessary to adjust, please make a fine adjustment of ± 0.1 according to the coordination of the front and rear actions when operating person is not familiar with the characteristics of the machine, and then make corresponding adjustment after several tests.

手动操作界面：**Manual operation interface**





- 调速电机：对传输速度进行调配；

Belt motor: adjust the feeding speed.

- 主电机: 支持机器主轴结构的动力供应；

Main Motor: to support power supply of machine major structure.

- 超声焊：超声波焊接口罩主体；

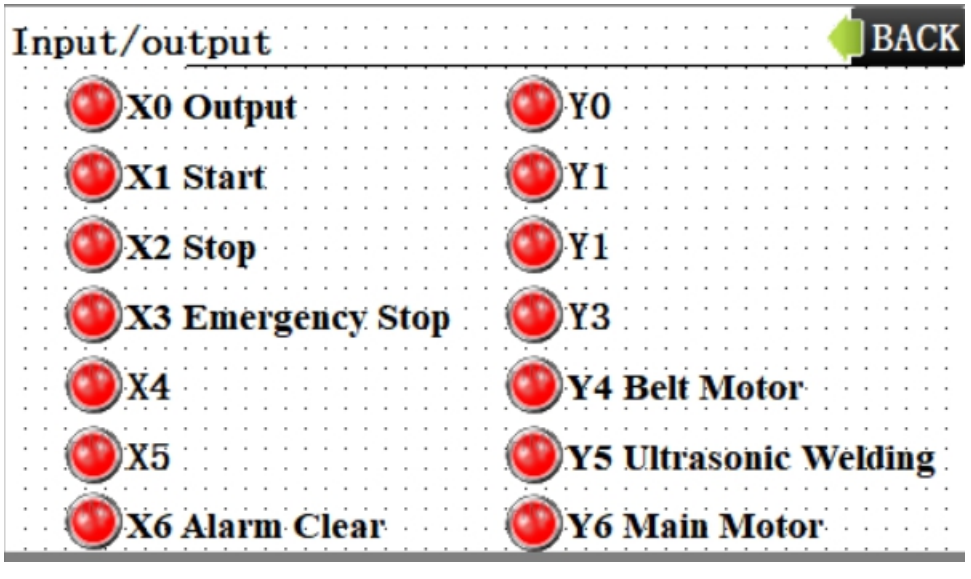
Ultrasonic welding: ultrasonic power to cut and weld the fabric, forming the face mask body.

注意：手动操作界面只能在非运行状态下进行操作，操作时应通知设备附近人员切勿接触设备，防止机械伤人；

Note: the manual operation interface can only be operated in non operating state. Personnel near the equipment should be informed **NOT** to touch the equipment to prevent mechanical injury;

I/O监控界面: I / O monitoring interface

输入/输出状态 Input/Output:



显示各信号输入输出的当前状态（故障检查时查看）

Display the current status of each signal input and output (check during fault check)

机器上各个线路点连接线均表示了编号，如X00, X01及Y00，Y01等，均可根据编号进行检索线路连接出现松动、错漏或者烧坏等问题，及时排查错误或者替换新的元器件。

Each connection line on the machine is indicated number such as X00, X01 and y00, Y01, etc., which can be retrieved according to the number. In case of loosen, wrong connection, disconnection or burn-out of the line connection, timely check the errors or replace new components.

报警设定： Alarm set

显示各信号输入输出的当前状态（故障检查时查看），及时修复或更换。

Display the current status of each signal input and output (check during fault check)，timely repair or replace:

4-1-2. 整线自动运行 Automatic operation

- 自动运行前需确保各部分都已完成回零初始化（具体操作参考操作界面介绍），检查各原料上料口是否穿料完成，检查各人机界面相关功能参数正常，准备工作完成。

Before the automatic operation, it is necessary to ensure that all parts have completed the reset initialization (refer to the introduction of the operation interface for specific operation), check whether the material feeding port of each raw material is completed, and check whether the relevant functional parameters of the screen touch interface are normal and the preparatory work is completed.

- 由于光电感应的出厂设定，就是自动运行模式，回到原点后直接放口罩到输送带位置上即会触发感应，自动进行送料。

Since the factory setting of photoelectric induction is the automatic operation mode, after returning to the original point, directly placing the mask on the conveyor belt will trigger the induction and automatically feed.

4-1-3. 注意事项 Attentions

- 启动 Start：
  设备回原点完成后，按下启动，绿色指示灯亮，设备可以被操作.
  When the “machine reset”,Press “start”,the device can be operated.

- 急停 Emergency Stop：
  紧急停止作用. Under emergency situation to stop the machine.

- 当系统异常 When the system is abnormal：
  触摸屏会提醒报错，从而来提醒工作人员需要处理异常。需要根据报警内容查找相关故障，排除后再按复位键复位报警。
  The touch screen will remind you to report an error, thereby reminding the staff to deal with the exception. Need to find related faults according to the content of the alarm, and then press the reset button to reset the alarm after elimination.

第5节 常见故障处理
Usual Fault Handling

5-1.

要求 Request：

- 依据报警页面的报警内容来进行故障处理
  Perform fault handling based on the alarm content on the alarm page。
- 主要分为马达报警和气缸报警：
  Mainly divided into motor alarm and cylinder alarm:
  - 马达报警主要为过载报警，请查看马达是否碰上物品
    Motor alarms are mainly overload alarms, please check whether the motor hits objects ；
  - 气缸报警请手动操作相应的气缸，查看传感器状态
    Cylinder alarm, please manually operate the corresponding cylinder to check the sensor status。

5-2. 一般的故障修理程序

步骤 Step	内容 Content
1	识别有错误的组件。 Identify the faulty component.
2	依据故障解决表、电路图等，找出引起故障的零部件或仪表。 According to the troubleshooting table, circuit diagram, etc., find out the component or instrument that caused the failure.
3	分析问题。 analyse problem.
4	解决问题。 Solve the problem.

5-3. 常见机械故障及排除方法 Usual Fault Handling

1. 耳线漏点 Ear Loop Leak Welding ：
   - 耳线的宽窄会影响耳线张力，适当调节张力控制滑块(优力胶)
     The width of the ear loop will affect the tension of the ear loop, adjust the tension control slider appropriately。
2. 耳线焊接时会产生头子外露 The ear loop will be exposed when the ear loop is welded
   - 耳线不外露调整耳线张力，适当调节张力控制滑块（优力胶)向下移动。
     Adjust the tension of the ear loop without exposing the ear loop, and adjust the tension appropriately to control the slider (youli glue) to move down
3. 耳线熔接牢度根据耳线的原料来定 Ear Loop Welding Fastness Depends on the Material of the Ear Loop
   - 耳线熔接牢度根据耳线的原料配比，设定耳线熔接时间
     The ear loop welding fastness is based on the raw material ratio of the ear loop, and the ear loop welding time is set;;
4. 外耳线机设备配件 Ear Loop Welding Machine Accessories
   - 开爪与闭爪联接气缸，支撑螺丝易损断裂 Opening pickers and closing pickers are connected to the cylinder, the supporting screw is easy to break
   - 爪子磨损比较多，更换次数比较平稳，爪子插销弯曲
     The pickers wear more, the replacement times are relatively stable, and the pickers latches are bent
   - 耳线剪刀磨损更换次数比较平稳
     The frequency of scissors wear and replacement is relatively stable

5-4. 常见电气故障排除 Common Electrical Troubleshooting

常规问题为Common Problems：

1. 各感应器是否感应到：检查各感应器确保工作正常，并且所在的位置正确。感应器的亮灭，要跟 PLC 各对应输入点的亮灭一样。这样才能确保感应器是好的。手动情况下，测试各汽缸是否动作正常，如果汽缸不动作，先检查汽缸的气压调节阀是否调得太紧，造成气不通，调松调节阀，看是否接通。接通后，手动电磁阀如果对应汽缸仍无动作，那就是电磁阀坏掉了。如果电磁阀没有坏掉，请检查手动时 PLC 的输出点是否是亮的。如果不亮，为 PLC 输出点坏掉。
   Whether the sensor senses: Check each sensor to make sure it is working properly and is in the correct position. The on and off of the sensor should be the same as that of the corresponding input points of the PLC. This will ensure that the sensor is good. Under manual operation, test whether each cylinder is operating normally. If the cylinder does not operate, first check whether the air pressure regulating valve of the cylinder is adjusted too tightly, resulting in air failure, loosen the regulating valve to see if it is connected. After the connection, if the manual solenoid valve still has no action, the solenoid valve is broken. If the solenoid valve is not broken, please check whether the output point of the PLC is bright when manual. If it does not light, the PLC output point is broken.