赛曼斯
SAIMANSI

Operation Manual

ZHEJIANG SAIMANSI INTELLIGENT TECHNOLOGY CO., LTD.

CE identification
M.2021.206.C67682

Customer service-phone number

Phone	**0575-87633222**
Sales department	**International sales: Manager Zhou: 136-7576-5810** **Domestic sales: Manager Chen: 136-7686-4998**
After sales/technical service support	**Mr. He: 177-9180-6995**
Communication address: No.688-1, Jiefang road, Zhuji, Shaoxing, Zhejiang, China **Zip code: 311800** **Manufacture address: Yongle industry park, Jinghe Xincheng, Xixian new district, Shaanxi province** **Zip code:713702** **E-mail: sales@saimansi.com** **Website: www.saimansi.com**	

Foreword

ZHEJIANG SAIMANSI INTELLIGENT TECHNOLOGY CO., LTD. is subsidiary of **ZHEJIANG BOSHITE GROUP CO., LTD.,** professionally provide nylon tube post treatment machine in automobile area, such as nylon tube bending machine, nylon tube end modeling machine, nylon tube tighten degree test machine, nylon tube with automatic coiling machine and others, suitable to all diameter ranges of nylon tube in automobile areas.

SAIMANSI is the world leading nylon tube bending machine manufacturer in automobile market, we broken the traditional technology, start the transform miracle in nylon tube thermal modeling. Use our nylon tube bending machine, if bending 10,000,000 pieces tube/year then will annually save RMB4,240,000 compare to the traditional technology. SAIMANSI already build strategy cooperate partner relationship with globe automobile fluid pipeline suppliers.

We seeking innovation, make complex come to be more simple.....

Welcome to use CNC PA (model: S3000-16V) tube bending machine!

CNC nylon modeling tube bending machine famous based on high efficiency,

low energy consumption and best quality, we have advanced design concept and complete after sales system, it is your best choice.

The necessary condition of correctly operate machine is know well about the function of each part of machine, maintain and maintenance of machine.

This operating manual provide useful helps, reminding you correctly use SAIMANSI tube bending machine, hold this manual are necessary to each one machine installation staff and operators.

Please read this operating manual carefully before put machine into production.

This product according to the relate standards such as "**EN ISO 12100:2010; EN 60204-1:2018"**, the same series products

Use the machine in the environment where altitude not exceed 2000m.

Noise of the machine source from blowing air cooling after tube body bent, because the machine noise will exceed 70dB(A), so please the operators attention to add necessary protection actions.

SAIMANSI only responsible to own designed CNC tube bending machine and assist equipment, if the customer move assist equipment away, the should reinstall the protection or safety device which according to the relate standards. And, any problems caused by this will be responsible by customer themselves.

The customer only use SAIMANSI appointed parts or accessory, especially at tube bend wheel mold, heating rod, bearing and others.

The description and charts provided by this operating manual is explained according to machine model (**S3000-16V**). Here we emphasis that we will process the corresponding modification if has requirements or technology further developed.

The machines all processed each item test before leave factory, according to leave factory standards, reasonable use machine, fine maintain and maintenance of equipment will have bigger performance to reliability and stability of equipment.

This datum only provide to the manage staffs and site operator to read, keep secret to other people, can't copy and backup this manual if no authority of our company.

Contents

Chapter I General safety instruction

1 Equipment used marks and warning

Danger!

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

Danger!

Danger root from electric equipment, if not adopt correct prevent actions then will caused serious accidents or death.

Danger!

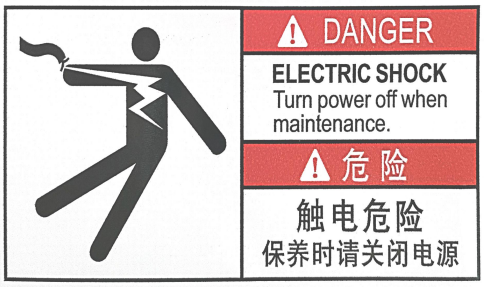
Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

Danger

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

Danger

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents



Danger

Danger root from electric equipment, if not adopt correct prevent actions then will caused serious accidents or death.

Danger

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

Danger

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

Warning

Danger root from mechanical equipment, if unsuitable operating then will caused serious accidents

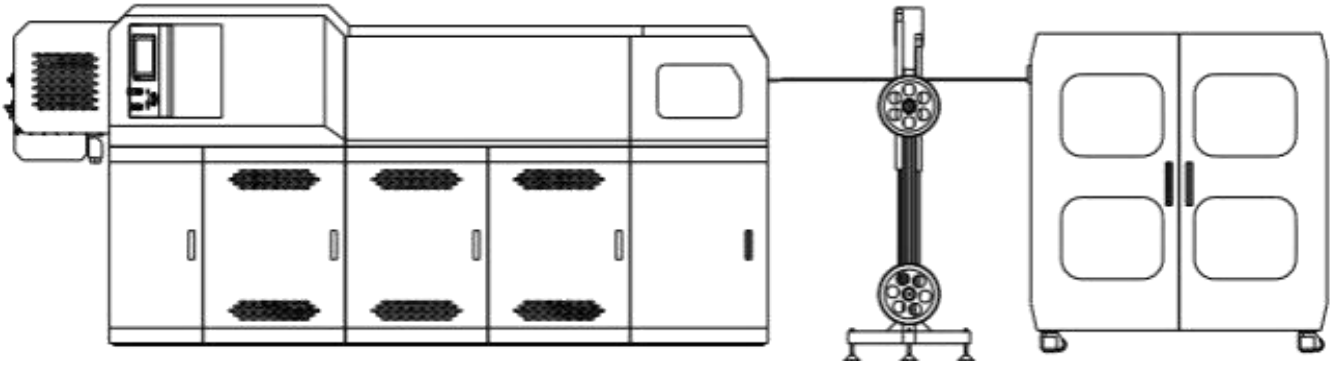
2. General safety instruction

2.1 Attention points of installation and debugging (the detail contents please refer to the relate contents in chapter III)

2.1.1 The transporting, installation and debugging of the machine must be finished by the appointed professional staffs, and completely know well about the relate parameters of this machine.

2.1.2 The operating environment of the machine must be in the clean and tidy indoor, keep enough lighting and air venting, and must make ensure there has a certain operating space around the machine;

2.1.3 Must be straight layout the production main machine and material feeding device according to the diagram (the below diagram) when installing the machine;



2.1.4 Must process measure and evaluation to the safety operating range and done well at the safety warning line around the machine before formally use the machine.

2.2 Attention points of operating and use

2.2.1 The operators must pass through necessary train before on post, the contents include:

2.2.1.1 About the possible danger when using this machine;

2.2.1.2 The machine working principle, the method of correctly use and adjust the relate parameters of the machine and possibly occurring results;

2.2.1.3 The function and safety knowledge relate to the machine;

2.2.1.4 Safety treatment of waste materials;

2.2.1.5 All staffs should keep suitable safety distance with the machine head working position;

2.2.2 The operators must be strictly follow the operating specification;

2.2.3 The employer has responsibility to inform the operators the relate knowledge relate to equipment operation and functions, and the regions where maybe generate danger during working, include the correct actions how to protect themselves and equipment safety;

2.2.4 Strictly forbid to operate the equipment when operators feeling tired.

2.3 Attention points maintain works

2.3.1 All maintain works must be processed by the appointed staff with qualification;

2.3.2 Maintain staffs must know well about the parameters, structure and performance of the machine in details before maintain works;

2.3.3 Use the qualified maintain tools

2.3.4 Must close the energy source for the electric circuit maintain, especially at maintain and renewal electric types, must make ensure that cut off general power supply;

2.3.5 Should check each action function of the machine in details after maintained, only can deliver to the operators for production after all qualified, and done well at the detail records.

2.4 Safety working standards

All functions of the machine will be stopped immediately when this equipment pressed down emergency stop button **(STOP key)**. The safety protection door of this machine also configured safety lock, all functions of the equipment will be stopped when opening.

2.4.1 Firstly process start machine inspection before operate the machine;

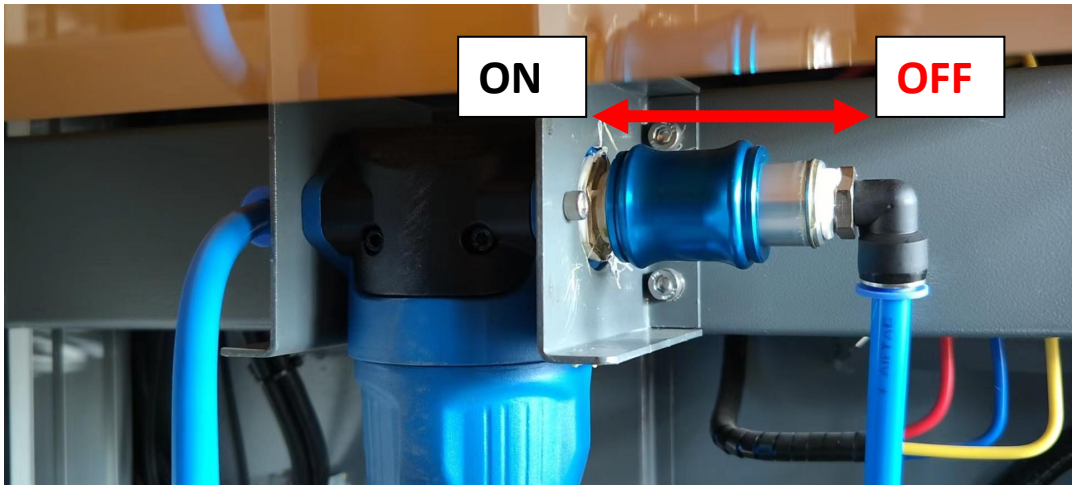
2.4.2 Firstly cut off the power supply before open the electric cabinet of the machine, shift the main switch to OFF position;

2.4.3 Firstly cut off the power supply before process any maintenance or maintain in the machine, shift the main switch to OFF position

General power supply close status OFF

General power supply open status ON

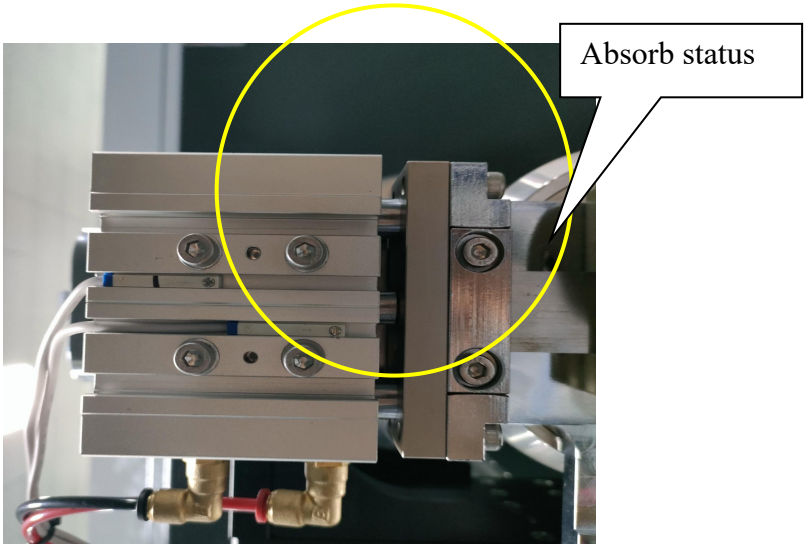
2.4.4 Must cut off air source when renewal and adjust the blades and renewal fixture, and press down emergency stop switch;



2.4.5 Must wear anti scald gloves when renewal fixture or clean the guide tube, make ensure that task under the power off situation; **attention at high temperature scald!!!**

2.4.6 Close all protection cover and door of the machine before operate the machine and far away the machine head equipment working area, return to the appointed operator safety area;

2.4.7 Confirm the blade position before start machine, action air cylinder of cutter be at absorb status under the situation that connect air;



2.4.8 Don’t place any loosen object or tool on or in the machine.

2.4.9 Don’t enter into the accessories working area of the machine after the power supply of this machine connected. (example: machine head revolve arm, material feeding drag and material feeding rack).

2.4.10 Not allow the not authorized staffs stay in working area

Chapter II Equipment information

1. Equipment instruction

1.1 Background technology:

Nylon bending modeled tube long time applied in automobile industry till now, according to the requirements of practice application, generally, it need be bent to difference angles on different directions, generally, in the existing technology, the nylon bending modeled tube adopt the working steps that firstly **Modeled**——then **heating** ——then **cooling**:

Means that firstly manufacture the metal mold with specific bending degree according to the shape of nylon tube which need be modeled, then put the nylon tube without bending into the mold, then heating the mold and nylon tube together, finally cooling the mold, the nylon tube after opened the mold then modeled the specific shape.

This production technology more trouble, not only waste time and big energy consumption, and the specific metal mold only can process the nylon tube modeling at one specification, unable to be commonly applied, caused serious cost waste.

1.2 Equipment technology:

BST25-IV is the equipment of one nylon tube automatic heating and bending modeled, refer to the top technical area of nylon tube modeling. The characteristics of this equipment is that start machining after input digit program:

Material feeding⟹Heating⟹Revolve adjustment⟹Bending⟹ Cooling

Repeat the above steps, till the length and bending degree of nylon tube achieved the requirements; **cut off**.

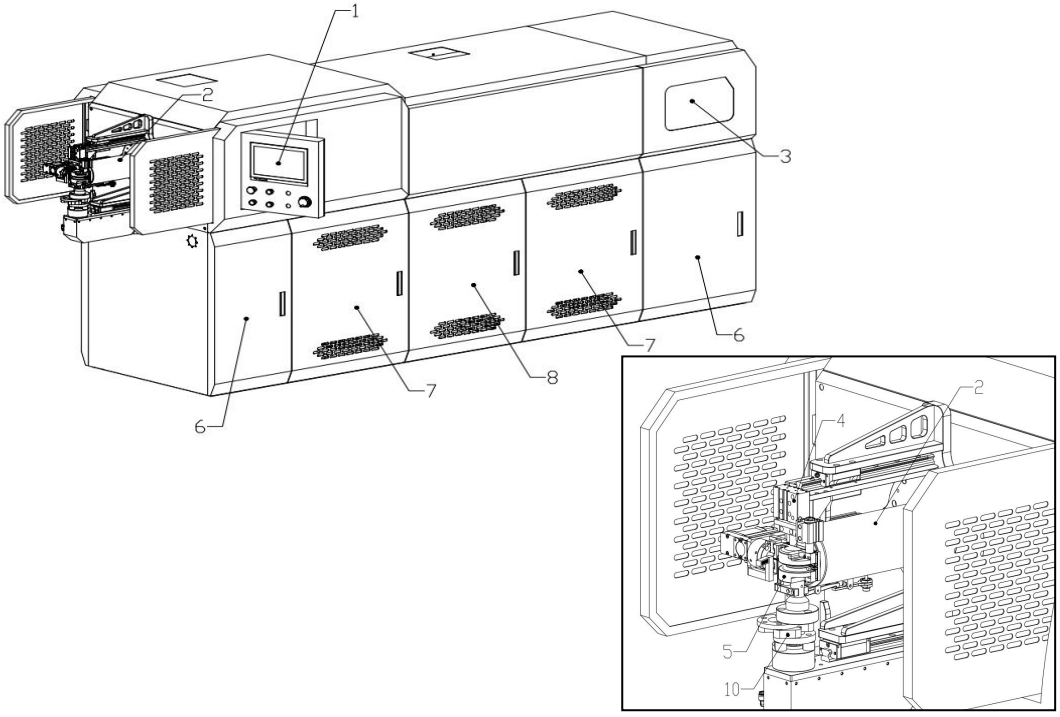
This equipment has the benefit effects that improve the modeling precision of nylon tube, guarantee the product quality, improved the machining efficiency and save energy consumption.

This equipment according to the requirements of the valid version standard "**EN ISO 12100:2010; EN 60204-1:2018**", and pass through EU CE

identification:

Identification number:**“M.2021.206.C67682”**

1.3 Profile summary of equipment main body:



1— Operating panel: program editing, equipment action orders control

2— Revolve arm: the device which realize vert action

3— Material feeding mechanism: finish the action that tube body drag to feeding material

4— Cut off device: cut off function after machining finished

5— Tube bending mechanism: tube body bending, cooling and modeling

6— Pneumatic control source: control the product modeling cut off, control the air blow cooling after final products bend modeling, control the tube body vert assist clip.

7— Two regions heating station, internally configure circling fan and heating bar

8— Main electric control cabinet (low voltage electrics, PLC, positioning module, temperature control module, serve driver, heating frequency converter, electric relay and others)

9— Heating oven main body: realize that tube body physical soften, this is necessary condition of tube body bend modeling

10— Clutch: transmit the bending kinetic energy

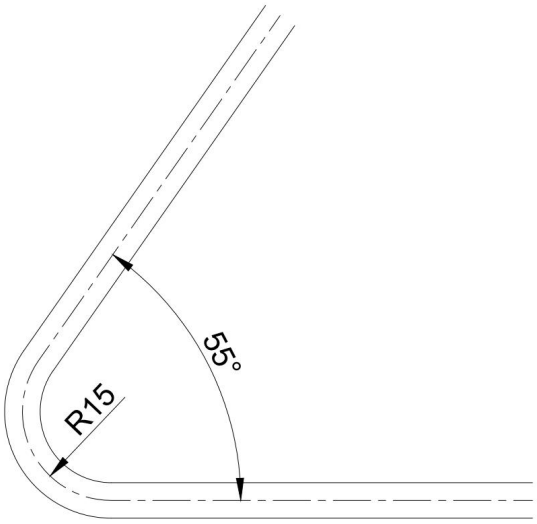
1.4 Equipment machining range and characteristics:

1.4.1 Equipment machining range

①. Able to machining material PA12/PA11 (single/multiply layers tube), PA612, PA66, PP, PE, TPV and others.

②. Able to realize that machining different tube diameter at φ6~φ25;

③. The equipment bending angle equal and bigger than 65°, the below picture shown the min angle.



管体折弯参数选定推荐

规格	最小弯管半径	最小夹角	两直角最短直线段	弯轮规格模式	支持强磁拉杆折弯辅助	弯管率
6*1	R15	55°	25	一体式弯轮	否	≥85%
8*1	R20	55°	30	一体式弯轮	否	≥85%
10*1	R25	55°	30	分体式弯轮	否	≥85%
10*1.25	R25	55°	30	分体式弯轮	否	≥85%
12*1	R28	60°	30	分体式弯轮	是	≥85%
12*1.25	R28	60°	30	分体式弯轮	是	≥85%
12*1.5	R28	60°	30	分体式弯轮	否	≥85%
12.5*1.5	R30	60°	28	分体式弯轮	是	≥85%
13.5*1.25	R30	60°	28	分体式弯轮	是	≥85%
14*1.5	R30	60°	27	分体式弯轮	是	≥85%
14*2	R30	60°	27	分体式弯轮	是	≥85%
15*1.5	R30	60°	25	分体式弯轮	是	≥85%
15*1.25	R30	60°	25	分体式弯轮	是	≥85%
16*1.25	R30	60°	25	分体式弯轮	是	≥85%
16*1.5	R30	60°	25	分体式弯轮	是	≥85%
16*2	R30	60°	25	分体式弯轮	是	≥85%
18*1.5	R35	60°	27	分体式弯轮	是	≥85%
19*1.5	R35	65°	27	分体式弯轮	是	≥85%
20*1.5	R35	65°	28	分体式弯轮	是	≥85%
21*1.5	R37	65°	30	分体式弯轮	是	≥85%
22*1.5	R39	65°	30	分体式弯轮	是	≥85%

Recommend tube body bending parameters selection

Specification	The min tube bending radius	The min include angle	The shortest straight line section of two right angle	Bending wheel specification mode	Support strong magnetism draw bar bending assist	Tub bending ratio
6*1	R15	55°	25	Integration type bending wheel	No	≥85%
8*1	R20	55°	30	Integration type bending wheel	No	≥85%
10*1	R25	55°	30	Integration type bending wheel	No	≥85%
10*1.25	R25	55°	30	Integration type bending wheel	No	≥85%
12*1	R28	60°	30	Integration type bending wheel	Yes	≥85%

12*1.25	R28	60°	30	Integration type bending wheel	Yes	≥85%
12*1.5	R28	60°	30	Integration type bending wheel	No	≥85%
12.5*1.5	R30	60°	28	Integration type bending wheel	Yes	≥85%
13.5*1.25	R30	60°	28	Integration type bending wheel	Yes	≥85%
14*1.5	R30	60°	27	Integration type bending wheel	Yes	≥85%
14*2	R30	60°	27	Integration type bending wheel	Yes	≥85%
15*1.5	R30	60°	25	Integration type bending wheel	Yes	≥85%
15*1.25	R30	60°	25	Integration type bending wheel	Yes	≥85%
16*1.25	R30	60°	25	Integration type bending wheel	Yes	≥85%
16*1.5	R30	60°	25	Integration type bending wheel	Yes	≥85%
16*2	R30	60°	25	Integration type bending wheel	Yes	≥85%
18*1.5	R35	60°	27	Integration type bending wheel	Yes	≥85%
19*1.5	R35	65°	27	Integration type bending wheel	Yes	≥85%
20*1.5	R35	65°	28	Integration type bending wheel	Yes	≥85%
21*1.5	R37	65°	30	Integration type bending wheel	Yes	≥85%
22*1.5	R39	65°	30	Integration type bending wheel	Yes	≥85%

1.4.2 Equipment characteristics

①. PLC realize action control;

②. Mitsubishi temperature control module, dual frequency conversion circling fan, more accurate temperature control;

③. Able to realize dual temperature area (room temperature/195℃) control: because the characteristics of partial materials, the machining process must be low temperature preheat first then high temperature heating;

④. Human-computer control interface, support program coordinate writing, one key generate the machining program parameters; programming operation realization more safe and simple;

⑤. Big tube diameter production configured strong magnetism draw bar assist, fission type bending wheel fixture, tube bending ratio of bending more better controlled;

⑥. Support manipulator, realize that big tube diameter pass tube spring works, receive material and other works;

⑦. Drag center height of material feeding up and down automatic adjusting, reduce it happen failure.

2. Datum of assist equipment

2.1 Material release machine

Tube tray internal diameter	**280mm-480mm**
Tube tray max external diameter	**1000mm**
Tube tray max width	**345mm**

Characteristics

①. Adopt servo motor automatic feeding material

②. Able to self adapt material release speed according to machining speed

③. Link with main machine, failure information real time transmitting and monitor

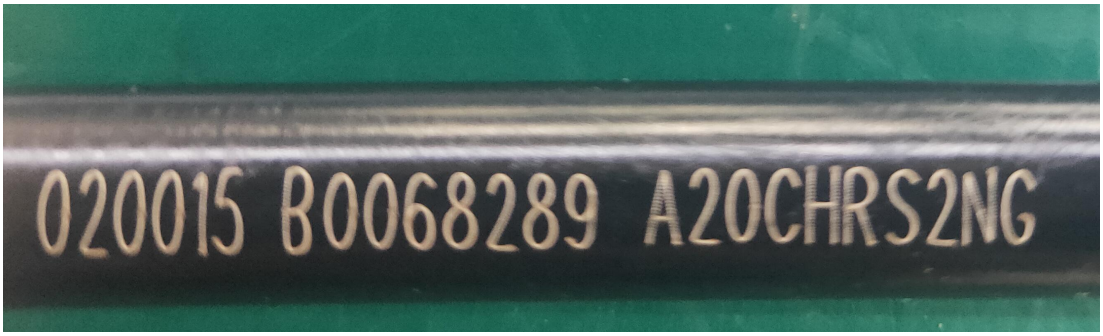
④. Support one key reset

2.2 Marking device

ingle marking device

Dual marking device

Instruction: able to select and use single marking and dual marking mode, according to customized, able to link use with the equipment.



Characteristics:

①. Machining and marking syn processing;

②. Adopt fibre optic layer, flying mode, high speed;

③. Able to realize the marking out marks of the specific products;

④. Mark contents: able to self setting contents.

2.3 Manipulator device

Instruction: able to realize bending tube assist, receive materials and other actions.

▶规格

形式		单位	RV-8CRL-D
环境规格			油雾环境
保护等级			IP65
安装姿势			落地安装、天吊(壁挂※1)
构造			垂直多关节型
动作自由度			6
驱动方式			AC伺服马达
位置检测方式			绝对编码器
可搬重量	额定	kg	7
	最大	kg	8
机械手臂长		mm	450+470
最大伸臂半径		mm	931
安装螺距		mm	□160
动作范围	J1	度	±170
	J2		±110
	J3		+0～+165
	J4		±200
	J5		±120
	J6		±360
最大速度	J1	度/s	288
	J2		321
	J3		360
	J4		337
	J5		450
	J6		720
最大合成速度		mm/sec	10,500
周边温度		℃	0~40
本体重量		kg	41
容许力矩	J4	Nm	16.2
	J5		16.2
	J6		6.86
容许惯性	J4	Kgm2	0.45
	J5		0.45
	J6		0.1
工具配线			15芯D-SUB
工具空气配管			φ6×2
机器间连接线			5m
连接控制器			CR800-D

规格 Specification

形式 Type	单位 Unit	RV-8CRL-D
环境规格 Environment specification		油雾环境 Oil fog environment
保护等级 Protection grade		IP65
安装姿势 Installation posture		落地安装. 天吊(壁挂※1)Ground installation, ceiling hoist (wall hanging×
构造 Construction		垂直多关节型 Vertical multiply nodes type
动作自由度 Action freedom		6
驱动方式 Drive method		AC 伺服马达 AC servo motor
位置检测方式 Position test method		绝对编码器 Absolute coder

可搬重量 Transportable weight	额定 Rated	kg	7
	最大 The max	kg	8
机械手臂长 Manipulator arm length		mm	450+470
最大伸臂半径 The max stretch arm radius		mm	931
安装螺距 Installation helical distance		mm	□160
动作范围 Action range	J1	度 Degree	±170
	J2		±110
	J3		+0~+165
	J4		±200
	J5		±120
	J6		±360
最大速度 The max speed	J1	度/s Degree/s	288
	J2		321
	J3		360
	J4		337
	J5		450
	J6		720
最大合成速度 The max combine speed		mm/sec	10, 500
周边温度 Around temperature		℃	0~40
本体重量 Body weight		kg	41
容许力矩 Allowable torque	J4	Nm	16.2
	J5		16.2
	J6		6.86
容许惯性 Allow inertia	J4	Kgm2	0.45
	J5		0.45
	J6		0.1
工具配线 Tool configured wire			15 芯 D-SUB 15 cores D-SUB
工具空气配管 Tool air configure tube			Φ6X2
机器间连接线 Connect wire among machines			5m
连接控制器 Connect the controller			CR800-D

Select and use of assist equipment, the customer able to self select the suitable assist equipment according to the practice production environment and requirements!

S/N	Assist equipment
1	Tube tray type material release machine
2	Dual marking device
3	Manipulator device

Contact method:

Sales hotline: international sale-Manager Zhou: 136-7576-5810

Domestic sales-Manager Chen: 136-7686-4998

Technical support service hotline: 17791806995

After sales service hotline: 17791806995

Communication address: No.688-1, Jiefang road, Zhuji, Shaoxing, Zhejiang, China

Zip code: 311800

3. Equipment main parameters

3.1 Equipment physical and energy consumption parameters

Equipment model: S3000-16V				
Wiring power supply		Three phase 380V 50HZ		
Rated power	Kw.h	13		
Energy consumption	Kw.h	4		
Air consumption	M³/min	0.3~0.5		
Heating power	KW	8.5 (Peak value)		
Heating furnace length	mm	3100		
Fan power		380V frequency conversion, flow 300m³/h, pressure 20kpa		
Bending tube (Y) servo motor power *1	KW	0.4		
Vert (Z) servo motor power *1	KW	1.5		
Front material feeding (X) servo motor power *2	KW	0.1		
Rear material feeding (X) servo motor power *2	KW	0.4		
Hoisting (Z) servo motor power *1	KW	0.75		
Equipment net weight	KG	2280		
Equipment color		Creamy white/industry gray		
Main equipment size	mm	3800mm(Length)	1100mm(Width)	2050mmm(Height)
Equipment floor area	mm	8000mm(Length)	2100mm(Width)	2500mm(Height)
Additional assist equipment size floor area		Refer to the chapter III		

3.2 Equipment technical parameters

90° angle production speed ratio	S/bending	2.5
Manufacture material		PA11/PA12 (single/multiply layers tube), PA612, PA66, TPV, PA6, PP
Manufacture tube diameter	mm	Φ6-φ22
Manufacture min bending angle	Degree	Check the below table (attach table II)
Controlled air pressure	MPa	0.6-0.8

Heating temperature setting		Check the below table (attach table I)
Recommend bending parameters selection		Check the below table (attach table II)

Attach table I:

Material	Section I temperature (reference)	Section II temperature (reference)
PA612	170~175℃	170~175℃
PA66	170~175℃	170~175℃
PA6	170~175℃	170~175℃
PA11/PA12	150~160℃	150~160℃
PP	130~140℃	130~140℃
TPV	140~150℃	140~150℃

Attach table II: (Recommend tube body bending parameters selection)

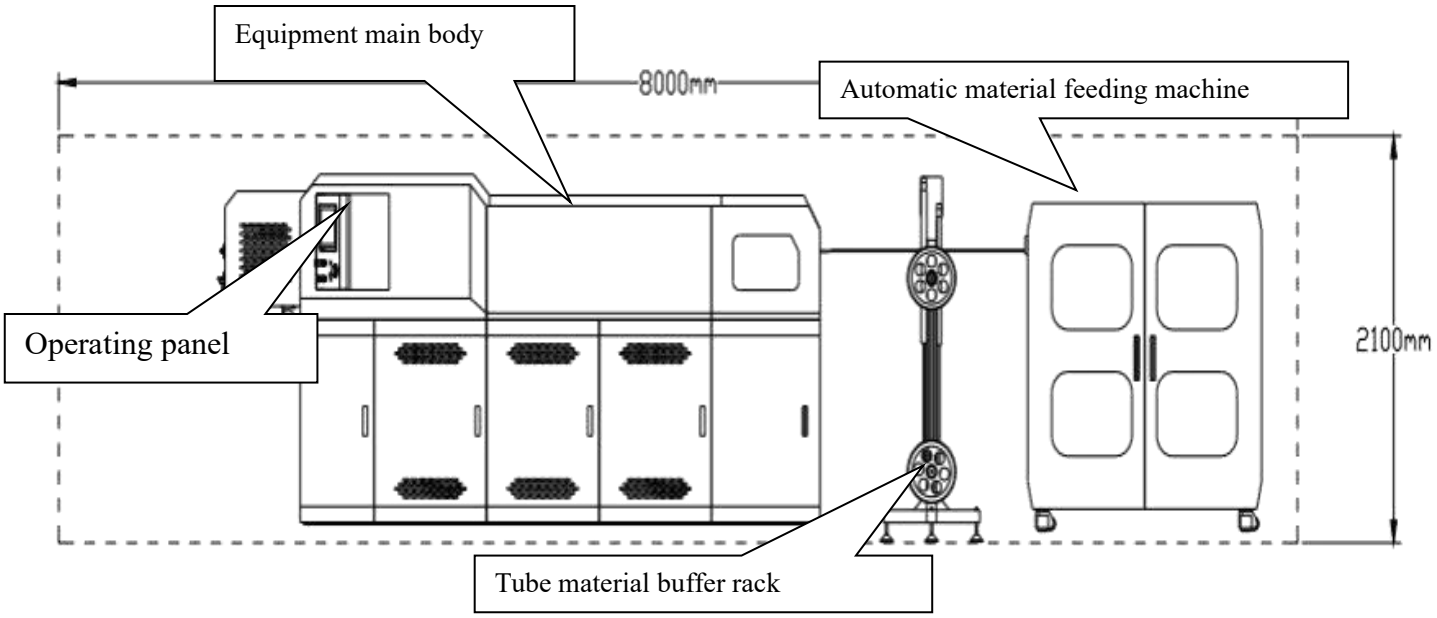
Specification	The min bending radius	The min bending angle	The shortest straight line distance of both right angles	Bending ratio	80℃ high temperature test
6*1	R15	55°	25	≥85%	OK
8*1	R20	55°	30	≥85%	OK
10*1	R25	55°	30	≥85%	OK
10*1.25	R25	55°	30	≥85%	OK
12*1	R28	60°	30	≥85%	OK
12*1.25	R28	60°	30	≥85%	OK
12*1.5	R28	60°	30	≥85%	OK
12.5*1.5	R30	60°	28	≥85%	OK
13*1.25	R30	60°	28	≥85%	OK
14*1.5	R30	60°	27	≥85%	OK
14*2	R30	60°	27	≥85%	OK

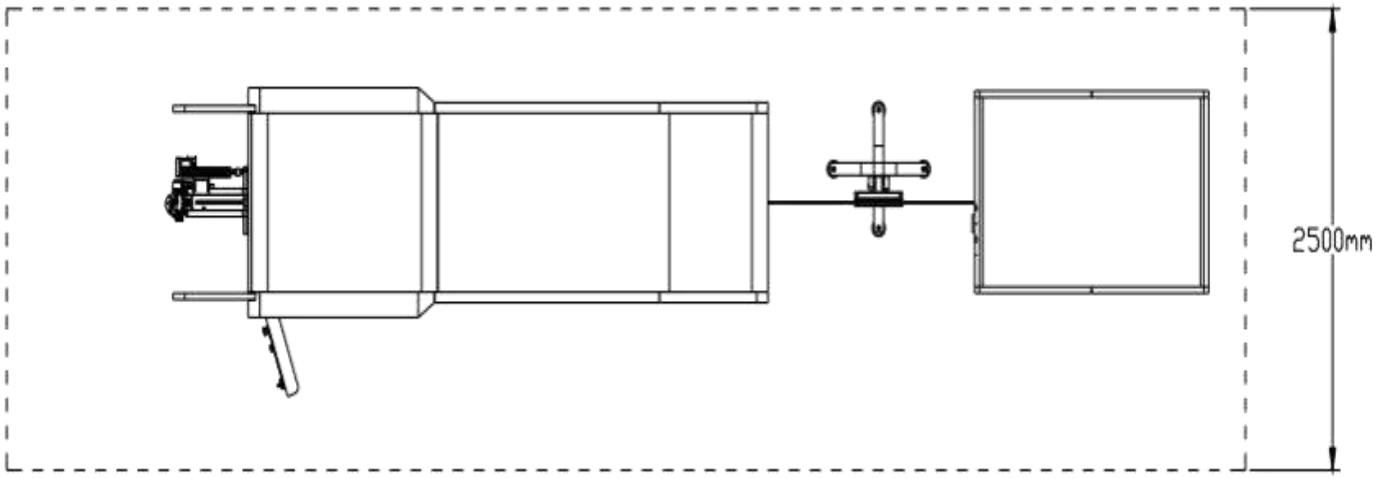
15*1.5	R30	60°	25	≥85%	OK
15*1.25	R30	60°	25	≥85%	OK
16*1.25	R30	60°	25	≥85%	OK
16*1.5	R30	60°	25	≥85%	OK
16*2	R30	60°	25	≥85%	OK
18*1.5	R35	60°	27	≥85%	OK
19*1.5	R35	65°	27	≥85%	OK
20*1.5	R35	65°	28	≥85%	OK
21*1.5	R37	65°	30	≥85%	OK
22*1.5	R39	65°	30	≥85%	OK

Chapter III Equipment installation and confirmation

1. Installation

1.1 nstallation layout





1.2 Installation environment

The operating environment of the machine required to be the clean and tidy indoor,

keep enough lighting and air venting, and meeting the below condition, if exceed the below conditions then must be estimated by the professional staffs to check whether allow to process production actions:

- Working temperature: -40~45℃
- The relative humidity of air: 85% or below, can't condensate
- Around the machine must guarantee a certain space, refer to diagram of installation layout
- Electromagnetism: the electromagnetism disturb of the equipment around this machine, shouldn't exceed the mechanical required common standards when construction the plant.
- Altitude height: the highest 2000m

1.3 Equipment installation

1.3.1 Electric circuit installation

1.3.1.1 Warning marks

Danger! Only allow the qualified and authorized staffs connect the power supply.

Danger! Current-firstly disconnect this machine main power supply's fatal dangerous voltage.

Danger! Even though the main switch be at disconnect position, the switch and power supply cable still with power - fatal dangerous voltage.

1.3.1.2 General electric circuit wiring

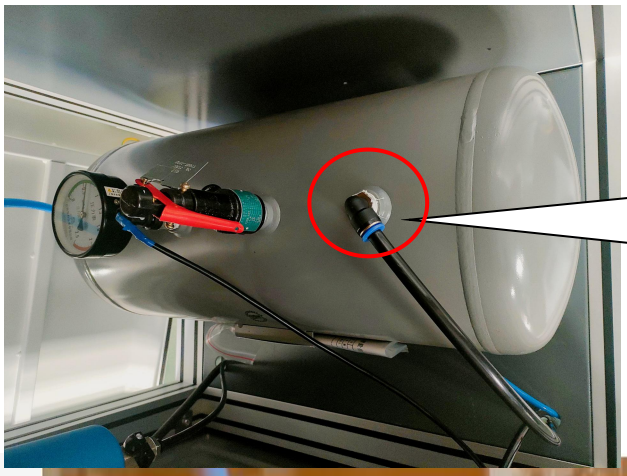
L1	L2	L3	N	PE

The voltage range of 3 phase 380V /50HZ, select and use three phase five wires, the copper wire with specification 6mm^2, especially attention to correctly connect ground wire (externally configured air switch select and use specification 35A).

Make ensure the working voltage of this machine according to the voltage of supply power. Check whether the current value of overload breaker of motor according to the current value of the corresponding motor. Use this machine attached electric circuit diagram, check whether connect correctly.

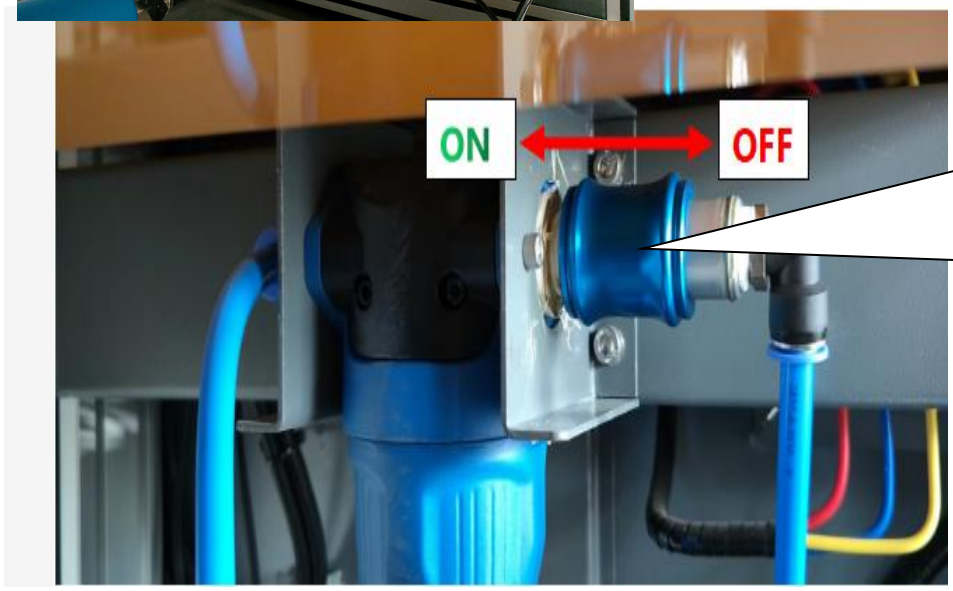
1.3.2 Air circuit installation

The compress air system of this machine: (use free oil and dry air source)Air source pressure 0.6~0.8Mpa, the compress air need be connected to the air inlet valve which locate behind this machine. The compress air used tube is external diameter 12mm.



Main air inlet:

Quick plug with specification Φ12



Hand sliding valve

Gas valve switch of air storage tank

Outward push is close air source

Inward push is open air source

1.3.3 Level adjustment

Level adjustment universal wheel:
(Model: 100F, single part weighing 150kg

Quick move performance
strong withstand force
anti wear and stable
just rotating then can adjust height of this base

The left picture is installation effect diagram

Able to realize 15mm height adjustment, level adjustment use this universal wheel, more simple operation, also more convenient to move

2. Electric circuit and air circuit confirmation

2.1 Electric circuit confirmation

① Check whether each electric element normally wiring according to the electric circuit diagram, whether normally running after power on

② Confirm whether fan rotating direction is positive

③ Fan no noise after the frequency transformer start

④ Heating furnace able to normally rising temperature and able to stably control temperature

⑤ Operating interface normally control actions of each position

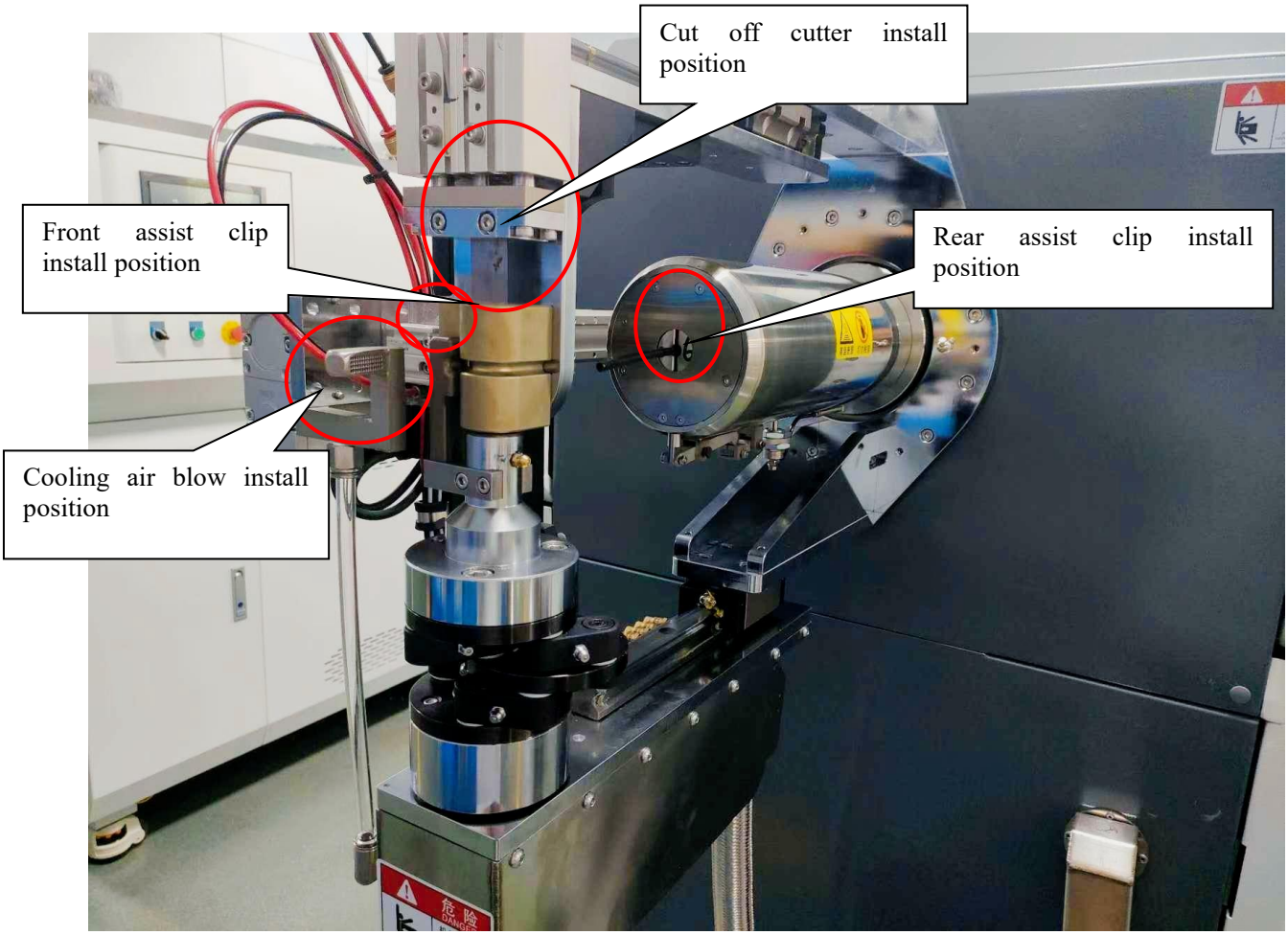
2.2 Air circuit confirmation

① Start cooling air blowing electromagnetism switch, confirm whether blowing air

② Start air cylinder cutter cut off, confirm whether cutter normal

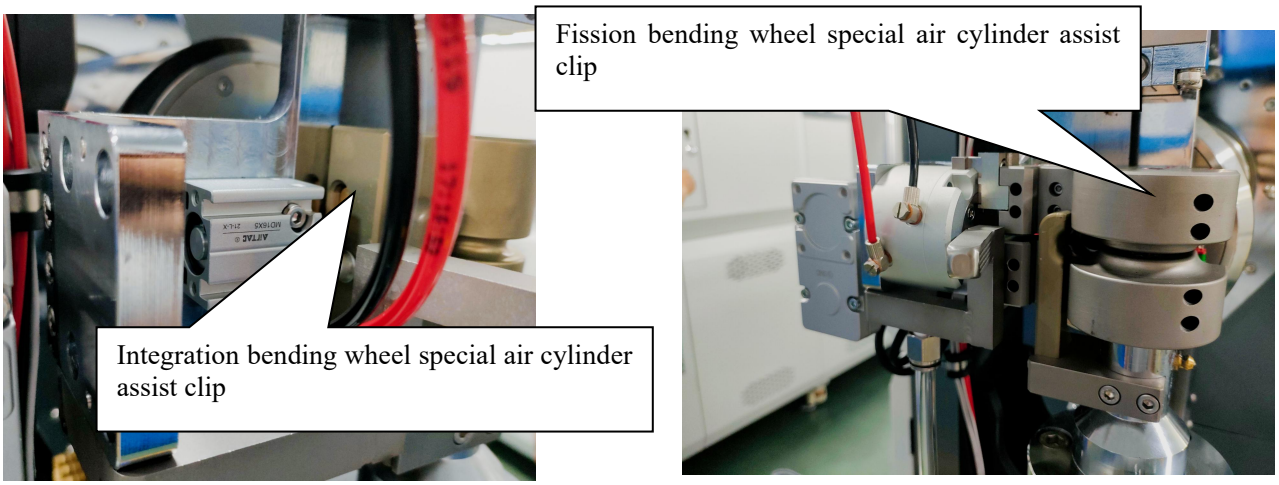
③ Start front assist clip, confirm whether front assist clip action is sensitivity

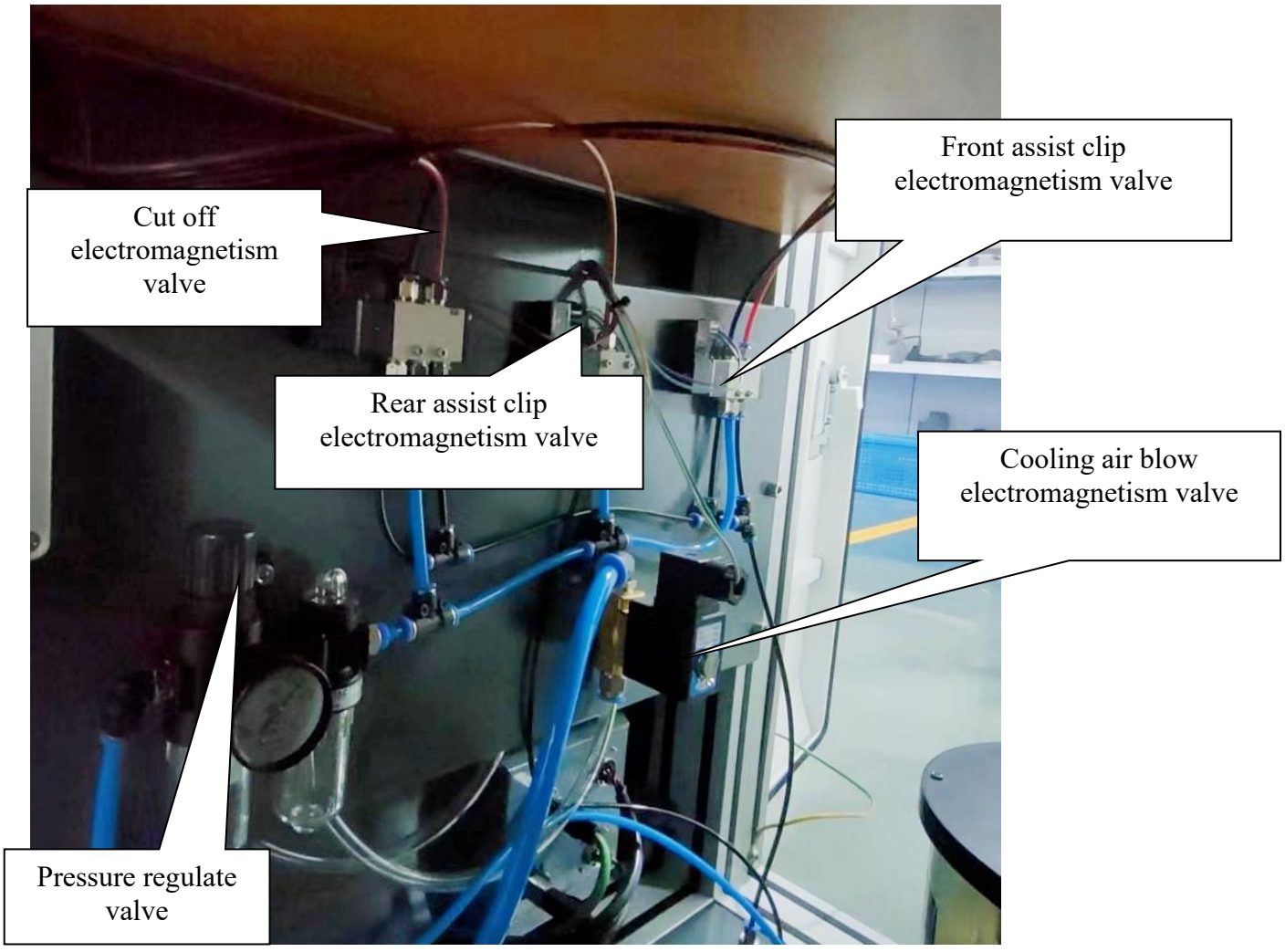
④ Start rear assist clip, confirm whether rear assist clip action is sensitivity



Two front assist clip structure:

Integration type bending wheel special assist clip Fission type bending wheel special assist clip





Chapter IV Main machine equipment device instruction

1. Heating system instruction

Customized oven

Temperature control	Dual control temperature region
Heating range	Room temperature~190℃
Heat insulation material	Aerogel
Structure characteristics	Sealing type internal circling

Heating device

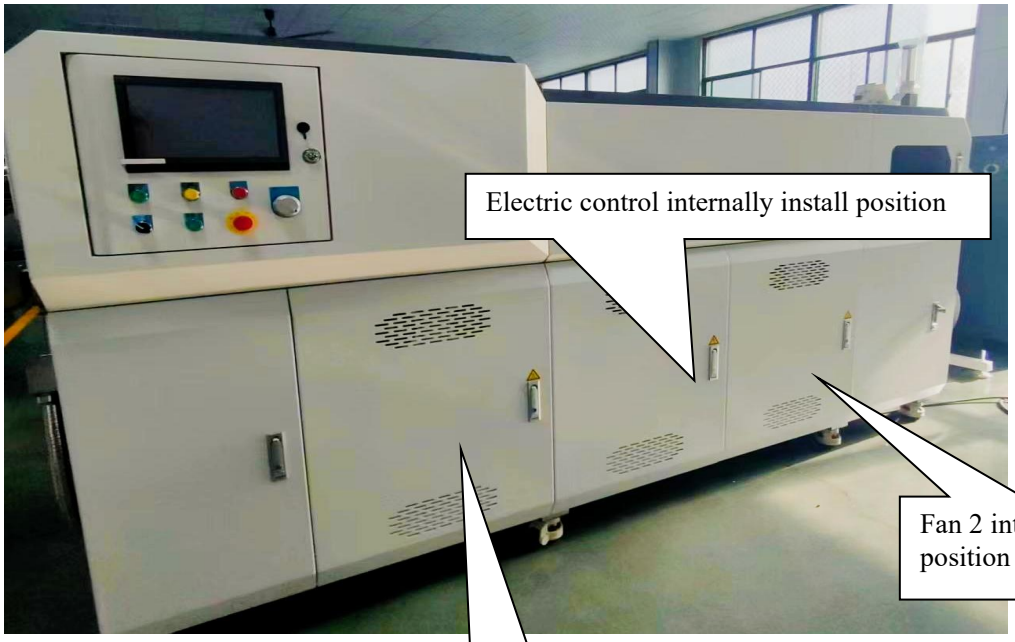
Heating method	Electric heating
Heating rod	Adopt anti dry burning type material (4*2.5KW 380V)
Thermocouple	Type K 304 material

High pressure fan

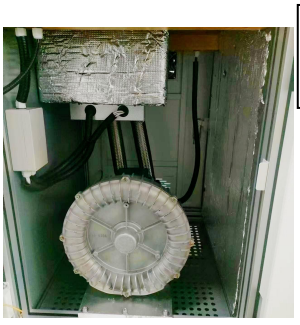
Power	2.2KW*2
Voltage	380V frequency conversion
Flow	300m³/h
Pressure	20KPA

Control device

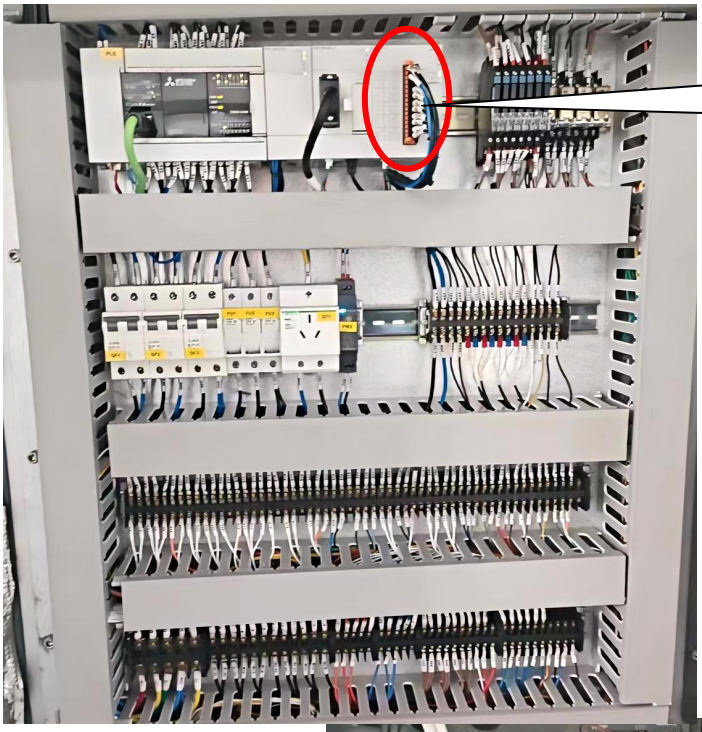
Controller	Mitsubishi temperature control module(FX5-4LC)
Electric relay	Three phase solidity electric relay(2-20A+40A)
Frequency transformer	Mitsubishi frequency transformer(FR-F840-2.2k)

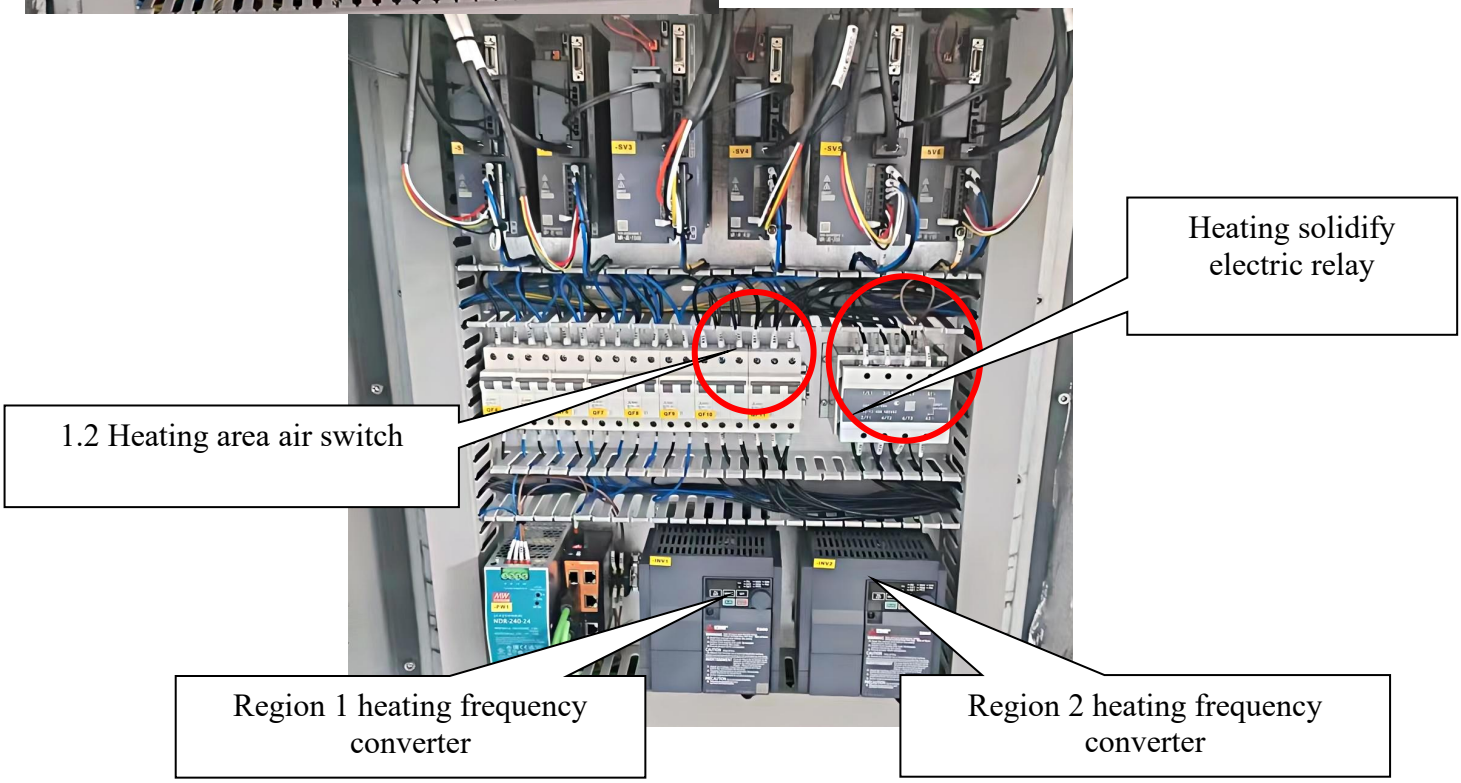


Fan:



Electric control:





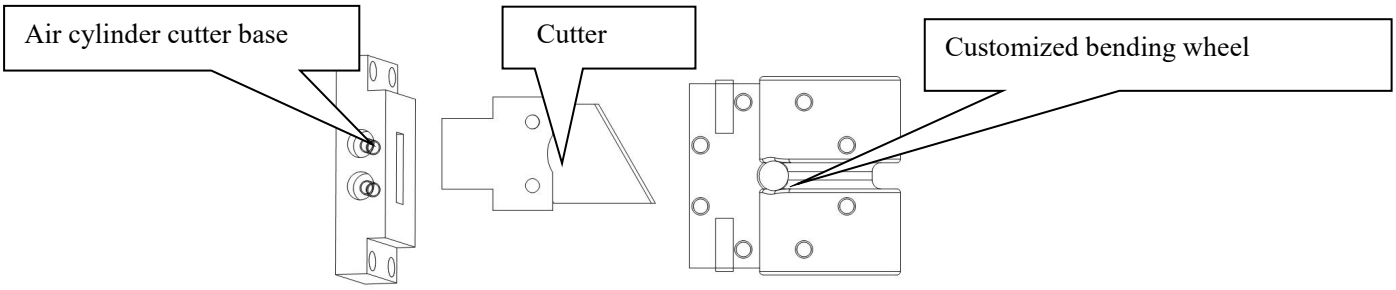
2. Pneumatic part instruction

Air pressure required 0.6~0.8MPa

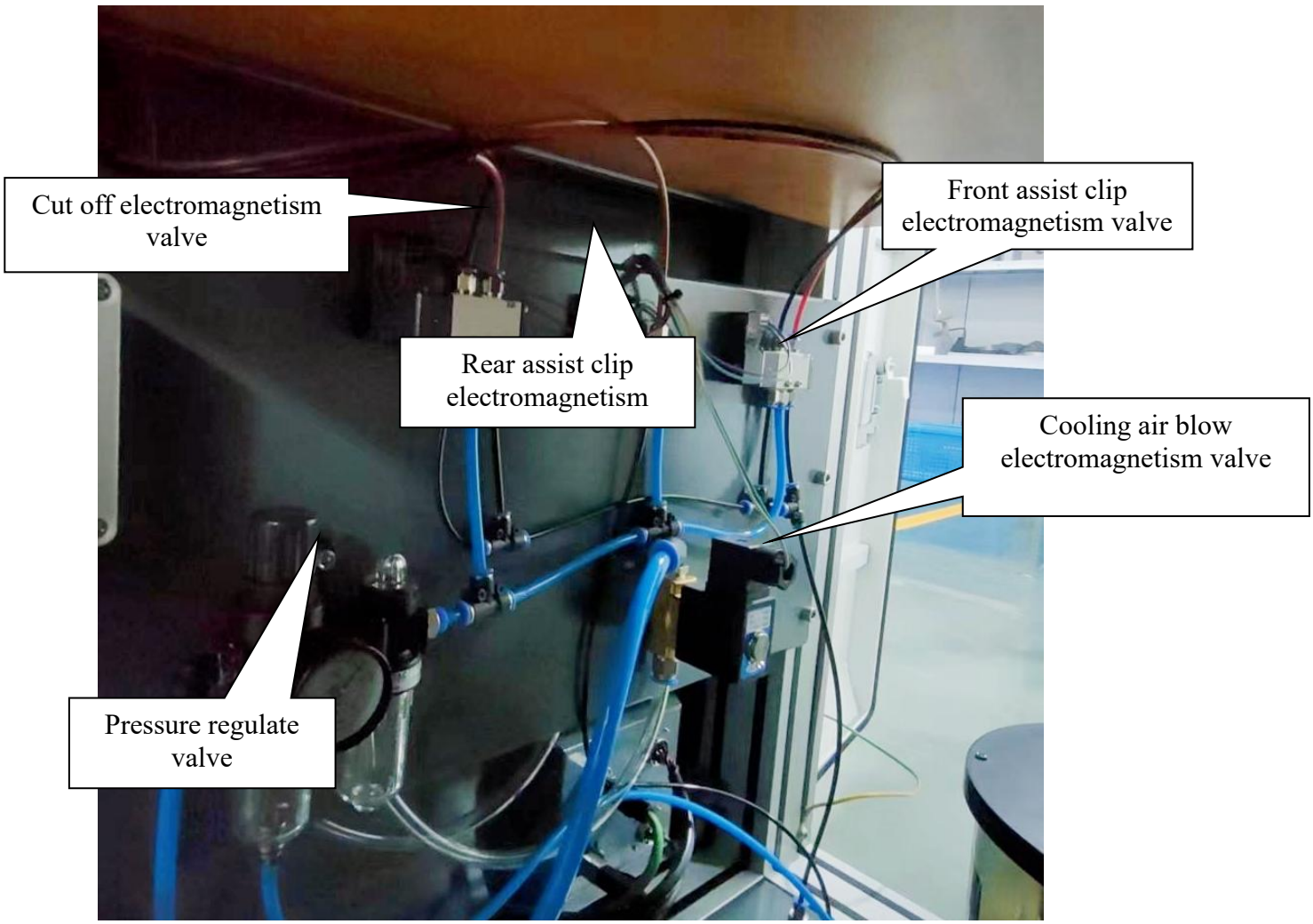
Select and use the air inlet tube with specification φ12

2.1 Pneumatic cutter device

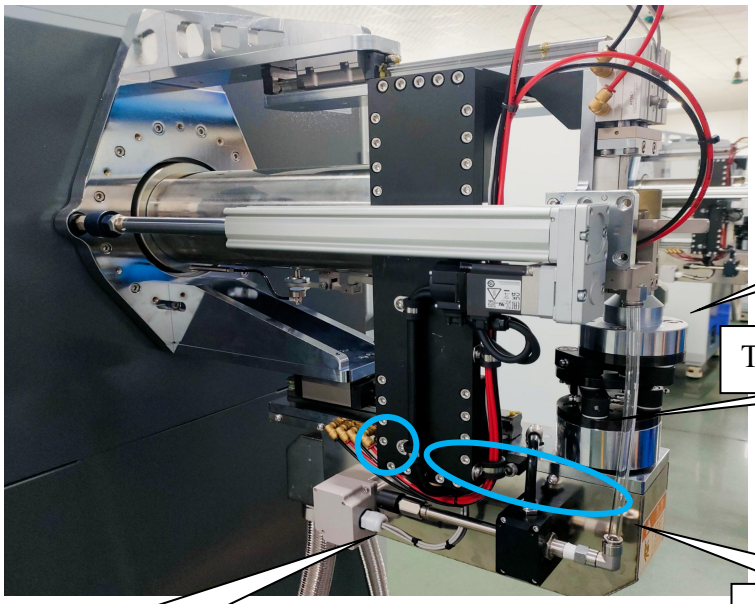
Pneumatic cutter assemble sketch instruction



Cutter air cylinder assembled at machine head position, the electromagnetism valve control the air cylinder open and close, drive the cutter cutting the bent products



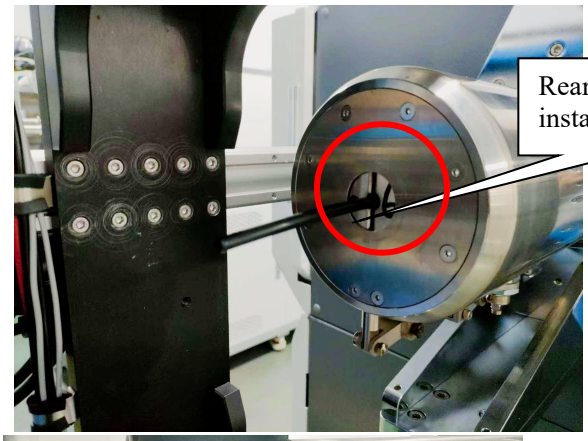
2.2 Cooling device instruction



Cooling air blow port assembled at machine head air tube bending position, the electromagnetism valve control the air connect or disconnect, process air blow cooling modeled by bent air tube

2.3 Pneumatic assist clip instruction

2.3.1 Pneumatic rear assist clip

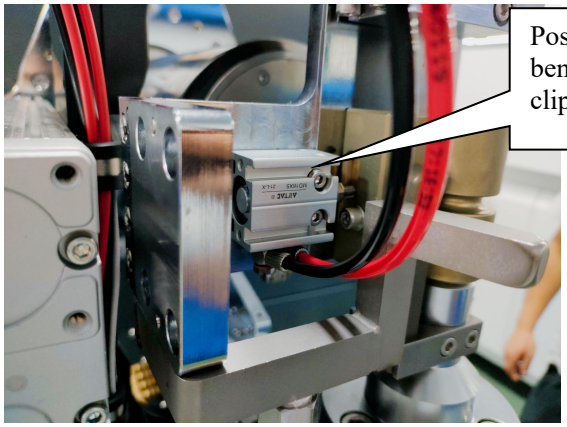


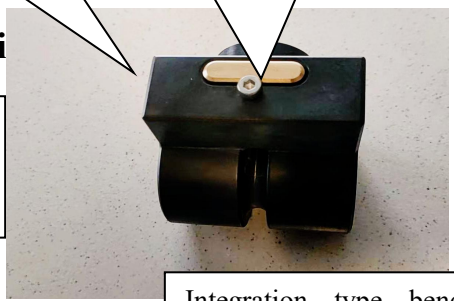
Air tube rear assist clip: the electromagnetism valve control the rear assist clip action air cylinder open and close, drive the rear assist clip action to realize that clip or loosen air tube

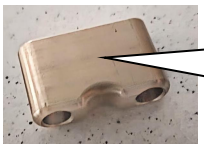
Attention: warning the high temperature, high temperature easily scald skin

2.3.2 Pneumatic front assist clip

Integrate type bending wheel pneumatic front assist cli

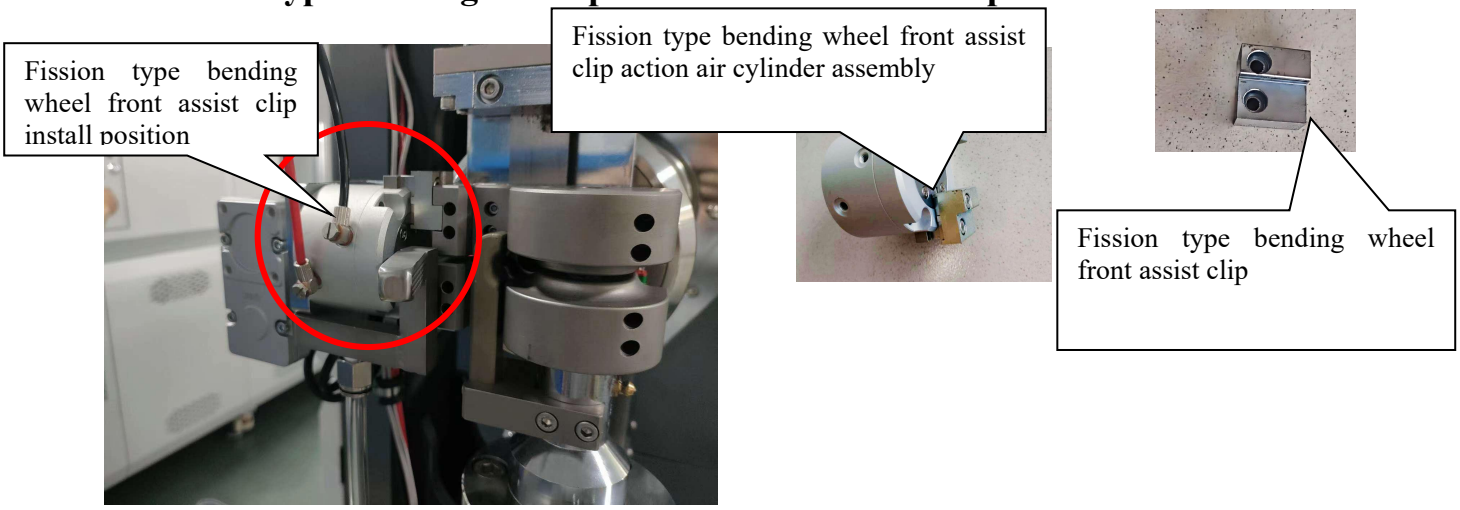


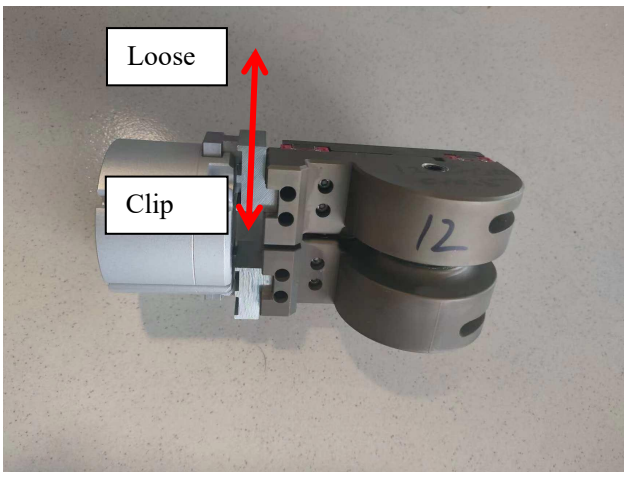




Integration type bending wheel air tube front assist clip: the electromagnetism valve control the front assist clip action air cylinder open and close, drive the front assist clip action to realize that clip or loosen air tube

Fission type bending wheel pneumatic front assist clip





Fission type bending wheel front assist clip: the electromagnetism valve control the front assist clip pneumatic assembly action, realize the fission type bending wheel clip and loosen, thus realize that clip or loosen air tube

2. Mechanical part instruction

3.1 Material feeding mechanism instruction

①. Tail guide tube

②. Material feeding drive down

③. Material feeding drive up

④. Up belt tension wheel

⑤. Down belt tension wheel

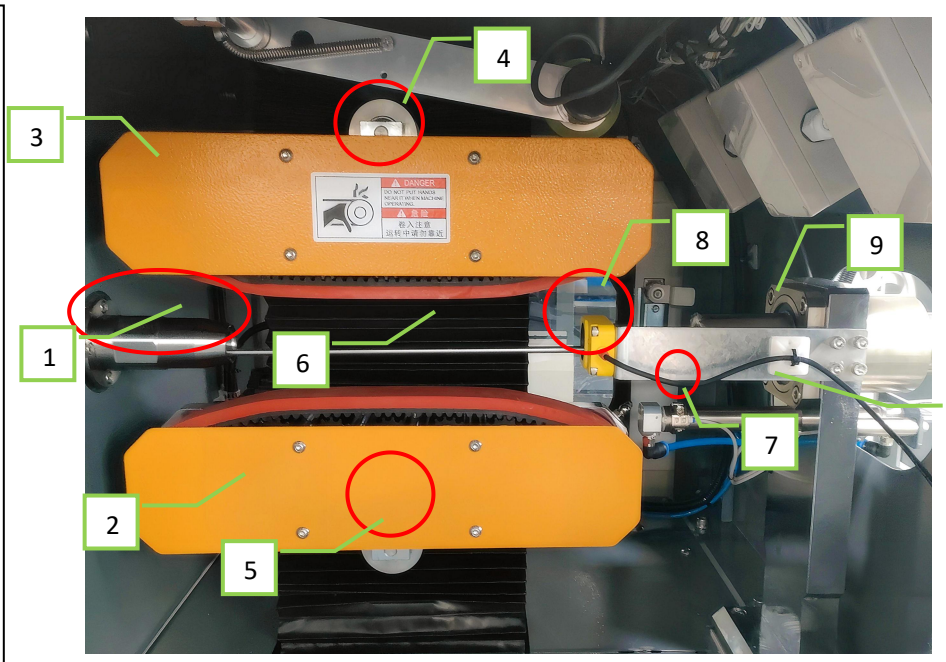
⑥.Draw bar in tube assembly

⑦.Core bar forward stretch spacing

⑧.Core bar forward stretch leave test

⑨.Permanent magnetism main body

⑩.Draw bar assembly action air cylinder

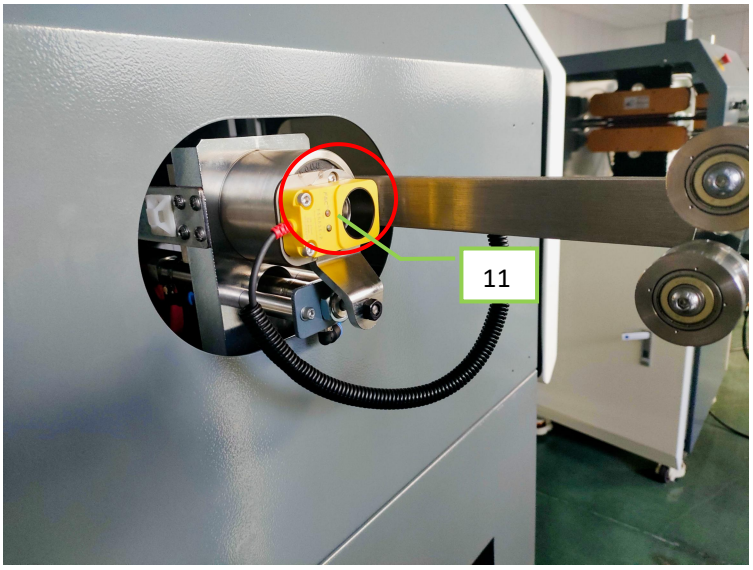


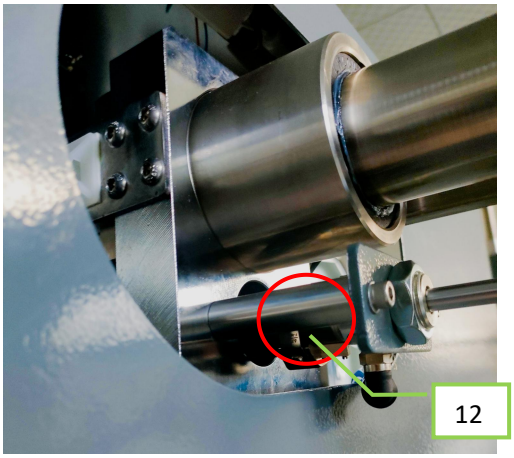
(11). Core bar withdraw to leave test

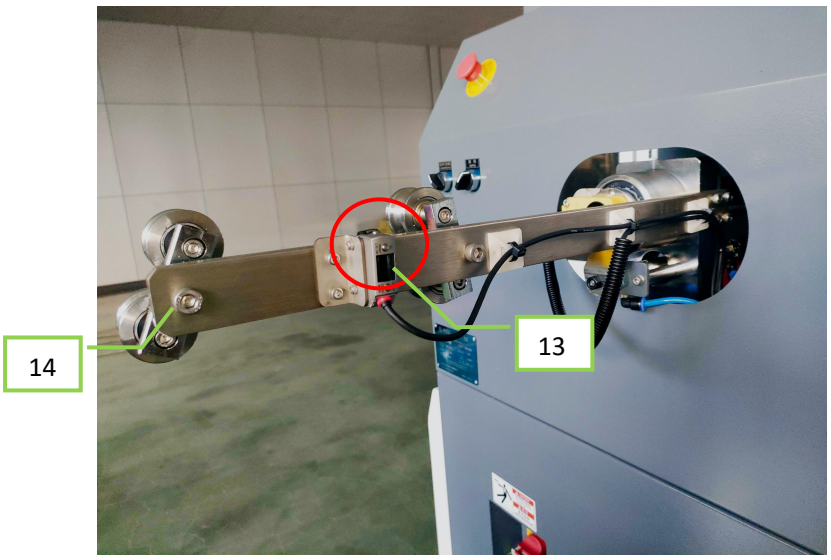
(12). Core bar withdraw spacing

Attention

Small tube diameter air tube production not configure magnetism absorb assembly, draw bar in tube assembly







(13). Raw material test

(14). Air tube material feeding guide wheel

Drag belt: environment protection anti wear material, adopt imported red gum integrate sulfuration syn belt;

Drag hoisting: servo hoisting adjustment;

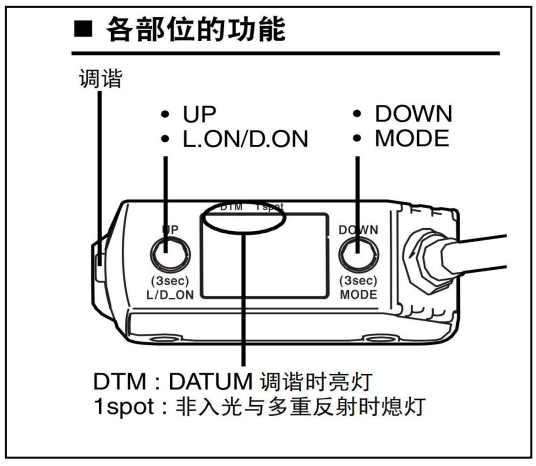
Speed setting: 1-50m/min (able to additionally setting according to production requirements);

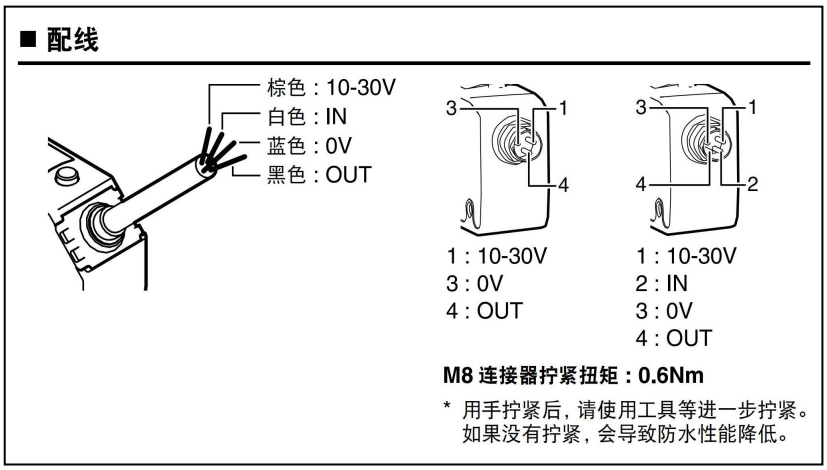
Drive motor: Mitsubishi servo motor;

Transmit method: precision planet reducer, provide accurate output;

Material feeding/lack test: KEYENCE fibre optical test device (LR-ZB100P);

Operating instruction of LR-ZB100P fibre optical test device:





各部位功能 Function of each position

调谐 Harmonious

DTM：DATUM 调谐时亮灯 DTM: lighting when DATUM harmonious

1spot：非入光与多重反射时熄灯 1 spot: extincted when non light enter and multiply reflecting

配线 Configure wires

棕色：Brown: 10-30V

白色：White: IN

蓝色：Blue: 0V

黑色：Black: OUT

MB 连接器拧紧扭矩：Twist torque of MB connector: 0.6Nm

•用手拧紧后，请使用工具等进一步拧紧。如果没有拧紧，会导致防水性能降低。Please use tool further tightly twist after hand tightly twist it. If not tightly twist it then will caused the water proof performance reduced.

LR-ZB100P

方形 反射型 电缆型 100mm

*请注意，图片中的配件可能不包括在产品中。

规格

型号		LR-ZB100P
类型		距离设定型 (BGS/FGS)
外观		矩形
输出		PNP
连接形态		2m 电缆
检测距离		35 至 100 mm (650 至 0)*1
标准检测段差		35 至 50 mm：1.5 mm 50 至 100 mm：3 mm
显示分辨率		2 (0.2 mm)
光点直径		100 mm 时，约 2 × 1 mm
响应时间		1.5ms/10ms/50ms 切换方式
光源	类型	红色激光 (660 nm)
	激光分类	1 类激光产品 (IEC60825-1、FDA (CDRH) Part1040.10*2)
功能	指示灯	3 位数 7 段显示 (红色)、输出指示灯 (黄色)、 DATUM 指示灯 (橙色)、1 spot 指示灯 (绿色)
	计时器	OFF/ON- 延时/OFF- 延时/ 单触
电气规格	电源电压	10-30 VDC、包含波动 10% (p-p)、Class 2 或 LPS
	消耗功率	450 mW 以下 (24 V 时在 18 mA 以下、12 V 时在 34 mA 以下)
	控制输出	PNP 集电极开路 外加电压在 30 VDC 以下、控制电流在 100 mA 以下、 残余电压 10 mA 以下时在 1.2 V 以下、10 至 100 mA 时在 2 V 以下
	保护电路	电源逆接保护、输出过电流保护、输出电涌保护、输出逆接保护
	输出动作	入光时 ON / 遮光时 ON 的切换方式
	外部输入	输入时间　调谐：35 ms 以上时 ON、35 ms 以上时 OFF 投光停止：2 ms 以上时 ON、20 ms 以上时 OFF 短路电流　NPN：1 mA 以下/ PNP：2 mA 以下
环境抗耐性	外壳防护级	IP68 (IEC60529)、IP69K (DIN40050-9)、ECOLAB*3、Diversey*3
	绝缘电阻	20 MΩ 以上 (500 VDC)
	环境光照	白炽灯：4,000 lux 以下 日光：8,000 lux 以下*4
	环境温度	-10 至 +50 °C (无冻结)
	存放环境温度	-25 至 +75 °C (无冻结)
	相对湿度	35 至 85 % RH (无凝结)
	耐电压	1,000 VAC、50/60 Hz、1 min
	抗震性	10 至 55 Hz、双振幅 1.5 mm、X,Y,Z 方向各 2 个小时
	耐冲击性	1,000 m/s², X,Y,Z 方向各 6 次

LR-ZB100P

方形 Square　反射型 Reflect type　电缆型 Cable type　100mm

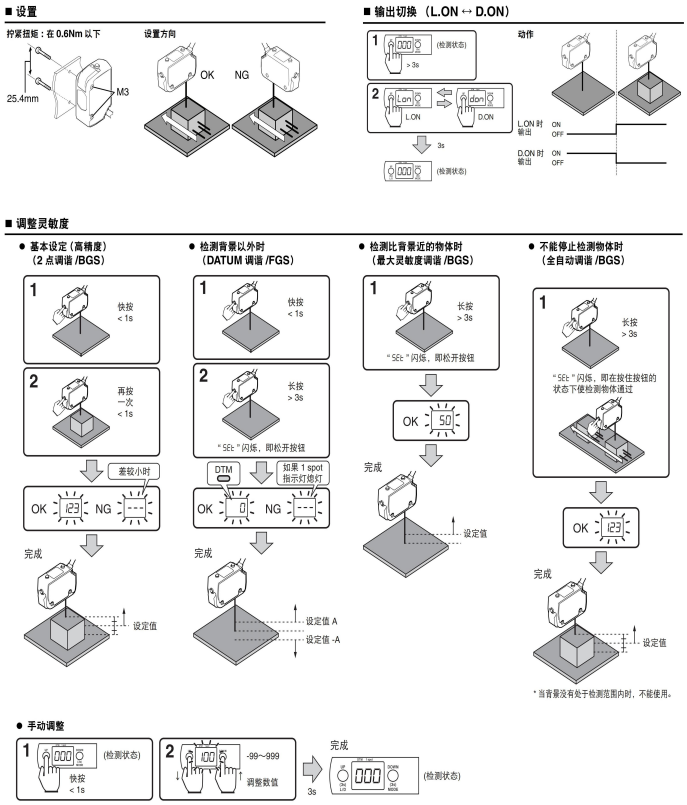
*请注意，图片中的配件可能不包括在产品中。Please attention, the accessories in the picture maybe not included into the product.

规格 Specification

型号 Model	LR-ZB100P
类型 Type	距离设定型 Distance setting type (BGS/FGS)
外观 Appearance	矩形 Rectangle
输出 Output	PNP
连接形态 Connect state	2m 电缆 2m cable
检测距离 Test distance	35 至 100mm(650 至 0)*1　35 to 100mm (650 to 0)*1
标准检测段差 Standard test section	35#50mm:1.5mm

difference		50#100mm:3mm
显示分辨率 Display resolution ratio		2 (0.2 mm)
光点直径 Light spot diameter		100mm 时,约 2x1mm About 2x1mm when at 100mm
响应时间 Response time		1.5ms/10ms/50ms 切换方式 shift method
光源 Light source	类型 Type	红色激光(660 nm) Red laser (660nm)
	激光分类 Laser classify	1 类激光产品 Category 1 laser products (IEC60825-1, FDA (CDRH) Part1040.10*2)
功能 Function	指示灯 Indicate lamp	3 位数 7 段显示(红色). 输出指示灯(黄色). DATUM 指示灯(橙色). 1 spot 指示灯(綠色) 3 byte number section display (red), output indicate lamp (yellow), DATUM indicate lamp (orange), 1 spot indicate lamp (green)
	计时器 Timer	OFF/ON- 延时/OFF- 延时/单触 OFF/ON-delay/OFF-delay/single touch
电气规格 Electric specification	电源电压 Power supply voltage	10-30 VDC. 包含波劫 10% (p-p). Class 2 或 LPS 10-30 VDC, include wave 10% (p-p), Class 2 or LPS
	消耗功率 Consumed power	450mW 以下 Under 450mW (24V 时在 18mA 以下. 12V 时在 34mA 以下) (under 18mA when at 24V, under 34mA when at 12V)
	控制输出 Control output	PNP 集电极开路 PNP collector open circuit 外加电压在 30 VDC 以下. 控制电流在 100 mA 以下. 残余电压 10 mA 以下时在 1.2V 以下. 10 至 100 mA 时在 2V 以下 Externally added voltage under 30VDC, control current under 100mA, residual voltage under 1.2V when under 10mA, under 2V when under 10 to 100mA
	保护电路 Protection electric circuit	电源逆接保护. 输出过电流保护. 输出电涌保护. 输出逆接保护 Power supply reversely connection protection, output over current protection, output surge protection, output reversely connect protection
	输出动作 Output action	入光时 ON /遮光时 ON 的切换方式 Shift method when in light ON/shield light ON
	外部输入 External input	输入时间 调谐:35ms 以上时 ON. 35ms 以上时 OFF 投光停止:2ms 以上时 ON. 20ms 以上时 OFF 短电流 NPN：1mA 以下/PNP：2mA 以下 Input time Harmonious: ON when above 35ms, OFF when above 35ms Light projecting stop: ON when above 2ms, OFF when above 20ms Short current NPN: under 1mA/PNP: under 2mA
环境抗耐性 Environment anti and withstand performance	外壳防护级 Shell protection level	IP68 (IEC60529), IP69K (DIN40050-9), ECOLAB*3. Diversey*
	绝缘电阻 Insulation electric resistance	20MΩ以上 Above 20MΩ(500 VDC)
	环境光照 Environment light shining	白炽灯：4,000 lux 以下 日光：8,000 lux 以下*4 Filament lamp: under 4,000lux Sunlight: under 8,000lux*4
	环境温度 Environment temperature	-10 至+50 ℃ (无冻结) -10 to +50 ℃ (no freeze)
	存放环境温度 Storage environment temperature	-25 至+75℃ (无冻结) -25 to +75℃ (no freeze)
	相对湿度 The relative humidity	35 至 85%RH(无凝结) 35 to 85%RH (no condensation)
	耐电压 Withstand voltage	1,000 VAC, 50/60 Hz, 1 min
	抗震性 Anti vibrate performance	10 至 55 Hz. 双振幅 1.5 mm, X,Y,Z 方向各 2 个小时 10 to 55Hz, dual amplitude 1.5mm, each 2 hours at direction X, Y and Z

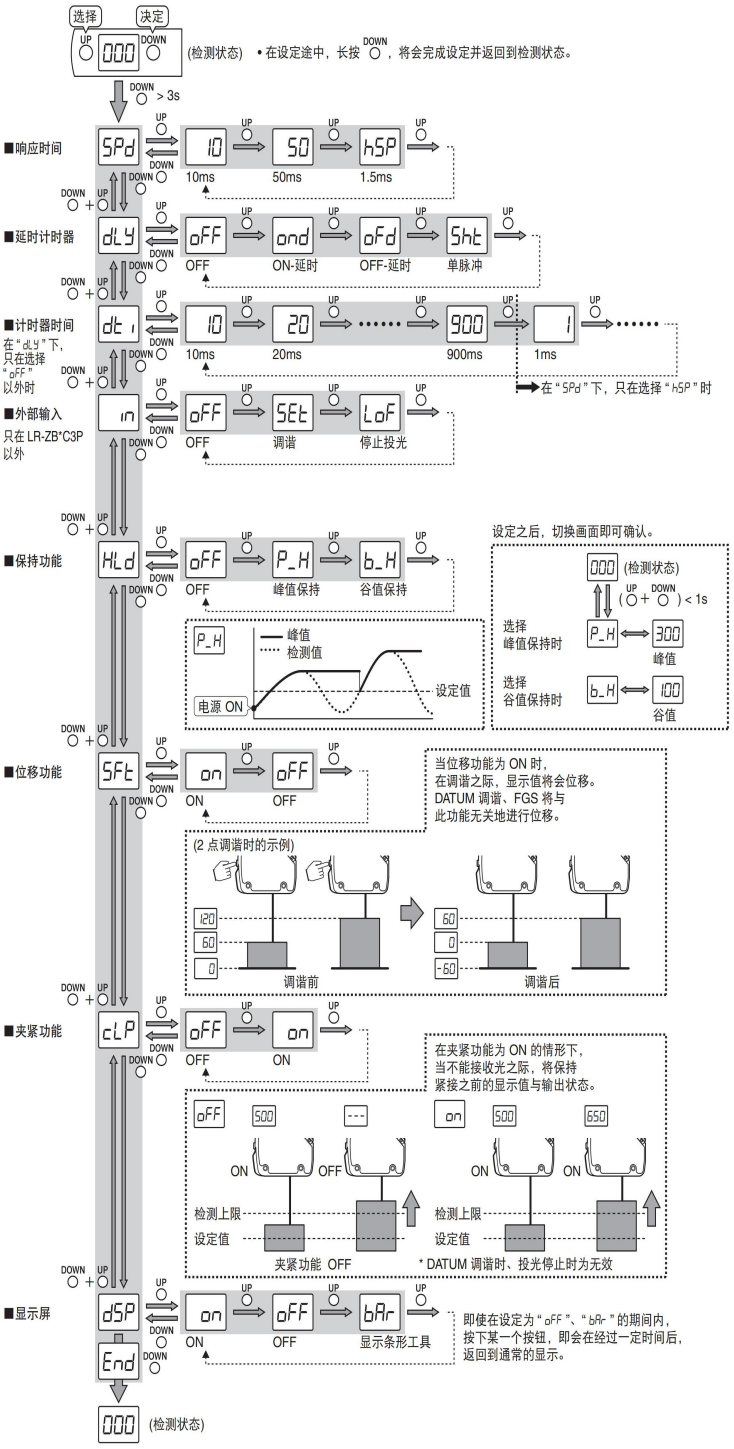
	耐冲击性 Anti shock performance	1.000 m/s2. X,Y,Z 方向各 6 次 1.000 m/s^2. Each 6 times at direction X, Y and Z

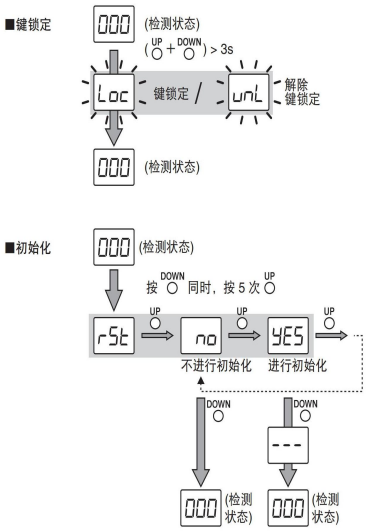


拧紧扭矩：在 0.6Nm 以下 Tightly twist torque: under 0.6Nm
设置方向 Setting direction
输出切换 Output shift
检测状态 Test state
动作 Action
输出 Output
调整灵敏度 Adjustment sensitivity
•基本设定(高精度)(2 点调谐/BGS)Basic setting (high precision) (2 points harmonious/BGS)
•检测背景以外时(DATUM 调谐/FGS)When test out of background (DATUM harmonious/FGS)
•检测比背景近的物体时(最大灵敏度调谐/BGS) When test the object which more close than background (the max sensitivity harmonious/BGS)
•不能停止检测物体时(全自动调谐/BGS)When unable to stop test object (fully automatic harmonious/BGS)
1 快按<1S Quickly press<1S
再按一次 One time press again
长按 Long time press
“SEE”闪烁，即松开按钮 “SEE” flashing, then loosen button
长按>3s Long time press>3s
“SEE”闪烁，即在按住按钮的状态下使检测物体通过 “SEE” flashing, then make the tested object pass through under the status that pressed button
差较小时 When smaller difference
完成 Finish
如果 1spot 指示灯熄灯 If 1 spot indicate lamp extincted
设定值 Setting value
*当背景没有处于检测范围内时，不能使用。 *Unable to use when background not be in test range.
手动调整 Manual adjustment
(检测状态) (Test status)

调整数值 Adjust value

详细设定





初始值一览

项目	初始值	项目	初始值
响应时间	10ms	位移功能	ON
延时计时器	OFF	夹紧功能 OFF	OFF
计时器时间	10ms	显示屏	ON
外部输入	OFF	设定值	LR-ZB100* : 300 LR-ZB250* : 100
保持功能	OFF	输出逻辑	L.ON

数值以外的显示

显示	内容	确认与对策	控制输出
ErC	在控制输出上存在 100mA 以上的电流	• 确认负载的电阻值。 • 确认控制输出线是否与其他的线相接触。	OFF
ErS	系统错误	请与就近的 KEYENCE 办事处联系。	OFF
ErL	激光二极管故障		FAR
ErE	记忆传感器设定的 EEPROM 的错误 *		通常
uuu	反射光量过多	调整传感器的设置角度。	不定
---	反射光量不足	• 确认检测距离是否处于规格范围内。 • 调整传感器的设置角度。	FAR
-FF	检测物体位于远离显示范围的地方	• 原封不动地使用。 • 将位移功能置于 "OFF"。	通常
Loc	键锁定功能处于有效的状态	同时按 (> 3s) UP+DOWN 解除键锁定功能。	通常
P_H	显示峰值	同时按 UP+DOWN 切换画面。	通常
b_H	显示谷值	同时按 UP+DOWN 切换画面。	通常
熄灯	传感器没有接通电源	• 确认电源电压、电源容量。 • 确认传感器的电源线。	不定

* 设定的覆盖次数的上限为 100 万次。

选择 Selection

决定 Decision

(检测状态) 在设定中，长按 DOWN，将会完成设定并返回到检测状态。(Test status) Long time press DOWN during setting, this will finish setting and return to test status.

■响应时间 Response time

■延时计时器 Delay timer

■计时器时间在"oly"下，只在选择"OFF"以外时 When timer time under "oly", and only can select out of "OFF"

■外部输入只在 LR-ZB*C3P 以外 External input only out of LR-ZB*C3P
ON-延时 OFF-延时 单脉冲 ON-delay OFF- delay Single pulse
在“5Pd”下，只在选择“h5P”时 When only select “h5p” under “5Pd”
调谐 Harmonious 停止投光 Stop shooting light
■保持功能 Keep function
峰值保持 Keep peak value
谷值保持 Keep valley value
峰值 Peak value
检测值 Test value
设定值 Setting value
设定之后，切换画面即可确认 Shift tableau then can confirm after setting
(检测状态)(Test status)
选择峰值保持时 Select peak value keeping
选择谷值保持时 Select valley value keeping
峰值 Peak value
谷值 Valley valuE
■位移功能 Displacement function
(2 点调谐时的示例)(Sample of 2 points harmonious)
调谐前 调谐后 Before harmonious After harmonious
当位移功能为 ON 时， When displacement function is ON
在调谐之际，显示值将会位移。Display value will displacement when at harmonious
DATUM 调谐. FGS 将与此功能无关地进行位移。DATUM harmonious and FGS will displacement without relate to this function
■夹紧功能 Clip function
在夹紧功能为 ON 的情形下，当不能接收光之际，将保持紧接之前的显示值与输出状态。Will keep the display value and output status before keep tightly connect when unable to receive light under the situation that clip function is ON
检测上限 Test up limit
设定值 Setting value
夹紧功能 OFF Clip function OFF
DATUM 调谐时. 投光停止时为无效 Invalid when DATUM harmonious and shooting light stop
■显示屏 Display screen
显示条形工具 Display strip shape tool
即使在设定为“OFF”. “bPr”的期间内，按下某一个按钮，即会在经过一定时间后，返回到通常的显示。
(检测状态)Press down one button even though in the period during setting is “OFF” and “bPr”, then will return to common display after pass through a certain time.
■键锁定 Key lock
解除键锁定 Release key lock
■初始化 Initialize
按 DOWN 同时，按 5 次 UP Press 5 times UP at the same time of press DOWN
不进行初始化 Not process initialization 进行初始化 Process initialization
初始值一览 Initial value view

项目 Item	初 始 值 Initial value
响应时间 Response time	10ms
延时计时器 Delay timer	OFF
计时器时间 Timer time	10ms
外部输入 External input	OFF
保持功能 Keep function	OFF

项目 Item	初始值 Initial value
位移功能 Displacement function	ON
夹紧功能 Clip function OFF	OFF
显示屏 Display screen	ON
设定值 Setting value	LR-ZB100*:300 LR-ZB250*:100
输出逻辑 Output logic	LON

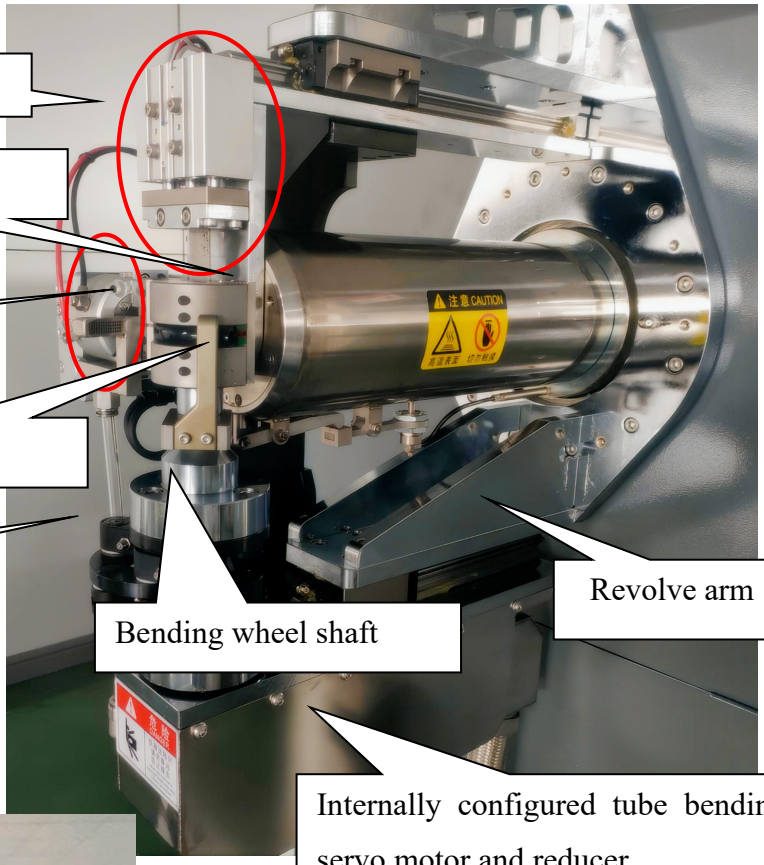
数值以外的显示 Display out of value

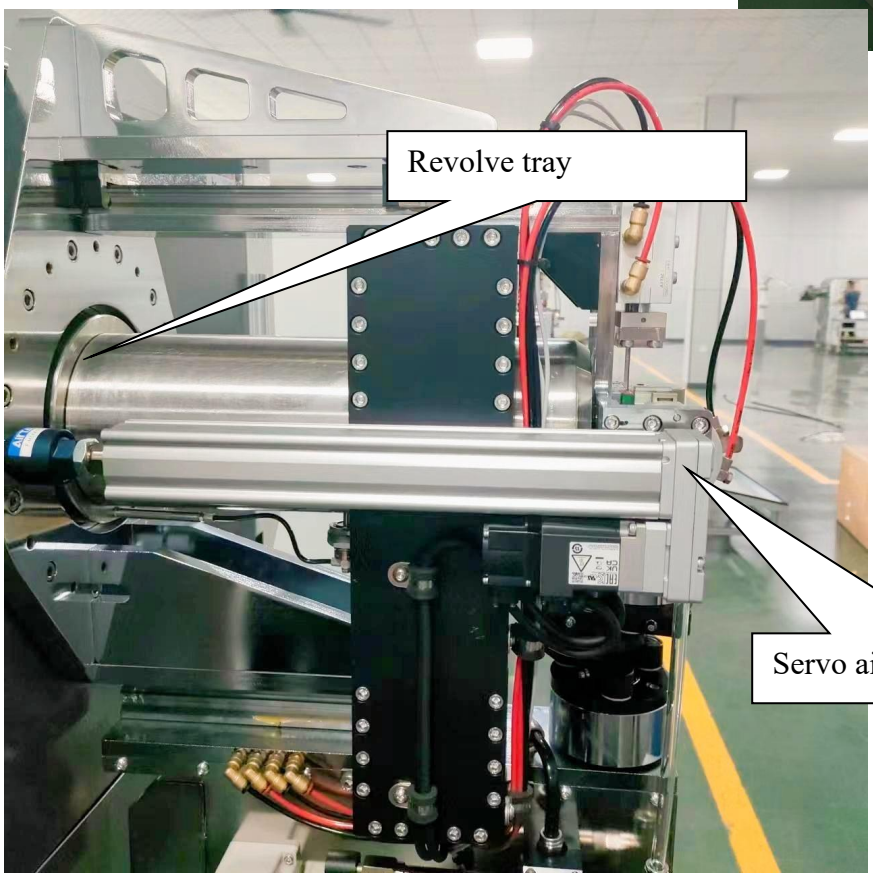
显 示 Display	内容 Contents	确认与对策 Confirm and policy	控 制 输 出 Control output
ErC	在控制输出上存在	● 确 认 负 载 的 电 阻 值 。 Confirm the	OFF

	100mA 以上的电流 Existing current above 100mA on the control output	electric resistance value of load ●确认控制输出线是否与其他的线相接触。 Confirm whether control output wire contact with other wire and phase.	
ErS	系统错误 System error	请与就近的 KEYENCE 办事处联系。Please contact the nearby KEYENCE office	OFF
ErL	激光二极管故障 Laser diode failure		FAR
ErE	记忆传感器设定的 EEPROM 的错误 * Memory sensor setting EEPROM error		通常 Usually
uuu	反射光量过多 Too much reflect light quantity	调整传感器的设置角度。Adjust the setting angle of sensor.	不定 Uncertain
---	反射光量不足 Not enough reflect light quantity	●确认检测距离是否处于规格范围内。Confirm whether test distance be in specification range. ●调整传感器的设置角度。Adjust the setting angle of sensor.	FAR
-FF	检测物体位于远离显示范围的地方 Test objects locate at the place where far away display range	●原封不动地使用。Use in origin. ●将位移功能置于“OFF"。 Set the displacement function at “OFF”.	通常 Usually
Loc	键锁定功能处于有效的状态 Key lock function be at valid status	同时按(> 3s) UP+DOWN 解除键锁定功能。Press (>3s) UP+DOWN at the same time to release key lock functions.	通常 Usually
P_H	显示峰值 Display peak value	同时按 UP+DOWN 切换画面。Press UP+DOWN at the same time to shift tableau.	通常 Usually
b_H	显示谷值 Display valley value	同时按 UP+DOWN 切换画面。Press UP+DOWN at the same time to shift tableau.	通常 Usually
熄灯	传感器没有接通电源 Sensor not connect power supply	●确认电源电压. 电源容量。Confirm the power supply voltage and power supply capacity. ●确认传感器的电源线。Confirm the power supply wire of sensor.	不定 Uncertain

*设定的覆盖次数的上限为 100 万次。Set the up limit of cover times at 1,000,000 times.

3.2 Forward stretch tube bending modeled and revolve mechanism instruction

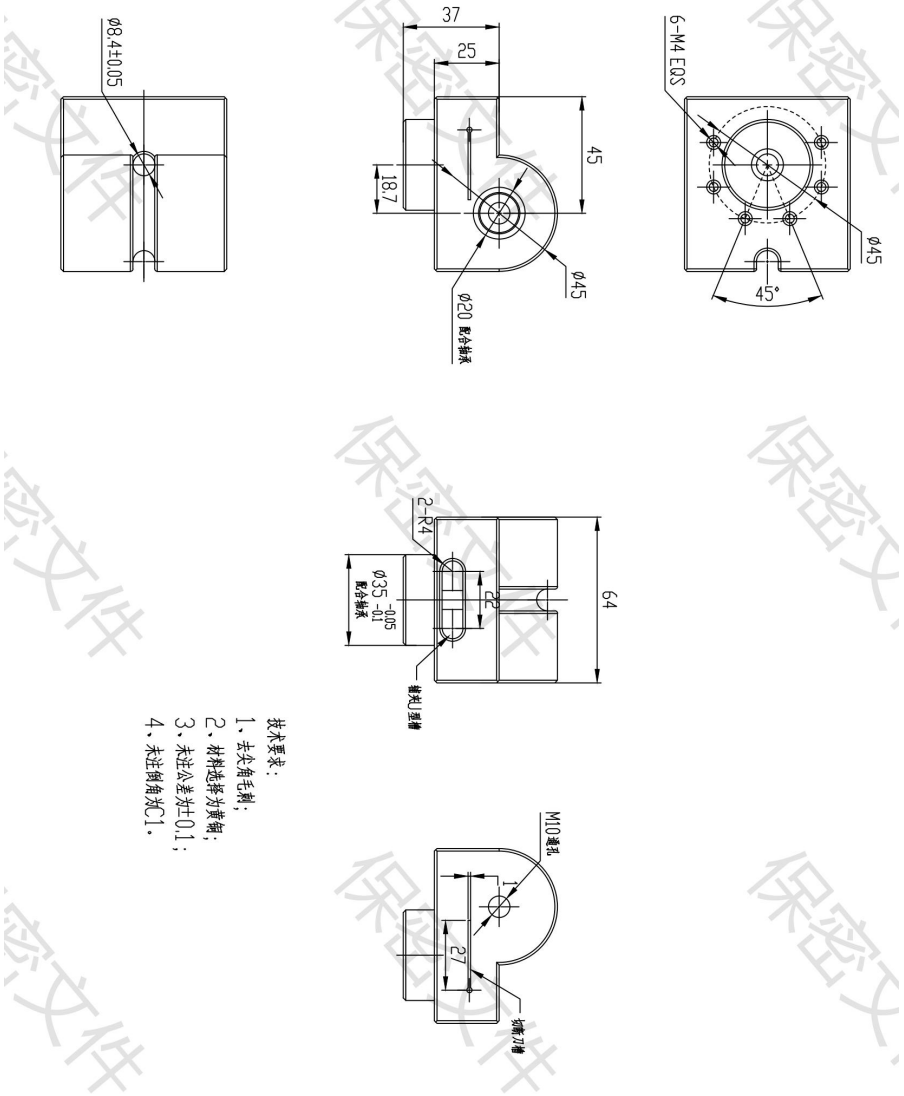




Motor: Mitsubishi servo motor
Reducer: planet directly connect precision reducer + right angle precision reducer;
Syn belt: GATES syn belt;
Main shaft: dual position bearing installation (customized)
Cooler: AITAIKE vortex tube;
Cut off device: pneumatic cut off method;
Bending wheel: integrate type bending wheel/fission type bending wheel;

3.3 Bending wheel structure drawing

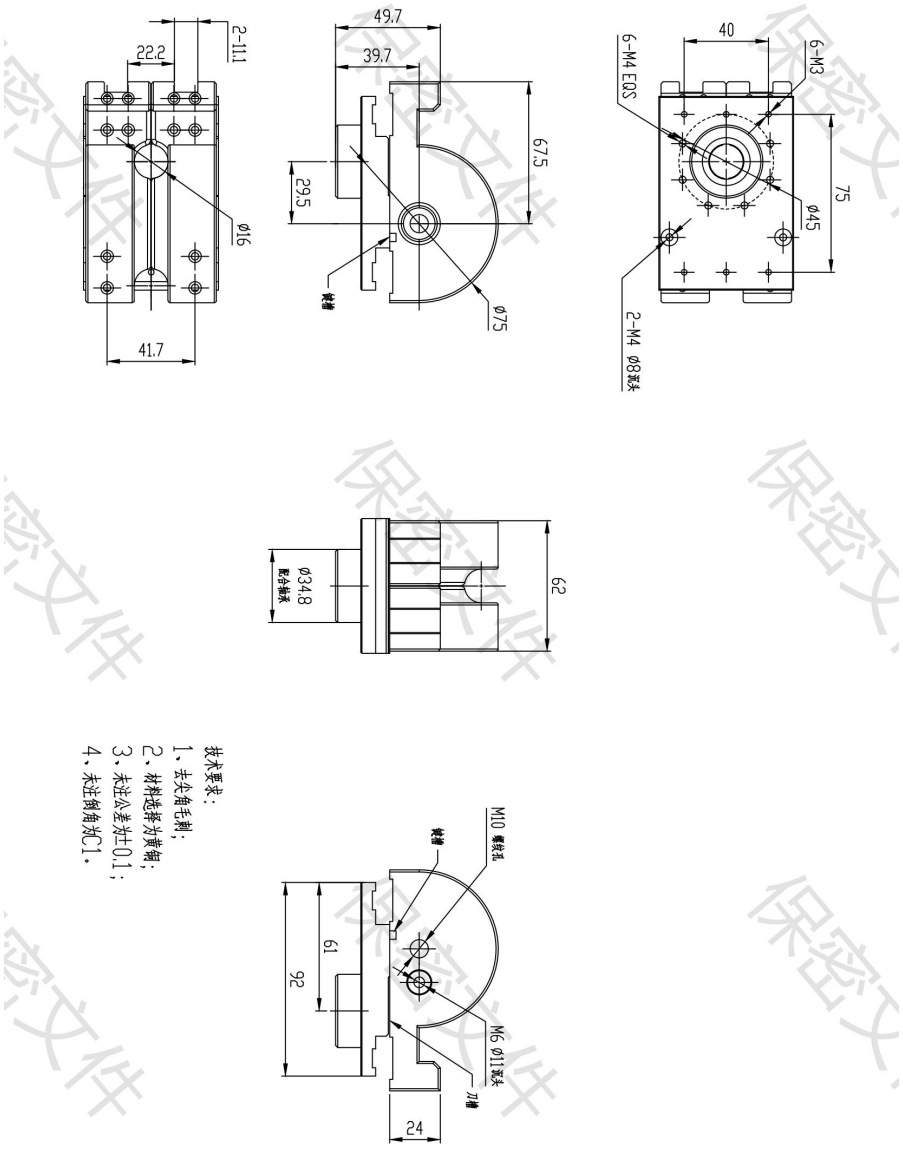
3.3.1 Integrate type bending wheel structure drawing



配合轴承 Fit bearing
辅夹 U 型槽 Type U groove of assist clip
M10 通孔 M10 through hole
切断刀槽 Cut off cutter groove
技术要求： Technical requirements:
1.去尖角毛刺；Remove sharp edge and burr;
2. 材料选择为黄铜；Material select brass;
3. 未注公差为±0.1；Non noted tolerance is ±0.1;

4. 未注倒角为 C1. Non noted chamfer is C1.

3.3.2 分体式弯轮结构图 Fission type bending wheel structure drawing



键槽 Key groove 沉头 Sediment head
刀槽 Cutter groove 螺纹孔 Screw hole 键槽 Key groove
技术要求： Technical requirements:
1.去尖角毛刺；Remove sharp edge and burr;
2. 材料选择为黄铜；Material select brass;

3. 未注公差为±0.1；Non noted tolerance is ±0.1;
4. 未注倒角为 C1. Non noted chamfer is C1.

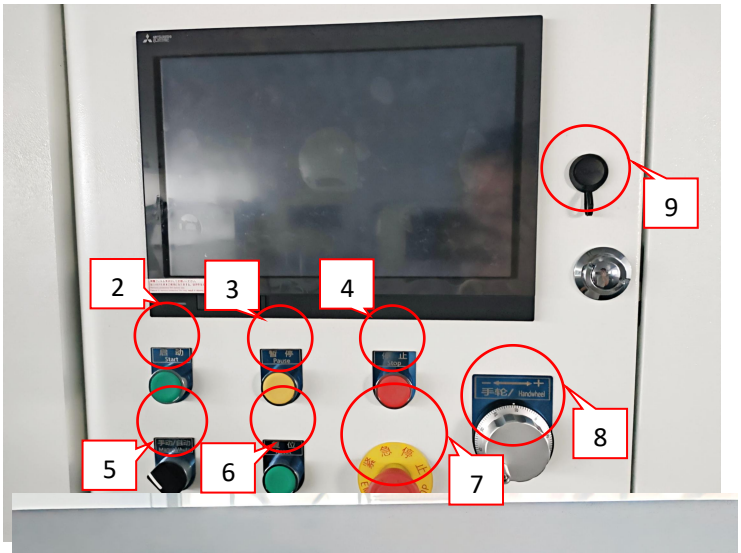
Chapter V Start machine summary and program

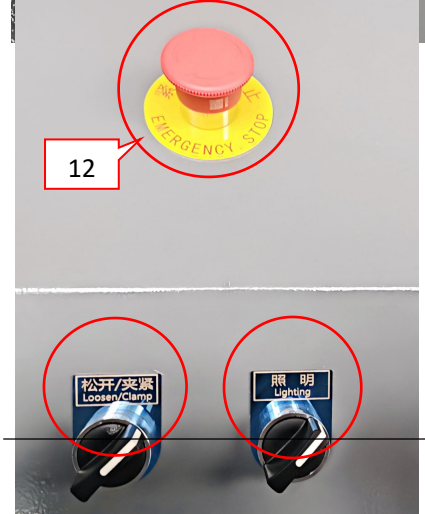
1. Start machine inspection

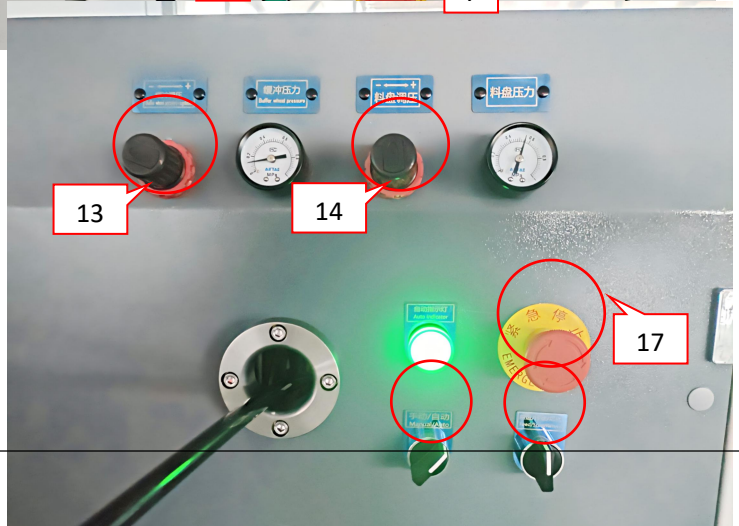
Must process the below operation before use the machine:

1. Check the power supply voltage of this machine to machine, and check whether it is according to the clearly marked voltage on the data plate of the machine;
2. Check the air source. Open the main valve of this machine, and set the operating pressure value at 0.6-0.8Mpa;
3. Check whether the position of machine head revolve arm and tube bending mechanism are correct;
4. Check whether material leading is correct;
5. Check whether equipment electric cabinet and protection door are closed.

2. Key operation instruction of control device







10 11 15 16

① General power supply switch: start and close the equipment general power supply, must close and lock when maintaining;

② Start button: program start machining under the automatic machining mode after press down it;

③ Pause button: program pause machining under the automatic machining mode after press down it, press start key to secondary starting;

④ Stop button: program stop machining under the automatic machining mode after press down it, each shaft automatic reset after cut off, shift to manual mode after stopped, and one time press reset button;

⑤ Manual/automatic select switch: select “Manual” and “Automatic” mode under start machine status; need shift to “Manual” mode after equipment alarm failure, then reset to release it;

⑥ Reset button: each shaft reset after pressed down under the manual situation, able to press reset key to release the common failure alarm;

⑦ Emergency stop button (Front): the equipment stop the current works after press down it anytime, (EU version equipment: cut off the power supply), revolve this button to release it;

⑧ Hand wheel: rotate the hand wheel under manual mode, then can realize the actions such as feeding material, vert and tube bending;

⑨ USB joggle: able to realize that input and copy the machining parameters;

⑩ Conveyor loosen/clip key switch: “Loosen” of material feeding drag (tube part loosen), select “Clip” (tube clipped);

⑪ Lighting switch: lighting in the material feeding mechanism;

⑫ Emergency stop button (rear): the equipment stop the current works after press down it anytime, revolve this button to release it;

⑬ Buffer pressure regulate switch: vertically outward push regulate switch, rotate switch then can regulate the air pressure to the buffer mechanism, press down the switch and lock after finish regulation then okay;

⑭ Material tray pressure regulate switch: vertically outward push regulate switch, rotate switch then can regulate the air pressure to the material tray mechanism mechanism, press down the switch and lock after finish regulation then okay;

⑮ Material tray manual/automatic select switch: select “Manual” and “Automatic” mode under the start machine status; select “Automatic” mode under normal working situation then okay; able to select “Manual” mode cooperate to pass through tube when need change material and pass through tube;

⑯ Material tray forward/stop/backward select switch: select this switch then can realize the material tray positive, stop and reverse running under material tray manual mode;

⑰ Emergency stop button : the equipment stop the current works after press down it anytime, revolve this button to release it;

3. Control terminal summary

3.1 Initial tableau

赛曼斯 版本：20240720 SAIMANSI Version: 2024720
初始画面 Initial tableau
运行模式 Running mode
档案管理 File management 报警记录 Alarm records 参数设置 Parameter setting
维护信息 Maintain information 密码管理 Password management
全自动弯管机 Fully automatic tube bending machine
Select the required language at this tableau after start machine.

3.2 Running tableau

3.2.1 Manual tableau (Revolve “Manual/automatic “ key, make it on “Manual”)

手动模式 Manual mode
加热开启 Heating start
加热关闭 Heating close
冷却打开 Cooling open
前辅夹夹紧 Front assist clip tightly clipped
1 区温度℃ Region 1 temperature ℃
2 区温度℃ Region 2 temperature ℃
风机 1 频率 Hz Fan 1 frequency Hz
风机 2 频率 Hz Fan 2 frequency Hz
后辅夹夹紧 Rear assist clip tightly clipped
切刀伸出 Cutter stretch out
芯棒插入 Core bar insert
手动打标 Manual marking
手脉速率选择 Manual pulse speed ratio selection
前送料 Front feeding material
回零 Return to zero
后送料 Rear feeding material
清零 Reset
倾转 Vert
回零 Return to zero
弯管 Tube bending
回零 Return to zero
牵引升降 Drag hoisting
同步送料 Syn feeding material

Heating start: fan and heating start at the same time;

Heating close : fan and heating close at the same time;

Cooling open: cooling electromagnetism open, cooling device air blow open;

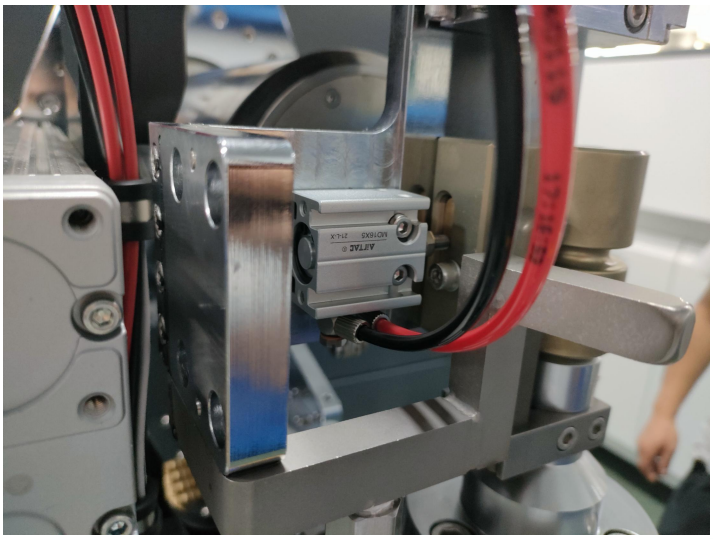
Cooling close: cooling electromagnetism close, cooling device air blow stop;

Front assist clip tightly clipped :front assist clip electromagnetism open, machine head assist clip air cylinder jack out;

Front assist clip loosen: front assist clip electromagnetism close, machine head assist clip air cylinder draw back;

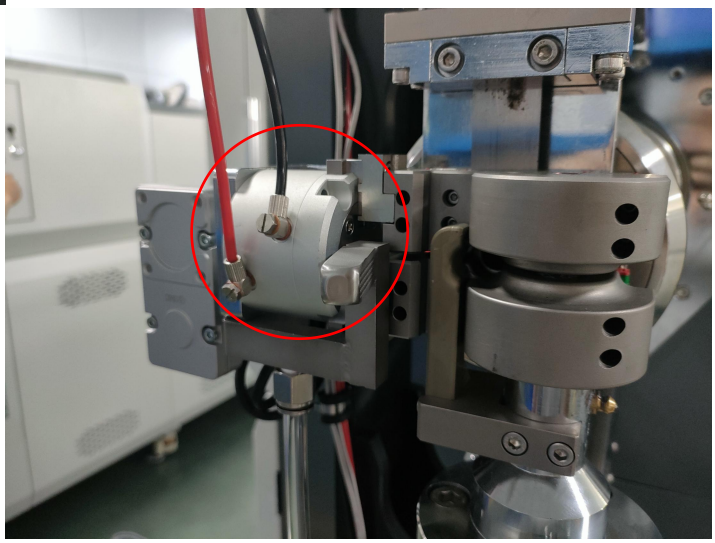
Rear assist clip tightly clip :rear assist clip electromagnetism open, machine head rear assist clip air cylinder jack out;

Rear assist clip loosen: rear assist clip electromagnetism close, machine head assist clip air cylinder draw back;

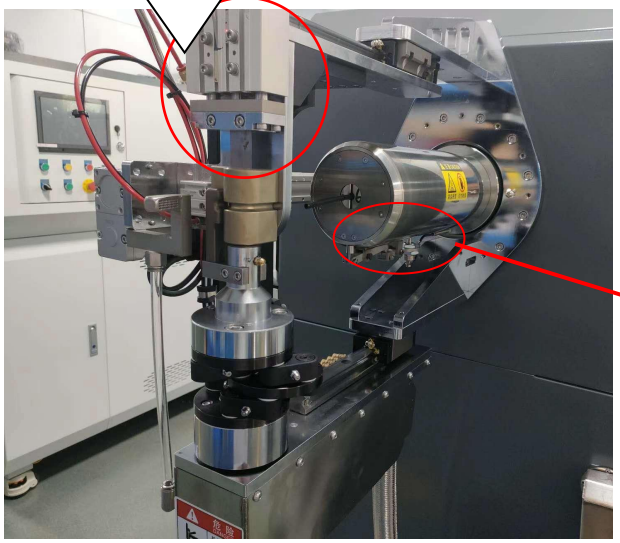


The left picture shown the integration type bending wheel machine head assist clip air cylinder

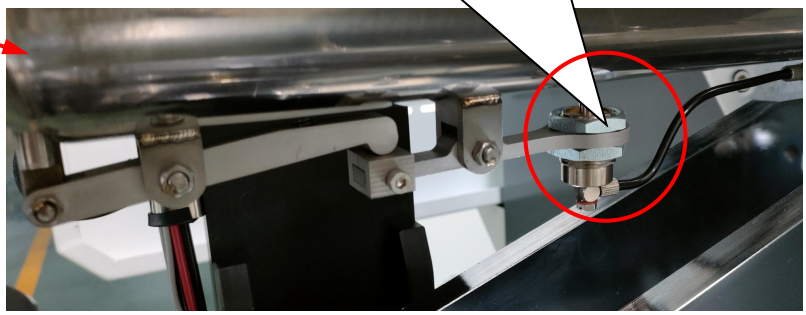
The right picture shown the fission type bending wheel machine head assist clip air cylinder



Cutter assembly

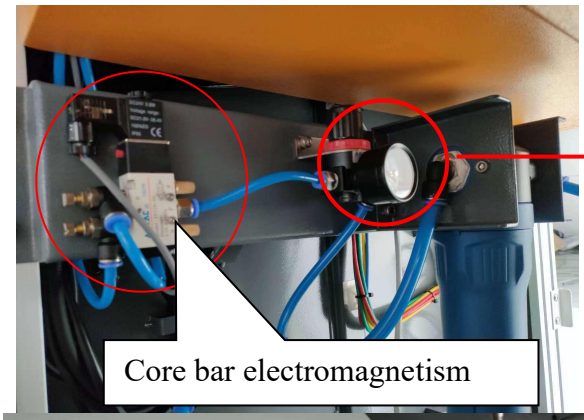


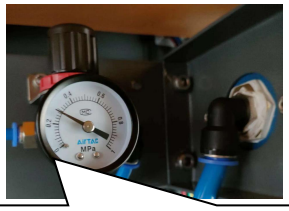
Rear assist clip action air cylinder

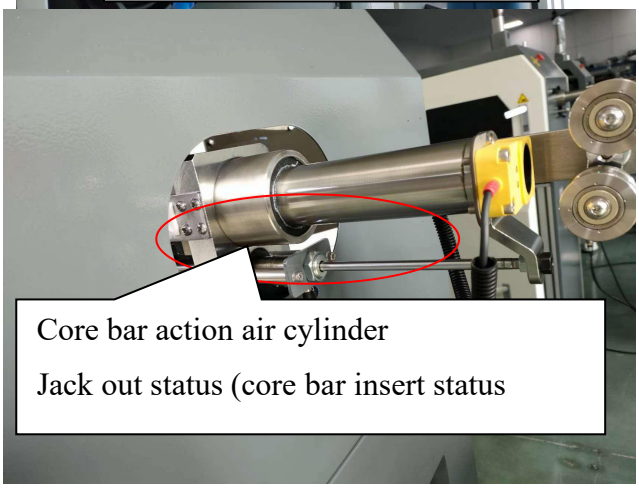


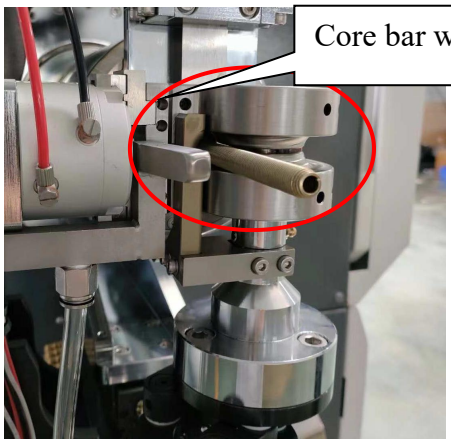
Cutter stretch out: cutter electromagnetism valve open, cutter blade stretch out;

Cutter draw back: cutter electromagnetism valve close, cutter blade draw back;









Core bar insert: core bar electromagnetism valve open, core bar action air cylinder jack out;

Core bar withdraw: core bar electromagnetism valve close, core bar action air cylinder draw back;

Manual marking: laser trigger marking under manual mode; (optional laser marking then can use it)

Manual pulse speed ratio select X1/X10/X50: hand wheel control speed ratio selection under manual mode, default X10;

Front feeding material: lighting this key, rotate hand wheel then can realize machine

head front feeding material arm extending and withdraw

Return to zero: (front feeding material) front feeding material arm reset

Rear feeding material: lighting this key, rotate hand wheel then can control the conveyor to realize the raw material forward and backward

Reset: (rear feeding material) calibrating zero point again

Vert: lighting this key, rotate hang wheel then can control the revolve arm process vert action

Return to zero: (vert) Vert reset

Tube bending: lighting this key, rotate hang wheel then can control the guide wheel process tube bending action

Return to zero: (Tube bending) Tube bending reset

Drag hoisting: 2s long time press then can lighting this key, rotating hand wheel then can control the drag rising and falling

Syn feeding material: 2s long time press then can lighting this key and “Rear feeding material”, rotating hand wheel then can realize the syn feeding material of machine head and dragging

Region 1 temperature / Region 2 temperature / Fan 1 frequency / Fan 2 frequency: click password management, pop out password dialog box, input: 2 (default), activate the setting authority of region 1 temperature, region 2 temperature and fan 1 frequency and fan 2 frequency, click “SV”, then can set the temperature again according to the tube material, fan 1 and 2 frequency default at 50, generally, needn’t modify it.

After activated the set authority, "SV" background change to be striking yellow, click then can modify the setting value

3.2.2 Automatic tableau (revolve "Manual/automatic" key, make it on "Automatic")

自动模式 Automatic mode
到达维护期限 Achieved maintain limit period
设定数量 Setting quantity
重新计数 Counting again
打标监视 Marking monitor
序号 Serial number
送料 Material feeding

倾转 Vert
弯管 Tube bending
冷却 Cooling S
让位 Give away position mm
当前值 Current value
1 区温度℃ Region 1 temperature ℃
2 区温度℃ Region 2 temperature ℃
加工周期 Machining period S
展开长度 Spread out length mm
尾座高度 Tail stock height mm
总加工数 Total machining quantity
循环模式 Circling mode
周期模式 Period mode
预热送料 Preheat material feeding
穿芯模式 Pass core mode
分体弯轮 Fission bending wheel
一体弯轮 Integrate bending wheel
尾料加工 Tailing machining
在线打标 Online marking
初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management

Circling mode: start rear starting task;

Period mode: single product stop after produced one period;

Preheat material feeding: initially start after feeding material, need select “Preheat material feeding”, the material slowly feed to front end of machine head (about 2min) from tail of oven, automatically cut off and start machining;

Pass core mode: partial tube diameter specification adopt fission type bending wheel, need configure pass core fixture and lighting this mode;

Fission bending wheel: partial small tube diameter specification adopt fission type bending wheel, needn’t pass core fixture, lighting this mode;

Integration bending wheel: partial small tube diameter specification adopt integrate

type bending wheel, needn't pass core fixture, lighting this mode;

Tailing machining: end rest tailing machining; **(attention: pass core mode not support it)**

Online marking: realize syn marking;

Setting quantity: click then can set the machining quantity;

Counting again: 2s long time press it then can counting again;

Marking monitor: monitor the marking status;

Region1 temperature: display the current temperature value of oven 1;

Region 2 temperature: display the current temperature value of oven 2;

Machining period S: single machining time of current modeling products;

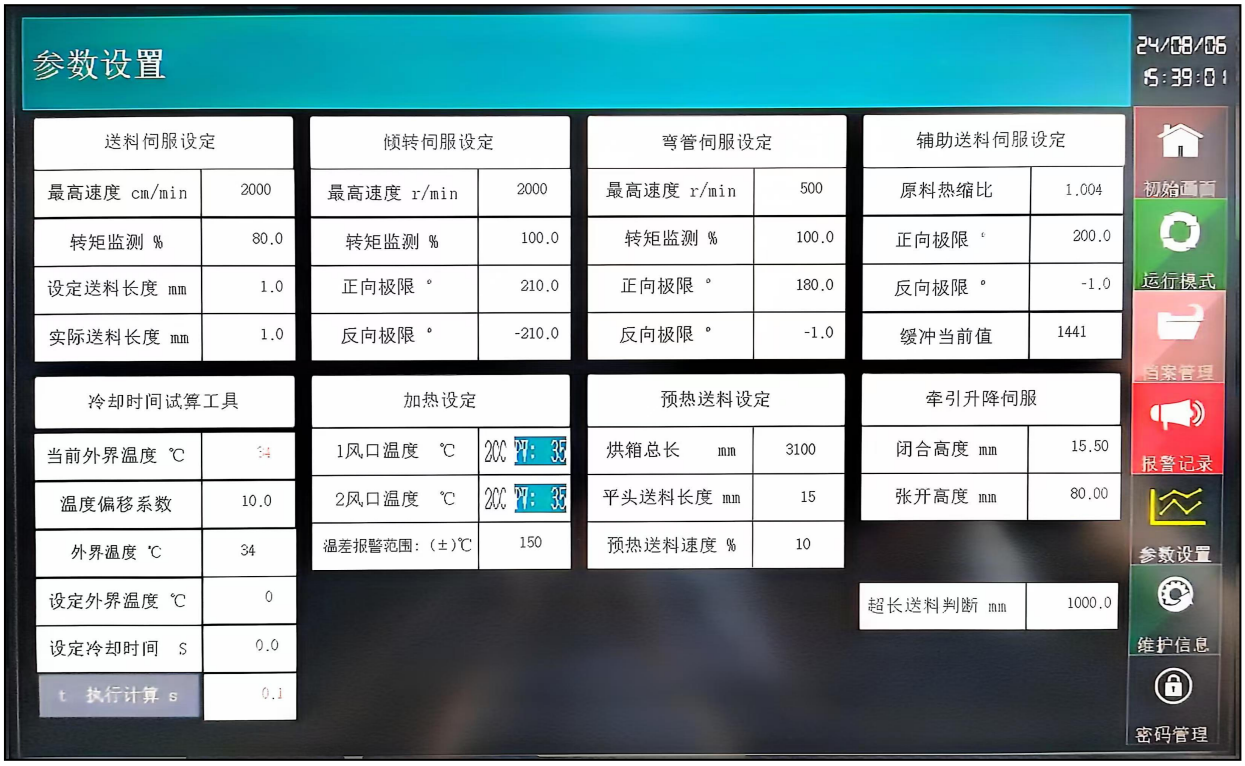
Spread out length mm: the spread out length of current modeling products;

Tail stock height mm: the rear material feeding drag height value;

Total machining quantity: counting the production quantity, long time press to clear the counting;

4.Parameter setting

Click “Parameters setting” on running page, enter into this tableau (the below value are leave factory value):

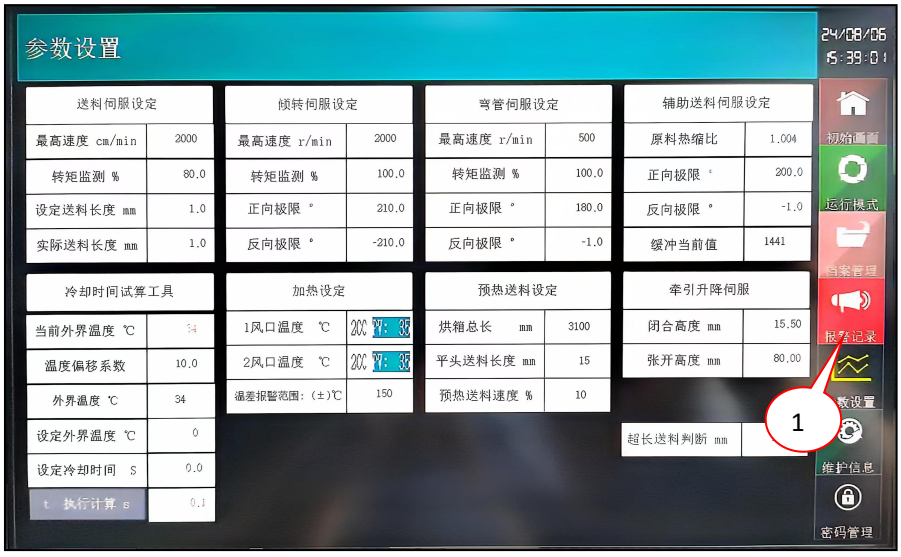


初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management

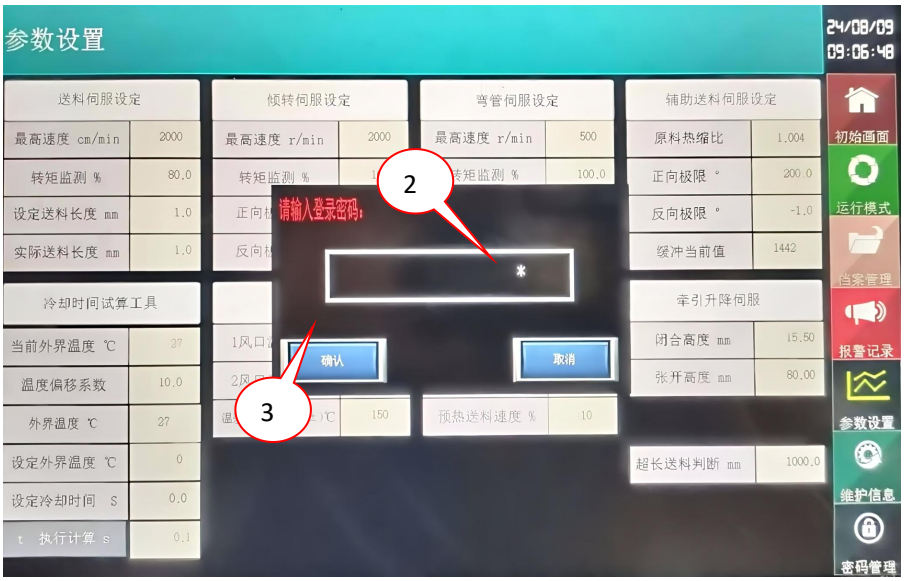
参数设置 Password management
送料伺服设定 Material feeding servo setting
最高速度 The highest speed
转矩监测 Torque monitor
设定送料长度 Set material feeding length
实际送料长度 Actual material feeding length
冷却时间试算工具 Cooling time trial calculation tool
当前外界温度 Current external environment temperature
温度偏移系数 Temperature deviation coefficient
外界温度 External environment temperature
设定外界温度 External environment temperature
设定冷却时间 Set cooling time
执行计算 Carry out calculation
倾转伺服设定 Vert servo setting
最高速度 The highest speed
转矩监测 Torque monitor
正向极限 Positive limit

反向极限 Negative limit
加热设定 Heat setting
1 风口温度 Air port temperature
2 风口温度 Air port temperature
温差报警范围 Temperature difference alarm range
弯管伺服设定 Tube bending servo setting
最高速度 The highest speed
转矩监测 Torque monitor
正向极限 Positive limit
反向极限 Negative limit
预热送料设定 Preheat material feeding setting
烘箱总长 Oven total length
平头送料长度 Flat head material feeding length
预热送料速度 Preheat material feeding speed
辅助送料伺服设定 Material feeding servo setting
原料热缩比 Raw material heat shrink ratio
正向极限 Positive limit
反向极限 Negative limit
缓冲当前值 Buffer current value
牵引升降伺服 Drag hoisting servo
闭合高度 Close height
张开高度 Open height
超长送料判断 Over length material feeding judgement

Parameter modification: click **Parameter setting** and enter into interface, this interface be at protection status, unable to process parameter modification, click **Password management**, input password (leave factory default password: 2), activate the modify parameter authority after confirmed



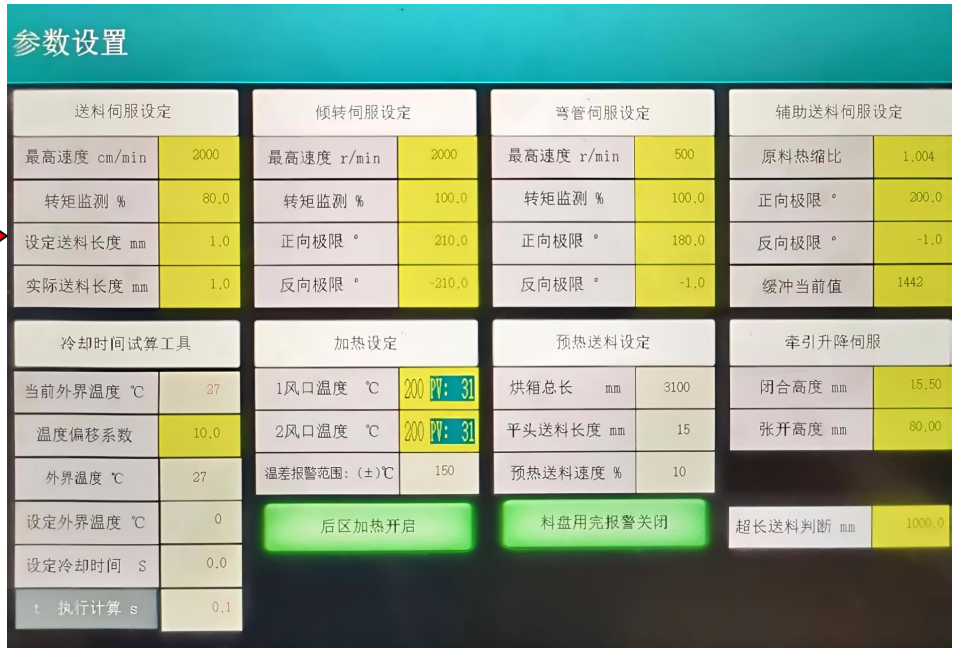
①. Click right side “Password management”



②． Input the activate password in the pop out dialog box (leave factory default activate password:2)

③． Click “Confirm”, finish activation

Parameter page after activated



Material feeding servo setting：

①． The highest speed of material feeding servo at 2000cm/min(default value);

②. Torque test 80% (default value), torque test is the protection program to prevent increasing material tray block materials, will caused too big drag force, it will stop machining and alarm when tested torque bigger than test setting value

③． Set material feeding length: 1.0 (default value, needn’t adjustment)

④． Actual material feeding length: 1.0 (default value, needn’t adjustment)

Vert servo setting: (default value)

The highest speed value: 2000r/min Positive limit: 210° Negative limit: -210°

Torque monitor: 100%

Tube bending servo setting: (default value, needn't adjustment)

The highest speed value: 500r/min Positive limit: 180° Negative limit: -1°

Torque monitor: 50%

Material feeding servo setting:

Raw material heat shrink ratio: 1.0~1.01

(details pending)

Cooling time trial calculation tool:

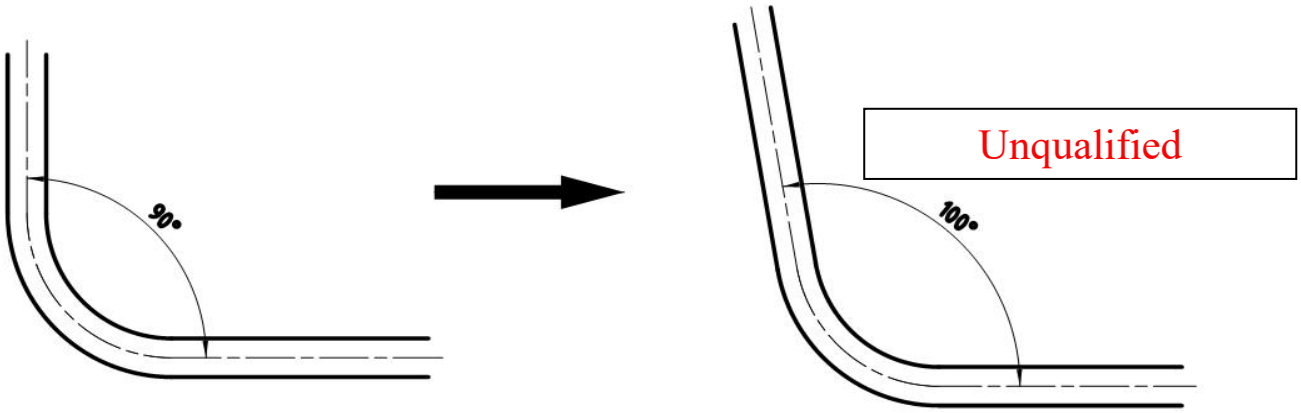
Temperature deviation coefficient: default coefficient 10, adjustable!

Temperature deviation coefficient perform: it will occur deviation of tube bending angle because influence of environment temperature, this function able to validly solve this appearance.

How to adjust the deviation coefficient: (more bigger coefficient value then more longer actual cooling time)

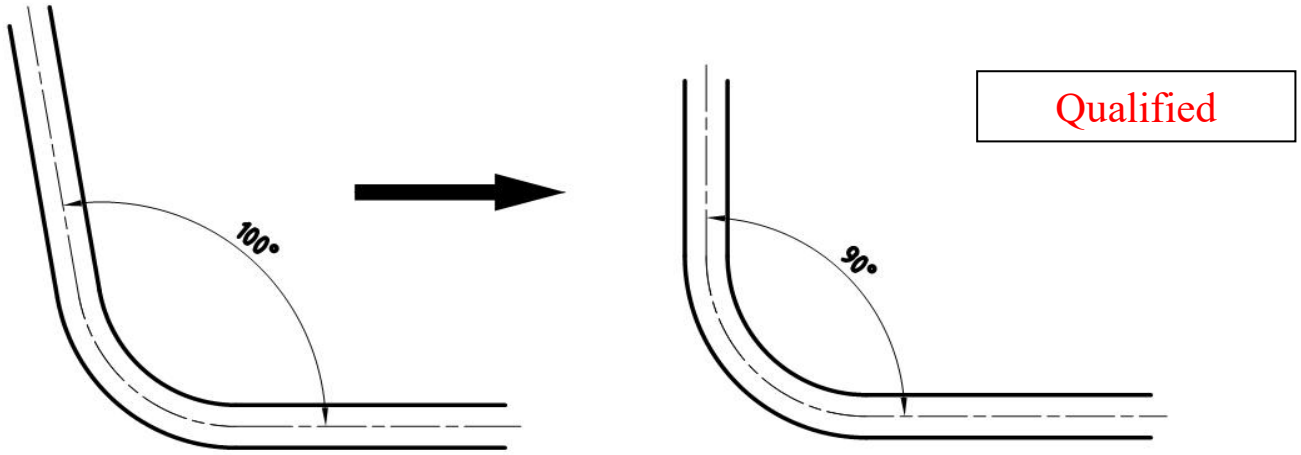
Environment temperature	Set tube bending parameters (rotate angle of guide wheel)	Set cooling time	Temperature deviation coefficient	Angle after product modeled	Actual air blow time
0℃	160°	4S	5	90°	4S
35℃	160°	4S	5	100°	4.7S

Make the parameters of product machining at 0℃ as reference, environment temperature higher when deviate coefficient is 5, this caused the produce angle bigger, should increase the deviation coefficient and make the angle be at 90°



Environment temperature	Set tube bending parameters (rotate angle of guide wheel)	Set cooling time	Temperature deviation coefficient	Angle after product modeled	Actual air blow time
35℃	160°	4S	10	90°	6.1S

Increase Temperature deviation coefficient



Different tube material then different deviation coefficient, the details according to machining experience.

Carry out calculation:

Equal to one calculate program, cooperate with "Temperature deviation coefficient" to calculate out actual air blow cooling time.

Environment temperature	Angle after product modeled	Set tube bending parameters (rotate angle of guide wheel)	Set cooling time	Deviation coefficient	Actual air blow time
35℃	90°	160°	4S	10	6.1S

Heat setting: each region heating parameters setting and temperature control alarm setting

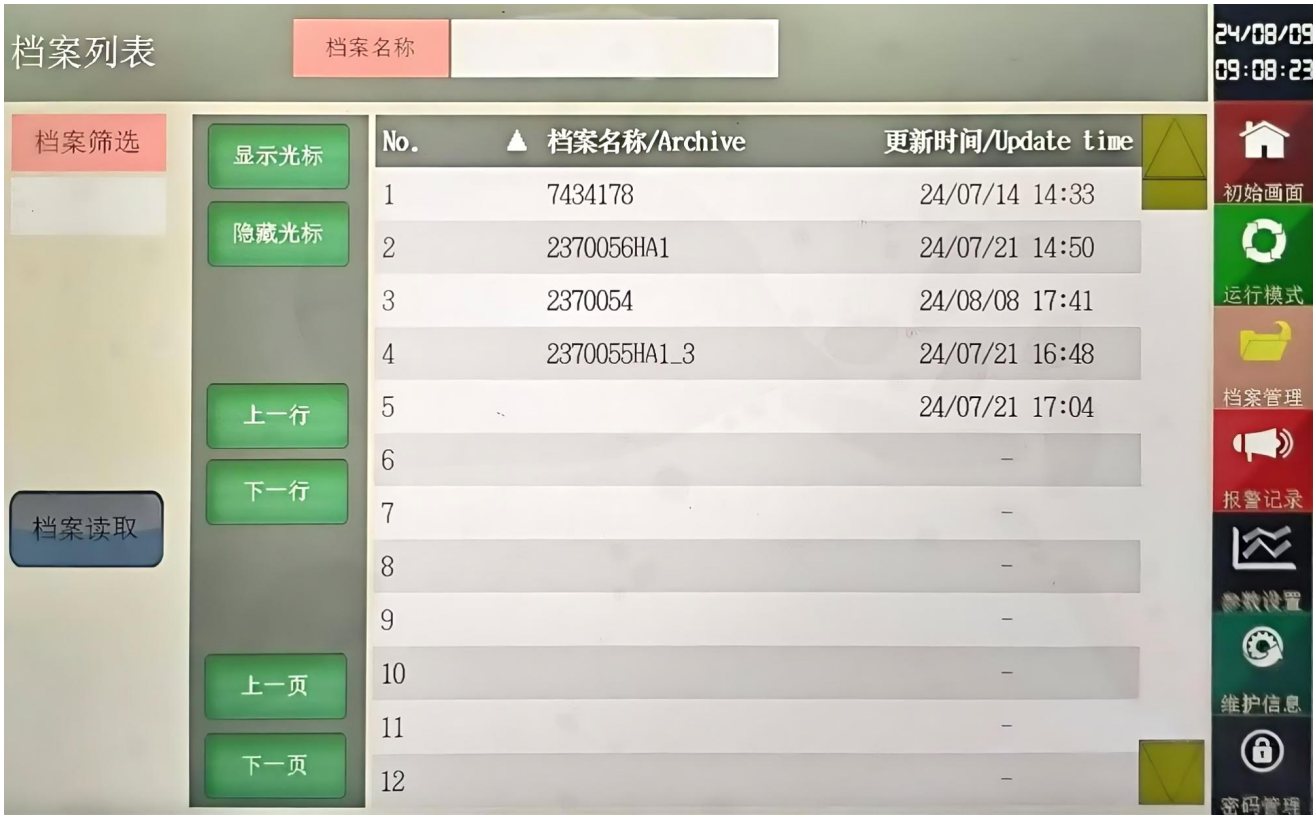
Preheat material feeding setting: (leave factory setting value, generally needn't modify)

Drag hoisting servo: set the height value of drag close and open

Over length material feeding judgement : 999 (default value), able to setting modify

6. Manage and write program

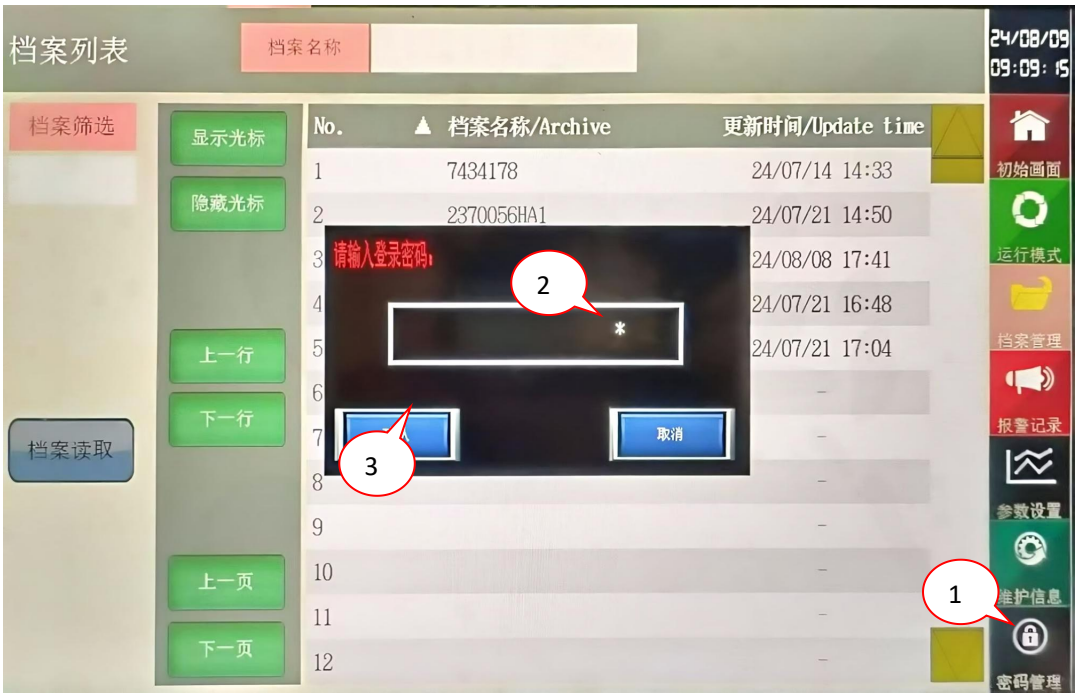
Click “File management” on running page then enter into this tableau:



初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
档案列表 File list
档案名称 File name
档案筛选 File screening
显示光标 Display cursor
隐藏光标 Hide cursor
档案名称 File name
更新时间 Update time
档案读取 Read file
上一行 Up one row
下一行 Next one row
上一行 Up one row
下一行 Next one row

Page modification activating

Note: except the “Read file” and “File screening” operations needn’t input administrator modification password, the other operations all need input password (leave factory activate password: 1) to activate.



① . Click right side “Password management”, jump out password dialog box

② . Input correct password in the password dialog box

③ . Click “Confirm” and finish activate operation

Note: finish activate operation then the page will automatically jump to cursor display draw up page of the program

(If not select then will default program with serial number 1)

Now, we click the right side “File management” again, return to activated “File management” page

初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management

档案编辑 File edit
档案名称 File name
档案保存 File save
坐标编辑 Coordinate edit
序号 Serial number
送料 Material feeding
长度 Length
速度 Speed
倾转 Vert
角度 Angle
补偿 Compensation
速度 Speed
弯管 Tube bending
角度 Angle
进弯速度 Forward bending speed
退弯速度 Withdraw bending speed
冷却 Cooling
让位 Give away position
插入本行 Insert this row
删除本行 Delete this row
全部清除 All cleared

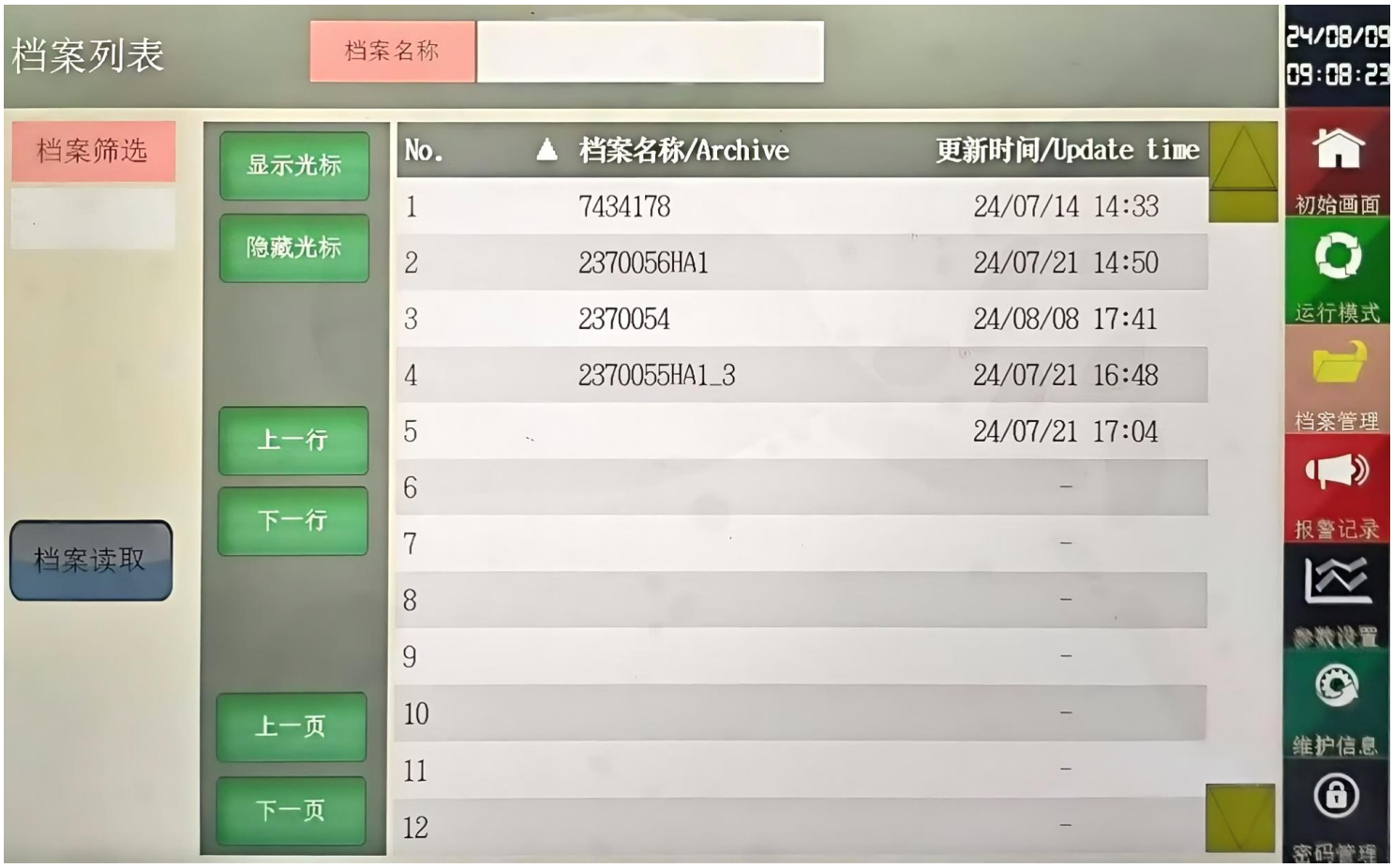
档案筛选 File screening
显示光标 Display cursor
隐藏光标 Hide cursor
档案名称 File name
更新时间 Update time
档案读取 Read file
档案另存 File saved as
上一行 Up one row
下一行 Next one row
上一行 Up one row
下一行 Next one row
档案删除 Delete file

The above picture is the activated “File management” page

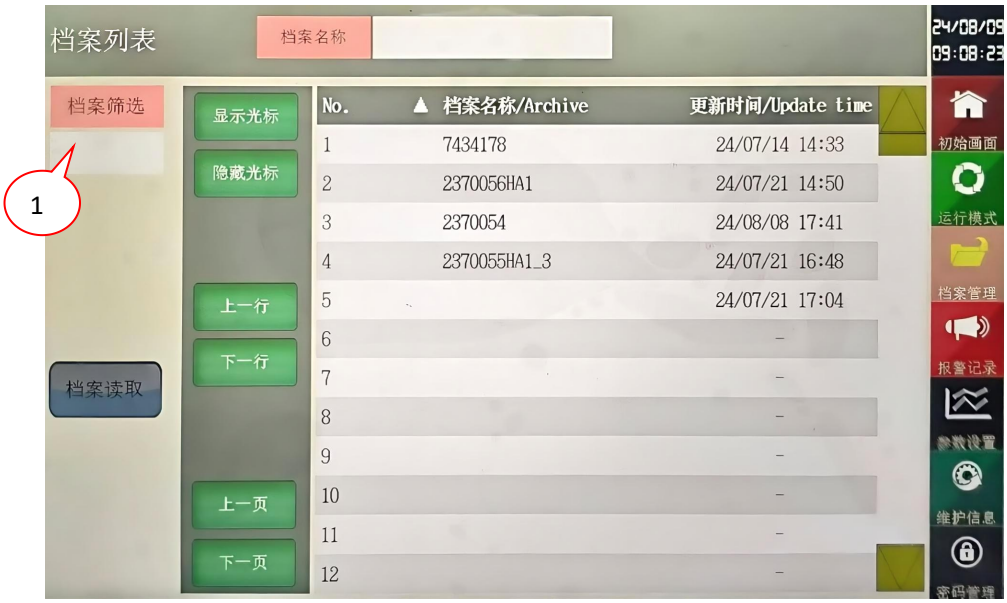
Activated **“Rename”, “File lead in and lead out”, “File saved as”,** and “**Delete file**” authority; additionally, click “**Read file**”, also able to edit and newly add program

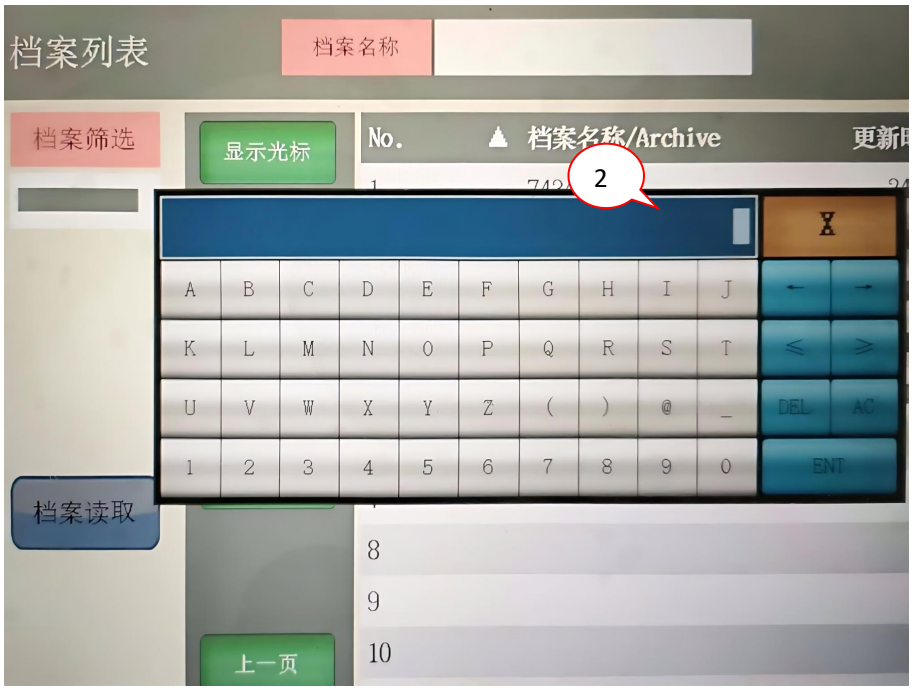
5.1 Program files list summary

Click “File management” on running page then enter into this tableau:



File screening: click blank column under left side “File screening”, jump out dialog box, input the key words or name which need be searched, click “ENT” then can finish screening files. (Diagram)

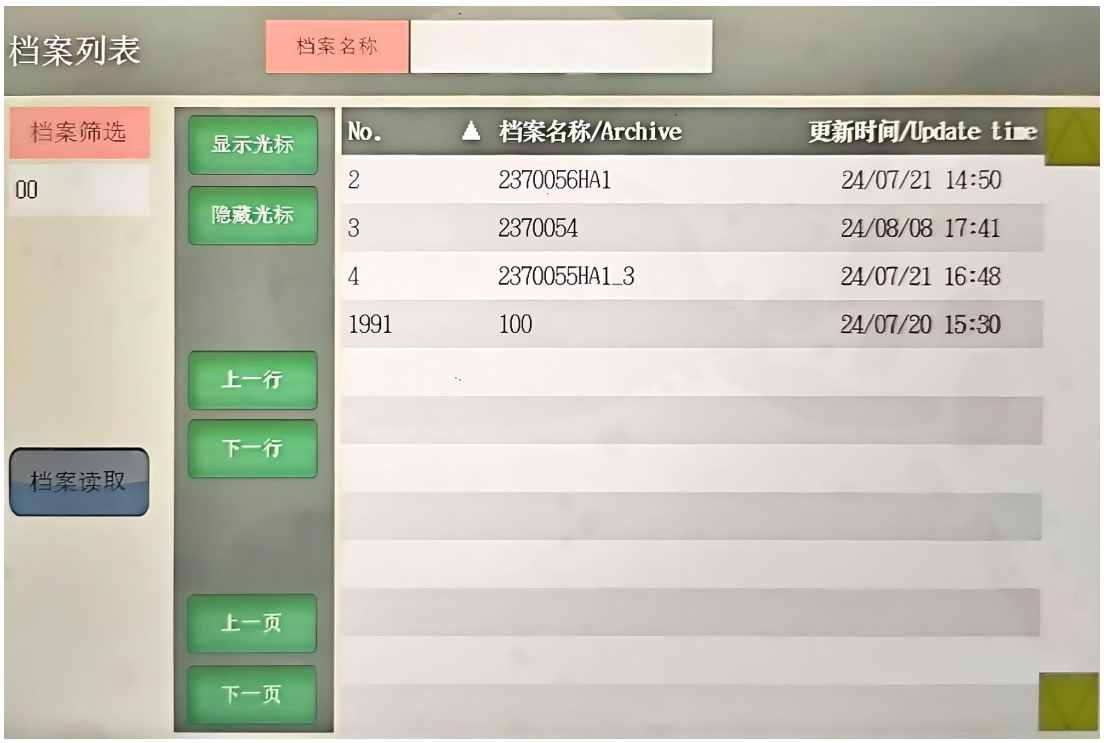




①. Click blank column under "**File screening**"

②. nput the key words or name which need be searched in jump out dialog box, click "ENT" then can finish screening.

Tableau after finish screening



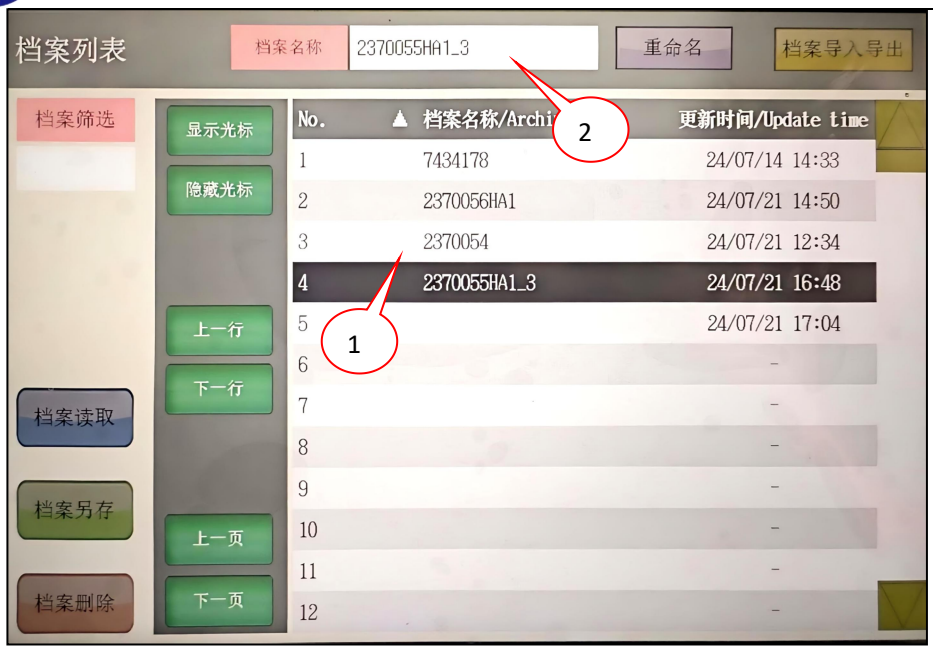
File renaming: able to display after page activated (diagram)

Sample: 1. select the program which need be renamed on file management interface;

2. Input new name;

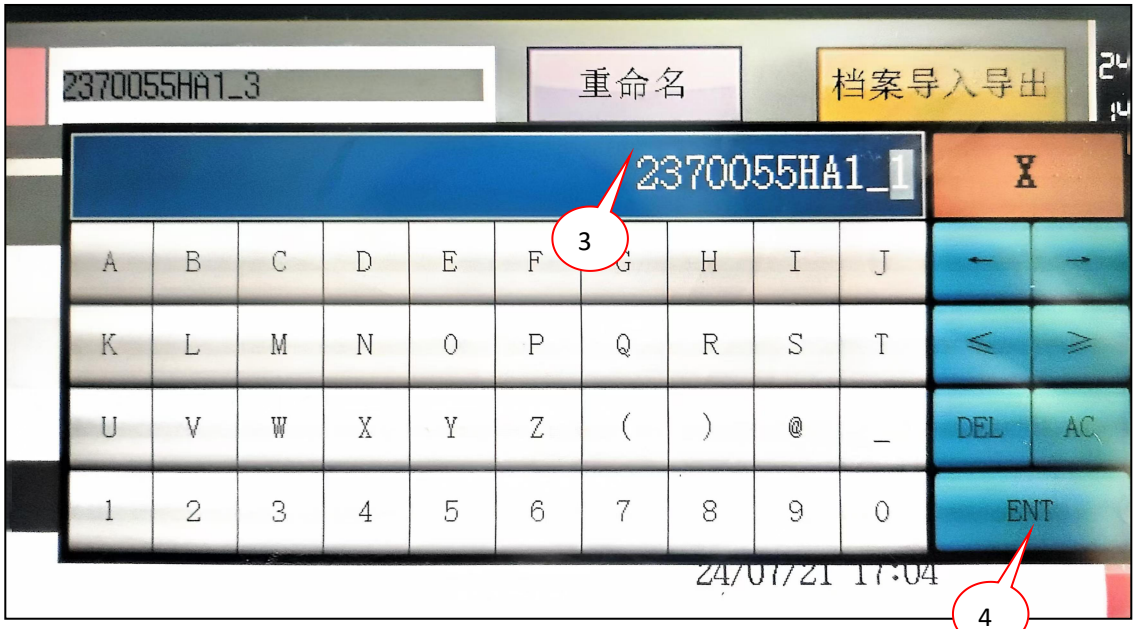
3.Click rename;

4.Click OK, finish rename.



①. Select the modeling which need be renamed

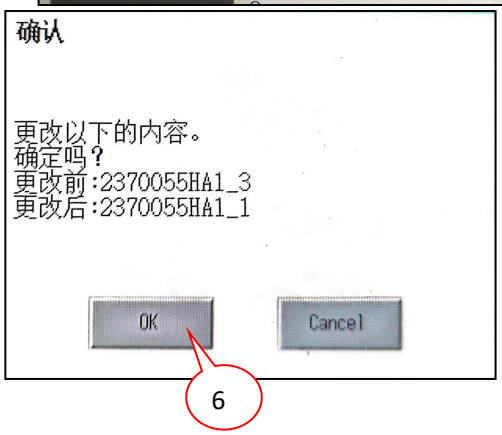
②. Click the display column behind “File name”



重命名 Rename　　档案导入导出 File lead in and lead out

③.　Manually input name

④. Click ENT key and jump to “File name” display column.



⑤. Click “Rename” after change name and input “File name” display column

⑥. Jump out confirm dialog box, click “Confirm”

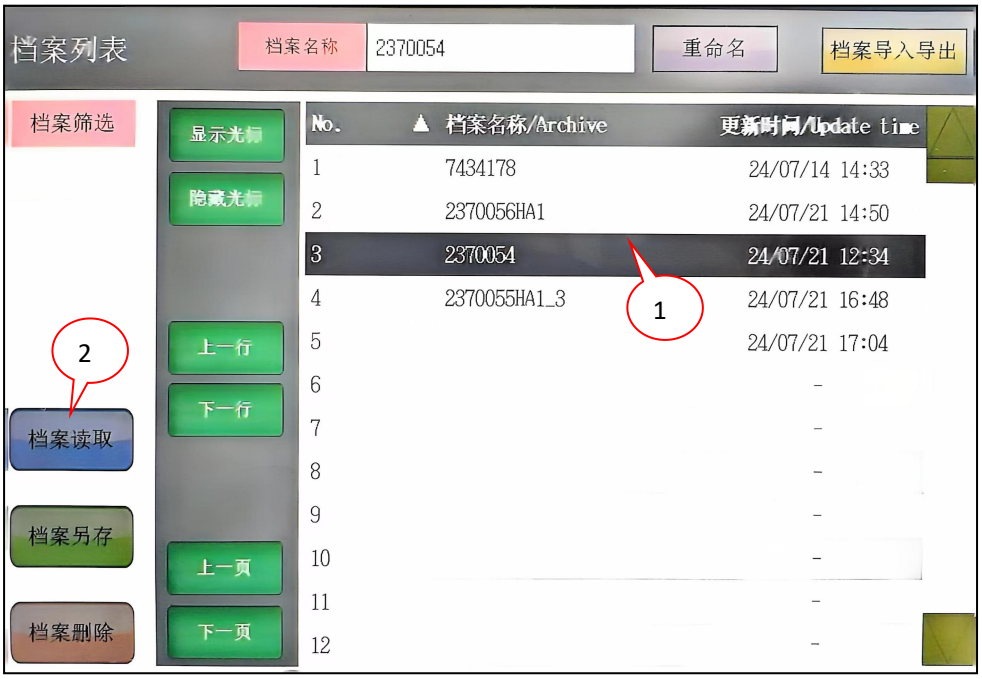
Read file: select the corresponding program row, click “Read file”, enter into file edit tableau.

Sample: 1. select the program which need be produced on the program interface;

2. Click read file;

3. Enter into program display column

4. Shift the “Automatic/manual” button to automatic mode, finish read program



①. Select the program which need read

②. Click “Read file”

③. Shift the “Automatic/manual” button to automatic mode

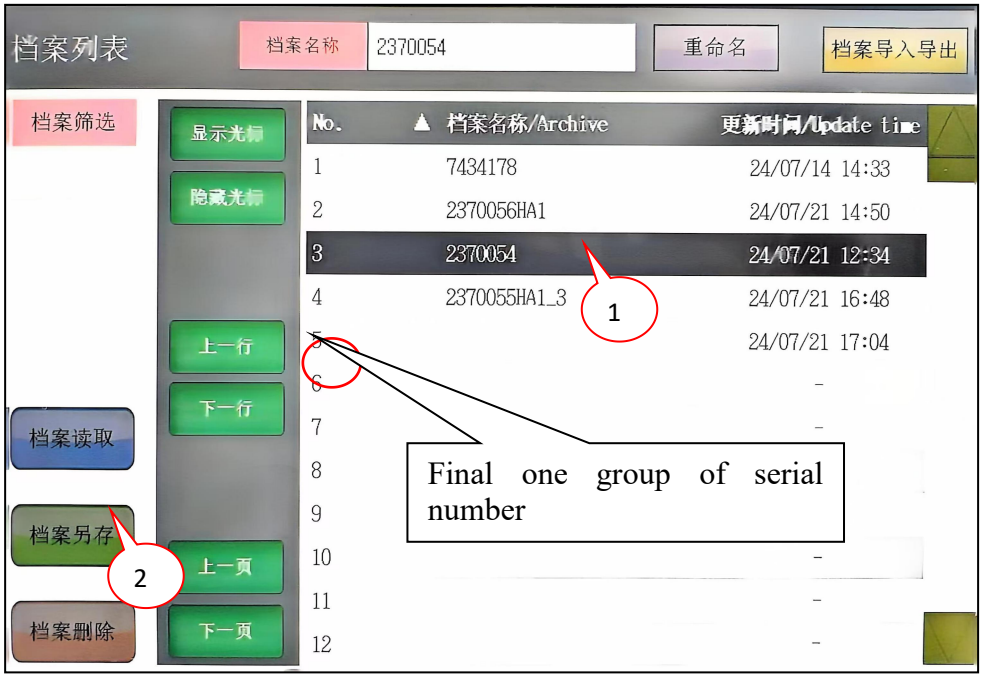
File saved as: able to display save of files after page activated, able to save 2000 groups files.

Sample: 1. select the program which need be saved ad on program interface

2. Click file saved as

3. Jump out program saved as dialog box, click OK

4. File automatic saved to final one group of the serial number



①. Select the program which need be saved as

②. 2s long time press “File saved as”, pop out save as dialog box

③. Click “OK” key in dialog box, then program automatically saved as the final one group of the serial number

Attention: now the saved as program no name, refer “File saved as” to process name naming

Delete file: able to display after the page activated

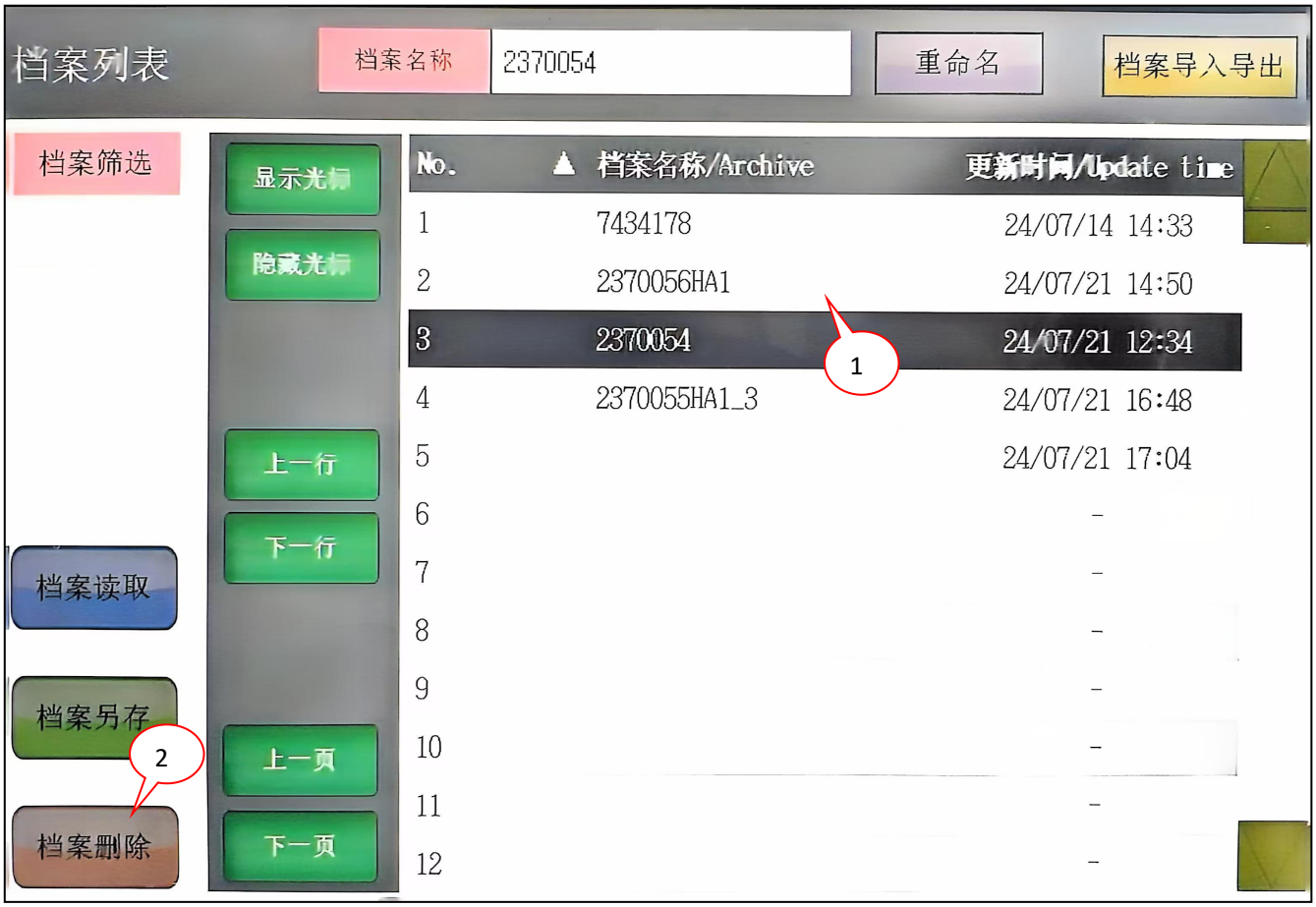
Able to delete the selected program, long time press 2s, execute delete operation.

Sample: 1. select the program which need be deleted on program interface

2s long time press Delete file

3. Enter into delete program dialog box, click OK

4. Delete program successfully



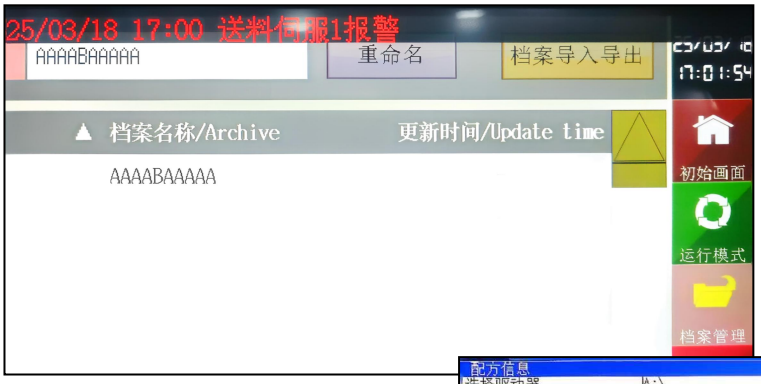
5.2. **Program lead in and lead out:**

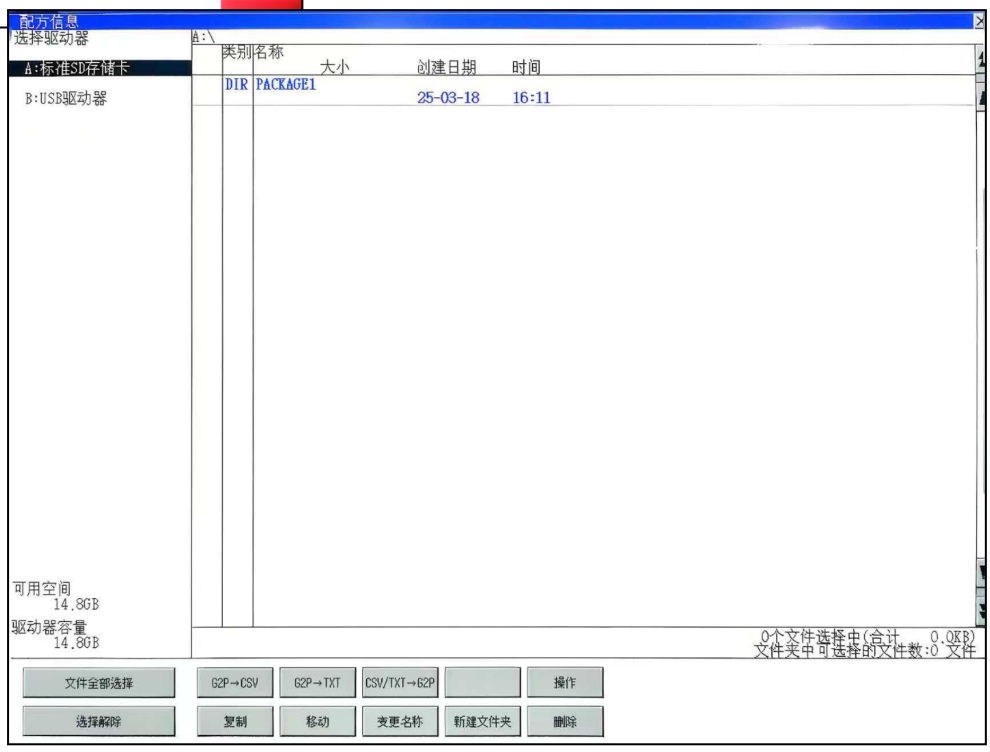
Operating profile (here make U-disk as sample):

①. Insert the U-disk into the USB hole at side of screen, the equipment will automatically discriminate

②. Click file management, enter into “File list” page, input password to activate (leave factory password “2”)

③. Find “File lead in/lead out” key on activated page, click and enter into “Recipe information” page, process program lead in or lead out operation on this page





Select driver column:
Generally, A is standard memory card in equipment
B is external mobile disk

配方信息 Recipe information

选择驱动器 Select driver

标准 SD 存储卡 Standard SD memory card
USB 驱动器 USB driver
类别 Category
名称 Name
大小 Size
创建日期 Create date
时间 Time
可用空间 Usable space
驱动器容量 Driver capacity
文件全部选择 Select all files
选择解除 Release selection
复制 Copy
移动 Move
变更名称 Alter name
新建文件夹 Newly create file folder
删除 Delete
操作 Operating
0 个文件选择中(合计 0.0KB) 0 piece file selecting (total 0.0KB)
文件夹中可选择的文件数：0 文件 File quantity can be selected in file folder: 0 file

④. Select the driver which need lead in or lead out, click to select the file which need lead in or lead out at right side

类别 Category

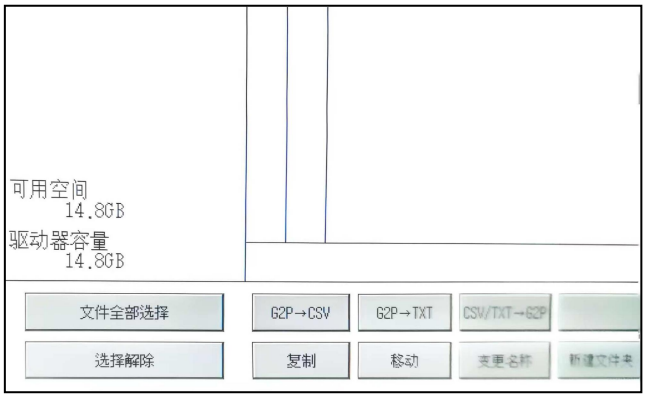
名称 Name

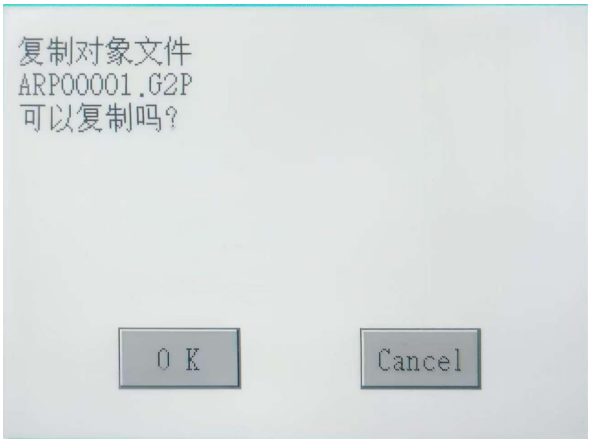
大小 Size

创建日期 Create date

时间 Time

⑤. Find “Copy “ key under the page, jump out confirm dialog box, click “OK” to copy

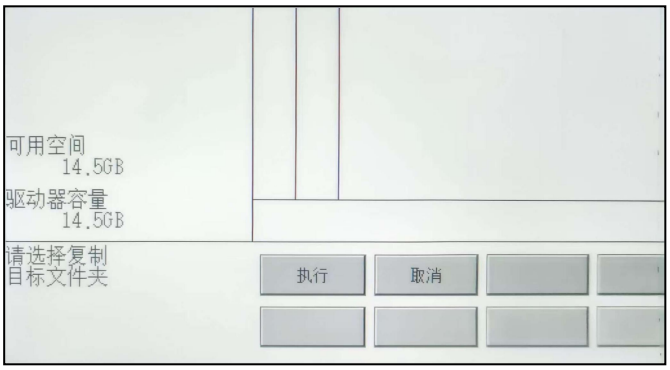


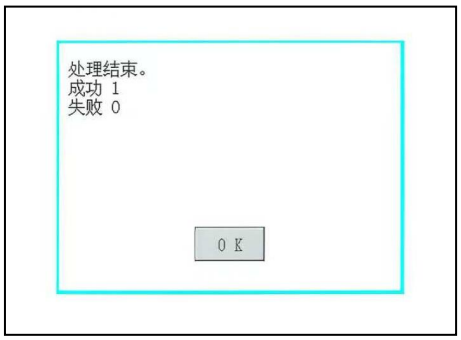


可用空间 Usable space
驱动器容量 Driver capacity
文件全部选择 Select all files
选择解除 Release selection

复制 Copy
移动 Move
变更名称 Alter name
新建文件夹 Newly create file folder
复制对象文件 Copy the target file
ARP00001.G2P
可以复制吗？Able to copy?

⑥. Select another one driver which need be lead in or lead out after copied successfully, click “Execute”, lead in or lead out successfully after jump out dialog box and click confirm.





可用空间 Usable space

驱动器容量 Driver capacity

请选择复制 Please select to copy

目标文件夹 Target file folder

执行 Execute

取消 Cancel

处理结束。 Treatment finished.

成功 1 Successful 1

失败 0 Fail 0

5.3 Program modification and newly built summary

Select the program number in “File list” which need be modified or newly added blank program number, click read file, enter into program edit page to activate (input leave factory password “2”)

初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
档案编辑 File edit
档案名称 File name
档案保存 File save
坐标编辑 Coordinate edit
序号 Serial number
送料 Material feeding
长度 Length
速度 Speed
倾转 Vert
角度 Angle
补偿 Compensation
速度 Speed
弯管 Tube bending
角度 Angle
进弯速度 Forward bending speed
退弯速度 Withdraw bending speed
冷却 Cooling
让位 Give away position
插入本行 Insert this row
删除本行 Delete this row
全部清除 All cleared

1. Input the corresponding numerical value such as “Material feeding”, “Material feeding”, “Incline totating” and others, shown as the picture

2. Attention: shown as the above picture, this program total 8 rows, the 8th row is terminal material feeding length, also need has numerical value even though the terminal needn’t material feeding length, able to be 0.1mm.

Bending number: each row means 1 bending, total 40 rows;

Material feeding mm: the material feeding length of each bending;

Speed %: material feed speed of each bending (input value from 1% to 100);

Vert°: incline angle of each bending (input value from -210° to 0° to 210°)

Speed %: vert speed of each bending (input value from 1% to 100);

Tube bending°: tube bending angle of each bending (input value from -1° to 180°)

Speed %: tube bending speed of each bending (input value from 1% to 100);

Cooling s: cooling time of each bending (input value are 0.1s~1.5s);

Give away position: input the corresponding value when this bend machining and tube body happen interfere when revolving, the material feeding length will automatically increase give away position length, will reduce the give away position length after revolve action finished (**attention: not support it under pass core mode**);

Save file: click save after finish modified the program;

Edit coordinate: jump to coordinate edit tableau;

Insert this row: 2s long time press “Insert this row” after selected the corresponding bend number, insert one row on this row;

Delete this row: 2s long time press “Delete this row” after selected the corresponding bend number, delete this row;

Clear all: 2s long time press “Clear all”, empty program.

5.4 Coordinate edit

Click “Edit coordinate” in “Edit file”, enter into this tableau:

坐标编辑 Edit coordinate
坐标反向 Coordinate reverse
执行计算 Carry out calculation
计算路径 Calculate path
序号 Serial number
X 坐标 Coordinate X
Y 坐标 Coordinate Y
Z 坐标 Coordinate Z
R 半径 Radius R
序号 Serial number
X 坐标 Coordinate X
Y 坐标 Coordinate Y
Z 坐标 Coordinate Z
R 半径 Radius R
起始倾转角度 Start vert angle
插入本行 Insert this row
删除本行 Delete this row
全部清除 Clear all
直接退出 Withdraw directly

- Click “Calculate path”, select the required calculate path (default 1);
- Generally the start vert angle needn’t been modified (default 0.0);
- Input coordinate in sequence on coordinate input tableau;
- ump out confirm execute calculation dialog box after clicked “Execute

calculation", click "Confirm":

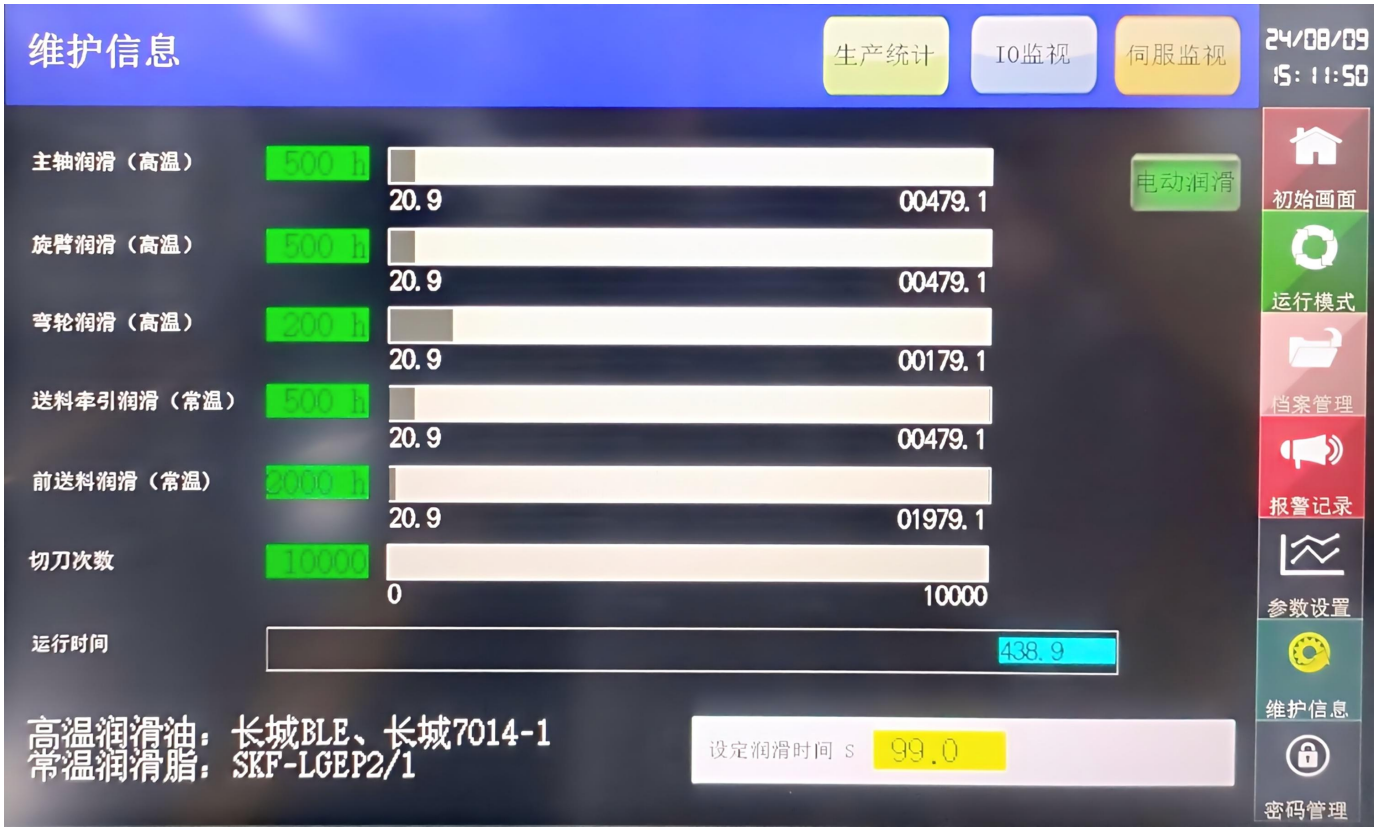
Jump out Carry out calculation dialog box after clicked " Carry out calculation", click "Confirm": the system able to calculate out the actual material feeding value through coordinate point, bending radius, tube material diameter, material and other parameters, here calculated out material feeding value maybe has deviation with the actual value of the products, need test tool to verify first then adjust.

- Press "Directly withdraw" button then the coordinate directly shift to machining program.

Coordinate reverse: click "Coordinate reverse", then can adjust the start coordinate of tube, make the start coordinate change to be terminal coordinate to execute.

7. Maintain interface instruction

Click "Maintain information", enter into the below tableau then can process maintain information setting.



维护信息 Maintain information
生产统计 Production statistic
I0 监视 IO monitor
伺服监视 Servo monitor
电动润滑 Electric lubricating
主轴润滑(高温) Main shaft lubricating (high temperature)
旋臂润滑(高温)Revolve arm lubricating (high temperature)
弯轮(高温)Bending wheel (high temperature)
送料牵引润滑(常温)Material feeding drag lubricating (high temperature)
前送料润滑(常温)Front material feeding lubricating (high temperature)
切刀次数 Cutter times
运行时间 Running time
高温润滑油：长城 BLE. 长城 7014-1 High temperature lubrication oil: Greatwall BLE, Greatwall 7014-1
常温润滑脂：Room temperature lubricating grease: SKF-LGEP2/1
设定润滑时间 Setting lubricating time: S
初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management

Advise to use the factory recommend lubricating oil and lubricating grease

High temperature lubrication oil: Greatwall BLE, Greatwall 7014-1

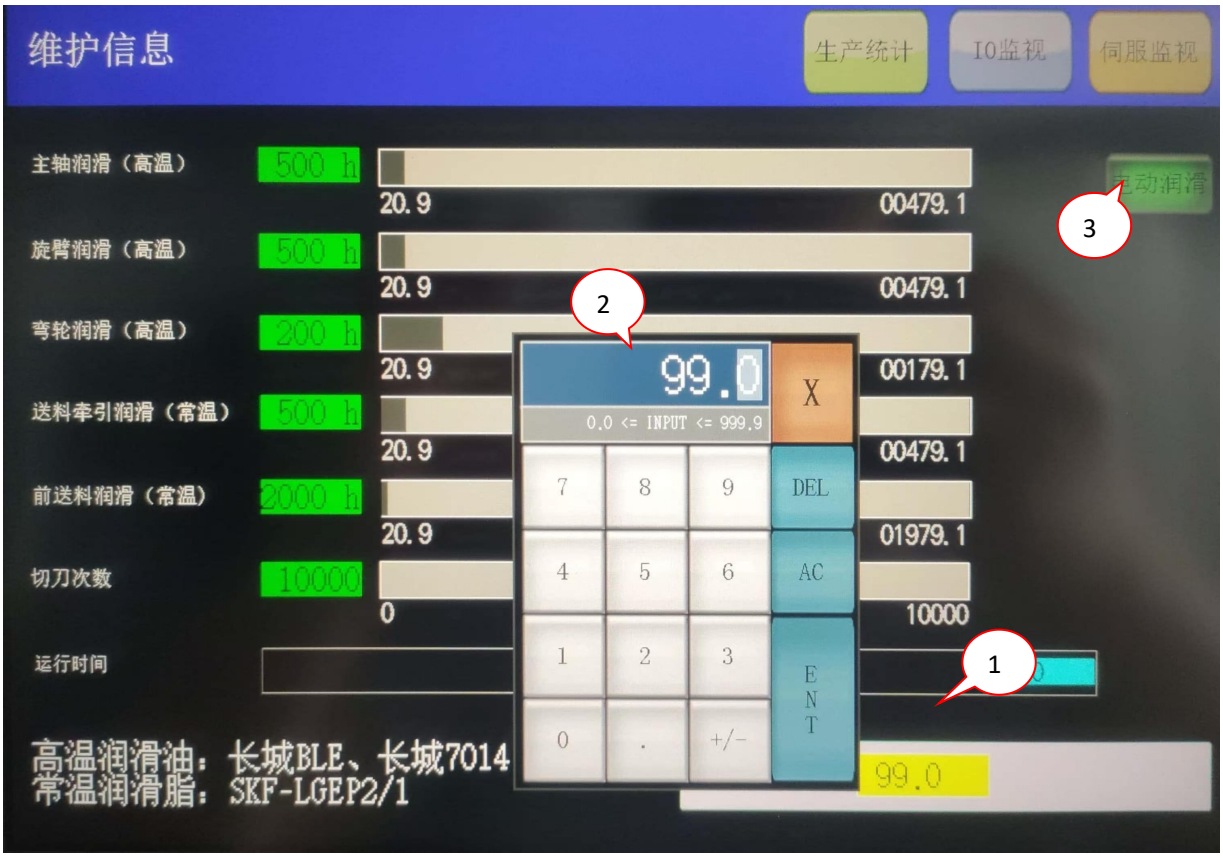
Room temperature lubricating grease: SKF-LGEP2/1

---Set well the corresponding maintain period, the running tableau will jump out to remind "Arrived maintain time limit" after arrived the time (machine not stop after alarm reminding)

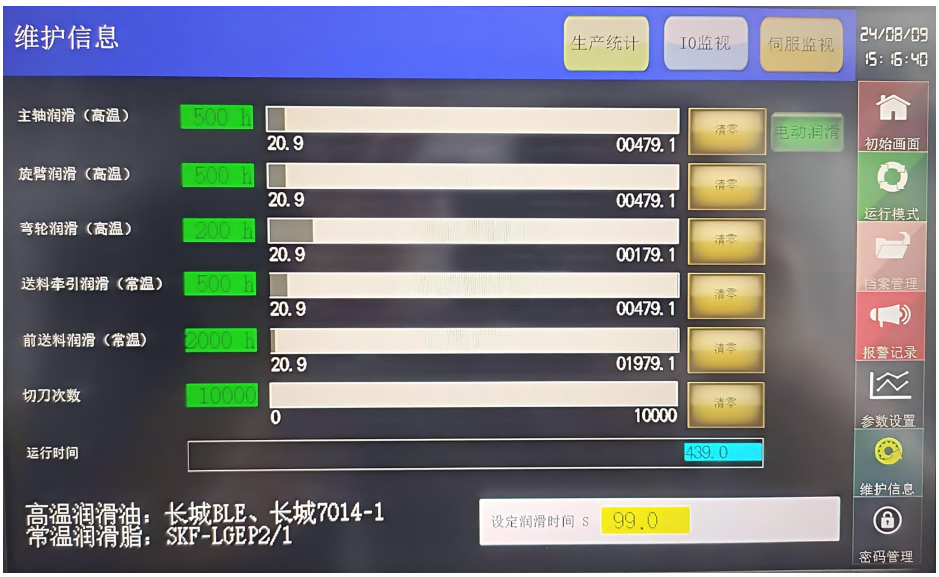
"Electric lubricating" (only support main shaft lubricating operation): setting and operation of "**Electric lubricating**" (each one time execute lubricating time of revolve main shaft)

①. The display column after click down right corner "Setting lubricating time S" as the pAble to process setting value modification to each time lubricating time of revolve mains haft on the jump out dialog box, press "ENT" confirm to modify.

②. Click "Electric lubricating", the oil pump able to automatic filling oil lubricating according to the setting time.



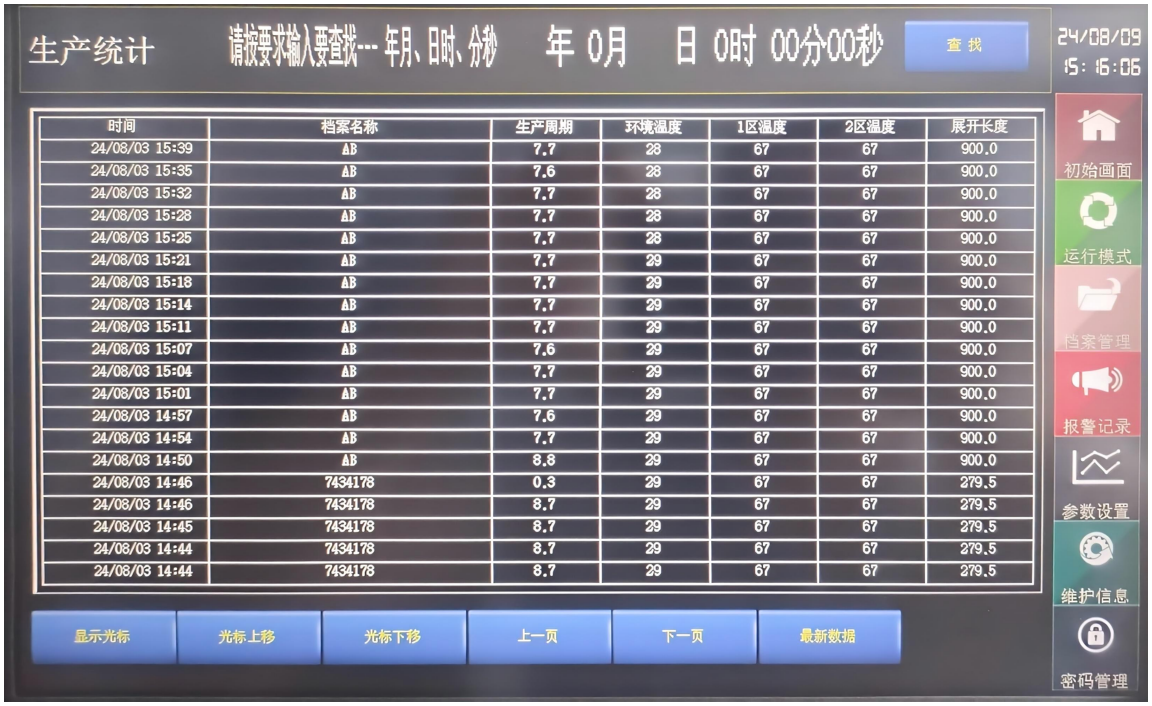
“Reset”: under the stop status, finish the maintain and maintenance of the reminding area, click “Password management”, input parameter to modify password (leave factory default password: 2)activate modification authority.



Long time press maintain information tableau Reset button, clear record value, counting again.

"**Production statistic**": production information record statistic

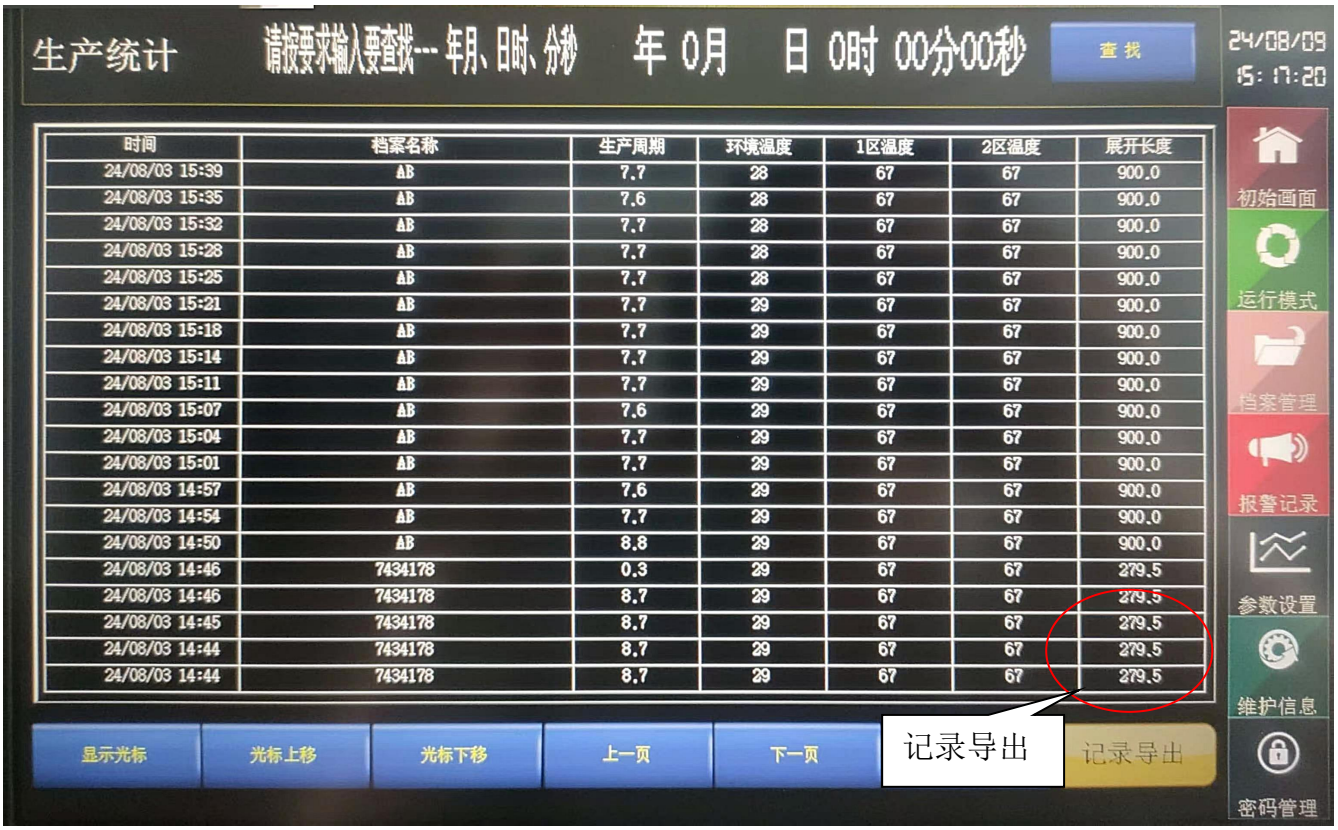
Click the up "**Production statistic**" and jump out production statistic list page



初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
生产统计 Production statistic
请按要求输入要查找 Please input which search according to requirements 年 Year 月 Month. 日 Day 时 Hour. 分 Minute 秒 Second
年 Year 月 Month 日 Day 时 Hour 分 Minute 秒 Second
查找 Search
时间 Time
档案名称 File name
生产周期 Production period
环境温度 Environment temperature
1 区温度 Region 1 temperature
2 区温度 Region 2 temperature
展开长度 Spread out length
显示光标 Display cursor
光标上移 Cursor upward move
光标下移 Cursor downward move
上一页 Last one page
下一页 Next one page
最新数据 The latest data

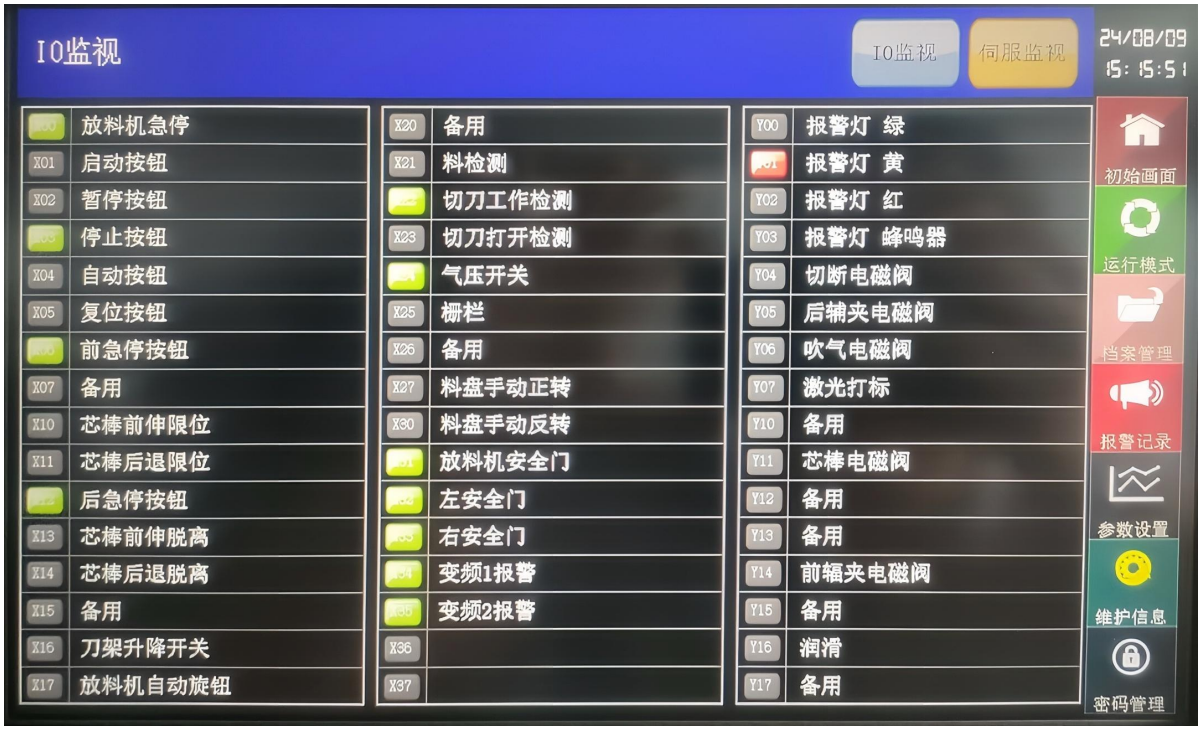
Click up year, month and day and jump out dialog box, input the date time which need be inquired, click “Search” then can check the production records at this time period

Production statistic records also can be lead out, click right side “Password management”, input parameter modify password (leave factory default password is 2), activate “Records lead out” authority.



“IO monitor”: equipment each unit running and operate status monitor

Click “IO monitor” at up of “Maintain information”, enter into “IO

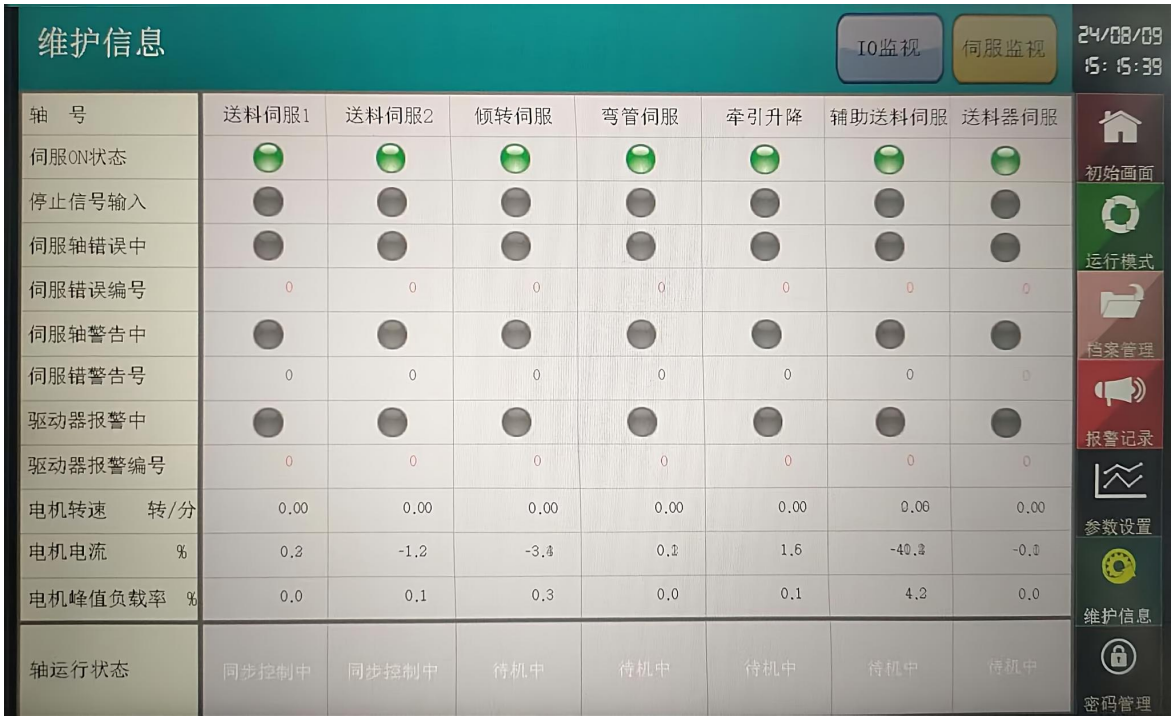


初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
IO 监视 IO monitor
伺服监视 Servo monitor
放料机急停 Material release machine emergency stop
启动按钮 Start button
暂停按钮 Pause button
停止按钮 Stop button
自动按钮 Automatic button
复位按钮 Reset button
前急停按钮 Front emergency stop button
备用 Reserve
芯棒前伸限位 Core bar forward stretch spacing
芯棒后退限位 Core bar backward stretch spacing
后急停按钮 Rear emergency stop button
芯棒前伸脱离 Core bar forward stretch distance
芯棒后退脱离 Core bar withdraw stretch distance
备用 Reserve
刀架升降开关 Cutter rack hoisting switch
放料机自动旋钮 Material release machine automatic knob
备用 Reserve
料检测 Material test
切刀工作检测 Cutter working test
切刀打开检测 Cutter open test
气压开关 Air pressure switch

栅栏 Railings
备用 Reserve
料盘手动正传 Material manual positive
料盘手动反转 Material manual reverse
放料机安全门 Material release machine safety door
左安全门 Left safety door
右安全门 Right safety door
变频 1 报警 Frequency converter 1 alarm
变频 2 报警 Frequency converter 2 alarm
报警灯绿 Alarm lamp green
报警灯黄 Alarm lamp yellow
报警灯红 Alarm lamp red
报警灯 蜂鸣器 Alarm lamp buzzer
切断电磁阀 Cut off electromagnetism
后辅夹电磁阀 Rear assist clip electromagnetism
吹气电磁阀 Air blow electromagnetism
激光打标 Laser marking
备用 Reserve
芯棒电磁阀 Core bar electromagnetism
备用 Reserve
备用 Reserve
前辅夹电磁阀 Front assist clip electromagnetism
备用 Reserve
润滑 Lubricating
备用 Reserve

“**Servo monitor**”: each servo unit of the equipment running status monitor

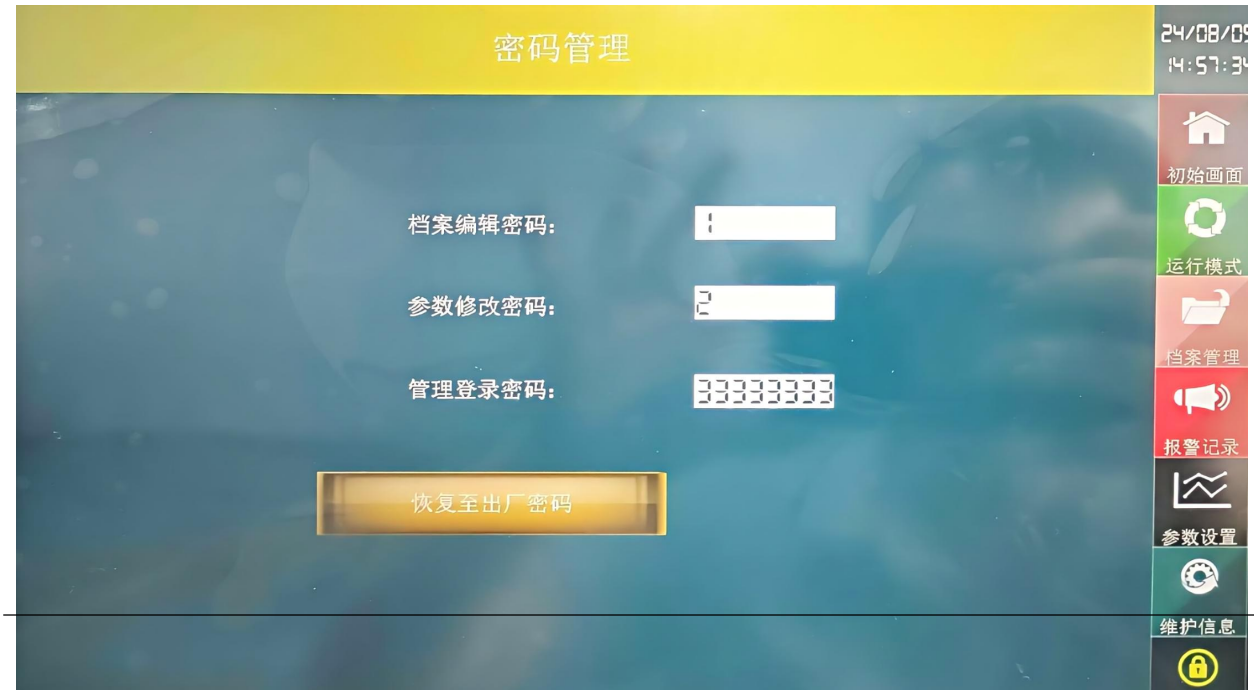
Click ‘Servo monitor” at up of “Maintain information”, enter into “Servo monitor” page



维护信息 Maintain information
轴号 Shaft number 送料伺服 1 Material feeding servo 1
送料伺服 2 Material feeding servo 2
倾转伺服 Vert servo
弯管伺服 Tube bending servo
牵引升降 Drag hoisting
辅助送料伺服 Assist material feeding servo
送料器伺服 Material feeding device servo
伺服 CN 状态 Servo CN status
停止信号输入 Stop signal input
伺服轴错误中 Servo shaft error
伺服错误编号 Servo error number
伺服轴警告中 Servo shaft warning
伺服错警告号 Servo error warning number
驱动器报警中 Driver alarming
驱动器报警编号 Driver alarm number
电机转速 转/分 Motor speed RPM
电机电流 % Motor current %
电机峰值负载率 Motor peak value load ratio
轴运行状态 Shaft running status
同步控制中 Syn controlling
待机中 Standby
初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management

8. Password management setting instruction

Click “Password management” input password “33333333”, enter into the below page, able to process password setting



初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
密码管理 Password management
档案编辑密码 File edit password
参数修改密码 Parameter modification password
管理登录密码 Management login password
恢复至出厂密码 Recover to leave factory password

--- System default leave factory file edit password 1

Parameter modify password 2

Management login password 33333333

Chapter VI Machining, stop machine

1. Start machine

The operators must pass through necessary train before on post, only can operating on post after train qualified

1.1 Inspection before start machine

1.1.1 Check the air circuit, the size of air storage tank is 0.6~0.8MPA, material tray pressure is 0.5~0.6MPA, buffer rack pressure is 0.1~0.2MPA

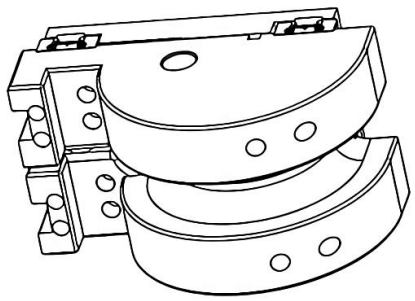
1.1.2 Confirm the wiring of equipment electrics

1.1.3 Check the equipment

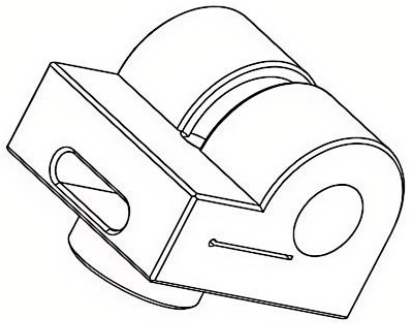
①. Whether cutter correctly installed, whether up and down running have interfere

②. Refer to Equipment operating specification, verify each fixture mold according to production air tube specification

③. Refer to Equipment operating specification, confirm whether production air tube specification need additionally install pass core assembly



Fission type bending

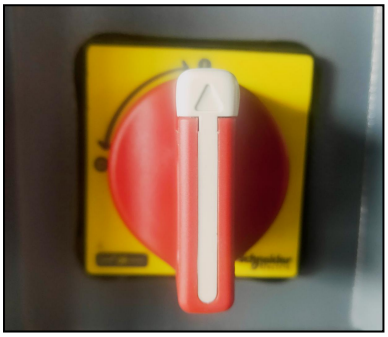


Integration type bending wheel

1.2 Power on to start machine and heating

1.2.1 Open power supply general switch

Power off status OFF



Power on status ON

1.2.2 Shift to manual mode after waiting for system start finished, then click "Reset"

Click "**Cooling open", "Cooling close"...."Core bar insert" and "Core bar withdraw"** keys in sequence, confirm whether each action sensitivity responding

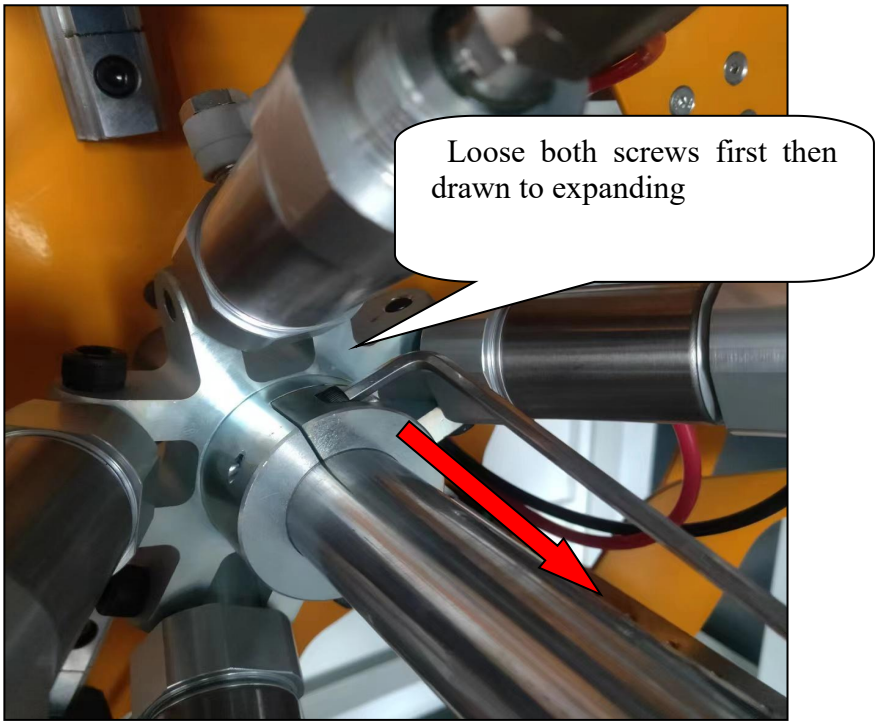
1.2.3 Input password to activate setting authority under manual mode, set heating temperature according the material, long time press 2S and start heating (heating time about 30~40min)

2. Prepare to machining

2.1 Place tube materials

①. Measure tube tray internal diameter size

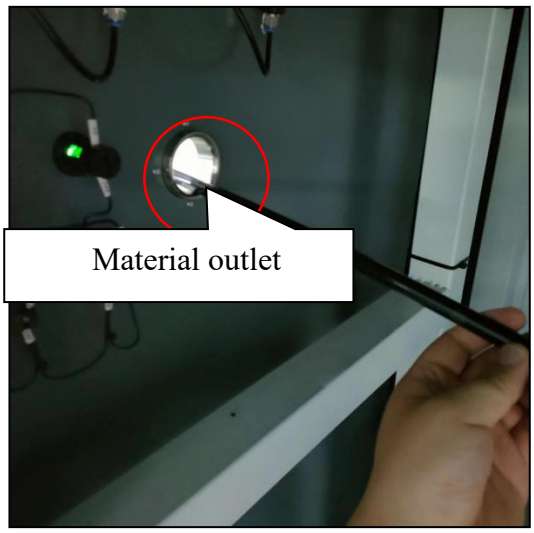
②. Loosen the lock screw, drawn to adjust the internal brace size (shown as the picture)



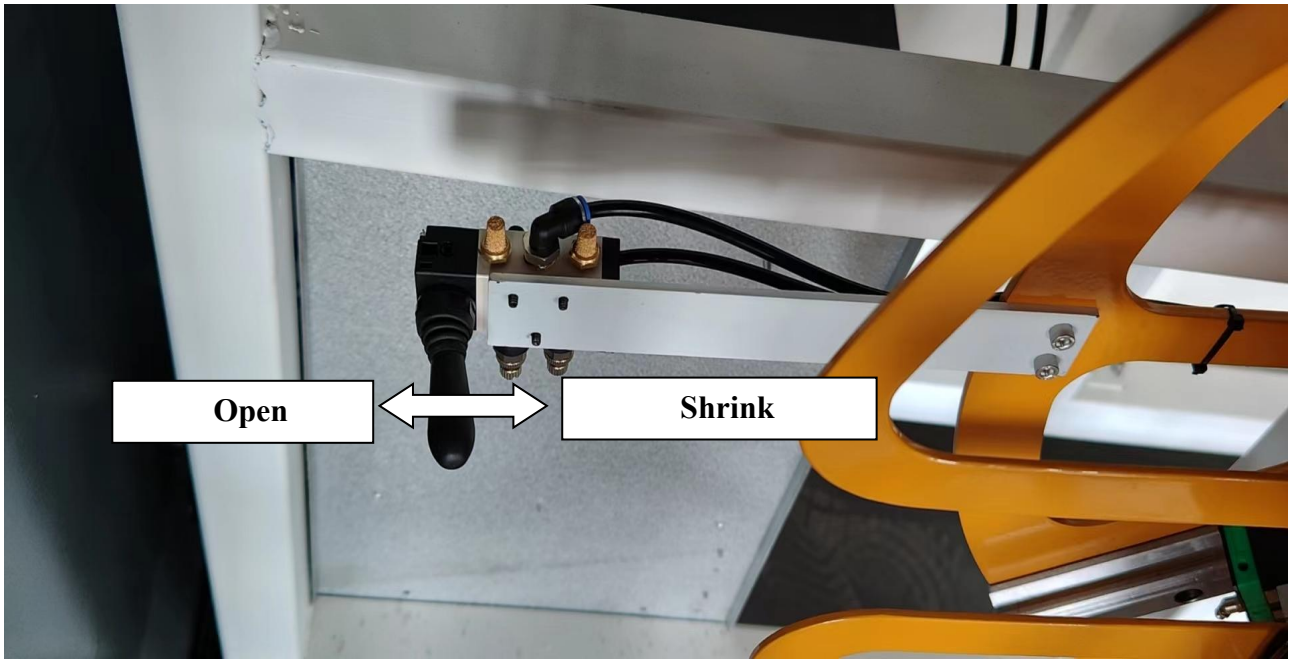
③. Adjust the internal brace diameter according to tube tray internal diameter size and tightly locked. (Shrink size should be 10-25mm smaller than tube tray internal diameter), shown as the below picture:

⑤. Cover the guard plate after installed tube tray, and use the quick lock to lock it, manually drag the air tube lead out from the material outlet. Shown as the below picture:

Operating instruction of quick lock:
One hand press the metal knurl in it, and inward force on it, another one hand quickly revolve the hand to tightly lock it, both hands cooperate to fix

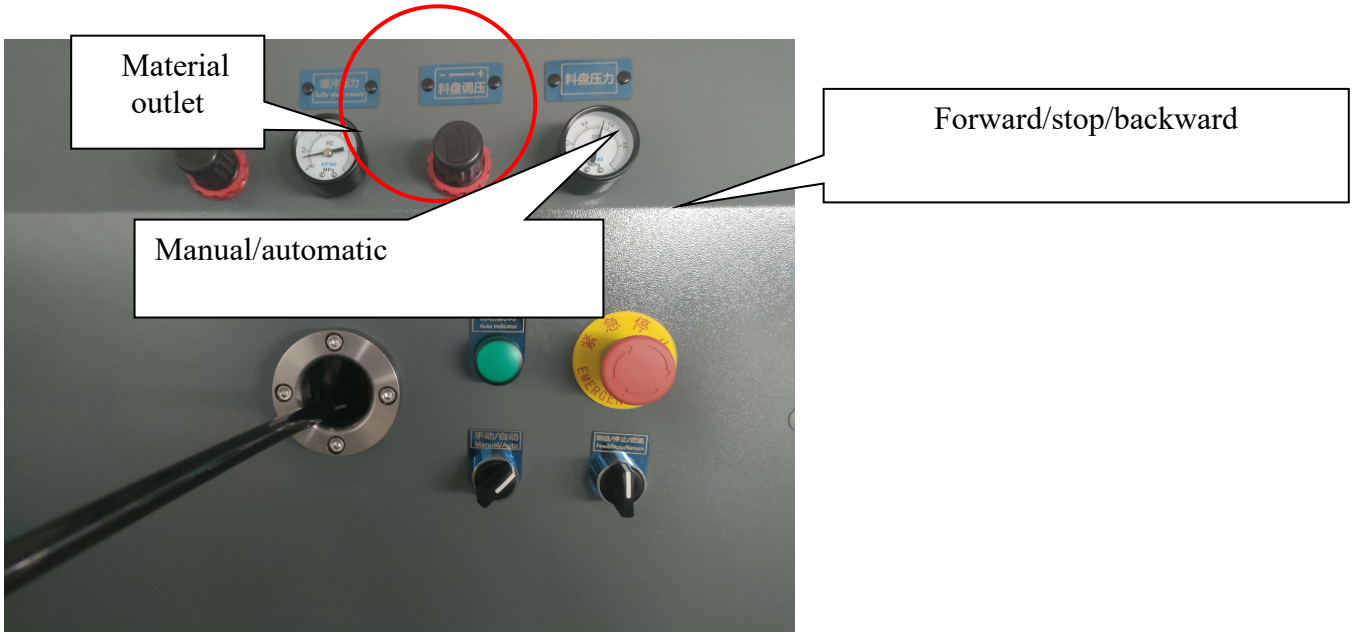


⑥. Open the pneumatic valve, make the internal ring tightly brace tube tray internal ring;



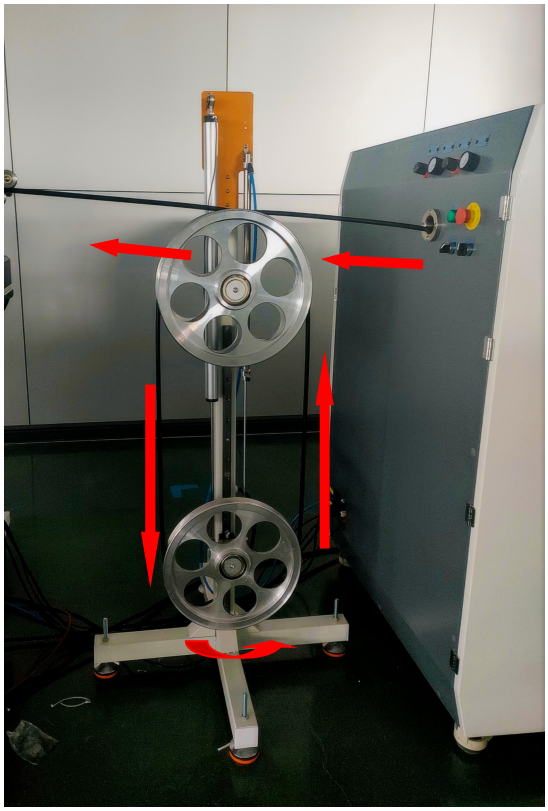
2.2. Feeding material

①. Material release machine shift to manual mode, material tray motion direction shift to forward, then manual drag the tube material, make the air tube pass through material outlet.



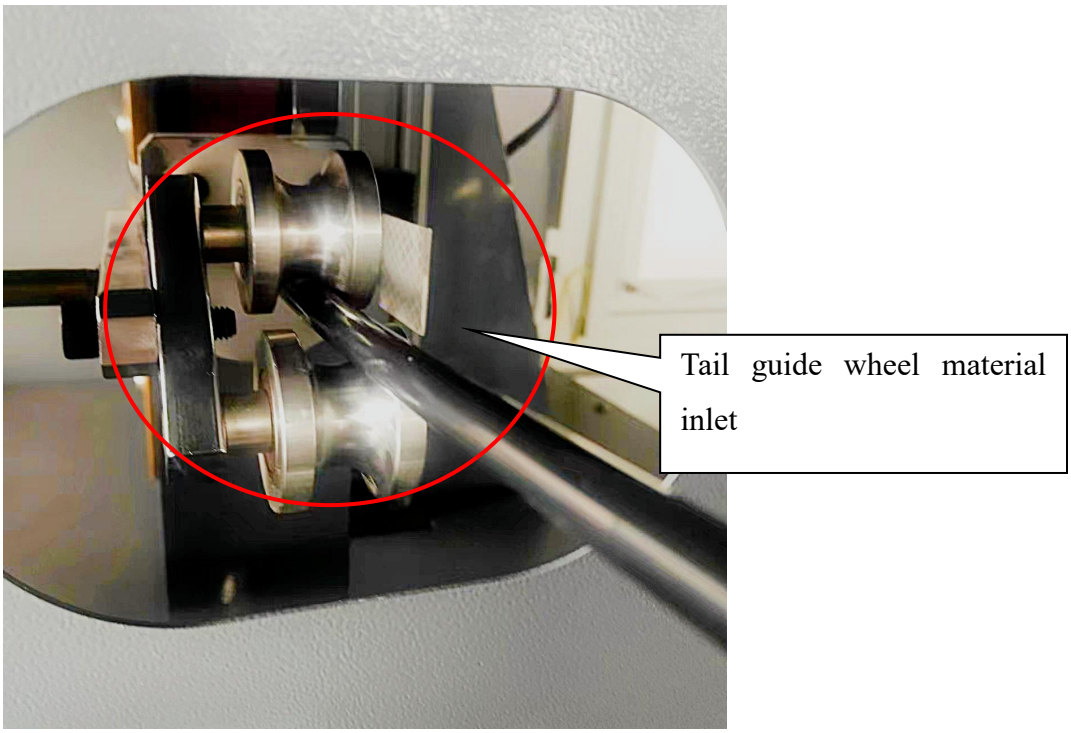
②. Pass in tube material buffer wheel

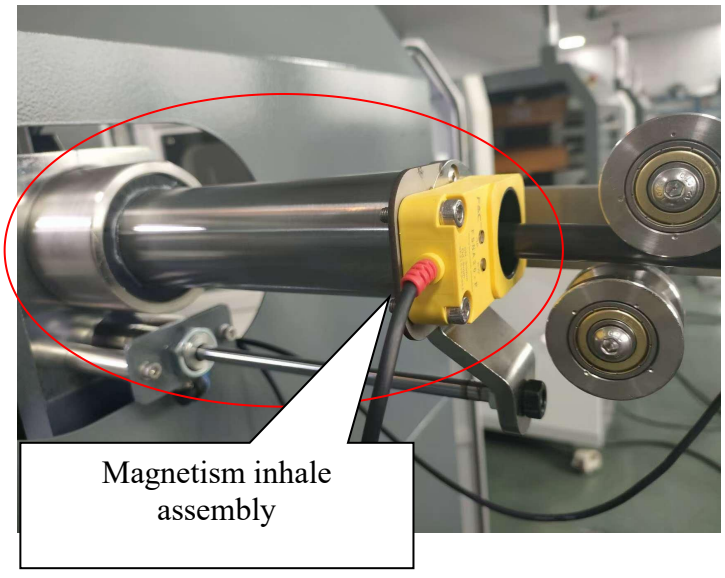
Drag out the tube body from the material outlet according to the diagram, bypass the buffer wheel in sequence, shown as the below picture:



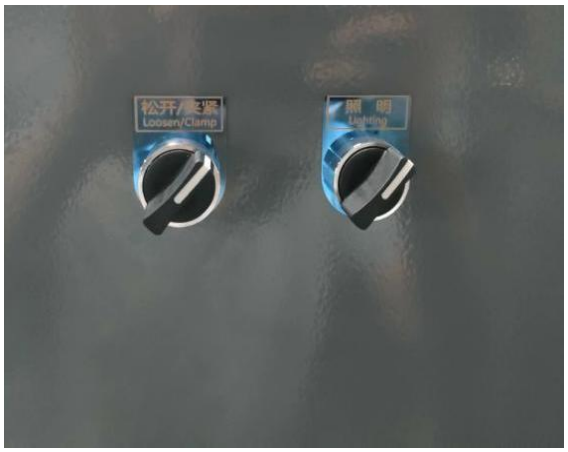
One time bypass the buffer wheel according to the diagram, make ensure the tube material can't happen twist

③. Manually lead in the material inlet of machine tail guide wheel, pass through material inlet





④. Pass through drag machine (drag machine at rising status), then pass through oven tail guide tube



Find the drag machine “Loosen/clip” revolve button at machine tail, revolve to “Loosen” status

Tail guide tube

⑤. Manually hold the tube material, start falling revolve switch of drag machine, drag machine falling to clip tube materials (**Attention that air tube at the same level with material inlet center under the clip status**)

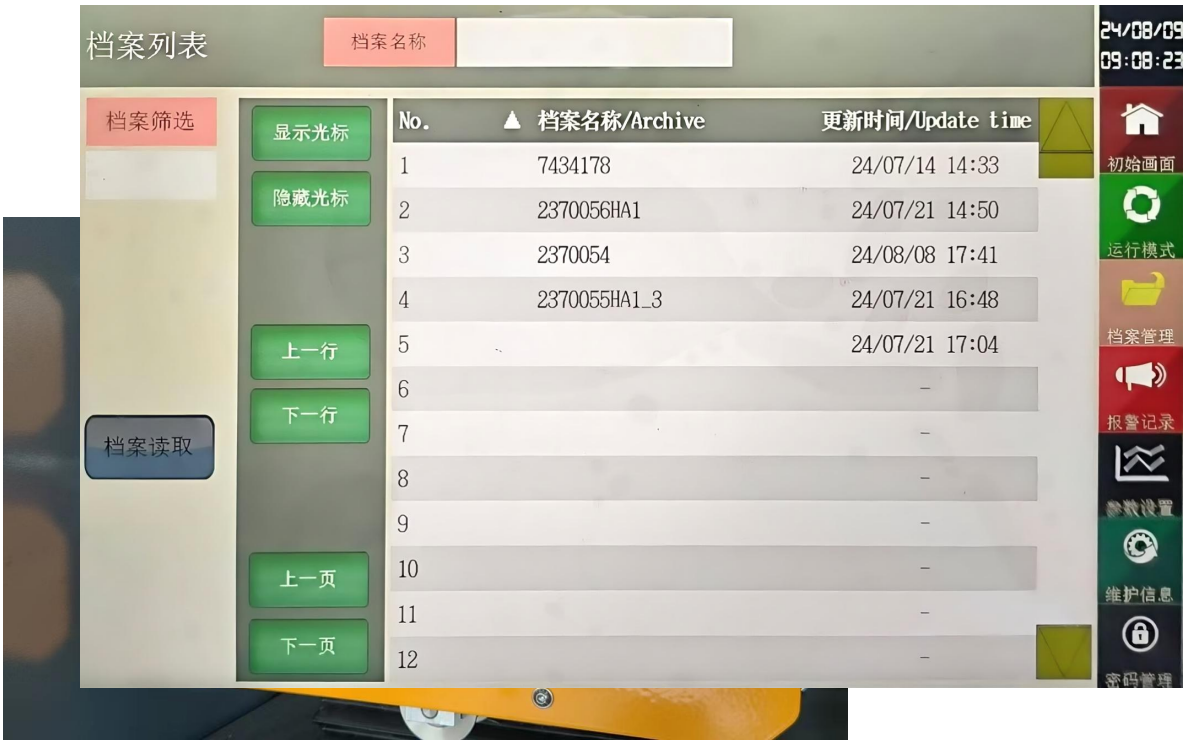
3. Start machining

3.1 Read and newly built program:

3.1.1 Read program

①. Click right side File management and enter file management page under the manual mode on operating page, select the program which need machining, click Read file;

File management

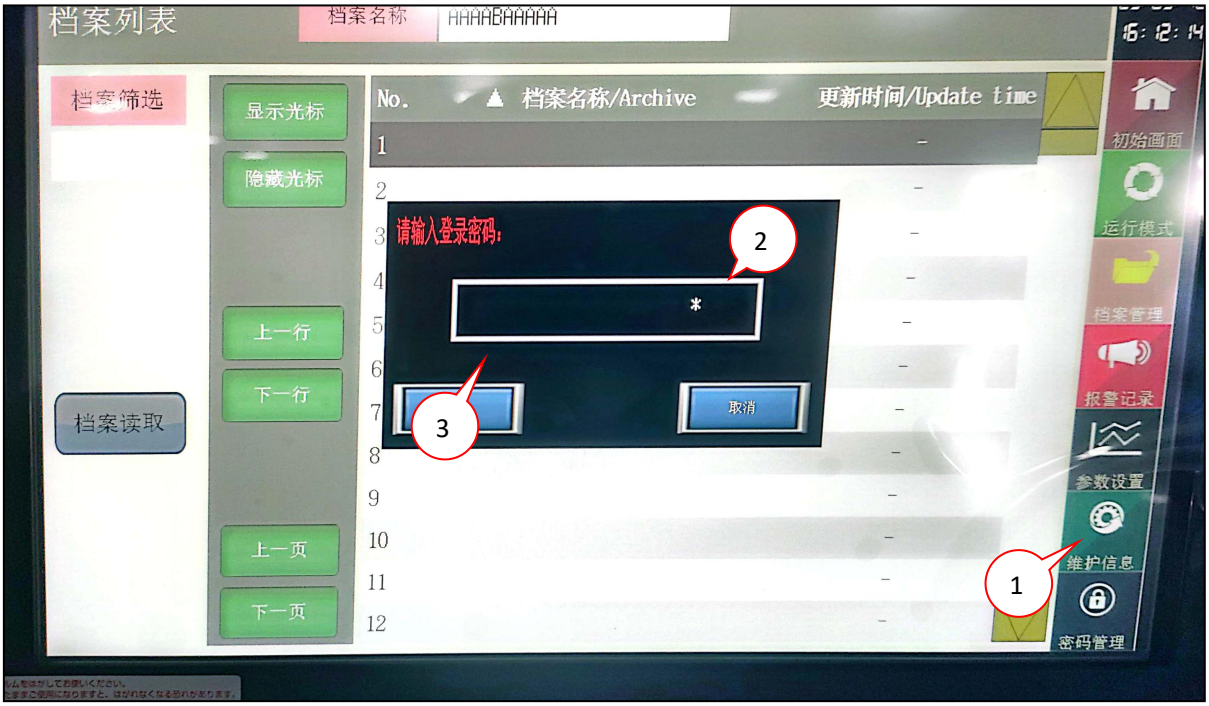


Select the program which need production in the file list, click “Read file”

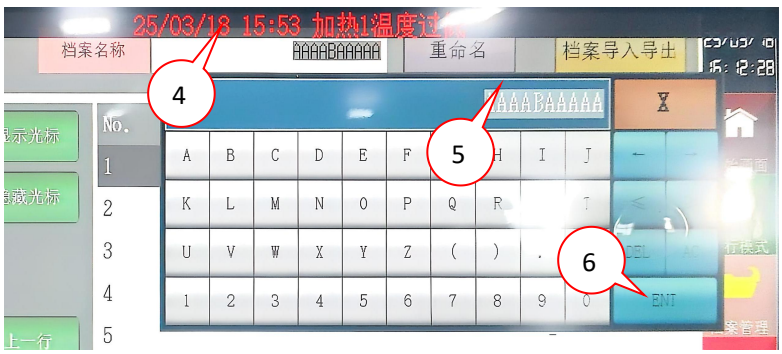
②. Mode directly shift to automatic mode on file edit page, read program successfully

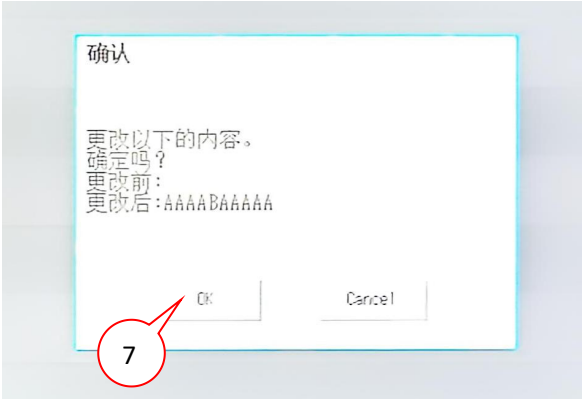
3.1.2 Newly create program

①. Click “File management” on homepage, enter into file list page, click “Password management”, input leave factory password “1” to edit and activate page;



③. Click up input box which behind “File name”, jump out input assist keyboard, input new file name first then press ENT key to confirm, jump out dialog box, click “OK”, new file named successfully





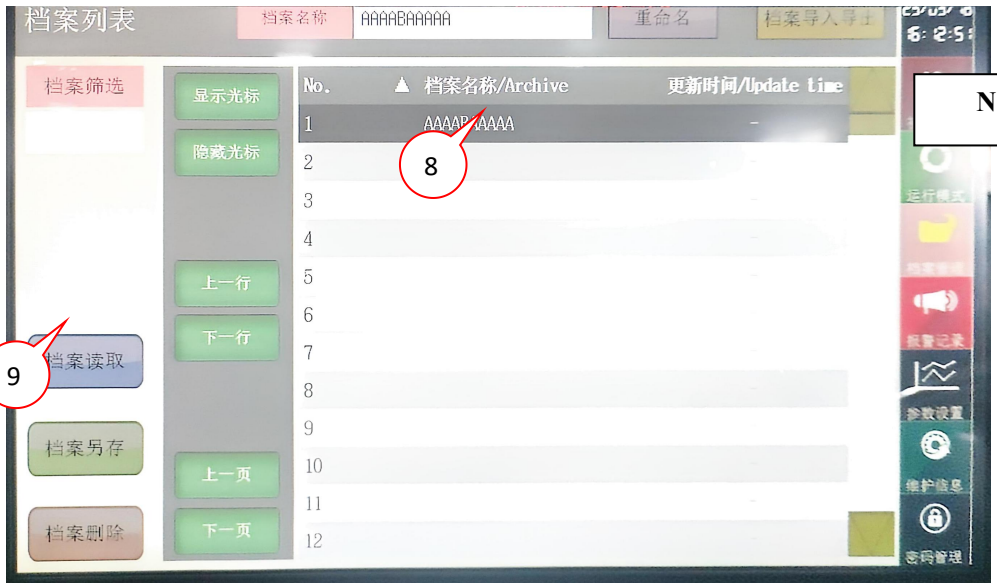
确认 Confirm

更改以下的内容。Modify the below contents.

确定吗？Confirm?

更改前 Before modification

更改后 After modification



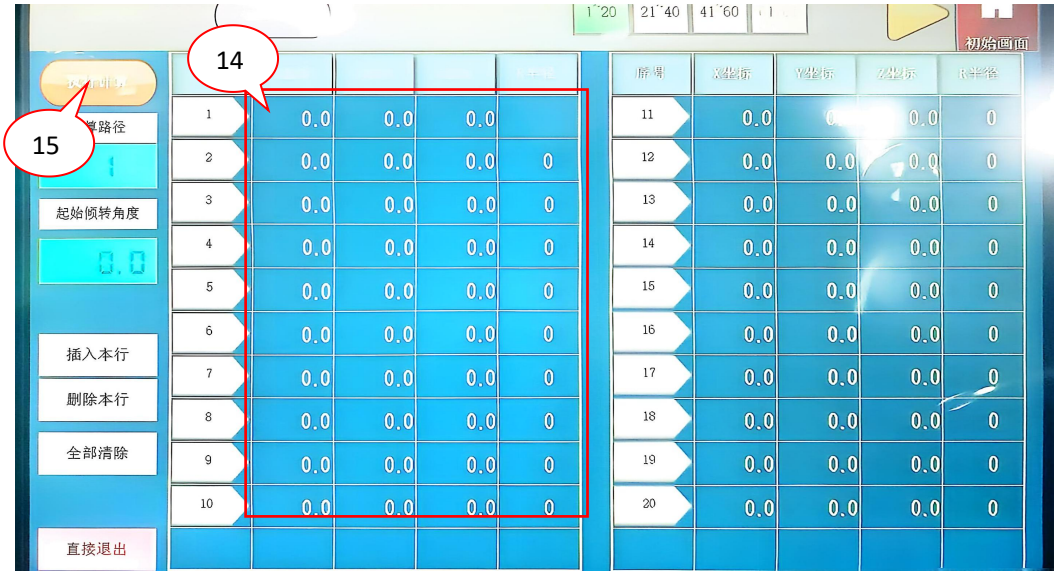
New file name input successfully

③.Select the new file, click “Read file”, enter into file edit page, click “Password management”, input activate password (leave factory password “2”) to activate

请输入登录密码 Please input login password

确认 Confirm　取消 Cancel

④. Click “Edit coordinate” on activate page, enter into coordinate edit page, manually input tube coordinate parameters X, Y and Z and bending radius on this page, click “Carry out calculation” after finished, jump out confirm dialog box, long time press “Confirm”



⑥. Waiting the program calculation cover finished, it will automatically jump to the program edit page with data, machining mode manually shift to automatic mode, newly create program read successfully

3.2 Select automatic machining mode

3.2.1 Select the machining mode which need production: circling mode or period mode

3.2.2 Select equipment program running mode:

Pass core mode, fission bending wheel, integration bending wheel, tailing material machining, online marking

Pass core mode: partial tube diameter specification adopt fission type bending wheel, need configure pass core fixture and lighting this mode;

Fission bending wheel: partial small tube diameter specification adopt fission type bending wheel, needn't pass core fixture, lighting this mode;

Integration bending wheel: partial small tube diameter specification adopt integrate type bending wheel, needn't pass core fixture, lighting this mode;

Tailing machining: end rest tailing machining;

Online marking: realize syn marking;

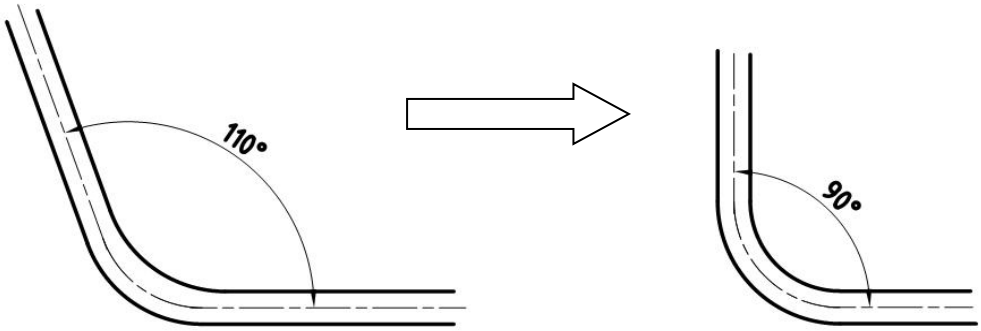
Preheat material feeding: (preheat material feeding only selected after every one time feeding material gain) the material slowly feed to front end of machine head (about 2min) from tail of oven, automatically cut off and start machining;

初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
自动模式 Automatic mode
到达维护期限 Arrived maintain time limit
设定数量 Setting quantity
重新计数 Counting again
打标监视 Marking monitor
序号 Serial number
送料 Material feeding
倾转 Vert
弯管 Tube bending
冷却 Cooling
让位 Give away position
1 区温度 Region 1 temperature
2 区温度 Region 2 temperature
加工周期 Machining period S
展开长度 Spread out length mm
尾座高度 Tail stock height mm
总加工数 Total machining quantity
循环模式 Circling mode
周期模式 Period mode
预热送料 Preheat material feeding
穿芯送料 Pass core feeding material
穿芯模式 Pass core mode
分体弯轮 Fission bending wheel
一体弯轮 Integrate bending wheel

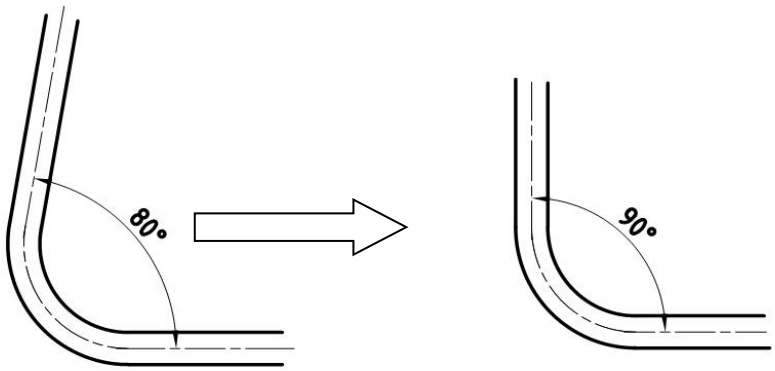
3.3 Adjust modeling angle deviation

Use product test tools to process assist verification, to verify the tube bending angle and length of straight line section

Bigger tube bending angle: reduce tube bending angle or lengthen cooling air blow time



Smaller tube bending angle: increase tube bending angle or reduce cooling air blow time



Attention points of program debugging:

1. During debugging stage, the tube section unstable heating time (longer) in the equipment, caused the program which edited well according to the steps occur the situation not according to test tool after running, need firstly send out the front end material then process micro adjustment.

2. **Tube bending theory value will existing difference with actual bending, able to adjust edit data of each bending section according to test tool requirements.**

4. Stop machine

4.1 Emergency stop machine

Before and back of equipment all set emergency stop button under the emergency situation, equipment stop work after press down.

4.2 Normal stop machine

- Automatically stop after the current program machining finished
- Shift to manual status, close heating
- Forbid to pick out tube material from tail under pass core mode
- Close general power supply and close air source

Chapter VII Troubleshooting

1. Alarm tableau instruction

Click “Alarm record” and enter into the below page

初始画面 Initial tableau
运行模式 Running mode
档案管理 File management
报警记录 Alarm records
参数设置 Parameter setting
维护信息 Maintain information
密码管理 Password management
报警记录 Alarm records
显示光标 Display cursor
清除光标 Clean cursor
光标上移 Cursor upward move
光标下移 Cursor downward move
报警确认 Alarm confirm
全部确认 All confirm
报警删除 Delete alarm
全部删除 Delete all
报警消音 Alarm erasure
报警复位 Alarm reset
发生 Happen
注释 Note

恢复 Recover
紧急停止报警 Emergency stop alarm
加热未加工报警 Material feeding not machining alarm
送料伺服 1 报警 Material feeding servo 1 alarm
送料伺服 2 报警 Material feeding servo 2 alarm
倾转伺服故障 Vert servo failure
弯管伺服故障 Tube bending servo failure
加热或变频异常 Abnormal heating or frequency conversion
加热 1 温度过高 Too high heating 1 temperature
加热 1 温度过低 Too low heating 1 temperature
风口 1 温度过高 Too high air port 1 temperature
机器人未就绪 Robot not ready
加热 2 温度过高 Too high heating 2 temperature

Able to process the operations such as alarm information check, alarm erasure, alarm reset and others, also able to delete the alarm information (unable to recover, select delete carefully)

2. Alarm information and release

S/N	Alarm information	Alarm reasons	Release
1	Emergency stop alarm	Press down emergency stop button	Make ensure reset emergency stop button under normal situation
2	Heating not work alarm	Heating not start	Check whether fan frequency converter failed, start heating after released
3	Material feeding servo 1 alarm	Material feeding servo 1 failure	Check whether material feeding servo 1 driver alarm, press down reset button after released, release alarm
4	Material feeding servo 2 alarm	Material feeding servo 2 failure	Check whether material feeding servo 2 driver alarm, press down reset button after released, release alarm
5	Vert servo failure	Vert servo failure	Check whether vert servo driver alarm, press down reset button after released, release alarm
6	Tube bending servo failure	Tube bending servo failure	Check whether tube bending servo driver alarm, press down reset button after released, release alarm

7	Abnormal heating or frequency conversion	Fan and frequency converter occur failure	1. Check whether fan abnormal (blocked, rotating occur noise and others) and process the corresponding treatment 2. Check whether frequency converter occur alarm, (the details check 7.4 Frequency converter failure code view)
8	Too high heating 1 temperature	Heating region 1 temperature higher than setting value	1. The temperature higher than setting value 50℃, check region I solidify, whether sensor damaged and process the corresponding treatment 2. The temperature lower than setting value 50℃, waiting the temperature reduce to setting value under standby status.
9	Too low heating 1 temperature	Heating region 1 temperature lower than setting value	1. Waiting 10min, observe whether temperature rising, rising above 10℃, continue waiting then okay. 2. Whether solidity electric relay, heating rod and sensor damaged.
10	Too high air port 1 temperature	Heating region 1 air port temperature higher than setting value	1. The temperature higher than setting value 50℃, check whether solidity and sensor in region 1 damaged and process the corresponding treatment 2. The temperature lower than setting value 50℃, waiting the temperature reduce to setting value under standby status.
11	Too high air port 2 temperature	Heating region 2 air port temperature higher than setting value	1. The temperature higher than setting value 50℃, check whether solidity and sensor in region 2 damaged and process the corresponding treatment 2. The temperature lower than setting value 50℃, waiting the temperature reduce to setting value under standby status.
12	Robot not ready	Robot preparation works not done well	Check whether robot be at preparation ready status.
13	Too high heating 2 temperature	Heating region 2 temperature higher than setting value	1. The temperature higher than setting value 50℃, check whether solidity and sensor in region 2 damaged and process the corresponding treatment 2. The temperature lower than setting value 50℃, waiting the temperature reduce to setting value under standby status.

14	Too low heating 2 temperature	Heating region 2 temperature lower than setting value	1. Waiting 10min, observe whether temperature rising, rising above 10℃, continue waiting then okay. 2. Whether solidity electric relay, heating rod and sensor damaged.
15	Air pressure low alarm	Air pressure lower than setting value	1. Check whether air pressure of pressure meter lower than required value 2. Check whether pressure sensor at failure
16	Too big material feeding torque monitor	Material feeding drag torque over the setting value	1. Check whether material rack tube tray block materials 2. Check whether drag belt occur blocked appearance 3. Check whether tube tube diameter over tolerance and too big material inlet resistance 4. Check whether machine head occur material block appearance 5. Whether torque monitor setting value in material feeding servo setting are reasonable
17	Too big vert torque monitor	Vert torque over the setting value	1. Under the power off situation, push vert arm to check whether vert mechanism blocked 2. Whether torque test of vert servo setting are reasonable
18	Too big tube bending torque monitor	Tube bending torque over the setting value	1. Check whether machine head tube bending part occur material block appearance 2. Check whether tube bending clutch damage or has block appearance 2. Check whether tube bending guide wheel rub with bending wheel 3. Whether torque monitor value in tube bending servo setting are reasonable
19	Abnormal material inlet test	Material inlet of drag machine front end occur abnormal	1. Whether tube diameter over tolerance, block with material outlet 2. Check whether materials inlet monitor device invalid 3. Check whether material inlet monitor switch damaged
20	Not enough raw materials	Not enough raw materials	1. Check whether raw materials are not enough 2. Check whether raw materials monitor switch damaged

21	Cutter up limit sensor failure	Cutter up limit sensor indicate lamp not lighting	1. Check whether cutter air cylinder and electromagnetism valve action are normal 2. Check whether sensor damaged
22	Cutter down limit sensor failure	Cutter down limit sensor indicate lamp not lighting	1. Check whether cutter air cylinder and electromagnetism valve action are normal 2. Check whether sensor damaged
23	Material release device failure	Material release device failure	1. Check whether material release rack material tray blocked 2. Check whether “Material release device failure” sensor damaged
24	Automatic stop overtime alarm	Long time not start under automatic status alarm	Shift manual tableau to release
25	Material feeding not enter into syn mode	Material feeding mechanism not syn	Press reset button to release under manual mode
26	Abnormal cutter open test	Cutter alarm when automatic machining	1.Check whether blade complete well and sharp 2.Check whether cutter air cylinder open actions are normal 3.Check whether sensor loosen or damaged
27	Tail hoisting servo ALM	Drag up and down servo alarm	Press reset button to release under manual mode
28	Safety door open warning	Safety door open alarm	Close safety door
29	Power supply not start, please press reset	Power supply cut off	Press reset button to recover power supply
30	Vert over up limit	Over setting value	Press reset button to release under manual mode
31	Vert over down limit	Over setting value	Press reset button to release under manual mode
32	Tube bending over up limit	Over setting value	Press reset button to release under manual mode
33	Tube bending over down limit	Over setting value	Press reset button to release under manual mode
34	Material feeding belt not on position	Drag not be at working position	Press reset button to release under manual mode

3.Frequency transformer failure code view

操作面板显示			名称
重故障	E.ILF	E. ILF *	输入缺相
	E.OLT	E. OLT	失速防止
	E. bE	E. BE	制动晶体管异常检测
	E. GF	E. GF	启动时输出侧接地过电流
	E. LF	E. LF	输出缺相
	E.OHT	E. OHT	外部过电流继电器动作
	E.OP1	E. OP1	通讯选件异常
	E. 1	E. 1	选件异常
	E. PE	E. PE	变频器参数存储元件异常
	E.PE2	E. PE2 *	内部基板异常
	E.PUE	E. PUE	PU脱离
	E.rET	E. RET	再试次数溢出
	E. 5 / E. 6 / E. 7 / E.CPU	E. 5 / E. 6 / E. 7 / E. CPU	CPU错误
	E.IOH	E. IOH *	浪涌电流抑制电路异常
	E.AIE	E. AIE *	模拟量输入异常
	E.USb	E. USB *	USB通讯异常
	E.MB4 ~ E.MB7	E. MB4~ E. MB7	制动器顺控错误
	E. 13	E. 13	内部电路异常

操作面板显示			名称
重故障	E.ILF	E. ILF *	输入缺相
	E.OLT	E. OLT	失速防止
	E. bE	E. BE	制动晶体管异常检测
	E. GF	E. GF	启动时输出侧接地过电流
	E. LF	E. LF	输出缺相
	E.OHT	E. OHT	外部过电流继电器动作
	E.OP1	E. OP1	通讯选件异常
	E. 1	E. 1	选件异常
	E. PE	E. PE	变频器参数存储元件异常
	E.PE2	E. PE2 *	内部基板异常
	E.PUE	E. PUE	PU脱离
	E.rET	E. RET	再试次数溢出
	E. 5 / E. 6 / E. 7 / E.CPU	E. 5 / E. 6 / E. 7 / E. CPU	CPU错误
	E.IOH	E. IOH *	浪涌电流抑制电路异常
	E.AIE	E. AIE *	模拟量输入异常
	E.USb	E. USB *	USB通讯异常
	E.MB4 ~ E.MB7	E. MB4~ E. MB7	制动器顺控错误
	E. 13	E. 13	内部电路异常

操作面板显示 Operating panel display			名称 Name
重故障 Heavy failure			输入缺相 Input lack phase
			失速防止 Prevent loss speed
			制动晶体管异常检测 Brake transistor abnormal test
			启动时输出侧接地过电流 Output side grounding over current when starting
			输出缺相 Output lack phase
			外部过电流继电器动作 External over current relay acting
			通讯选件异常 Communication select parts abnormal
			选件异常 Select parts abnormal
			变频器参数存储元件异常 Frequency converter parameters storage elements abnormal
			内部基板异常 Internal base plate abnormal
			PU 脱离 PU separated
			再试次数溢出 Test times overflow
			CPU 错误 CPU error
			浪涌电流抑制电路异常 Surge current restrain electric circuit abnormal
			模拟量输入异常 Analog quantity input abnormal
			USB 通讯异常 USB communication abnormal
			制动器顺控错误 Brake sequence control error
			内部电路异常 Internal electric circuit abnormal

4. Driver failure code view

	编号	名称	详细编号	详细名称	停止方式（注2、3）	报警的解除		
						报警复位	CPU复位	电源的再接通
报警	10	欠电压	10.1	电源电压下降	EDB	○	○	○
			10.2	母线电压下降	SD	○	○	○
	12	存储器异常1（RAM）	12.1	RAM异常1	DB			○
			12.2	RAM异常2	DB			○
			12.3	RAM异常3	DB			○
			12.4	RAM异常4	DB			○
			12.5	RAM异常5	DB			○
	13	时钟异常	13.1	控制时钟异常1	DB			○
			13.2	控制时钟异常2	DB			○
	14	控制处理异常	14.1	控制处理异常1	DB			○
			14.2	控制处理异常2	DB			○
			14.3	控制处理异常3	DB			○
			14.4	控制处理异常4	DB			○
			14.5	控制处理异常5	DB			○
			14.6	控制处理异常6	DB			○
			14.7	控制处理异常7	DB			○
			14.8	控制处理异常8	DB			○
			14.9	控制处理异常9	DB			○
			14.A	控制处理异常10	DB			○
	15	存储器异常2（EEP-ROM）	15.1	接通电源时EEP-ROM异常	DB			○
			15.2	运行过程中EEP-ROM异常	DB			○
	16	编码器初始通信异常1	16.1	编码器初始通信　接收数据异常1	DB			○
			16.2	编码器初始通信　接收数据异常2	DB			○
			16.3	编码器初始通信　接收数据异常3	DB			○
			16.5	编码器初始通信　发送数据异常1	DB			○
			16.6	编码器初始通信　发送数据异常2	DB			○
			16.7	编码器初始通信　发送数据异常3	DB			○
			16.A	编码器初始通信　处理异常1	DB			○
			16.B	编码器初始通信　处理异常2	DB			○
			16.C	编码器初始通信　处理异常3	DB			○
			16.D	编码器初始通信　处理异常4	DB			○
			16.E	编码器初始通信　处理异常5	DB			○
			16.F	编码器初始通信　处理异常6	DB			○
	17	电路板异常	17.1	电路板异常1	DB			○
			17.3	电路板异常2	DB			○
			17.4	电路板异常3	DB			○
			17.5	电路板异常4	DB			○
			17.6	电路板异常5	DB			○
	19	存储器异常3（Flash-ROM）	19.1	Flash-ROM异常1	DB			○
			19.2	Flash-ROM异常2	DB			○
	1A	伺服电机组合异常	1A.1	伺服电机组合异常1	DB			○
	1E	编码器初始通信异常2	1E.1	编码器故障	DB			○
	1F	编码器初始通信异常3	1F.1	不支持编码器	DB			○

5. Driver failure code view

	编号 No.	名称 Name	详细编号 Detail number	详细名称 Detail name	停止方式（注 2. 3)Stop method (note 2, 3)	报警的解除 Release alarm		
						报警复位 Alarm reset	CPU 复位 CPU reset	电源的再接通 Re-connect power supply
报警 Alarm	10	欠电压 Lack voltage	10.1	电源电压下降 Power supply voltage reduce	EDB	o	o	o
			10.2	母线电压下降 Bus line voltage reduce	SD	o	o	o
	12	存储器异常 1(RAM) Memory abnormal 1 (RAM)	12.1	RAM 异常 1 RAM abnormal 1	DB			o
			12.2	RAM 异常 2 RAM abnormal 2	DB			o
			12.3	RAM 异常 3 RAM abnormal 3	DB			o
			12.4	RAM 异常 4 RAM abnormal 4	DB			o
			12.5	RAM 异常 5 RAM abnormal 5	DB			o
	13	时钟异常 Clock abnormal	13.1	控制时钟异常 Control clock abnormal 1	DB			o
			13.2	控制时钟异常 Control clock abnormal 2	DB			o
	14	控制处理异常 Control treatment abnormal	14.1	控制处理异常 Control treatment abnormal 1	DB			o
			14.2	控制处理异常 Control treatment abnormal 2	DB			o
			14.3	控制处理异常 Control treatment abnormal 3	DB			o
			14.4	控制处理异常 Control treatment abnormal 4	DB			o
			14.5	控制处理异常 Control treatment abnormal 5	DB			o
			14.6	控制处理异常 Control treatment abnormal 6	DB			o
			14.7	控制处理异常 Control treatment abnormal 7	DB			o
			14.8	控制处理异常 Control treatment abnormal 8	DB			o
			14.9	控制处理异常 Control treatment abnormal 9	DB			o
			14.A	控制处理异常 Control treatment abnormal 10	DB			o
	15	存储器异常 2(EEP-ROM)Memory abnormal 2 (RAM)	15.1	接通电源时 EEP-ROM 异常 EEP-ROM abnormal when connect power supply	DB			o
			15.2	运行过程中 EEP-ROM 异常 EEP-ROM abnormal during running	DB			o
	16	编码器初始通信异常 1 Coder initial communication	16.1	编码器初始通信 接收数据异常 1 Coder initial communication receive data	DB			o

		abnormal 1		abnormal 1				
			16.2	编码器初始通信 接收数据异 常 2 Coder initial communication receive data abnormal 2	DB			o
			16.3	编码器初始通信 接收数据异 常 3 Coder initial communication receive data abnormal 3	DB			o
			16.5	编码器初始通信 发送数据异 常 1 Coder initial communication launch data abnormal 1	DB			o
			16.6	编码器初始通信 发送数据异 常 2 Coder initial communication launch data abnormal 2	DB			o
			16.7	编码器初始通信 发送数据异 常 3 Coder initial communication launch data abnormal 3	DB			o
			16.A	编码器初始通信 处理异常 1 Coder initial communication treatment abnormal 1	DB			o
			16.B	编码器初始通信处理异常 2 Coder initial communication treatment abnormal 2	DB			o
			16.C	编码器初始通信 处理异常 3 Coder initial communication treatment abnormal 3	DB			o
			16.D	编码器初始通信 处理异常 4 Coder initial communication treatment abnormal 4	DB			o
			16.E	编码器初始通信 处理异常 5 Coder initial communication treatment abnormal 5	DB			o
			16.F	编码器初始通信 处理异常 6 Coder initial communication treatment abnormal 6	DB			o
	17	电路板异常 Electric circuit board abnormal	17.1	电路板异常 Electric circuit board abnormal 1	DB			o
			17.3	电路板异常 Electric circuit board abnormal 2	DB			o
			17.4	电路板异常 Electric circuit board abnormal 3	DB			o
			17.5	电路板异常 Electric circuit board abnormal 4	DB			o
			17.6	电路板异常 Electric circuit board abnormal 5	DB			o
	19	存 储 器 异 常 3(Flash-ROM)	19.1	Flash-ROM 异常 1	DB			o
			19.2	Flash-ROM 异 常 2	DB			o

		Memory abnormal 3 (Flash-ROM)		Flash-ROM abnormal 2				
	1A	伺服电机组合异常 Servo motor assemble abnormal	1A.1	伺服电机组合异常 1 Servo motor assembly abnormal 1	DB			o
	1E	编码器初始通信异常 2 Coder initial communication abnormal 2	1E.1	编码器故障 Coder failure	DB			o
	1F	编码器初始通信异常 3 Coder initial communication abnormal 3	1F.1	不支持编码器 Not support coder	DB			o

	编号	名称	详细编号	详细名称	停止方式（注2、3）	报警的解除		
						报警复位	CPU复位	电源的再接通
报警	20	编码器常规通信异常1	20.1	编码器通信 接收数据异常1	EDB			○
			20.2	编码器通信 接收数据异常2	EDB			○
			20.3	编码器通信 接收数据异常3	EDB			○
			20.5	编码器通信 发送数据异常1	EDB			○
			20.6	编码器通信 发送数据异常2	EDB			○
			20.7	编码器通信 发送数据异常3	EDB			○
			20.9	编码器通信 接收数据异常4	EDB			○
			20.A	编码器通信 接收数据异常5	EDB			○
	21	编码器常规通信异常2	21.1	编码器数据异常1	EDB			○
			21.2	编码器数据更新异常	EDB			○
			21.3	编码器数据波形异常	EDB			○
			21.5	编码器硬件异常1	EDB			○
			21.6	编码器硬件异常2	EDB			○
			21.9	编码器数据异常2	EDB			○
	24	主电路异常	24.1	硬件检测电路的接地检测	DB			○
			24.2	软件检测处理的接地检测	DB	○	○	○
	25	绝对位置丢失	25.1	伺服电机编码器绝对位置丢失	DB			○
	30	再生异常	30.1	再生散热量异常	DB	○（注1）	○（注1）	○（注1）
			30.2	再生信号异常	DB	○（注1）	○（注1）	○（注1）
			30.3	再生反馈信号异常	DB	○（注1）	○（注1）	○（注1）
	31	过速度	31.1	电机转速速度异常	SD	○	○	○
	32	过电流	32.1	硬件检测电路的过电流检测（运行中）	DB			○
			32.2	软件检测处理的过电流检测（运行中）	DB	○	○	○
			32.3	硬件检测电路的过电流检测（停止中）	DB			○
			32.4	软件检测电路的过电流检测（停止中）	DB	○	○	○
	33	过电压	33.1	主电路电压异常	EDB	○	○	○
	34	SSCNET接收异常1	34.1	SSCNET接收数据异常	SD	○	○（注4）	○
			34.2	SSCNET连接器连接错误	SD	○	○	○
			34.3	SSCNET通信数据异常	SD	○	○	○
			34.4	硬件异常信号检测	SD	○	○	○
	35	指令频率异常	35.1	指令频率异常	SD	○	○	○
	36	SSCNET接收异常2	36.1	间断通信数据异常	SD	○	○	○
	37	参数异常	37.1	参数设置范围异常	DB		○	○
			37.2	参数组合引起的异常	DB		○	○
	3E	运行模式异常	3E.1	运行模式异常	DB			○
	45	主电路元件过热	45.1	主电路元件温度异常1	SD	○（注1）	○（注1）	○（注1）
	46	伺服电机过热	46.1	伺服电机温度异常1	SD	○（注1）	○（注1）	○（注1）
			46.5	伺服电机温度异常3	DB	○（注1）	○（注1）	○（注1）
			46.6	伺服电机温度异常4	DB	○（注1）	○（注1）	○（注1）
	47	冷却风扇异常	47.2	冷却风扇转速下降异常	SD			○

	编号 No.	名称 Name	详细编号 Detail number	详细名称 Detail name	停止方式(注 2.3)Stop method (note 2, 3)	报警的解除 Release alarm		
						报警复位 Alarm reset	CPU 复位 CPU reset	电源的再接通 Re-connect power supply
报警 Alarm	20	编码器常规通信异常 1 Coder common communication abnormal 1	20.1	编码器通信 接收数据异常 Coder communication receive data abnormal 1	EDB			o
			20.2	编码器通信 接收数据异常 Coder communication receive data abnormal 2	EDB			o
			20.3	编码器通信 接收数据异常 Coder communication receive data abnormal 3	EDB			o
			20.5	编码器通信 发送数据异常 Coder communicationlaunch data abnormal 1	EDB			o
			20.6	编码器通信 发送数据异常 Coder communicationlaunch data abnormal 2	EDB			o
			20.7	编码器通信 发送数据异常 Coder communicationlaunch data abnormal 3	EDB			o
			20.9	编码器通信 接收数据异常 Coder communication receive data abnormal 4	EDB			o
			20.A	编码器通信 接收数据异常 Coder communication receive data abnormal 5	EDB			o
	21	编码器常规通信异常 2 Coder common communication abnormal 2	21.1	编码器数据异常 Coder data abnormal	EDB			o
			21.2	编码器数据更新异常 Coder data update abnormal	EDB			o
			21.3	编码器数据波形异常 Coder data wave form abnormal	EDB			o
			21.5	编码器硬件异常 Coder hardware abnormal 1	EDB			o
			21.6	编码器硬件异常 Coder hardware abnormal 2	EDB			o
			21.9	编码器数据异常 Coder data abnormal 2	EDB			o
	24	主电路异常 Main electric circuit abnormal	24.1	硬件检测电路的接地检测 Hardware test electric circuit grounding test	DB			o
			24.2	软件检测处理的接地检测 Software test treatment grounding test	DB	o	o	o
	25	绝对位置丢失 Absolute position loss	25.1	伺服电机编码器绝对位置丢失 Servo motor coder absolute position loss	DB			o
	30	再生异常 Regenerate abnormal	30.1	再生散热量异常 Regenerate heat radiation abnormal	DB	c		
			30.2	再生信号异常 Regenerate signal abnormal	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
			30.3	再生反馈信号异常 Regenerate feedback signal abnormal	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
	31	过速度 Over speed	31.1	电机转速速度异常 Motor speed abnormal	SD	o	o	o
	32	过电流 Over current	32.1	硬件检测电路的过电流检测(运行中)Over current test of hardware test electric circuit (running)	DB			o

			32.2	软件检测处理的过电流检测(运行中) Over current test of software test electric circuit (running)	DB	o	o	o
			32.3	硬件检测电路的过电流检测(停止中)Over current test of hardware test electric circuit (stopping)	DB			o
			32.4	软件检测电路的过电流检测(停止中)Over current test of software test electric circuit (stopping)	DB	o	o	o
	33	过电压 Over voltage	33.1	主电路电压异常 Main electric circuit voltage abnormal	EDB	o	o	o
	34	SSCNET 接收异常 1 SSCNET receive abnormal 1	34.1	SSCNET 接收数据异常 SSCNET receive data abnormal	SD	o	O(Note 4)	o
			34.2	SSCNET 连接器连接错误 SSCNET connector connect error	SD	o	o	o
			34.3	SSCNET 通信数据异常 SSCNET communication data abnormal	SD	o	o	o
			34.4	硬件异常信号检测 Hardware abnormal signal test	SD	o	o	o
	35	指令频率异常 Order frequency abnormal	35.1	指令频繁异常 Order frequency abnormal	SD	o	o	o
	36	SSCNET 接收异常 2 SSCNET receive abnormal 2	36.1	间断通信数据异常 Interval communication data abnormal	SD	o	o	o
	37	参数异常 Parameter abnormal	37.1	参数设置范围异常 Parameter setting range abnormal	DB		o	o
			37.2	参数组合引起的异常 Parameter assembly caused abnormal	DB		o	o
	3E	运行模式异常 Running mode abnormal	3E.1	运行模式异常 Running mode abnormal	DB			o
	45	主电路元件过热 Main electric element overheat	45.1	主电路元件温度异常 Main electric circuit element temperature abnormal 1	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
	46	伺服电机过热 Servo motor overheat	46.1	伺服电机温度异常 Servo motor temperature abnormal 1	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			46.5	伺服电机温度异常 Servo motor temperature abnormal 3	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
			46.6	伺服电机温度异常 Servo motor temperature abnormal 4	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
	47	冷却风扇异常 Cooling fan abnormal	47.2	冷却风扇转速下降异常 Cooling fan speed reduce abnormally	SD			o

	编号	名称	详细编号	详细名称	停止方式（注2、3）	报警的解除		
						报警复位	CPU复位	电源的再接通
报警	50	过载1	50.1	运行时热过载异常1	SD	○（注1）	○（注1）	○（注1）
			50.2	运行时热过载异常2	SD	○（注1）	○（注1）	○（注1）
			50.3	运行时热过载异常4	SD	○（注1）	○（注1）	○（注1）
			50.4	停止时热过载异常1	SD	○（注1）	○（注1）	○（注1）
			50.5	停止时热过载异常2	SD	○（注1）	○（注1）	○（注1）
			50.6	停止时热过载异常4	SD	○（注1）	○（注1）	○（注1）
	51	过载2	51.1	运行时热过载异常3	DB	○（注1）	○（注1）	○（注1）
			51.2	停止时热过载异常3	DB	○（注1）	○（注1）	○（注1）
	52	误差过大	52.1	滞留脉冲过大1	SD	○	○	○
			52.3	滞留脉冲过大2	SD	○	○	○
			52.4	转矩限制0时误差过大	SD	○	○	○
			52.5	滞留脉冲过大3	EDB	○	○	○
	54	振动检测	54.1	振动检测异常	EDB	○	○	○
	56	强制停止异常	56.2	强制停止时超速	EDB	○	○	○
			56.3	强制停止时减速预测距离超出	EDB	○	○	○
	8A	USB通信超时异常	8A.1	USB通信超时异常	SD	○	○	○
	8E	USB通信异常/串行通信异常	8E.1	USB通信接收错误/串行通信接收错误	SD	○	○	○
			8E.2	USB通信校验和错误/串行通信校验和错误	SD	○	○	○
			8E.3	USB通信字符错误/串行通信字符错误	SD	○	○	○
			8E.4	USB通信指令错误/串行通信指令错误	SD	○	○	○
			8E.5	USB通信数据号码错误/串行通信数据号码错误	SD	○	○	○
	888	看门狗	88._	看门狗	DB			○

注　1. 排除发生原因后，应预留大约30分钟的冷却时间。

2. 停止方式有DB、EDB和SD3种。

DB：动态制动停止（去除动态制动器的产品则呈现自由运行状态）

EDB：电子式动态制动器停止（仅特定的伺服电机有效）

关于特定的伺服电机请参照下表。除特定伺服电机外的停止方式为DB。

系列	伺服电机
HG-KN	HG-KN053/HG-KN13/HG-KN23/HG-KN43
HG-SN	HG-SN52

SD：强制停止减速

3. [Pr. PA04]为初始值时。SD的报警可以通过[Pr. PA04]将停止方式变更为DB。

4. 根据控制器的通信状态，可能无法解除报警因素。

	编号 No.	名称 Name	详细编号 Detail number	详细名称 Detail name	停止方式(注 2.3)Stop method (note 2, 3)	报警的解除 Release alarm		
						报警复位 Alarm reset	CPU 复位 CPU reset	电源的再接通 Re-connect power supply
报警 Alarm	50	过载 Overload 1	50.1	运行时热过载异常 Thermal overload abnormal when running 1	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			50.2	运行时热过载异常 Thermal overload abnormal when running 2	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			50.3	运行时热过载异常 Thermal overload abnormal when running 4	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			50.4	停止时热过载异常 Thermal overload abnormal when stopping 1	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			50.5	停止时热过载异常 Thermal overload abnormal when stopping 2	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
			50.6	停止时热过载异常 Thermal overload abnormal when stopping 4	SD	o(注 Note 1)	o(Note 1)	o(Note 1)
	51	过载 Overload 2	51.1	运行时热过载异常 Thermal overload abnormal when running 3	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
			51.2	停止时热过载异常 Thermal overload abnormal when stopping 3	DB	o(注 Note 1)	o(Note 1)	o(Note 1)
	52	误差过大 Too big error	52.1	滞留脉冲过大 Too big retention pulse 1	SD	o	o	o
			52.3	滞留脉冲过大 Too big retention pulse 2	SD	o	o	o
			52.4	转矩限制 0 时误差过大 Too big error when torque limit at 0	SD	o	o	o
			52.5	滞留脉冲过大 Too big retention pulse 3	EDB	o	o	o
	54	振动检测 Vibration test	54.1	振动检测异常 Vibration test abnormal	EDB	o	o	o
	56	强制停止异常 Mandatory stop abnormally	56.2	强制停止时超速 Over speed when mandatory stop	EDB	o	o	o
			56.3	强制停止时减速预测距离超出 Moderate predict distance over when mandatory stopping	EDB	o	o	o
	8A	USB 通信超时异常 USB communication overtime abnormal	8A.1	USB 通信超时异常 USB communication overtime abnormal	SD	o	o	o
	8E	USB 通信异常/串行通信异常 USB communication overtime abnormal/serial communication abnormal	8E.1	USB 通信接收错误/串行通信接收错误 USB communication receive error/series communication receive error	SD	o	o	o
			8E.2	USB 通信校验和错误/串行通信校验和错误 USB communication calibration and	SD	o	o	o

				error/series communication check and error				
			8E.3	USB 通信字符错误/串行通信字符错误 USB communication characters error/series communication check and error	SD	o	o	o
			8E.4	USB 通信指令错误/串行通信指令错误 USB communication order error/series communication order error	SD	o	o	o
			8E.5	USB 通信数据号码错误/串行通信数据号码错误 USB communication data number error/series communication data number error	SD	o	o	o
	888	看门狗 Guard dog	88._	看门狗 Guard dog	DB			o

注 1.排除发生原因后，应预留大约 30 分钟的冷却时间。Note 1: should obligate about 30 minutes cooling time after solved the happen reasons.

2.停止方式有 DB. EDB 和 SD3 种。Stop methods are 3 types such as DB, EDB and SD.

DB:动态制动停止(去除动态制动器的产品则呈现自由运行状态) DB: dynamic brake stop (remove dynamic brake products then represent free running status)

EDB:电子式动态制动器停止(仅特定的伺服电机有效) EDB: electric type dynamic brake stop (only specific servo motor valid)

关于特定的伺服电机请参照下表。除特定伺服电机外的停止方式为 DB。About the specific servo motor please refer to the below table. The stop method is DB except the specific servo motor.

系列 Series	伺服电机 Servo motor
HG-KN	HG-KN053/HG-KN1 3/HG-KN23/HG-KM43
HG-SN	HG-SN52

SD:强制停止减速 mandatory stop moderation

3. [Pr. PA04]为初始值时。SD 的报警可以通过[Pr. PA04]将停止方式变更为 DB。When [Pr. PA04] is initial value. Alarm of SA able to change stop method to be DB through [Pr. PA04].

4.根据控制器的通信状态，可能无法解除报警因素。Maybe unable to release alarm factors according to communication status of controller.

	编号	名称	详细编号	详细名称	停止方式（注2、3）
警告	91	伺服放大器过热警告（注1）	91.1	主电路元件过热警告	
	92	电池断线警告	92.1	编码器电池断线警告	
			92.3	电池劣化	
	96	原点设定错误警告	96.1	原点设定时到位警告	
			96.2	原点设定时指令输入警告	
	9B	误差过大警告	9B.1	滞留脉冲过大1警告	
			9B.3	滞留脉冲过大2警告	
			9B.4	转矩限制0时误差过大警告	
	9F	电池警告	9F.1	电池电压下降	
	E0	再生过载警告	E0.1	再生过载警告	
	E1	过载警告1	E1.1	运行时热过载警告1	
			E1.2	运行时热过载警告2	
			E1.3	运行时热过载警告3	
			E1.4	运行时热过载警告4	
			E1.5	停止时热过载警告1	
			E1.6	停止时热过载警告2	
			E1.7	停止时热过载警告3	
			E1.8	停止时热过载警告4	
	E3	绝对位置计数器警告	E3.2	绝对位置计数器警告	
			E3.5	编码器绝对位置计数器警告	
	E4	参数警告	E4.1	参数设定范围异常警告	
	E6	伺服强制停止警告	E6.1	强制停止警告	SD
	E7	控制器紧急停止警告	E7.1	控制器紧急停止输入警告	SD
	E8	冷却风扇转速下降警告	E8.1	冷却风扇转速下降中	
	E9	主电路OFF警告	E9.1	主电路OFF时伺服ON信号ON	DB
			E9.2	低速旋转中母线电压下降	DB
			E9.3	主电路OFF时RADEON信号ON	DB
	EC	过载警告2	EC.1	过载警告2	
	ED	输出功率超出警告	ED.1	输出功率超出警告	
	F0	Tough Drive 警告	F0.1	瞬停Tough Drive中警告	
			F0.3	振动Tough Drive中警告	
	F2	驱动记录器写入错误警告	F2.1	驱动记录器 区域写入超时警告	
			F2.2	驱动记录器 数据写入错误警告	
	F3	振动检测警告	F3.1	振动检测警告	

注　1. 排除发生原因后，应预留大约30分钟的冷却时间。

2. 停止方式有DB和SD2种。
   - DB：动态制动停止（去除动态制动器的产品则呈现自由运行状态）
   - SD：强制停止减速

3. [Pr. PA04]是初始值的情况。显示为SD的警告可以通过[Pr. PA04]将停止方式变更为DB。

	编号 No.	名称 Name	详细编号 Detail number	详细名称 Detail name	停止方式(注 2. 3)Stop method (note 2, 3)
警告 Warning	91	伺服放大器过热警告(注 1) Servo amplifier overheat warning	91.1	主电路元件过热警告 Main electric circuit elements overheat warning	
	92	电池断线警告 Battery broken wire warning	92.1	编码器电池断线警告 Coder battery broken wire warning	
			92.3	电池劣化 Battery come to be bad	
	96	原点设定错误警告 Origin setting error warning	96.1	原点设定时到位警告 On position warning when origin setting	
			96.2	原点设定时指令输入警告 Order input warning when origin setting	
	9B	误差过大警告 Too big error warning	9B.1	滞留脉冲过大 1 警告 Retention pulse too big 1 warning	
			9B.3	滞留脉冲过大 2 警告 Retention pulse too big 2 warning	
			9B.4	转矩限制 0 时误差过大警告 Too big error warning when torque limit at 0	
	9F	电池警告 Battery warning	9F.1	电池电压下降 Battery voltage reduce	
	E0	再生过载警告 Regenerate overload warning	E0.1	再生过载警告 Regenerate overload warning	
	E1	过载警告 Overload warning 1	E1.1	运行时热过载警告 Thermal overload warning when running 1	
			E1.2	运行时热过载警告 Thermal overload warning when running 2	
			E1.3	运行时热过载警告 Thermal overload warning when running 3	
			E1.4	运行时热过载警告 Thermal overload warning when running 4	
			E1.5	停止时热过载警告 Thermal overload warning when stopping 1	
			E1.6	停止时热过载警告 Thermal overload warning when stopping 2	
			E1.7	停止时热过载警告 Thermal overload warning when stopping 3	
			E1.8	停止时热过载警告 Thermal overload warning when stopping 4	
	E3	绝对位置计数器警告 Absolute position counter warning	E3.2	绝对位置计数器警告 Absolute position counter warning	
			E3.5	编码器绝对位置计数器警告 Coder absolute position counter warning	
	E4	参数警告 Parameter warning	E4.1	参数设定范围异常警告 Parameter setting range abnormal warning	
	E6	伺服强制停止警告 Servo mandatory stop warning	E6.1	强制停止警告 Mandatory stop warning	SD
	E7	控制器紧急停止警告 Controller emergency stop warning	E7.1	控制器紧急停止输入警告 Controller emergency stop input warning	SD

	E8	冷却风扇转速下降警告 Cooling fan speed reduce warning	E8.1	冷却风扇转速下降中 Cooling fan speed reducing	
	E9	主电路 OFF 警告 Main shaft OFF warning	E9.1	主电路 OFF 时伺服 ON 信号 ON Servo ON signal On when main electric circuit OFF	DB
			E9.2	低速旋转中母线电压下降 Bus line voltage reducing when low speed revolving	DB
			E9.3	主电路 OFF 时 RADEON 信号 ON RADEON signal On when main electric circuit OFF	DB
	EC	过载警告 Overload warning 2	EC.1	过载警告 2 Overload warning 2	
	ED	输出功率超出警告 Output power over warning	ED.1	输出功率超出警告 Output power over warning	
	F0	Tough Drive 警告 Tough Drive warning	F0.1	瞬停 Tough Drive 中警告 Warning during moment stop Tough Drive	
			F0.3	振动 Tough Drive 中警告 Warning during vibration Tough Drive	
	F2	驱动记录器写入错误警告 Drive recorder write in warning	F2.1	驱动记录器 区域写入超时警告 Drier recorder region write in overtime warning	
			F2.2	驱动记录器 数据写入超时警告 Drier recorder data write in overtime warning	
	F3	振动检测警告 Vibration test warning	F3.1	振动检测警告 Vibration test warning	

注 1.排除发生原因后，应预留大约 30 分钟的冷却时间。Note 1: should obligate about 30 minutes cooling time after solved the happen reasons.
2.停止方式有 DB 和 SD2 种。Stop methods are 2 types such as DB and SD.

•DB:动态制动停止(去除动态制动器的产品则呈现自由运行状态) DB: dynamic brake stop (remove dynamic brake products then represent free running status)
•SD:强制停止减速 mandatory stop moderation

4. [Pr. PA04] 是初始值的情况。显示为 SD 的警告可以通过[Pr. PA04]将 停止方式变更为 DB。 [Pr. PA04] is initial value situation. Alarm of SA which display as SD able to change stop method to be DB through [Pr. PA04].

Chapter VIII Equipment maintenance

1. Maintain and maintenance

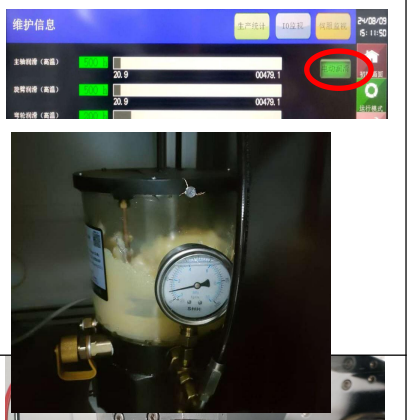
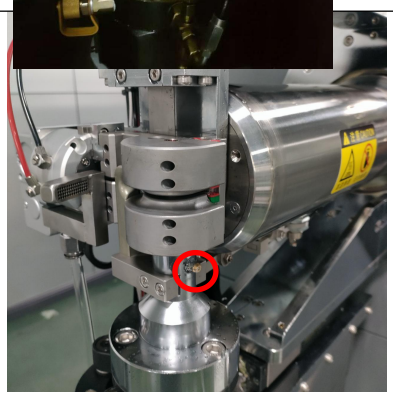
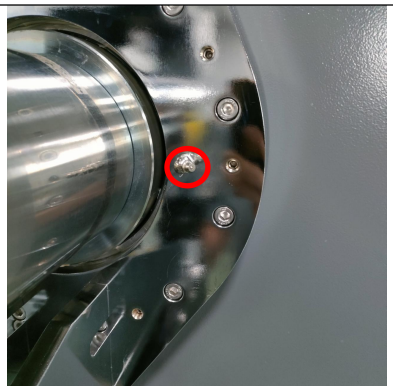
1.1 Lubricating oil

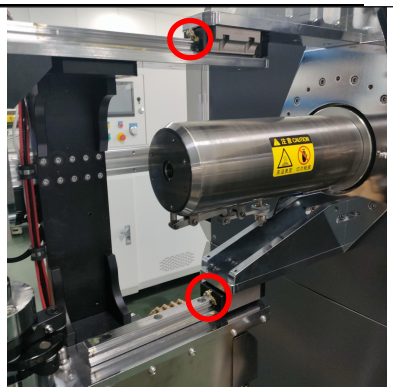
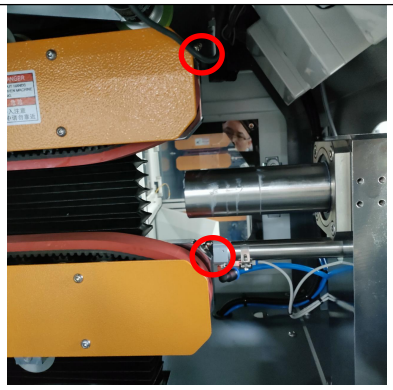
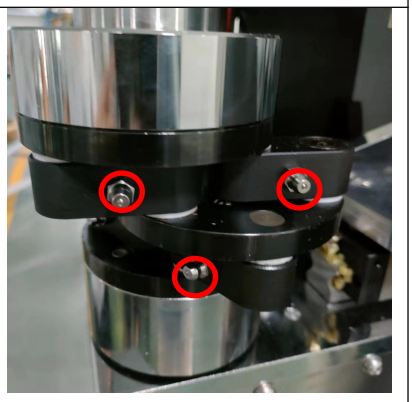
High temperature lubrication oil: SKF-LGHP2/1 or Greatwall 7025, use frequency: 500h/times;

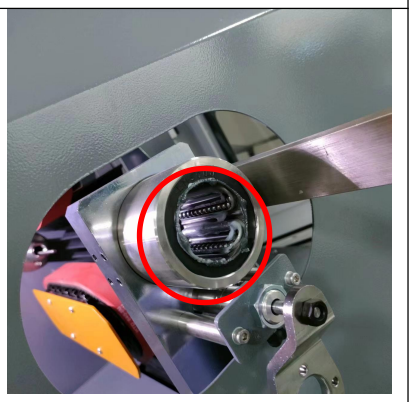
Common lubrication oil: SKF-LGEP2/1, use frequency: 2000h/times;

Main shaft lubrication oil: Greatwall BLE bearing lubrication grease

1.2 Maintenance items table

Item	Butter category/maintain method	Period	示 Diagram
Main shaft lubricating	Lubrication oil: Greatwall BLE bearing lubrication grease Select and enter into "Maintain information" operating page, repeatedly click "Electric lubrication" 3~4 times **The detail operating items check the below**	**500h/times**	
Tube bending bearing maintain	High temperature lubrication oil: SKF-LGHP2/1, use equipment configured butter gun fill according to pressure	**500h/times**	
Revolve box revolve bearing	High temperature lubrication oil: SKF-LGHP2/1, use equipment configured butter gun fill according to pressure	**500h/times**	

Front material feeding (X) sliding rail	Lubrication oil: SKF-LGEP2/1, use equipment configured butter gun fill according to pressure	**500h/times**	
Material feeding drag bearing	Lubrication oil: SKF-LGEP2/1, use equipment configured butter gun fill according to pressure	**2000h/times**	
Clutch	Lubrication oil: SKF-LGEP2/1, use equipment configured butter gun fill according to pressure	**2000h/times**	
Air circuit lubrication	Revolve oil cup to pick down it under the situation that cut off air source, filling [AIRTAC] special pneumatic lubrication oil	**Monthly/times**	

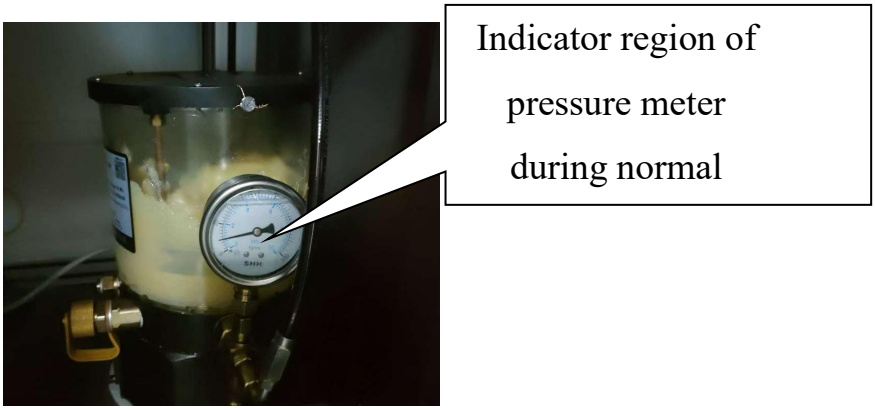
Air circuit water discharge	Open the air cabinet door, water discharge switch show as the picture, revolve the valve to discharge water	**Daily/times**	
Permanent magnetism main body bearing	Common lubrication oil: SKF-LGHP2/1, use equipment configured butter gun fill according to pressure, even coating	**Monthly/times**	

1.2.1 Main shaft lubrication operating items

①. Click to select “Maintain information” on homepage of operating panel, enter into equipment maintain information page

②. Click “Electric lubrication” on maintain information page, observe the pressure meter of electric lubrication pump and process main shaft lubrication, the pressure meter will up and down jumping under normal task status

③. Main shaft lubrication, need repeat electric lubrication 3~4 times, make ensure completely lubricating in the main shaft



Main shaft lubricating notices:

①. The pressure meter always under reset status when the main shaft lubricating just starting, because it has air in the main shaft, need firstly process air venting in main shaft

②. During the normal lubricating, the indicator of pressure meter up and down jumping at a certain region, this is normal appearance

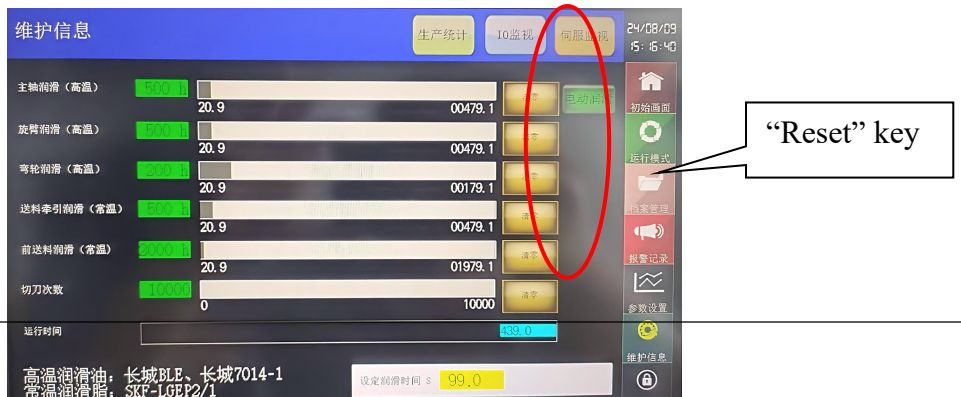
③. If too high display pressure of pressure meter indicator, and always on high position, this means main shaft lubricating pipeline blocked, should stop lubricating immediately, one by one check and maintain

1.3 Maintenance initialize

This operation processed under that every one time maintenance finished, all maintenance record parameters need reset

Click “Password management” on “Maintain information” page, input parameter modify password (leave factory default parameter modify password:

2) Pop out “Reset” key, means enter successfully, now 2s long time press “Reset” key, one by one reset record parameter

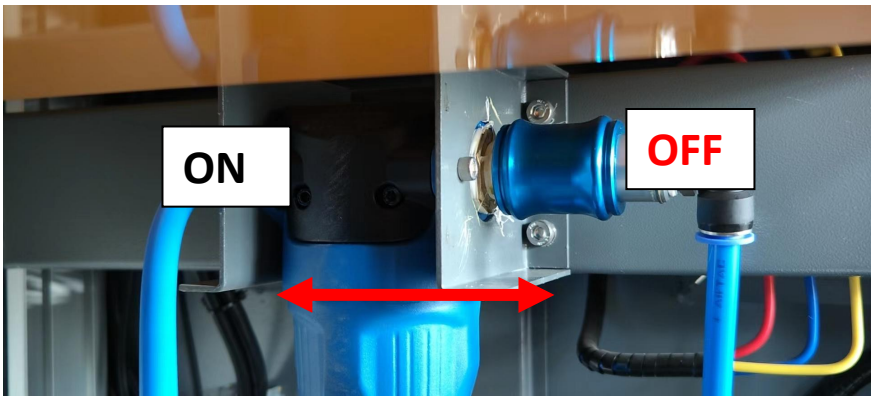


2. Disassemble equipment fixture

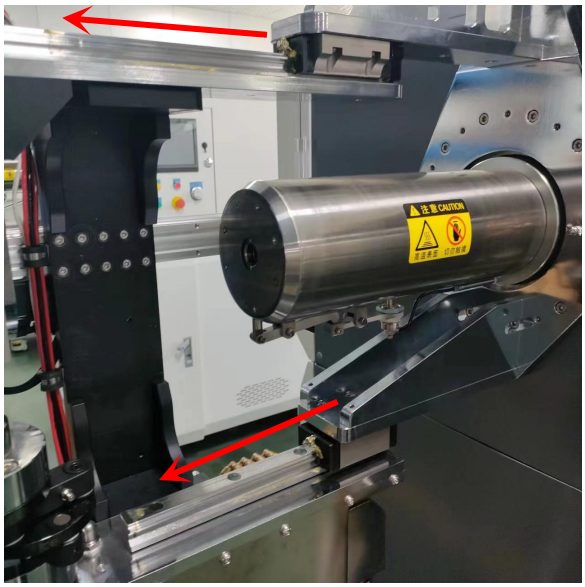
Prepare one set internal hexagon spanner, running interface shift to manual mode

2.1 Disassemble the fixture at equipment machine head position

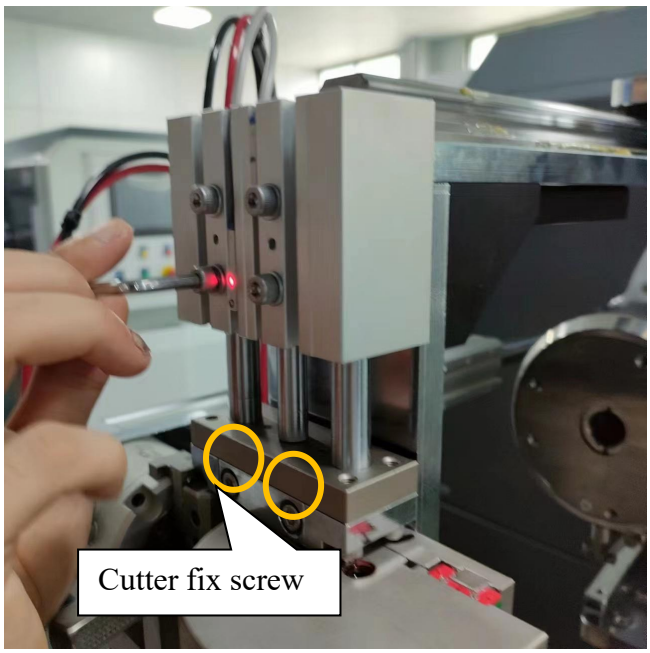
2.1.1 Close air source under equipment reset status



2.1.2 Move material feeding sliding rail to the max stroke (click "Front feeding material", rotate hand wheel)



2.1.3 Disassemble cutter

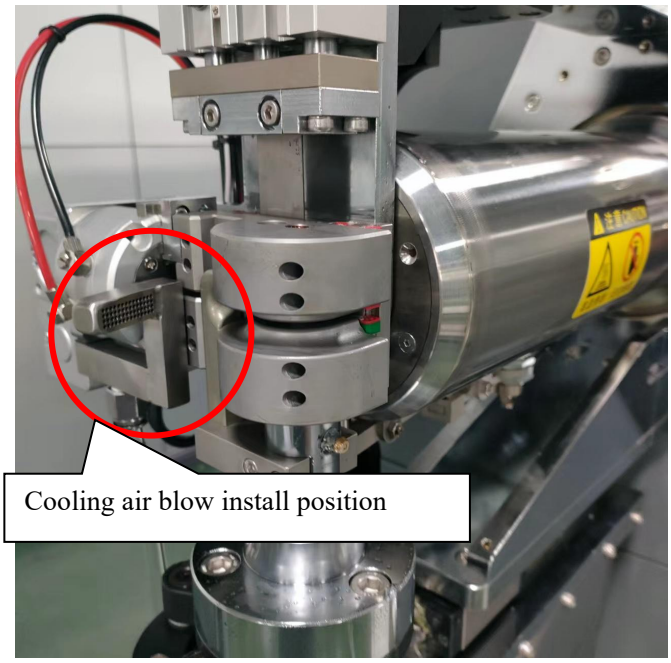


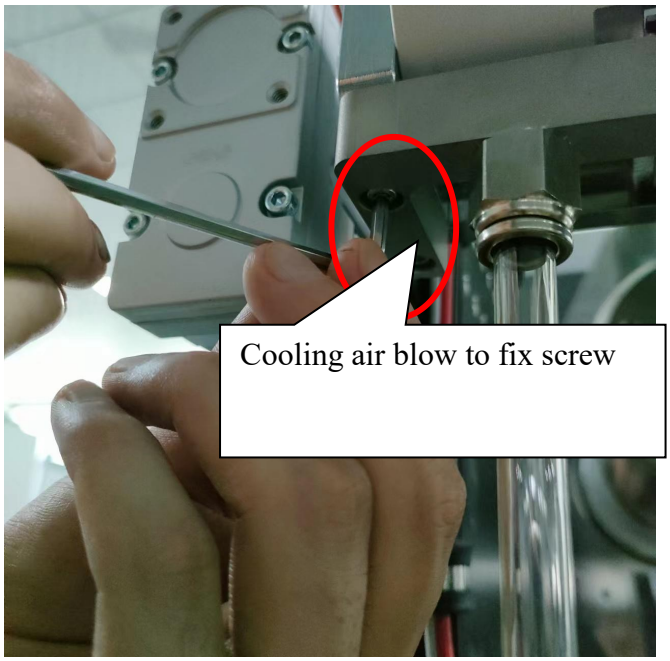
Operating steps:

1. Disassemble the fix screws on the cutter air cylinder in sequence
2. Vertical upward pick out pneumatic cutter assemble then okay
3. Able to renewal cutter under this status
   - 3.1. Disassemble the fix screw of blade, pick out blade which need renewal
   - 3.2. Insert the new blade into cutter groove bottom, fix screw then okay

Attention: cutter exposed then has scratch risk, please place carefully

2.1.4 Disassemble cooling air blowing



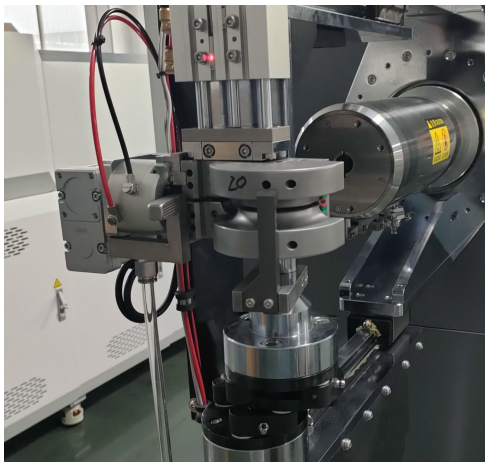


Status after disassembled

Operating steps:

1. Find the assemble position of cooling air blow
2. Disassemble the down fix screw then okay

2.1.5 Disassemble guide wheel

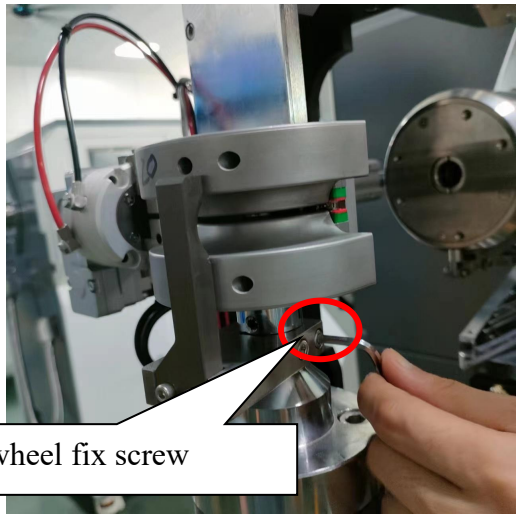


①. Main tableau lighting "Tube bending" under manual mode

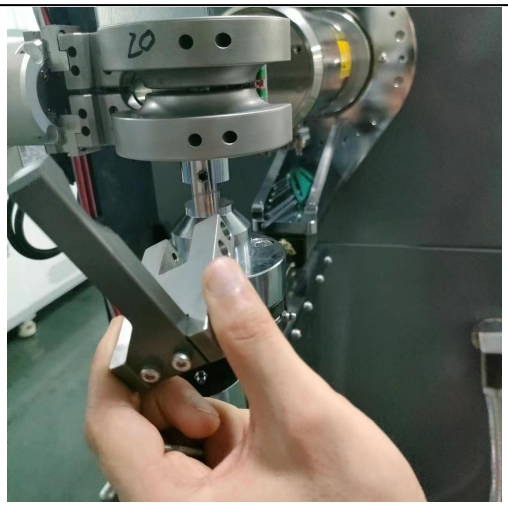
②. Rotate hand wheel, "Guide wheel" start acting

③. "Guide wheel" acting to shown as left picture status then okay (tube bending action angle about 100°)

④. Disassemble fix screw then okay

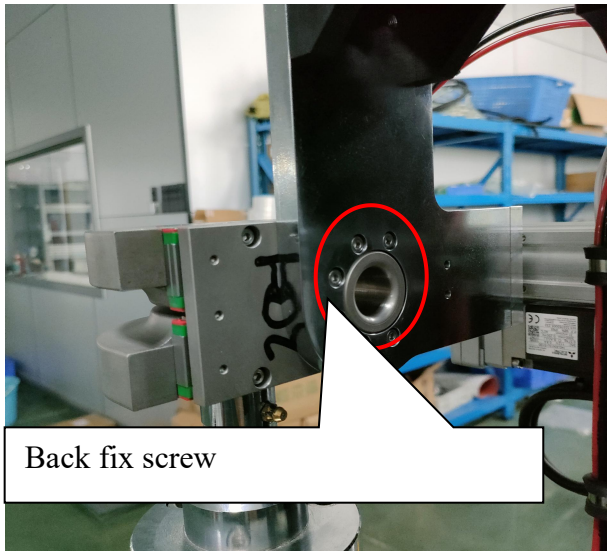


Guide wheel fix screw



2.1.6 Disassemble bending wheel assembly

First, find the bending wheel rear fix screw, disassemble in sequence



Back fix screw

Bending wheel specification has two modes:

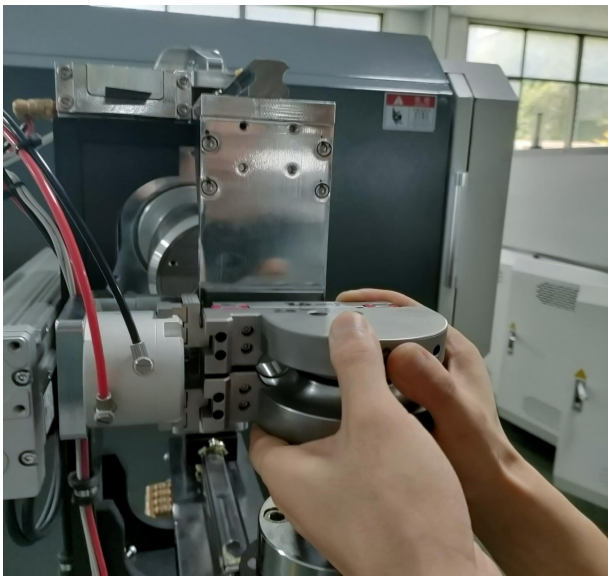
① **Fission type bending wheel:** suitable to big tube diameter bending

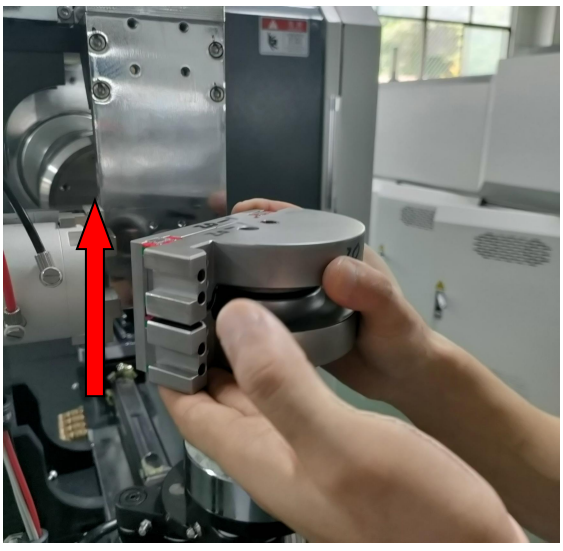
② **Integration type bending wheel:** suitable to small tube diameter bending

Fission type bending wheel disassemble

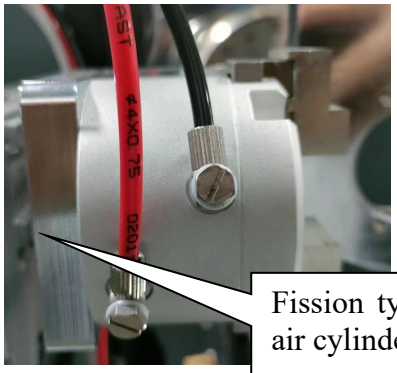
Hands hold bending wheel, upward shake and outward rotating, make it leave the front air cylinder assist clip

Refer to shown as left picture, pick out bending wheel then okay

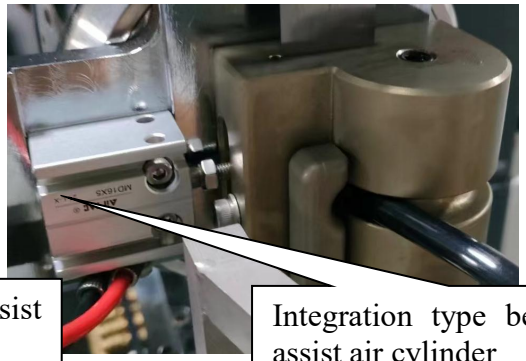




Attention: change fission type bending wheel to integration type bending wheel, or integration type bending wheel change to fission type bending wheel, all need renewal the assist air cylinder

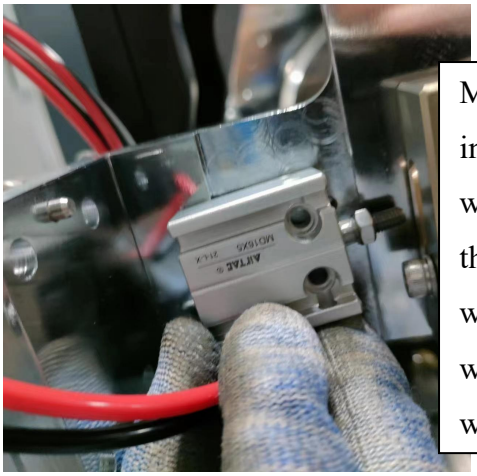


Fission type bending wheel assist air cylinder

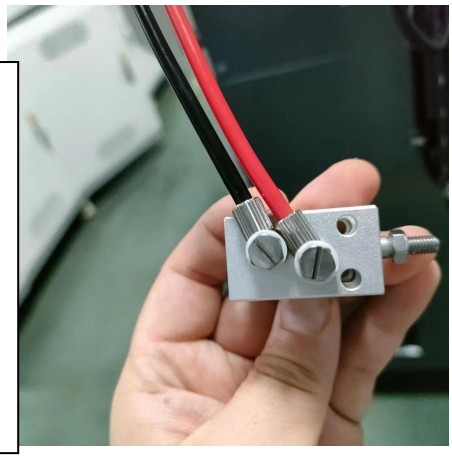


Integration type bending wheel assist air cylinder

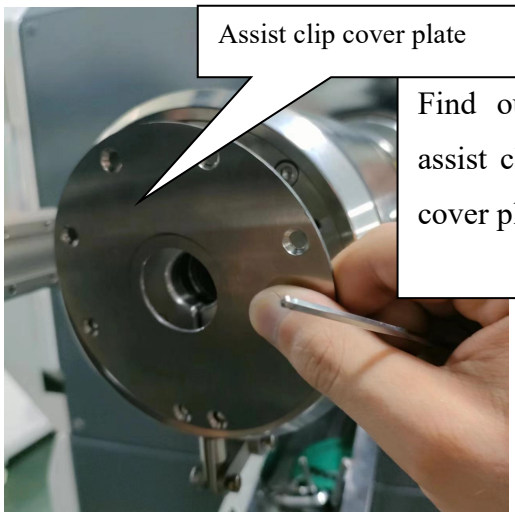
Integration type bending wheel disassemble



Must firstly disassemble integration type bending wheel assist air cylinder, then same operating steps with fission type bending wheel, pick out bending wheel

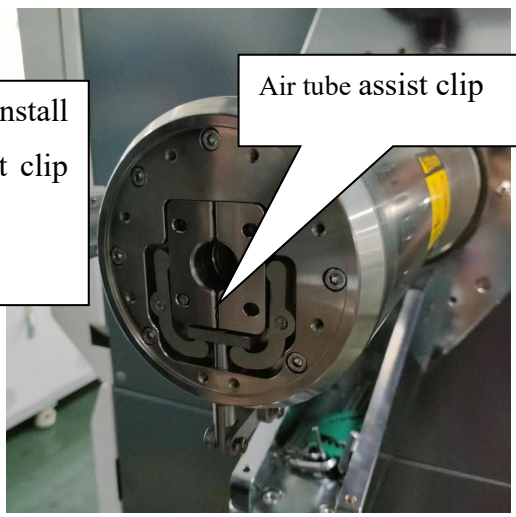


2.1.7 Disassemble assist clip fixture (attention: high temperature on equipment surface, prevent scald)



Assist clip cover plate

Find out the position of install assist clip, disassemble assist clip cover plate



Air tube assist clip

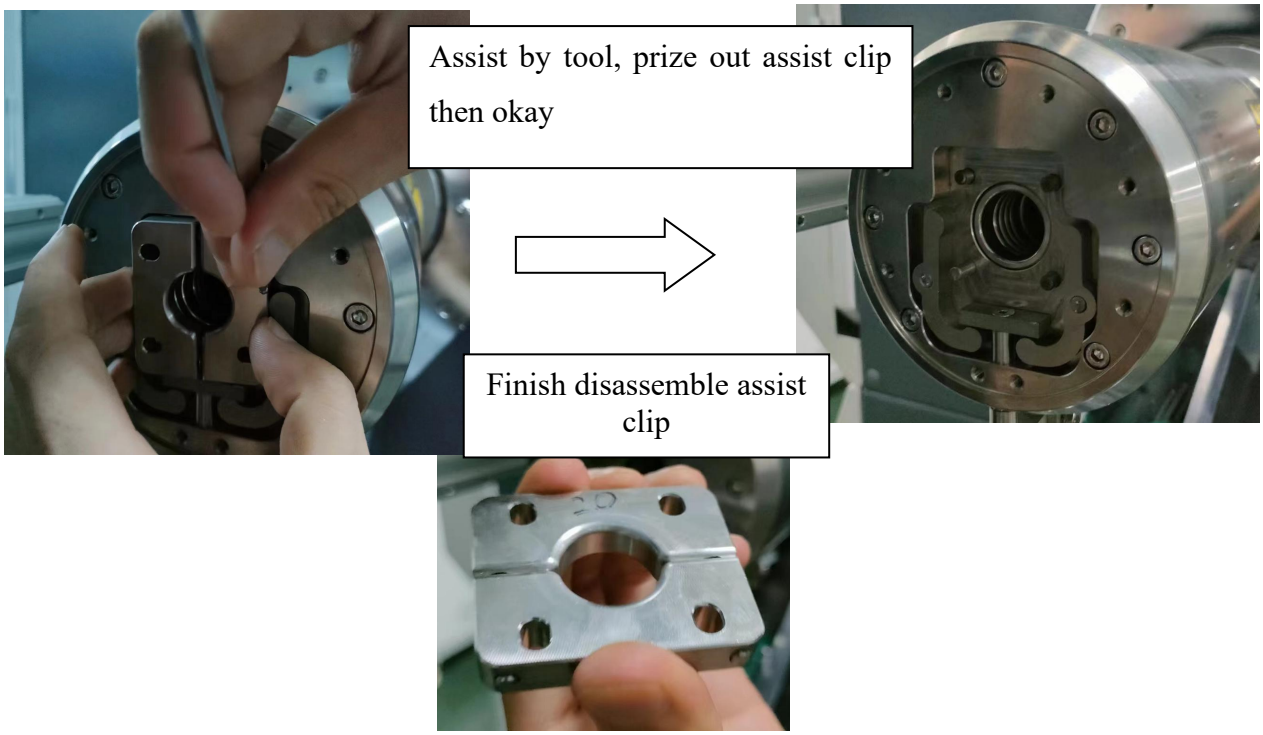
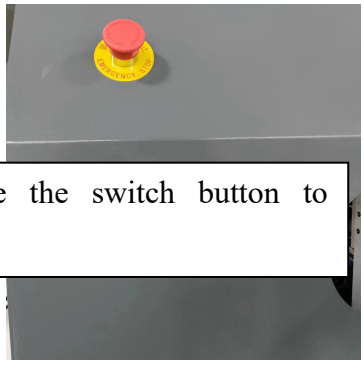


Table 1: (fixture optional configuration instruction table)

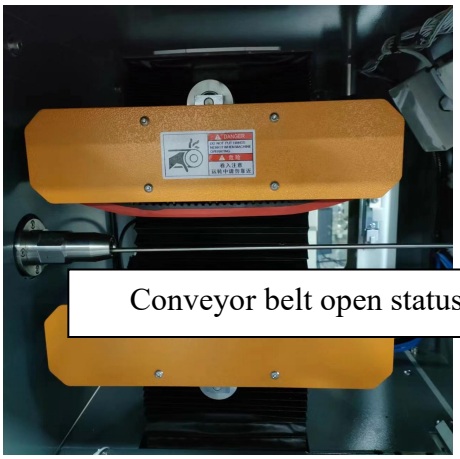
S/N	Workable tube diameter specification	Bending wheel specification mode	Whether configure strong magnetism draw bar bending assist
1	6*1	Integration type bending wheel	No
2	8*1	Integration type bending wheel	No
3	10*1	Fission type bending wheel	No
4	10*1.25	Fission type bending wheel	No
5	12*1	Fission type bending wheel	Yes
6	12*1.25	Fission type bending wheel	Yes
7	12*1.5	Fission type bending wheel	No
8	12.5*1.5	Fission type bending wheel	Yes
9	13.5*1.25	Fission type bending wheel	Yes
10	14*1.5	Fission type bending wheel	Yes
11	14*2	Fission type bending wheel	Yes
12	15*1.5	Fission type bending wheel	Yes
13	15*1.25	Fission type bending wheel	Yes
14	16*1.25	Fission type bending wheel	Yes
15	16*1.5	Fission type bending wheel	Yes
16	16*2	Fission type bending wheel	Yes
17	18*1.5	Fission type bending wheel	Yes
18	19*1.5	Fission type bending wheel	Yes
19	20*1.5	Fission type bending wheel	Yes
20	21*1.5	Fission type bending wheel	Yes
21	22*1.5	Fission type bending wheel	Yes
22	25*1.5	Fission type bending wheel	Yes

2.2 Disassemble fixture at tail of equipment

Make ensure to operate under the status that tail conveyor open



Revolve the switch button to loosen



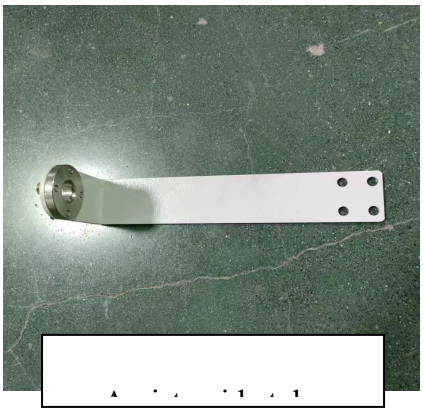
Conveyor belt open status

2.2.1 Disassemble strong magnetism assist guide tube/assist guide tube

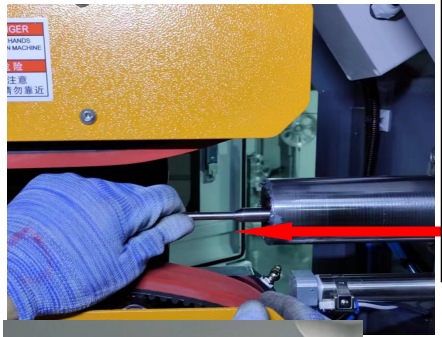
(Assist guide tube selection check table 1)

First, close air source

Strong magnetism assist guide tube

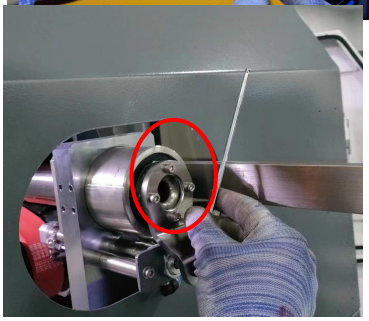


Disassemble strong magnetism assist guide tube:

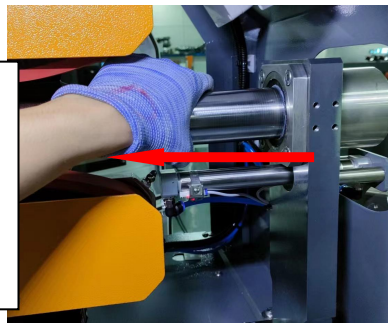


①. Pull away strong magnetism draw bar assembly according to the direction of left picture

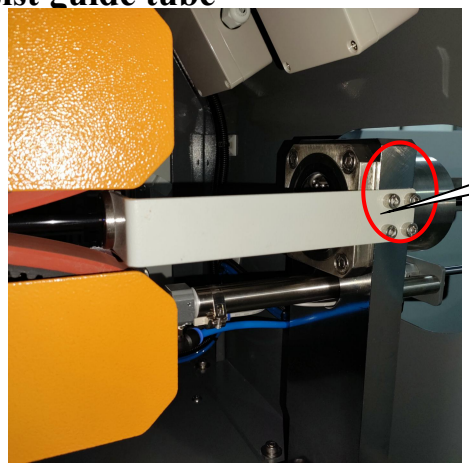
Attention: now, the draw bar spring will leave machine body and occur at machine head



②.Disassemble flange fix screw of strong magnetism guide tube, shown as the right picture shown direction, pull away strong magnetism guide tube



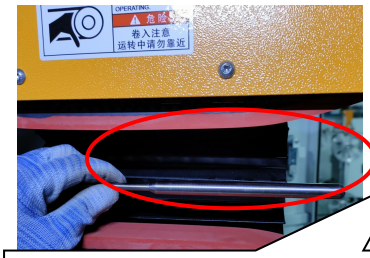
Disassemble assist guide tube



Disassemble here fix screw then can finish disassemble

2.2.2 Disassemble strong magnetism assist draw bar assembly

Attention: the whole renewal process must make ensure bar type strong magnetism can't enter into oven



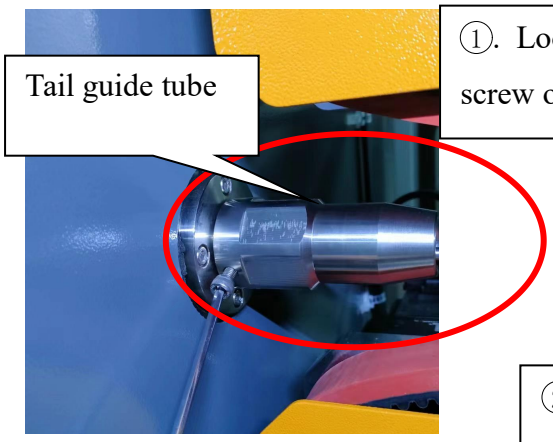
Bar type strong magnetism

①. Twist out bar type strong magnetism which fixed on draw bar

②. Pull away draw bar according the right picture shown direction then okay

③. Separate draw bar and spring as the left picture shown direction

2.2.3 Disassemble the oven tail guide tube and internal spring



①. Loosen the internally configured spring and spring lock screw on tail guide tube

②. Anticlockwise disass emble tail guide tube

③. Pull away oven internally configure spring as the picture shown

Fixture disassemble sequence:

Air cylinder cutter—cooling air blowing—guide wheel—(assist air cylinder)—bending wheel—assist clip—strong magnetism assist guide tube/assist guide tube—(assist draw bar assembly)—tail guide tube and internally configured spring

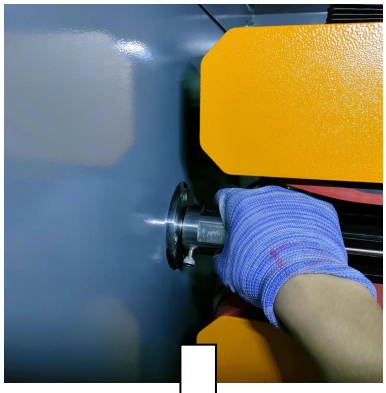
3. Renewal equipment fixture (must press down "Emergency stop switch" first then operating during manually renewal)

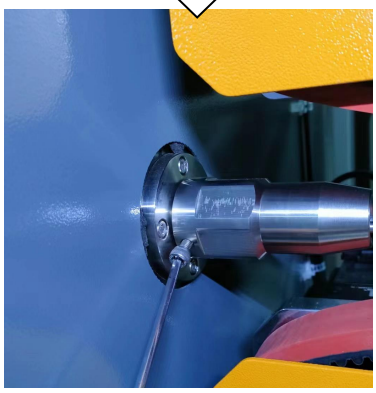
Prepare one set internal hexagon spanner, running interface shift to manual mode

Renewal sequence:

Internally configured spring and tail guide tube—assist draw bar assembly and strong magnetism assist guide tube/assist guide tube—assist clip—bending wheel—guide wheel—(assist air cylinder)—cooling air blowing—Air cylinder cutter

3.1 Assemble internally configured spring and tail guide tube





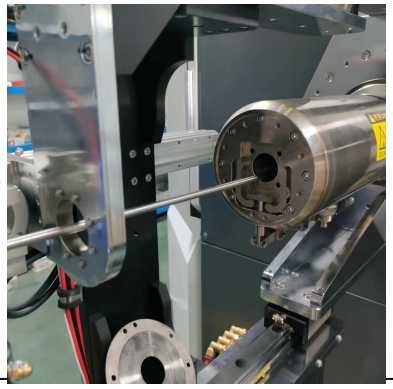
①. Select the oven spring which need renewal, manually pass through from oven tail

②. Select the assorting tail guide tube, clockwise tightly twisted

③. Utilize the internal hexagon spanner, tighten spring lock screw

3.2 Assist draw bar assembly and assemble strong magnetism assist guide tube/assist guide tube (refer to table 1 list, select and use the suitable fixture to assemble)

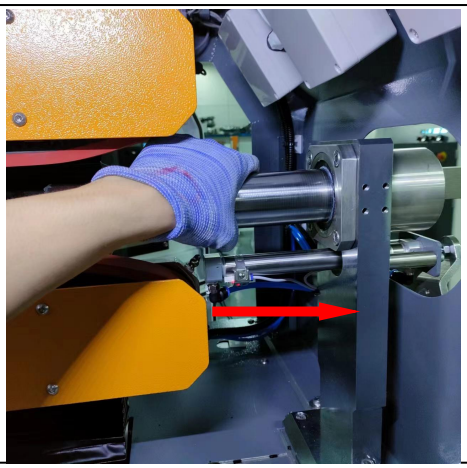
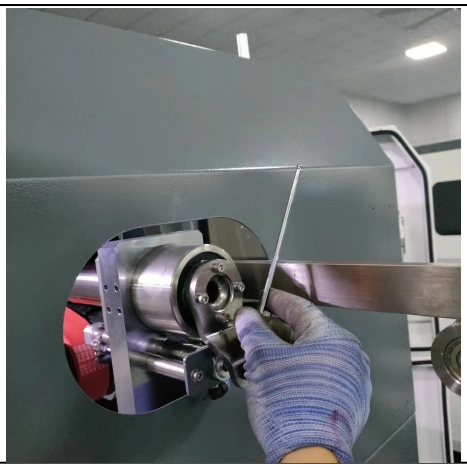
3.2.1 Assist draw bar assembly and assemble strong magnetism assist guide tube


①. Select and use the suitable specification spring fixture, assembled at one end of draw bar

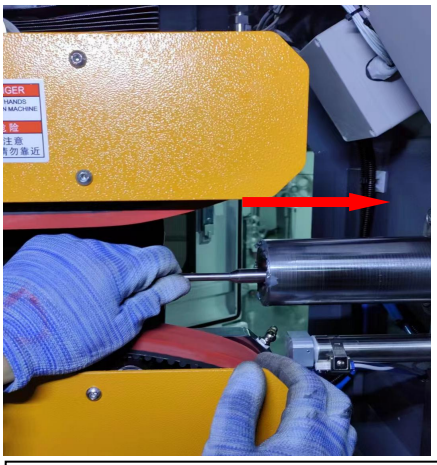
②. Make one end of draw bar which not installed spring manually pass through machine head (shown as the above picture, enter into oven and pass through the tail guide tube

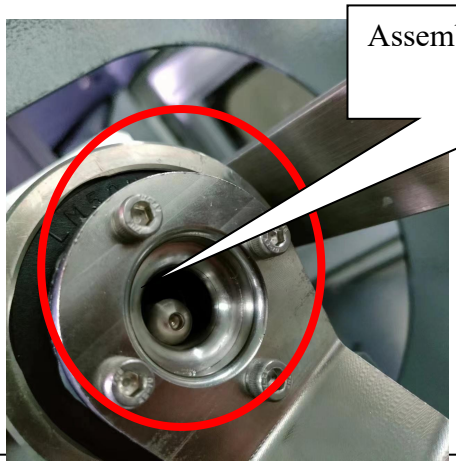
③. Bar type strong magnetism assemble and one end of draw bar to process clockwise tightly twist assemble

④. Select and use the assorting specification strong magnetism assist guide tube to process the assemble which shown as the above picture

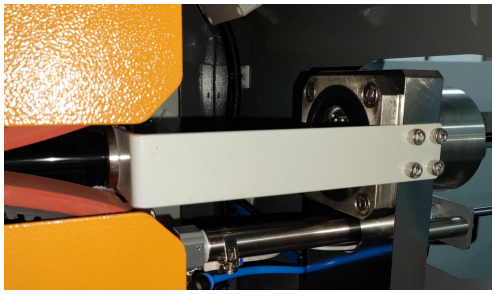
⑤. Fix the strong magnetism assist guide tube on the flange





⑥. Draw bar assembly and strong magnetism assist guide tube process manually assemble

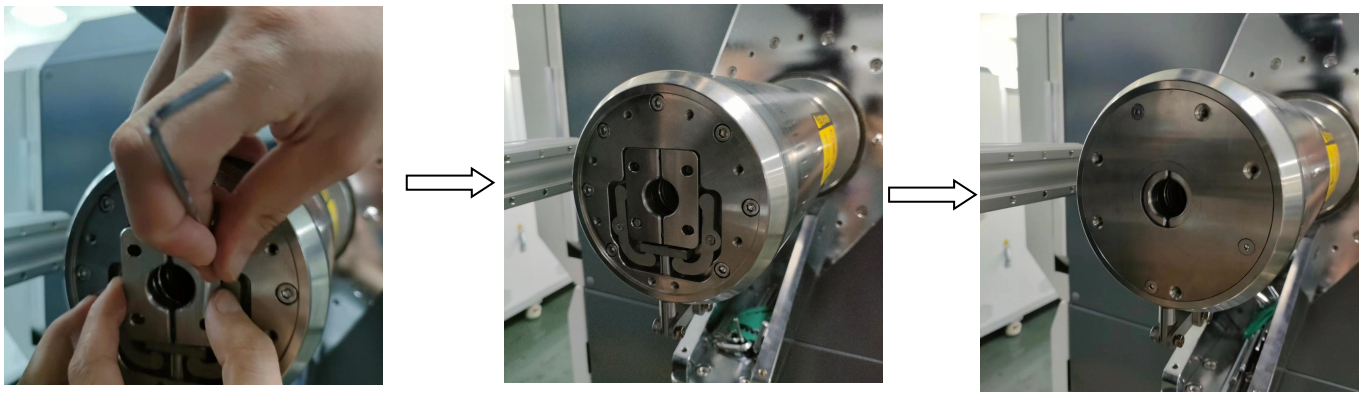
3.2.2 Assemble assist guide tube



Notices of assemble assist guide tube:

During assemble **assist guide tube**, must make ensure centering with conveyor, can't interfere under tube drawn straightly status

3.3 Assemble assist clip

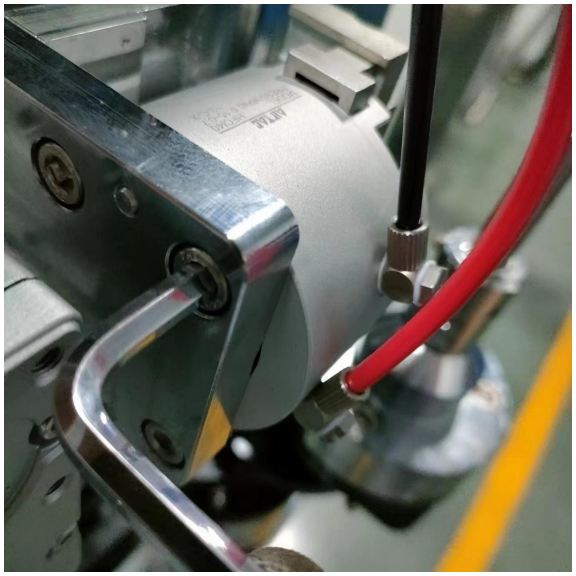


①. Select suitable assist clip, install into assist clip groove assisted by tools

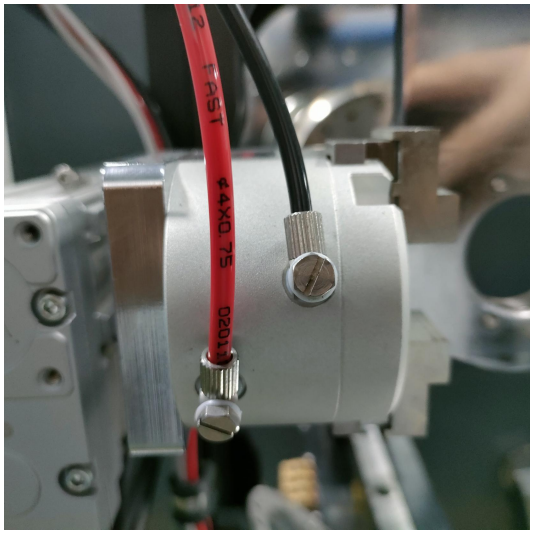
②. Assemble assist clip cover plate, tighten by screws

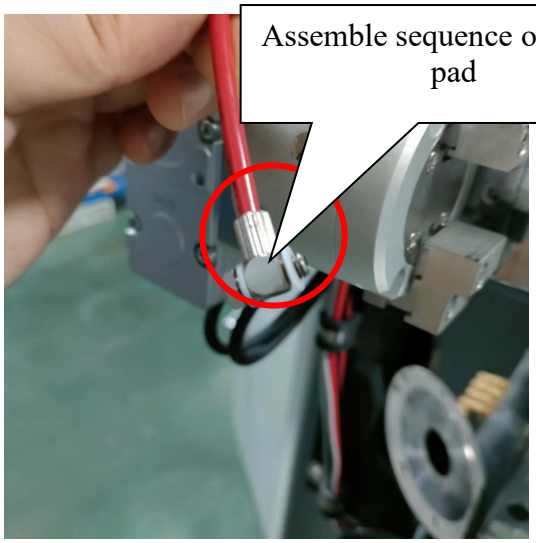
3.4 Assemble bending wheel

3.4.1 Assemble fission type bending wheel



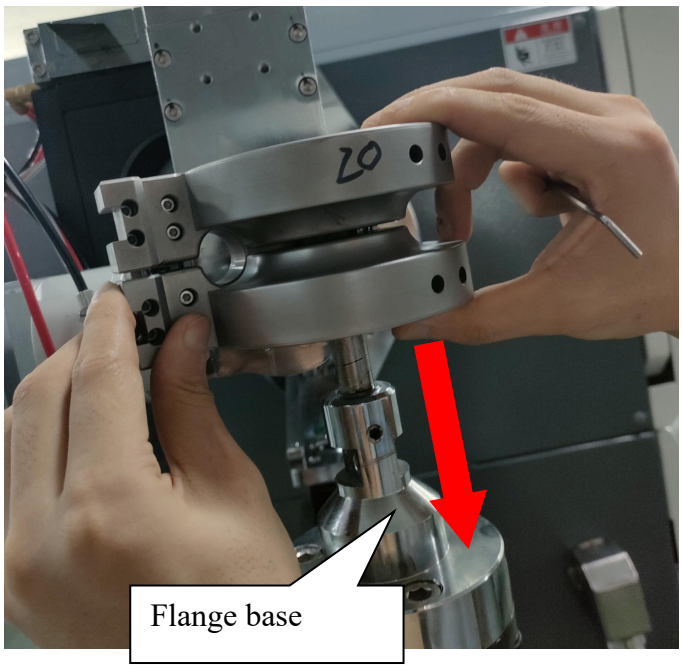
Shown as the picture, fix the assist air cylinder on the air cylinder flange (only need fix three pieces screws



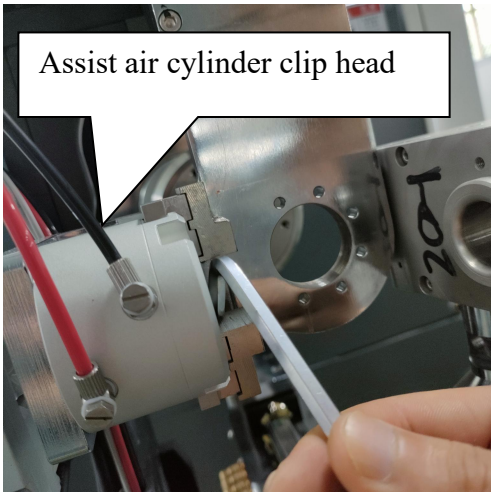


Assemble air cylinder red and black tubes according to the picture

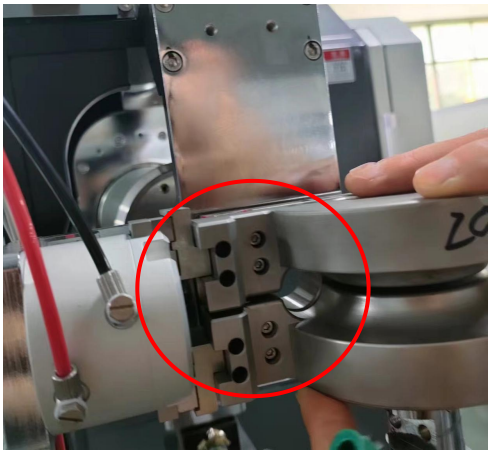
Attention: attention to the assemble sequence and assemble of sealing pad when disassemble the assembled air tube, to prevent air leakage



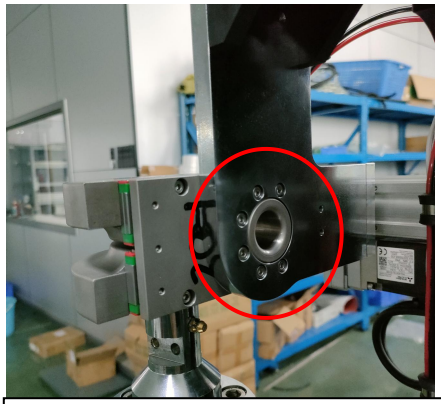
①. According to picture shown direction, assemble fission type bending wheel on flange base



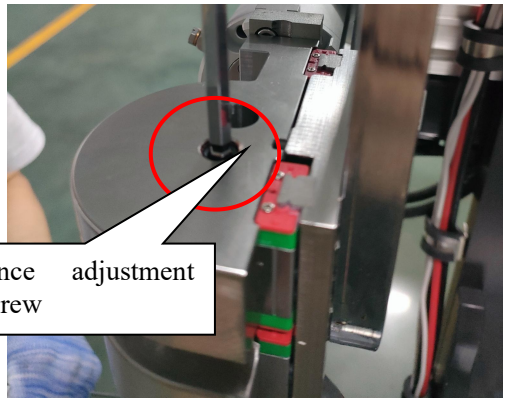
②. Utilize the tool to adjust the assist air cylinder clip head distance, make it convenient to assemble with fission type bending wheel



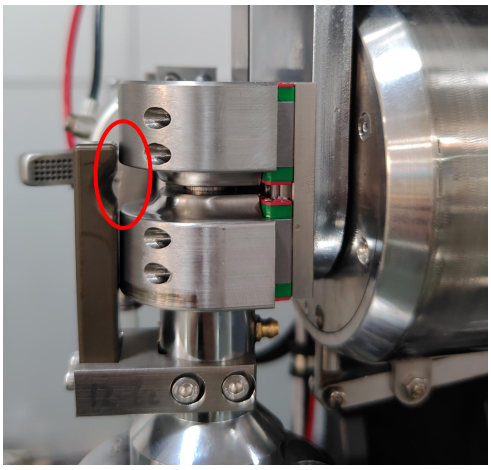
③. Assemble the assist air cylinder and fission type bending wheel as the picture shown



④. Fix the bending wheel on the bending wheel base



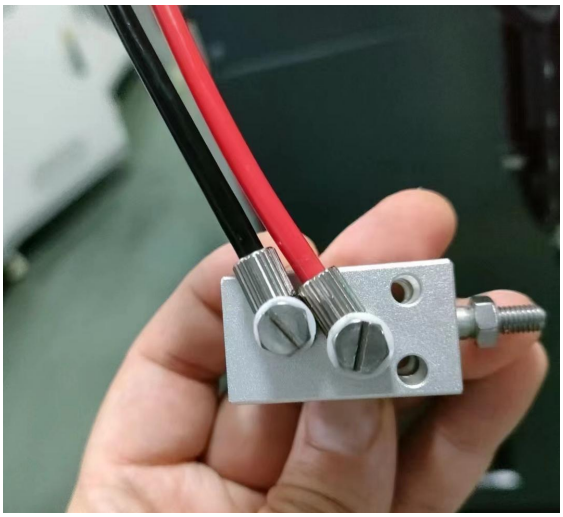
⑤. **Utilize the tool to fix the c**learance adjustment jack screw which at up of fission type bending wheel, make the guide wheel and bending wheel shown as the picture, visually check concentric, up and down floating clearance at about 0.2mm



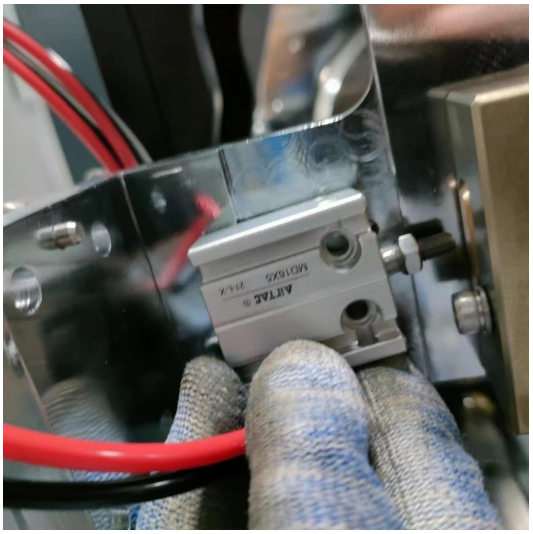
3.4.2 Assemble integration type bending wheel

Same to assemble integration type bending wheel, assemble the integration type bending wheel on the flange base

Able to firstly fix the base screw of bending wheel, then assemble the integration type bending wheel assist air cylinder



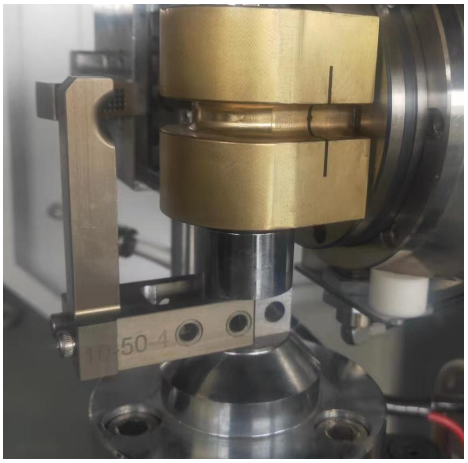
①. Shown as the picture, the red and black tubes on the assist air cylinder

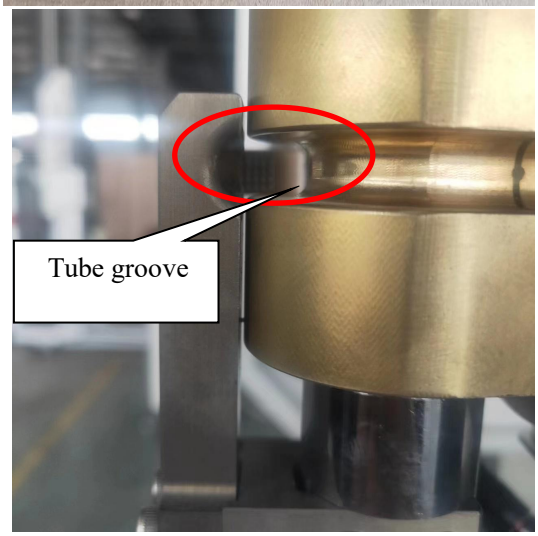


②. **Assemble the assist air cylinder as the picture shown, attention to the direction of air cylinder assemble**

Assemble finish diagram of assist air cylinder

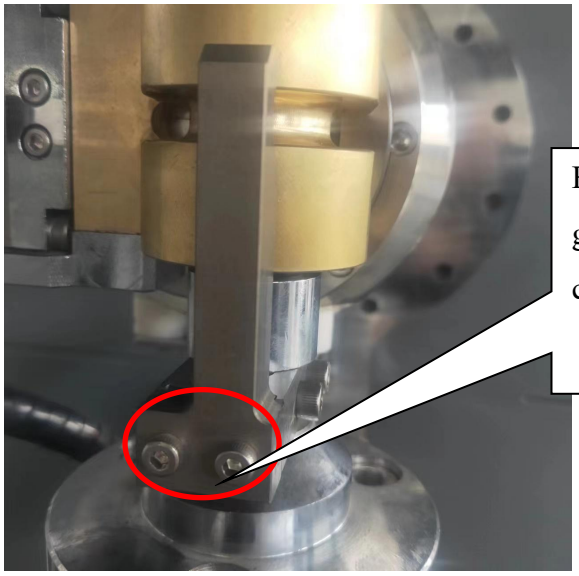
3.5 Assemble guide wheel





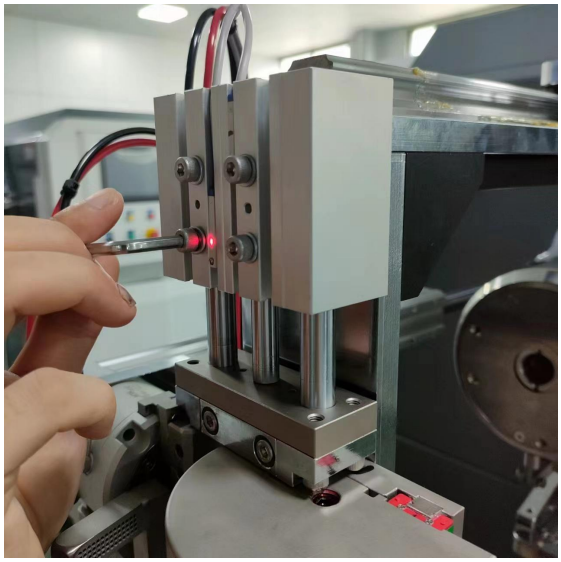
Assemble attention points:

1. **Up and down assemble clearance of bending wheel and guide wheel must be level (visually check)**
2. **Bending wheel tube groove center according to guide wheel tube groove center (visually check)**



Bending wheel tube groove center and guide wheel tube groove center occur eccentric, loosen here screws then can up and down adjust

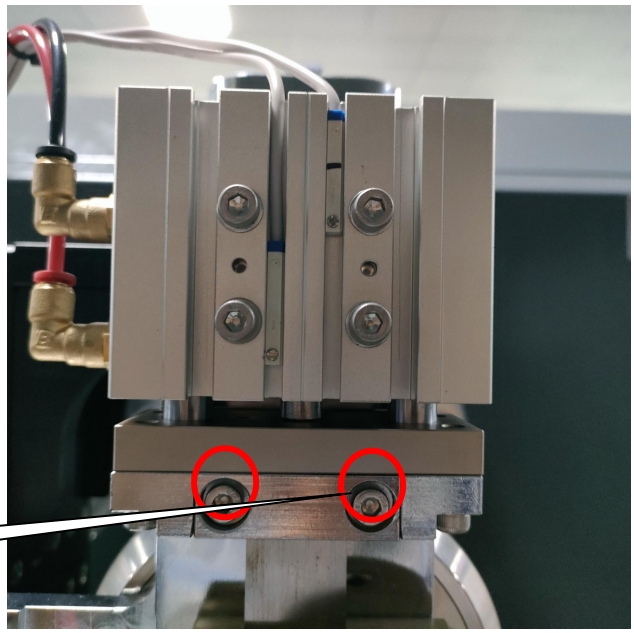
3.6 Assemble air cylinder cutter



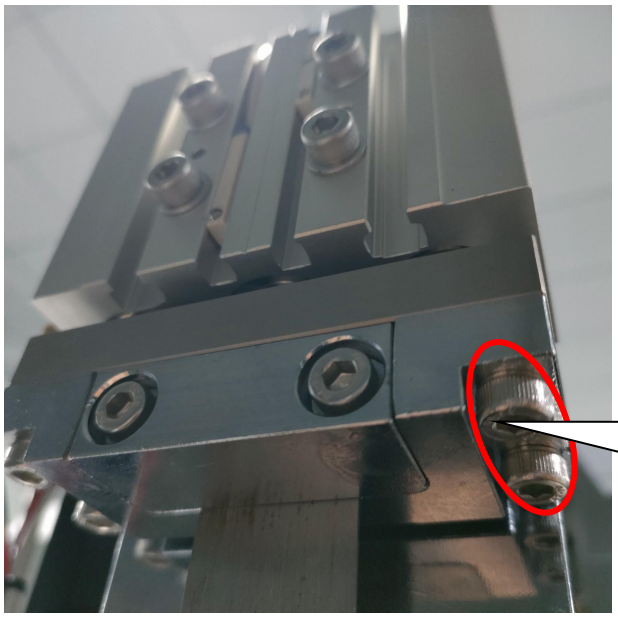
① . Make blade align to cutter groove to assemble

② . Fix the air cylinder as the picture shown

Attention: manually pull the cutter to up and down motion after installed cutter, if has interfere then need adjustment



Blade fix screw



Adjustment screw of blade interfere: loosen the adjustment screw and tighten again

4. Analyse of machining change factors

4.1. The factors affect the bending tube angle change

① Actual cooling time change (cooling coefficient not according)

Solve method: adjust the cooling coefficient

②Tube bending angle value modification

③Tube wall thickness uneven and over tolerance

Solve method: renewal tube material

④Guide wheel position loosen

Solve method: tighten by tools

⑤Guide wheel zero point missed (adjust the guide wheel position again, zero calibrating again)

⑥Not enough tube body heating time, too quick material feeding time, these caused tube body too short time from entrance to exit, the time not enough 2min (reduce material feeding speed)

Solve method: reduce material feeding speed

⑦ Too long tube body heating time, the time of tube stay in oven over 10min

Solve method: send the tube material in the oven out

4.2 The factors affect material feeding length change

① Material feeding drag up and down not clip tightly or too big clip force

Solve method: adjust the material feeding drag and tightly press position

② Drag belt seriously wear

Solve method: renewal drag belt or adjust the tightly press position

③ Too big material release resistance of material release machine

Solve method:

1. Material feeding tube tray of automatic material feeding machine missed, renewal the missed material tray
2. Bigger buffer wheel downward press force, reduce the pressure

④ Guide tube long time not clean, too big resistance

Solve method: disassemble and clean the internal guide tube and tail guide tube

⑤ Front and back assist clip invalid and not tightly clip or open in time

Solve method:

1. Assist clip action not sensitivity, renewal assist clip air cylinder
2. The electromagnetism valve which control the air cylinder action damaged, renewal the electromagnetism valve

⑥ Tube external diameter over tolerance, too big resistance

Solve method:

1. Renewal the material tube with qualified size

⑦ Drag center deviation, up and down belt rub with material feeding guide tube

Solve method: up and down conveyor happen mechanical deviation, adjust the conveyor mechanical position (the factory technicians guide to adjust)

⑧ Modification of material feeding program setting value

⑨ Pass core draw bar deformation, generate resistance in tube

Solve method: repair or renewal pass core draw bar

4.3 The factors affect vert angle change (firstly correct the tube bending angle, vert automatically recovered)

① Changes of tube bending angle

② Assist clip clipping actions invalid

Solve method:

1. Check whether assist clip action air cylinder damaged, renewal the assist clip air cylinder
2. Assist clip spring damaged, renewal spring
3. Assist clip air circuit electromagnetism valve damaged, renewal electromagnetism valve

③ Too big resistance of internal pipeline

Solve method:

1. Long time not clean guide tube, clean guide tube
2. Tube external diameter over tolerance, renewal qualified tube materials

④ Modification of vert program setting value

⑤ Happen twist before tube materials feeding

Solve method: start material feeding drag under manual mode, release tube body stress

⑥ Tube body clip damage and rub with pipeline during production

Solve method: remove the tube body with defects

Chapter IX Maintain warrant rules

Thank you for you select and use brand "SAIMANSI" nylon modeling machine with model "S3000-16V", explain the maintain contents relate to the modeling machine as below:

I The contents of whole set maintain warrant one year means that we will provide free maintain within one year from the day of our company deliver the machine, the problems which caused by the machine self manufacture quality problems (the parts and accessories according to the stipulates in term III and IV).

II The premise of the product (machine) maintain warrant period is under the situation that customer standard operating, the damages caused by that unsuitable operation, the responsibilities belong to users.

III Maintain warrant period stipulates and instruction of main parts and components of the machine

1. Computer liquid crystal display screen: maintain warrant period 12 months
2. PLC: maintain warrant period 12 months
3. Motion module, temperature control module and safety module: maintain warrant period 12 months
4. Servo motor and driver: maintain warrant period 12 months
5. Customized bending wheel mold: maintain warrant period 12 months

IV Not be maintain warrant period when meeting one of the below situation:

① Manual damages obviously

② The lubricating oil maintain and maintenance not use the stipulated brands according to the stipulate requirements during use the machine

③ Long time not process scheduled maintenance according to the maintenance manual

④ Equipment alarming but still process unqualified operation

⑤ Not follow the equipment instruction and unsuitable operation

⑥ The damaged electric elements which power grid voltage not according to the national standard

V The machine exceed the maintain warrant period, need take reasonable cost and labour cost if renewal parts, components or maintain

VI ZHEJIANG SAIMANSI INTELLIGENT TECHNOLOGY CO., LTD. carry out whole life maintain for the sold machines

ZHEJIANG SAIMANSI INTELLIGENT TECHNOLOGY CO., LTD.

After sales department/technical support Phone: 177 9180 6995