坐标式（XYZ）自动锁螺丝机

Coordinate-Type (XYZ) Automatic Screw Locking Machine

使用说明书

User Manual

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一、设备简介

I. Machine Overview

坐标式自动锁螺丝机是由螺丝供给系统、自动拧紧机构、XYZ 坐标系机构、自动下料构四部分完美组合而成。螺丝供给系统通过压缩空气将螺丝吹送到批嘴（吹气式），XYZ 定位到目标坐标点后再由气缸执行机构带动伺服批完成自动拧紧产品螺丝，拧紧完成后采用电机机械臂自动取出产品。设备采用单手启动作业，左右双平台循环工作、机器可以 24 小时不停机工作，设备操作简单、锁付速度快、效率高、为企业节省人工成本等优势。

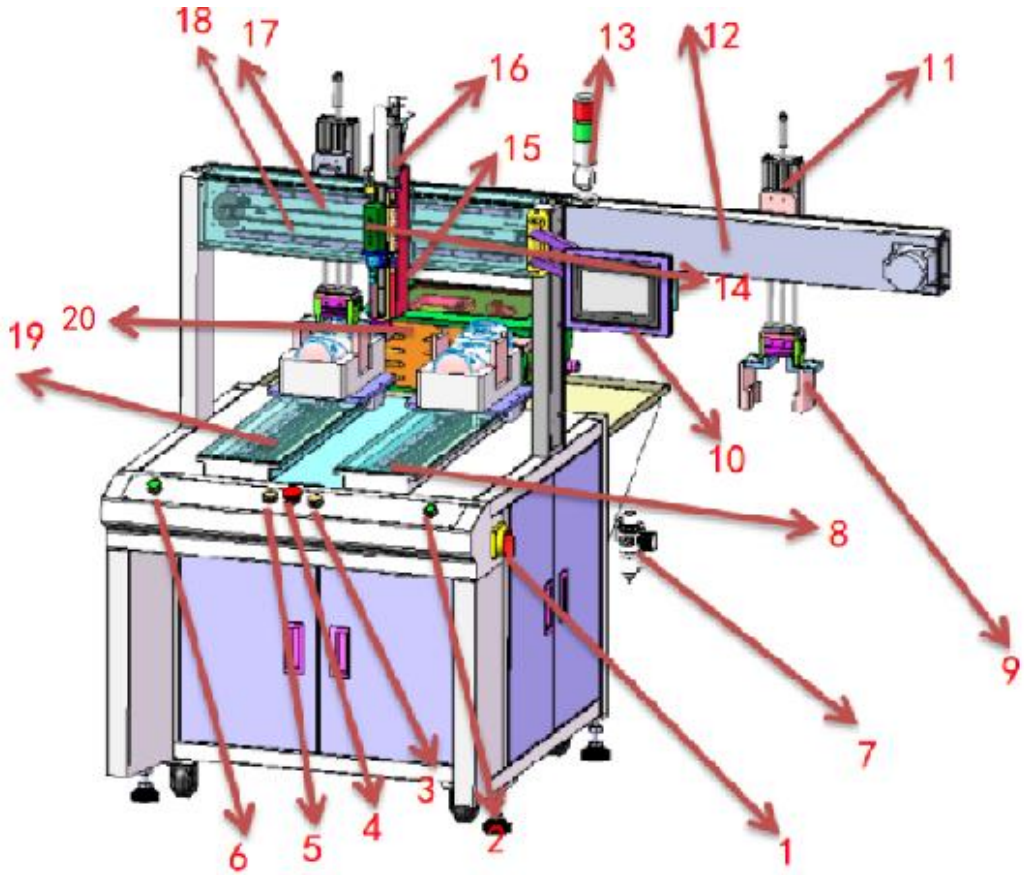
The coordinate-type automatic screw locking machine comprises four key components: the screw supply system, automatic tightening mechanism, XYZ coordinate system, and automatic unloading mechanism. The screw supply system employs compressed air to pneumatically feed screws to the screwdriver bit. The XYZ system then moves to the programmed coordinates, where a servo-driven actuator automatically tightens the screw, after which an electric robotic arm removes the finished product. The machine features one-handed start operation, dual platforms for continuous cyclic work, and 24/7 operational capability, ensuring simple operation, fast locking speed, high efficiency, and significant labor cost reduction.

注：以下介绍中根据坐标式机械臂机型讲解，不带机械臂的请忽略相关操作。

NOTE: The following instructions pertain specifically to the coordinate-type model equipped with a robotic arm. Operations related to the robotic arm are not applicable to other variants.

二、设备结构介绍

II. Machine Components



(1)电源开关

(1) Main Power Switch

(2)右启动按钮（自动模式下启动按钮灯未点亮时则可启动系统）

(2) Right Start Button: In automatic mode, the machine can only be started when the Start button indicator is off.

(3)复位按钮（XYZJ 轴和气缸回到初始位置）

(3) Reset Button: Press this button to return all axes (X, Y, Z and J) and cylinders to their home positions.

(4)急停旋钮（用于紧急情况下停止系统并复位气缸动作到初始状态）

(4) Emergency Stop Button: Press this button to immediately stops the machine and resets all cylinders to their initial state in case of emergency.

(5)暂停按钮（系统运行中、按下暂停、机器 XYZ 到位后暂停中，按下启动按钮解除）

(5) Pause Button: Press this button to pause the current operation. Press the Start buttons to resume when the X, Y and Z axes reach the programmed positions.

(6)左启动按钮（自动模式下启动按钮灯未点亮时则可启动系统）

(6) Left Start Button: In automatic mode, the machine can only be started when the Start button indicator is off.

(7)气源调压油水分离两联件

(7) Air Preparation Unit (Pressure Regulator + Oil-Water Separator)

(5)右 Y 轴

(8) Right Y-Axis

(9)机械臂手指气缸(抓产品气缸）

(9) Gripper Cylinder: Used to hold and manipulate products.

(10)HMI 人机界面

(10) HMI (Human-Machine Interface)

(11)机械臂升降气缸

(11) Robotic Arm Lifting Cylinder

(12)机械手轴

(12) Gripper Shaft

(13)三色指示灯（黄：空闲；绿：运行；红：故障）

(13) Tricolor Indicator: Yellow (Idle), Green (Running), Red (Error)

(14)伺服批

(14) Servo Screwdriver

(15)Z 轴

(15) Z-Axis

(16)锁付机构升降气缸

(16) Locking Mechanism Lifting Cylinder

(17)X 轴

(17) X-Axis

(18)直线导轨和皮带

(18) Linear Guide & Belt

(19)左 Y 轴

(19) Left Y-Axis

(20)螺钉供给机

(20) Screw Feeder

三、设备特点

III. Machine Features

1、驰速坐标式自动锁螺丝机均选用知名品牌气缸、直线导轨、控制器、HMI人机界面、电磁阀、伺服批(电动起子、气动起子)、供料系统等组成锁付机构与系统，设备具有耐用性强、锁付可靠性高等特点。

1. The Chisu coordinate-type automatic screw locking machine integrates high-quality components—including leading-brand cylinders, linear guides, controllers, HMIs, solenoid valves, and servo screwdrivers—into a robust system, ensuring exceptional durability and reliable locking performance.

2、螺丝供给器采用最新式的分料结构，噪声小，送螺丝可靠性高，卡料自复位实现送螺丝免维护。

2. The screw feeder incorporates an innovative distribution mechanism that ensures quiet, highly reliable operation. Its automatic jam clearance function enables virtually maintenance-free feeding.

3、可根据不同螺丝制定不同的螺钉供给方式。

3. The feeding method can be customized to suit specific screw types.

4、可根据不同产品定制非标化设备达到客户锁付要求。

4. Non-standard solutions can be provided according to different product and locking requirements.

5、设备控制方面采用控制器+HMI 人机界面，操作直观并且后期改造和检修等极为便利。

5. The machine is controlled via an integrated controller and HMI, designed for intuitive operation and ease of future modification and maintenance.

6、全中文界面(可根据客户要求定制他国语言)，自主研发自动锁螺丝控制系统，可实时监控系统状态等数据。

6. The machine features a fully Chinese interface (other languages available upon request) and a proprietary control system for real-time monitoring of all machine status and data.

7、定位销对治具孔位、跟换治具方便、精度高

7. Quick-change fixtures with precision positioning pins ensure fast replacement and consistent high accuracy.

四、设备电气规格

IV. Electrical Specifications

1、输入电源：AC220V 50HZ（可根据不同国家定制）

1. Power Supply: AC 220 V, 50 Hz (Configurable for regional standards)

2、输入气源：0.4-0.6Mpa

2. Air Supply: 0.4-0.6 MPa

3、额定功率：1.2KW(400W 双平台)

3. Rated Power: 1.2 kW (400 W for dual-platform operation)

注：额定功率是指伺服满力矩堵转未及时断开时的最大功率，而在日常使用时实际功率不会有这么大。

NOTE: Rated power refers to the maximum power when the servo is stalled at full torque without timely disconnection. Typical operational power consumption is significantly lower.

五、操作安全申明

V. Safety Precautions

1、凡有安全标识提示说明的请严格按照说明操作设备。

1. Strictly adhere to operational instructions where safety signs are displayed.

2、操作人员禁止使用脚踏开关，必须使用双手启动按钮来启动设备。

2. The equipment must be started exclusively using the two-hand Start buttons. The use of foot switches is prohibited.

3、机器运行时，严禁将身体任何部位放入设备台面以内的范围。

3. Keep all body parts outside the working table during operation.

4、在手动调试设备时请将双手离开后再进行执行机构的操作。

4. Ensure hands are clear before operating any actuator during manual configuration.

六、设备工作前检查

VI. Pre-Operation Inspection

1、气源是否正常。

1. Verify that the air supply unit is functioning properly.

2、送钉机是否正常。

2. Verify that the screw feeder is functioning properly.

3、送料管内是否有螺钉。

3. Verify that the feeding tube is loaded with screws.

4、批嘴里是否有螺钉。

4. Verify that a screw is present in the screwdriver bit.

5、各个 I/O 点是否正常。

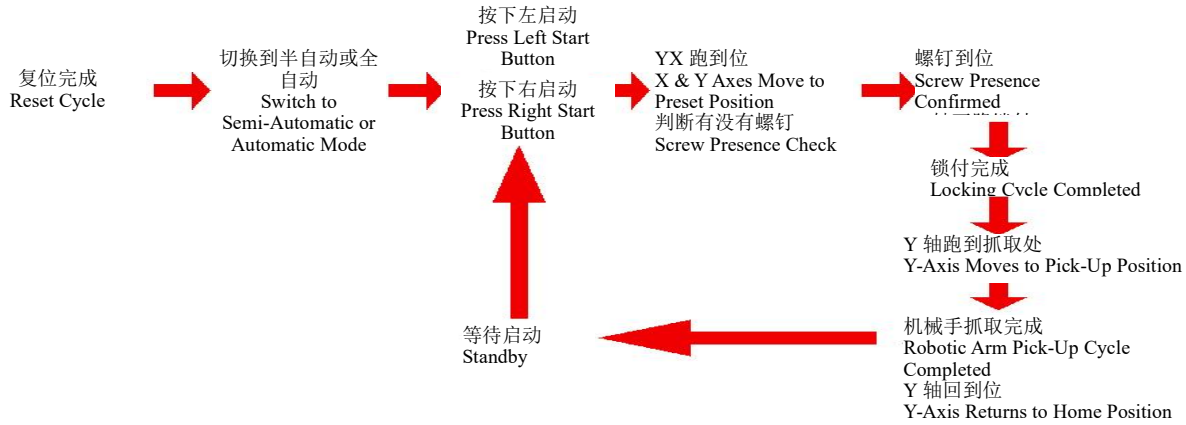
5.Verify that all I/O points are functioning properly.

6、执行机构是否运行正常。

6. Verify that all actuators are functioning properly.

七、工作流程图

VII. Workflow Diagram



八、手动调试操作(换产品时只需调试一次，后续把产品文件调用出来)

VIII. Manual Configuration (This procedure is only required during initial product changeover. For subsequent runs, simply recall the corresponding product file.)

1、把系统复位完成后、将已经锁付好的产品按照正确方向放入 Y 轴上的治具内。

1. After resetting the system, place a reference product (a correctly assembled part) into the Y-axis fixture, ensuring it is oriented properly.

2、从主画面单击【文件】按键进入文件画面，新建一个文件名称、建立完成后返回到主画面、单击【示教】按键进入示教画面。

2. From the Home screen, select the [File] button to access the file menu. Create and name a new file for the product, then return to the Home screen. Press the [Teach] button to enter the teaching mode.

3、把批嘴抓夹装上去再把螺丝扭紧。

3. Install the bit holder and securely fasten the retaining screw.

4、将传动轴从伺服活接卡扣中处取出。

4. Disengage the drive shaft from the servo quick-connect coupling.

5、单击【轴手动】、XYZ 轴到目标点位后(Z 轴到位后，抓夹打开不能碰撞产品，离产品 3-5mm 处)，请根据产品和螺钉长短适当调整 Z 下降锁付坐标。

5. Select [Axis Manual] mode. Move the X, Y and Z axes to the target positions, ensuring the Z-axis stops 3-5 mm above the product to prevent collision with the bit holder. Fine-tune the Z-axis descent coordinates for the locking operation based on the specific product geometry and screw length.

5、人工将批头插入锁付好的螺钉看是否能够对准螺丝头，若能不能对准，用低速模式微调 XY 轴直到对准。

5. Manually insert the screwdriver bit into a seated screw to verify alignment with the screw head. If misaligned, fine-tune the X and Y-axis coordinates in slow mode until perfect alignment is achieved.

6、所有对孔完毕后点下增加、坐标就自动添加完成。

6. Once all hole positions are correctly aligned, click [Add] to save the current coordinate set automatically.

7、点击下料参数、将 Y 轴移动下料位置，再将机械臂移动到抓取位置打开手指下降调好手指张开中心距，合上手指后上下操作机械臂升降气缸取放产品自然即可。

7. Navigate to the [Unloading Parameters] menu. Move the Y-axis to the unloading position, and the robotic arm to the pick-up position. Open the gripper, and adjust the opening center distance. Close the gripper and operate the lifting cylinder to complete a pick-and-place cycle.

8、调整好后将点下确认、在点下保存、坐标就保存完成。（提示：必须在系统复位完成的情况下进行）

8. Then click [Confirm] -> [Save] to save all configured coordinates. (NOTE: This entire procedure must be performed after a successful system reset.)

9、设置好等待坐标和下料坐标。

9. Set the desired standby and unloading coordinates, respectively.

10、以上完成后检查所有螺钉是否紧固。

10. Upon completion of the above steps, verify that all screws on the machine are securely tightened.

九、自动运行操作

IX. Automatic Operation

1、接通气源 4-6MP　　电源 AC220V50HZ

1. Connect the air supply (4-6 MPa) and powersupply (AC 220 V, 50 Hz).

2、打开主机电源开关。

2. Turn on the Main Power Switch.

3、等待 HIM 启动完成后应认真阅读安全提示后进入系统。

3. After the HMI boots up, carefully read the safety prompts and then enter the system.

4、启动前应检查最大锁付时间、送钉时间、上抬坐标是否设置正确并检查批嘴里有无螺丝，若无则应单击【送钉】按键送入螺丝到批嘴里。

4. Before startup, verify the following parameters are set correctly: maximum locking time, screw feeding time, and retracted position coordinates. Confirm the presence of a screw in the screwdriver bit. If absent, press the [Feed] button to load one.

5、单击【手动】切换按钮切换为半自动或者全自动模式。

5. Click the [Manual] toggle button to select either semi-automatic or full-automatic mode.

6、以上工作完成后，将产品放入 Y 轴治具内，按下主机前面板的【启动】按钮系统将运行，触摸屏左下角显示‘工作中’锁付流程开始工作（流程见第七节）。

6. Then place a product into the Y-axis fixture, and press the [Start] button on the front panel. The system begins operation, and the touchscreen displays "Running" in

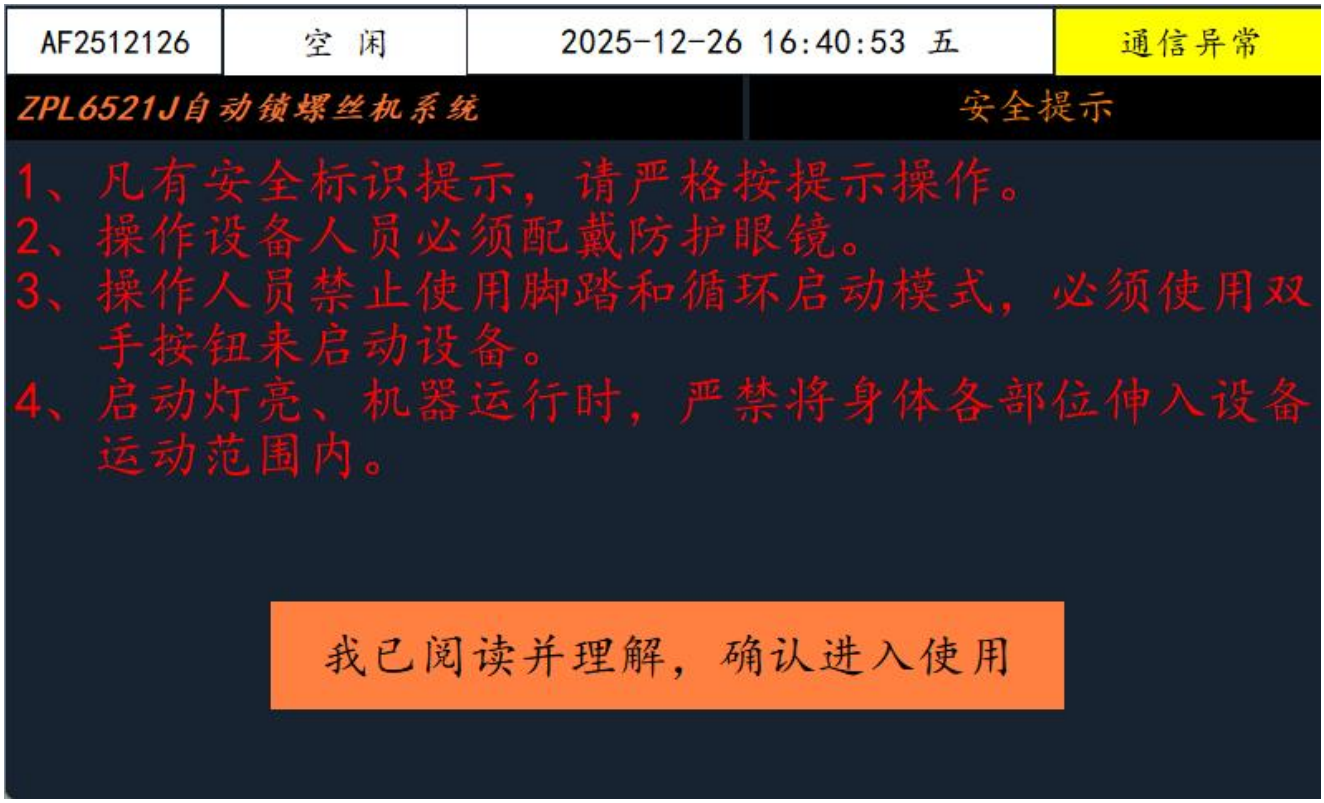
the lower left corner. The locking cycle now commences (refer to Section VII for the detailed workflow).

十、画面以及按键功能说明

X. Screens and Button Functions

1、安全提示画面

1. Safety Prompt Screen



提示操作人员在使用设备中需要注意的安全事项。

This screen displays critical safety precautions that must be observed by the operator when using the machine.

2、联系信息画面

2. Contact Information Screen

AF2512126:设备编号（购买配件以及同我司售后部处理问题时使用）。

AF2512126: Machine ID (Please reference this number when ordering parts or requesting technical support).

我司商标与联系方式以及地址。

This screen displays the manufacturer's trademark, contact information, and address.

【主页】：进入主画面按键

[Home]: This button is used to access the Home screen.

3、主画面

3. Home Screen

(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)显示当前文件名称。

(2) File: Display the title of the current file.

(3)显示已生产总数量。（使用产量清零按键清零或满 99999999 自动清零）

(3) Output: Display the total production count. (Use the Clear Output button or auto-clears at 99999999).

(4)设置送螺钉时间。

(4) Screw Feeding Time: Set the screw feeding time.

(5)设置循环启动的时间。

(5) Auto Start Delay: Set the time delay between each cycle of automatic starts.

(6)显示总螺丝孔位。

(6) Total Screw Positions: Display the total number of screw positions.

(7)显示当前锁付孔位。

(7) Current Screw: Display the current locking position.

(8)显示锁付消耗的时间。

(8) Unit Time Consumption: Display the time consumed for the locking cycle.

(9)设置从那个开始孔位和到那颗螺丝结束孔位。

(9) Start Screw/End Screw: Set the start and end screw positions.

(10)自手动切换按钮(空闲中才能切换)。

(10) Manual/Auto Button: Switch between manual and automatic mode (available only when the system is idle).

(11)产量清零按键。（系统空闲下长按 5 秒）

(11)Clear Output Button. (Hold for 5 s in idle state).

(12)复位系统按键。（系统空闲下单击）

(12) Reset Button: Reset the machine. (Click only in idle state).

(13)清除报警按键。

(13) Clear Alarm Button: Clear alarm messages.

(14)报警弹出按键。

(14) Alarm Message Button: Display pop-up alarm messages.

(15)系统停止按键。

(15) Stop Button: Stop the machine.

(16)锁付不良检测按钮。

(16) Torque Check ON/OFF Button: Check locking defects.

(17)保存按键。

(17) Save Button.

(18)送钉按键。（系统空闲下单击）

(18) Feed Button. (Click only in idle state).

(19)返回主页按键。

(19) Return to home button.

(20)进入文件设置画面。

(20) File: Enter the file settings screen.

(21)进入系统设置画面按键。

(21) System Settings: Enter the system settings screen.

(22)进入调试坐标画面按键。

(22) Teach: Enter the configuration coordinates screen.

(23)进入控制器输入输出画面按键。

(23) System Diagnostics: Enter the controller input/output screen.

(24)进入机械参数画面按键。

(24) Mechanical Parameters: Enter the mechanical parameters screen.

(25)进入厂家联系信息画面。

(25) Contact Information: Enter the manufacturer's contact information screen.

(26)进入批头型号画面按键。

(26) Bit Model: Enter the screwdriver bit model screen.

(27)进入系统升级画面按键。

(27) Software Upgrade: Enter the system upgrade screen.

(28)显示螺钉有没有。

(28) No Screw: Display the current screw presence.

(29)系统状态显示。（空闲、工作中、复位中）。

(29) Idle: Display the current status of the machine. (Idle/running/resetting).

(30)控制器跟触摸屏连接状态

(30) PLC Communication: Abnormal: Display the connection status between the controller and the touchscreen.

4、基本参数画面

4. Basic Parameters Screens

(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)设置轴空移速度。

(2) No-Load Speed: Set the axis travel speed under no-load conditions.

(3)设置轴运行速度。

(3) Operating Speed: Set the axis travel speed under operating conditions.

(4)伺服扭螺丝扭矩(示教每个孔位扭矩设置为 0 时候用这个扭矩)。

(4) Locking Torque: Set the servo torque for screw tightening. (This default torque is applied when the value for an individual screw position is set to 0 during teaching).

(5)伺服扭螺丝速度。

(5) Locking RPM: Set the servo speed for screw tightening.

(6)设置下料臂等待位置。

(6) Arm Standby Position: Set the standby position of the arm.

(7)设置下料臂放料位置。

(7) Arm Unloading Position: Set the unloading position of the arm.

(8)设置下料臂安全位置(左边抓取移动的时候，会碰撞到右边产品时候，才使用、小于安全位置时候，右边 Y 轴才能移动到下料位置)。

(8) Arm Safety Position: Set the safety position of the arm. (This setting is used to prevent collisions during left-side operations. The right Y-axis can only move to the unloading position when it is below the safety position).

(9)出现故障是否报警提示按钮

(9) Alarm Switch: Enable/Disable the alarm prompt function.

(10)出现故障是否暂停或者不停止运行。

(10) Error Response: Pause or continue the current operation in case of error.

(11)下料臂开关。

(11) Auto Unloading: Enable/Disable the arm unloading function.

(12)放产品时候，下料臂是否下降放产品。

(12) Unloading & Descending: Enable/Disable the descent movement of the arm during unloading.

(13)左平台预压气缸开关。

(13) LH Pre-Compression: Enable/Disable the left platform pre-compression cylinder.

(14)右平台预压气缸开关。

(14) RH Pre-Compression: Enable/Disable the right platform pre-compression cylinder.

(15)返回主画面按键。

(15) Exit: Return to the Home screen.

(16)进入基本参数画面按键。

(16) Basic Parameters: Enter the basic parameters screen.

(17)进入锁付参数画面按键。

(17) Locking Parameters: Enter the locking parameters screen.

(18)进入时间参数画面按键。

(18) Time Parameters: Enter the time parameters screen.

(19)进入权限密码修改窗口按键。

(19) Change Password: Enter the password settings screen.

(20)调试好参数保存按键。

(20) Save Button: Save configured parameters.

5、锁付参数画面

5. Locking Parameters Screen

(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)左平台参数。

(2) Left Platform: This section pertains to the left platform parameters.

(3)右平台参数。

(3) Right Platform: This section pertains to the right platform parameters.

(4)自动时候、Z 轴上抬到安全位置后 XY 方可允许定位。

(4) Z-Axis Safety Position: In automatic mode, the X and Y movements are only allowed after the Z-axis retracts to the safety position.

(5)当前单个孔位锁付时间。

(5) Current Locking Time: Display the time for the current locking cycle.

(6)锁付螺钉的最大用时，超过此时间未接收到扭力反馈信号则为滑牙。

(6) Max Locking Time: Set the maximum time for locking a screw. If no torque feedback is received after this time, it indicates a stripped screw.

(7)锁付螺钉的最小用时，未达到最小时间接收到扭力反馈则为浮锁。

(7) Min Locking Time: Set the minimum time for locking a screw. If the torque feedback is received before the minimum time, it indicates a floating lock.

6、时间参数画面

6. Time Parameters Screen

(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)设置屏保时间。

(2) Screen Saver Time: This refers to the activation time for the screen saver.

(3)锁付完成后延时此时间后 Z 轴再上升。

(3) Z-Axis Retract Delay: This refers to the delay time before the Z-axis retracts after the locking cycle is completed.

(4)锁付完成后升降气缸上升同时计时送钉启动时间，启动时间到达开始送钉。

(4) Screw Feed Delay: While the Z-axis retracts after completing the locking cycle, the timer for screw feeding begins. When the set time is reached, the feeding cycle starts.

(5)预压气缸压住产品时间。

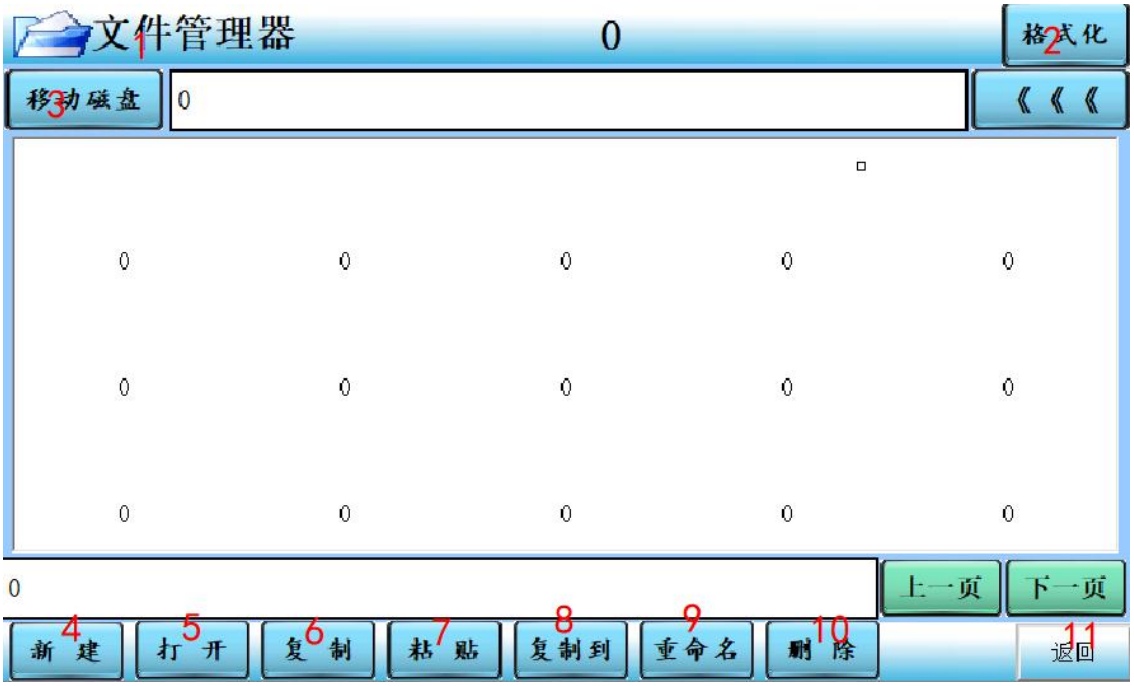
(5) Pre-Compression Hold Time: This refers to the duration for which the pre-compression cylinder applies pressure to hold a product.

(6)预压气缸打开时间。

(6) Pre-Compression Release Time: This refers to the duration for which the pre-compression cylinder remains in the release position.

7、文件管理

7. File Manager Screen



(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)格式化(使用权限【管理员】密码：123456 操作)。

(2) Format: (Administrator permission level required; Password: 123456).

(3)选择本地或者 U 盘。

(3) Removable Drive: This field is used to select the local or USB drive.

(4)新建文件(不能重复相同文件，否则无效)。

(4) New: Create a new file (duplicate file names are invalid).

(5)打开选中的文件。

(5) Open: Open the selected file.

(6)复制(配合 U 盘使用、点击需要的文件点击复制、在点下移动磁盘、点击粘贴、再修改文件名称)。

(6) Copy (for USB drive): Select the desired file, click Copy → Removable Drive → Paste, then rename the file).

(7)粘贴复制的文件。

(7) Paste: Paste the copied file.

(8)把文件复制到另外一个硬盘里面。

(8) Copy To: Copy the file to another drive.

(9)更改选中文件的名称。

(9) Rename: Rename the selected file.

(10)删除选中的文件。

(10) Delete: Delete the selected file.

(11)返回主画面。

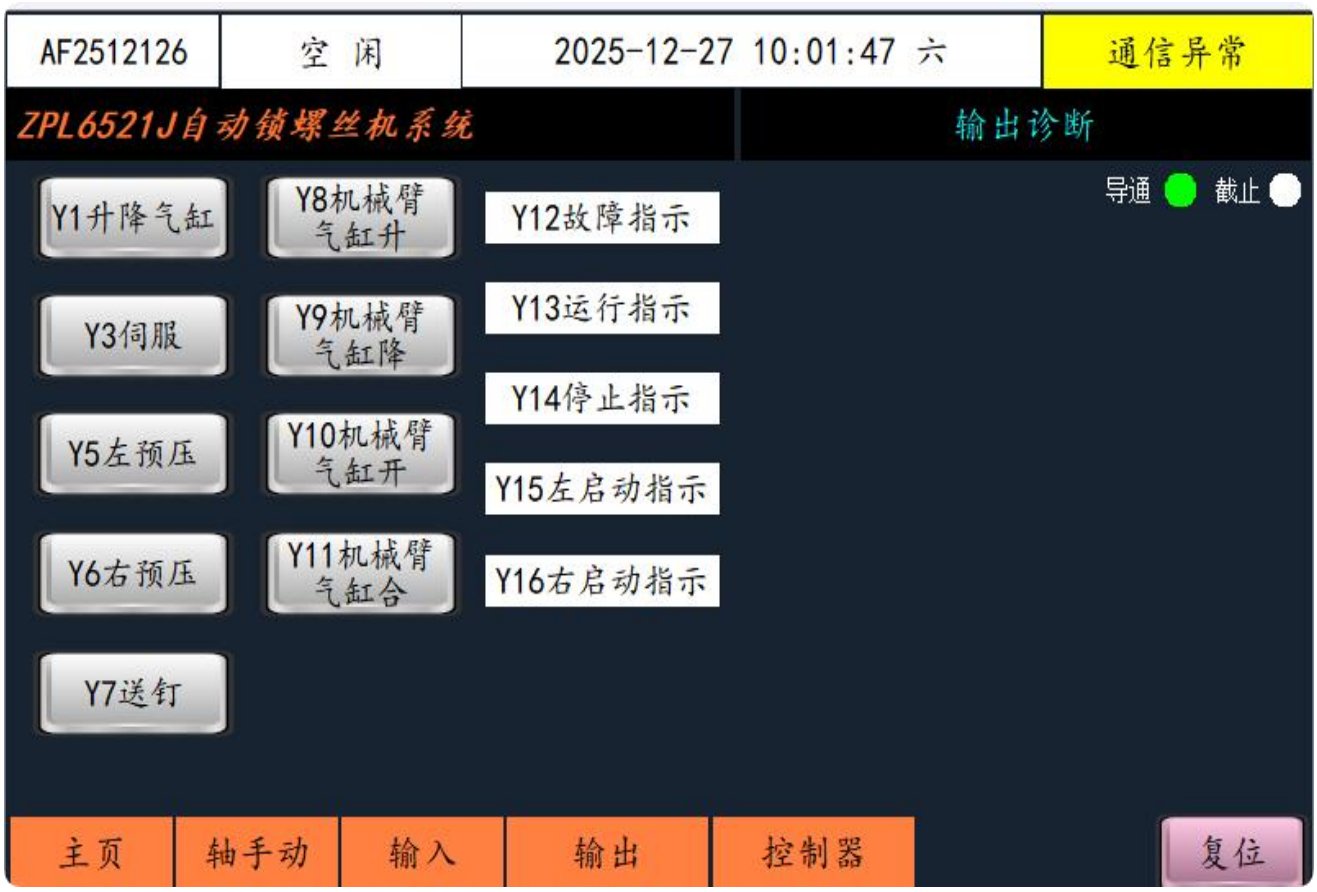
(11) Back: Return to the Home screen.

8、系统诊断画面

8. System Diagnostics Screen


AF2512126
空 闲
2025-12-27 10:00:29 六
通信异常
ZPL6521J自动锁螺丝机系统
轴诊断
导通
截止
EL1-
0.00
X-
X+
EL2-
0.00
左Y-
左Y+
EL3-
0.00
Z-
Z+
EL4-
0.00
右Y-
右Y+
EL5-
0.00
J-
J+
低 速
4
1
2
3
主页
轴手动
输入
输出
控制器
复位


AF2512126
空 闲
2025-12-27 10:01:09 六
通信异常
ZPL6521J自动锁螺丝机系统
输入诊断
导通
截止
X2_急停
X3_复位
X4_暂停
X5_左启动
X6_右启动
X7_扭力检测
X13_螺钉到位信号
X15_升降气缸上磁环
X19_机械臂气缸上磁环
X20_机械臂气缸下磁环
X21_机械臂气缸开磁环
X22_机械臂气缸合磁环
X23_驱动故障信号
主页
轴手动
输入
输出
控制器
复位



(1)轴原点(灰色未检测原点、黄色检测到原点)。

(1) Axis Home Indicator (Gray: Not detected, Yellow: Detected).

(2)当前坐标位置。

(2) Current Coordinate.

(3)轴运行方向

(3) Axis Movement Direction.

(4)XYZJ 轴手动移动速度切换。

(4) Slow Button: Select the manual movement speed for the X, Y, Z and J axes.

(5)输入诊断:当前输入点位的状态显示。（红色无信号，绿色有信号）

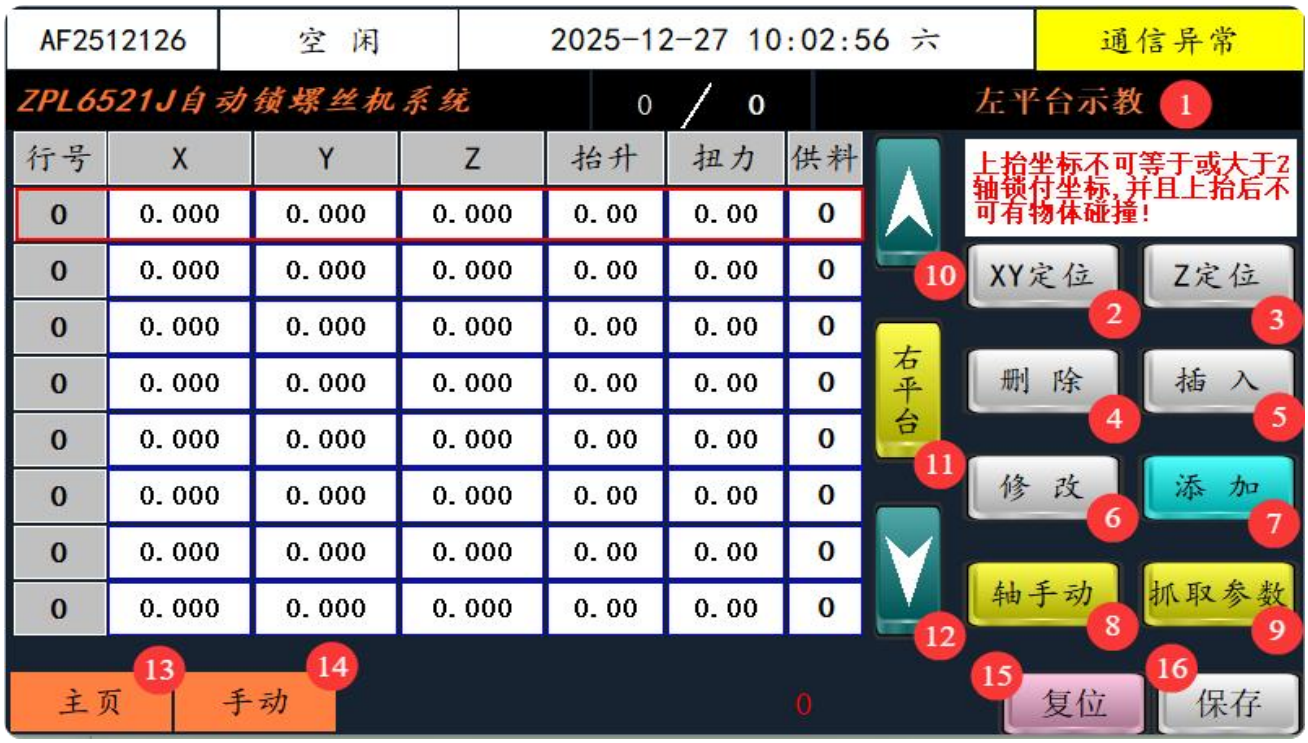
(5) Input Diagnostics: Display the status of the current input position. (Red: No signal, Green: Signal present).

(5)输出诊断:当前输出点位的状态显示。（白色无信号，绿色有信号）

(6) Output Diagnostics: Display the status of the current output position. (White: No signal, Green: Signal present).

9、左平台

9. Left Platform



(1)显示当前画面名称。

(1) Title: Display the title of the current screen.

(2)XY 轴定位到选中目标行坐标。

(2) XY Positioning: Move the X and Y axes to the selected coordinates.

(3)Z 轴定位到选中目标行坐标。

(3) Z Positioning: Move the Z-axis to the selected coordinate.

(4)删除选中行，后面行数自动上移补齐。

(4) Delete: Delete the selected row; subsequent rows automatically shift up.

(5)在选中行下方插入新的一行，后面行数自动往后移。

(5) Insert: Insert a new row below the selected row; subsequent rows automatically shift down.

(6)将 XYZ 轴当前坐标写入选中行对应坐标。

(6) Change: Write the current X, Y and Z coordinates to the selected row.

(7)添加 XYZ 坐标到最后一行。

(7) Add: Add the current X, Y and Z coordinates to the last row.

(8)进入轴手动画面按键。

(8) Manual Axis Movement: Enter the manual axis movement screen.

(9)进入下料臂参数画面按键。

(9) Pick-Up Parameters: Enter the arm parameters screen.

(10)上页。

(10) Up Arrow: Scroll to the previous page.

(11)进入右平台示教画面按键。

(11) Right Platform: Enter the right platform teach screen.

(12)下页。

(12) Down Arrow: Scroll to the next page.

(13)返回主画面。

(13) Back: Return to the Home screen.

(14)进入手动按钮画面按键。

(14) Manual: Enter the manual buttons screen.

(15)复位系统按键。

(15) Reset: Reset the machine.

(16)保存参数按键。

(16) Save: Save the configured parameters.

注意:复位完成，才能修改坐标，坐标修改后一定要点击保存

IMPORTANT: System reset is required before coordinate modification. Always click Save after modifications.

10、右平台

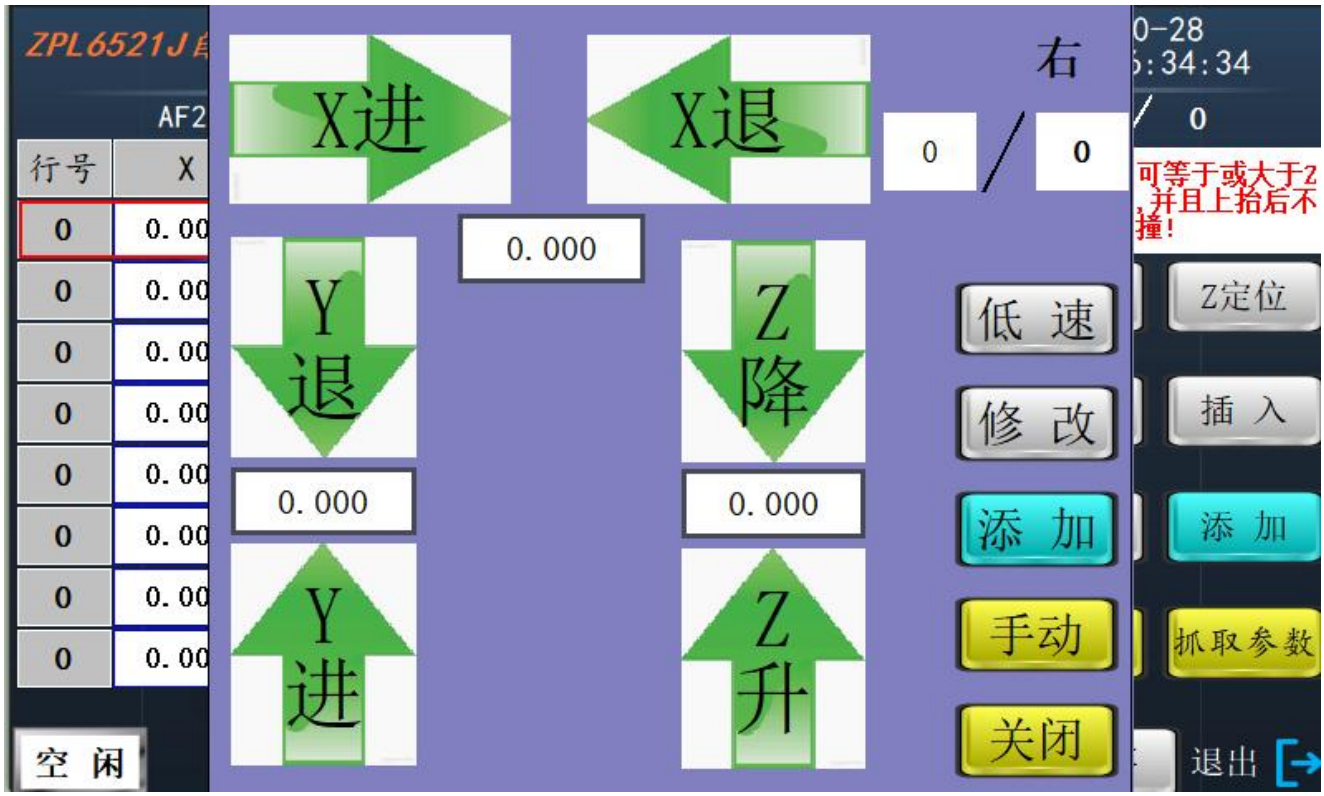
10. Right Platform

同左平台一样

Configuration and functions are identical to the left platform.

11、轴手动

11. Manual Axis Movement



轴运行按钮

Axis Movement Buttons

12、下料参数

12. Unloading Parameters Screen

添加抓取产品坐标

Add product pick-up coordinates.

13、手动按钮

13. Manual Buttons

(1)升降气缸升降按键。

(1) Lifting Cylinder: Press this button to move the lifting cylinder up or down.

(2)启动伺服批按键。

(2) Servo: Press this button to start the servo screwdriver.

(3)左预压气缸按键。

(3) LH Pre-Compression: Press this button to enable or disable the left pre-compression cylinder.

(4)右预压气缸按键。

(4) RH Pre-Compression: Press this button to enable or disable the right pre-compression cylinder.

(5)送螺钉按键。

(5) Feed: Press this button to activate the screw feeding process.

14、警讯

14. Alarm Message

(1)左平台在锁螺丝不良出现报警、按重锁、重新锁当前孔位。

(1) LH Re-Lock: Press this button to re-tighten the current screw in the event of a locking defect on the left platform.

(2)左平台在锁螺丝不良出现报警、按跳过锁付下个孔位。

(2) LH Skip: Press this button to skip the current screw in the event of a locking defect on the left platform.

(3)系统复位按钮

(3) Reset: Press this button to reset the machine.

(4)右平台在锁螺丝不良出现报警、按重锁、重新锁当前孔位。

(4) RH Re-Lock: Press this button to re-tighten the current screw in the event of a locking defect on the right platform.

(5)右平台在锁螺丝不良出现报警、按跳过锁付下个孔位。

(5) RH Skip: Press this button to skip the current screw in the event of a locking defect on the right platform.

(6)停机按钮。

(6) Stop: Press this button to stop the machine.

(7)返回主画面按钮。

(7) Close: Press this button to return to the Home screen.

(8)清除报警按钮。

(8) Clear Alarm: Press this button to clear alarm messages.

(9)送钉失败后再按下送钉按钮。

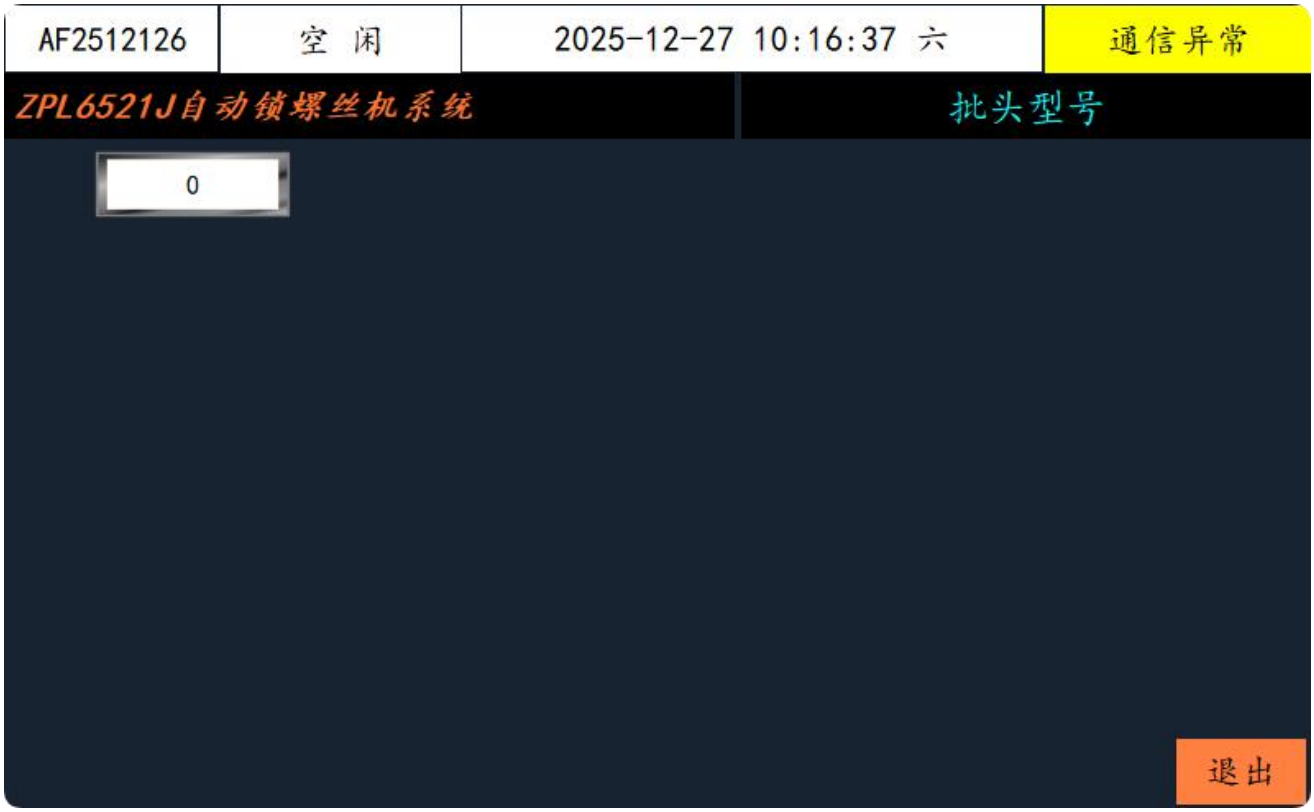
(9) Feed Screw: Press this button to feed screws after a feeding failure.

(10)显示当前画面名称。

(10) Title: Display the title of the current screen.

15、批头型号画面

15. Bit Model Screen



批头型号。（出厂已设置，可根据此型号购买批头）

Screwdriver bit model. (Factory preset. Reference this model number when ordering replacements).

十一、报警信息原因分析

XI. Alarm Analysis

序号 Code	内容 Alarm Message
1	无工件 No Workpiece
2	送钉失败 Feeding Failure
3	左锁螺纹浮锁 Left Floating Lock
4	右锁螺纹浮锁 Right Floating Lock
5	左锁螺纹滑牙

	Left Stripped Screw
6	右锁螺纹滑牙 Right Stripped Screw
7	驱动故障 Driver Failure
8	超极限报警 Overtravel Alarm

(1)没有放产品或者输入线路断线。

(1) No product is present or the input wiring is disconnected.

(2)螺丝没有送过来，检查供料器是否正常或者输入线路断线。

(2) No screw is fed; check if the feeder is functioning normally or if the input wiring is disconnected.

(3)-(6)锁付螺丝滑丝或者漏锁，若无滑丝和漏锁进入 I/O 画面观察扭力检测信号是否正常，或者输入线路断线。

(3)-(6) Stripped threads or missed locking; check if the torque signal is normal in the I/O screen or if the input wiring is disconnected.

(7)XYZ 驱动发生故障，驱动红灯闪烁，或者输入 X 驱动故障与 OV 短路造成报警。

(7) X/Y/Z drive failure (red indicator); or input X drive failure and OV short-circuit.

(8)设置的相应坐标超出最大行程，重新设置即可。

(8) The set coordinates exceed the maximum travel; reset coordinates correctly.

十二、故障以及处理

XII. Troubleshooting

1、系统不能启动：检查启动条件输入线路和外部硬件；启动条件如下：半自动模式、启动按钮指示灯处于熄灭状态、机械臂正好位于等待位置上时机械臂升降气缸必须在上位并输入点有信号、系统无报警发生、系统复位完成、锁付升降气缸上磁环有信号、启动按钮按下。（系统无法启动时会有对应条件报警信息弹出）

1. System Fails to Start: Check if the input wiring and external hardware meet start conditions. Prerequisites Check: Operation mode set to Semi-Auto; Start button indicator off; robotic arm in Standby position (lifting cylinder raised with signal); no active alarm present; system reset successfully; locking cylinder magnetic ring signal detected; Start button activated. (Alarm messages will automatically appear when abnormalities are detected.)

2、系统复位没有反应：首先切换到手动、按每个轴会不会正常运行、不能的话、按下每一个轴+-当前坐标会不会变化、能变化检查脉冲方向线是否松掉、电压是否正常。

2. No Response to Reset: Switch to manual mode and test the movement of each axis individually. If it is still unresponsive, check if the axis coordinates change when using the +/- controls. If so, verify that the pulse direction wiring is secure and that the power supply voltage is normal.

3、XYZJ 轴后退时冲过原点感应：检查原点传感器和输入线路

3. Axis Fails to Stop at Home Position during Retraction: Check the home position sensor and the input wiring.

4、锁付升降气缸不能上下动作：首先查看对应输出点是否输出，检查控制电磁阀以及输出线路，检查气源。

4. Locking Cylinder Fails to Move Up/Down: Verify if the controller output is active. Inspect solenoid valve operation and output wiring. Verify that the air supply is functioning properly.

5、伺服不启动:首先查看伺服批输出点是否输出，检查伺服控制输出线路；伺服没有通讯上，检查通讯线是否导通、修改转速和扭距会不会变化、通讯账号是否按顺序来、没有重复、波特率是否正确;伺服驱动是否报警。

5. Servo Fails to Start: Check if the servo screwdriver output is active. Then, inspect the servo control output wiring. If there is no communication signal, verify that the communication cable is connected properly. Verify parameter modifications (e.g., RPM and torque) are applied successfully. Verify the communication address assignment follows the correct sequence and contains no duplicates. Validate the baud rate configuration. Check for any servo drive alarms.

6、锁付完成不送螺钉：检查送钉机是否卡螺钉，送钉机的电源气源是否正常。

6. No Screw Feeding after Locking: Check for jammed screws in the feeder. Verify that the power and air supply to the feeder are functioning properly.

7、下料臂不工作：查看系统设置-基本参数中下料功能是否启用。

7. Arm Inactive: Navigate to System Settings > Basic Parameters and ensure the unloading function is enabled.

8、下料臂抓取产品后不能上升：检查夹紧产品后是否与治具之间卡死，然后查看机械臂升降气缸上升输出点是否输出，检查控制电磁阀以及输出线路，检查气源。

8. Arm Fails to Retract after Pick-Up Operation: Check if the fixture is jammed after a product is picked up. Verify if the elevation output of the robotic arm lifting cylinder is active. Inspection the control solenoid valve and output wiring. Verify that the air supply is functioning properly.

9、下料臂升降气缸不能升降动作：首先查看对应输出点是否输出，检查控制电磁阀以及输出线路，检查气源。

9. Arm Lifting Cylinder Fails to Move Up/Down: Verify if the corresponding output is active. Inspect solenoid valve operation and output wiring. Verify that the air supply is functioning properly.

10、下料臂手指不能动作：首先查看对应输出点是否输出，检查控制电磁阀以及输出线路，检查气源。

10. Gripper Inactive: Verify if the corresponding output is active. Inspect solenoid valve operation and output wiring. Verify that the air supply is functioning properly.

11、下料臂到放料位后不放产品：检查手指气缸动作是否正常。

11. Arm Fails to Release Product in Unloading Position: Check the gripper cylinder for normal operation.

提示：当系统出现异常时都会弹出对应报警信息，可根据信息处理故障。

NOTE: Alarm messages will automatically appear to guide troubleshooting when abnormalities are detected.

十三、设备保养

XIII. Machine Maintenance

1、工作结束后应关闭电源和气源，并打扫干净设备上的灰尘清扫掉落的螺钉等物体。

1. After work, turn off the power and air supply; then clean the machine and remove any dust or loose screws.

2、定期给各轴直线导轨加防锈耐高温润滑导轨油(建议一月一次)注：加油不能太 多（T32#导轨油）。

2. Apply anti-rust, high-temperature-resistant lubricant to the linear guides on a regular basis (preferably once a month). NOTE: Avoid over-lubrication (T32# rail oil).

3、定期检查设备上的所有紧固螺丝有无松动。

3. Check all fastening screws on the machine for looseness on a regular basis.

4、定期检查皮带是否磨损。

4. Check the belts for wear on a regular basis.

5、在设备长期不使用的情况下应保养一次并用缠绕膜包好放在干燥的环境中。

5. If the machine is not used for an extended period, perform maintenance, then wrap the machine with protective film and store it in a dry environment.