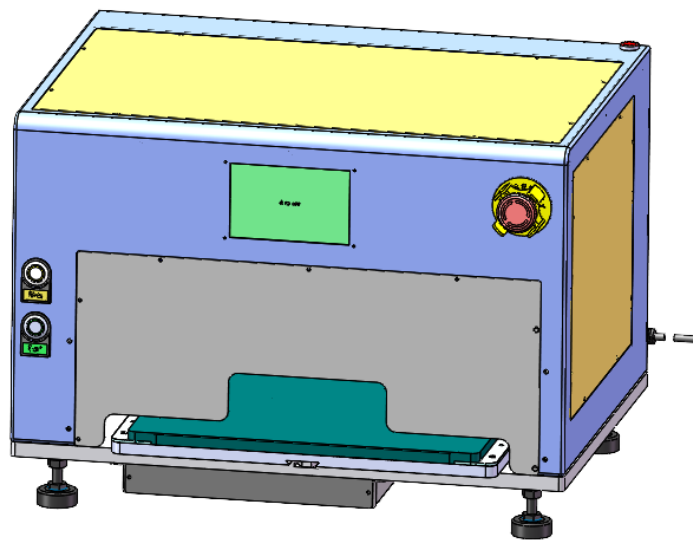


Automatic Press Fixture

产品手册

Operation Original Instructions



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前 言 Preface

感谢您使用苏州赛腾精密电子股份有限公司生产的 Automatic Press Fixture。

Congratulations and thank you for using Automatic Press Fixture manufactured by Suzhou secote Precision electronic Co.,Ltd.

在安装和使用之前，请仔细阅读本手册。若您不遵守本手册的说明而造成的人身伤害、 机器损坏及其他财物损失我们将不承担责任。如有疑问，请与我们联系，我们将及时、热 情地为您提供服务。

Please read this manual carefully before installing and using. If you do not abide by this manual that result in human hurt, machine damaged or some other losses, we will not responsible for them. If you have any questions, please contact us, we will provide you in time and warm service.

本手册主要对 Automatic Press Fixture 的结构特征、工作原理、安装与调试、使用与维护、故障分析与排除，以及运输、贮存等方面作出说明。主要器件的技术资料等，我们将以其他随机附（文）件方式向您提供。

This manual mainly describes the structure features, working principle, installation & debugging, usage & maintenance, failure analysis & solution, delivery, storage etc. We will provide some documents such as main parts in the terms of documents with machine.

本手册适用于 Automatic Press Fixture。

This manual is suitable for Automatic Press Fixture.

本手册中出现的 product 外观图或其他图例等若与实际产品有所不同，使用时以实际产品为准。Compared the manual with actual products, if there are some differences in the attached images and other images like menu screen ,it will subject to the actual product during operation.

公司的产品技术会不断创新，产品手册也会随之更改。以后的所有更改，均不另行通知。

With constant technology innovation of our company, operation manual will change in correspondence. Data afterwards are subject to change without notice.

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0 关键提示 Key Remind

0.1 安全和警告标识 Safety and warning identification

本手册中，将在不同地方出现表 0.1 中列出安全和警告提示，请务必注意。

Please pay special attention to the safety warning mark as Table 0.1 in this manual.

表 0-1 安全和警告提示

Table 0-1 Safety & Alarm remind

	触电危险，可能导致死亡或重伤 Warning: Electric shock may cause death or serious injury.
	机械伤害危险，可能导致死亡或重伤 Warning: mechanism hurt, may cause death or serious injury.
	危险警告，可能导致伤害 Warning: Dangerous, may cause hurt.
	按钮标识，表示按钮的按下状态 Button label: indicates the pressed status of the button.
	按钮标识，表示按钮的弹起状态 Button label: indicates the unpressed status of the button
	保险丝标识，用于标示本治具的保险丝参数 Fuse label: used to mark the fuse parameters of the fixture
	保护接地标识 Protection grounding mark
	功能接地标识 Functional grounding mark

0.2 遵守本手册的规定是保障您人身和财产安全、设备质量保障和正常运行的前提。

Abiding by the regulations of this manual is the precondition that safeguards your health, property, quality and normal running.

0.3 本手册提供了 Automatic Press Fixture 正确安装、使用和维护的重要资料，请在设备安装位置附近妥善保管。

This manual includes the important information of correct installation, using and maintenance for the Automatic Press Fixture. Please keep it safe.

0.4 本手册未尽事宜，将会以操作说明书等其它形式呈现。

Matters not covered in this manual will be presented in other forms such as operating instructions.

1 安全说明 Safety introduction

下列安全说明涉及 Automatic Press Fixture 的运输与储存、安装与调试、使用与维护保养，忽略这些安全说明可能造成人身伤害或财产（设备/原料/产品）损失。

The following safety introduction includes Automatic Press Fixture delivery & storage, installation & debugging, using & maintenance which may cause human injury or property loss (equipment, raw material or product) when ignore these safety instruction.

同时请注意本手册中各章节中的补充性安全说明。

Meanwhile, please pay attention to the complementary safety introduction in per chapter or parts in this manual.

如果设备以制造商未指定的方式使用，设备提供的保护可能会受到损害。

The protection provided by the device may be compromised if it is used in a way not specified by the manufacturer.

1.0 概述 General description

设备运行时有：带电部件；设备停机时有：带电部件。

When equipment running contains: live parts; Equipment downtime: live parts.

非受到培训的专业人员不可进行以下操作：

Professional trained personnel do the following work:

- 运输 Delivery
- 储存 Storage
- 安装/装配 Installation
- 使用 Using
- 维护保养 Maintenance
- 维修 Maintain

进行这些操作之前，请仔细阅读以下文件资料：

Please read the following documents before the above work:

- 本手册的附图 Attached drawings
- 其他随机文件 Other documents with machine
- 设备标志牌 Equipment mark plate
- 有关设备的特别规定和要求 Special regulation and requirements about the equipment.
- 有关安全和事故防范的国家/地方性规定 Country or regional regulation of prevention accidents and safety

以下情形会导致严重人身伤害和物资损失：

The following matters will cause serious injury and property loss.

- 不正确的搬运 incorrect convey
- 不正确的安装 incorrect installation
- 使用或操作不正确 incorrect using or operation
- 擅自拆除必要的安全防护装置 dismantle safety protection devices
- 擅自拆开设备进行检修 Disassemble equipment for maintenance without authorization

1.1 运输与储存 Delivery and Storage

——确认运输过程中的产品防护，在收货之后请立即检查包装箱是否完好，若有损坏请立即通知运输单位和本公司，此为产品运输过程索赔的前提。

Check the goods safety during the shipping. On arriving the product should be free of breach otherwise should inform shipping company and CANAAN as the precondition of claim.

——请严格遵守有关产品搬运的说明，否则可能导致人身伤害或设备损坏。

Transit must be in conjunction with the relative regulation to avoid damaging the equipment.

——设备长期存放请遵照本手册中设备“长期存放”的规定，应在标明的地方加注足够的润滑油或润滑脂，并做好防锈措施。长期存放时应特别做好电气控制箱的防护。

The devices should be lubricated and anti-rust in case of being placed for a long time according to the regulations and the protection of the control cabinet.

1.2 安装与调试 Installation & Debugging

——请仔细阅读本手册中有关设备安装的说明。

Please read the installation sheet prior to installation.

——本设备的安装与调试应由本公司或本公司代理商的专业人员进行，在上述人员未到达现场之前，请不要拆解包装箱，此为您有关产品索赔的前提之一。

The equipment must be unpacked and installed by CANAAN or the qualified personnel from the agent. Please do not unpack the package; it is one precondition of claiming for compensation.

——调试过程中出现任何不正常的现象（尖锐噪声、超范围的温升），应立即停机检查，直至找出原因并排除。

Operator should stop the machine and check for any abnormal functioning such as noise, temperature rise out of range, etc.

1.3 使用与维护保养 Maintenance

——设备使用过程中存在带电部件，操作过程需请谨遵本手册的规定，以免使用过程中造成触电伤害或机械伤害。

The equipment consist of electronic components, tail-wagging components, reciprocate linear motion parts, negative pressure parts, the operator should go upon the platform to operate according to the operation manual

to avoid electric shock, mechanical injury or falling.

——设备运行过程中出现任何不正常的现象（尖锐噪声、超范围的温升），应立即停机检查，直至找出原因并排除，必要时请与本公司联系。

Operator should stop the machine and check for any abnormal functioning such as noise, temperature rise out of range, etc. If necessary please contact us.

——设备清洁过程可能涉及带电部件，请谨遵本手册的规定，以免造成触电。

Do cleaning according to this manual and pay special attention to the electric components, chemical liquid and high temperature liquid to avoid electric shock, corruption or burns.

——设备维护保养或故障排除过程可能涉及带电部件、运动部件，请谨遵本手册的规定，以免造成触电、机械伤害或碰（砸）伤。

Maintenance according to this manual and keep an eye for moving the electric components, belt drive and gear drive components to avoid electric shock, mechanical injury, etc.

1.4 接地保护 Ground protection

为避免触电安全隐患，本治具在使用过程中需要确保可靠接地。

In order to avoid electric shock safety hazards, the fixture needs to ensure reliable grounding during use.

本治具外壳为金属材质，在内部已可靠接地，使用中需要确保 AC 电源线中的地线是可靠接地的，否则治具外壳有带电的风险。

The cover of the fixture is made of metal and has been reliably grounded internally. Ensure that the ground wire in the AC power cable is reliably grounded during use; otherwise, the cover of the fixture may be charged.

治具内部接地方法如下图：

The internal grounding method of the fixture is shown below:



Pic 1.4-1 治具内部接地图示

Pic1.4-1 Internal grounding diagram of fixture

2 设备概述 General Description

2.1 概述 General description

Automatic Press Fixture（后称本治具或本设备）治具主要由滚轮、三轴运动平台、控制单元组成，滚轮作为工作部件，由三轴运动平台驱动，可实现以一定的压力对手机、笔记本电脑、Ipad 的电池或屏幕进行滚压，辅助产品的电池和屏幕的组装步骤。

(Hereinafter referred to as this fixture or this equipment) The jig is mainly composed of a roller, a three-axis motion platform, and a control unit. The roller is used as a working part and is driven by a three-axis motion platform, which can achieve a certain pressure on mobile phones, laptops, Ipad. The battery or screen is rolled, and the assembly steps of the battery and screen of the auxiliary product.

2.2 产品特点 Features

2.2.1 结构特点 Structural features:

本治具内部含有 X Y Z 三个运动轴，组成 XYZ 运动平台.其中 Z 轴带压力传感器可实现对产品以指定的压力进行滚压。

The fixture contains three motion axes, X, Y, and Z, which form an XYZ motion platform. The Z-axis with a pressure sensor can roll the product with a specified pressure.

本治具产品上下料使用了推拉式设计，缩小了操作空间要求。

This fixture uses a push-pull design for loading and unloading, which reduces the operating space requirements.

本治具 XY 运动范围大，可满足多种产品尺寸的滚压需求。

The jig has a large XY movement range and can meet the rolling requirements of various product sizes.

本治具产品取放区域进行了安全设计并装配了安全光栅，防止人体伸进治具，确保了安全性。

The product pick-and-place area of this fixture has been designed for safety and equipped with safety gratings to prevent the human body from reaching into the fixture and ensure safety.

本治具结构小巧，可放置在操作桌面上使用。

The fixture has a compact structure and can be placed on the operating table.

本治具可单独使用，也可配合电脑获取滚压的压力数据信息。

This fixture can be used alone, or can be used with a computer to obtain the pressure data information of rolling.

本治具具备 2 个带 LED 指示灯的按钮以及 HMI 触摸屏，用于指示治具的工作状态。

The fixture has 2 buttons with LED indicators and HMI touch screen to indicate the working status of the fixture.

2.2.2 控制方式 Control mode:

本治具为手动操作型治具，用户将待滚压产品放入特定的载具中，将载具底部导向槽对准治具上

料区域的导向柱，向治具内部推送载具，直到听到咔嚓声，说明插入到位。用户按下治具上的 Start 按钮，治具开始读取产品滚压程序并开始执行滚压。滚压过程中 HMI 显示红色界面并显示倒计时。滚压结束后 HMI 显示绿色界面标识滚压结束。

This jig is a manual-operated jig. The user puts the product to be rolled into a specific carrier, aligns the guide groove at the bottom of the carrier with the guide column in the feeding area of the jig, and pushes the carrier into the jig until A clicking sound is heard, indicating that the insertion is in place. The user presses the Start button on the fixture, and the fixture starts to read the product rolling program and starts rolling. During the rolling process, the HMI displays a red interface and displays a countdown. After the rolling is finished, the HMI will display a green interface to indicate that the rolling is finished.

2.2.3 上料方式 Load DUT

将待滚压产品放入特定的载具中，将载具底部导向槽对准治具上料区域的导向柱，向治具内部推送载具，直到听到咔嚓声，说明插入到位。

Put the product to be rolled into a specific carrier, align the guide groove at the bottom of the carrier with the guide column in the feeding area of the fixture, and push the carrier into the fixture until a click sound is heard, indicating that it is inserted in place.

2.2.4 测试方式 Load DUT

上料完成后，按下治具 Start 按钮 开始对产品进行滚压，滚压结束后各轴回到初始位置。

After the feeding is completed, press the Start button of the fixture to start rolling the product. After the rolling is completed, each axis returns to the initial position.

2.2.5 测试结果显示方式 The model to display the test result

测试结果显示在 HMI 上 绿色背景表示 PASS 蓝色背景加错误代码表示 FAIL。

The test results are judged by a computer and displayed on a computer monitor.

2.2.6 下料方式 Unload DUT

待滚压结束后，用户用双手将载具从治具中拉出。

After the rolling is finished, the user pulls the carrier out of the fixture with both hands.

2.2.7 设备材质 The equipment material

本设备的制造材料主要有：铝、钣金。

The main manufacturing materials of this equipment are: aluminum, sheet metal.

2.3 产品主要用途和适用领域 Using and practice areas

本治具主要用途是在手机、笔记本电脑、Ipad 的电池或屏幕的组装制程中，可以以设定的压力滚压电池或屏幕，辅助组装。适配的产品型号有：

The main purpose of this fixture is to roll the battery or screen with a set pressure to assist in the assembly process of the battery or screen of the mobile phone, notebook computer, and Ipad. The

compatible product models are:

由于涉及产品保密条款，产品型号无法列举

Due to product confidentiality clauses, the product models cannot be listed.

2.4 机种型号定义 Model Definition

目前本治具只有一款型号，不排除后续设计出同系列产品。

There's only one module of this equipment at present, it's possible to design the same serials of product in the future.

Name: Automatic Press Fixture

Model: APF V3.4

2.5 适用的环境和工作条件 Circumstance and Working conditions

2.5.1 工作环境 Circumstance

a) 环境温度：正常工作的环境在 5℃~40℃

Temperature: The ambient temperature should be within 5℃~40℃

b) 湿度：当环境温度为 40℃时，工作环境的相对湿度不超过 50%，较低温度下可允许较大湿度（如环境温度为 20℃时，工作环境的相对湿度不超过 90%）。

Humidity: The relative humidity≤50% when the ambient temperature reach to 40℃ and lower temperature allow high humidity (e.g. ambient temperature in 20℃ the humidity≤90%).

2.5.2 工作条件 Working conditions

a) 电源条件 : AC 100~240V 50/60Hz

Power supply: AC 100~240V 50/60Hz

b) 整机运行噪声小于 65dB(A)

The working noise≤65dB(A)

2.5.3 设备报废 Equipment scrapping

设备经多年使用后将会被报废，报废物资的处理请遵守当地法律法规的规定。设备中有些部份可以回收其残值，如：

When the equipment is discarded as useless, the useless parts treatment should be according to the local laws and regulations, and the reclaim parts of the equipment as following:

——机箱、外壳、丝杆、轴等碳素钢可作为废铁；

Screw, wire, probe, sheet metal shell can be used as scrap iron, scrap copper;

——其他塑料件作为废旧塑料。

Other plastic material as scrap plastic

3 结构特征与工作原理 Structure Feature and Working Principle



本章中插图仅为阅读本手册时的参考图例，是对器件清单的补充，使用中以实物为准。

The figures used here is reference only, subject to equipment on site.

3.1 概述 General Description

3.1.1 治具本体 Fixture mainbody

本治具每次可以对一个产品进行滚压，正面照如下图。

The fixture can roll one product at a time, as shown in the picture below.

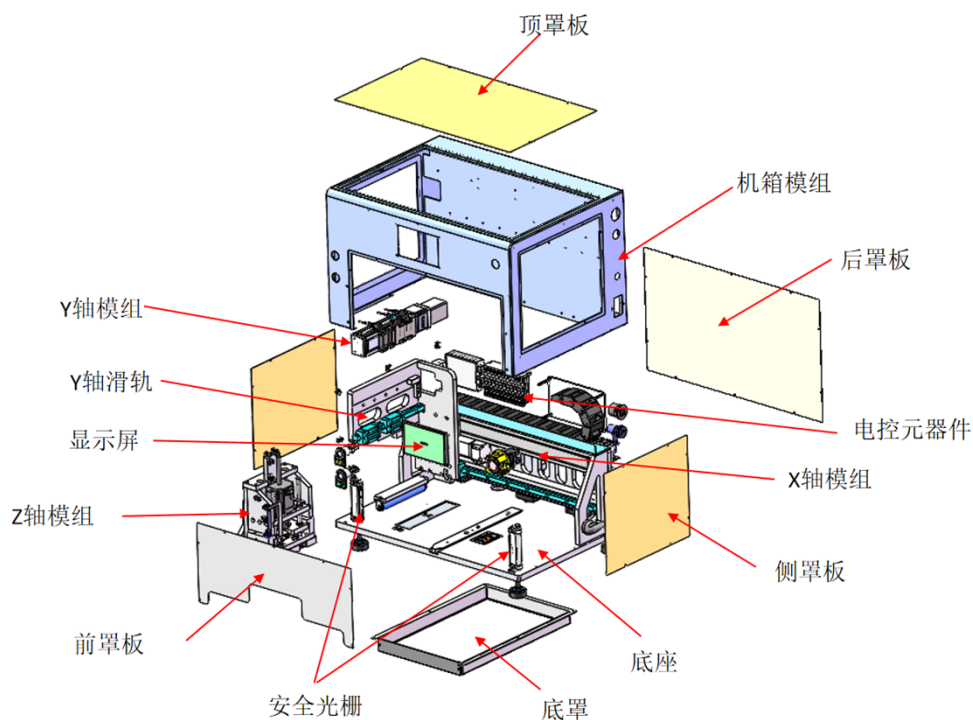


Pic 3-1-1 治具正视图

Pic 3-1-1 Front view of fixture

本治具主要由机箱、滚压系统等组成，爆炸图如下。

This fixture is mainly composed of chassis, rolling system, etc. The explosion diagram is as follows.



Pic 3-1-1 治具爆炸图

Pic 3-1-1 Fixture explosion diagram

3.2 机架及其附属物 frame and its subassemblies

机架采用优质 SPCC 折弯焊接而成，焊成一体式坚固耐用，是整机其他各功能单元的主要安装结构单元。

The frame is made of high quality SPCC bending welding, welded into an integral durable, is the main installation of other functional units of the machine structural unit.

机箱附属物主要包括机箱、侧门、后门、上保护罩等，在设备系统中起着设备防护和操作安全防护作用。

Chassis appendages include chassis, handle, rear door, and upper protective cover, which play a role in device protection and operation safety protection in the device system.

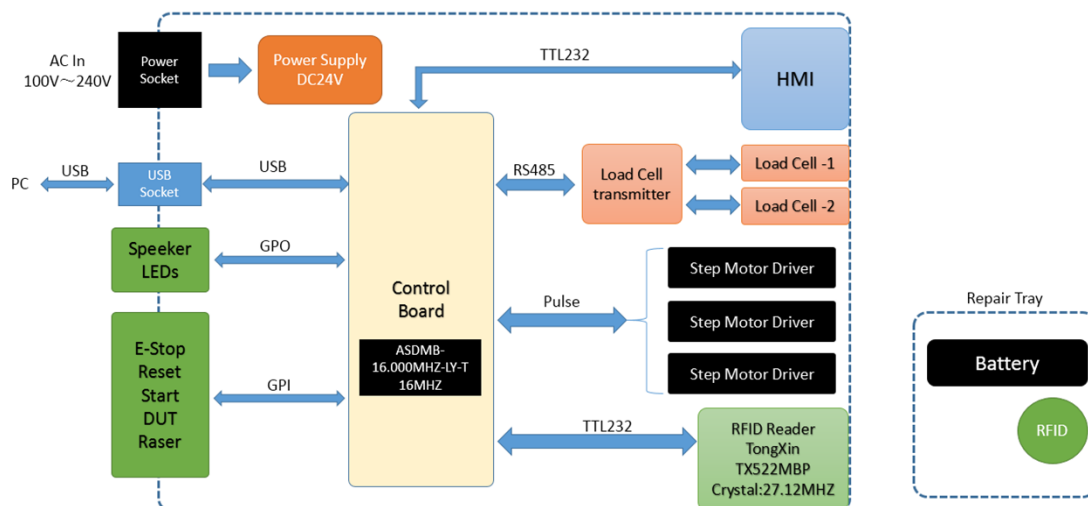
3.3 电气控制系统 Electric controls system

仅为原理说明，使用时以实物与随机电气文件为准

It is only for principle explanation, please follow the real and the electrical documents attached.

3.3.1 电系统控制系统结构如下图

The electrical system control system structure is shown below:



Pic 3.3-1 电气控制系统

Pic 3.3-1 Electric controls structure

3.3.2 治具的电气控制系统主要包括：MCU 控制板、步进电机驱动器、伺服电机驱动器、压力传感器、开关电源、USB 接口、HMI、RFID Reader 等。

The electrical control system of the fixture mainly includes: MCU control board, stepper motor driver, servo motor driver, pressure sensor, switching power supply, USB interface, HMI, RFID Reader, etc.

控制板实现输入输出接口，步进电机和伺服电机控制功能，并在 HMI 上显示滚压过程信息和滚压结果。也可以通过 USB 线连接到电脑，与电脑进行通讯，获取测试压力数据。

The control board realizes the input and output interface, stepper motor and servo motor control functions, and displays the rolling process information and rolling results on the HMI. It can also be connected to a computer through a USB cable to communicate with the computer to obtain test pressure data.

步进电机驱动器用于将脉冲和方向信号转换为步进电机的旋转信号，驱动步进电机旋转。

The stepper motor driver is used to convert the pulse and direction signals into the rotation signal of the stepper motor and drive the stepper motor to rotate.

伺服电机驱动器用于将脉冲和方向信号转换为伺服电机的旋转信号，驱动伺服电机旋转。

The servo motor driver is used to convert the pulse and direction signals into the rotation signal of the servo motor and drive the servo motor to rotate.

压力传感器用于将压力信号转换为数字信号并发送给控制板进而实现对压力进行测量。

The pressure sensor is used to convert the pressure signal into a digital signal and send it to the control board to measure the pressure.

USB 接口用于连接电脑，实现治具的程序升级以及压力数据获取等。

The USB interface is used to connect to the computer to realize the program upgrade of the fixture and the acquisition of pressure data.

HMI 用于进行参数设置和滚压结果显示。

HMI is used for parameter setting and display of rolling results.

开关电源用于向控制板 步进驱动器 伺服驱动器和压力传感器等进行供电。

Switching power supplies are used to supply power to control boards, stepper drives, servo drives, and pressure sensors.

3.3.3 RFID Reader

本系统含有 RF 射频读卡器，用于识别 Holder 的 ID，以判断 Holder 的型号，以使治具自动选择操作程序。

The system contains an RF card reader, used to identify the ID of Holder, to judge the model of Holder, in order to make the jig automatic selection of operating procedures.

RFID 参数如下 RFID parameters are as follows:

Table 3.3-1 RFID parameters

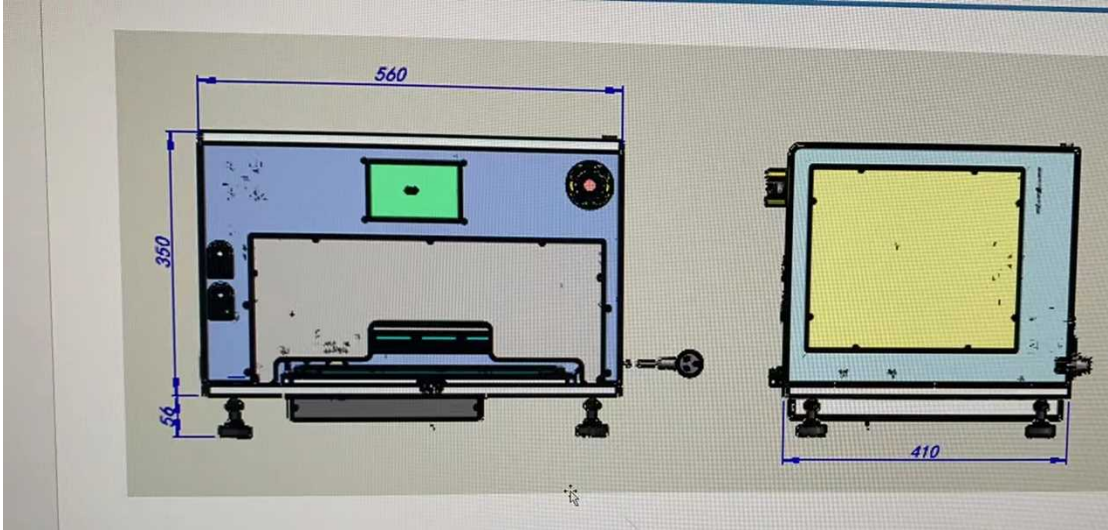
Model	TX522MBP
Power consumption	+3.3V/30mA
Work frequency	13.56MHZ
Cardssupport	mifare1 S50、mifare1 S70、mifare UltraLight、mifare Pro and it's compatible cards
Modulation method	ASK
Product dimension	10mmx23mmx3mm
Antenna type	PCB Loop Antenna

4 外形尺寸及主要技术参数 Dimension and main technical parameters

4.1 治具外形尺寸 dimensions of the fixture

治具外形尺寸如下：

The external dimensions of the fixture are as follow:



Pic 4.1-1 治具外形尺寸

Pic 4.1-1 External dimensions of fixture

4.2 主要技术参数 Main technical parameters

表 4.2-1 主要技术参数

Table 4.2-1 Main technical parameters

序号 NO.	项目 Item	参数 Parameter	备注 Remark
1	治具供电电压 Voltage	AC 100~240 V	
2	治具供电频率 Frequency	50/60 Hz	
3	治具功率 Power	150W	
4	满载电流 Full-load current	1.5A@110V	
5	短路电流 Short-circuit current	10A	
6	重量 Weight	51KG	
7	尺寸 Size	L410mm*W560mm*H350mm	

4.3 铭牌 Nameplate

本治具铭牌如下图：

The nameplate of this fixture is as follows:

Manufacturer	Secote
Fixture Name	Automatic Press Fixture
Fixture Model	APF V3.4
Fixture SN	FX1202112200007
Shipping Date	20211220

Pic 4.3-1 治具铭牌

Pic 4.3-1 Name plate of fixture

铭牌信息请以实物为准

The nameplate information is based on the actual object

5 安装与调试 Installation and Debugging

	<p>本机应由专业人员安装！ Must be installed by the professional personnel.</p> <p>在提供了接地标志的地方，须正确接地，并进行接地通路试验，读数不大于 4Ω，否则必须校正； Correct ground connection for the position marked, and do the circuit test of ground connect with value $\leq 4\Omega$.</p> <p>开始安装前应保证起重设备是适当的，这些装置应具有有效的测试证书； Check hoisting devices good condition prior to installation and the devices should have effective test certificates.</p> <p>禁止使用不完好和不匹配的工具。 It is prohibited to use no good or unsuitable tools.</p>
---	---

5.1 设备安装 Equipment installation

5.1.1 安装技术要求 Technical requirements for installation

安装环境 设备的安装环境要符合以下要求：

Installation environment, The installation environment must meet the following requirements:

- a) 设备需放置在工作台上使用. 工作台承重需要 $>80\text{kg}$.

Need to place on the working table, table loads need $>80\text{kg}$

- b) 设备安装平面不得倾斜、松软或不规则。

Cannot be tilted, soft or unregular

- c) 请于设备安装位置四周保留适当空间，以便以后维修、检查作业。

Keep proper space around the install position for future maintenance and inspection

- d) 为了确保设备的稳定以及寿命，请勿将设备安装在热源及阳光照射处。

To make sure the stabability and life cycle, please do not install the machine under the hot source and sunshine

5.1.2 安装 Installation

- a) 拆开包装箱后，取出治具放置到操作桌面上

After unpacking, take out the fixture and place it on the operating table

- b) 调整治具底部四个脚杯使治具处于水平状态

Adjust the four foot cups at the bottom of the fixture to make the fixture in a horizontal state.

- c) 连接 AC 电源

connect AC power supply.

- d) 安装检查，纠正不适当处。

Check the installation and correct the wrong points.

5.2 安装注意事项 Attentions for installation

5.2.1 本设备的安装与调试应由本公司或本公司代理商的专业人员进行，在上述人员未到达现场之前，请不要拆解包装箱，此为您有关产品索赔的前提之一。

The installation and debugging should be performed by professional personnel from our company or our agent. Please do not unpack the package until the professional personnel comes to the spot. It is one precondition of claiming compensation for the product.

5.2.2 安装现场即为设备工作现场，现场环境应符合 2.4.1 的规定。

Installation spot is the working area of the equipment. The ambient there should accord with 2.4.1 regulation.

5.2.3 安装之前请先确认设备现场供电是否符合本机技术要求（见表4.2-1 和2.5 的要求）。

Before installation, please confirm the supply service (water, power supply, air, vacuum, etc.) accord with requirements of table 4.2-1 and 2.5 or not.

5.2.4 不要把设备放在很难操作断开装置的位置。

Instructions not to position the equipment so that it is difficult to operate the disconnecting device.

5.2.5 安装过程中的搬运请参阅第 9 章“搬运与储存”。

Delivery during the installation process please sees “Delivery and Storage”. in chapter9.



拆除机架附属物有可能造成人身伤害或设备损坏！

Remove the subassemblies will result in injury or damage.



安装或调整、维修本部份时应防止机械伤人！

Keep from hurting by belt when installing, debugging or maintenance.



非专业人员不得进行调试作业！

Only professional personnel do debugging.

6 设备使用 操作 Operating procedure

6.1 设备启动及使用操作程序、方法 Operating procedure

6.1.1 设备使用前检查 Checking before debugging

表 6.1 使用前检查项目

Table 6.1 Check before debugging

检查项目Item	要求requirement	方法method
系统接地 ground connect	接地和保护接地电阻不大于 4Ω Ground connect and protect ground connect resistances $\leq 4\Omega$	以欧姆表检测 Test with OHM meter
各安装联接 Per install connecting	牢固可靠 Fasten and reliable	感官测试 Sense check
接通电源 Connect power supply	AC100~240V 50/60Hz	万用表检测 Multimeter check
设备工作区域 working area	无影响工作的杂物或无关人员 No sundries or idle persons	

6.1.2 连接电源 Connect the power

本治具出货时附带符合当地国家标准的电源线，若要更换电源线，请根据使用场所的 AC 插座类型选择匹配的电源线类型。

The fixture is shipped with a power cord that conforms to the local national standard. If you want to replace the power cord, please select the matching power cord type according to the AC outlet type of the place of use.

本治具的电源插座如下图：

The power socket of the fixture is shown as follows:



Pic 6.1-1 电源插座

Pic 6.1-1 Power socket

本治具匹配的电源线插头类型如下图：

The type of power cord plug matched by this fixture is shown as follows:



Pic 6.1-2 电源线插头

Pic 6.1-2 Power cable plug

将 AC 电源线连接到 AC 插座和治具的电源插座。

Connect the AC power cable to the AC socket and power socket of the fixture.

6.1.3 开机 start the machine

1,将电源开关拨到“--”/ON 位置，如下图：

Switch the power switch to "--" /ON, as shown below:

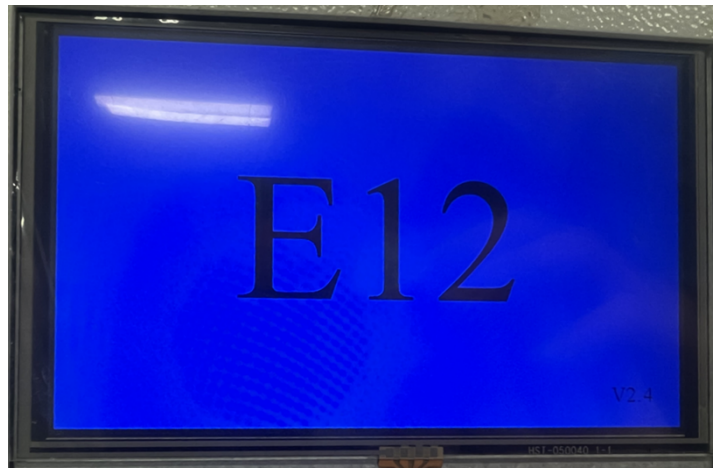


Pic 6.1-3 电源开关

Pic 6.1-3 power switch

将电源开关拨到“--”/ON 位置后，治具会开始工作，HMI 工作并显示蓝色画面 代码 E12。

After turning the power switch to the "--"/ON position, the fixture will start to work, the HMI will work and the blue screen code E12 will be displayed.



Pic 6.1-4 HMI 工作状态

HMI working status

Pic 6.1-4

按下复位按钮，初始化治具。

Press the reset button to initialize the fixture.



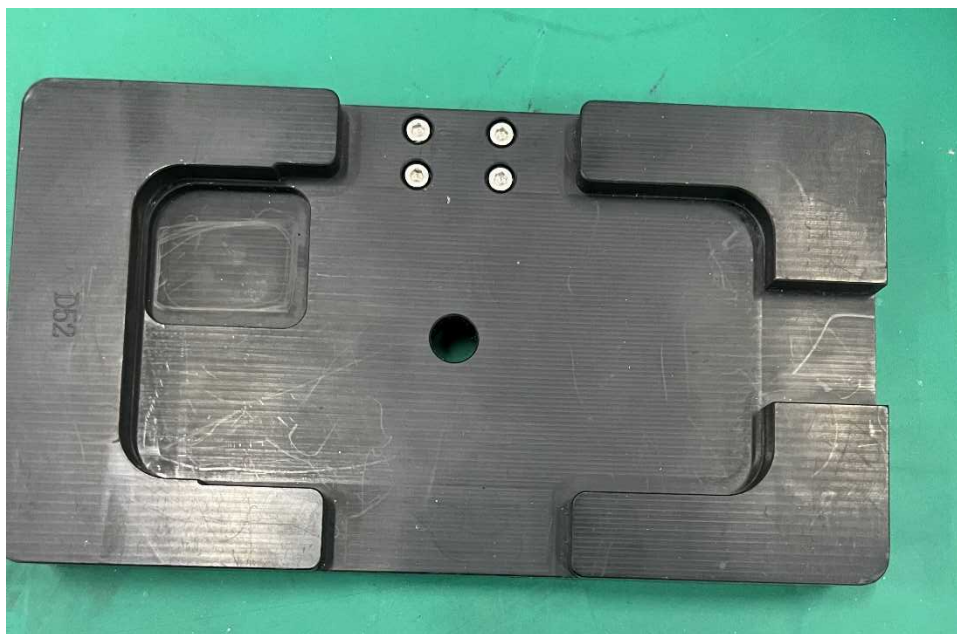
Pic 6.1-5 复位按钮

Pic 6.1-5 Reset Button

6.2 上料 Loading

首先把待测产品放入产品载具中。

First put the product to be tested into the product carrier.



Pic 6.2-1 载具

Pic 6.2-1 Holder

将含有产品的载具顺着导轨推入测试治具中：

Push the carrier containing the product into the test fixture along the rails



Pic 6.2-2 推入载具 push the carrier

Pic 6.2-2

按下治具的 Start 按钮开始滚压。

Press the Start button of the fixture to start rolling.



Pic 6.2-3 启动按钮

Pic 6.2-3 Start Button



如果按下 **Start** 按钮 后治具无动作或者 HMI 界面显示错误代码，请参考错误代码表获取异常原因信息。

If the fixture does not work after pressing the Start button or an error code is displayed on the HMI interface, please refer to the error code table for information on the cause of the abnormality.

6.3 作业中断控制 Interrupt control

本设备运行过程中，可通过按下急停按钮来终止运动。

During the operation of the equipment, the movement can be terminated by pressing the emergency stop button.

6.4 断电 Power Off

设备使用结束，请将电源开关拨到“0”/OFF 位置，并拔下 AC 电源线。

When the device is used, switch the power switch to 0 /OFF and remove the AC power cable.

7 故障分析与排除 Failure analysis and solution

大多数情况下，当设备出现故障，治具上的 HMI 会显示错误代码以便于操作和维护人员采取相应措施。

In most cases, when the equipment fails, the HMI on the fixture will display an error code so that operators and maintenance personnel can take corresponding measures.

表7.0 常见错误代码表 Common Error Code Table

Tab 7.0

Error Code	Abnormal description	TROUBLE SHOOTING
E01	正在回原点 Returning to origin	非异常 No abnormality
E02	回原点异常 Abnormal return to origin	尝试按 Reset 按钮再次复位，或由专业人员检查治具 Try to press the Reset button to reset again, or have a professional check the fixture
E03	回原点完成 back to origin complete	非异常 No abnormality
E04	初始化过程中 During initialization	非异常 No abnormality
E05	急停被按下 Emergency stop pressed	急停释放后可恢复，若不恢复则可能是急停按钮线路异常，需请专业人员维修 After the emergency stop is released, it can be recovered. If it does not recover, it may be that the emergency stop button circuit is abnormal and needs to be repaired by professionals.
E06	光栅被遮挡 The grating is blocked	光栅恢复后治具会恢复运行，若不恢复则可能是光栅线路异常，需请专业人员维修 After the grating is restored, the fixture will resume operation. If it does not recover, the grating circuit may be abnormal, and professional maintenance is required.
E07	未检测到产品 Product not detected	若产品已放置到位仍显示该异常，则可能是 DUT Sensor 线路异常，需请专业人员维修 If the abnormality is still displayed after the product has been placed in place, it may be that the DUT Sensor circuit is abnormal and needs to be repaired by a professional
E08	未检测到压力传感器 Pressure sensor not detected	请专业人员检查压力变送器及线路 Ask professionals to check the pressure transmitter and wiring
E09	未识别到 RFID RFID not recognized	检查 RFID card 是否正常，或检查 RFID reader 是否正常 Check if the RFID card is normal, or check if the RFID reader is normal
E10	该机种参数文件不存在 The parameter file of this model does not exist	需请专业人员处理 Professionals are required

E11	机种参数错误	需请专业人员处理
	Model parameter error	Professionals are required
E12	需执行回原点操作	请取出载具，并按下 Reset 按钮执行回原点操作
	Back-to-origin operation is required	Please take out the vehicle and press the Reset button to perform the return-to-origin operation
E13	运行过程中	非异常
	During operation	No abnormality
E14	滚压过程中	非异常
	During rolling	No abnormality
E15	设备就绪	非异常
	Device ready	No abnormality
E16	X 轴出错	需专业人员检查 X 轴电机运行是否有异常
	X-axis error	Professionals are required to check whether the X-axis motor is running abnormally
E17	Y 轴出错	需专业人员检查 Y 轴电机运行是否有异常
	Y axis error	Professionals are required to check whether the Y-axis motor is running abnormally
E18	Z 轴出错	需专业人员检查 Z 轴电机运行是否有异常
	Z axis error	Professionals are required to check whether the Z-axis motor is running abnormally

出现故障时，系统所有运行会被立即中止，工作人员应及时进行故障分析排除。

When a fault occurs, all operations of the system will be suspended immediately, and the staff should analyze and eliminate the fault in time.

7.1 常见故障现象 Common faults

本治具常见的故障现象有：

The common faults of this fixture are:

a) 打开电源开关，治具无法上电 HMI 不显示

Turn on the power switch, the fixture cannot be powered on, and the HMI does not display

b) 按下 Reset 按钮后治具无动作

The fixture has no action after pressing the Reset button

b) 按下 Start 按钮后治具无动作

The fixture does not move after pressing the Start button

7.2 故障分析与排除 Failure analysis and troubleshooting

常见故障现象的原因分析及排除方法如下

Common failure phenomenon, cause analysis and solutions are as follows:

7.2.1 打开电源开关，治具无法上电 HMI 不显示

Turn on the power switch, the fixture cannot be powered on, and the HMI does not display

检查步骤: Inspect steps:

a) 检查电源线是否插紧，若未插紧，则适当用力紧固

Check whether the power cables are tightly inserted. If they are not tightly inserted, tighten them properly.

b) 确认给设备供电的插座上有电且满足供电需求

Make sure the socket is energized and meets the power supply requirement

c) 确认使用的电源线为设备匹配的电源线，从插座和设备拔掉电源线，使用万用表检查电源线导通性，若不导通，更换一根正常的电源线。

Ensure that the power cable used is matched with the device. Remove the power cable from the socket and device, and use a multimeter to check the connectivity of the power cable. If the power cable does not work, replace it with a normal one.

d) 在电源线未供电的情况下，确认电源开关的保险丝是否烧坏。

When the power cable is not powered on, check whether the fuse of the power switch is burned out.

e) 当进行过以上步骤都不能解决异常时，请联系专业技术人员或赛腾售后处理。

If the fault cannot be solved after the preceding steps, contact professional technical personnel or Secote after-sales service.

注意: Notes:

a) 如果保险丝故障，请首先检查治具是否存在短路现象，若有异常，请专业技术人员维修；

If the fuse is faulty, please first check whether there is a short circuit phenomenon fixture, if there is abnormal, please professional and technical personnel maintenance;

b) 如果要更换保险丝，请务必使用同型号的保险丝，保险丝型号请查阅第 12 章设备主要易损件清单。

If you want to replace the fuse, be sure to use a fuse of the same model. Please refer to the list of main vulnerable parts of the equipment in Chapter 12 for the fuse model.

7.2.2 按下 Reset 按钮后治具无动作

The fixture has no action after pressing the Reset button

检查步骤: Inspect steps:

a) 检查急停按钮是否被按下，如果按下顺时针旋转急停按钮以解除急停状态。

Check if the emergency stop button is pressed, if pressed, turn the emergency stop button clockwise to release the emergency stop state.

b) 检查治具内是否有载具，有的话请拿出。

Check whether there is a carrier in the fixture, and take it out if there is.

- c) 检查是否有异物遮挡光栅，如有请清除异物。

Check whether there is any foreign object blocking the grating, and if so, please remove the foreign object.

7.2.3 按下 Start 按钮后治具无动作

The fixture does not move after pressing the Start button

检查步骤: Inspect steps:

- a) 检查急停按钮是否被按下，如果按下顺时针旋转急停按钮以解除急停状态。

Check if the emergency stop button is pressed, if pressed, turn the emergency stop button clockwise to release the emergency stop state.

- b) 检查是否有异物遮挡光栅，如有请清除异物

Check whether there is any foreign object blocking the grating, if so, please remove the foreign object

- c) 检查载具背面是否有白色圆形 RFID 卡片 如果没有请联系专业技术人员或赛腾售后处理。

Check whether there is a white round RFID card on the back of the carrier. If not, please contact professional technicians or Saiteng after-sales service.

- d) 检查载具是否推入到位，到位时会听到“咔哒”一声

Check that the carrier is pushed into place, you will hear a "click" when it is in place

- e) 当进行过以上步骤都不能解决异常时，请联系专业技术人员或赛腾售后处理。

If the fault cannot be solved after the preceding steps, contact professional technical personnel or Secote after-sales service.

7.3 注意事项 matters need attention

故障分析及排除过程中，请切断电源开关，并拔掉 AC 电源线，确保不会发生触电危险

During fault analysis and rectification, cut off the power switch and remove the AC power cable to avoid electric shock



(1) 电气控制系统的维修、维护保养须由专业人员进行！

Maintenance for the electric control system must be performed by qualified personnel.

(2) 不得用潮湿的手触碰电器控制系统的任何部件！

Keep your wet hands away from the HMI and the inverter.



所有设备故障应由专业人员检修，故障排除后应进行确认！

All the equipment failures must be checked and repaired by the qualified personnel. Should confirm them after solution.

8 维护及保养 Maintenance

8.1 概述 Description

本部分所包含的内容是为确保人员和设备安全和有效操作所必须进行的预防性维护程序。

This part, as a preventive maintenance procedure, must be taken to insure the safety and the effective operation.

执行维护工作的人只能是称职的工程技术人员或已经接受过此设备维护培训的人员。

The maintenance operator should be the qualified technological personnel or the persons who have been taken the maintenance training for the equipment.

这些预防性的维护项目都进行了单独的分类，日程表中引用的是它们的题目，题目简要说明了执行该项任务的时间间隔。

The preventive maintenance item has been sorted, details please see the table below.



在本机机器防护面板（罩）打开之前，必须保证供气 and 供电与本机都隔离断开。

Before opening the defending panel plate, must be cut off the air supply and power supply.

表 8.1 所列维护日程，如不适用可忽略

Table 8.1 Maintenance calendar: can be ignored when unsuitable.

表8.1 设备维护日程

Table 8.1 Daily maintenance

日常维护：每天使用机器前都进行的维护 For before using the machine every day.	
序号 NO	程序 Procedure
DM1	设备的视觉检查 Visual inspection of equipment
DM2	日常清洁 Daily cleaning
临时维护，测试 1000 次后的维护，或运行120 小时后进行的维护 Temporary maintenance, maintenance after 1000 tests, or maintenance after 120 hours of operation	
序号 NO	程序 Procedure
OM1	设备的视觉检查 Visual inspection of equipment
OM2	治具功能检查 Check fixture function
每月进行的维护，或运行400 小时后进行的维护 Maintenance performed monthly or after running for 400 hours	
序号 NO	程序 Procedure
MM1	治具功能检查 Check fixture function
MM2	载具取放时的顺滑度检查 Check smoothness when Holder is placed

MM3	急停按钮功能检查 Emergency stop button function check
MM4	光栅功能检查 Raster function check
年度维护，或运行5000 小时后进行的维护 every year or after running 5000 hours	
序号 NO	程序 Procedure
YM1	设备的视觉检查 Visual inspection of equipment
YM2	治具功能检查 Check fixture function
YM3	载具取放时的顺滑度检查 Smoothness check during carrier pick and place
YM4	急停按钮功能检查 Emergency stop button function check
YM5	光栅功能检查 Raster function check

8.2 日常维护 Daily maintenance

8.2.1 DM1：设备的视觉检查 Vision check for DM1 equipment

使用前的检查项目 Check items before use

a) 检查设备外观是否有明显异常

Check whether the appearance of the device is abnormal

b) 检查 USB 接口是否有破损等异常现象

Check whether the USB port is damaged

8.2.2 DM2：日常清洁 Daily cleaning

日常使用完毕，请对设备做清洁工作，设备保持干净有利于提高设备的使用寿命

Please clean the equipment after daily use. Keeping the equipment clean is beneficial to prolong the service life of the equipment

a) 整理设备周围的物品

Tidy things around the equipment

b) 用干净的抹布擦拭设备表面，可以蘸取适量的酒精，切不可使用有腐蚀性的液体，否则可能会损伤设备

Use a clean cloth to wipe the surface of the device and dip it with an appropriate amount of alcohol.

Do not use corrosive liquid; otherwise, the device may be damaged

c) 设备表面经过喷漆或烤漆工艺处理，严禁使用有机溶剂擦拭。

The surface of the equipment should be painted or painted. Do not wipe it with organic solvent.

8.3 临时维护 Temporary maintenance

详细的检查：测试 1000 次产品后，或运行120 小时后进行的维护。

Detailed inspection: Maintenance performed after 1000 product tests or 120 hours of operation.

8.3.1 OM1: 设备的视觉检查 Vision check for OM1 equipment

- a) 检查设备外观是否有明显异常

Check whether the appearance of the device is abnormal

- b) 检查 USB 接口是否有破损等异常现象

Check whether the USB port is damaged

8.3.2 OM2: 治具功能检查 Check fixture function

- a) 接通电源，HMI 是否点亮， RESET 按钮指示灯是否点亮。

Turn on the power, whether the HMI is lit, and whether the RESET button indicator is lit.

- b) 按下 Reset 按钮，治具是否开始回原点。

Press the Reset button, whether the fixture starts to return to the origin.

- c) 放入含产品的载具到治具中，按下 Start 按钮，启动测试，观察滚压过程是否正常

Put the carrier containing the product into the fixture, press the Start button to start the test, and observe whether the rolling process is normal

8.4 月度维护 The monthly maintenance

每月进行的维护或运行 400 小时后进行的维护

Monthly maintenance or maintenance performed after running for 400 hours

除进行临时维护外，每月或每运行 400 小时后（后者通常要小于前者），执行以下任务：

Besides proceeding the maintenance, should also do the following checks every month or after running 400 hours.

8.4.1 MM1: 治具功能检查 Check fixture function

- a) 接通电源，检查 HMI 是否点亮

Turn on the power and check if the HMI lights up

- b) 按下 Reset 按钮，治具是否开始回原点。

Press the Reset button, whether the fixture starts to return to the origin.

- c) 放入含产品的载具到治具中，按下 Start 按钮，启动测试，观察滚压过程是否正常

Put the carrier containing the product into the fixture, press the Start button to start the test, and observe whether the rolling process is normal

8.4.2 MM2: 载具取放时的顺滑度检查 Check smoothness when Holder is placed

- a) 将载具卡在治具导轨上并推进治具中，检查放置过程中的顺滑度，是否有异常

Clip the carrier on the guide rail of the jig and push it into the jig to check the smoothness during placement and whether there is any abnormality

b) 将载具从治具中拉出，检查取出过程中的顺滑度，是否有异常

Pull the carrier out of the jig and check the smoothness during the removal process and whether there is any abnormality

8.4.2 MM3: 急停按钮功能检查

a) 治具上电并按下 Reset 按钮复位治具

Power on the fixture and press the Reset button to reset the fixture

b) 按下急停按钮，HMI 显示代码 E05。

Press the emergency stop button, the HMI displays code E05.

c) 顺时针旋转急停按钮以释放急停按钮 HMI 显示代码 E12。

Turn the emergency stop button clockwise to release the emergency stop button HMI displays code E12.

d) 急停按钮已经释放的状态下按下 Reset 按钮，此时治具开始运动，执行回原点运动。

Press the Reset button when the emergency stop button has been released, at this time the fixture starts to move and executes the movement back to the origin.

8.4.3 MM4: 光栅功能检查

a) 治具上电 此时 HMI 显示代码 E12

When the fixture is powered on, the HMI displays the code E12

b) 用手遮挡光栅。

Shade the grating by hand.

c) 按下 Reset 按钮，此时治具不会运动，不会执行回原点运动。

Press the Reset button, the fixture will not move at this time, and will not perform the movement back to the origin.

d) 光栅无遮挡状态下按下 Reset 按钮，此时治具开始运动，执行回原点运动。

Press the Reset button, the fixture will not move at this time, and will not perform the movement back to the origin.

8.5 年度维护 Annual maintenance

年度维护或运行5000 小时后应进行的维护

Every year or after running 5000 hours.

每年或运行5000 小时后（后者通常小于前者）应进行以下维修任务：

It should also do the following checks every year or after running 5000 hours.

8.5.1 YM1: 设备的视觉检查 Vision check for DM1 equipment

a) 检查设备外观是否有明显异常

Check whether the appearance of the device is abnormal

- b) 检查 USB 接口是否有破损等异常现象

Check whether the USB port is damaged

8.5.2 YM2: 治具功能检查 Check fixture function

- a) 接通电源, 检查 HMI 是否点亮

Turn on the power and check if the HMI lights up

- b) 按下 Reset 按钮, 治具是否开始回原点。

Press the Reset button, whether the fixture starts to return to the origin.

- c) 放入含产品的载具到治具中, 按下 Start 按钮, 启动测试, 观察滚压过程是否正常

Put the carrier containing the product into the fixture, press the Start button to start the test, and observe whether the rolling process is normal

8.5.3 YM3: 载具取放时的顺滑度检查 Check smoothness when Holder is placed

- a) 将载具卡在治具导轨上并推进治具中, 检查放置过程中的顺滑度, 是否有异常

Clip the carrier on the guide rail of the jig and push it into the jig to check the smoothness during placement and whether there is any abnormality

- b) 将载具从治具中拉出, 检查取出过程中的顺滑度, 是否有异常

Pull the carrier out of the jig and check the smoothness during the removal process and whether there is any abnormality

8.5.4 YM4: 急停按钮功能检查

- a) 治具上电并按下 Reset 按钮复位治具

Power on the fixture and press the Reset button to reset the fixture

- b) 按下急停按钮, HMI 显示代码 E05。

Press the emergency stop button, the HMI displays code E05.

- c) 顺时针旋转急停按钮以释放急停按钮 HMI 显示代码 E12。

Turn the emergency stop button clockwise to release the emergency stop button HMI displays code E12.

- d) 急停按钮已经释放的状态下按下 Reset 按钮, 此时治具开始运动, 执行回原点运动。

Press the Reset button when the emergency stop button has been released, at this time the fixture starts to move and executes the movement back to the origin.

8.5.5 YM5: 光栅功能检查

- a) 治具上电 此时 HMI 显示代码 E12

When the fixture is powered on, the HMI displays the code E12

- b) 用手遮挡光栅。

Block the grating with your hand.

c) 按下 Reset 按钮，此时治具不会运动，不会执行回原点运动。

Press the Reset button, the fixture will not move at this time, and will not perform the movement back to the origin.

d) 光栅无遮挡状态下按下 Reset 按钮，此时治具开始运动，执行回原点运动。按钮已经释放的状态下按下 Reset 按钮，此时治具开始运动，执行回原点运动。

Press the Reset button when the grating is unobstructed, at this time the fixture starts to move and executes the return-to-origin movement. Press the Reset button when the button has been released, at this time the fixture starts to move and executes the return-to-origin motion.

8.6 长期存放时的维护与保养 Maintenance for long time

8.6.1 长期停放时应切断电源

The power supply should be cut off for long-term storage

8.6.2 以纸箱或其他包装物对设备进行包装，设备包装前将载具取出；

Pack the equipment in cartons or other packaging, and take out the carrier before packing the equipment;

8.6.3 设备应储存在通风、干燥、无腐蚀性介质、无振动的环境中；

It should be stored in ventilation, dry, no rust and vibration environment.

8.6.4 在定期检查包装、湿度的情况下，可最多储存 3 年。

3 years at most after package and checking at certain time.

8.6.5 长期存放后，重新安装或开机前应再次进行设备性能确认。

After long time storage, re-install or confirm capability before turnon.

8.7 其他说明 Others

其他配套元器件的维护和保养请参阅相应的器件说明书。

Maintain of other components refer to operation manual of parts.

9 设备的搬运与贮存 carrying and storage

9.1 包装 Package

工厂验收测试（FAT）完成以后，对设备进行包装。

After the factory acceptance test (FAT) is completed, the equipment is packaged.

包装形式不限于纸箱、木箱等。

The packing form is not limited to carton, wooden case, etc.

9.2 搬运 carrying

治具整体重量约 51KG，务必采用叉车 小车等安全的方式搬运。

The overall weight of the fixture is about 51KG, and must be transported in a safe manner such as a forklift or a trolley.

9.3 运输 Transport

本设备适宜陆运和海运。

It can be shipped by land and sea.

陆运时装车应注意包装箱上的标志，包装箱不得倒置、侧放和倾斜过多。装车时还应采取适当的防护措施，以避免设备在运输过程中受潮、受振和受冲击。

When transported by land, pay attention to the package label, all the parts of the equipments, exclude base part, require the package case should not be converted, side lay down and incline too much. When loaded in the van, should take suitable protection measure to avoid wet, vibrating and impacting during the transportation.

海运时遵照海运相关规范即可。

For sea way, transport according to the relative regulation.

9.4 贮存 Storage

设备应贮存于干燥、通风、无腐蚀性介质、无振动的室内。

It should be stored in the dry, ventilated and with no corrosive medium room.

必要时，可放置到纸箱等盒子内贮存，并在箱体内放置干燥剂。

When necessary, can be placed in cartons and other boxes for storage, and placed in the box desiccant.

非封闭环境贮存时，请注意做好防尘、防潮处理

When storing in non-enclosed environment, please pay attention to dust proof and moisture proof treatment.

10 开箱及检查 Unpacking and check

10.1 开箱注意事项 Unpacking Attentions

10.1.1 开箱现场应有本公司或本公司产品代理商的安装服务人员

It should have the installation service personnel from manufacturer or its agent in the unpacking spot.

10.1.2 开箱前应仔细检查包装是否完好，件数、名称规格与运单是否一致；

Before unpacking, check the package, quantity, product name and model whether conform to the packing list.

10.2 检查内容 check items

10.2.1 随机文件（一般包括：装箱单、合格证明书、使用说明书、检验报告、随机附件清单）。

Documents with machines(include: packing list, up to grade certificate, operation manual, inspection report, attached list, etc.).

10.2.2 根据装箱单上记载的内容逐件核对查验，并作好记录；

Check the items according to the packing list one by one and make a record.

10.2.3 检查设备外表是否受碰、磕、剧烈振动等引起的变形、划伤等。

Check the appearance of the machine whether has distortion, scuffing caused by knocking and strongly vibration

11 附件 Attachment

名称 Name	型号 Model	规格 Spec	备注 Remark
USB Cable	US315	USB-A to USB-B 1.5M	

12 设备主要易损件清单 Main damage parts

本设备易损件清单见下表：

The vulnerable parts list of the equipment is shown in the following table:

表 12-1 易损件清单

Tab 12-1 Vulnerable parts list

名称 Name	规格 Spec
保险丝 Fuse	Littelfuse 0218004.MXBP 4A Φ 5-20MM
弹簧 spring	Compression spring Cataro CMR159-170-025-065

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules / Innovation, Science and Economic Development Canada's licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This equipment complies with ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.