



机器人 + 柔性振动盘 + 机器视觉
robot + flexible vibration tray + machine vision

机器人柔性上料系统

Robot Flexible Feeding System



物料筛选
Material Screening



物料摆盘
Material Swing



物料简单组装
Simple Assembly Of Materials



螺丝锁付
Screw Lock



散件供料
Feed In Pieces

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» 1.1 设备概述 Equipment Overview

柔性上料展机，由SDG集团旗下苏州协纬自动化设计制作。该展机，将联源品牌中的SCARA工业机器人、直线模组、柔性振动盘、机器视觉、端子排、按钮等融合一体，其中同样使用到明纬电源。

The Flexible Feeder Demonstration Machine, designed and manufactured by Suzhou SHARE WELL Automation, a subsidiary of SDG Group. It integrates SCARA industrial robots, linear modules, flexible vibratory feeders, machine vision systems, terminal blocks, and buttons from the PowerNex. Similarly, it also employs MEAN WELL power supplies.

该展机的亮点如下：

Highlights of this demonstration machine include:

①、以“机器人+柔性振动盘+机器视觉”的标准品完美搭配，适用于物料区分筛选、物料上下料摆盘、螺丝锁付等多种场景，为制造业中“少量多样”的生产模式提供自动化解解决思路。

The combination of "robot + flexible vibratory feeder + machine vision" provides a standard solution. It is suitable for material sorting, loading/unloading, palletizing, and screw fastening and so on. It offers an automation solution for manufacturing with "small batch, diverse production."

②、展机体积小精致，创新性的使用全电力驱动，不需要使用工业压缩空气，适用于办公室、展间、实验室等无法接驳压缩空气的场所，节省空间，为客户提供静音、舒适的使用体验。

The demonstration machine is compact, fully electric, and doesn't require other any compressed air, making it suitable for offices, exhibition rooms, and labs where compressed air isn't available. It provides a quiet and comfortable experience while saving space.

该展机的动作流程：

Operation Flow of this Demonstration Machine:

①、启动后，设备默认料盘满料，默认吸盘有料（防止物料碰撞），机器人先默认移动到柔震上方将吸盘上的料抛掉，并复位所有IO信号，移动到原点；

After startup, the machine defaults to a full tray of materials and the vacuum suction cup is assumed to have materials (to prevent material collision). The robot first moves above the flexible feeder, discards material from the suction cup, resets all I/O signals, and moves to the original position.

②、再移动模组使料盘移动到抛料位，机器人开始将料盘的料抛至柔振料盘中。

Then, the linear module moves the material tray to the discard position, and the robot starts discarding the tray material into the flexible feeder plate.

③、抛料完毕后，机器人移动到原点等待，模组移动到放料位，柔振开始振动，振动完成后，触发视觉开始拍照，处理并将物料型号和点位坐标发送给机器人，经过处理机器人通过拱形运动从原点移动到取料点，将物料放至料盘中并循环这一套动作，直到料盘满料，模组移动到抛料位，机器人开始抛料。抛料完成后将继续循环取料，放料动作直到按下停止按钮。

After discarding, the robot returns to the home position and waits, while the module moves to the feed position.

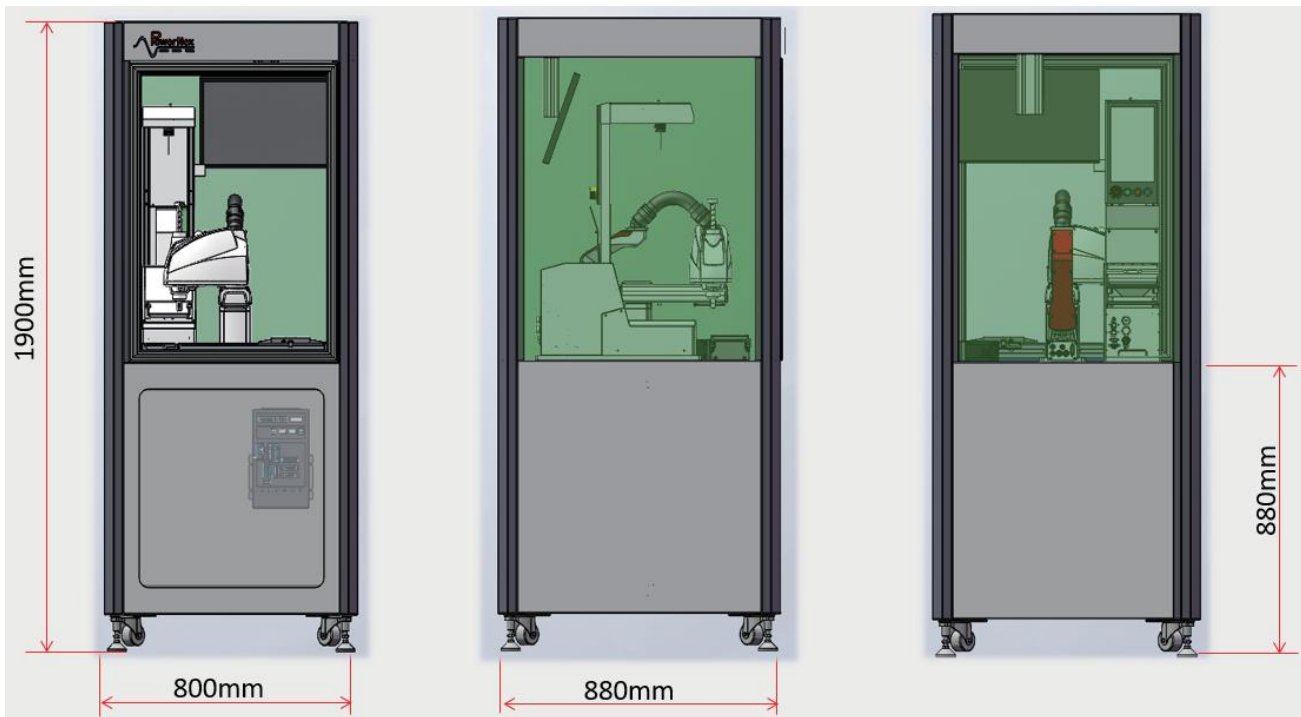
The flexible feeder vibrates, machine vision captures images, processes them, and sends material data and coordinates to the robot. The robot picks and places materials until the tray is full, then returns to the discard position and repeats until the stop button is pressed.

该展机扩展之能力应用

Expansion Capabilities of this Demonstration Machine:

该展机不仅仅是一台展示设备，亦是一台具有多用功能的标准自动化设备！除展机所展示之应用外，使用单位可透过简单改造，使展机满足物料筛选、物料摆盘、物料简单组装、螺丝锁付、散件供料等。Not only is this demonstration machine a display device, but it's also a versatile standard automation equipment! With simple modifications, it can meet the needs of material sorting, palletizing, simple assembly, screw fastening, and bulk material feeding.

>> 1.2 设备整体外形及概述 Overall Equipment Appearance and Overview



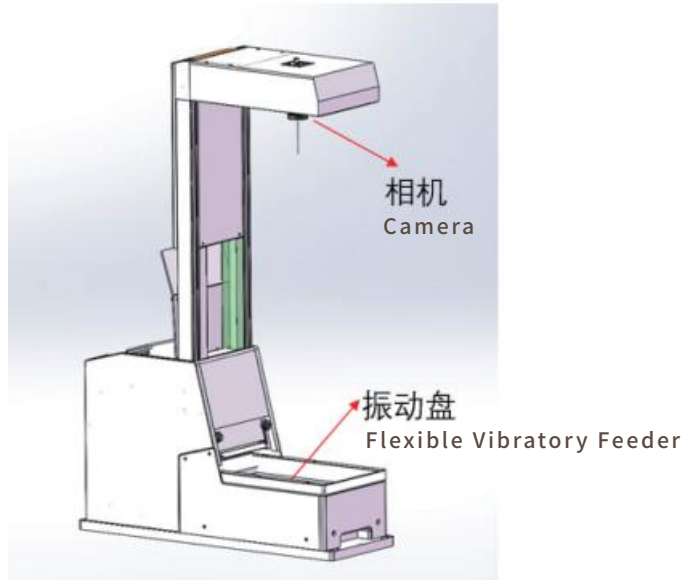
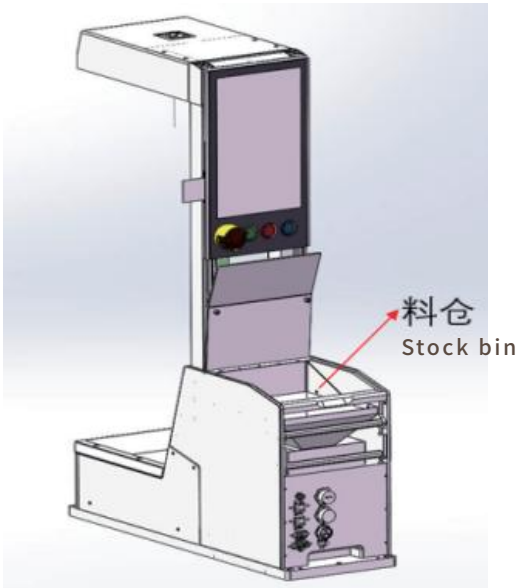
设备尺寸为 Equipment Dimensions: 800mm*880*1900

("8" means good luck in Chinese)

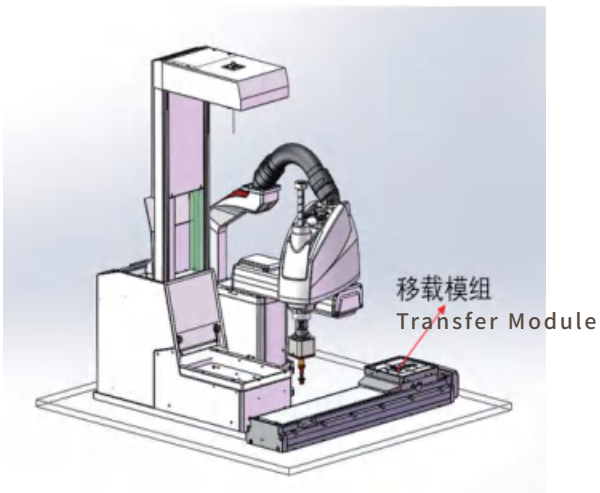
重量为 Weight: 500KG.

>> 1.3 机构描述 Mechanism Description

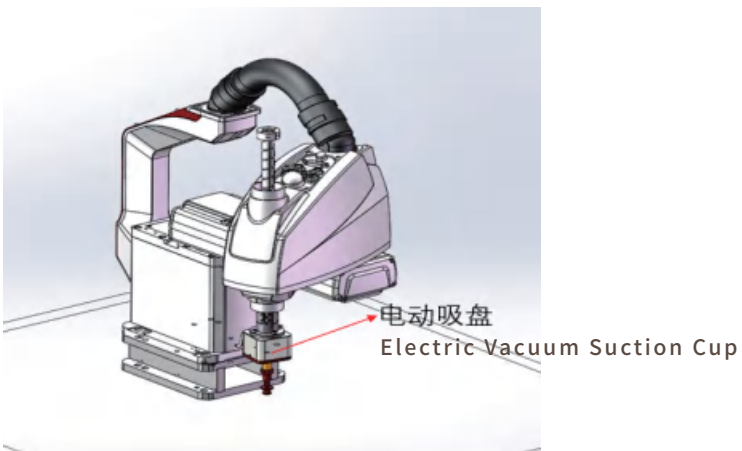
1.3.1 柔性振动盘 Flexible Vibratory Feeder



1.3.2 移载模组 Transfer Module



1.3.3 SCARA机器人 SCARA Robot



第二章 安全防范 / Chapter 2: Safety Precautions

一般安全信息摘要 General Safety Information Summary:

这台机器有许多安全装置为防止操作人员和设备维护人员伤害到自己、他人或是机器。任何一个自动化机器都有许多避免危险的机械和电气安全设备，如联动互锁装置，紧急按钮，电路断路器等安全设备在机器操作和维护时起着重要作用。

This machine is equipped with numerous safety devices to prevent harm to operators, maintenance personnel, and the machine itself. Any automated machine incorporates various mechanical and electrical safety devices to mitigate hazards, such as interlocking mechanisms, emergency buttons, circuit breakers, etc., which play a vital role during machine operation and maintenance.

目的 Purpose:

为了建立安全的工作习惯以避免潜在的危險。

To establish safe working habits and prevent potential hazards.

范围 Scope:

安全防范设备适用于所有的操作、维护和修理机器设备的人员。操作和维护任何一个自动化设备，人员都有潜在的危險。完全遵循这部分的程序规定将确保设备安全操作和维护。

Safety precautions are applicable to all personnel operating, maintaining, and repairing this machine. Working with automated machines poses inherent risks, and following the procedures ensures safe operation and maintenance.

安全防范和警报系统 Safety Precautions and Alarm System:

在手册中下列标识和说明，要一直留意，操作时要注意预防，避免导致人体伤害和财产损失。

Be sure to always pay attention to the following signs and instructions in the manual, take precautions during operation to prevent injury or property damage.



紧急危险情况，如果不注意或避让，将会导致死亡或严重伤害。

Emergency Hazard: If ignored, this could result in death or serious injury.



潜在的危險狀況，如果不注意，將可能導致小的或中等的人身傷害或是造成設備損壞。

Potential Hazard: Ignoring this could lead to minor/moderate personal injuries or equipment damage.

由相关技术人员操作、维护和修理

Operation, Maintenance, and Repair by Relevant Technical Personnel:

只有经过许可并且通过培训的人员，才可参与该设备的相关维护及维修工作。

为了预防故障发生，必须由富有经验的人员进行定期维护检查。

机器改变正常的运转(能量消耗变大、温度变高、噪音变大或者检测设备有反应等)意味着功能削弱。为了防止机器老化，维修人员对维修不得拖延，否则可能直接或间接导致机器的损坏。

Only authorized, trained personnel may maintain and repair this equipment. To prevent malfunctions, regular maintenance inspections must be conducted by experienced individuals. Any deviation from normal operation of the machine (increased energy consumption, higher temperatures, louder noise, or detection of device responses, etc.) indicates a weakening of functionality. To prevent machine aging, repairs must not be delayed by maintenance personnel, as this could directly or indirectly lead to damage to the machine.

保护装置

Protection Devices:

紧急停止开关EMS:

Emergency Stop Switch (EMS):

当EMS被激活，整机的电源会被切断，同时气源也被切断。

When EMS activated, EMC cuts off power and air to the entire machine.

EMS是直接安装在机器正面用来防止意外的红色蘑菇状按钮。除了上述按钮没有其他按钮用于紧急情况。

EMS is a red mushroom-shaped button installed directly on the front of the machine to prevent accidents. Besides it, there are no other buttons for emergency situations.

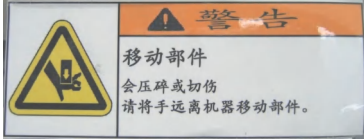


· 警告标示 Warning Labels:

一些用来对危险操作引起注意的警告标识，通常在机器的门、盖子和移动部件上可以看见。为了可靠的维护机器，执行任务时，在所涉及的区域仅可以留有相关的人在场。

Warning labels alert to potentially hazardous operations and are often found on doors, covers, and moving parts. Access is limited to relevant personnel only.

· 伤害手部标识 Hand Injury Symbol:



该标识警示：操作和维修人员若违反操作，会有被移动部件挤压到手的危险，通常位于有移动部件的地方。

The label indicates: Operators and maintenance personnel may be at risk of being crushed by moving parts if they violate procedures, typically located where moving parts are present.

· 在清理障碍之前，必须等到机器处于停机模式。

Ensure the machine is in shutdown mode before clearing obstructions.

· 在进行日常维修前必须按下“急停”按钮

Press the "Emergency Stop" button before daily maintenance.

· 小心触电标识 Electric Shock Warning:



该标识表示：带电的接线端或零部件有高压的危险，维修机器前必须关闭电源。有一些零部件带有220V或更高电压，如果接触可能有死亡的危险。

The label indicates: There is a high-voltage danger associated with electrified terminals or components. The power must be switched off before servicing the machine. Some components carry 220V or higher voltage, posing a risk of death if touched.

· 电源高压危险 Electrical High-Voltage Hazard:

为了预防故障发生，要由有经验的维护人员定期对机器进行维护检查。

To prevent faults, regular inspections should be conducted by experienced staff.

在替换保险丝或清洁机器前要断开主电源。

Disconnect the main power before replacing fuses or cleaning.

· 面板门没有关闭的时候不要运行机器。

Do not operate the machine when the panel door is not closed.

· 不要断开机器内外的接地线。

Do not disconnect the grounding wires inside or outside of the machine.

· 不要去掉任何接线或者私自接线。

按照说明书给机器接入指定电压，如果电压引入错误，将会损坏或烧毁电气硬件，甚至会发生火灾。

Do not remove any connections or make unauthorized connections.

Connect the machine to the specified voltage as per the instructions. Incorrect voltage input can damage or burn electrical hardware, and even cause fires.

》》3.1 电气规格 Electrical Specifications

这部分详细说明了该设备的电气规格，详见以下列表。

This section provides detailed information about the electrical specifications of the equipment.

项目 Item		规格 Specification			
01	电源 Power Supply	电压 Voltage:	电流 Current:	相位 Phase:	频率 Frequency:
		220VAC	16 Amps	1Φ	50 HZ
02	气压 Air Pressure	5-6 Bar			
03	配线 Wiring	L+N+PE			
04	额定电流 Rated Current	25Amps			
05	最大单个负载电流 Maximum Load Current (Single)	16Amps			

》》3.2 机械规格 Mechanical Specifications

这部分详细说明了机械规格。以下是其列表，详细规定了操作标准以及机器性能。

This section provides detailed information about the mechanical specifications, including operational standards and machine performance.

项目 Item		规格 Specification
01	温度 Temperature	常温 (除特殊部位) Normal (except specific parts)
02	相对湿度 Relative Humidity	40-50% (除特殊部位) 40-50% (except specific parts)
03	噪音标准 (在通风排气装置开启情况下) Noise Standard (with ventilation on) <75 dB Notes Avoid vibration and impact	<75 分贝 <75 dB
04	注意事项 Notes	避免震动和撞 Avoid vibration and impact

第四章 机器安装及设置 / Chapter 4: Machine Installation and Setup

» 4.1 设备安置 Equipment Placement

为了能够方便检查和清洁维护，一个适当安全的场所对设备安装是非常重要的。这部分内容在安装前作为指导。

For ease of inspection, cleaning, and maintenance, it's crucial to install the equipment in a safe and suitable location. Follow the checklist below for guidance:

遵循下列清单步骤 Follow these checklist steps:

清单 Checklist:

- ① 设备应固定在一个坚硬平整的表面上。
Secure the equipment on a hard, flat surface.
- ② 避免灰尘和潮湿。
Avoid dust and moisture.
- ③ 避免将机器安置在有腐蚀性物体的场所，如硫酸、盐酸。
Keep the machine away from corrosive substances like sulfuric acid and hydrochloric acid.
- ④ 机器远离化学物品放置。
Store chemicals away from the machine.
- ⑤ 地面要清洁且没有油污或碎片，以确保设备工作时保持稳定和平衡。
Keep the floor clean, free of oil stains and debris, ensuring the equipment remains stable.
- ⑥ 设备工作时，要4个地脚与地面接触，若有脚轮，将其与地面脱离接触。
Ensure all four feet are in contact with the floor when the equipment is operating. If the equipment has casters, they should not touch the ground.
- ⑦ 机器远离高温或低温来源放置。
Keep the machine away from extreme temperature sources.
- ⑧ 避免将设备安置在受振动影响的场所。
Avoid placing the equipment in areas subject to vibration.
- ⑨ 机器前面空大约1米，后面或侧面若有电箱，要方便电箱门打开。
Maintain about 1 meter of clearance at the front, and ensure the electrical box doors at the back or sides can be opened easily.
- ⑩ 外部电源供给，建议离机器不超过1.5米。
The external power supply should ideally be no more than 1.5 meters from the machine.
- ⑪ 设备安置好后避免过大的震荡，若设备配有相机检测，设备震荡将会影响数据测量。
Avoid strong vibrations after setup; if the equipment is equipped with a camera system, shaking can affect measurement accuracy.

>> 4.2 设备包装箱单 Equipment Packing List

这部分列出了交货清单，以确保所有部件能完整地递送到。如有缺少部件，请立即报告协纬自动化科技有限公司。

This section provides a delivery list to ensure that all parts are delivered completely. Report any missing parts to Suzhou SHARE WELL Automation Technology Co., Ltd.

以下是包装项目清单 Here is a list of packaging items:

- 1) 设备框架 Equipment Frame: 1台/1 set
- 2) 附件如下 The attachments are as follows:

附件项目 Item	数量 Quantity
操作手册 Operation Manual	1套/1 set
电路图 Circuit Diagram	1套/ 1 set

>> 4.3 设备初始运行测试 Initial Operation Test

执行下述检查以确认机器的初始状况。

Perform the following checks to verify the machine's initial state.

4.3.1 电源供给前 Before Connecting the Power Supply:

- 4.3.1.1 连接电源供给。Connect the power supply.
- 4.3.1.2 检查电源电压、空气压力供给是否与机器规格需求相匹配。
Check that the power voltage and air pressure match the machine's specifications.

01	电源 Power Supply	电压 Voltage:	电流 Current:	相位 Phase:	频率 Frequency:
		220VAC	16 A	1Φ	50 HZ

- 4.3.1.3 检查所有的连接器连接在正确的位置。连接错误会导致机器故障。
Ensure all connectors are in the correct positions; incorrect connections can lead to machine malfunctions.
- 4.3.1.4 检查机器内外是否有不相关的物体。检查是否有松动的部件。
Verify there are no unrelated objects inside or outside the machine and check for loose parts.
- 4.3.1.5 确保主隔离开关处于OFF状态。Ensure the main isolation switch is off.

4.3.2 电源供给后: After Connecting the Power Supply:

- 4.3.2.1 当机器在运行模式下，检查所有的紧急停止按钮及门锁开关的功能是否完好。
Check that all emergency stop buttons and door lock switches function correctly while the machine is in operation mode.

4.3.2.2 试运行机器，看是否有部件不正常。

Run a test operation to detect any abnormal parts.

>> 4.4 设备调试流程 Equipment debugging process:

操作流程简述如下 The basic operating procedure is as follows:

- A) 开启电源 Turn on the power;
- B) 选择自动模式 Select the automatic mode;
- C) 确认产品型号 Confirm the product model;
- D) 复位通气 Reset the air supply;
- E) 开始自动运行 Start automatic operation;

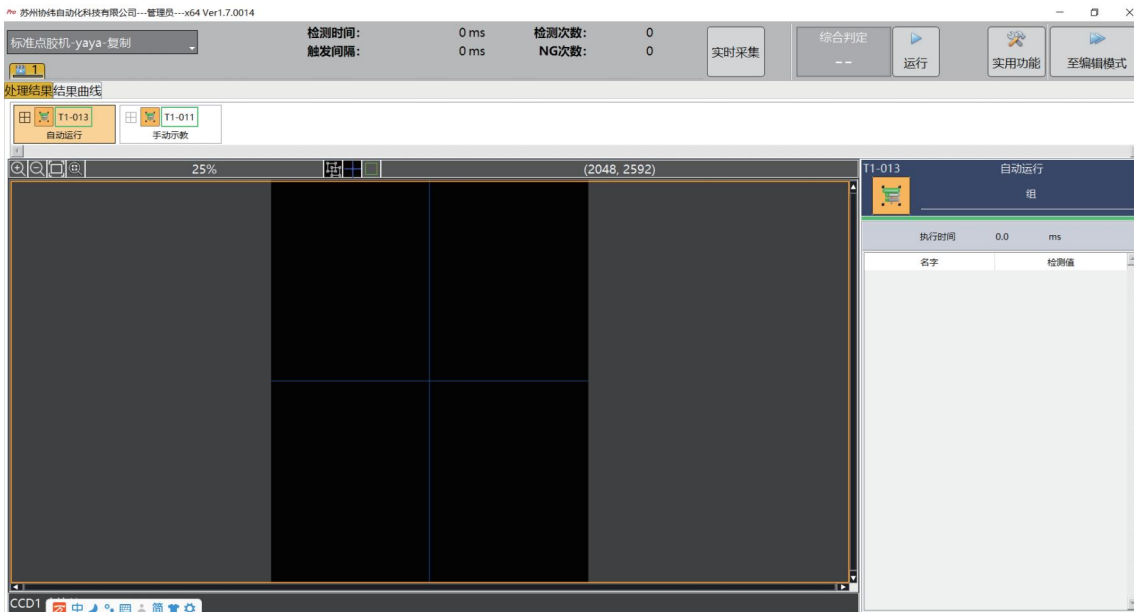
第五章 软件程序流程 / Chapter 5: Software Program Flow

这一部分可以让操作者更好地了解系统的软件操作步骤。

This section helps operators better understand the software operating steps of the system.

》 5.1 自动控制流程 Automated Control Flow:

5.1.1 视觉软件运行 Vision Software Operation;



机台上电后，视觉软件会自动打开并运行。

When the machine is powered on, the vision software automatically launches and starts operating.

5.1.2 启动自动运行 Start Automated Operation:



视觉软件打开完成后，按启动按钮运行机台。

After the vision software launches, press the start button to operate the machine.

>> 5.2 报警控制流程 Alarm Control Flow

This section will guide operators through the alarm handling process:



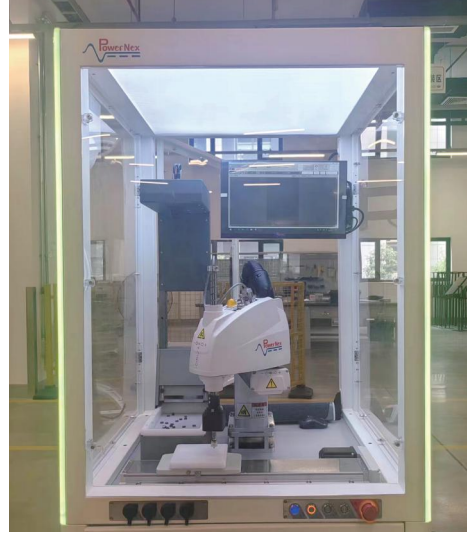
第六章 机台状态显示 / Chapter 6: Machine Status Display

指示灯 Indicator Lights:

绿色 Green: 机台自动运行中
The machine is running automatically.



黄色 Yellow: 机台停止中
The machine is stopped.



红色 Red: 报警中
An alarm has been triggered.



第七章 预防性维护 / Chapter 7: Preventive Maintenance

➤ 7.1 预防性维护 Preventive Maintenance

对机器和设备维护或更换零件时必需切断设备电源。确保机器或设备已停止，在维修人员进行维修维护之前杜绝所有可能潜在的危險。

To ensure the safety of maintenance personnel when maintaining or replacing machine parts, turn off the machine's power supply and ensure that the machine is stopped. Eliminate any potential hazards before maintenance begins.

一般维护程序和置换程序

General Maintenance Procedures and Replacement Guidelines

特殊的机器零件应定期性地检查，确保机器运行正常。遵循下述定期检修程序使生产中断时间降到最小。

Regularly check specific machine parts to ensure proper operation. Follow these regular inspection procedures to minimize production downtime.



只有懂得机器动作顺序的人员，才可以进行机器维护。

Only personnel who understand the machine's sequence of actions can maintain the machine.

在对机器进行维护或清洁前，应将机器总进气阀断开。

Disconnect the machine's main air valve before maintenance or cleaning.



在机器进行维护和调整时必须放置一个指示标志，避免任何人接触正在运转的机器。

Place a notice near the machine to warn people to avoid contact with an operating machine during maintenance and adjustment.



在操作压缩空气时应戴安全护目镜。直吹的气流，或吹气时飞溅的碎片，可能对眼睛造成严重伤害。

When handling compressed air, wear safety goggles. Direct airflow or splashed debris can cause serious eye injuries.

7.1.1 每日预防性维护 Daily Preventive Maintenance

每日生产开始前 Before Daily Production:

- (a) 检查电源电压供给是否正常 Check that the power voltage supply is normal.
- (b) 检查气压, 真空是否正常 Check the air pressure and vacuum levels.

每日生产结束后 After Daily Production:

- (a) 电源关闭 Turn off the power supply.
- (b) 气源关闭 Turn off the air supply.
- (c) 用酒精清洁机器表面 Clean the machine surface with alcohol.

7.1.2 每月预防性维护 Monthly Preventive Maintenance

7.1.2.1 电缆和电线 Cables and Wires:

每月检查所有电线、电缆、插座和连接器, 留意插座和连接器是否松动或损坏。电缆或电线必须处于好的机械状态, 没有引起中断, 短路或接地, 没有明显的弯曲或切口。

Check all cables, wires, sockets, and connectors for looseness or damage. Ensure cables and wires are in good condition, without breaks, short circuits, or grounding issues, and free of bends or cuts.

7.1.2.2 螺丝松动 Loose Screws:

检查所有松动的接线终端、连接螺丝和装配于机器敏感部分的螺丝是否拧紧, 拧紧所有松动的螺丝。

Check all loose wire terminals, connecting screws, and screws on sensitive machine parts. Tighten any loose screws.

7.1.2.3 电气检查 Electrical Inspection:

检查确保没有任何接线端子、继电器、触点有烧焦痕迹和粘黏现象, 若有需及时更换。应该每月检查一次漏电保护开关, 看其功能是否失效, 如果失效, 应该及时更换。

Ensure no wire terminals, relays, or contacts are burned or sticky. Replace if necessary. Check the residual current circuit breaker monthly for proper function and replace it if it fails.

7.1.2.4 润滑油组成 Lubricant Composition:

用柔软的物料和酒精清洁机器台面。清洁结束后, 在机械运动部分的表面涂上一层润滑油。

Clean the machine table with a soft material and alcohol. After cleaning, apply a layer of lubricant to the surface of the mechanical moving parts.