

SGS-600系列 SGS-600 Series

开放式锁螺丝机器人 Integrated Intelligent Tightening Robot



扫码查看公众号



扫码查看视频号

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智能锁螺丝机器人

Intelligent Robotic Screw Fastening System

专为锁螺钉应用开发的机器人

Robot specifically developed for screw fastening applications



智

高智能
High Intelligent

产能数据采集
Production Capacity Data Acquisition
良率数据分析
Yield Rate Data Analytics
锁付数据追溯
Fastening Process Data Traceability
实时监控报警
Real-time Monitoring & Alarm

速

高效率
High Efficiency

高效拧紧工艺
High-Efficiency Tightening Process
高效锁钉节拍
High-Speed Fastening Cycle
高效即用即装
Plug-and-Play Integration
高效快捷调试
Rapid Commissioning

准

高精度
High Precision

新型扭矩算法
Advanced Torque Control Algorithm
高精度传感器
High-Precision Sensors
精准扭矩反馈
Precision Torque Feedback
智能角度控制
Intelligent Angle Control

易

易上手
Easy to use

工艺简单易懂
User-Process Intuitiveness
操作简单便捷
Simplified Operation
人机交互优越
Superior HMI Visual
编程可视显示
Programming Interface

专

高专业
High Professional

专注螺丝拧紧
Focus on tightening the screws
专业技术咨询
Professional Technical Consulting
专业工艺对接
Specialized Process Integration
专职研发团队
Dedicated R&D Team

应用场景：小家电、军工、汽车电子、医疗、新能源、通讯、3C等行业
Application Scenarios: Home appliances, military industry, automotive electronics, medical, new energy, telecommunications, 3C and other industries.

01

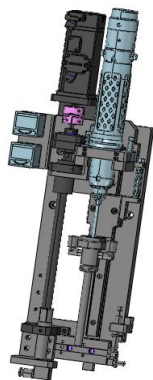
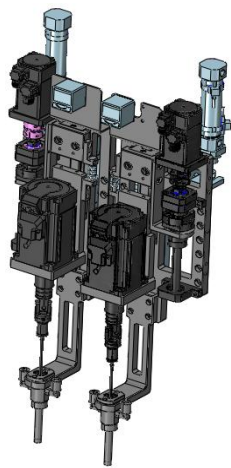
应用场景 Application Scenarios



SDF系列智能拧紧螺丝刀

SDF Series Intelligent
Tightening Screwdriver

SDP系列伺服拧紧螺丝刀

SDP Series Intelligent
Tightening Screwdriver

汇川伺服拧紧轴
Inovance Servo Tightening Axis
嘉孚朗拧紧枪
JFL Tightening Gun
德派拧紧枪
DEPRAG Tightening Gun
阿特拉斯
Atlas Copco
马头拧紧枪
Desoutter Tightening Gun
丹尼克爾
Danikor

支持多品牌
Sup for many
brands

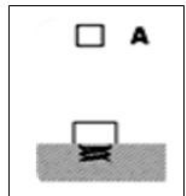
单头或双头
Single or Dual-Head

吸式，吹式，吹+吸
Suction-Type, Blow-Type, Blow+Suction Hybrid

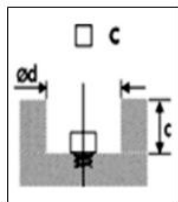
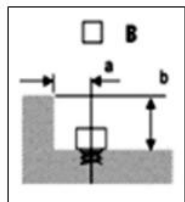
点胶，装配，替代直角坐标模组等
Dispensing, Assembly - Replacing Cartesian
Coordinate Modules and More

专为非标而生替代直角坐标式锁螺丝机
Born for Non-Standard Applications Replacing Cartesian
Coordinate Screw Fastening Machines

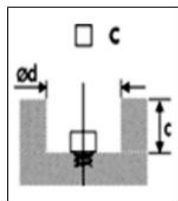
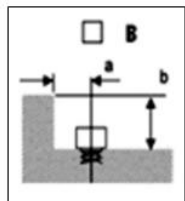




螺丝无沉孔、螺孔周边无干涉
No countersink for the screw; no interference around the screw hole



沉孔螺丝、螺孔周边干涉
Countersunk screw and interference around the screw hole



沉孔螺丝、螺孔周边干涉
Countersunk screw and interference around the screw hole

吹气式供螺丝

适用无干涉螺孔

节拍：约1.5-2秒/颗（全过程）

螺丝长径比满足：1:1.3（帽头/全长）

适用螺钉：M2-M6*20mm及以下长度

Blow-Fed Screw Feeding System:

Suitable for Unobstructed Screw Holes

Cycle Time: Approx. 1.5-2 seconds per screw (full process)

Screw Head-to-Length Ratio Requirement: $\geq 1:1.3$ (head diameter / total length)

Compatible Screw Sizes: M2-M6, up to 20mm in length

吸取式供螺丝

适用深孔螺丝、螺孔周边干涉

节拍：约3秒/颗（全过程）

兼容螺丝帽头最大直径:8mm

适用螺钉：M1-M5*20mm及以下长度

Vacuum Pick-Up Screw Feeding System:

Suitable for Deep Screw Holes and Interference-Prone Surroundings

Cycle Time: Approx. 3 seconds per screw (full process)

Max Compatible Screw Head Diameter: 8mm

Compatible Screw Sizes: M1-M5, up to 20mm in length

吹加吸式供螺丝

适用深孔螺丝、螺孔周边干涉

节拍：约2.5秒/颗（全过程）

兼容螺丝帽头最大直径:8mm

螺丝长径比满足：1:1.3（帽头/全长）

适用螺钉：M2-M6*20mm及以下长度

Blow-and-Vacuum Hybrid Screw Feeding System:

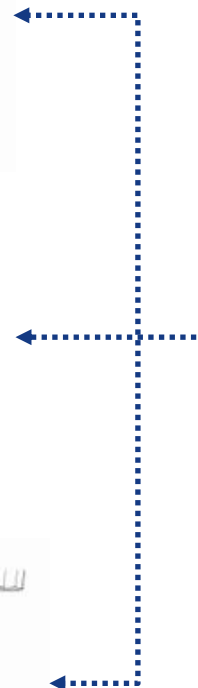
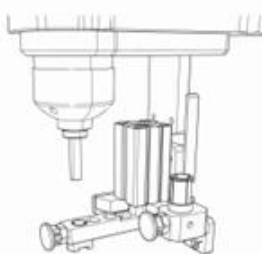
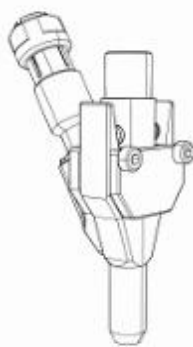
Suitable for Deep Screw Holes and Interference-Prone Surroundings

Cycle Time: Approx. 2.5 seconds per screw (full process)

Max Compatible Screw Head Diameter: 8mm

Minimum Required Screw Head-to-Length Ratio: 1:1.3

Compatible Screw Sizes: M2-M6, up to 20mm in length



备注：加长，加粗，非常规类型的螺丝，需提供20颗螺丝和产品实物评估

Note: For extended, oversized, or non-standard screws, 20 sample screws and actual product parts must be provided for evaluation.

气吹式供料器 Air-Blow Screw Feeder

层级推料方式上料至直线轨道，推料机构动力采用气缸，节能降噪；超大料仓容量，有效容积可达3L-4L，可放置螺丝例M3*10) 近1000-6700颗。

Layered Pushing Mechanism: Screws are fed onto the linear track using a tiered pushing method powered by a pneumatic cylinder, offering energy efficiency and noise reduction.
High-Capacity Hopper: Effective volume of 3-4 liters, capable of holding approximately 1,000 to 6,700 screws (e.g., M3×10).



支持选配视觉相机 Supports Optional vision camera

支持Socket通讯
坐标数据交互
Supports Socket communication for
coordinate data exchange.



智能扭力测试仪 Intelligent Torque Tester

人工预先编好校准扭矩程序，按启动
可进行扭矩校验。
Pre-programmed with calibration torque
settings; start to perform torque verification.



气吸式供料器 Vacuum Pneumatic Feeder

适用 M1.0-M6.0 螺丝

有卡料反转和故障报警功能。

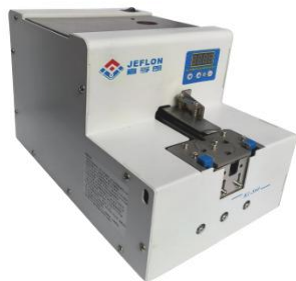
有信号输出配合自动机使用，重复定位精度±0.02mm。

Suitable for screws from M1.0 to M6.0.

Equipped with jam reversal and fault alarm functions.

Provides signal output for integration with automation equipment.

Repeat positioning accuracy: ±0.02 mm.



工控电脑 Industrial PC

运行上位机系统

采集存储螺丝拧紧数据和对接MES

Runs the upper-level control system
Collects and stores screw tightening data

Interfaces with MES (Manufacturing Execution System).



读码器/扫码枪 Barcode Reader / Scanner

读取产品一维码或者二维码
Read product 1D barcodes or QR codes



自动换头机构 Automatic Tool Change Mechanism

自动换头机构，采用创新的组合式设计，让开放式机器人能实现快速自动换头（吸嘴批头），且针对不同螺钉，锁付工艺能灵活切换。

The automatic tool change mechanism features an innovative modular design, enabling open robots to perform fast and automatic tool changes (suction nozzles and screwdriver bits). It allows flexible switching between different screw types and fastening processes.



应用场景

Application Scenario

- 多规格螺丝锁付难题**：生产制造中，单产品需锁付两种规格螺钉的情况屡见不鲜。一方面，螺丝差异大，批头吸嘴根本没法通用；另一方面，两种螺丝扭矩跨度大，同一电批根本无法兼容。传统做法是一种螺丝或一个扭矩区间配备一台设备，这无疑大幅增加了厂家的投入成本。
- In manufacturing, it is common for a single product to require fastening two different screw specifications. On one hand, the screw differences are significant, making the screwdriver bits and suction nozzles incompatible. On the other hand, the torque range between the two screws is large, and one electric screwdriver cannot accommodate both. The traditional solution is to equip one device per screw type or torque range, which significantly increases the manufacturer's investment cost.

优势亮点

Key Advantages

- 自动模组切换**：开放式双头锁螺丝机器人，采用双挂枪模组设计。左右模组可自由切换，全程无需人工介入，轻松实现同一工站完成两种螺钉的锁付任务，节省设备投入及人工成本。

Automatic Module Switching:

The open dual-head screw locking robot features a dual-gun module design. The left and right modules can be switched freely without manual intervention, allowing one workstation to complete fastening tasks for two different screws easily, saving both equipment investment and labor costs.

- 灵活工艺切换**：针对不同扭矩的螺钉，其锁付工艺存在差异。该机器人可在电批扭矩允许范围内，智能自动地切换扭矩及锁付工艺，确保每种螺丝都能以最佳工艺完成锁付，保障产品质量。

Flexible Process Switching:

Different screws require different fastening processes due to torque variations. Within the allowable torque range of the electric screwdriver, this robot intelligently and automatically switches torque and fastening processes, ensuring each screw is fastened optimally to guarantee product quality.

- 开放组合设计**：以开放式锁螺丝机为本体，可根据需求指定不同品牌电批进行组合安装。其强大的锁付能力，最大可锁付 20N.m（需提供样品验证），满足多样化的生产需求，为企业提供了更具灵活性和性价比的解决方案。

Open Modular Design:

Based on an open screw locking machine platform, it supports combination installation with electric screwdrivers of various brands as needed. Its powerful fastening capability can handle up to 20 N·m (subject to sample verification), meeting diverse production requirements and offering enterprises more flexibility and cost-effectiveness.

- 视觉定位系统**：可选配视觉定位系统。

Optional Vision Positioning System:

A vision positioning system can be optionally configured for enhanced accuracy.



应用场景 Application Scenario

●多规格螺丝锁付难题：在生产中，当面临单产品或多产品需锁多种规格螺丝，且螺丝差异性大，导致批头吸嘴无法兼容，传统做法是一种螺丝配备一台设备，这无疑大幅增加了厂家的投入成本。

In production, when a single or multiple products require fastening screws of various specifications with large differences, the incompatibility of screwdriver bits and suction nozzles becomes a common challenge. The traditional approach is to assign one device per screw type, which significantly increases the manufacturer's investment cost.

优势亮点 Key Advantages

●智能自动换头：自动换头锁螺丝机器人的吸嘴批头采用创新的组合式设计。在锁付进程中，设备能够自动、快速地完成换头操作，全程无需人工介入，极大提升了生产效率，降低人工成本。

Intelligent Automatic Tool Change:

The automatic tool-changing screw fastening robot features an innovative modular design for suction nozzles and screwdriver bits. During the fastening process, the device can automatically and quickly complete tool changes without manual intervention, greatly improving production efficiency and reducing labor costs.

●灵活工艺切换：针对不同规格的螺钉，其锁付工艺存在差异。该机器人可在电批扭矩允许范围内，智能自动地切换扭矩及锁付工艺，确保每种螺丝都能以最佳工艺完成锁付，保障产品质量。

Flexible Process Switching:

Different screw specifications require different fastening processes. Within the allowable torque range of the electric screwdriver, this robot intelligently and automatically switches torque and fastening processes to ensure that each screw is fastened with the optimal method, guaranteeing product quality.

●开放组合设计：以开放式锁螺丝机为本体，可根据需求指定不同品牌电批进行组合安装。其强大的锁付能力，最大可锁付 20N.m（需提供样品验证），满足多样化的生产需求，为企业提供了更具灵活性和性价比的解决方案。

Open Modular Design:

Built on an open screw fastening machine platform, it supports integration with electric screwdrivers of various brands as needed. With a powerful fastening capability of up to 20 N·m (subject to sample verification), it meets diverse production demands and provides enterprises with a more flexible and cost-effective solution.



06 功能 Functions

备注/Note:

*1 不同螺钉会有差异

*2 每组程序可编辑2000颗螺钉点位

*1 Differences may occur depending on the type of screw.

*2 Each program group can store up to 2,000 screw fastening points.

功能:

- ◇ SCARA机械手运动控制软件, 支持点, 直线运动
- ◇ 预置锁螺钉工艺包, 兼容气吸式/气吹式/吹加吸式锁付工艺
- ◇ 支持复锁, 废料点, 停机点, 路径点, 跟随锁付
- ◇ 智能伺服拧紧螺丝刀, 支持多扭矩锁付, 扭矩一键校准
- ◇ 工艺设置, 支持浮锁, 滑牙, OK智能判断,
- ◇ 水平多关节机械手机构, 轻松驾驭各种空间
- ◇ 兼容气吸/气吹式螺钉供料器
- ◇ 支持IO输入、输出、等待、逻辑控制功能;
- ◇ 支持与上位机通讯, 传递生产数据(数据和方式详询)
- ◇ 安全防护接口(急停, 光栅, 门磁, 暂停)
- ◇ 支持相机引导定位(详见第17项)
- ◇ RJ45网口1: 支持Ethercat扩展
- ◇ RJ45网口2: 支持Modbus-RTU(主机)/RS-485
- ◇ RJ45网口3: 支持EthernetTCP
- ◇ 串口: 输入25Pin, 输出15Pin;(IO数量见IO表)
- ◇ USB接口: U盘

Functions:

- ◇ SCARA Robot Motion Control Software: Supports point-to-point and linear motion.
- ◇ Built-in predefined screw-fastening process packages, compatible with vacuum pick (air suction), air-blow, and blow+vacuum combined feeding processes.
- ◇ Supports re-tightening, waste screw points, stop points, path points, and follow-screw fastening.
- ◇ Equipped with an intelligent servo screwdriver, enabling multi-torque fastening and one-touch torque calibration.
- ◇ Process logic includes floating screw detection, stripped thread detection, and OK/NG smart judgment.
- ◇ Utilizes horizontal articulated (SCARA) arm structure, easily adaptable to complex spatial orientations.
- ◇ Compatible with air-suction and air-blow type screw feeders.
- ◇ Supports I/O input/output, wait, and logic control functions.
- ◇ Communicates with host systems to transmit production data (data type and method available upon request).
- ◇ Includes safety protection interfaces: emergency stop, light curtain, door sensor, and pause.
- ◇ Supports vision-guided positioning (see item 17 for details).
- ◇ RJ45 Port 1: Supports EtherCAT expansion.
- ◇ RJ45 Port 2: Supports Modbus-RTU (Master) / RS-485.
- ◇ RJ45 Port 3: Supports Ethernet TCP.
- ◇ Serial Port: 25-pin input, 15-pin output (see I/O table for detailed I/O quantity).
- ◇ USB Port: U-disk supported for file/data transfer.

产品型号: Product type	SGS-600/450-X/C/CX		臂 展: Arm span	600mm/450mm
工作气压: Working air pressure	4-8kg/cm²		最大速度: Max speed	轴1/2: 350°/S、Z轴: 500mm/s axis1/2: 350°/S、Z axis: 500mm/s
工作电压: Working voltage	AC 210-220V		锁付效率: Screw fastening efficiency	1.2-4.5秒/颗 (*1) 1.2-4.5 sec/per (*1)
示教方式: Teaching method	使用编程器示教		文件容量: Memory capacity	可预存1000组程序(*2) Up to 1000 sets of programs (*2) can be pre-stored.
工作范围: Working range	轴 1: axis 1	±135°	Z 轴行程: Z axis route	150mm
	轴 2: axis 2	±135°	重复精度: Repeat accuracy	± 0.02mm
伺服螺丝刀参数: Servo Screwdriver	转 速: Rotation speed	1-3000/rpm		
	扭力范围: Torque range	1-200kgf.cm （需更换伺服螺丝刀） 扭矩精度: ±5% 1-200kgf.cm (requires replacement of servo screwdriver) Torque accuracy: ±5%		
适用螺钉: Supported Screws	供螺钉方式: Screw Feeding Method	X 气吸式 / C 气吹式 / CX 吹加吸式 X: Vacuum Suction Type/C: Air Blow Type/CX: Blow + Suction Combined Type		
	适用螺钉规格: Supported Screw specifications	M0.8-M6.0 (需更换螺钉供料器) M0.8-M6.0 (requires corresponding screw feeder replacement)		
设备重量: Equipment weight	≈35kg, 不含电控箱, 电控箱重量≈19kg ≈35kg, , The weight of the electrical control box is not included. The weight of the electrical control box≈19kg			

08 产品选型-臂展600 Production Types--600 mm arm extension working area

SGS

开放式机器人
Mounting Plate Robot

600

机器人编号, 臂展
Robot ID, Arm span

X/C/CX

X:气吸式
Vacuum Suction Type
C:气吹式
Air Blow Type
CX:吹加吸式
Blow + Suction Combined Type

09

扭力范围
Torque Range

产品型号 Product Type	送钉方式 Screw Feeding	臂展 Arm span	扭力范围 Torque Range
SGS-600X-09	气吸式 Vacuum Suction Type	600	1-9kgf.cm
SGS-600X-18	气吸式 Vacuum Suction Type	600	3-18kgf.cm
SGS-600X-30	气吸式 Vacuum Suction Type	600	4-30kgf.cm
SGS-600X-90	气吸式 Vacuum Suction Type	600	15-90kgf.cm
SGS-600X-140	气吸式 Vacuum Suction Type	600	30-140kgf.cm
SGS-600X-200	气吸式 Vacuum Suction Type	600	60-200kgf.cm
SGS-600C-09	气吹式 Air Blow Type	600	1-9kgf.cm
SGS-600C-18	气吹式 Air Blow Type	600	3-18kgf.cm
SGS-600C-30	气吹式 Air Blow Type	600	4-30kgf.cm
SGS-600C-90	气吹式 Air Blow Type	600	15-90kgf.cm
SGS-600C-140	气吹式 Air Blow Type	600	30-140kgf.cm
SGS-600C-200	气吹式 Air Blow Type	600	60-200kgf.cm

09 产品选型-臂展600 Production Types--600 mm arm extension working area

SGS

开放式机器人
Mounting Plate Robot

600

机器人编号, 臂展
Robot ID, Arm span

X/C/CX

X:气吸式
Vacuum Suction Type
C:气吹式
Air Blow Type
CX:吹加吸式
Blow + Suction Combined Type

09

扭力范围
Torque Range

产品型号 Product Type	送钉方式 Screw Feeding	臂展 Arm span	扭力范围 Torque Range
SGS-600CX-09	吹加吸 Blow + Suction Combined Type	600	1-9kgf.cm
SGS-600CX-18	吹加吸 Blow + Suction Combined Type	600	3-18kgf.cm
SGS-600CX-30	吹加吸 Blow + Suction Combined Type	600	4-30kgf.cm
SGS-600CX-90	吹加吸 Blow + Suction Combined Type	600	15-90kgf.cm
SGS-600CX-140	吹加吸 Blow + Suction Combined Type	600	30-140kgf.cm
SGS-600CX-200	吹加吸 Blow + Suction Combined Type	600	60-200kgf.cm
SGS-600C-2S,双头	气吹式 Air Blow Type	600	/
SGS-600X-2S,双头	气吸式 Vacuum Suction Type	600	/
SGS-600-XH,自动换头	气吸式 Vacuum Suction Type	600	/

10 产品选型-臂展450 Production Types--450 mm arm extension working area

SGS

开放式机器人
Mounting Plate Robot

450

机器人编号, 臂展
Robot ID, Arm span

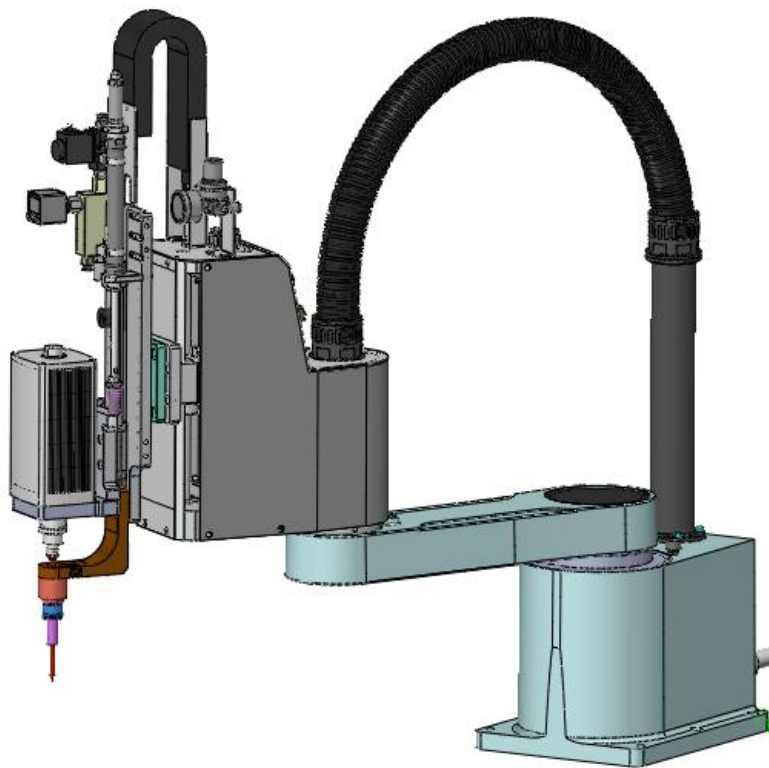
X/C/CX

X:气吸式
Vacuum Suction Type
C:气吹式
Air Blow Type
CX:吹加吸式
Blow + Suction Combined Type

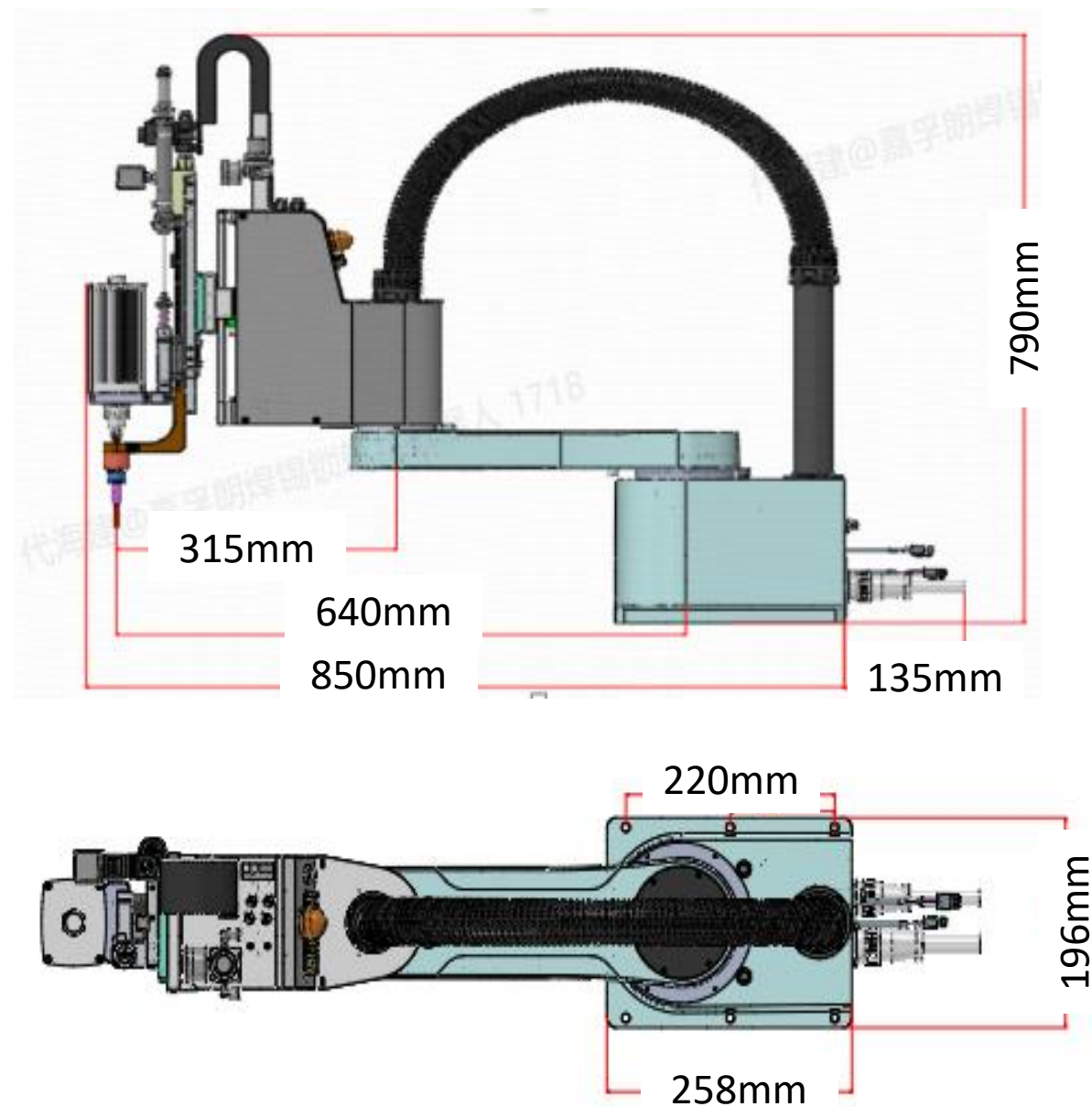
09

扭力范围
Torque Range

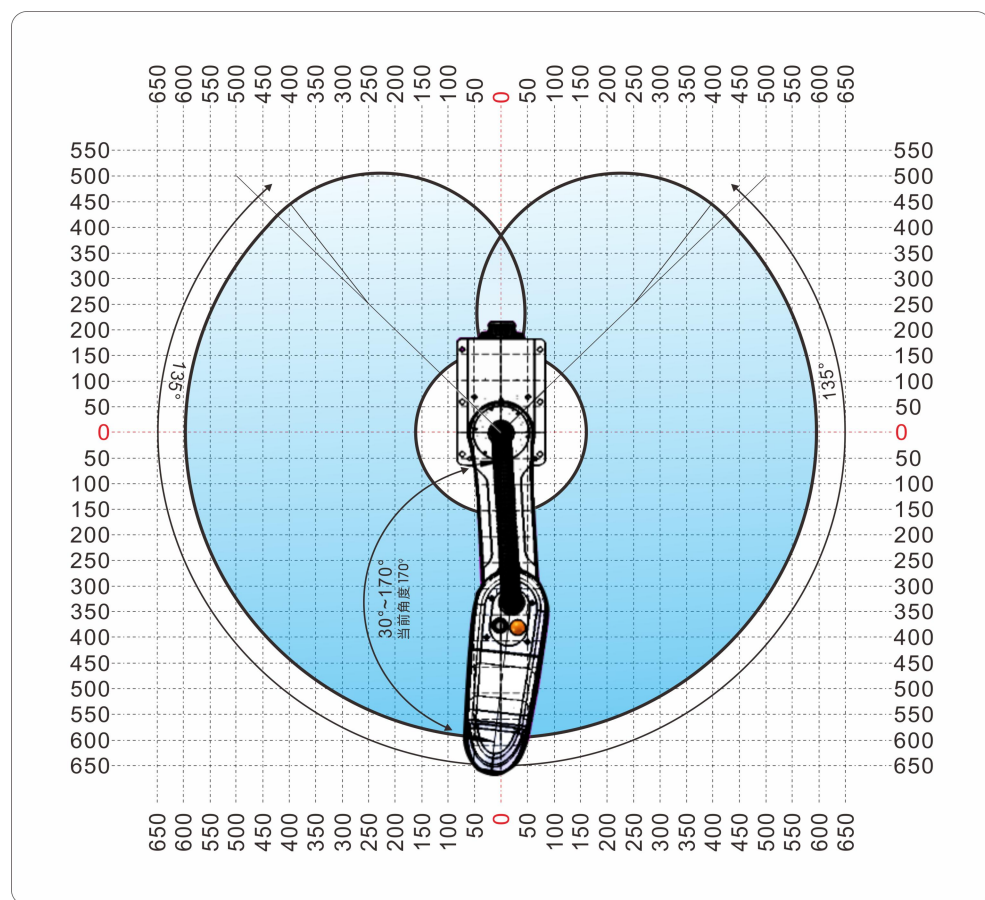
产品型号 Product Type	送钉方式 Screw Feeding	臂展 Arm span	扭力范围 Torque Range
SGS-450X-09	气吸式 Vacuum Suction Type	450	1-9kgf.cm
SGS-450X-18	气吸式 Vacuum Suction Type	450	3-18kgf.cm
SGS-450X-30	气吸式 Vacuum Suction Type	450	4-30kgf.cm
SGS-450X-90	气吸式 Vacuum Suction Type	450	15-90kgf.cm
SGS-450X-140	气吸式 Vacuum Suction Type	450	30-140kgf.cm
SGS-450X-200	气吸式 Vacuum Suction Type	450	60-200kgf.cm
SGS-450C-09	气吹式 Air Blow Type	450	1-9kgf.cm
SGS-450C-18	气吹式 Air Blow Type	450	3-18kgf.cm
SGS-450C-30	气吹式 Air Blow Type	450	4-30kgf.cm
SGS-450C-90	气吹式 Air Blow Type	450	15-90kgf.cm
SGS-450C-140	气吹式 Air Blow Type	450	30-140kgf.cm
SGS-450C-200	气吹式 Air Blow Type	450	60-200kgf.cm



请以实物3D模拟为准
please refer to the actual 3D model



12 机器人行程图Robot Travel Diagram



600mm臂展行程图
具体行程覆盖范围可提供3D图实际模拟
600mm Arm Stroke Diagram

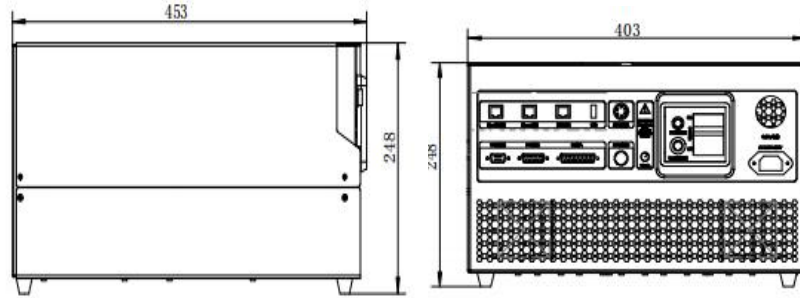
The specific stroke coverage range can be simulated with a 3D model upon request.

600mm臂展工作区域对应表 600mm Arm Working Area Reference Table		
长 Length (mm)	宽 Width (mm)	高 Height (mm)
1000	160	0~150
950	199	
900	230	
850	255	
800	280	
750	300	
700	320	
650	338	
600	352	
550	366	
500	379	
450	390	
400	400	
350	408	

450mm臂展工作区域对应表 450mm Arm Working Area Reference Table		
长 Length (mm)	宽 Width (mm)	高 Height (mm)
700	50	0~150
650	130	
600	150	
550	165	
500	185	
450	205	
400	220	
350	230	
300	240	
250	245	
200	260	
150	265	
100	270	

外形尺寸: W403XH248XD453mm

Boundary Dimension: W403XH248XD453mm



电控箱接口说明

Electrical control box interface description

1	Ethercat总线 EtherCAT bus	7	DO/输出(15Pin) DO / Digital Output (15-pin)
2	EthernetTCP网口 Ethernet TCP/IP port	8	DI/输入(25Pin) DI / Digital Input (25-pin)
3	Modbus-RTU/RS-485 (主机模式 Host Mode)	9	ATP2/航插2(备用) ATP2 / Aviation Connector 2 (Spare)
4	USB接口 USB interface	10	电控箱电源开关盒 Electrical control box power switch box
5	ATP1/航插1(供料器) ATP1 / Aviation Connector 1 (Screw Feeder)	11	Cable电缆口 Cable / Cable Port
6	示教器接口 (TP) Teach pendant interface (TP)	12	电源接口 (AC200V-235V) Power Input (AC200V-235V)

标配线束清单
Standard Cable Harness List

序号 No	名称 Name	订货号 Order Number	数量 QTY	图片 Image
1	连接主电缆 3M Main Connection Cable 3M	BZ230612004	1PCS	
2	25Pin线缆 2M 25Pin Cable 2M	HC3210716	1PCS	
3	15Pin线缆 2M 15Pin Cable 2M	HC3210715	1PCS	
4	电源线1.5M Power Cable 1.5M	DL3070960	1PCS	
5	示教器及连接线 Teaching Pendant and Connection cable	BZ2210517	1PCS	
6	供料器信号线2M Feeder Signal Cable 2M	/	1PCS	/

说明: 机箱电缆接口端最大直径为: 40mm, 设备电缆过孔建议开孔直径 > 45mm

Note: The maximum diameter of the cable interface port on the control cabinet is 40mm. It is recommended that the cable entry hole on the equipment be larger than 45mm in diameter.

螺丝机IO端口线功能定义说明 Screw machine I/O port cable function definition

DB25输入接口/线缆定义(NPN型,共地有效) DB25 Input interface/Cable definition (NPN type, common ground valid)				DB15输出接口/线缆定义(NPN型,共地有效) DB15 Output interface/Cable definition (NPN type, common valid)				
引脚/线色 Pin/line color	IO功能 IO function	引脚/线色	IO功能 Pin/line color	引脚/线色 Pin/line color	IO功能 IO function	引脚/线色 Pin/line color		IO功能 IO function
1黑(IN1)black	自定义Custom	14棕白(IN14)Brown white	自定义Custom	1黑(OUT5)black	Ready	14浅绿Light green		COM(GND)必接
2棕(IN2)brown	自定义Custom	15 红白(IN15)Red white	自定义Custom	2棕(OUT6)brown	Running	15浅蓝Light blue		内置24V+
3红(IN3)red	自定义Custom	16橙白(IN16)Orange white	默认光栅 Default raster	3红(OUT7)red	Paused	Aviation Connector (GX16-5)		
4橙(IN4)orange	自定义Custom	17绿白(IN17)Greenish white	默认跳过 Skip by default	4橙(OUT8)orange	错误输出 Error output	1	GND	吸式供料器 Suction feeder
5黄(IN5)yellow	自定义Custom	18蓝白(IN18)Blue white	默认重锁 Default relock	5黄(OUT9)yellow	信息组合1 Information combination 1	2	有料信号输入 Feed signal input	
6绿(IN6)green	自定义Custom	19紫白(IN22)Purplish white	启动(固定) Start (fixed)	6绿(OUT10)green	信息组合2 Information combination 2	3	GND	吹式供料器 Blow feeder
7蓝(IN7)blue	自定义Custom	20红黑(IN23)Reddish black	暂停(固定) Pause (fixed)	7蓝(OUT11)blue	信息组合3 Information combination 3	4	吹料信号输出 Blow signal output	
8紫(IN8) The purple	自定义Custom	21橙黑(IN19)orange black	复位(固定) Reset (fixation)	8紫(OUT12) The purple	信息组合4 Information combination 4	5	内置 +24V	

15

IO信号接口/IO signal interface

9灰(IN9)grey	自定义Custom	22黄黑(IN24)Yellowish black	紧急停止_1 Emergency stop_1	9灰(OUT13) grey	自定义Custom	485网口(RJ45)			
10白(IN10)white	自定义Custom	23绿黑(IN24)Greenish black	紧急停止_2 Emergency stop_2	10白(OUT14) white	自定义Custom	1		5	485_B
11粉红(IN11) pink	自定义Custom	24灰黑Grayish black	COM(GND)必接	11黑白(OUT15) Black and white	自定义Custom	2		6	
12浅绿(IN12) Light green	自定义Custom	25粉红黑Pinky black	内置24V+	12棕白(OUT16) Brown white	自定义Custom	3	GND	7	
13黑白(IN13) Black and white	自定义Custom			13粉红 pink	悬空Hang in the air	4	485_A	8	

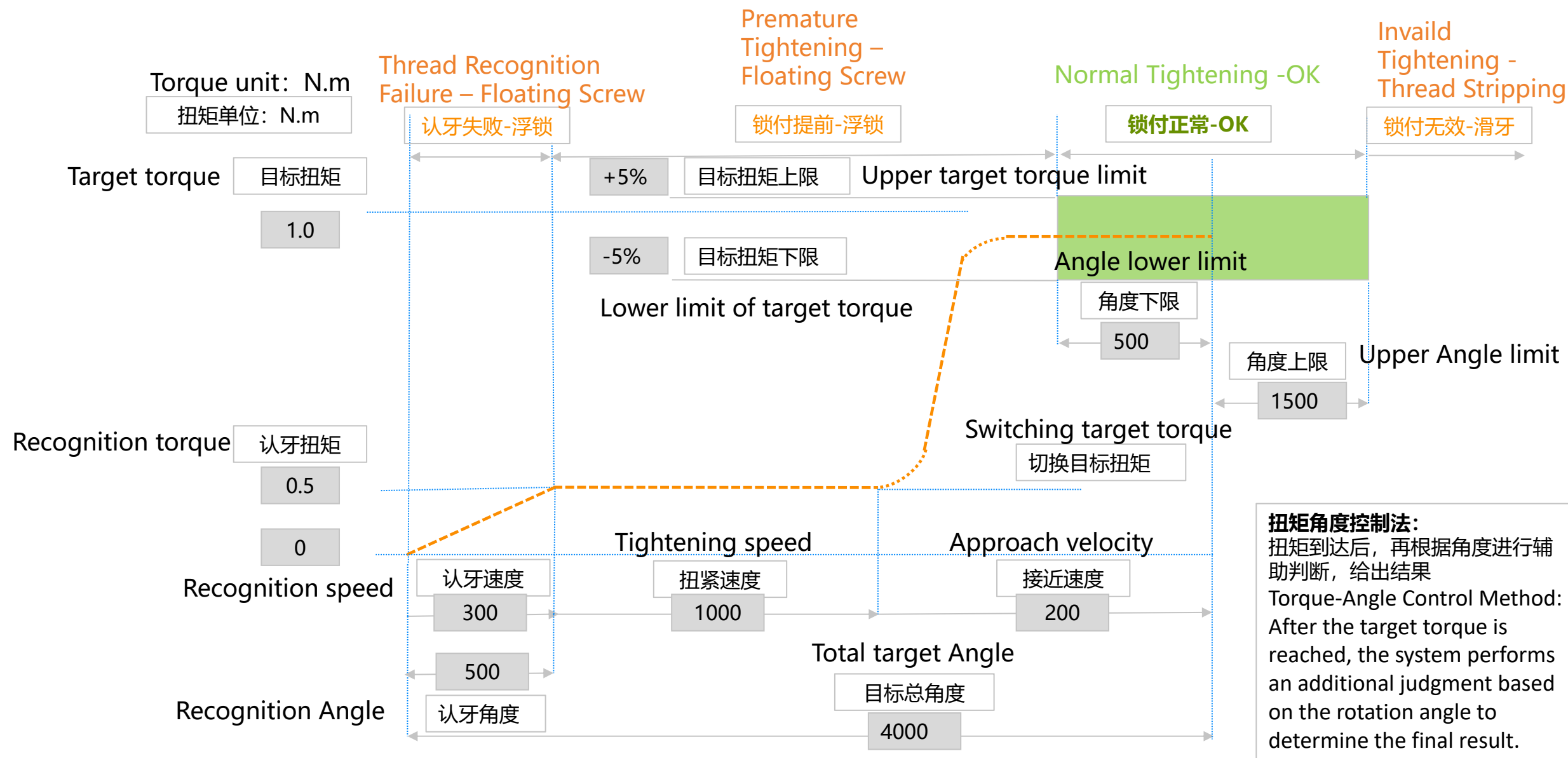
DB15输出默认信息组合(二进制)定义：0表示OFF,1表示ON The DB15 output default message combination (binary) is defined as 0 for OFF and 1 for ON																			
引脚编号 Pin number	8	7	6	5	引脚编号 Pin number	8	7	6	5	引脚编号 Pin number	8	7	6	5	引脚编号 Pin number	8	7	6	5
工作完成 Job done	0	0	0	1	X轴报错 X-Axis Error	0	1	0	1	电批报错 Electrical batch error report	1	0	0	1	真空异常 Vacuum anomaly	1	1	0	1
螺钉浮锁 Screw floating	0	0	1	0	Y轴报错 Y-Axis Error	0	1	1	0	数据异常 Data exception	1	0	1	0	自定义 Custom	1	1	1	0
气缸原点 Cylinder origin	0	0	1	1	Z轴报错 Z-axis Error	0	1	1	1	工艺异常 Process anomaly	1	0	1	1	自定义 Custom	1	1	1	1
螺钉OK Screw OK	0	1	0	0	螺钉滑牙 Screw slip	1	0	0	0	供料异常 Feed anomaly	1	1	0	0	自定义 Custom	0	0	0	0

16 示教器IO信号接口/Demonstrator IO signal definition

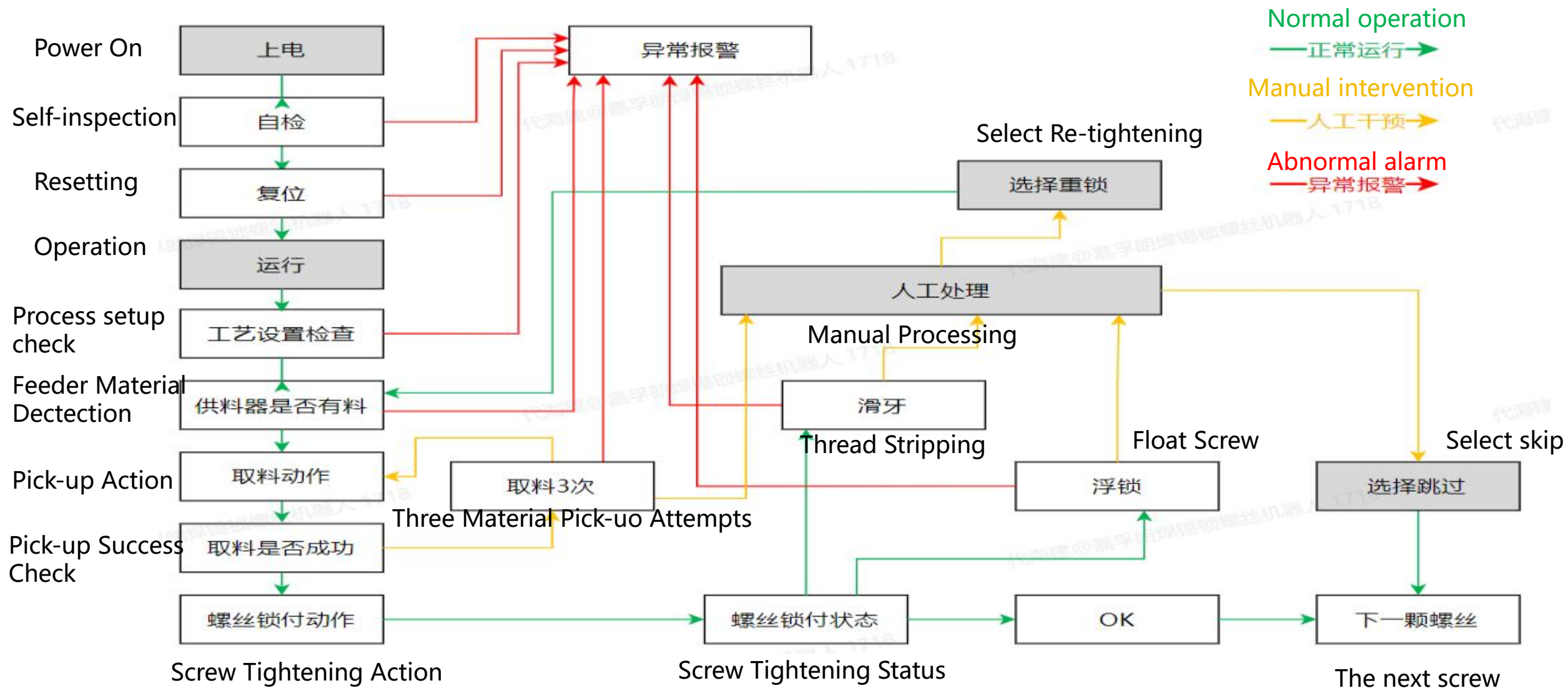
示教器IO信号功能定义 Demonstrator IO signal definition								
IO名称 IO name	锁付定义 Lock definition	端口(引脚) Port (pin)	IO名称 IO name	锁付定义 Lock definition	端口(引脚) Port (pin)	IO名称 IO name	锁付定义 Lock definition	端口(引脚) Port (pin)
IN1	自定义Custom	25PIN(1)	IN19	复位resetting	25PIN(21)	OUT1	吸气 inspiratory	内部使用 Internal use
IN2	自定义Custom	25PIN(2)	IN20	光敏 Photosensitive signal	内部使用 Internal use	OUT2	吹料 blowing	航插1(4)
IN3	自定义Custom	25PIN(3)	IN21		内部使用 Internal use	OUT3	气缸下压 Cylinder downforce	内部使用 Internal use
IN4	自定义Custom	25PIN(4)	IN22	启动activate	25PIN(19)	OUT4	摆料气缸 Swing cylinder	内部使用 Internal use
IN5	自定义Custom	25PIN(5)	IN23	暂停Pause	25PIN(20)	OUT5	Ready	15PIN(1)
IN6	自定义Custom	25PIN(6)	IN24	急停scram	25PIN(22-23)	OUT6	Running	15PIN(2)
IN7	自定义Custom	25PIN(7)	IN25(原点1)	螺丝有料Screw stock	航插1(2)	OUT7	Paused	15PIN(3)
IN8	自定义Custom	25PIN(8)	IN26(原点2)	气缸原点Cylinder origin	内部使用 Internal use	OUT8	报警 Give an alarm	15PIN(4)
IN9	自定义Custom	25PIN(9)	IN27(原点3)	真空信号Vacuum signal	内部使用 Internal use	OUT9	信息组合1 Information combination 1	15PIN(5)
IN10	自定义Custom	25PIN(10)	IN28(原点4)		内部使用 Internal use	OUT10	信息组合2 Information combination 2	15PIN(6)
IN11	自定义Custom	25PIN(11)	IN29(原点5)		内部使用 Internal use	OUT11	信息组合3 Information combination 3	15PIN(7)

17 示教器IO信号接口/Demonstrator IO signal definition

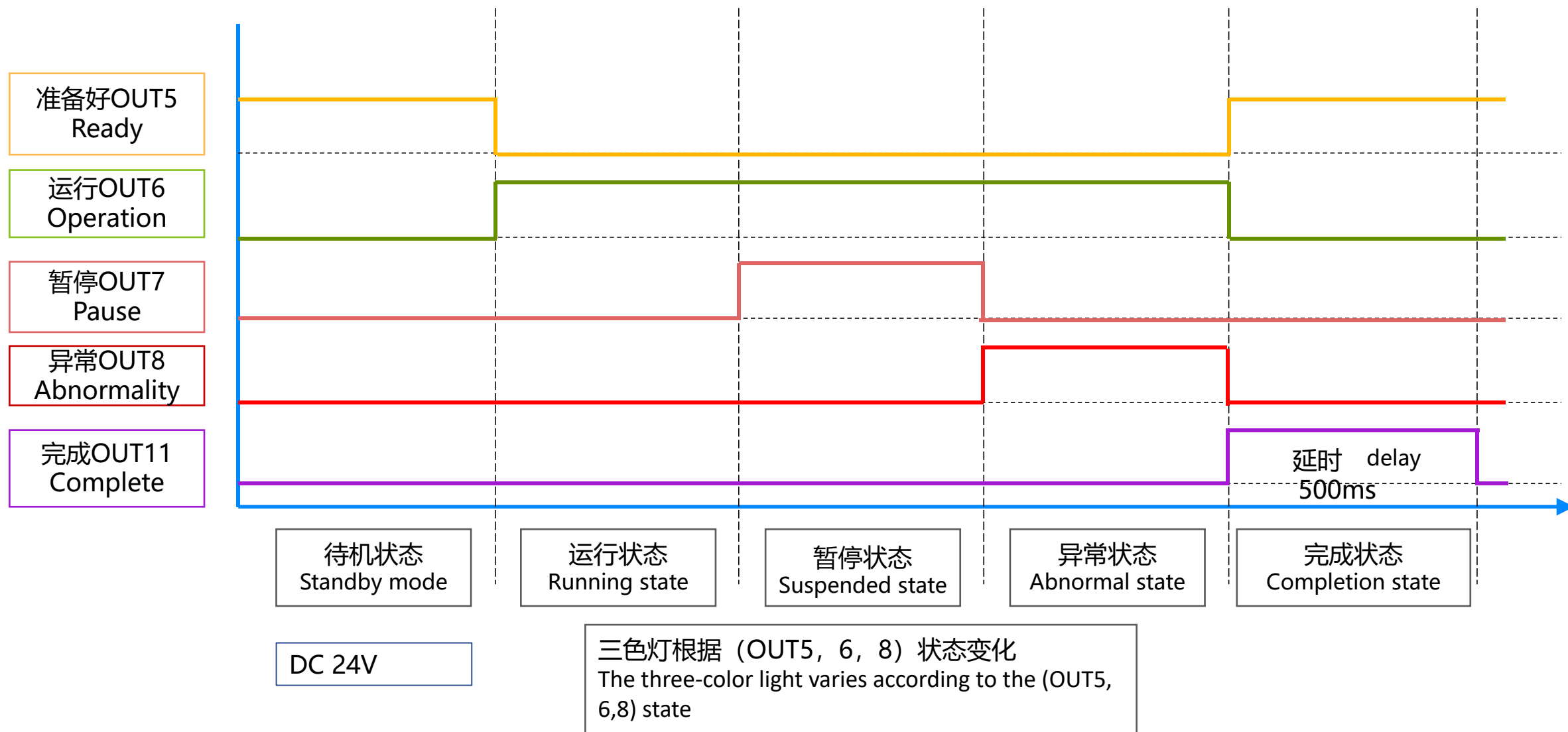
IN12	自定义Custom	25PIN(12)	IN30(origin 6)		内部使用 Internal use	OUT12	信息组合4 Information combination 4	15PIN(8)
IN13	自定义Custom	25PIN(13)	IN31(origin 7)		内部使用 Internal use	OUT13	自定义Custom	15PIN(9)
IN14	自定义Custom	25PIN(14)	IN32(origin 8)		内部使用 Internal use	OUT14	自定义Custom	15PIN(10)
IN15	自定义Custom	25PIN(15)	IN33(origin 9)		内部使用 Internal use	OUT15	自定义Custom	15PIN(11)
IN16	光栅grating	25PIN(16)	IN34(origin 10)		内部使用 Internal use	OUT16	自定义Custom	15PIN(12)
IN17	跳过skip	25PIN(17)	IN35(origin 11)		内部使用 Internal use			
IN18	重锁relock	25PIN(18)	IN36(origin 12)		内部使用 Internal use			



19 工艺流程/Process flow



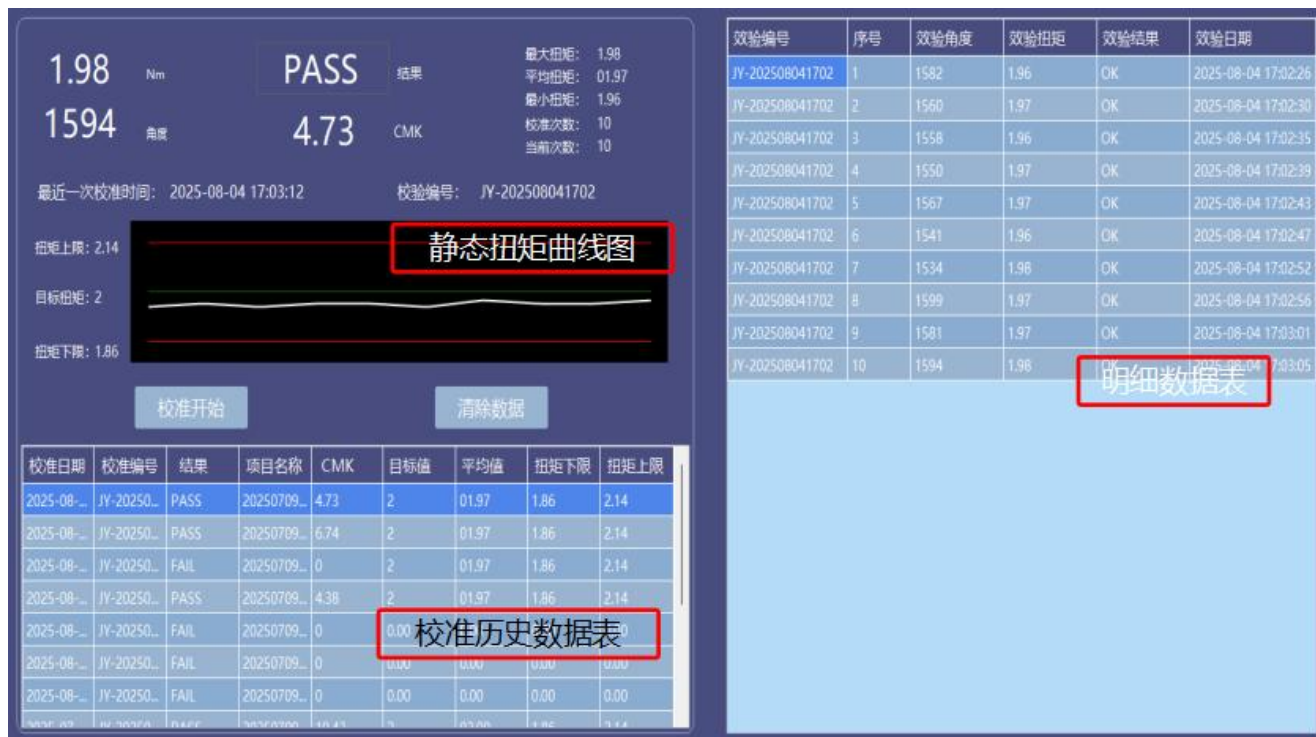
20 信号交互逻辑/interaction logicSignal



21

扭矩校验 Torque Calibration

- 人工预先编好校准扭矩程序，选择扭矩校准程序按启动，可进行自动扭矩校验。校验后，工作人员可依据精准数据快速调整扭矩设置参数，确保生产作业精度。
- A pre-programmed torque calibration routine can be selected and initiated manually. Once started, the system performs automatic torque calibration. After calibration, the operator can use the accurate test data to quickly adjust torque settings, ensuring production precision.
- 如果通过 485 通讯连接扭力测试仪，上位机上实时呈现扭矩锁付数据曲线与详细记录，便于直观监测与分析，为高效、精准的螺丝锁付作业保驾护航。
- When the torque tester is connected via RS-485 communication, the upper computer (host system) can display real-time torque fastening curves and detailed logs. This allows for intuitive monitoring and analysis, providing strong support for efficient and precise screw fastening operations.



扭力测试仪
Torque Tester

第六位：2为第二颗螺丝位置序号，

The sixth position: 2 is the position number of the second screw,

以此类推最后一位：3为结尾标识符

And so on to the last digit: 3 is the ending identifier

例：拍照形式 Example: photo form

模式1：产品整体拍照，然后识别产品螺丝孔位

Mode 1: Take a picture of the whole product, and then identify the screw hole position of the product

模式2：一次拍一个螺丝孔，或多个螺丝孔

Mode 2: Shoot one screw hole at a time, or multiple screw holes

模式3：拍对角螺孔或对角两个Mark点

Mode 3: Tap diagonal screw holes or diagonal two Mark points

满足以下条件，可根据实际需求决定是否使用相机引导：

If the following conditions are met, you can decide whether to use the camera boot according to actual needs:

① 载具或产品偏差在此表内

Vehicle or product deviation is in this table

② 对于锁付要求不高产品 [扭矩偏差允许±6%]

For products with low locking requirements [torque deviation allowed ±6%]

机牙螺钉规格 Machine screw specification	允许定位偏差 Allowable positioning deviation	自攻牙螺钉规格 Specifications of self tapping screws	允许定位偏差 Allowable positioning deviation
M1 - M1.9	±0.1mm	ST1 - ST1.9	±0.2mm
M2 - M2.5	±0.2mm	ST2 - ST2.5	±0.3mm
M3	±0.3mm	ST3	±0.5mm
M4	±0.4mm	ST4	±0.6mm
M5	±0.6mm	ST5	±0.8mm
M6	±0.8mm	ST6	±1.0mm

PC—交互

支持Scoket通讯
Support Scoket communication
坐标数据交互
Coordinate data interaction

PC - Interactive



锁螺丝机器人数据存储功能:

Locking screw robot data storage function

:数据记录:

Data records:

程序在运行的过程中, 如果有条码, 则按照条码为文件名存储每颗螺丝的锁付记录内容包括日期及时间、条码、螺丝序号、扭矩、数、结果, 当前作业员; 例如123456789.csv。

In the process of running the program, if there is a bar code, the lock record of each screw is stored according to the bar code for the file name, including date and time, bar code, screw serial number, torque, number, result, current operator; Example: 123456789.csv.

如果没有条码, 则按照设备开始启动的时间为文件名存储每颗螺丝的锁付记录, 内容包括日期及时间、条码、螺丝序号、扭矩、圈数、结果、当前作业员。例如:20240606132359.csv。

If there is no bar code, the lock record of each screw is stored in the file name according to the time when the device starts, including date and time, bar code, screw serial number, torque, number of turns, result, and current operator. For example, run 20240606132359.csv.存储格式:CSV

存储位置: (数据存储需要电脑和对应软件支持)

Storage location: (Data storage requires computer and corresponding software support)

自定义路径+系统年月日自动生成的文件夹

Custom path + system year, month and day automatically generated folder

MES 交互方式:

MES interaction mode:

不主动上传, 需要 MES 过来抓取。

Do not take the initiative to upload, need MES to come and grab.

抓取的一般方式:

General way to grab:

1 通过有线网络或者无线网络让 MES 系统与本设备的电脑组成局域网。

1 Through the wired network or wireless network, MES system and the computer of the equipment to form a LAN.

2 MES 根据本设备电脑数据文档存储的路径, 获取锁付数据。

2 MES obtains lock payment data according to the path of computer data document storage of the device.

3 解析并存储数据。

3 Parse and store the data.

MES对接 MES docking

数据发送方式:**Data sending method:**

- 1) 上位机为服务端, 机械手为客户端
- 1) The host computer is the server, and the manipulator is the client
- 2) 通过IP端口, 建立Socket连接。
- 2) Establish a Socket connection through IP and port.
- 3) 发送数据, 发送执行结果记录。
- 3) Send data and send execution result records.

上传数据的形式:**Form of upload data:**

- 1) 锁付一颗螺丝, 上传一颗螺丝的数据,
- 1) Lock a screw, upload the data of a screw,
- 2) 全部锁付完成后, 一次上传多颗螺丝的数据 (受Socket传送字节的限制 建议在10颗数据以内)
- 2) After all the locks are completed, upload the data of multiple screws at a time (subject to the limitation of Socket transmission bytes, it is recommended to upload less than 10 data)

PC—交互**PC - Interactive**

支持Socket通讯
Support Socket
communication
螺丝数据上传
Screw data upload
程序切换
Program switching
启动, 复位
Start, reset
暂停, 急停
Time out. Emergency
stop

**PLC—交互****PLC - Interactive**

支持IO握手信号的处理
Supports processing of IO
handshake signals
信号方式: NPN
Signal mode: NPN
电压: DC 24V
Voltage: DC 24V
Modbus-RTU(主机模式)
Modbus-RTU(Host mode)
IO程序切换
IO program switching
启动, 复位
Start, reset
暂停, 急停
Time out. Emergency stop

**例: 发送数据:****Example: Send data:**

2,NO-1,1,OK,200,230,15,3600,1.5,3

第一位: 2为标识符,

The first digit: 2 is the identifier,

第二位: NO-1为设备编号

Second place: NO-1 indicates the device number

第三位: 1为螺丝位置序号,

The third digit: 1 is the serial number of the screw position.

第四位: OK/NG 螺丝的锁付状态

Fourth: OK/NG screw lock status

第五位: X坐标

Fifth position: X coordinates

第六位: Y坐标

Sixth place: Y coordinate

第七位: 螺丝扭矩(精度是拧紧枪配置而定)/kg

Seventh: screw torque (accuracy is determined by tightening gun configuration)/kg

第八位: 螺丝角度(精度是拧紧枪配置而定)

Eighth: screw Angle (accuracy is determined by tightening gun configuration)

第九位: 单颗螺丝锁付时长/s

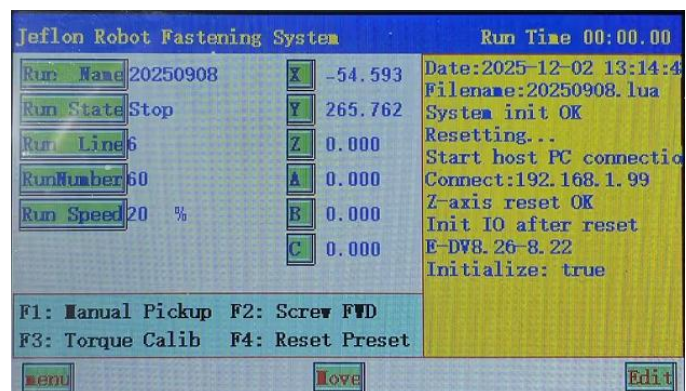
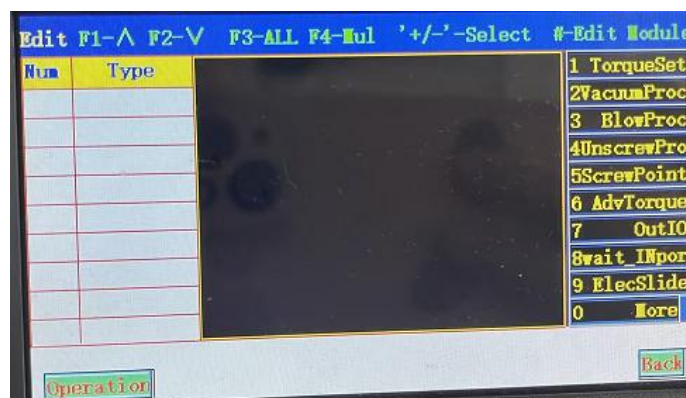
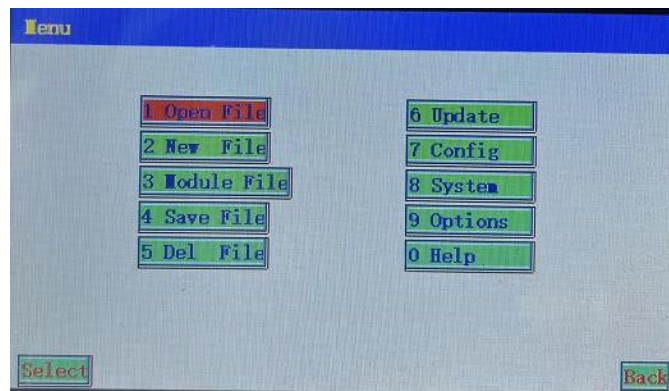
Ninth place: Single screw lock payment time /s

最后位: 3结尾标识符

Last bit: 3 end identifier

根据实际需求, 可以自定义发送数据, 需要二次开发

According to the actual demand, the data can be customized, which requires secondary development



高分辨彩屏、全中文操作界面，易学易用

High resolution color screen, all Chinese operation interface, easy to learn and use

手持式编程示教器，示教轻松，便捷

Handheld programming teaching device, teaching easy, convenient

专业的工艺指令，应对各种锁螺丝需求

Professional process instructions to respond to various lock screw needs

多种指令应对，阵列，复制，平移，批量

Multiple instruction response, array, copy, pan, batch

单步执行，全自动及循环运行

Single step, full automatic and cycle operation

I/O输入输出，条件判断，逻辑

I/O input/output, conditional judgment, logic

产量设定，锁付数据实时显示

Output setting, lock payment data real-time display

脱机，独立运行

Offline, independent operation

大容量储存100个加工文件

Large capacity storage of 100 processing files

26 上位机软件/Upper computer software

上位机软件管理 Upper computer software management



扭力曲线
Torsion curve
点位分布图
Point distribution map
生产报表
Production report
锁付数据
Locked data
实时数据监控
Real-time data monitoring

27 设备应用形式/Device Type



开放式单头
Single-head



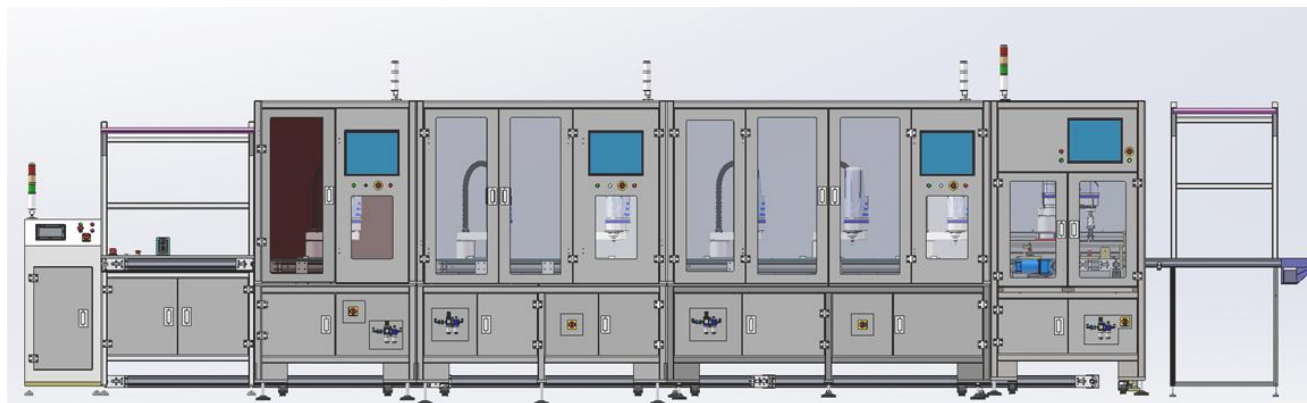
开放式双头
Dual-head



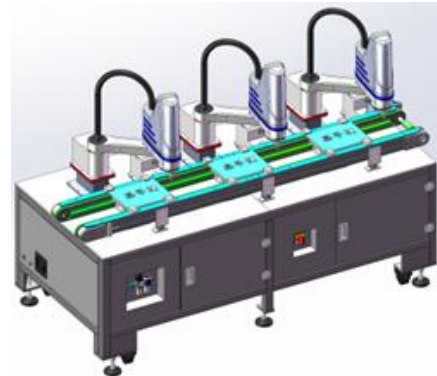
吹加吸式
Blow + Suction Combined Type



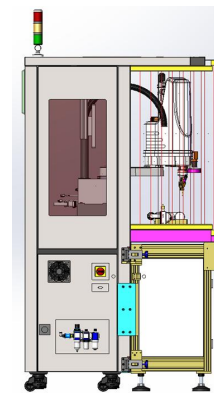
开放式自动换头
Automatic head change



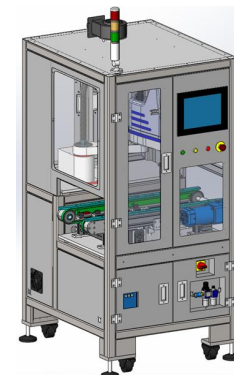
组线式
Built-up line



组合在线式
Combinatorial on-line



立式线边
Vertical edge



立式在线
Vertical on-line

设备工艺调试服务

Equipment process
commissioning services

专业技术团队服务
Professional technical team services
现场及远程技术支持
On-site and remote technical support

模块化设计
Modular design

模块化设计
Modular design
应对柔性生产需求
Responding to flexible
production needs

项目风险控制
Project risk control

协助评估验证工艺难点
Assist in evaluating and
verifying process difficulties
减少项目风险
Reduce project risk

项目周期控制
Project cycle control

方案设计周期短
The scheme design cycle is short
设备制作周期短
The production cycle of the
equipment is short

项目成本控制
Project cost control

设计制作成本节省最高达50%
Design and production cost savings
of up to 50%
售后成本节省最高可达50%
After-sales cost savings of up to
50%

01

02

03

04

05

29 项目设计/Project design

专业自动锁螺丝
技术顾问在线售前支持
大量行业成熟案例
提升项目评估准确性

Professional automatic locking screws
Technical advisor online pre-sales support
A large number of industry mature cases
Improve project evaluation accuracy

众多设计工程师
专职设计开发锁螺丝机构
工艺软件、吸嘴夹嘴
Many design engineers
Full-time design and development of lock
screw mechanism
Process software, suction nozzle clamp
nozzle

专业技术咨询
顾问
Professional
technical
consulting
consultant

专职
研发团队
Full-time
R&D team

专业工艺工程
师
Professional
process engineer

多种类
模组配件
A wide range of
module accessories

独立
实验室
Independent
laboratory

十余名专业应用工艺工程师，丰富的项目实战经验，提供自动锁螺丝过程的专业分析，为项目调试提供技术支持服务

More than ten professional application process engineers, rich project practical experience, provide professional analysis of automatic locking screw process, and provide technical support services for project debugging

离线、在线等多种形式的样机，随时进行产品测试，出具测试报告，为项目方案设计提供数据支持
Offline, online and other forms of prototype, product testing at any time, issue test reports, to provide data support for project design

多种类锁螺丝机构配件，包含：伺服螺丝刀、挂枪模组、供料器等。
Various kinds of locking screw mechanism accessories, including: servo screwdriver, hanging gun module, feeder, etc.



30 企业资质/Enterprise qualification



34 National Patented Technologies

国家专利技术34项



质量管理体系认证

软件著作权

Quality Management System Certification

Software Patent



感谢支持

Thanks for the support



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