Operating Manual

FFC Semi-Automatic Termination Machine

Customer Manual No.: ***409-35048***
Customer Manual PN: ***2413730-3***
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Edition: ***B***

Application Tooling

PRODUCT INFORMATION 1-800-522-6752

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Editor

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General Information

- The information provided serves only as a product description and is not to be regarded as confirmation of product characteristics [...] or as a guarantee in the legal sense. The information given does not release the user from the obligation of own judgment and verification.
- Our products have components or parts which are [...] also subject to natural wear and tear arising from normal use, depending very much on the type and degree of use and also how well the individual product has been serviced and maintained
- All rights with TE Connectivity (TE) also in case of applications for industrial property protection.
- The front page show a sample configuration. The shipped product may vary.
- The original manual was created in Chinese.

Contents

1 Revision

1.1 Revision process

Table 1: Revision process

Rev.	Date	Description	Name
A	28-February, 2024	First edition	Henry.REN
B	05-April, 2024	Updated to standard format & Updated the section 7.	Henry.REN

2 Introduction

2.1 About this operating manual

This operating manual describes the use and operation of the FFC Semi-Automatic Termination Machine as well as the necessary maintenance measures.

All persons using this machine must therefore be familiar with this operating manual and follow the instructions contained herein.

This operating manual must be available at the insertion machine at all times.

The machine owner/user is obliged to supplement this operating manual with instructions in line with existing national regulations for the prevention of accidents and environmental protection.

This operating manual applies to the following Termination Machine of TE Connectivity:

- FFC Semi-Automatic Termination Machine with IPC and touch screen

Warranty claims, liability

Tyco Electronics Shanghai Co., Ltd. disclaims all liability for any damage attributed to failure to observe instructions on the FFC Semi-Automatic Termination Machine or in this operating manual.

The manufacturer is not liable for any damage attributed to changes or modifications to the FFC semi-automatic termination machine not mentioned in this operating manual.

Serviceability

For further information and technical support, please contact the Customer Service Hotline. Addresses, see Section 15.

2.2 Signs and symbols used in this document

The signs and symbols mentioned in this section are used in this document.

2.2.1 Instructions

Instructions are marked as follows:

- For action steps
- For description of items or events

2.2.2 Notes

NOTE

General note on operation/use.

2.2.3 Safety instructions

Special safety instructions are provided where necessary. See section 3.

2.3 Abbreviations

Table 2: Abbreviations

Abbreviations	Meaning
PN	Product material No.
TE	TE Connectivity
FSE	Field Service Engineer
FVD	Force vs Distance Measurement
FFC	Flexible flat cable
FPC	Flexible printed cable
Foil	Flexible sheet
Terminal	FFC terminal
AOI	Automatic optical inspection mechanism

3 General notes on safety

The FFC Semi-Automatic Termination Machine has been manufactured in accordance with the generally accepted codes of practice and recognized safety rules.

Nonetheless, a risk of physical and material damage exists if the following general safety instructions and warnings preceding the instructions in this manual are not followed.

3.1 Intended use

The FFC Semi-Automatic Termination Machine is a semi-automatic terminal press that can be equipped with product-specific press-fit tools for processing FFC terminals. Information on press-fit tools can be found in the relevant operating manual.

Operational environment

The machine must only be used in a dry and dust-free environment.

The machine must not be used in environments with hazardous gas atmospheres.

3.2 Foreseeable abuse

The machine may be used only for the purpose described above. Use for any other purpose is considered improper and is deemed as misuse.

This applies in particular to:

- use for processing other types of terminals/products
- inadmissible tool product combinations
- use with bridged safety functions
- use without safety functions

NOTE
Claims for damages on the equipment which is based on not intended use are excluded.

3.3 Safety devices

The protective and safety devices of the machine serve for the protection of operating and maintenance personnel (users) and others against the majority of hazards that can occur during use (operation) of the machine.

However, certain safety precautions must be taken by operators, maintenance and repair personnel to prevent personal injury and damage to the machine.

The FFC Semi-Automatic Termination Machine has the following protective and safety devices:

- Emergency Stop switches
- Protective Door switches
- Closed Guard
- SCREEN

3.3.1 Emergency Stop switches

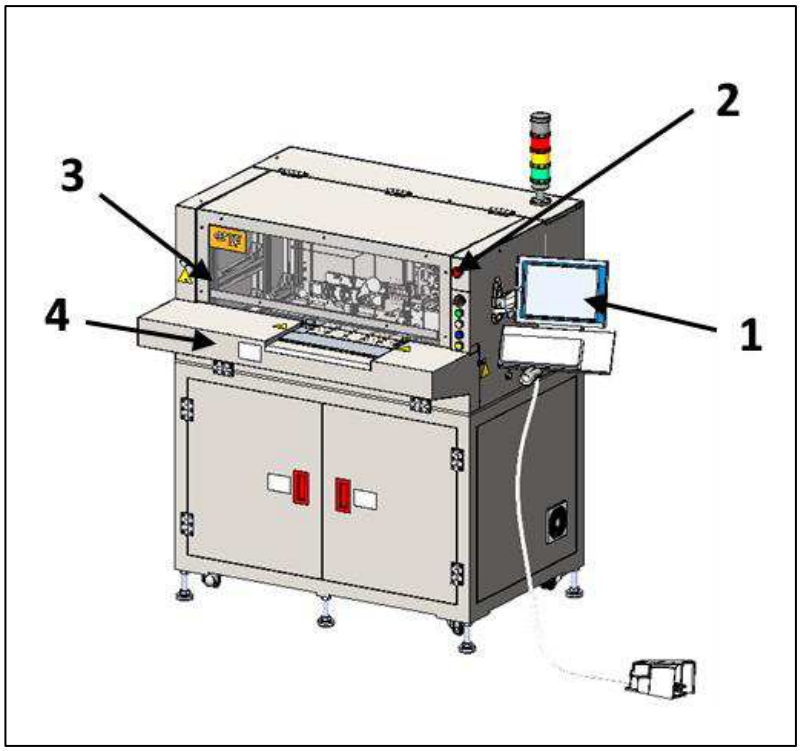
The machine has an Emergency Stop switch for switching off the machine in dangerous situations or emergencies.

The Emergency Stop switch is located:

- on the operator panel in front of the machine

When the Emergency Stop switch is pressed, all movements are stopped.

Figure 1: Emergency Stop switch and protective door



1	SCREEN	**3**	Protective door
2	Emergency Stop switches	**4**	Protection cover

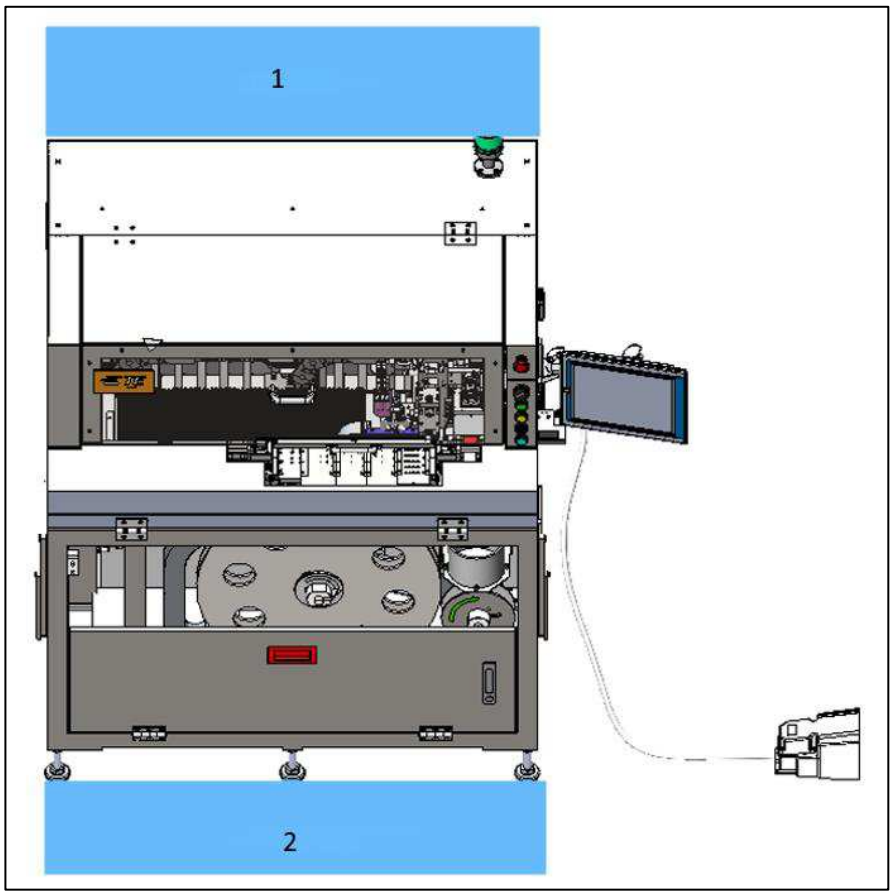
3.3.2 Protective door switches

The FFC Semi-Automatic Termination Machine is equipped with a safety system which prevents the operator from accessing the machine while the machine is running. The system is equipped with two safety guards at the front side, and one protective door at the upper and lower parts of the rear area, respectively. The machine is equipped with a protective door switches and safety door locks, so that if the operator opens the rear upper protective door or the front safety guard while the machine is in operation, all movements of the machine will stop immediately.

3.4 Workplaces/Danger zone

The operator may only stand in the hatched operator areas (1, 2).

Figure 2: Workplaces/Danger zone



1 Working area 2

2 Working area 1

Table 3: Workplaces

SN	Workplaces	Type of danger
1	Operating side	The operator can interact with the machine at the operator panel to select modes, programs, and more.
2	Overhaul and maintenance area	This area allows staff to carry out overhaul and maintenance of equipment.

3.5 Safety measures

3.5.1 General

The FFC Semi-Automatic Termination Machine may be used only for its intended purpose.

The machine must only be used by trained and authorized personnel.

The responsibilities of personnel for operation, setting, maintenance and repair must be clearly defined by the owner/operator of the machine and observed.

Unauthorized changes at the machine excludes any liability of the machine manufacturer (TE) for any resulting damages out of the unauthorized changes.

3.5.2 Safety measures for commissioning

The machine must only be set up and operated in a technically perfect condition in awareness of safety aspects and potential dangers.

Before each use, it must be ensured that all safety devices, in particular barriers, are mounted and function perfectly.

Barriers may only be removed with the machine stationary and disconnected from the power supply.

Housings and safety guards in particular may only be removed by qualified personnel.

3.5.3 Safety measures for transport and installation

Unpacking, Setting up and first start-up on site must be done by a FSE of TE

During transport, Setting up and operation of the machine there is a possible risk on crushing hazard

The connections of the machine (electrical / pneumatic) has to be done by qualified personnel

For lifting the machine with a fork lifter the usage of forks with a minimum length of 1,6m has to be used. The forks needs to be placed from the operator side in a centered position to ensure an equal weight distribution

Working environment is in liability of the operating company

Supply Pipes and Lines for electrical and pneumatic energies must be placed out of danger zones. They also must be placed in a way that nobody gets in collision with them

3.5.4 Safety measures for operation

The machine must only be operated in a technically perfect condition in awareness of safety aspects and potential dangers.

The machine must only be operated in a complete and functional condition.

In the event of a machine fault, work must be interrupted and the fault cleared before continuing work with the machine.

The machine must only be used by trained personnel.

3.5.5 Safety measures for maintenance

Machine and system components subject to maintenance and servicing must be disconnected from the supply unless stated otherwise in this operating manual. After disconnecting from the power supply, they should be tagged and locked to prevent misuse by others. The plug must be disconnected from the mains socket. The disconnected components must first be checked for absence of power, then earthed and short-circuited, and adjacent live parts insulated. The electrical equipment of the FFC Semi-Automatic Termination Machine must be regularly tested. Defects, e.g. loose connections or scorched cables must be remedied immediately. If work must be carried out on live parts, a second person must be present to operate the Emergency Stop switch or main switch or isolate the machine from the supply in an emergency if necessary. Only electrically insulated tools may be used. Hazard warnings and notices concerning personal protective equipment, as shown on the various signs, must be observed. Safety helmets must be worn when carrying out maintenance on the rear control cabinet and in the area below the product feed inlet.

Hazard!

Danger electricity, electric shock.

Hazard of an electrical stroke due to live power components.

Electrical components can still be under voltage at a switched off main switch

- *Operations at electrical components are permitted to be done by electrically qualified persons.*

Caution!

Hazard in case of removed safety guards

In case if safety guards needs to be removed for maintenance danger areas are free accessible.

- Maintenance is permitted to equipped personnel.
- After finishing maintenance work all removed safety guards must be mounted back to the machine and be proven for a correct function.

Warning!

Hand injuries

At unexpected movements of electrical or pneumatic components extremities can get squeezed.

- *Before Maintenance and repair at the machine, the machine must be disconnected from electrical and pneumatical power.*
- *Main switch and pneumatic maintenance unit must be secured against unauthorized power on.*

3.5.6 Personnel qualification

The operator is responsible for ensuring that every person working with the machine has been familiar with the contents of this operating manual.

The operator is also responsible for the training of operating personnel, which must include the following:

- Intended use
- Hazards
- Safety regulations
- Function
- Operation

To ensure that instruction has been understood, training must be provided in the language of operating personnel.

Table 4: Personnel qualification

Necessary personnel qualification	
Assembly Commissioning Instruction	In addition to Chinese, qualified technical personnel also speak the language of the operators.
Operation	Qualified persons trained by technically skilled persons.
Maintenance Service	Technically skilled persons who speak Chinese and English.

3.6 Warnings

NOTE

Keep all decals clean and legible. Replace them when necessary.

DANGER

ELECTRIC SHOCK HAZARD

This tool is not insulated. When using this unit near energized electrical lines, use proper personal protective equipment.

Failure to observe this warning could result in severe injury or death.

DANGER

Denotes an imminent hazard that can result in moderate or severe injury.

SKIN INJECTION HAZARD

Do not use hands to check for oil leaks. Highly pressurized oil punctures the skin, causing serious injury, gangrene, or death. If injured, seek immediate medical help to remove the oil.

DANGER

FIRE HAZARD

Do not use solvents or flammable liquids to clean the pressing tool. Solvents or flammable liquids could ignite and cause serious injury or property damage.

Failure to heed these warnings could result in severe injury from harmful fumes or burns from flying debris.

DANGER

Inspect the tool and jaws/dies before each use. Replace any worn or damaged parts. A damaged or improperly assembled tool can break and strike nearby personnel.

Failure to observe this warning could result in severe injury or death.

CAUTION

Do not place the tool in a vise. The pressing tool is designed for hand-held operation.

Protect the pressing tool from rain and moisture. Water damages the pressing tool and battery.

Failure to observe these precautions can result in injury or property damage.

CAUTION

Do not perform any service or maintenance other than as described in this manual. Injury or damage to the tool can result.

Failure to observe these precautions can result in injury or property damage.

3.6.1 Safety signs (type-specific)

The following safety signs are used in this operating manual and the surrounding area of the machine in order to warn the operator of hazards:

	General warning This warning sign accompanies specific activities subject to various hazards.
	Hand injuries This warning sign accompanies specific activities where there is a risk of hands being trapped, entangled or injured in other ways.
	Danger electricity, electric shock This warning sign accompanies specific activities where there is a risk of electric shock, potentially with fatal consequences.
	Warning of hazardous laser radiation This warning sign is used for activities where there is a risk of exposure to laser radiation and possible eye exposure to direct radiation longer than 25 sec.
	Warning of splashing This warning sign is used when there is a risk of splashing of small objects that could cause injury to the eyes, head or face.

3.6.2 Mandatory safety signs

The following mandatory safety signs are used in this operating manual and surrounding area of the machine in order to draw the attention of the user to wear personal protective equipment.

	Eye protection must be worn Eye protection must be worn when using tools, machines and apparatus in normal use.
	Ear protectors must be worn Ear protectors must be worn when entering specifically designated areas or operating machines and apparatus. There is otherwise a risk of reduced hearing sensitivity (reversible hearing loss after an extended period) and deafness following prolonged exposure (irreversible hearing loss).
	Read the operating manual The described object (FFC Semi-Automatic Termination Machine) must only be used after the user has read the operating manual.
	Safety gloves must be worn If safety gloves must be worn due to a risk of injury, this must be indicated. The use of safety gloves must be regulated in the operating manual as safety gloves must not be worn for certain work.

4 Description

The FFC Semi-Automatic Termination Machine consists of the following modules.

4.1 Layout

Figure 3: Front view

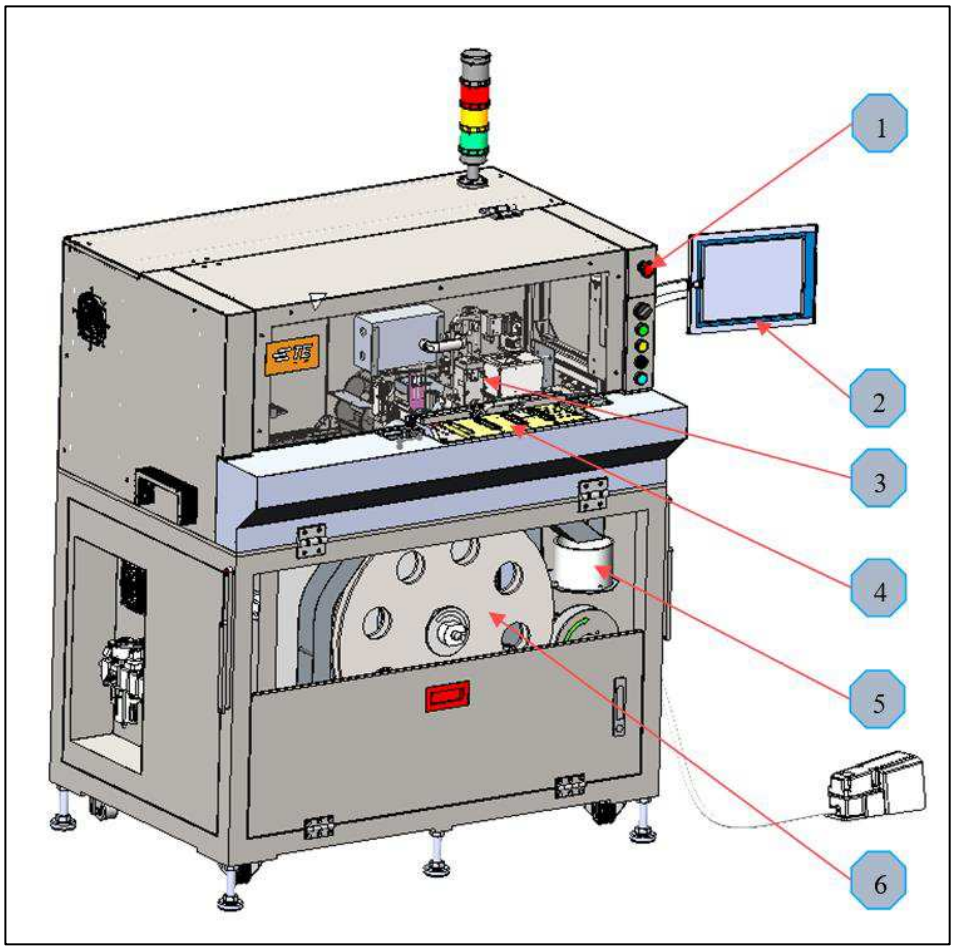
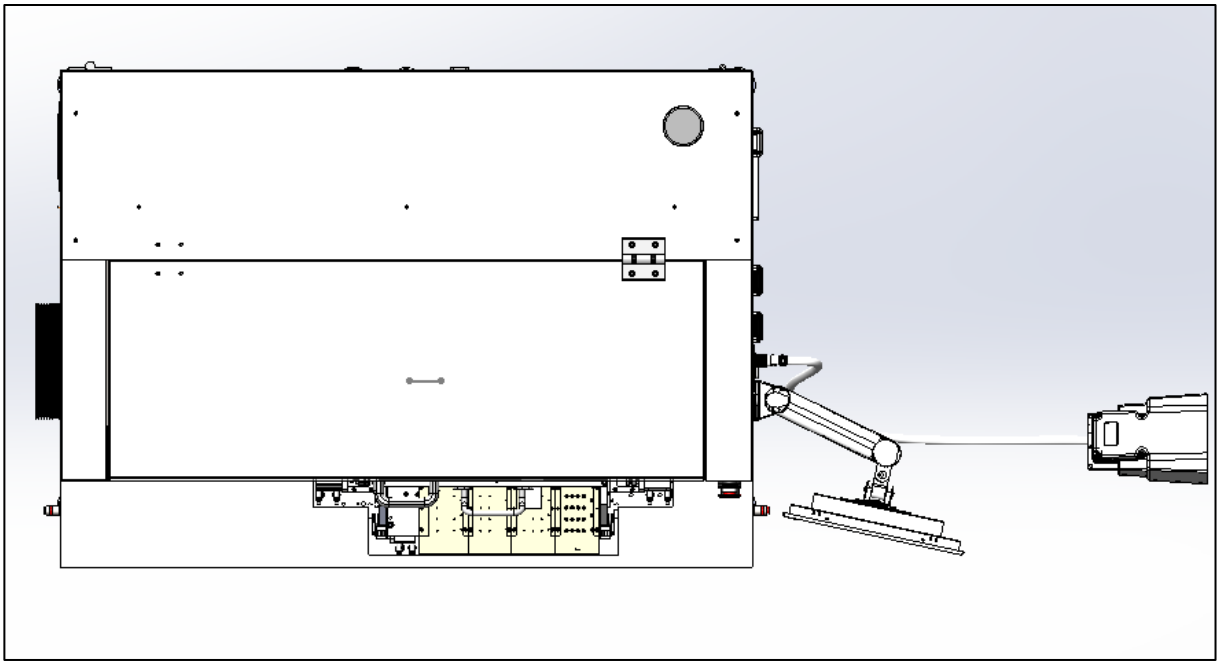


Table 5: Front of the FFC Semi-Automatic Termination Machine

Item	Name	Item	Name
1	Buttons and Emergency Stop switch	2	Operator panel + screen
3	Crimping and detection mechanism	4	Foil feeder
5	Waste bin	6	Active feeding unit

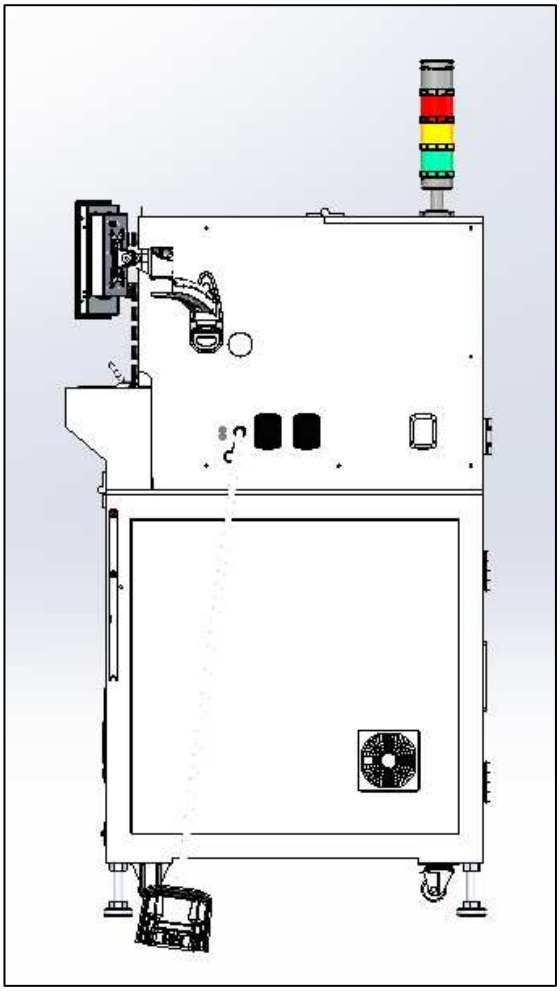
4.1.1 Top view

Figure 4: Machine top view



4.1.2 Side view

Figure 5: Machine side view



4.2 Schematic structure of the FFC Semi-Automatic Termination Machine

Figure 6: Schematic structure

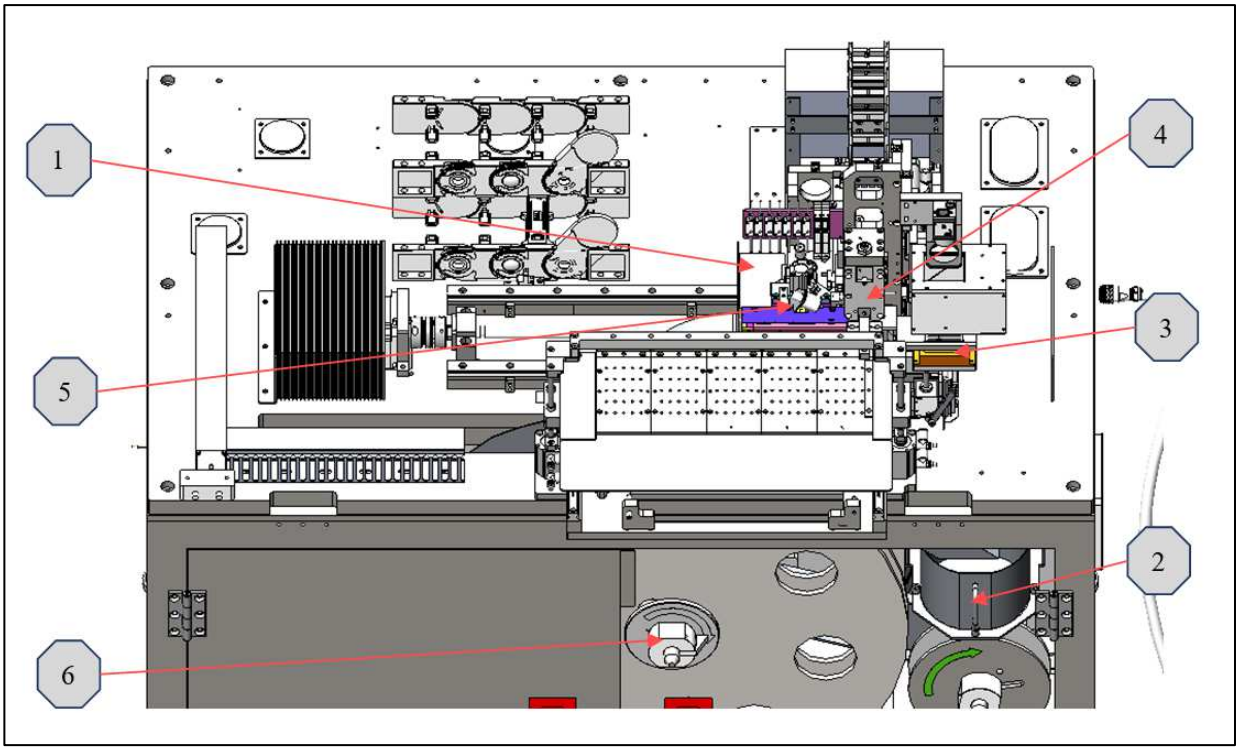


Table 6: Schematic structure

Item	Name	Item	Name
1	Head X-Y moving slide	2	Waste collection unit
3	CCD inspection unit + Foil front bezel	4	Terminal crimping unit
5	Terminal feeding unit	6	Active reel release mechanism

4.2.1 Head X-Y moving slide

Figure 7: Moving slide

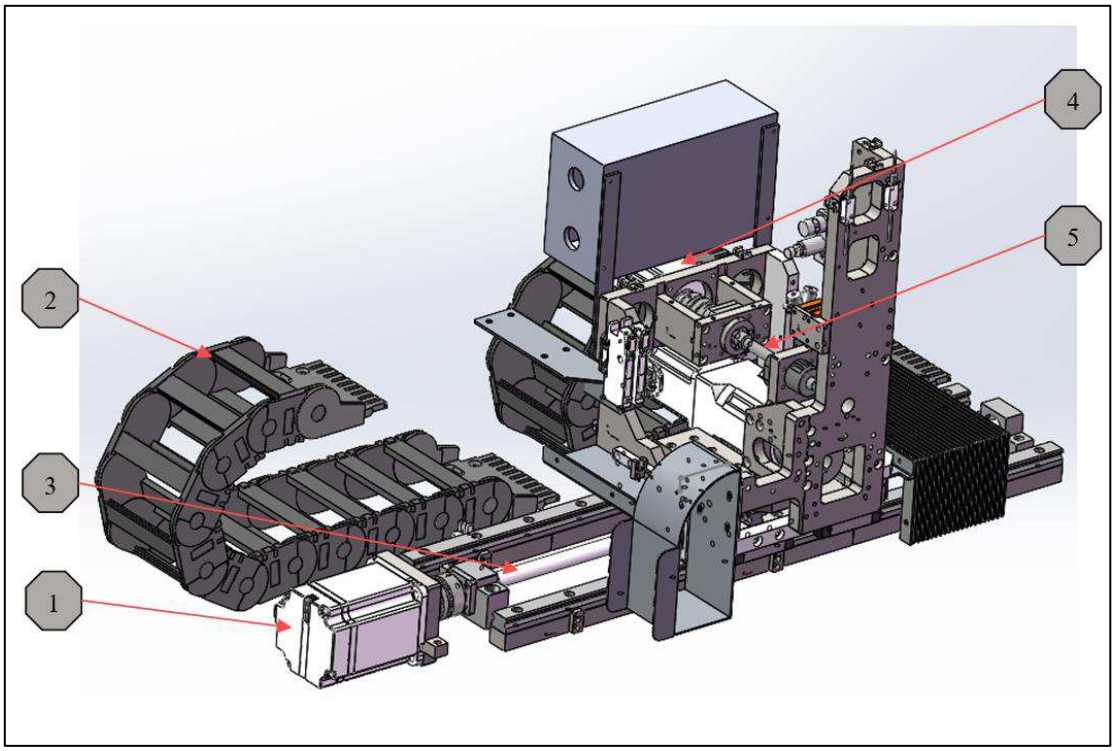


Table 7: Foil moving slide

SN	Name	Function
1	X-axis motor	X-direction slide drive
2	Cable drag chain	Protecting the moving cable on the slide
3	X-axis screw rod assembly	X-direction movement mechanism
4	Y-axis motor	Y-direction slide drive
5	Y-axis screw rod assembly	Y-direction movement mechanism

4.2.2 Waste collection unit

Figure 8: Waste collection unit

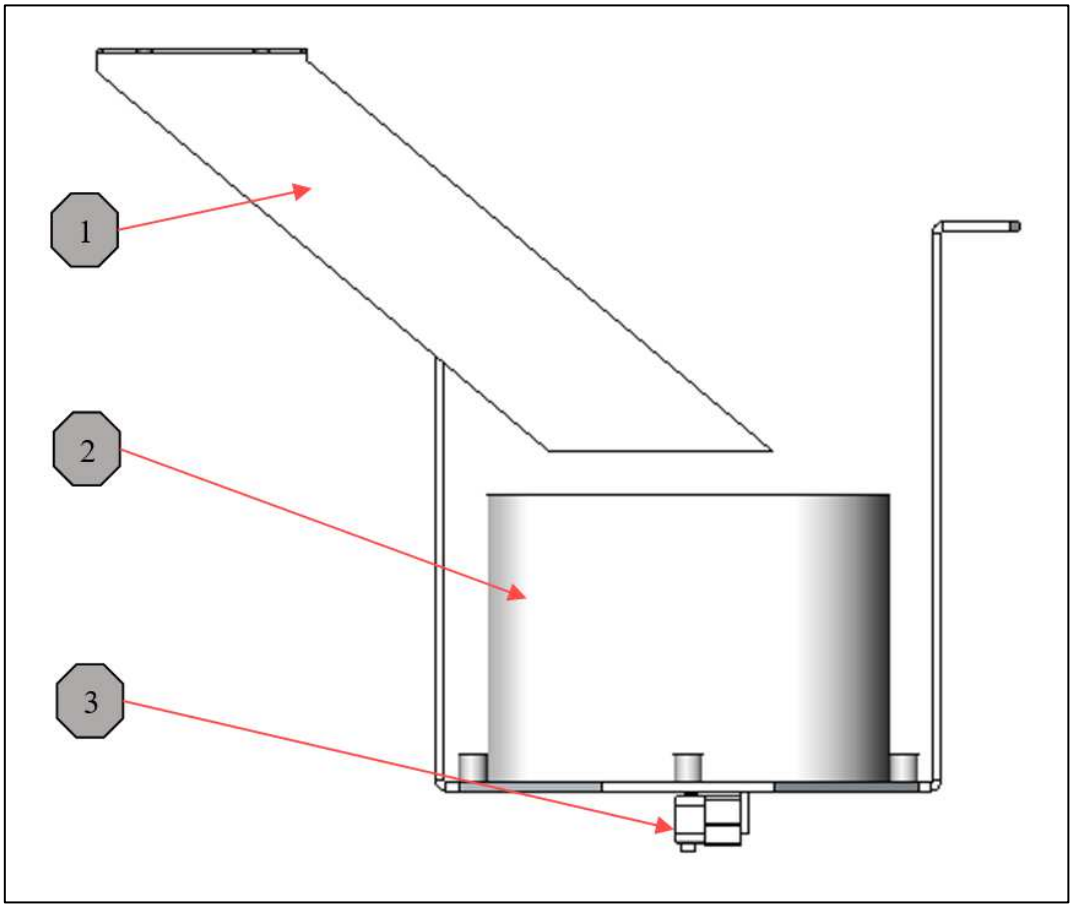


Table 8: Waste collection unit

SN	Name	Function
1	Waste collection pipe	For feeding the cut-off waste into the waste bin via this pipe
2	Waste bin	For storage of waste
3	Waste bin in-place inspection	For confirmation of the presence of the waste bin

4.2.3 CCD inspection unit

Figure 9: CCD inspection unit

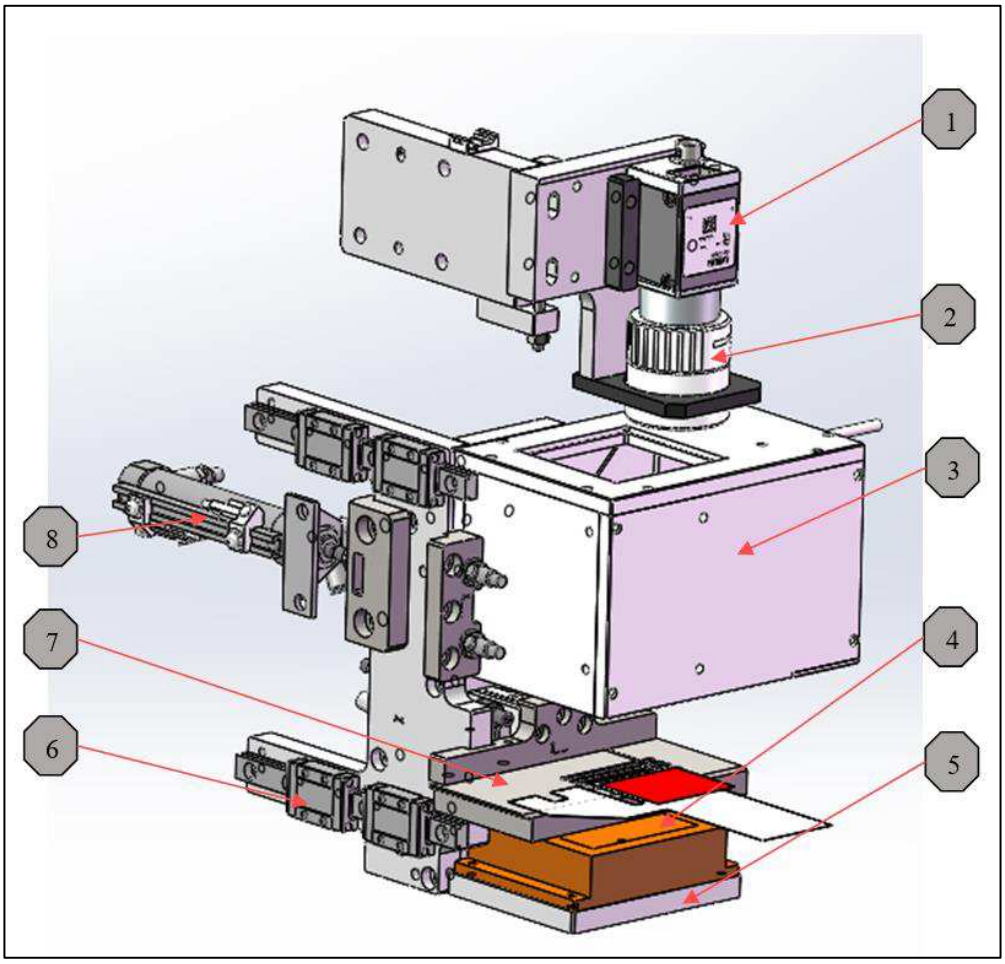


Table 9: CCD inspection unit

SN	Name	Function
1	CCD camera	Image capturing device
2	Lens	Optical device
3	Top light source	Light source for the top of the product
4	Bottom light source	Light source for the bottom of the product
5	Bracket	Bottom light source and light shield bracket
6	Linear slider	Guide and support for forward and backward movement of the light source assembly
7	Light shield	Product background
8	Cylinder	Power module for forward and backward movement of the light source assembly

4.2.4 Terminal crimping unit

Figure 10: Terminal crimping unit

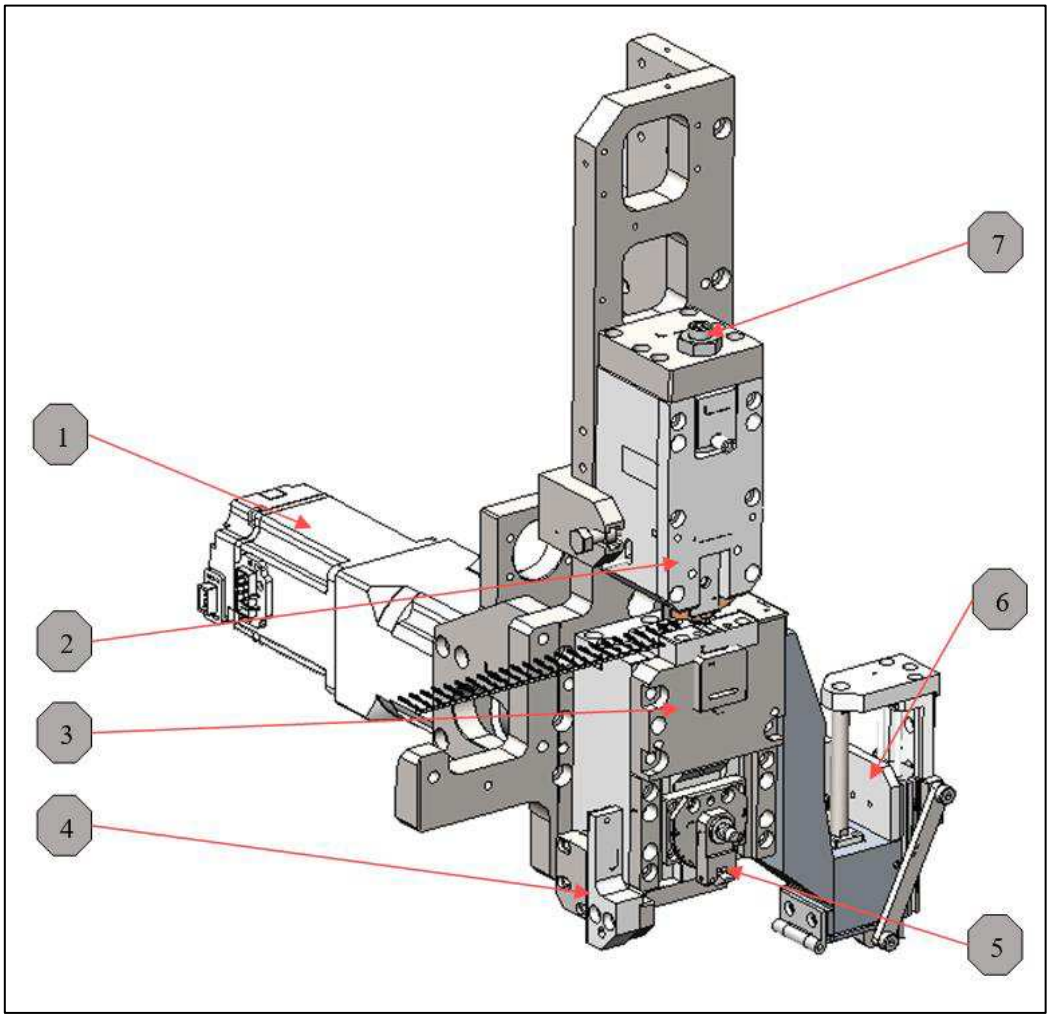


Table 10: Terminal crimping unit

SN	Name	Function
1	Crimping motor	Crimping driver
2	CRIMPER unit	Forming blade and pressure sensor unit
3	ANVIL unit	Bottom blade and crimping height adjustment unit
4	Crimping height detection mechanism	Magnetic scale and reading head for checking the crimping height
5	Crimping height adjustment handle	Crimping height adjustment
6	Waste discharge mechanism	Periodical discharge of cut-off waste
7	Pre-pressure adjustment mechanism of pressure sensor	Adjustment of pre-pressure of pressure sensor

4.2.5 Terminal feeding unit

Figure 11: Terminal feeding unit

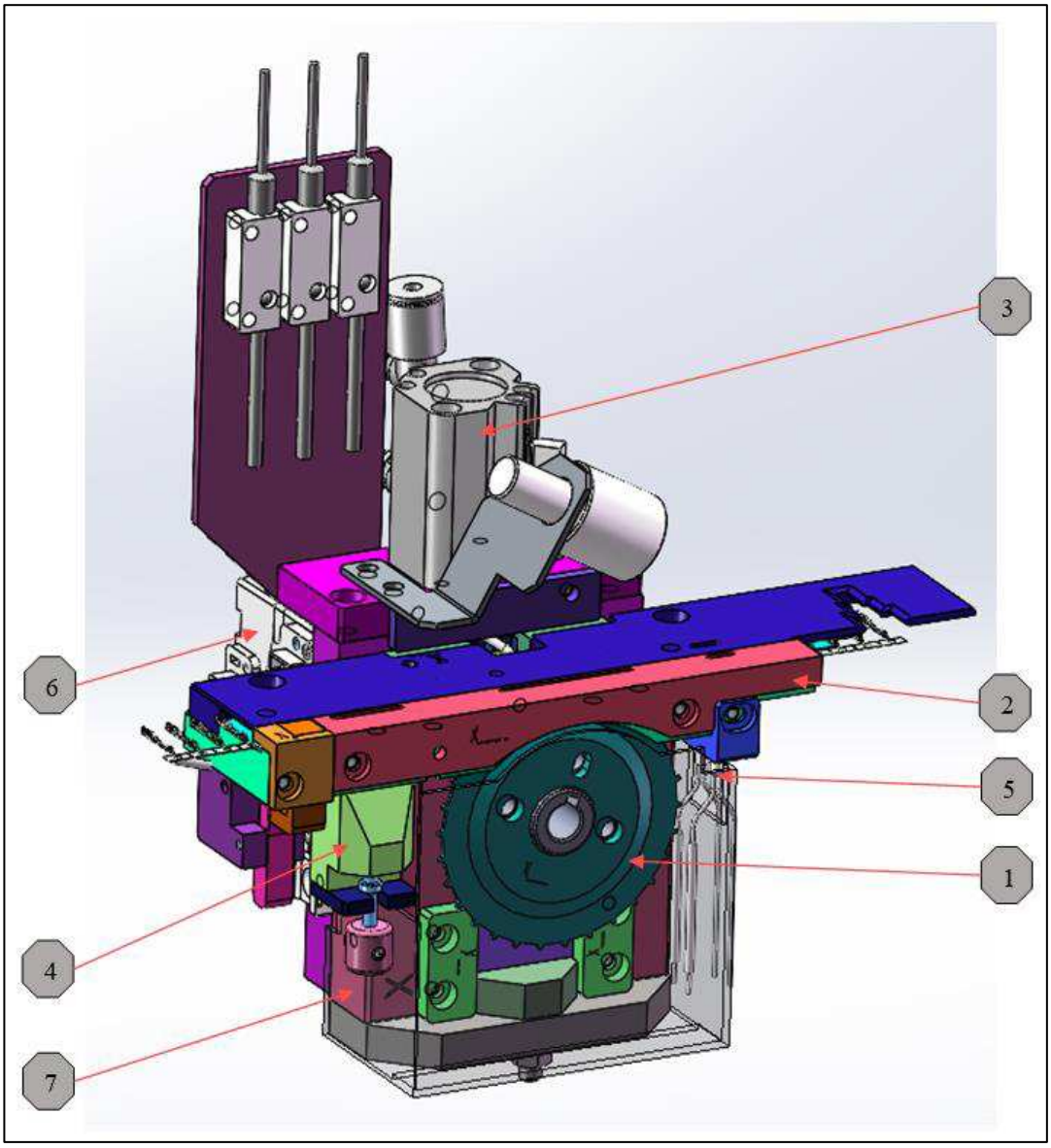


Table 11: Terminal feeding unit

SN	Name	Function
1	Feeding ratchet	Feeding with ratchet
2	Terminal in-feed channel	Terminal transfer channel
3	Ratchet locking cylinder	Locking of the ratchet's snap-in position
4	Strap positioning aid	Hand-pressed positioning pins
5	Sensor for pitch inspection	Positioning check of strap feeding holes
6	Ratchet motor	Ratchet power motor
7	Motor base	Motor placement

4.2.6 Active reel release mechanism

Figure 12: Active reel release mechanism

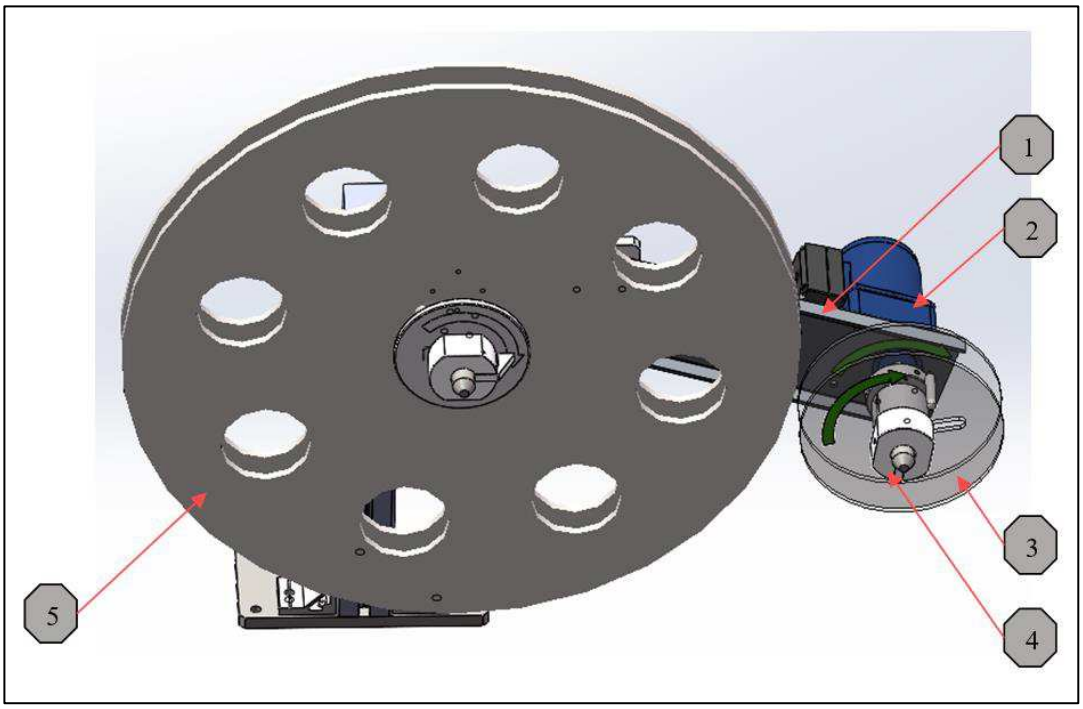


Table 12: Active reel release mechanism

SN	Name	Function
1	Bracket	Take-up motor and reel support
2	Take-up motor	Take-up motor for reeling in tape
3	Take-up reel	Tape storage
4	Reel clip	For clipping the reel and the materials in the reel
5	Terminal reel	Reel for organizing FFC terminals

4.3 Control Elements

Figure 13: Control elements

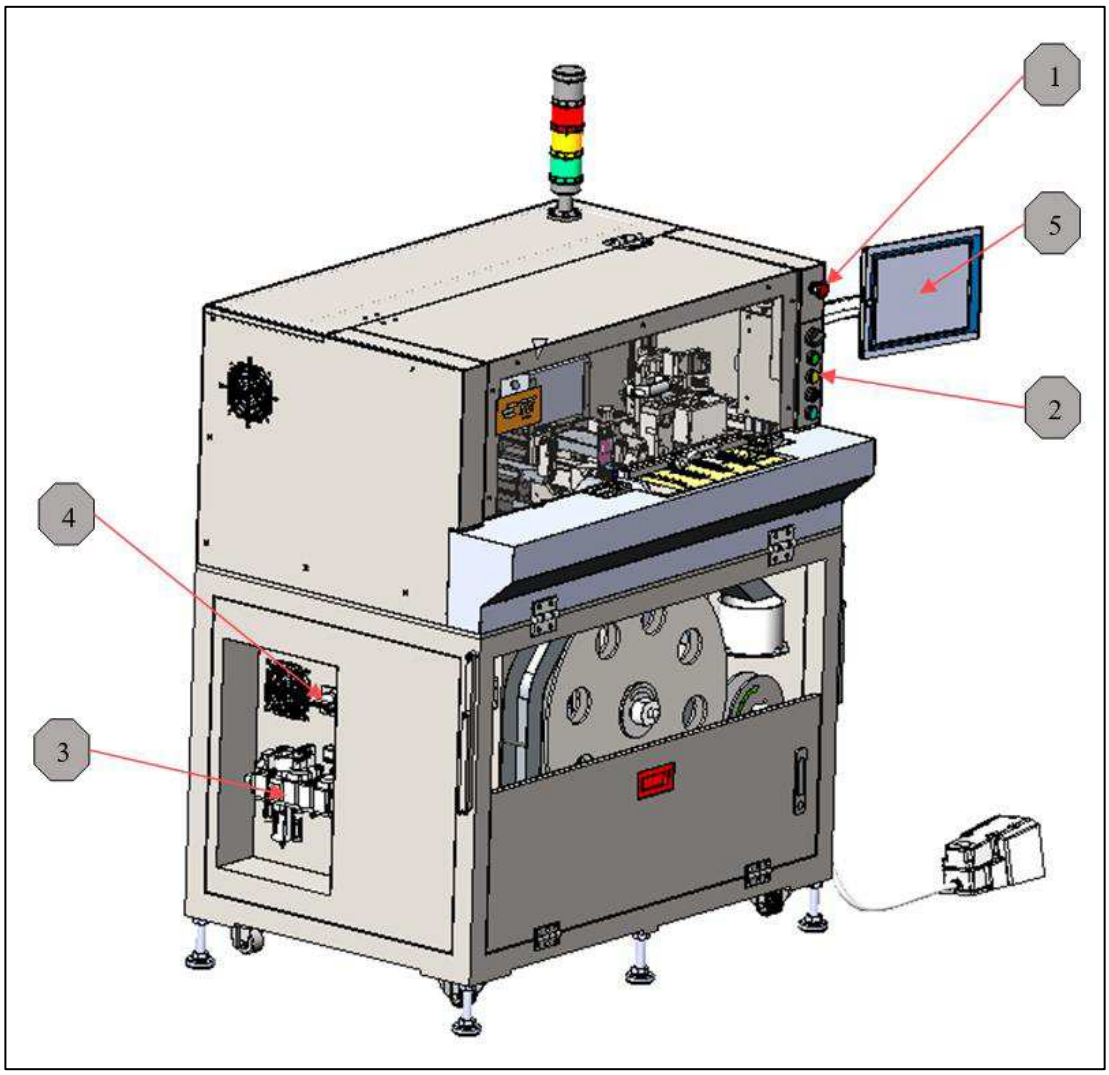


Table 13: Control elements

SN	Name	SN	Name
1	Emergency Stop switches	2	Control button
3	Air triplex	4	Main Power Switch
5	Touch screen		

4.3.1 Operator Panel

The machine is operated using a touch screen with push buttons and an Emergency Stop switch on the upper left side.

Figure 14: Operator Panel

4.3.2 Main Switch

Starts the machine

Figure 15: Main switch

4.4 Technical data

4.4.1 Rating plate

Figure 16: Rating plate

4.4.2 Machine data

Table 14: Machine data

Date	Value	Unit
Dimensions (net)	1300 x 860 x 1450 (W x D x H)	mm
Dimensions (packaging)	1850 x 1050 x 2400 (W x D x H)	mm
Weight (net)	about 380	kg
Weight (with packaging)	about 420	kg
Noise Level	<75	dB (A)

4.4.3 Product/performance data

Table 15: Product/Performance data

Date	Value	Unit
Maximum press-fit force	1	KN
Foil crimping width	0 - 300	mm
Minimum length of Foil straight section	50	mm
Minimum length of Foil bare copper tape	5.33	mm
Minimum crimping speed (1.8 mm pitch)	3	pcs/sec

4.4.4 Operating/Ambient conditions

Table 16: Operating/ambient conditions

Date	Value	Unit
Service temperature	10 - 50	°C
Storage temperature	10 - 50	°C
Humidity	40-60 (non-condensing)	%

4.4.5 Electrical requirements

Electrical Data

Table 17: Electrical Data

Date	Value	Unit
Supply voltage	230	V AC
System frequency	50	Hz
Phases	1	Phase
Power consumption	1.3	kW
Air pressure	600 - 800	kPa
Air consumption	50	Litre/min

5 Delivery

5.1 Internal transport

The machine can be transported packed by forklift truck.

After unpacking, it will be necessary to use transport aids. Observe the information on reasonable loads.

NOTE

The machine was packed and secured for safe transport in the TE plant. Unpacking, Setup and first installation have to be done by a FSE from TE.

5.1.1 Manual handling capacity

The Table 18 below can be used as a guide for lifting and carrying reasonable loads.

Table 18: Reasonable Loads

	Reasonable load in kg lifting and carrying frequency			
	occasional*		more frequently*	
Age	Women	Men	Women	Men
15 to 18 years	15	35	10	20
19 to 45 years	15	55	10	30
Older than 45 years	15	45	10	25

* "Occasional" means: Lifting and carrying a load up to once per hour over a transport distance up to maximum 4 steps

* "More frequently" means: Lifting and carrying a load at least twice per hour over a transport distance of 5 steps and more

5.1.2 Transport instructions (after unpacking)

The weight of the machine is about 380 kg.

The machine must be transported with suitable fork lifter. The fork lifter must be equipped with forks with a minimum length of 1.6 meters.

- ➲ Lift the machine at the marked points (operator side / centered)
- ➲ Transport the machine only by equipped personnel

DANGER
Danger due to moved masses.

- *Machine moving is only allowed with a fork lifter or a hand lift truck.*
- *The fork lifter must be equipped with forks with a minimum length of 1.6 meters.*
- *It is only allowed to lift the machine at the welded steel frame.*
- *Movement of the machine only allowed by educated personnel.*

Balance point and weight is to be considered.

CAUTION
Risk of injury from falling parts.

Transporting the machine incorrectly can give rise to hazards.

- *Only use lifting gear and load lifting appliances with sufficient carrying capacity. Observe the permitted lifting weight.*
- *Do not stand under suspended loads.*
- *Forks with a length over 1.6 meters is required.*

5.1.3 Storage, temporary storage

If the machine is not installed immediately, it must be stored/temporarily stored in a suitable location.

The machine should be stored/intermediately stored in the transport packaging. The ground should be level and dry.

If the storage is for a longer time then following points must be fulfilled

- ■ Machine must be stored in dry condition and frost-free.
- ■ The ground should be level and dry.
- ■ Avoid direct solar radiation.
- ■ Blank metal surfaces has to be covered against corrosion with a corrosive agent (oil).

6 Commissioning

NOTE

The safety instructions in Section 3 must be observed for all commissioning procedures.

6.1 Installation/Assembly

NOTE

- *Unpacking, Setup and first installation has to be done by a FSE from TE.*
- *If the machine must be connected to an external network, it must be ensured that there is no conflict with the IP address of the machine network.*
- *The customer assumes the risk of installing other software that may affect the network of the machine (e.g., anti-virus software with firewalls, VPN clients, etc.)*

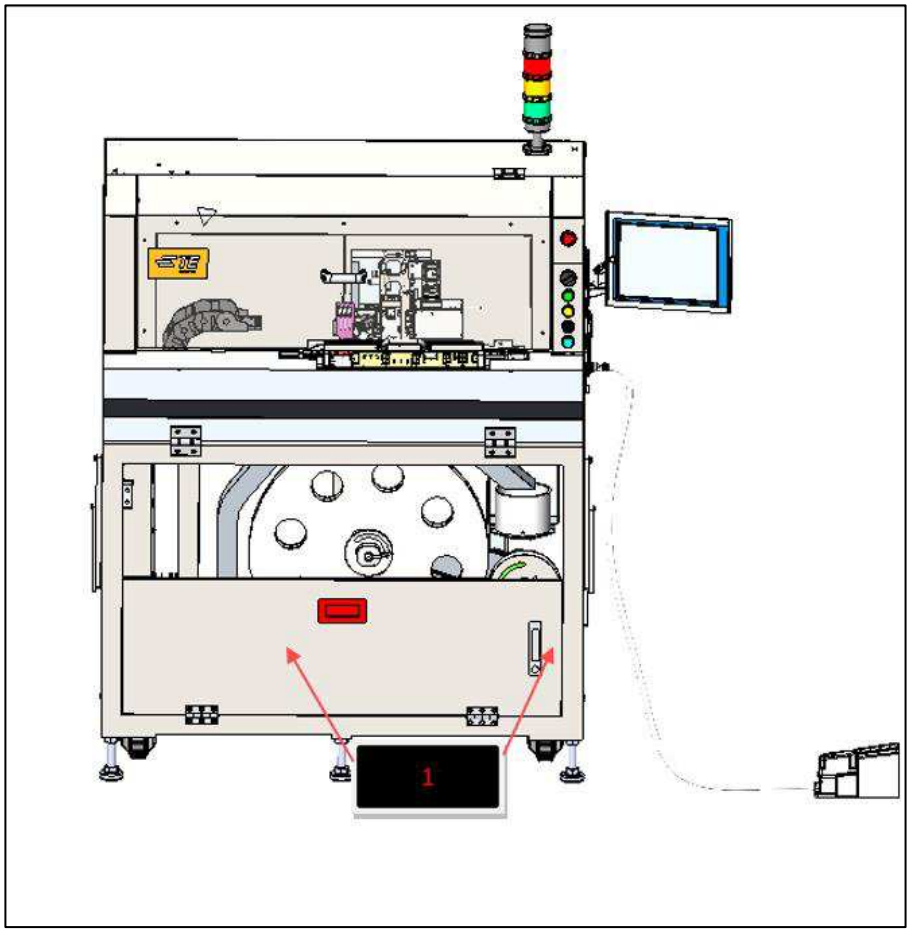
6.1.1 FFC Semi-Automatic Termination Machine

Preconditions/requirements for the site of installation

- The machine base is marked with lifting points for handling by forklift truck or pallet truck. The machine can be lifted and transported on these points.
- Ensure that the work surface is capable of taking the full weight of the machine.
- Adequate lighting should be ensured in the workplace.
- Adequate space for opening the control cabinet must be provided. Remove the protective foil and packaging with spare parts and technical documents from the working area.

6.1.2 Lifting point

Figure 17: Lifting point



1 Lifting point

6.1.3 Electrical

Preconditions/requirements for electrical supply

NOTE

The machine is electrically designed to comply with EN 60204 (for industrial equipment).

The power supply must be suitable for industrial equipment and comply with all requirements of EN 60204-1/EC 60204-1.

6.1.4 Compressed air

Requirements for compressed air source

The compressed air source is required to supply air through a flow control valve.

NOTE

The machine must only be operated with dry compressed air.

- *Standard filter 40 µm (MSB4).*
- *The machine must only be connected to the local compressed-air supply with the supplied compressed-air line.*
- *Operating pressure: 600 - 800 kPa.*

Machine connection

➲ Connect the machine's triplex inlet to a local compressed air source.

6.2 Start-up

A prerequisite for commissioning the machine is the installation of compressed air source and power cables.

The machine is switched on as follows:

- Open the compressed-air supply;
- Switch on the main switch at the control cabinet;
- Switch on the machine's manual switch valve;
- After a short start-up phase, the control components begin to operate;
- Close the protective doors;
- Release the emergency stop switch;
- Press the reset button and clear all reported errors;
- Press the zero button to put the machine into standby mode after a short reset action;
- Set the machine;
- Select the operating program.

The FFC Semi-Automatic Termination Machine is now ready for use.

7 Machine Control

NOTE

At all processes the safety instructions under point 3 needs to be considered.

NOTE

Increased wear and a shorter service life may be caused if the machine is not used under the proper conditions

The machine must be in an orderly and clean condition prior to starting work.

Residues and fouling must be removed if necessary.

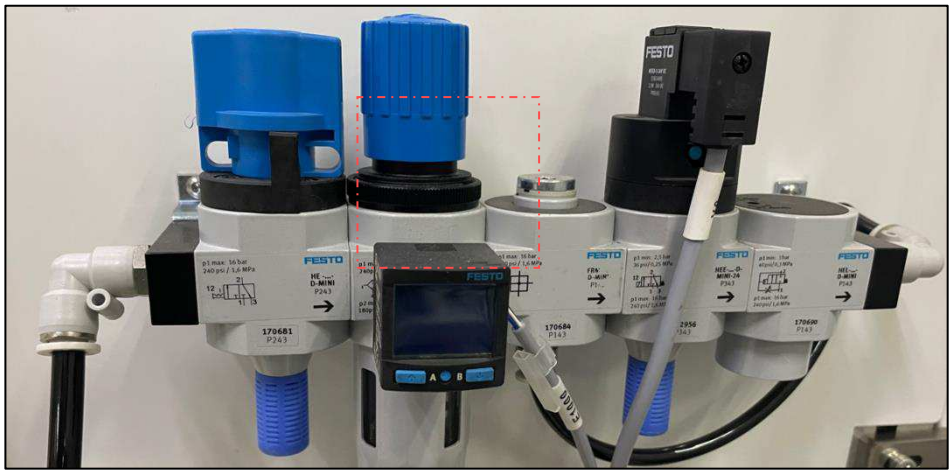
After completing the work, the machine must be cleaned and, if necessary, serviced and lubricated.

7.1 Switching on

Figure 18: Main switch (example)

➲ Switch on the FFC Semi-Automatic Termination Machine with the main switch by dialing from 0 to 1.

Figure 19: Triplex



➲ Switch on the valves on the triplex (shown in red) and make sure that the displayed air pressure is within the applicable range.

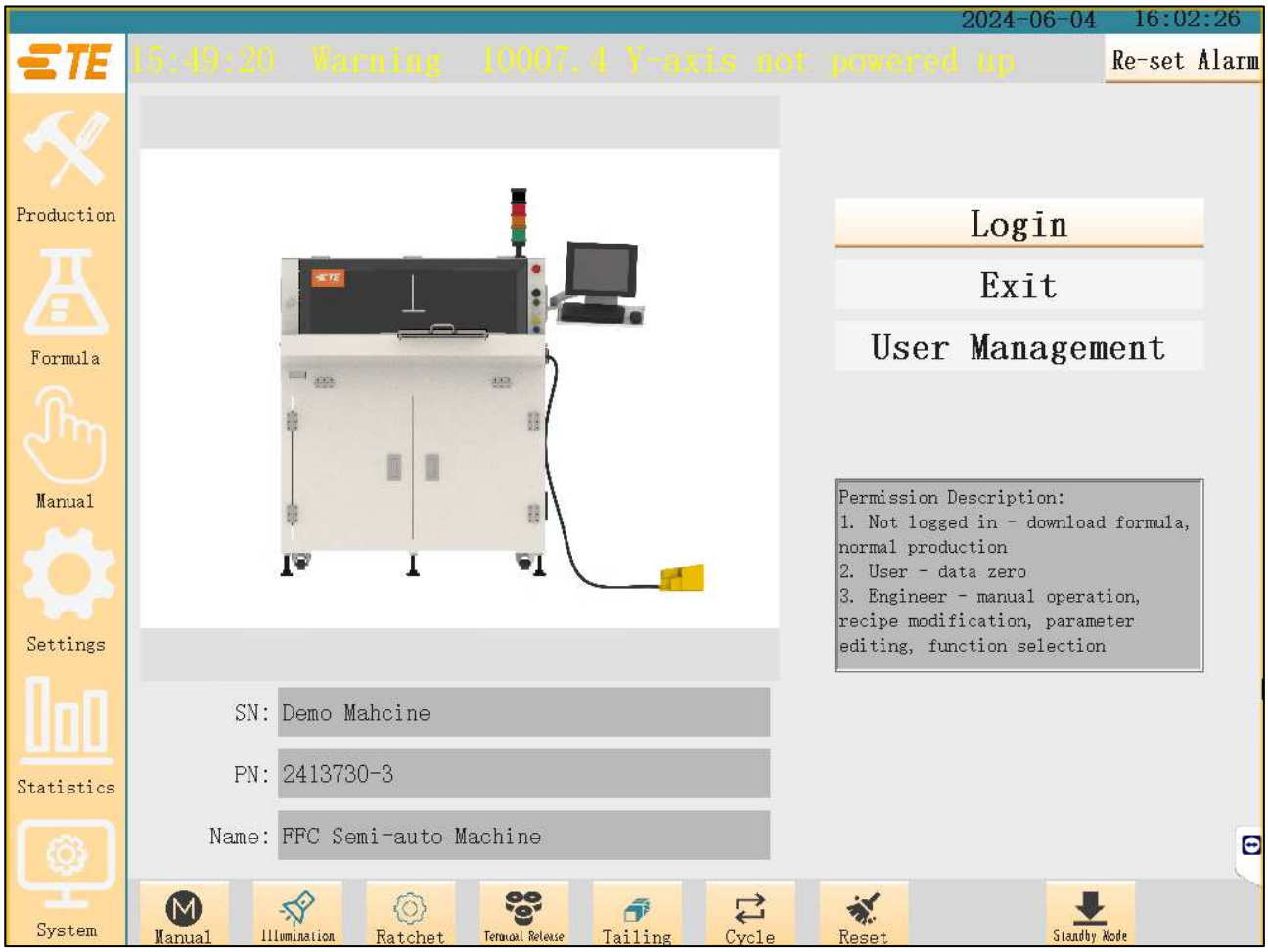
7.2 Introduction to the software interface

Figure 20: Boot screen

- Double-click FFC.exe shown in the red box after the machine starts up and the desktop is displayed to enter the login interface.

7.2.1 Interface framework

Figure 21: Default interface



Top status bar: A status bar that displays alarm messages that can be clicked on to provide more information about the error.

Left menu: A menu of page buttons that can be clicked on to display different functional interfaces.

Bottom menu: A menu of shortcut buttons that can be clicked on to enable different functions.

Shortcut button status:

Table 19: Shortcut button status

	Unavailable	Available	Active
Tab Status			

Tips: Buttons for Ratchet, Step, Clear Status, Standby Position, etc. must be pressed and held for 1 second before response.

In automatic mode: Only production and statistics are available, for all permission levels.

In manual mode: There are different permissions available for different permission levels.

Instructions for use of shortcut buttons:

Table 20: Instructions for use of shortcut buttons

SN	Function Buttons	Icons	Instructions for Use	Unavailability
1	Light		Click the light to turn it on; and click it again to turn it off.	● None
2	Ratchet		Top up the positioning pin, press and hold the ratchet button for 1 second, and the ratchet wheel rises; and click the ratchet button, the ratchet wheel drops.	● Emergency stop ● Auto
3	Reel release			● Emergency stop
4	Tailing Mode			● None
5	Step/Cycle		In manual mode, click this button to switch between Step and Cycle.	● None
6	Clear status		In manual mode, press and hold this button for 1 second to clear all current status and return to standby mode.	● Auto
7	Go to standby position		In manual mode, press and hold this button for 1 second, and the movement mechanism will go to the standby position.	● Emergency stop ● Auto ● Manual: unloading cylinder opens

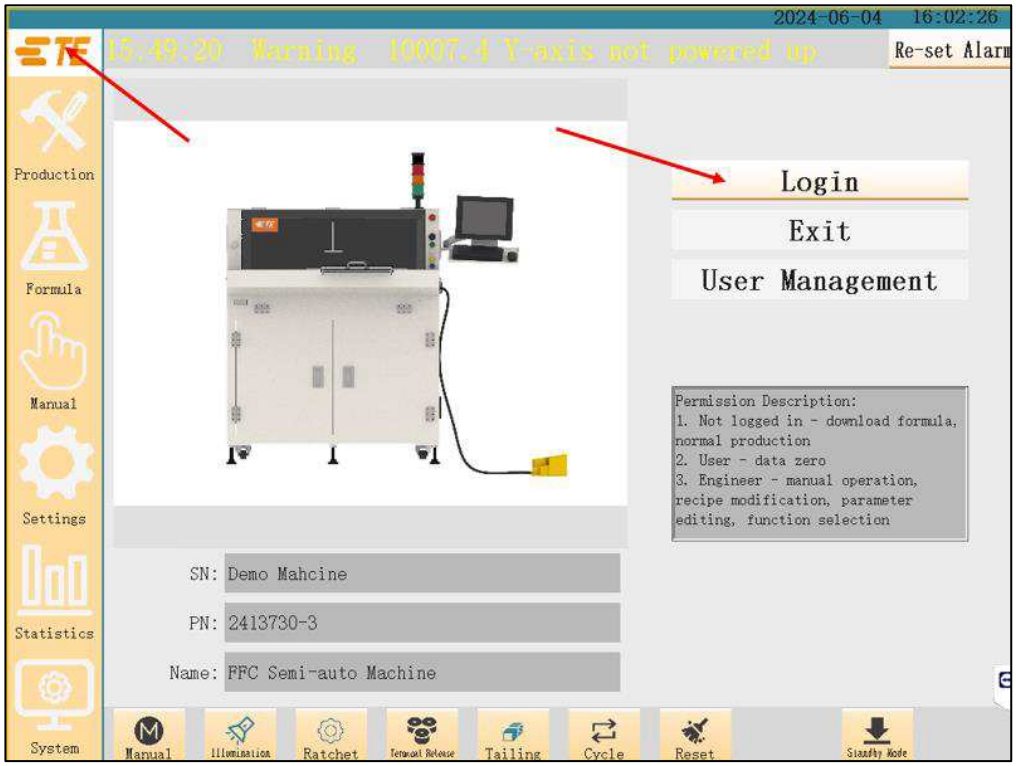
7.2.2 Login interface

Log in with the appropriate permissions in the account login interface.

Account: TE

Password: 267898

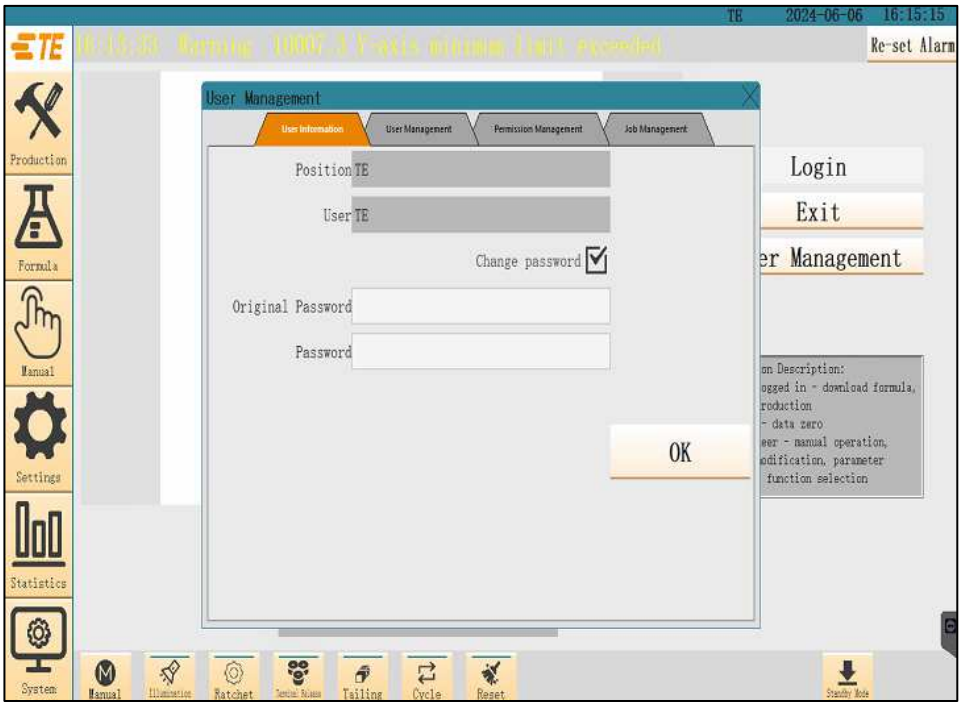
Figure 22: Login interface



Click on Login and enter your account and password to log in to the system.

7.2.3 User information

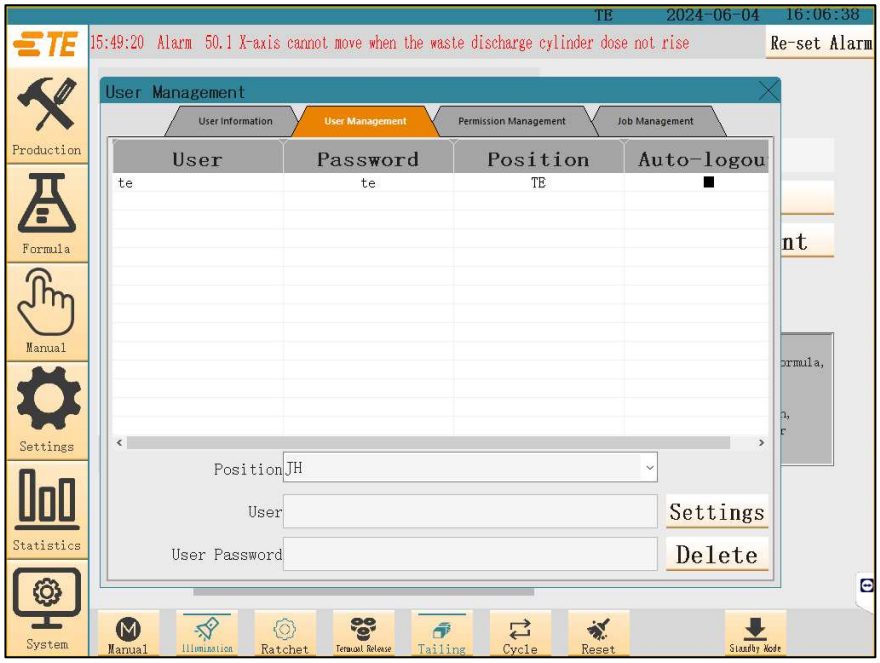
Figure 23: User information



Check √ Change Password, input the old password and new password in the input boxes displayed, and click on OK to finish.

7.2.4 User management

Figure 24: User management



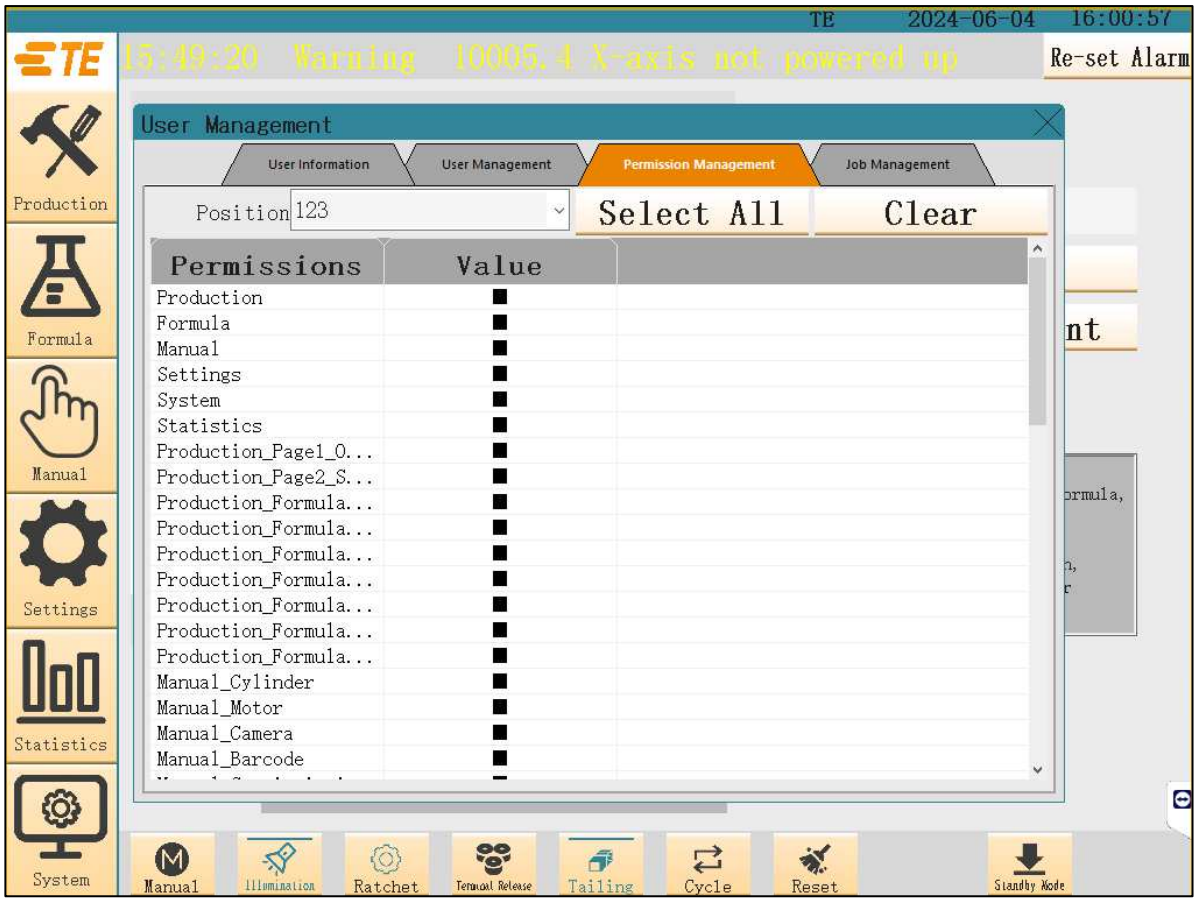
Post: the specified post level, e.g., Engineer, Operator, etc.

User: the login name.

Password: the login password.

7.2.5 Permission management

Figure 25: Permission management

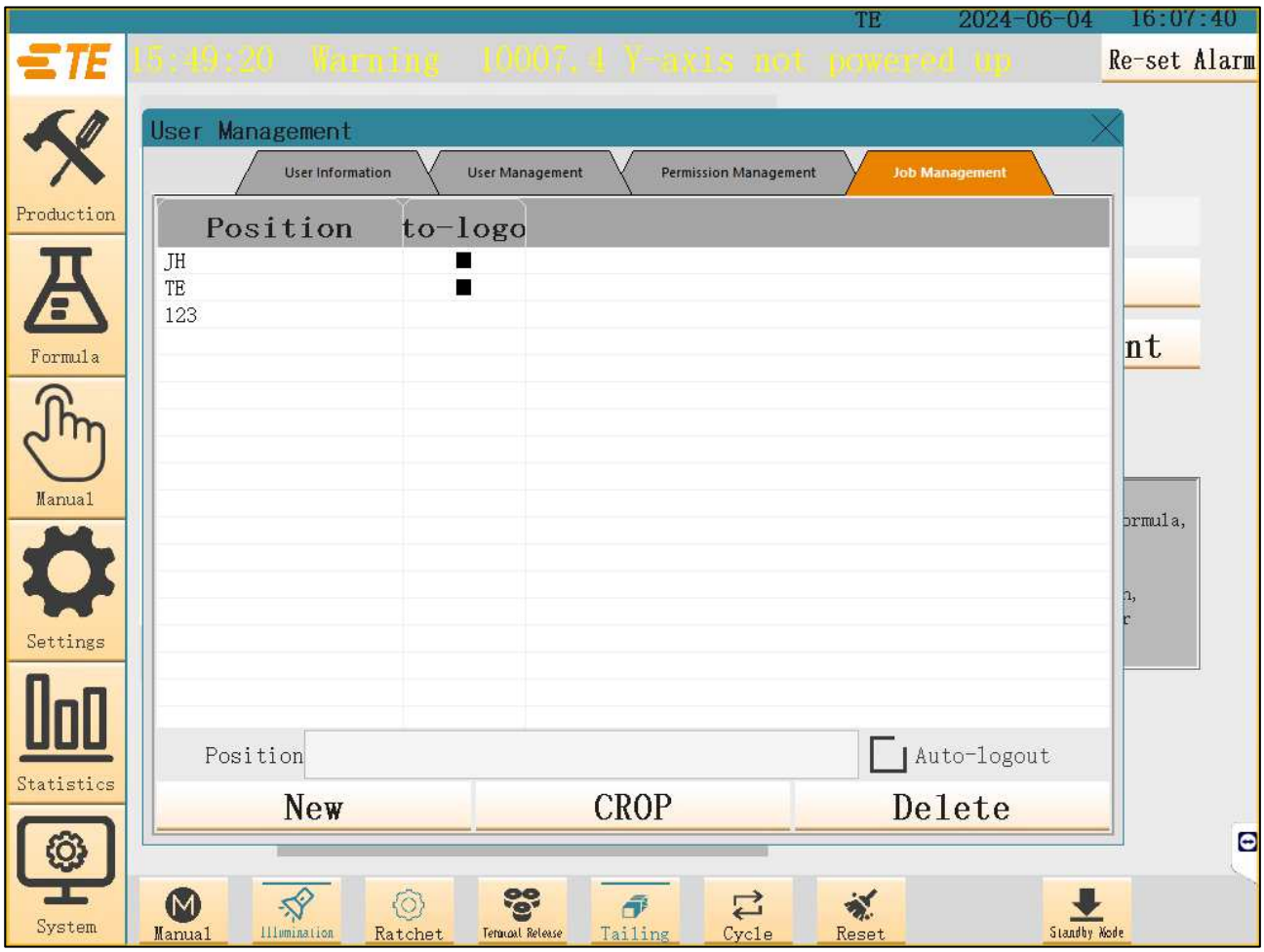


As shown in the Figure 25 above, you can select the post information from the post drop-down box, and the permissions and values below will show the current selection; the black square in the Value column indicates that the post has the permission.

Note: The higher level post has the permission to set the lower level post; if a post wants to use one of the permissions in the Settings page, this post must have the permission to set it.

7.2.6 Job Management

Figure 26: Job Management



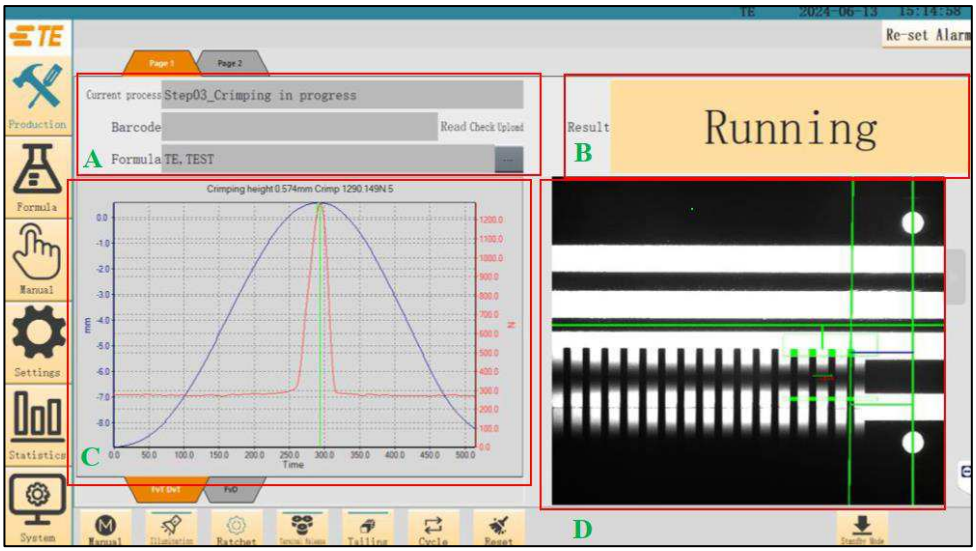
This interface allows you to create, edit and delete the settings of the related posts. If you want to set up automatic logout, you can check the "Auto Logout" check box.

7.3 Production interface

7.3.1 Page 1

Each part of the interface is shown in the Figure 27 below.

Figure 27: Page 1



A: Program running status and formula selection.

B: Test result.

C: FVD curve.

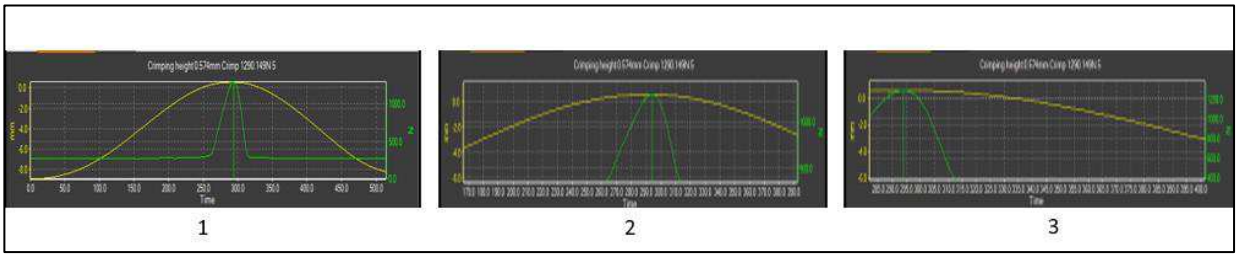
D: Image real-time display.

Curve Zoom Out: Press and hold the left mouse button, and slide from right to left.

Curve Zoom in: Press and hold the left mouse button, and slide from left to right.

Curve Move: Press and hold the right mouse button and drag the curve.

Figure 28: Curves

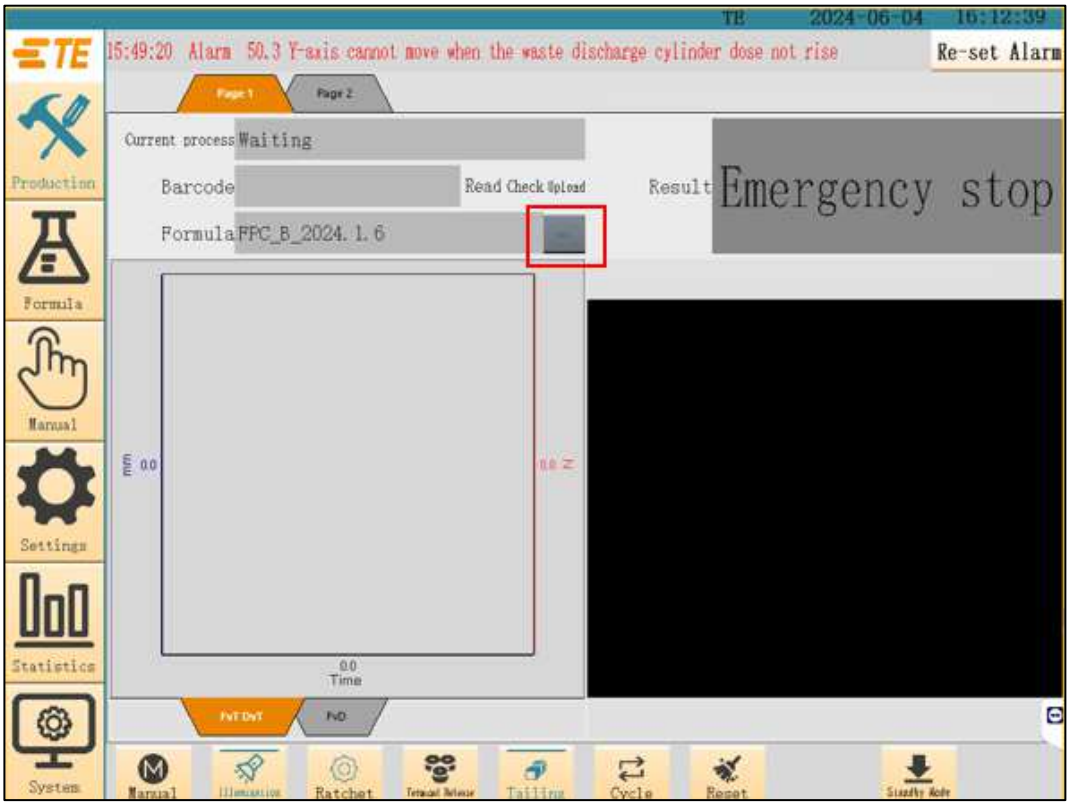


1 Curve Zoom Out

2 Curve Zoom In

3 Curve Move

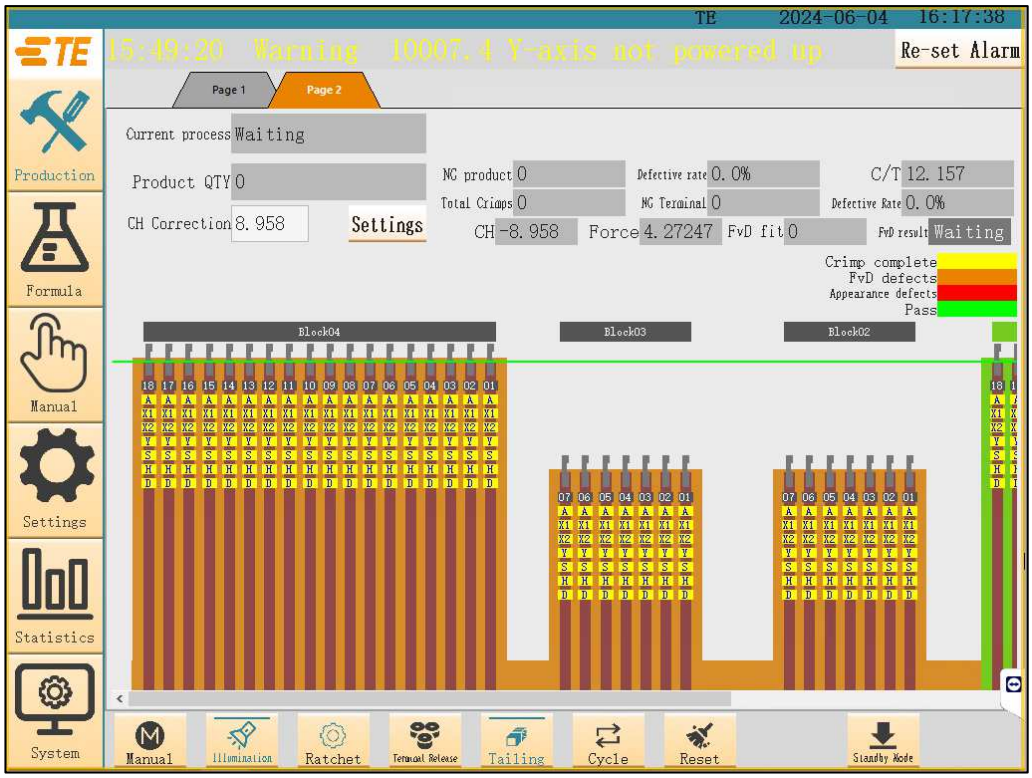
Figure 29: Formula button



You need to select a formula, so click on the Formula button.

7.3.2 Page 2

Figure 30: Page 2



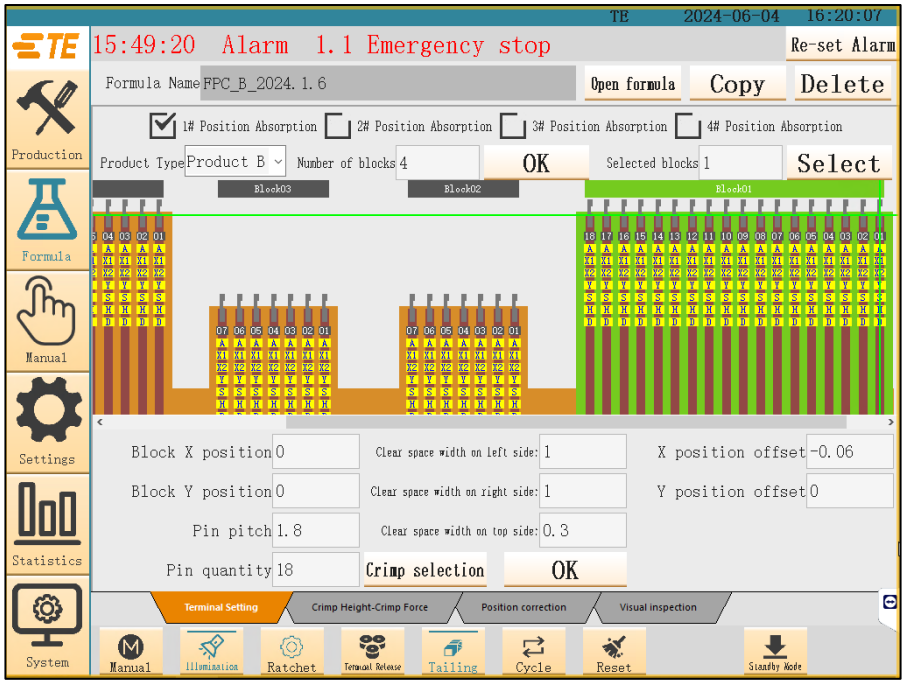
7.4 Formula interface

The following parameters need to be set when the camera is used for the first time or when the camera is replaced. After the settings are completed, the default can be selected for Formal Production.

7.4.1 Set up of the terminal

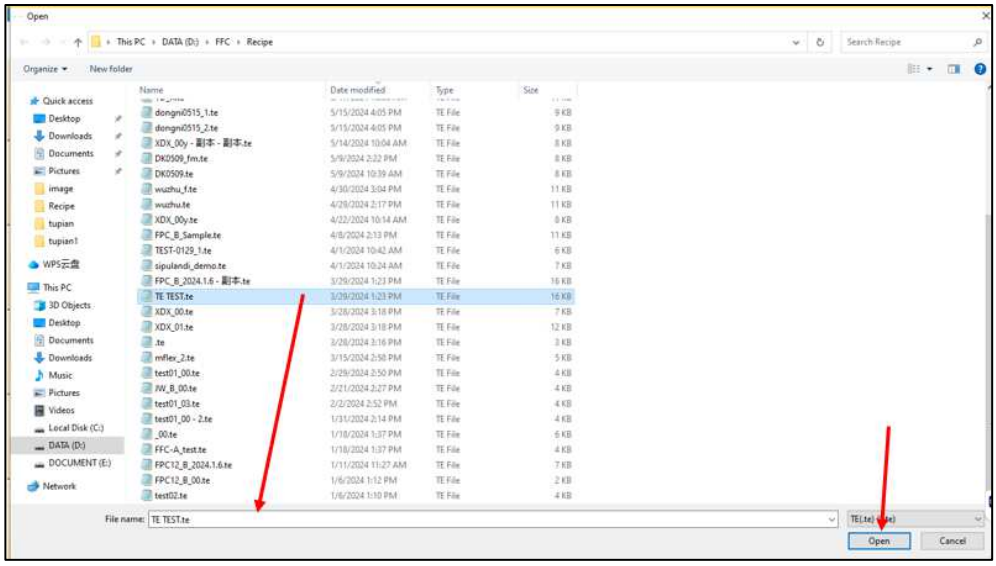
Camera gain and exposure time should be adjusted according to the sharpness of the object presented in the camera.

Figure 31: Set up of the terminal



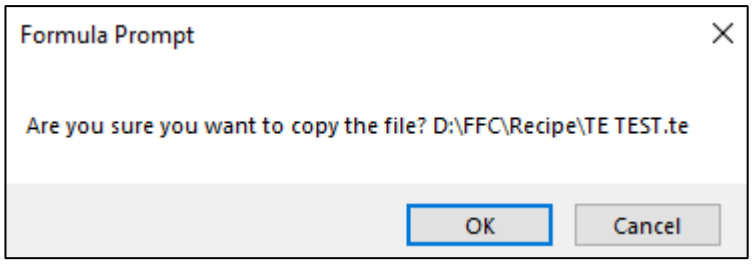
[Open Formula]: Select the formula required and click to open it.

Figure 32: Copy



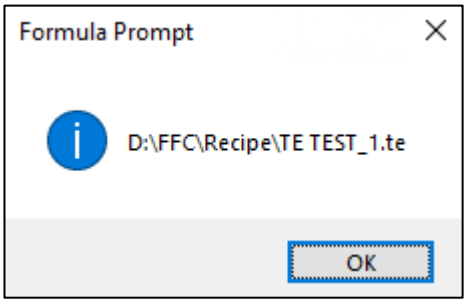
[Copy]: After clicking on the Copy button, a pop-up box will appear; if you need to copy, click on OK.

Figure 33: Formula prompt



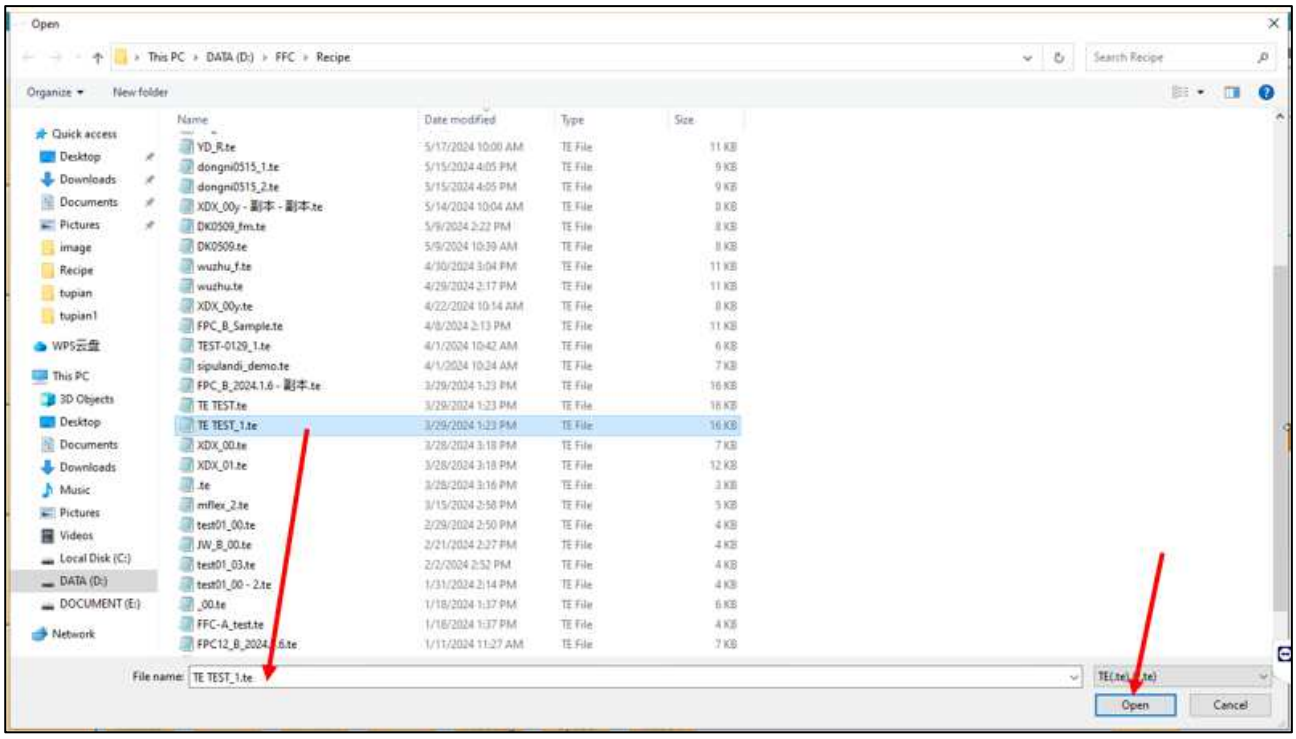
The copied formula will have the serial number added at the end of the formula. Click on OK and the formula copy is completed.

Figure 34: Formula prompt



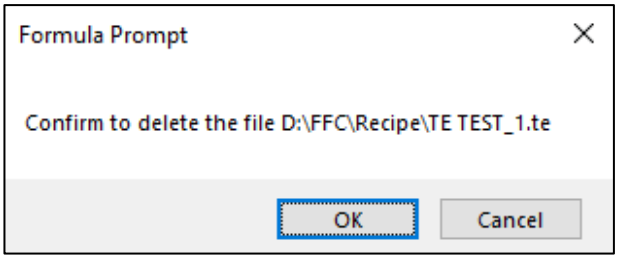
[Delete Formula]: Select the formula to be deleted and click to delete it.

Figure 35:Deleting Formula



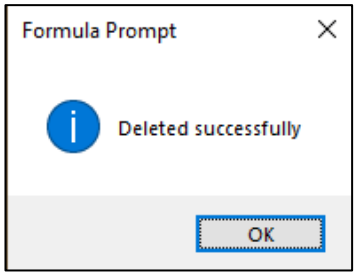
A pop-up box will appear; if you need to delete, click on OK.

Figure 36: Formula prompt



Continue to click on OK and the formula will be deleted successfully.

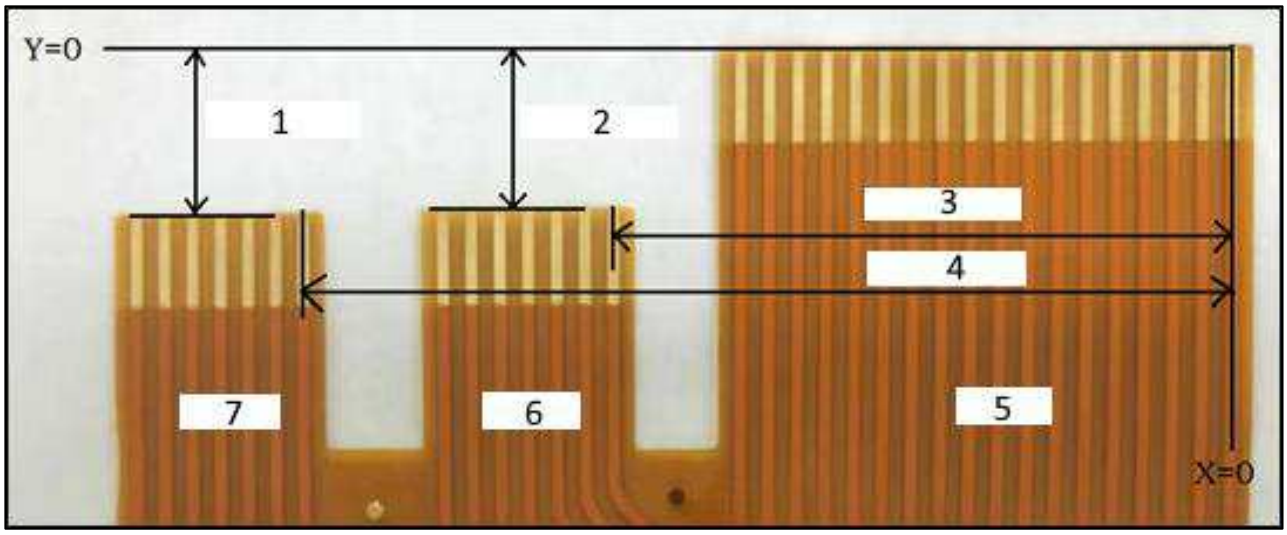
Figure 37: Formula prompt



[Block X Position]: The centerline of the first copper tape to the right of the first block is the 0 coordinate in the X direction, and the X position of the other blocks is noted as the distance between the centerline of the first copper tape to the right and the 0 coordinate.

[Block Y Position]: The upper edge of the copper tape in the block with the highest height is the 0 coordinate in the Y direction, and the Y position of the other blocks is noted as the distance between the upper edge of the tape and the 0 coordinate.

Figure 38: Position of Blocks



1 Y position of Block 3
2 Y position of Block 2
3 X position of Block 2
4 X position of Block 3
5 Block 1
6 Block 2
7 Block 3

[Copper Pitch]: Pitch of copper tape in this block.

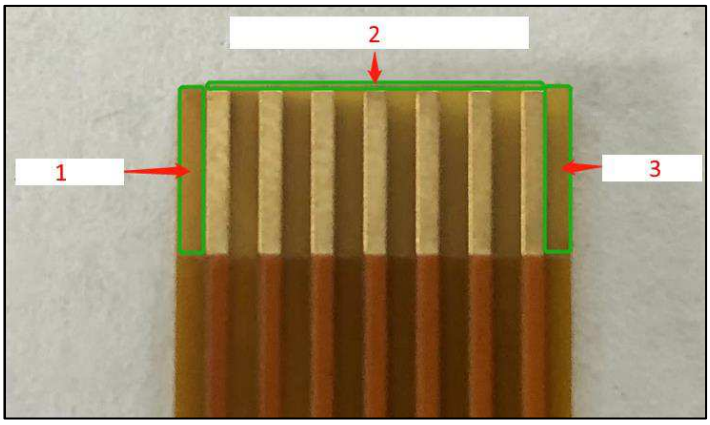
[Quantity of Copper Tapes]: Quantity of copper tapes in this block.

[Clear Space Width on Left Side]: The distance between the left edge of the block's Foil and the left edge of the leftmost copper tape.

[Clear Space Width on Right Side]: The distance between the right edge of the block's Foil and the right edge of the rightmost copper tape.

[Clear Space Width on Top Side]: The distance between the upper edge of the block's Foil and the upper edge of the copper tape.

Figure 39: Clear Space



1 Clear space on left side

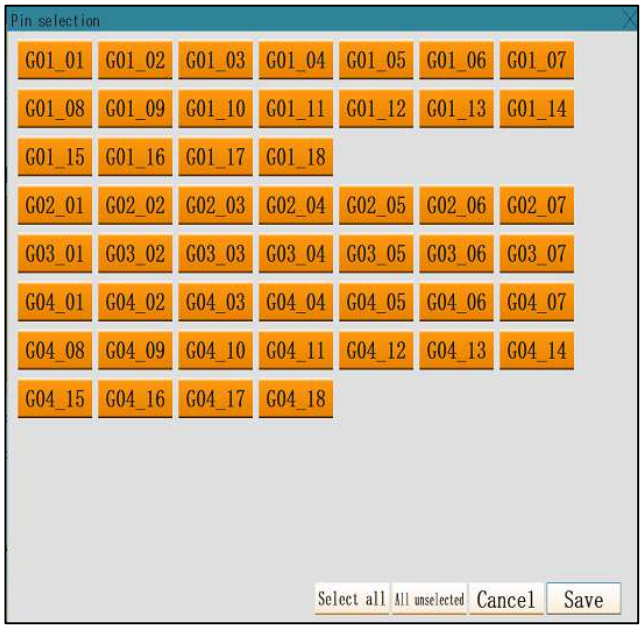
2 Clear space on top side

3 Clear space on right side

[OK]: After input for each block, click on OK, otherwise the change will not take effect.

[Crimping Selection]: Click on Crimping Selection to select the copper tape that needs to be crimped to the terminal. The default setting is Select All. Orange means selected (crimping is required) and gray means unselected. Click on Save when the settings are complete.

Figure 40: Pin selection



7.4.2 Crimping height and crimping force

Crimping height and crimping height tolerance are set according to the actual requirements.

Crimping height: the height for terminal crimping.

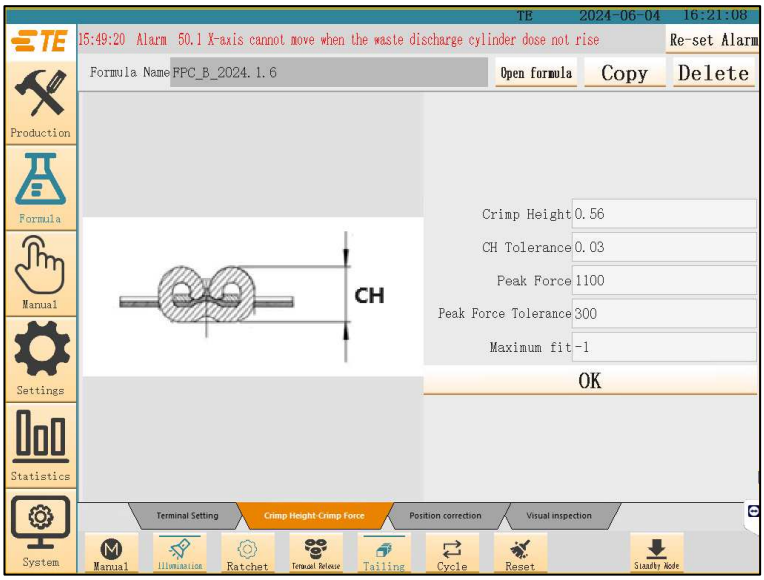
Crimping height tolerance: the range of plus or minus error of crimping height.

Maximum crimping force: maximum pressure to crimp the terminal.

Press-fit force tolerance: the range of plus or minus error of crimping force.

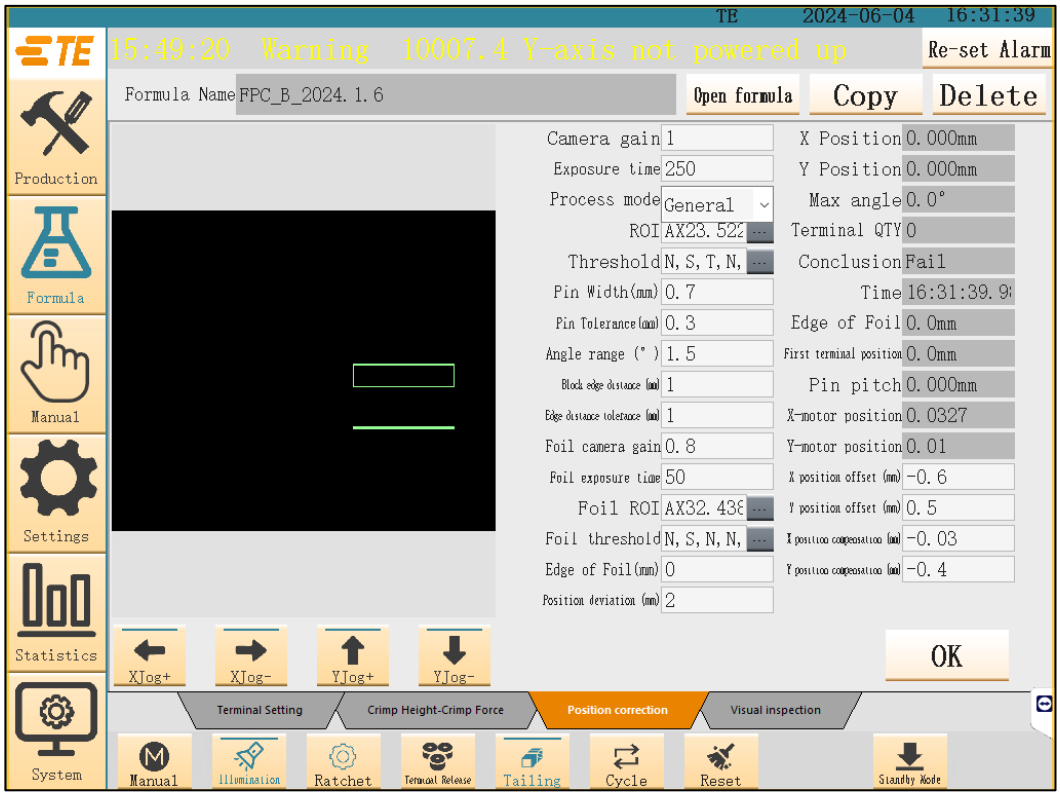
Maximum fit: -1 by default, i.e. the number of acquisition cycles allowed in which the crimping force must also be maximum when the crimping height is maximum.

Figure 41: Crimping height and crimping force



7.4.3 Position correction

Figure 42: Position correction



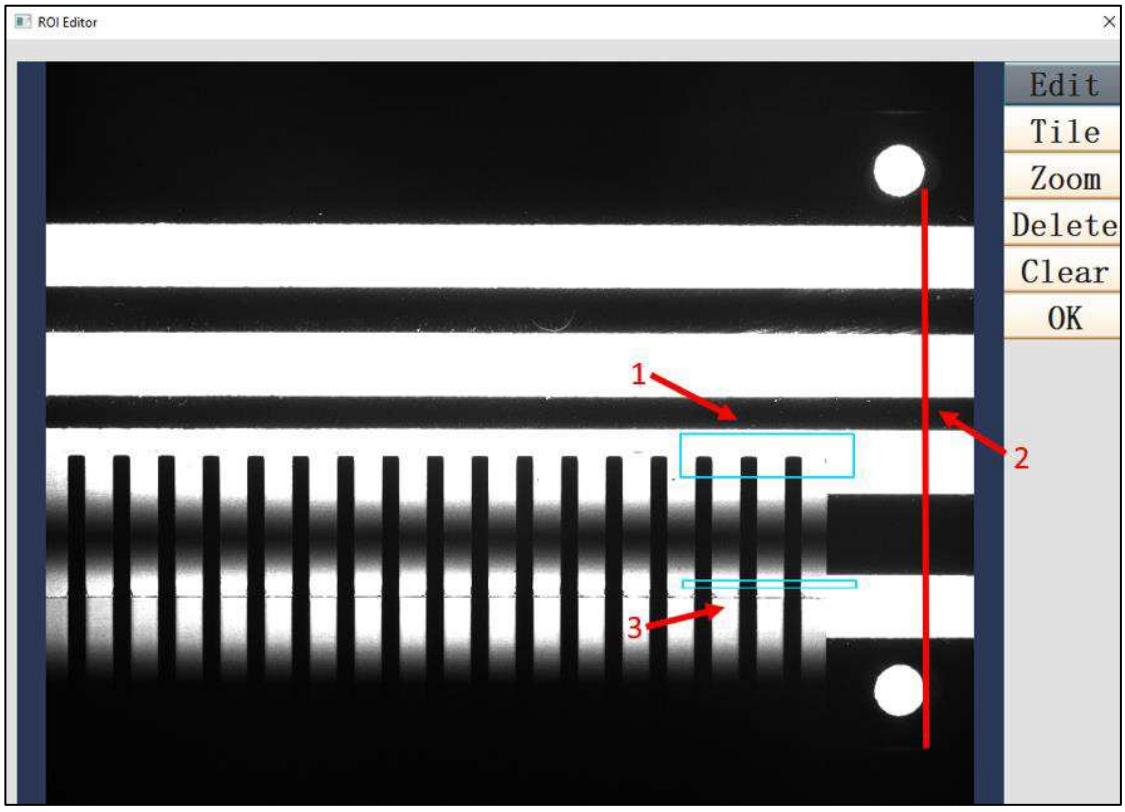
[Camera Gain]: recommended value of 0.7

[Exposure Time]: ranging from 0 to 15000

[Processing Mode]: General by default, not required to select

[ROI]: Select the copper tape, and two boxes are required

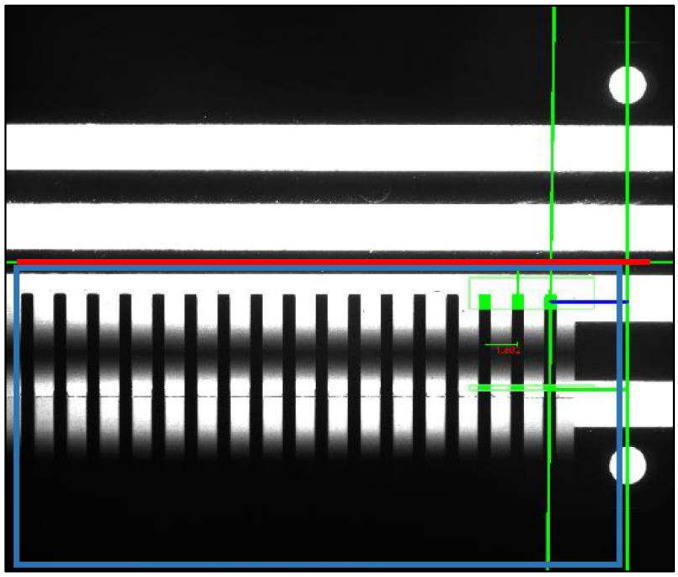
Figure 43: Positioning



1	The (lower) top side of the box should be as close to the black bar as possible, while leaving a distance from the top (lower) edge so that it does not overlap the black bar.
2	The right sides of all boxes should not exceed the red line.
3	Choose the position where the change in the copper strip occurs, if the copper has a change in width.

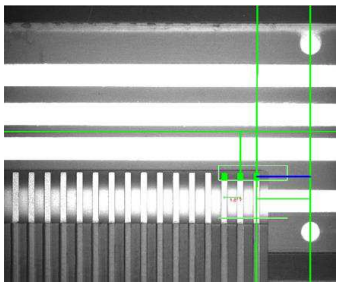
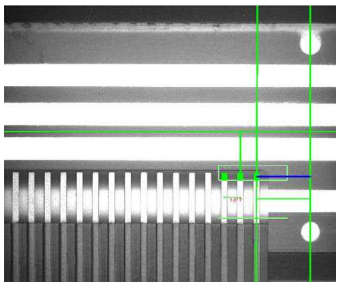
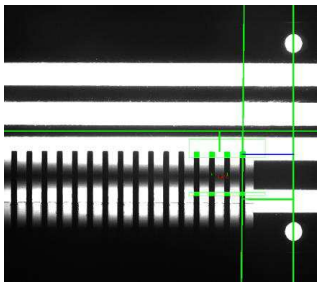
When positioning the Foil, after it has been mechanically clipped, it is necessary to ensure that the Foil is in the third quadrant (in the blue box below) and that the top edge does not extend beyond the edge of the black bar below the red line, and that the right edge does not extend beyond the green axis.

Figure 44: Positioning



Suggestions for several typical Foil placement areas are listed in the Table 21 below:

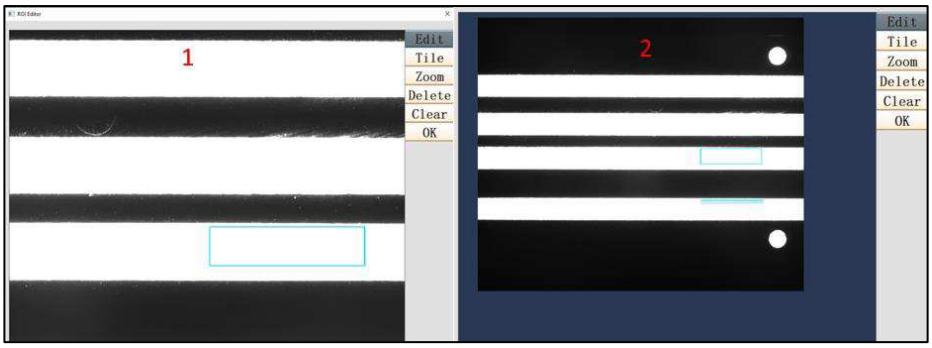
Table 21: Foil placement areas

	FFC	FPC front side	FPC back side
Foil top (Blue box)			
Text description	For light colored copper foils, place the top of the Foil in the black bar area to increase the contrast.	For light colored copper foils, place the top of the Foil in the black bar area to increase the contrast.	For dark colored copper foils, place the top of the Foil in the white bar area to increase the contrast.

Click on the selection button of ROI to select the target detection area.

- Tile: The image can be zoomed in.
- Indent: The image can be zoomed out.

Figure 45: target detection area

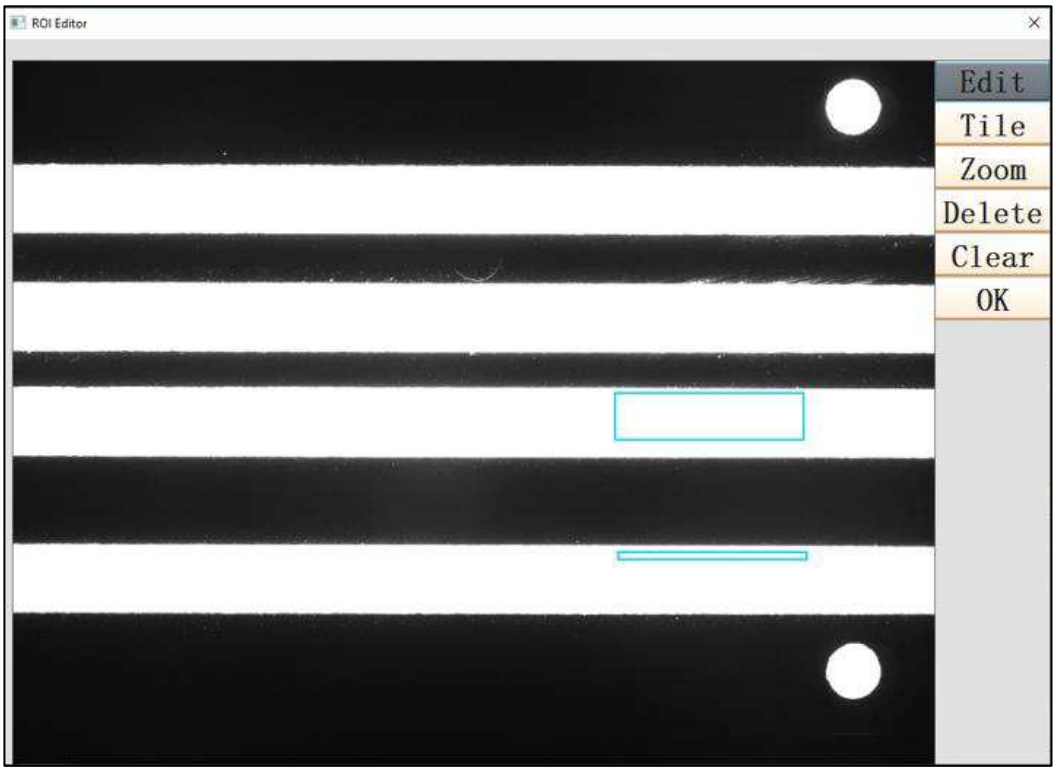


1 Tiling Effect

2 Indenting effect

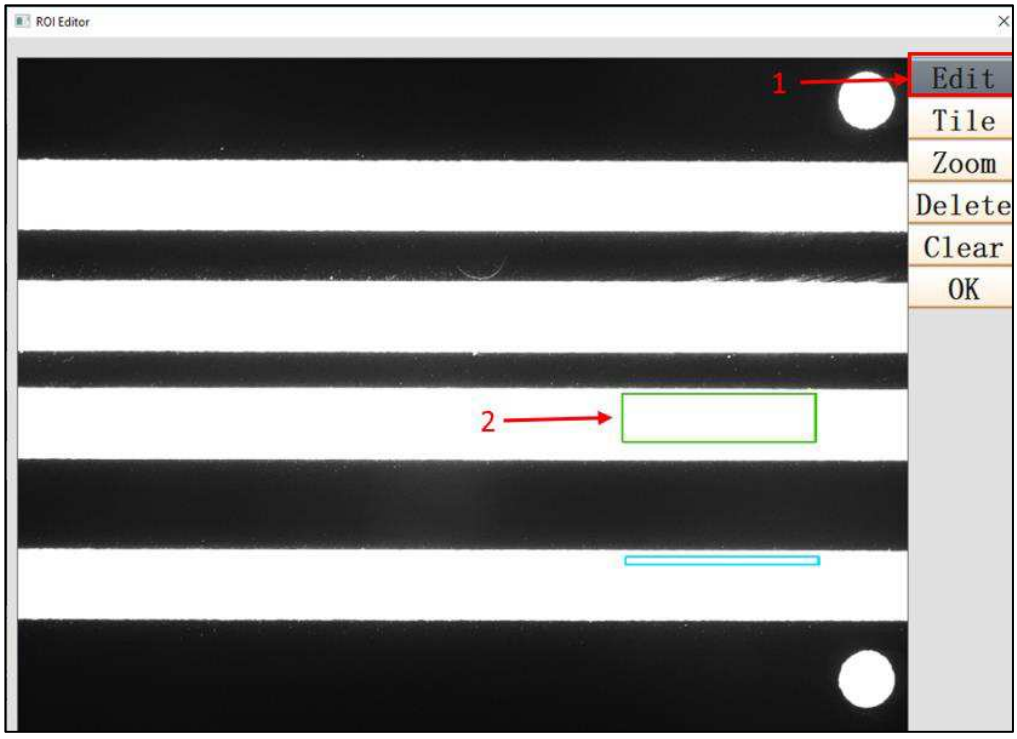
- Edit: After clicking on the Edit button, you can select the detection area.

Figure 46: ROI Editor



- Delete: To delete a certain area, click on the blue box, and after the blue box becomes green, click on the Delete button to delete the selected area. In the editing state, the blue box cannot be selected and you need to turn off editing by clicking on the Edit button.

Figure 47: Delete option



1 When deleting, editing must be turned off.

2 When the blue box turns green, it is selected and can be deleted.

- Clear: Click on the Clear button to delete all the box-selected areas.
- Zoom In/Out Image: In the ROI selection dialog box, zoom in or out the image with the mouse wheel.
- Move Image: In the ROI selection dialog box, press and hold the right mouse button to drag the image.

[Threshold]:

There are four algorithms for visual processing: Ots, Tri, MEAN and GAUSS. The default algorithm is Ots and you need to turn on this algorithm button.

- Result: Click on the Result button to switch from the actual photo image to the result processed by the algorithm.
- Invert: The vision software internally processes the image when the target image is white; if the target image is black, click on the Invert button to switch.
- Max: Take the maximum value of the pixel value.
- Min: Take the minimum value of the pixel value.
- Brightness: The camera brightness value.
- Contrast: The contrast of the image.
- Kernel: The kernel of morphological processing method. The kernel can only be odd, and even numbers can be displayed above it, with program making upward processing for odd number. Morphological Operations: Erosion, expansion, open operation, closed operation, gradient, top hat, black hat. Please learn the basics of morphological operations on your own.
- List View: The list view displays the area of the selected block for image processing. If selected, the image view displays the area of the selected block and the color changes.

Figure 48: Image view

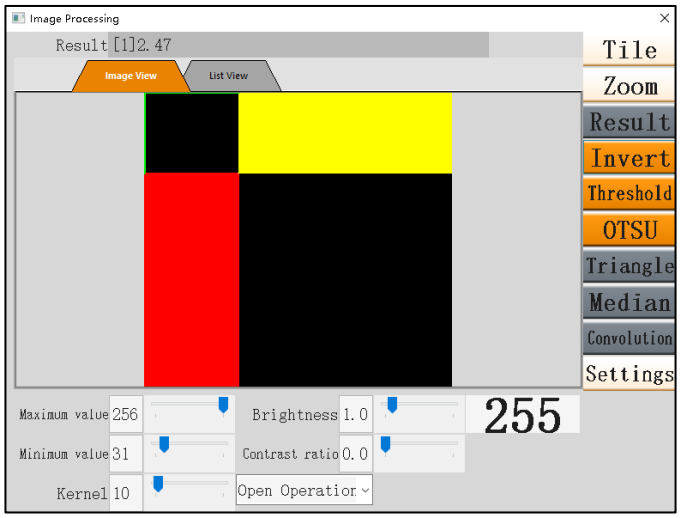
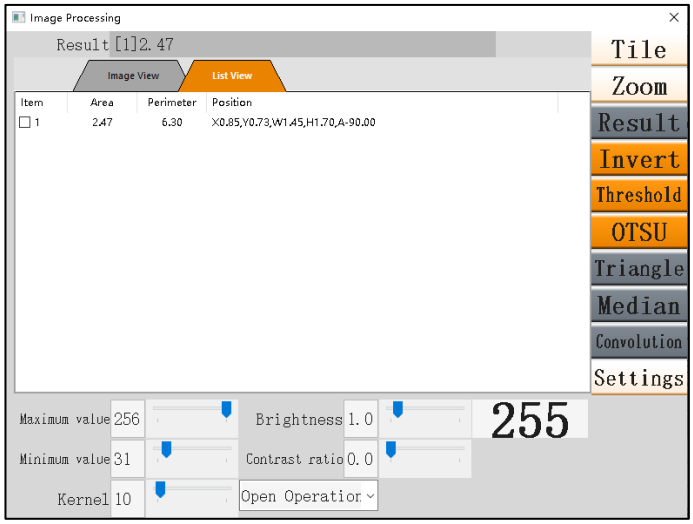


Figure 49: List view



[Copper Tape Width]: Set according to the product

[Copper Tape Error]: Set according to the product

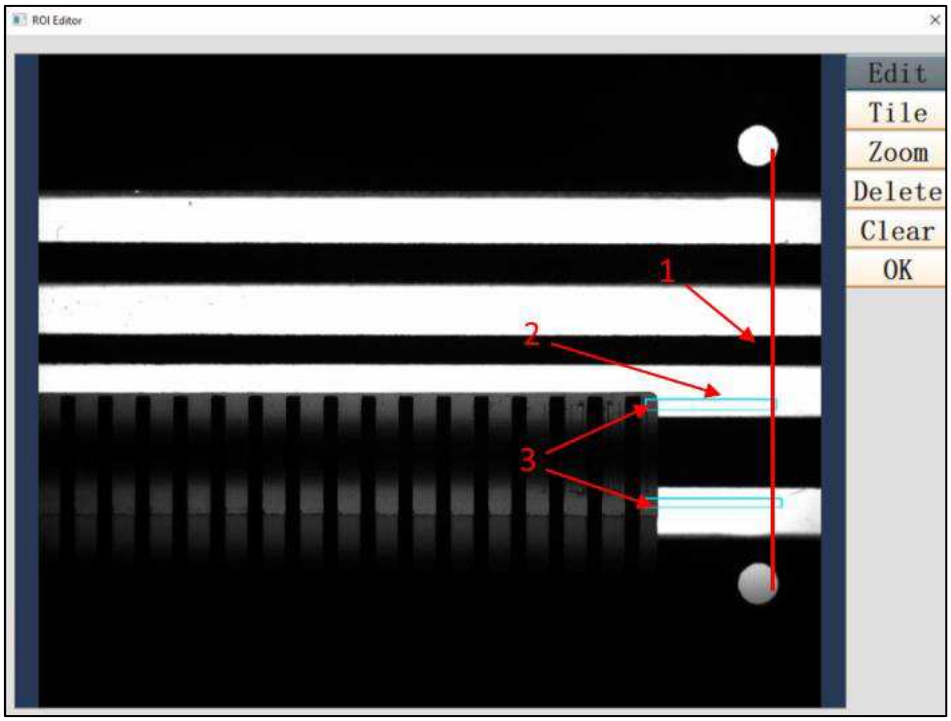
[Angle Range]: Set according to the product

[Substrate Camera Gain]: Recommended value of 0.3

[Substrate Exposure Time]: Ranging from 0 to 15000

[Substrate ROI]: To select the substrate, you can use 1 box (such as FFC products) or 2 boxes (such as FPC products)

Figure 50: Substrate ROI



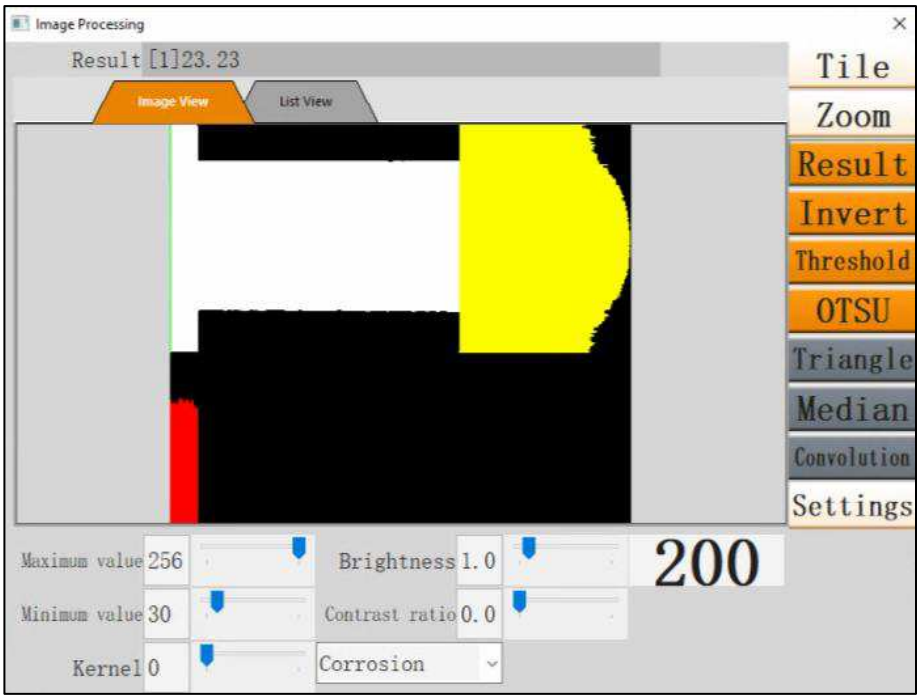
1 The right sides of the boxes should extend beyond the red line.

2 The boxes can only be within the white bar area

3 The Foil must be contained from the left sides

[Substrate Threshold]:

Figure 51: Substrate Threshold



[Positional Deviation]: 1 mm by default. Deviations < 1mm (including negative values) are allowed. If the deviation is > 1 mm, an error will be reported, the Foil will be exited and a repositioning will be requested.

Figure 52: Positional Deviation

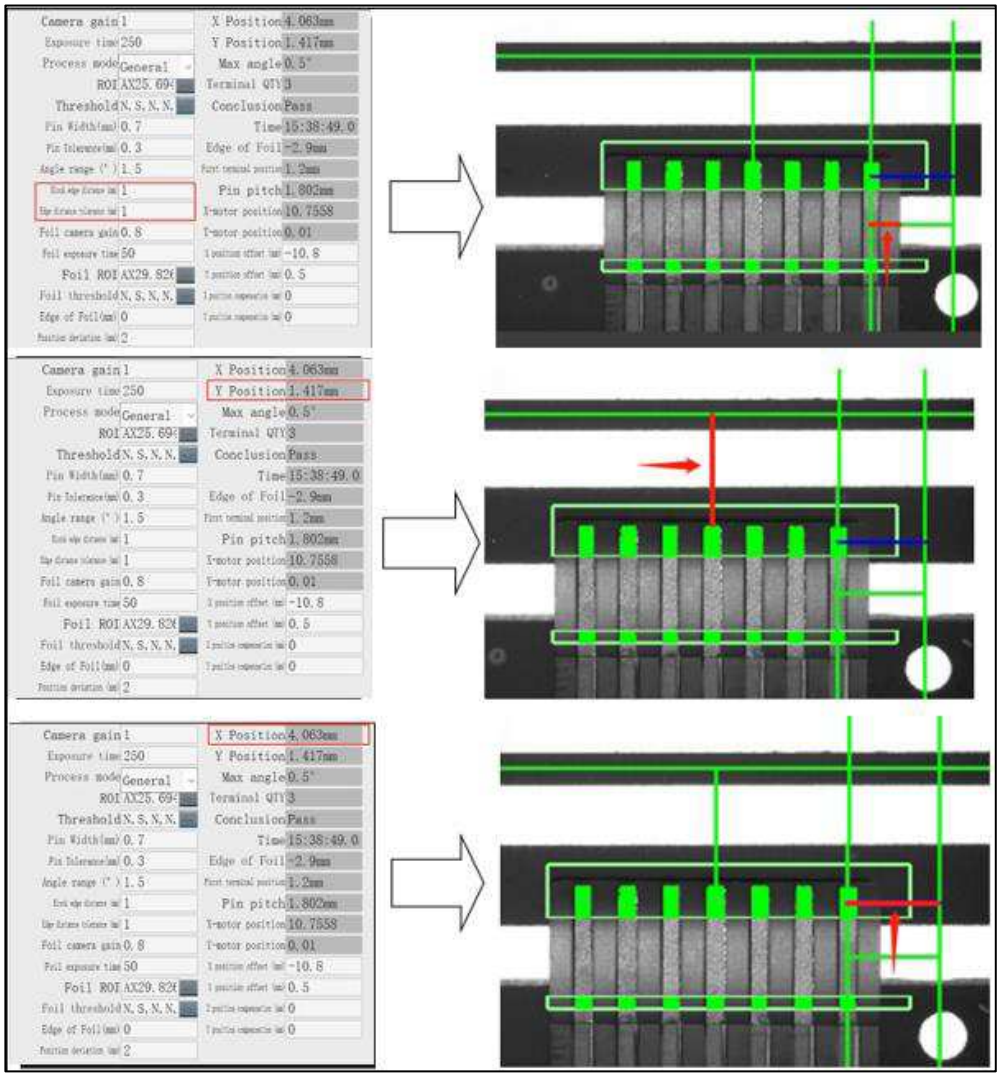
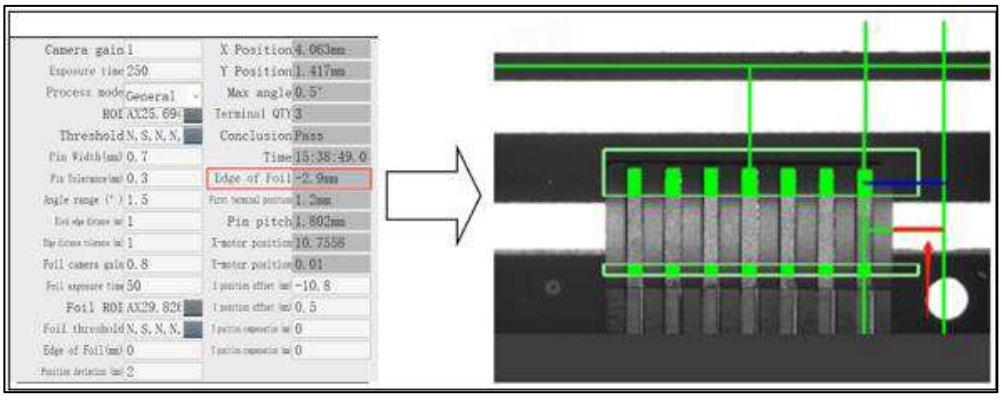


Figure 53: Positional Deviation



7.4.4 Visual inspection

Visual inspection contains multiple inspection items. Each inspection item can be set and enabled separately. Since the inspection points used in multiple inspection items are duplicated, the parameters can be quickly set by using the Copy and Paste buttons on different interfaces.

1. *Angle inspection*

Angle inspection acquires the value of the angle of the terminal to the copper tape after crimping. It detects the angle formed by the straight line joining the center point of P1 and the center point of P2 with the center line of Copper Tape C.

Figure 54: Angle inspection

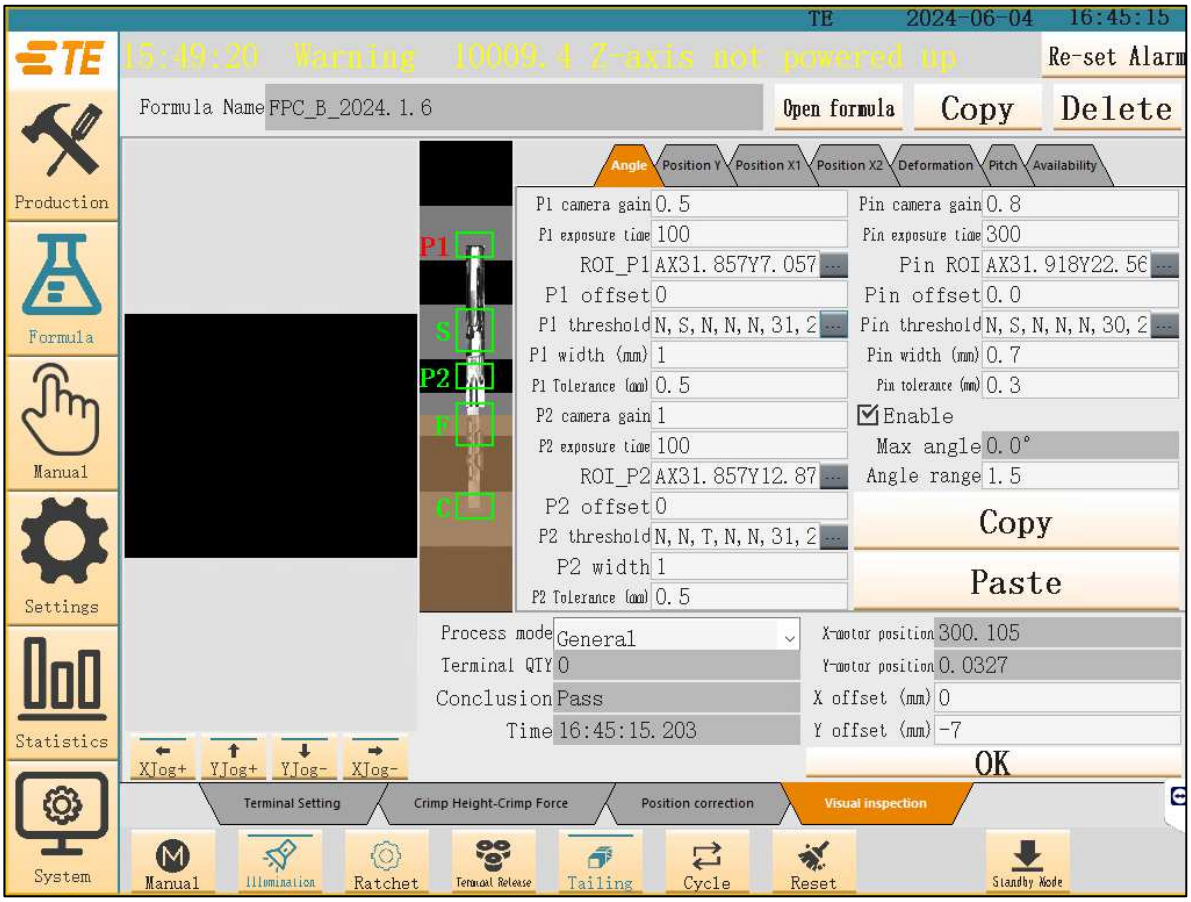
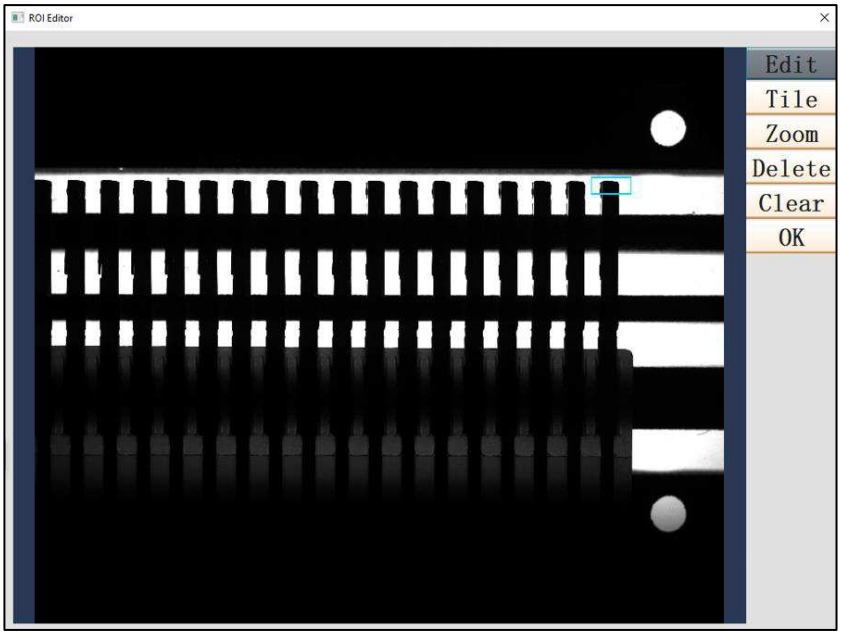
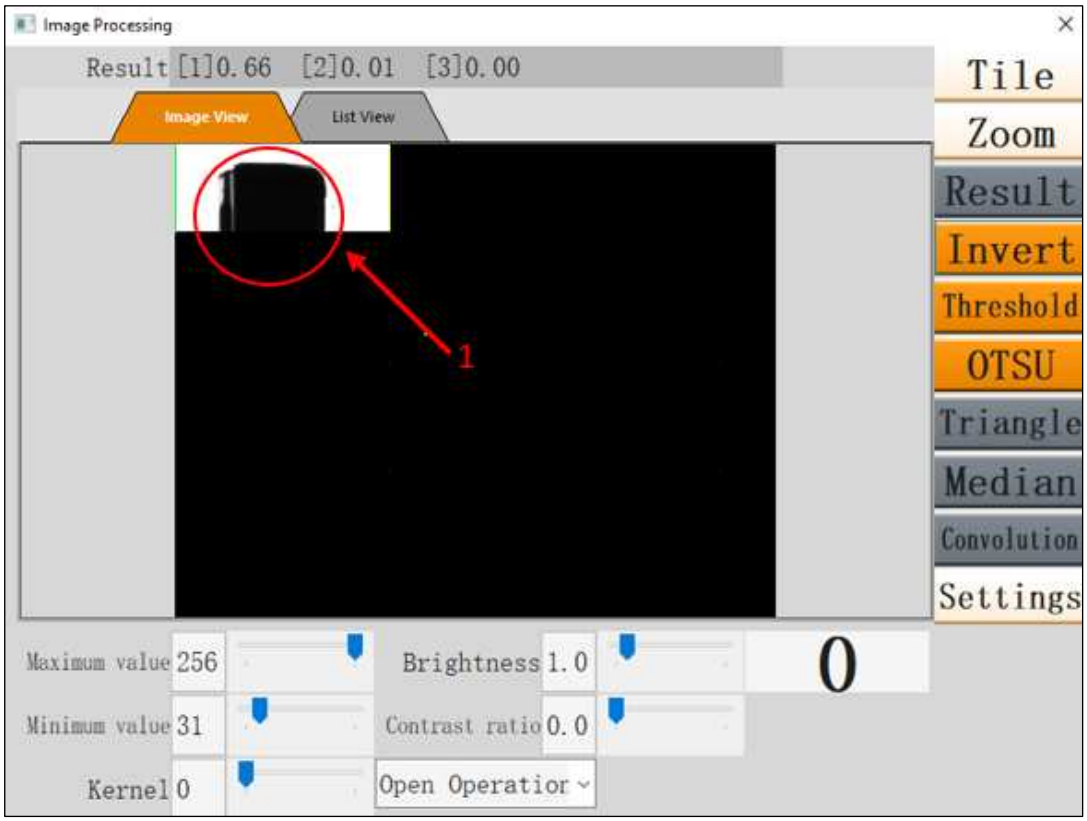


Figure 55: ROI selection for P1.D



The Figure 55 above shows a sample of ROI selection for P1.D.

Figure 56: sample P1 threshold setting



1 This piece is considered to be the overall width of what is detected.

Above is a sample P1 threshold setting. The white area in the above image forms a piece that is set as a block.

2. Position Y inspection

Position Y inspection takes the length of the substrate exposed after crimping the terminals to ensure that the terminals and substrates have enough contact surface. The principle is to take the value of the distance between the P1 and the upper edge of the substrate.

Figure 57: Position Y inspection

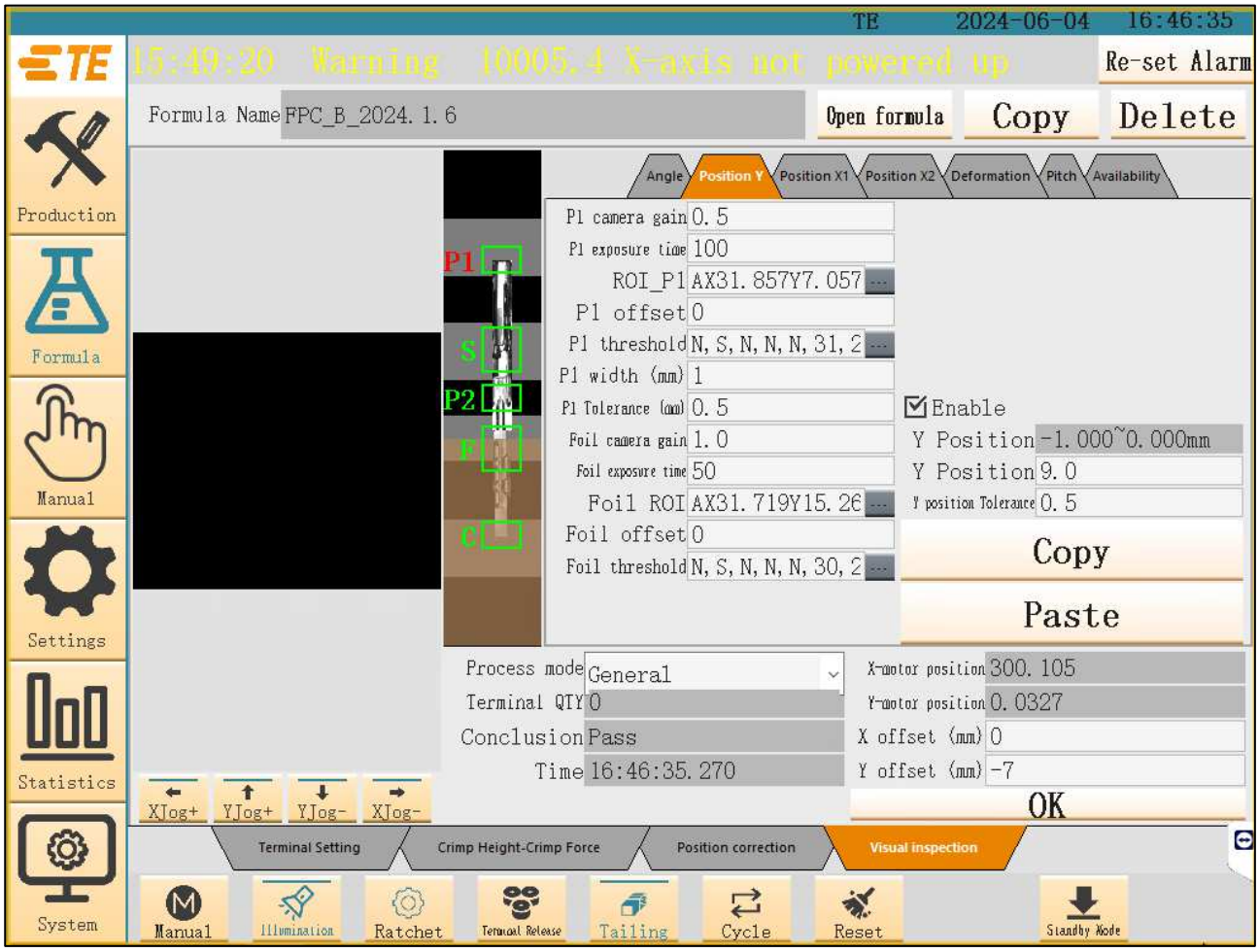
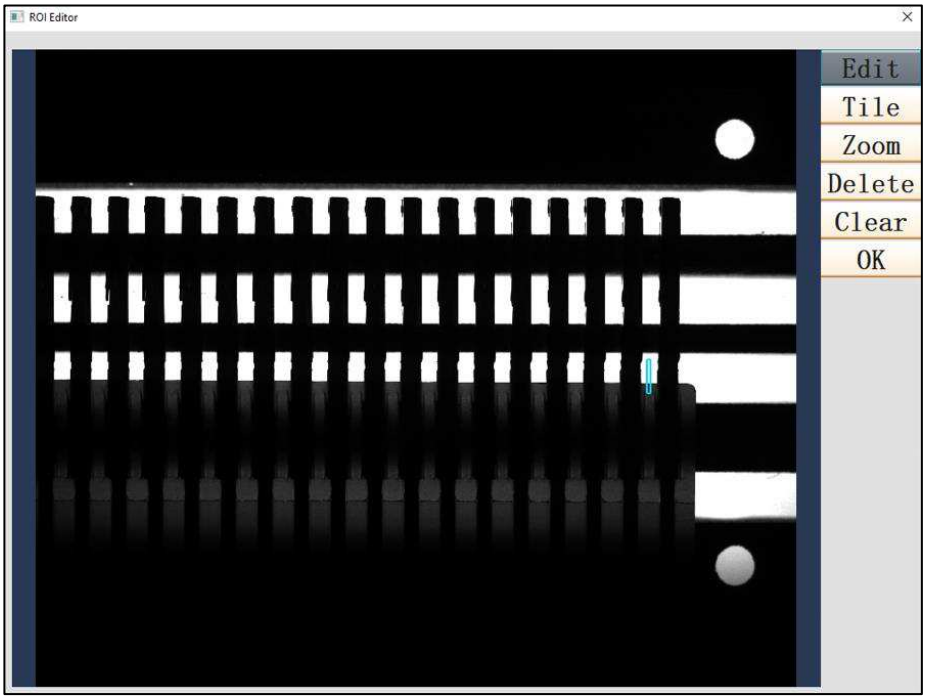
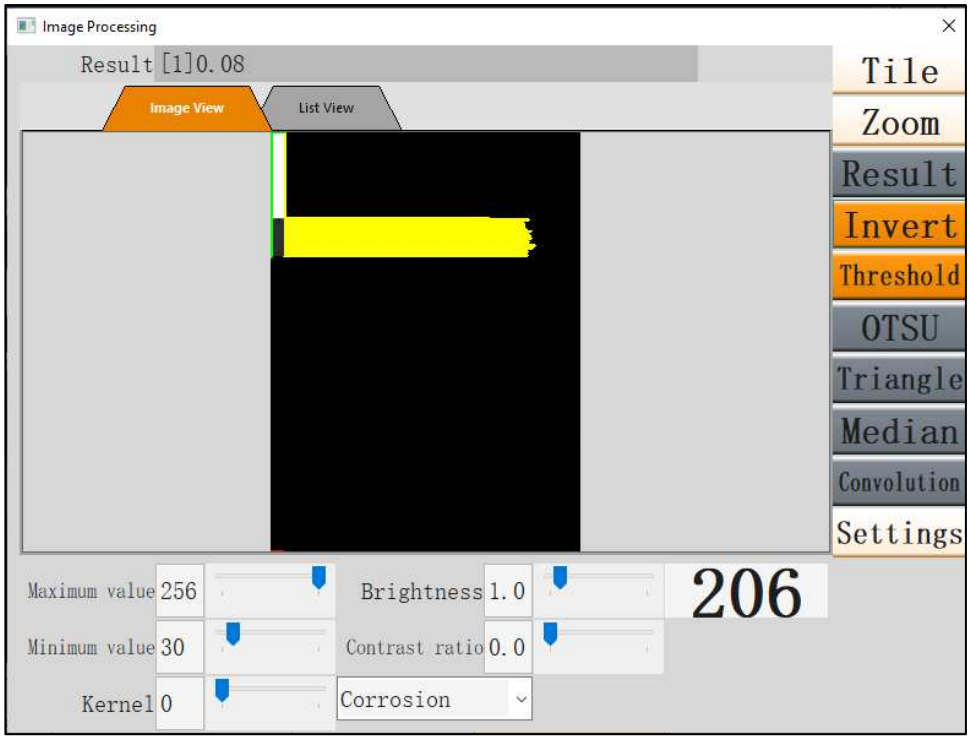


Figure 58: sample of substrate position ROI selection



The Figure 58 above is a sample of substrate position ROI selection.

Figure 59: substrate threshold setting

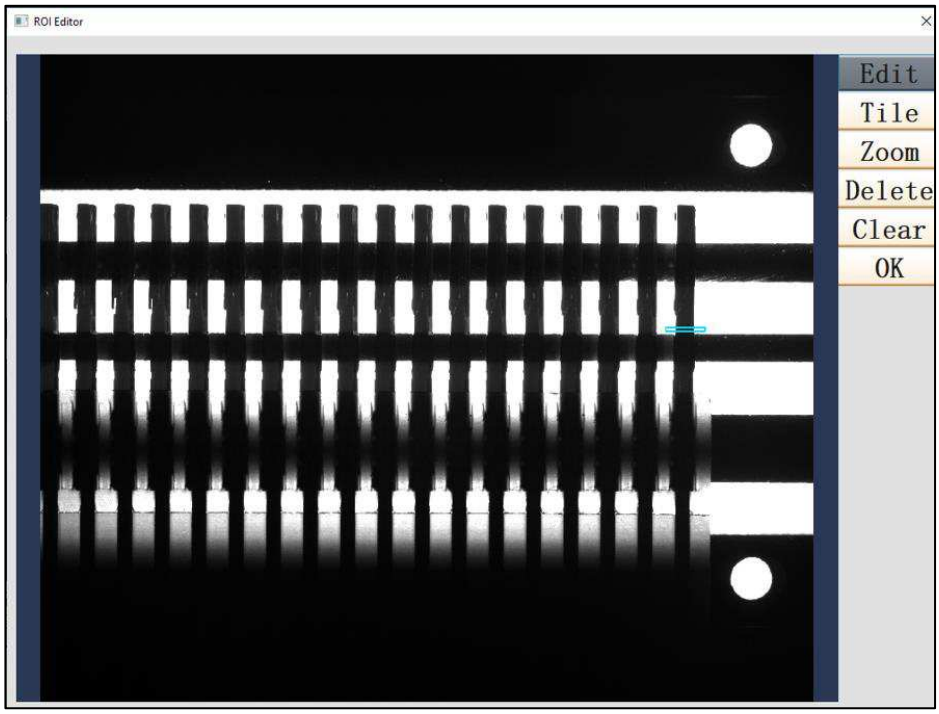


The Figure 59 above is a sample of substrate threshold setting.

3. X1/X2 position inspection

It checks whether the terminal coincides with the pin position of the substrate. It checks the X1 position or X2 position to detect the value of concentric deviation between the center of the terminal head/middle and the center of the copper tape.

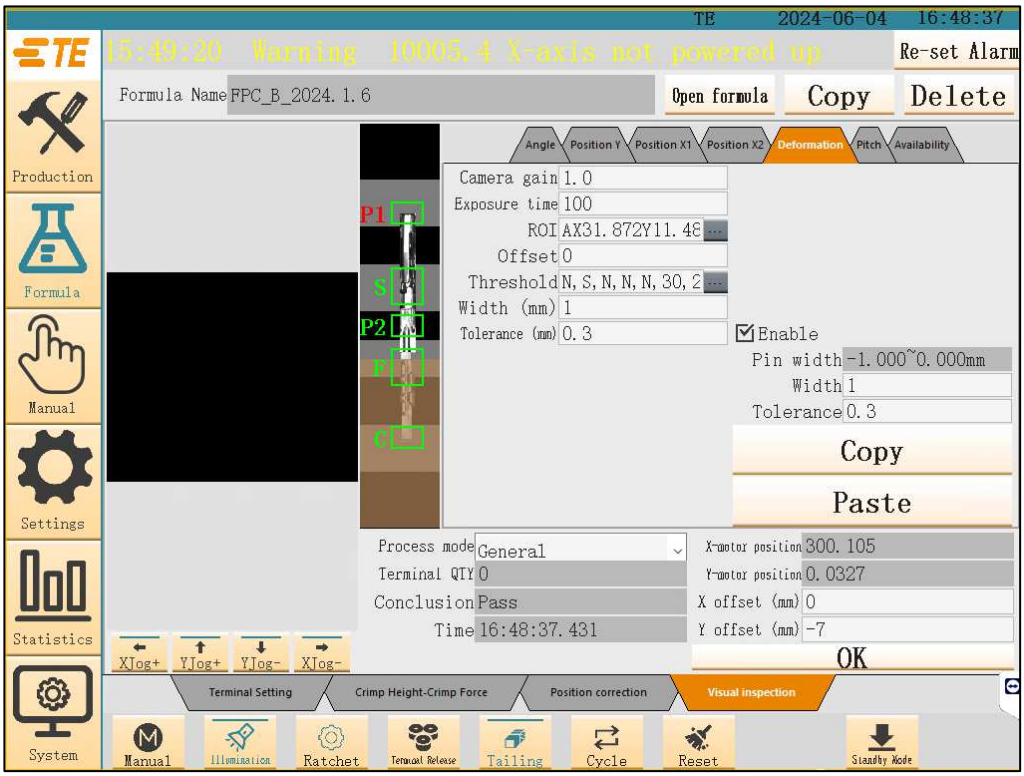
Figure 60: X1/X2 position inspection



4. Deformation inspection

It checks whether the terminals are twisted or deformed. The principle is to check whether the width of the S position is within the set inspection range.

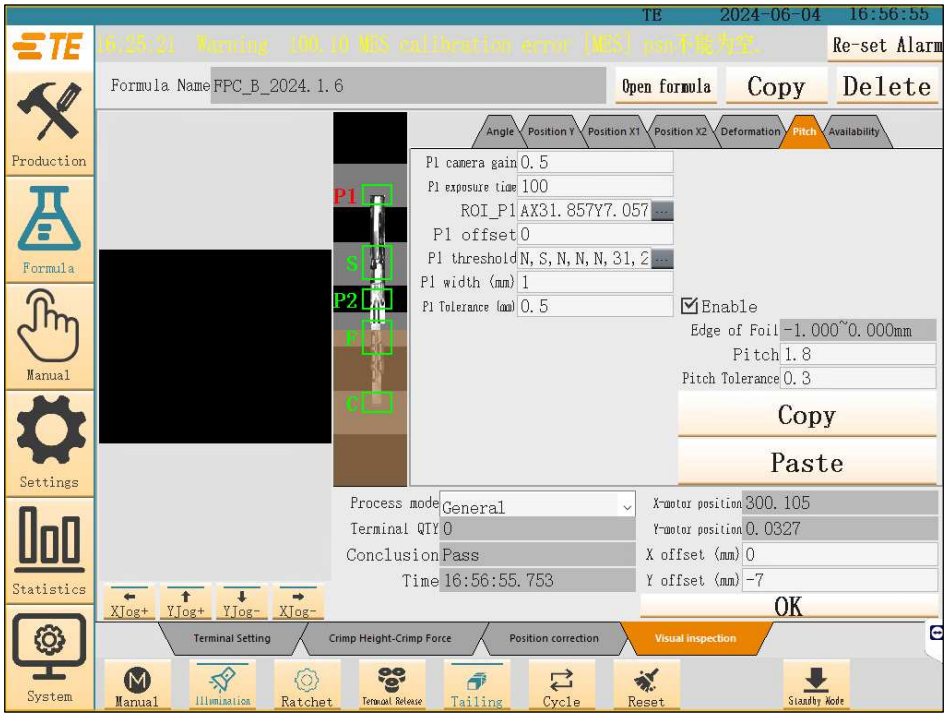
Figure 61: Deformation inspection



5. Pitch inspection,

It checks whether the spacing between the terminals complies with the formula. The principle is to check the distance value between the center of the P1 point of each terminal and the P1 point of the previous terminal. In addition, the distance value between the first terminal of each block on the substrate and the previous terminal is always 0.

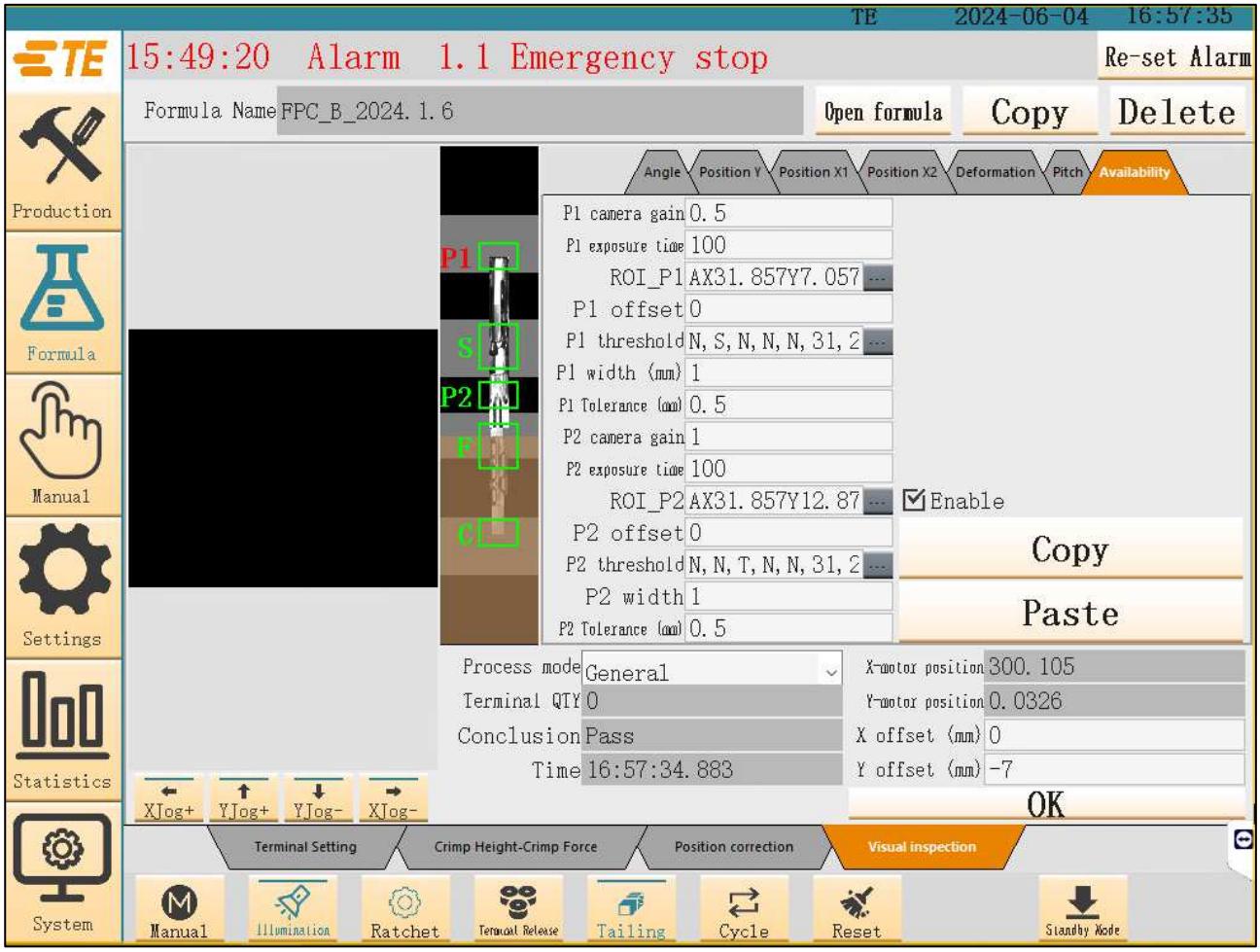
Figure 62: Pitch inspection



6. Terminal presence or absence

The presence or absence of a terminal is determined by detecting whether the head of the terminal and the center of the terminal are present at the same time.

Figure 63: Terminal presence or absence



7.5 Manual interface

The following parameters need to be set when the camera is used for the first time or when the camera is replaced. After the settings are completed, the default can be selected for Formal Production.

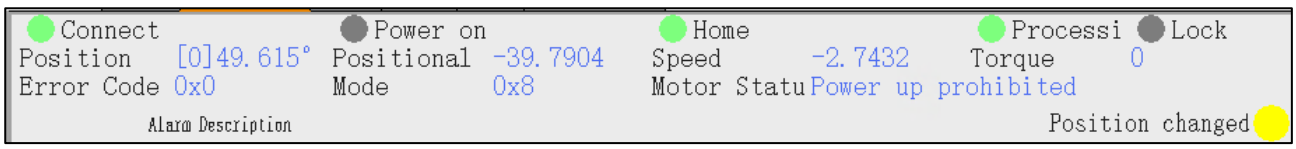
7.5.1 Cylinder

This is the interface for manual operation of the cylinder. When the cylinder is operable, it displays the operable buttons, with the green circle indicating that the sensor is on, and the green square indicating the status of the solenoid valve. If there is no button displayed, the operable condition is not satisfied, such as in the emergency stop condition, or in the interlock condition.

Figure 64: operation of the cylinder

7.5.2 Servo motor.

Figure 65: Servo motor operation



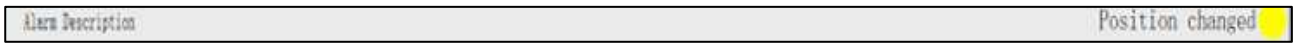
[Connection Indicator]: Green indicates that the motor is connected to the software and gray indicates that it is not connected.

[Power-up Indicator]: Green indicates that the motor is powered up and gray indicates that it is not powered up.

[Origin Indicator]: Green indicates that return to origin has been completed and gray indicates that return to origin is not completed or it is returning to the origin.

[Locking Indicator]: Red indicates that the motor is in a locked state and it is necessary to check whether there is an interlocking condition that affects the motor's movement, and gray indicates that the motor is not locked and can be moved.

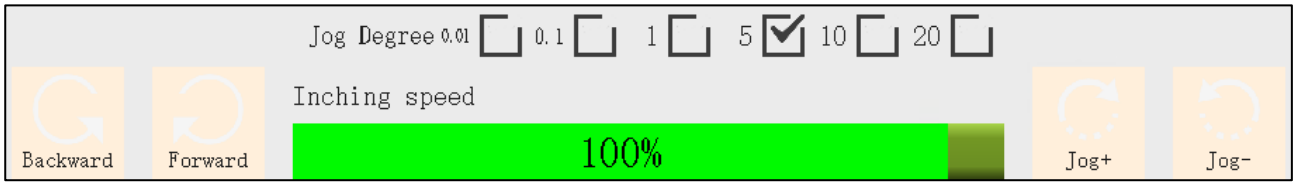
Figure 66: Alarm Description



[Alarm Description]: Alarm code and description of the motor.

[Position Change Indicator]: Green indicates that it is in the standby mode and the automatic mode can be enabled; yellow indicates that the status is not consistent with the standby mode and you should adjust the motor position in manual mode until the indicator turns green.

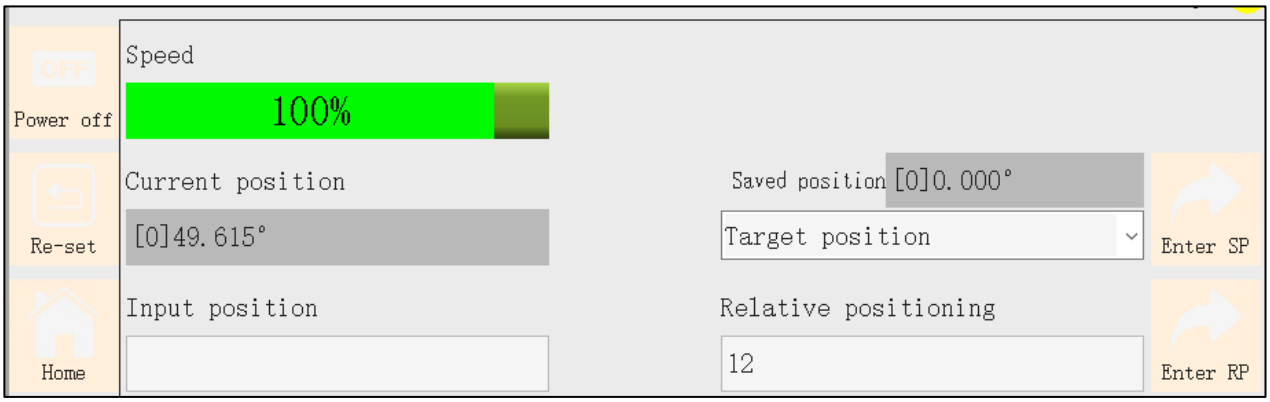
Figure 67: speed of jog



Speed of JOG-/JOG+/Inching move+/Inching move- = Auto speed × Global speed × Inching speed in the setting interface.

The value of the inching move label is checked, which is the distance of each inching move.

Figure 68: Speed of movement to a position



Speed of movement to a position = Auto speed × Global speed × Moving speed in the setting interface.

[Save Current]: Replace the saved position with the value of current position.

[Save Input]: Replace the saved position with the value of input position.

[Saved Position and Drop-down Box]: After selecting a position in the drop-down box, the saved position will show the value of the saved position accordingly.

[Relative Positioning]: Enter positive values for movement in the positive direction and negative values for movement in the negative direction.

[Go to Saved Position]: When clicked, it will go to the currently selected position in the drop-down box.

[Go to Relative Position]: When clicked, it will move to the value in the relative positioning and differentiate the direction.

Current motor is in power-off state

Current motor is in power-up state

Returned to origin

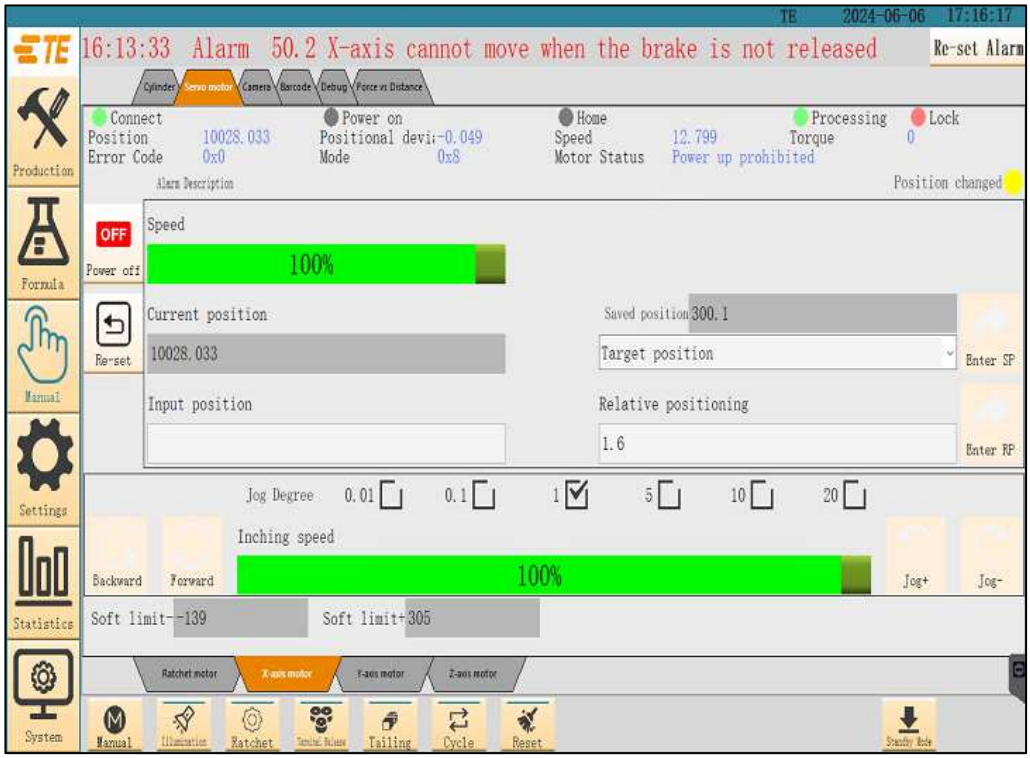
Not returned to origin

- Ratchet motor

Figure 69: Servo motor

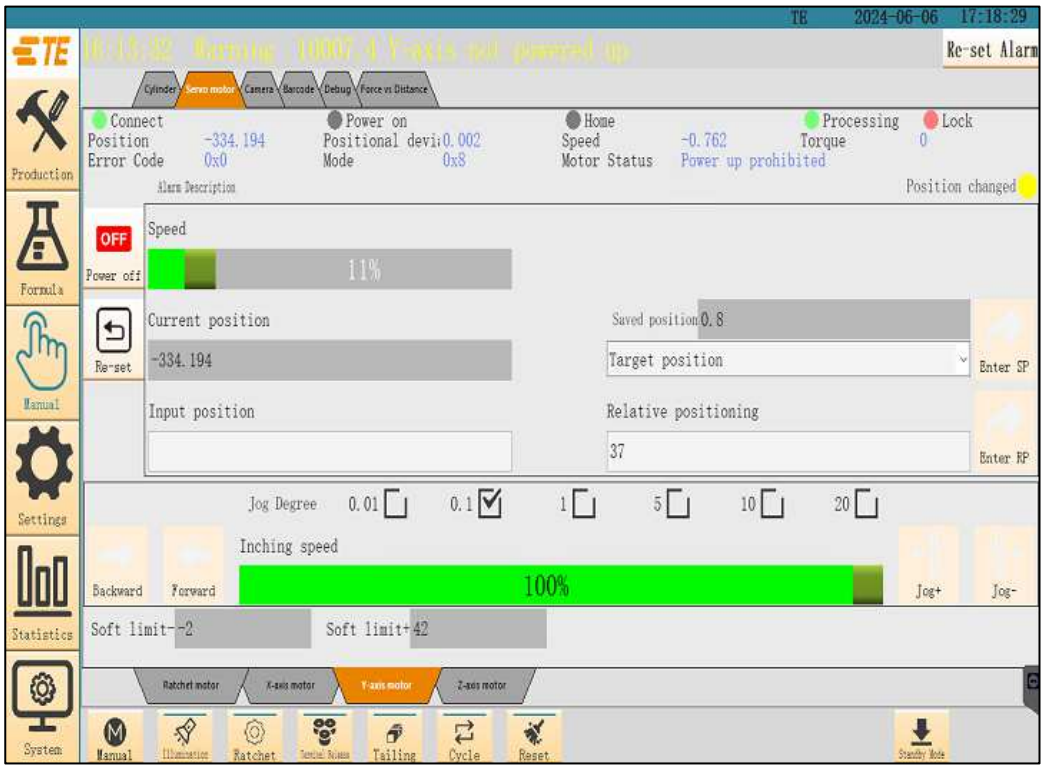
- X-axis motor

Figure 70: X-axis motor



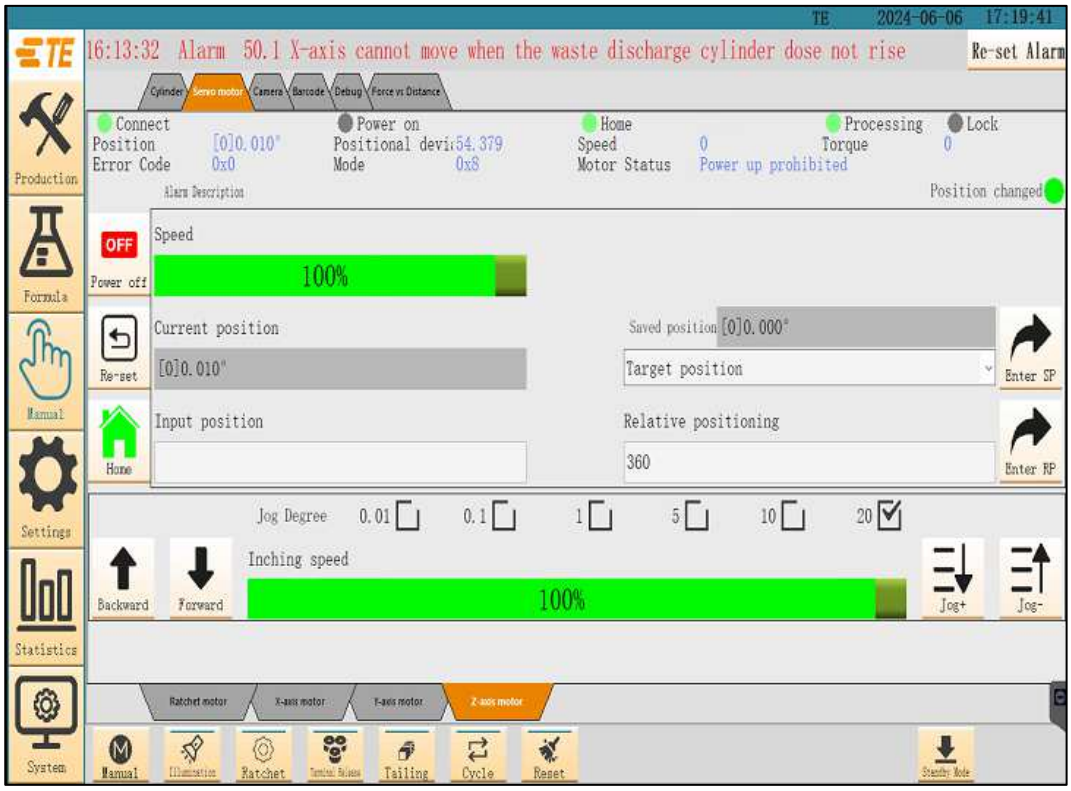
- Y-axis motor

Figure 71: Y-axis motor



- Z-axis motor

Figure 72: Z-axis motor

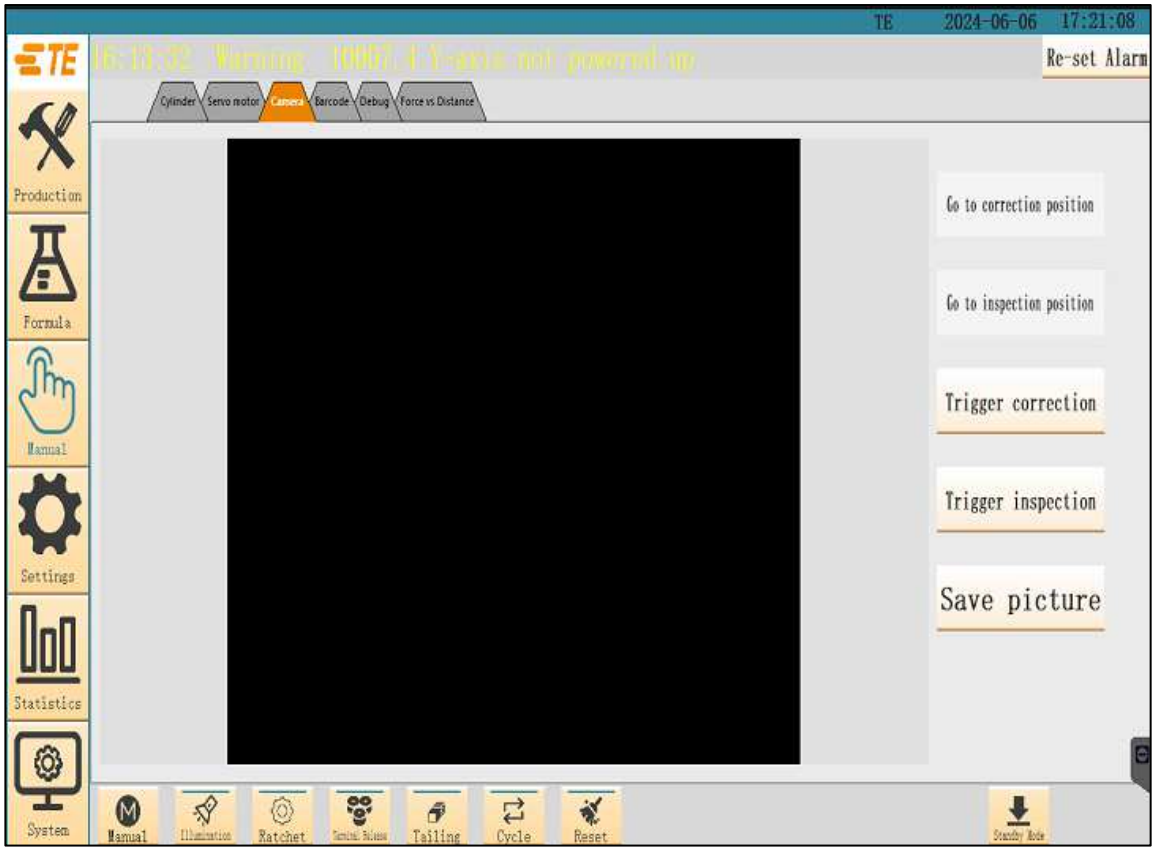


7.5.3 Camera

This is the Camera View page, where you can operate the movement of the camera and observe the status of the settings.

Go to correction position; Go to inspection position; Trigger correction; Trigger inspection; Save picture.

Figure 73: Camera



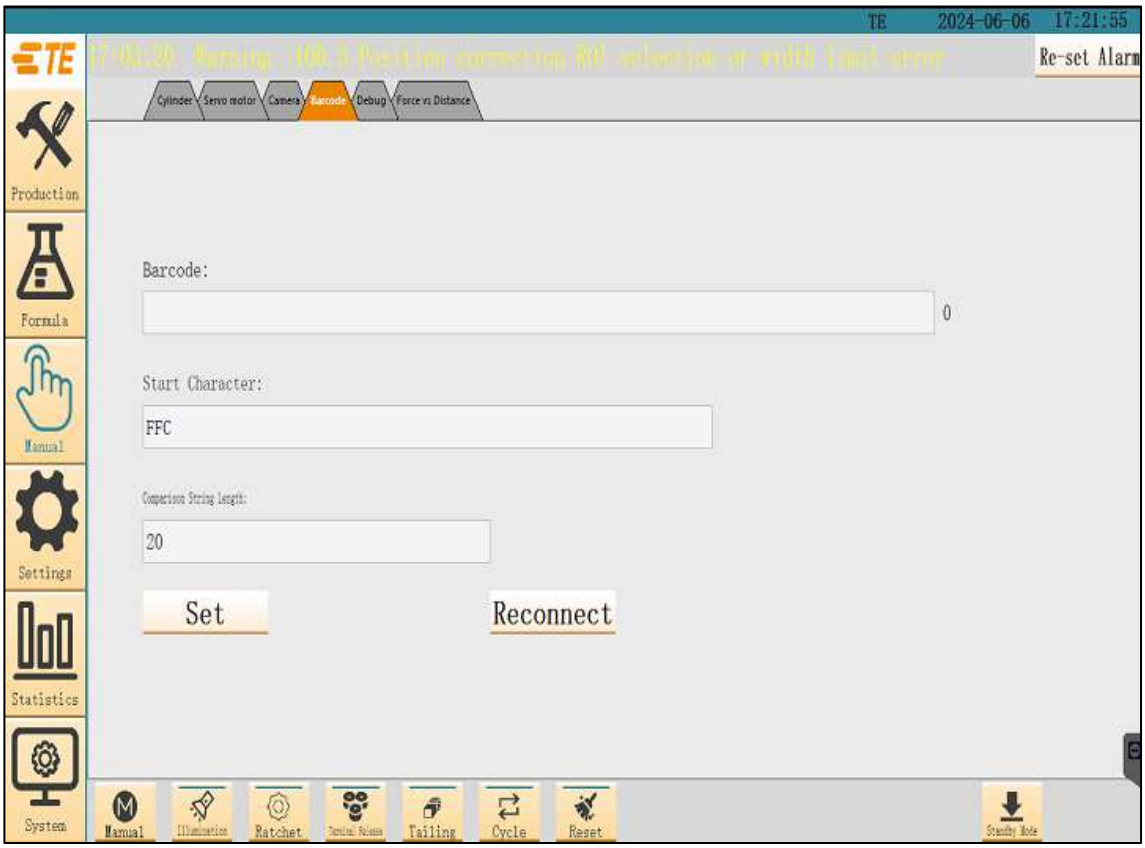
7.5.4 Barcode

[Barcode]: After aligning the reader to the barcode, click on it to read the code and the barcode information will be displayed in the barcode area.

[Compare String]: Input the string to be compared.

[Compare Starting Position]: Input the starting position character to be compared.

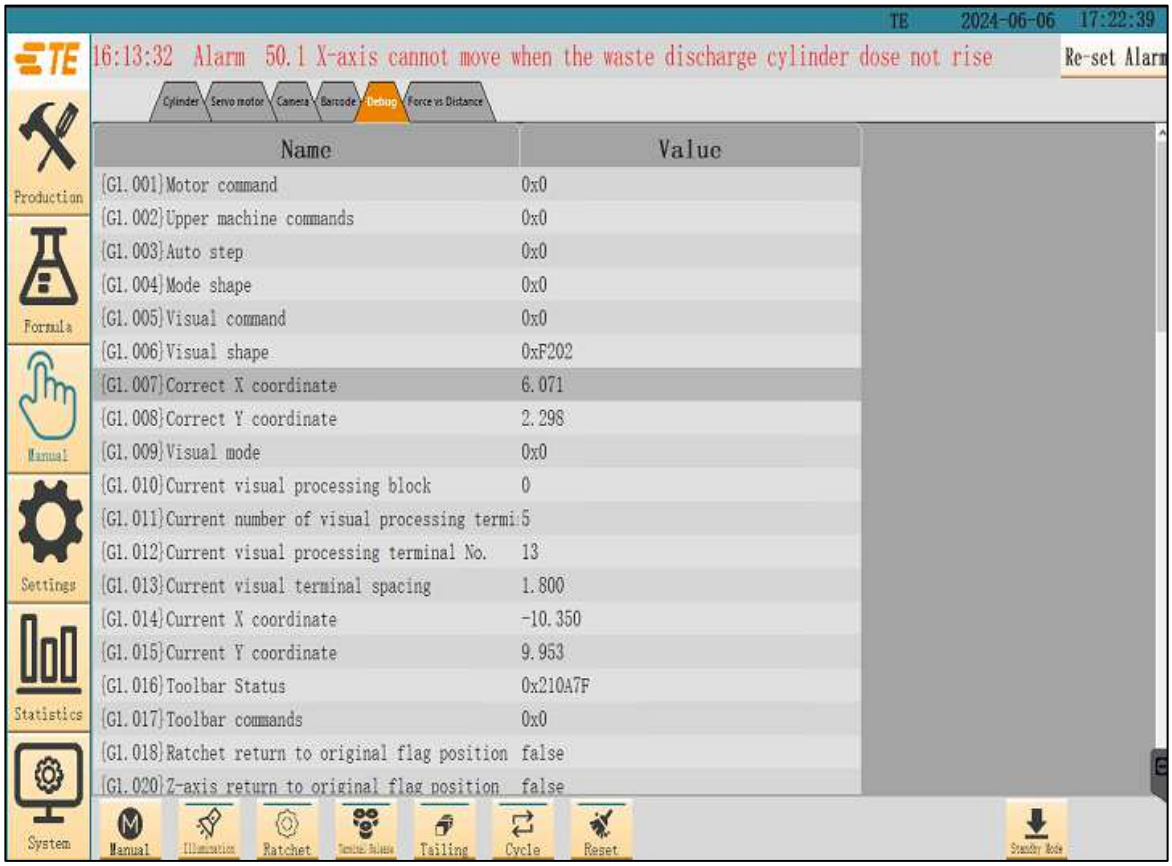
Figure 74: Barcode



7.5.5 Debugging

This is a developer interface for developers to debug the device. It supports visual query of PLC operation status, including current motor commands, host computer commands, automatic steps, etc.

Figure 75: Debugging



7.5.6 Pressure displacement

It monitors the FVD curve, where the contact force is the critical force setpoint, beyond which the collection of points begins.

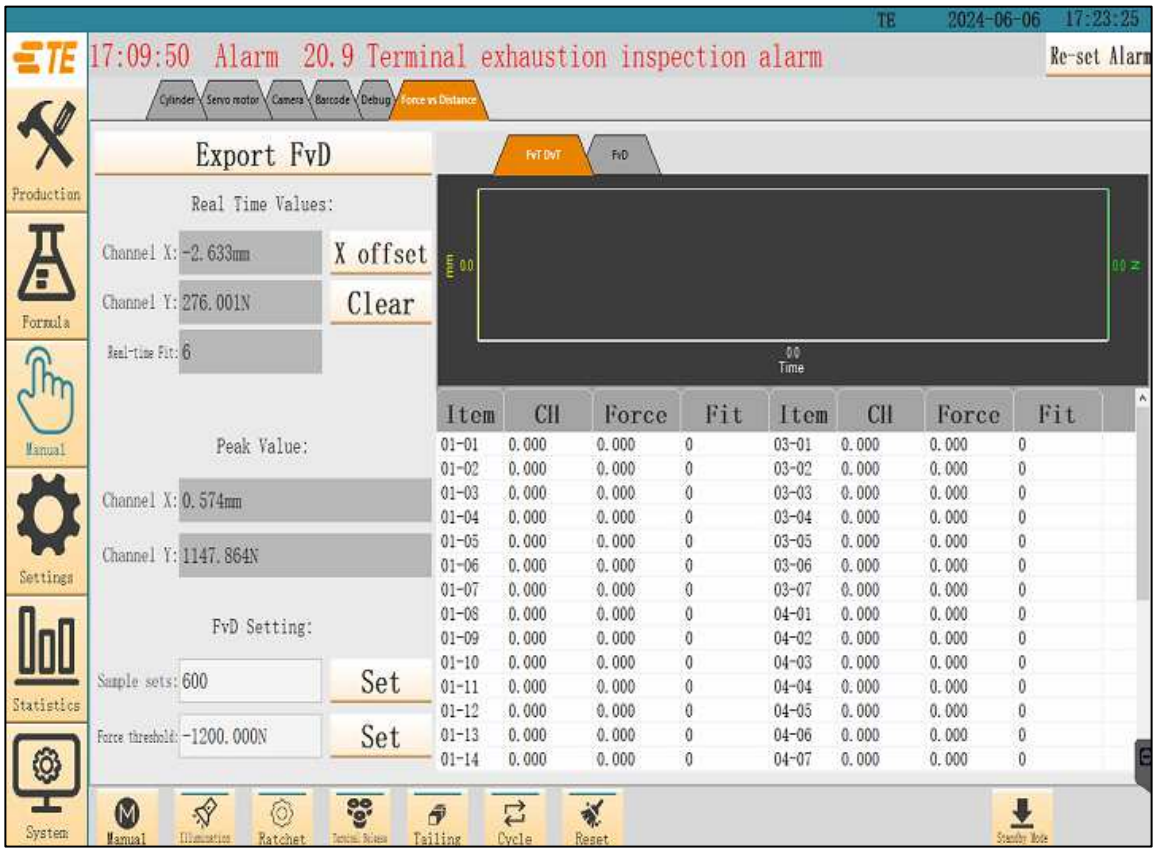
[X Null Offset]: For setting the null offset of the displacement channel.

[Clearance]: For setting the null offset of the pressure channel.

[Number of Acquisition Points]: The Channel sampling rate is 5KHZ. Set the number of acquisition points. 500 points means that the acquisition time is 0.2 ms x 500 = 100 ms.

[Contact Force]: When the pressure reaches this value, extraction of the active point begins.

Figure 76: Pressure displacement

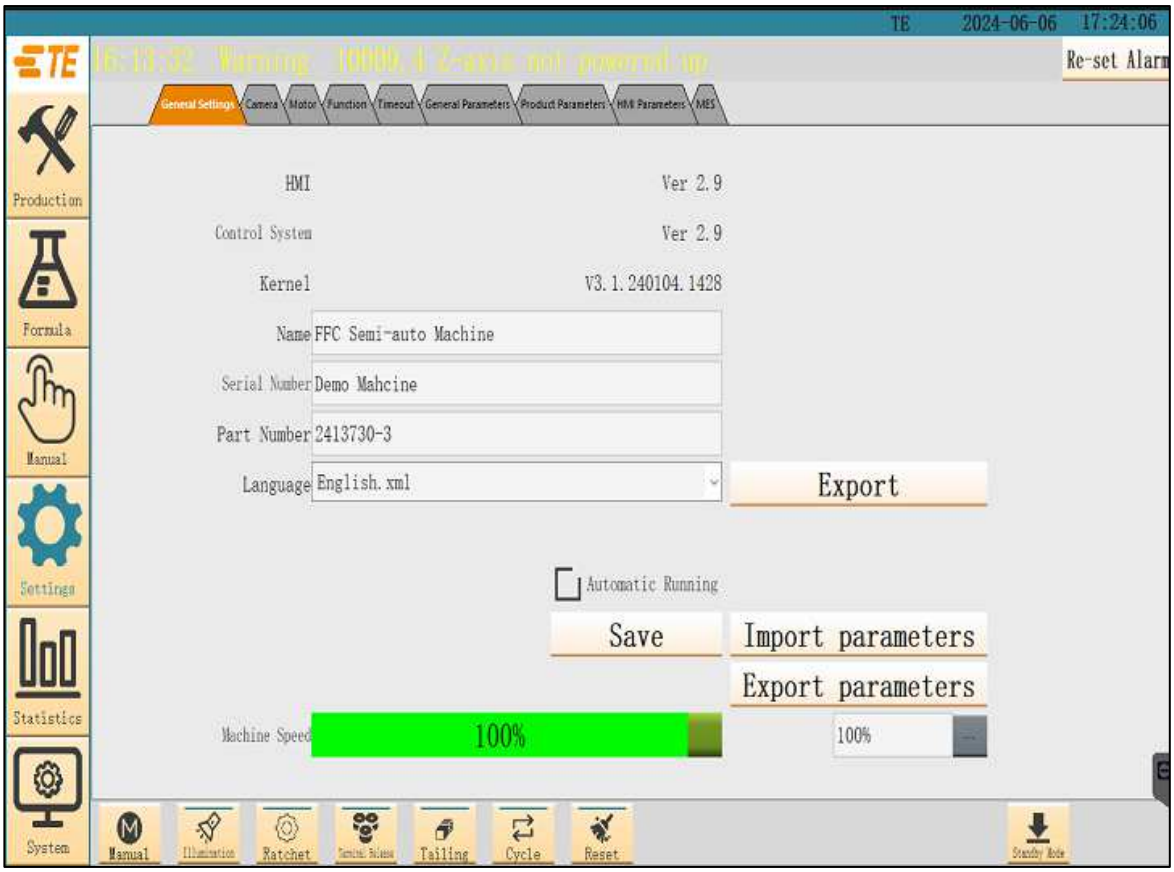


7.6 Setting interface

The following parameters need to be set when the camera is used for the first time or when the camera is replaced. After the settings are completed, the default can be selected for Formal Production.

7.6.1 General settings

Figure 77: General settings



[Language]: After checking the language, restart the software to take effect. Click on Export to translate specific terms.

[Import Parameters]: You can import the parameters of the equipment, which is not related to the formula.

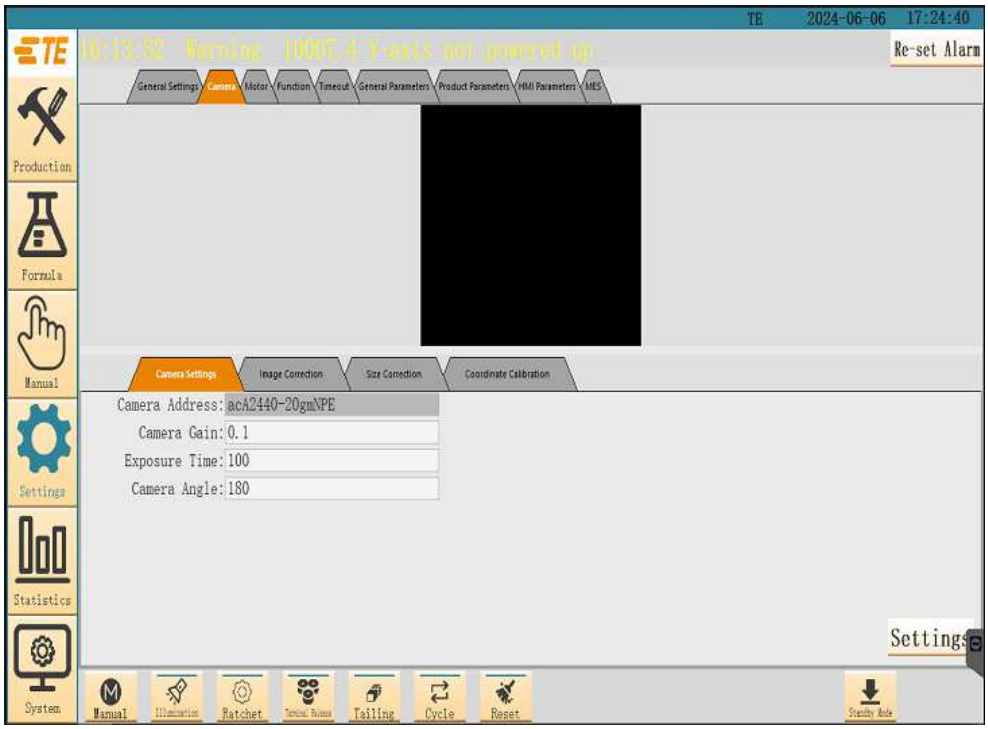
[Export Parameters]: You can export the parameters of the equipment, which is not related to the formula.

[Software Self-start]: After checking, the software will enable the function of automatic startup. Check the box to take effect.

[Global Speed]: After sliding on the speed bar to select it, the updated speed will be executed on the next action.

7.6.2 Camera

Figure 78: Camera



After clicking on the Camera Settings, just keep the factory settings. The description of each parameter is as follows:

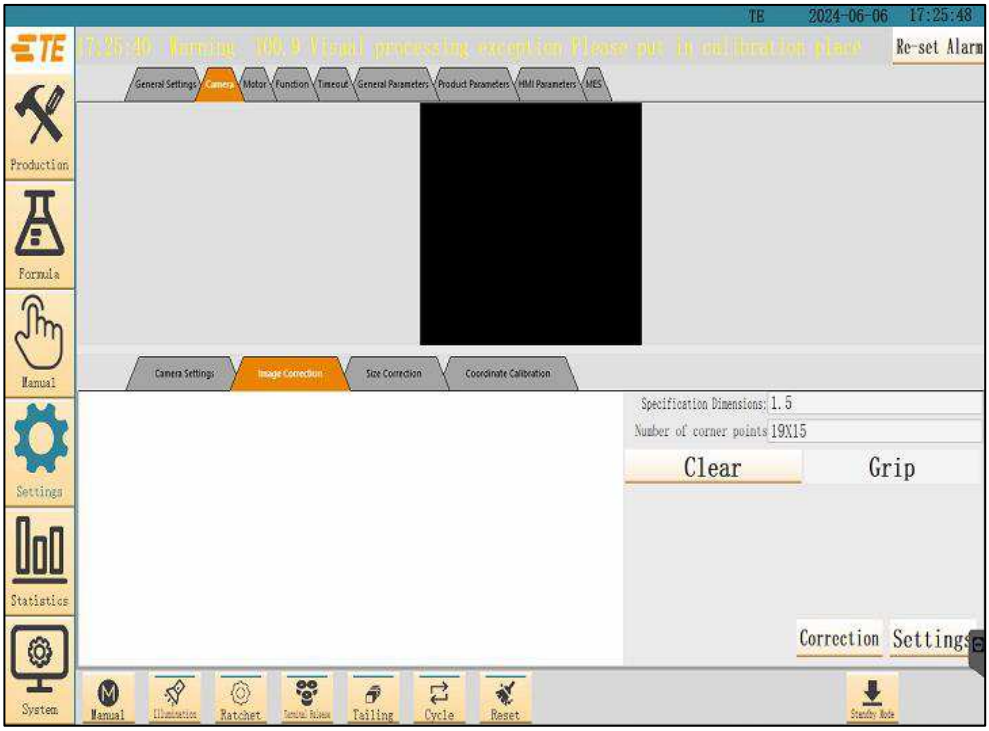
[Camera Address]: It is fixed by software and cannot be modified.

[Camera Gain]: If the brightness of visual photography is not suitable, you can adjust the value appropriately. In general, keep the factory settings.

[Exposure Time]: If the brightness of visual photography is not suitable, you can adjust the value appropriately. In general, keep the factory settings.

[Camera Angle]: If the adjustment mechanism does not keep the light shield parallel in the field of view, the value of the camera angle can be adjusted appropriately for the parallelism.

Figure 79: Image correction

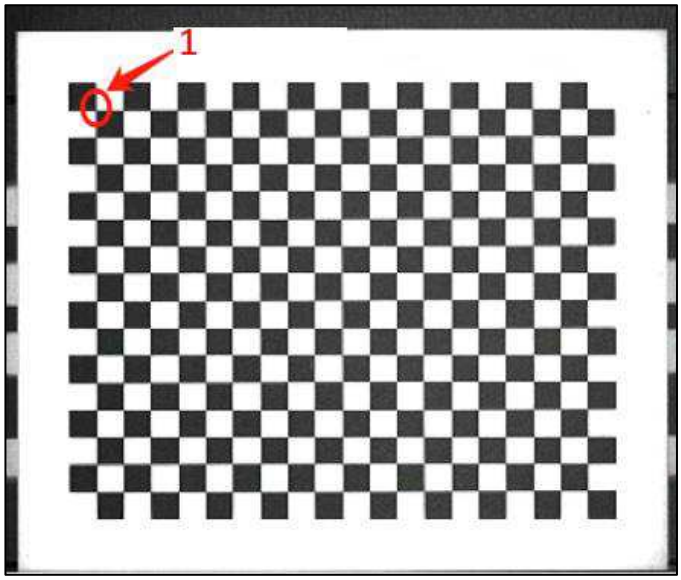


After clicking on Image Correction, enter the specifications and dimensions of the calibration plate and the number of corner points, and then click on the Set button.

Note on the number of corner points: If the calibration plate has 20 x 16 black-and-white grids, the number of corners is 19 x 15.

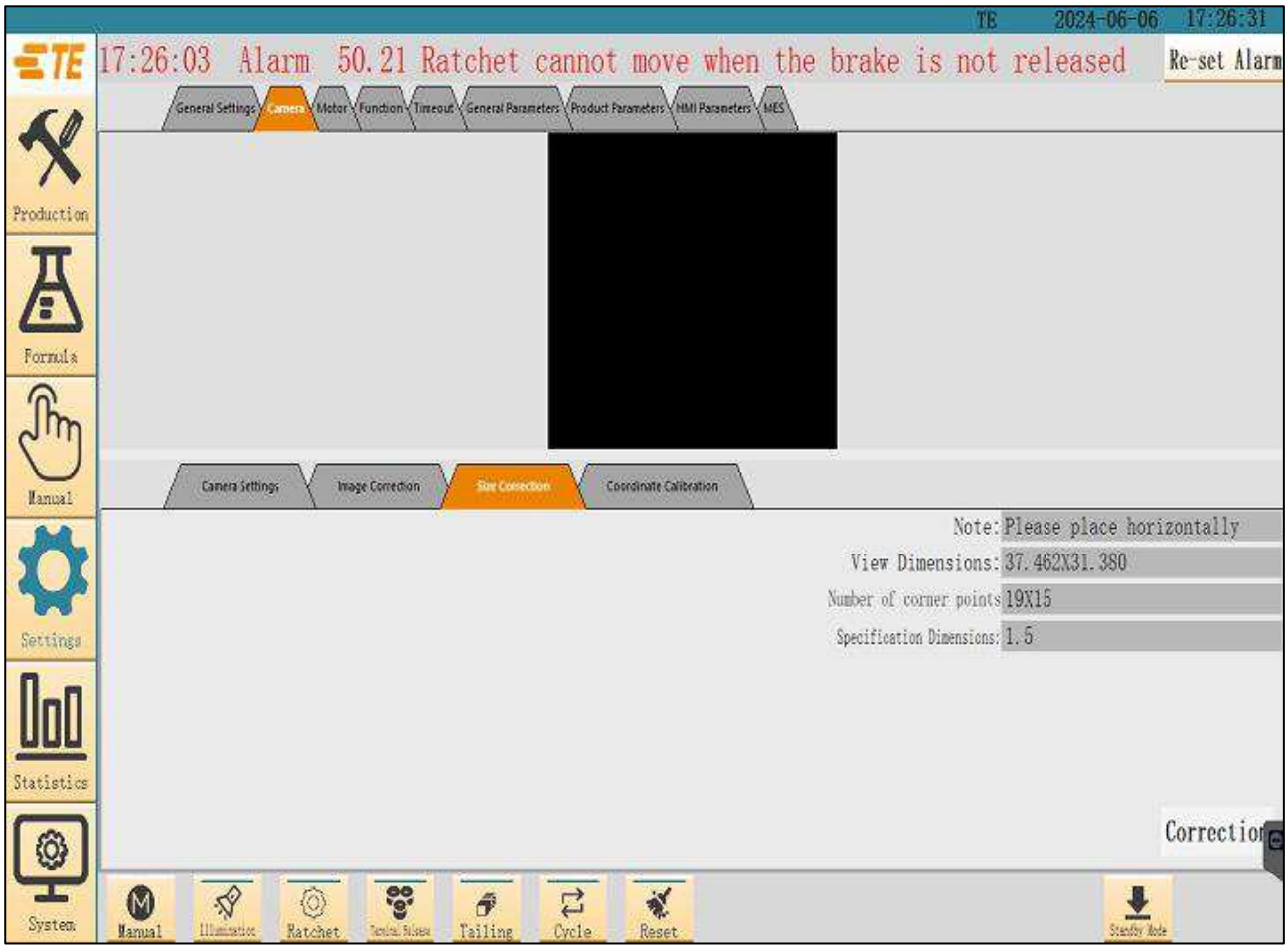
The following figure shows one of the corner points.

Figure 80: Corner point



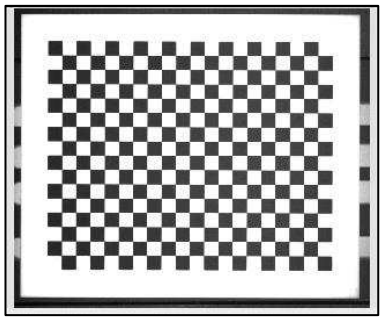
1 Corner point

Figure 81: Size correction



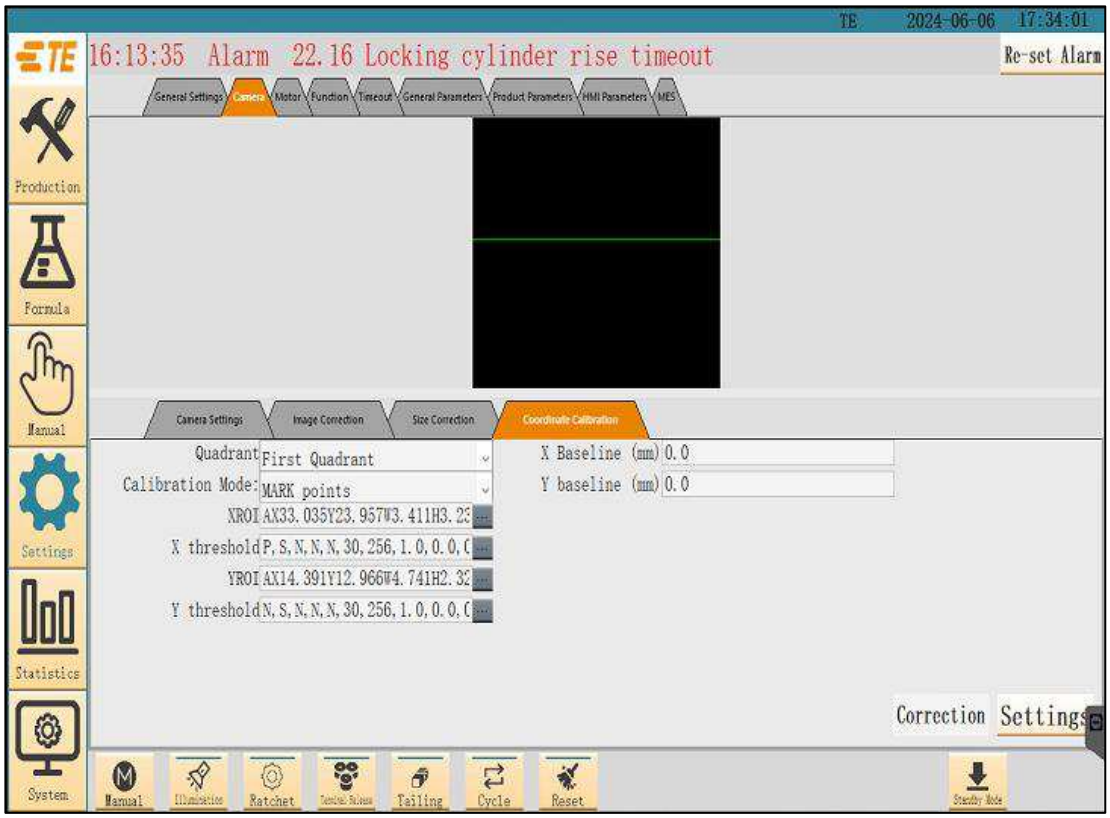
Click on Size Correction to display a prompt box showing "Please put in calibration plate," put the calibration plate into the center of the field of view.

Figure 82: calibration plate



When a red and green mark appears on the calibration plate, click on the Set button to complete the size correction.

Figure 83: Coordinate calibration



[Quadrant]: Select Third Quadrant as a fixed option.

[Calibration Method]: Select Mark Point as a fixed option.

[XROI]: Select the line connecting two Mark holes as the zero point of X coordinate. It is necessary to adjust the gain and exposure of the camera, ensure the visual processing effect of the two Mark holes as much as possible, otherwise it will affect the positioning of the coordinate axis.

Figure 84: XROI

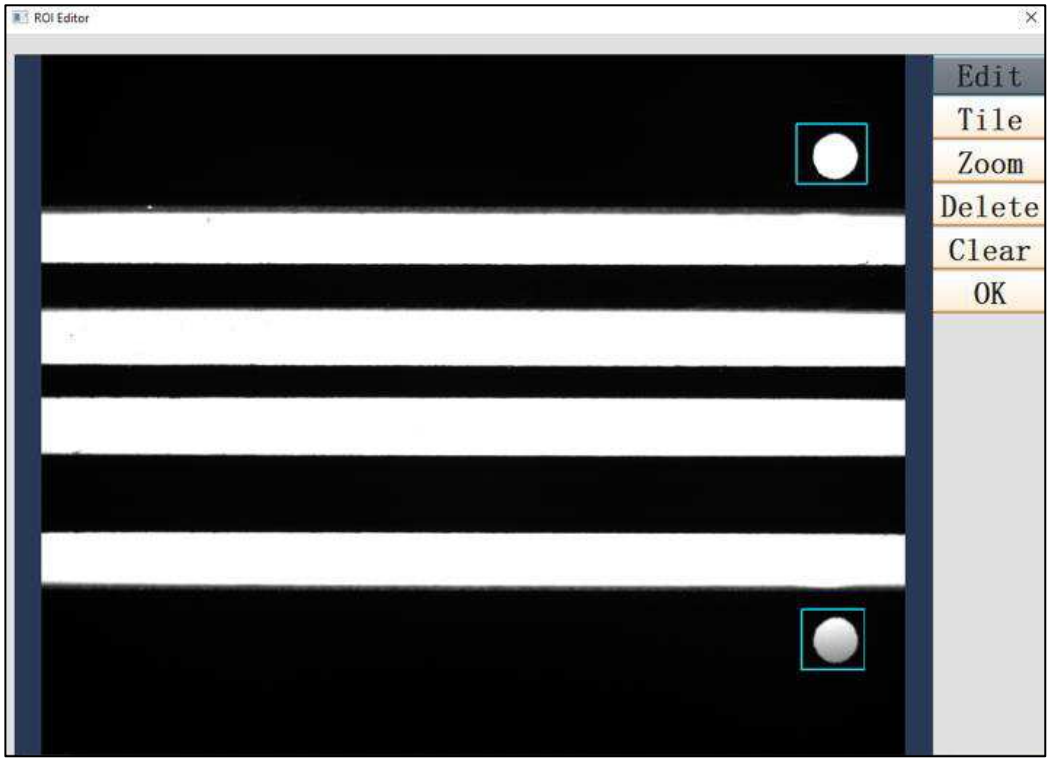
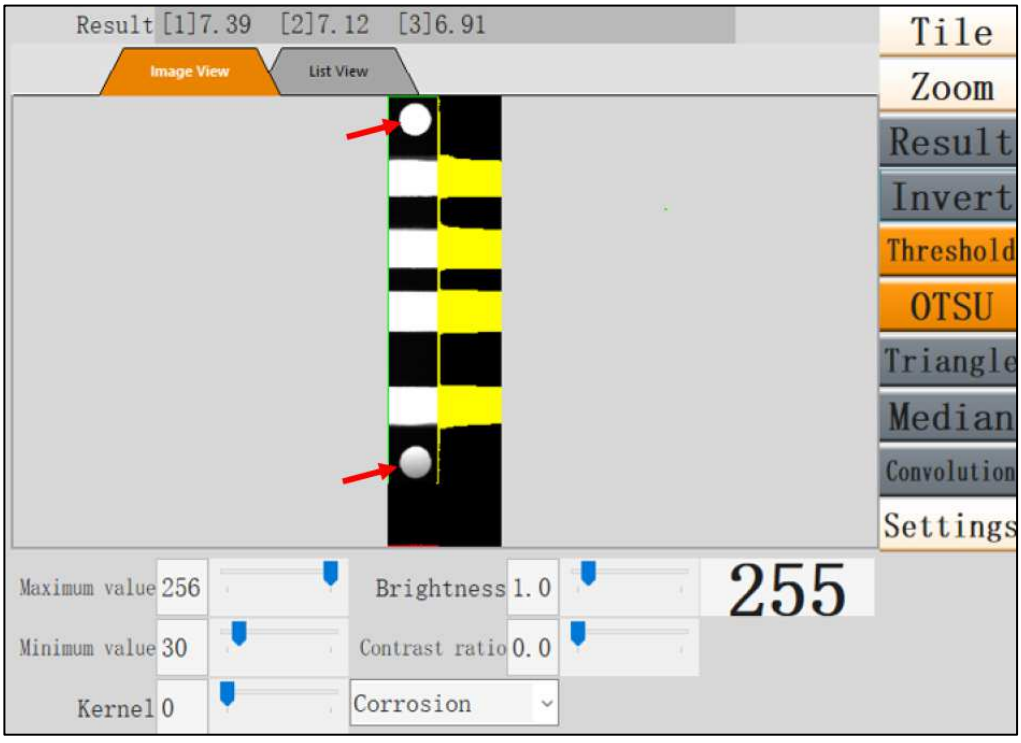


Figure 85: XROI



[YROI]: Select the specific horizontal prism as shown in the Figure 86 below, with the center line of the prism as the Y zero point.

Figure 86: YROI

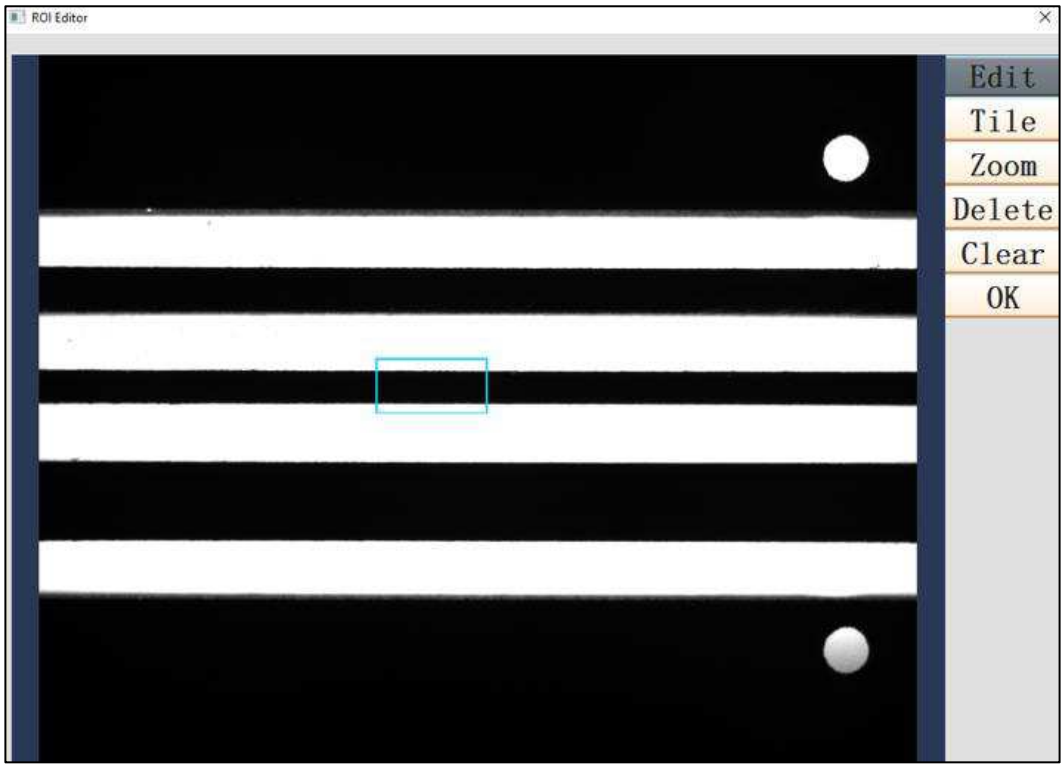
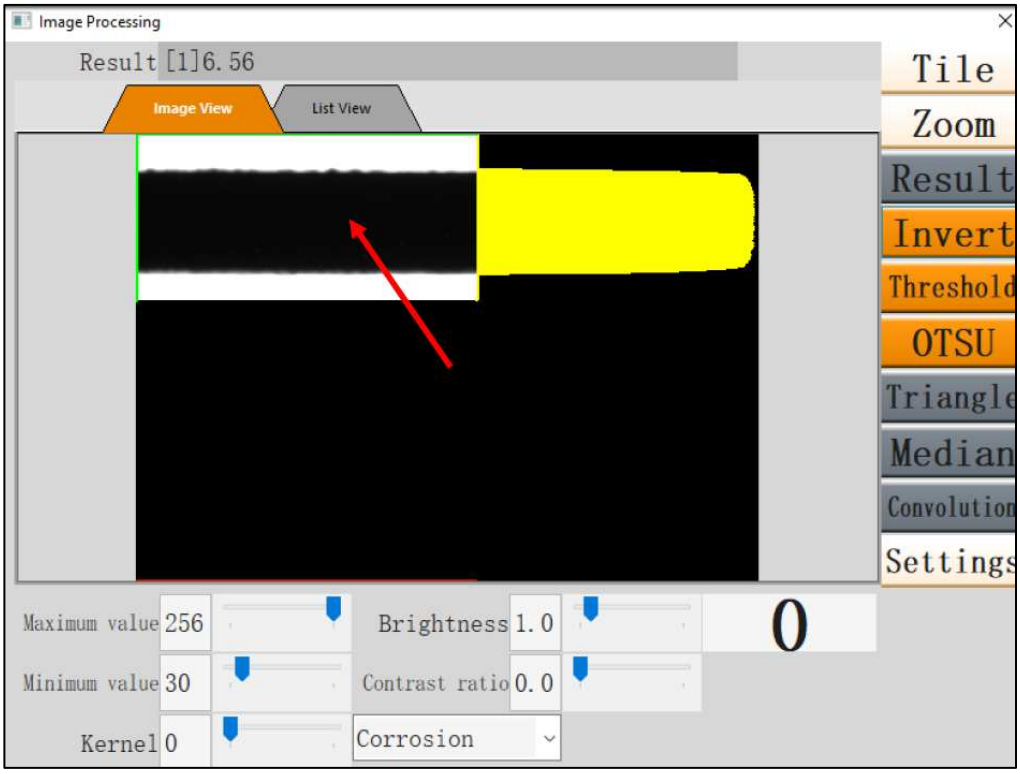
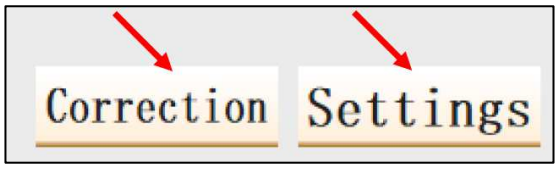


Figure 87: YROI



After all the settings are completed, click on the Settings and Calibration buttons in the lower right corner. Now, the camera calibration is complete.

Figure 88: Settings



7.6.3 Motor

There are four servo motor setup pages, and each motor page is divided into areas for system parameters and for user parameters. The system parameters involve hardware, which may need to be changed only when the hardware changes, so it is necessary to be careful when changing them. User parameters are some of the parameters related to the operation of the motor, which do not involve hardware.

For the specific meanings of the above parameters, please consult a mechanical or electrical engineer.

Figure 89: Ratchet Motor

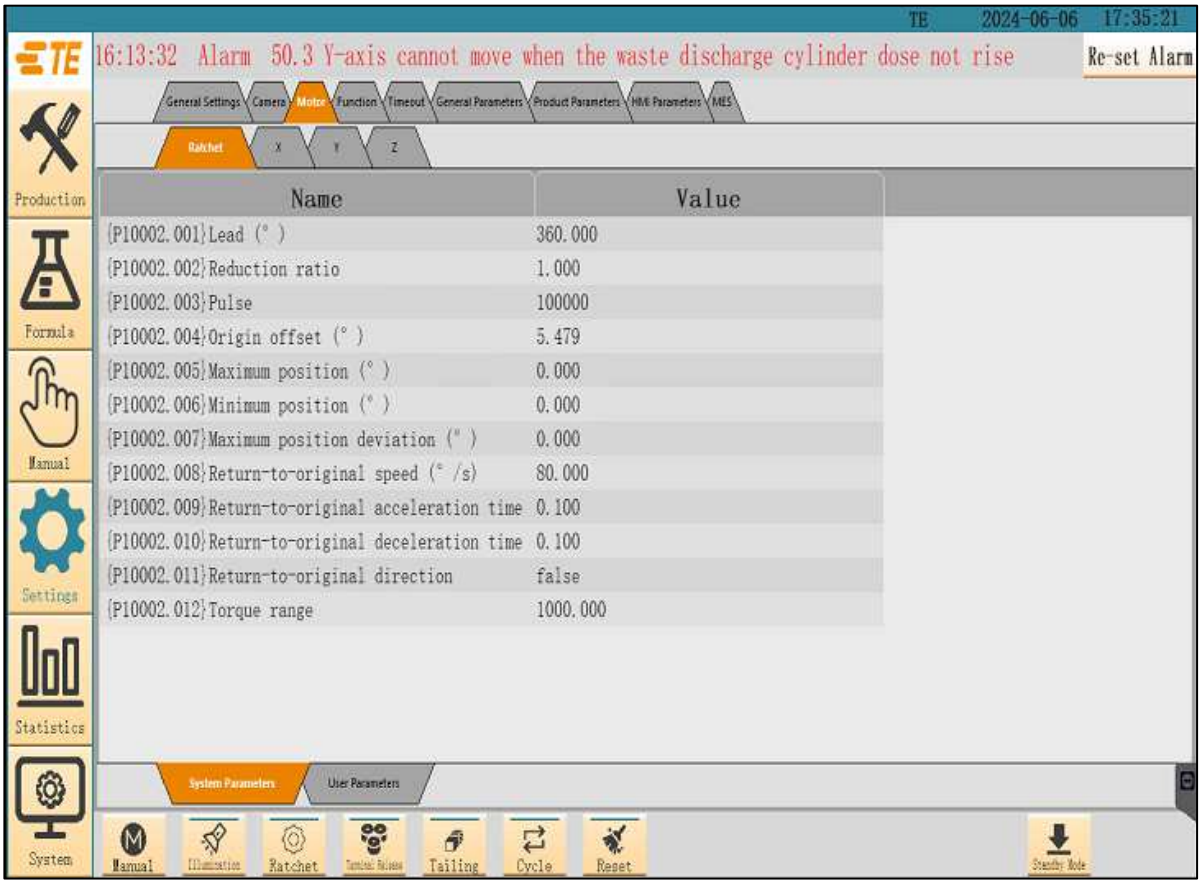


Figure 90: X motor

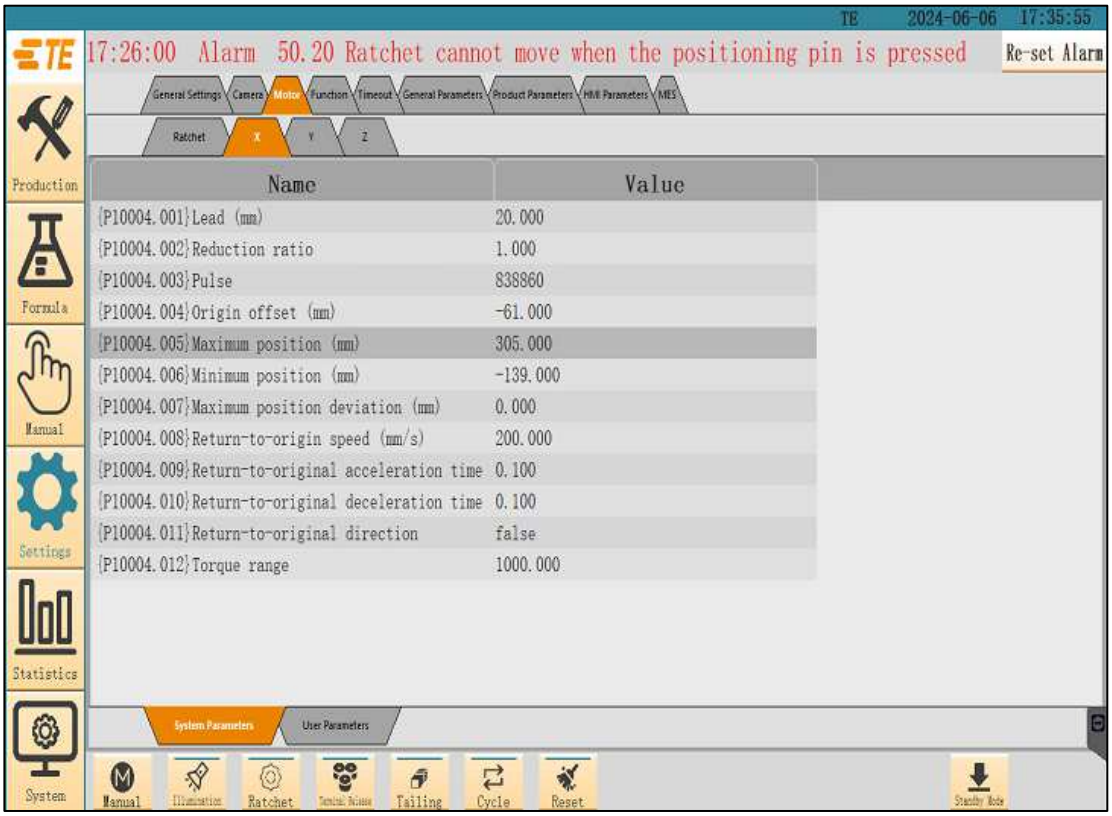


Figure 91: Y motor

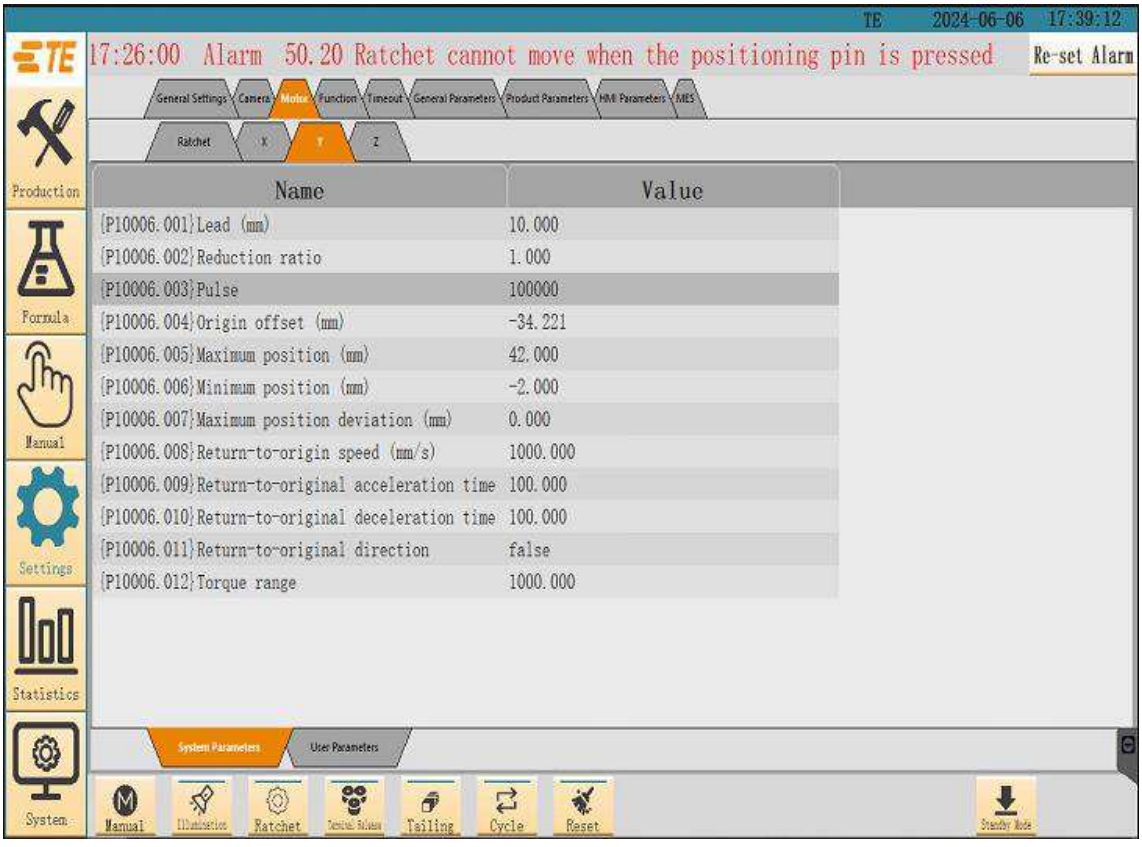
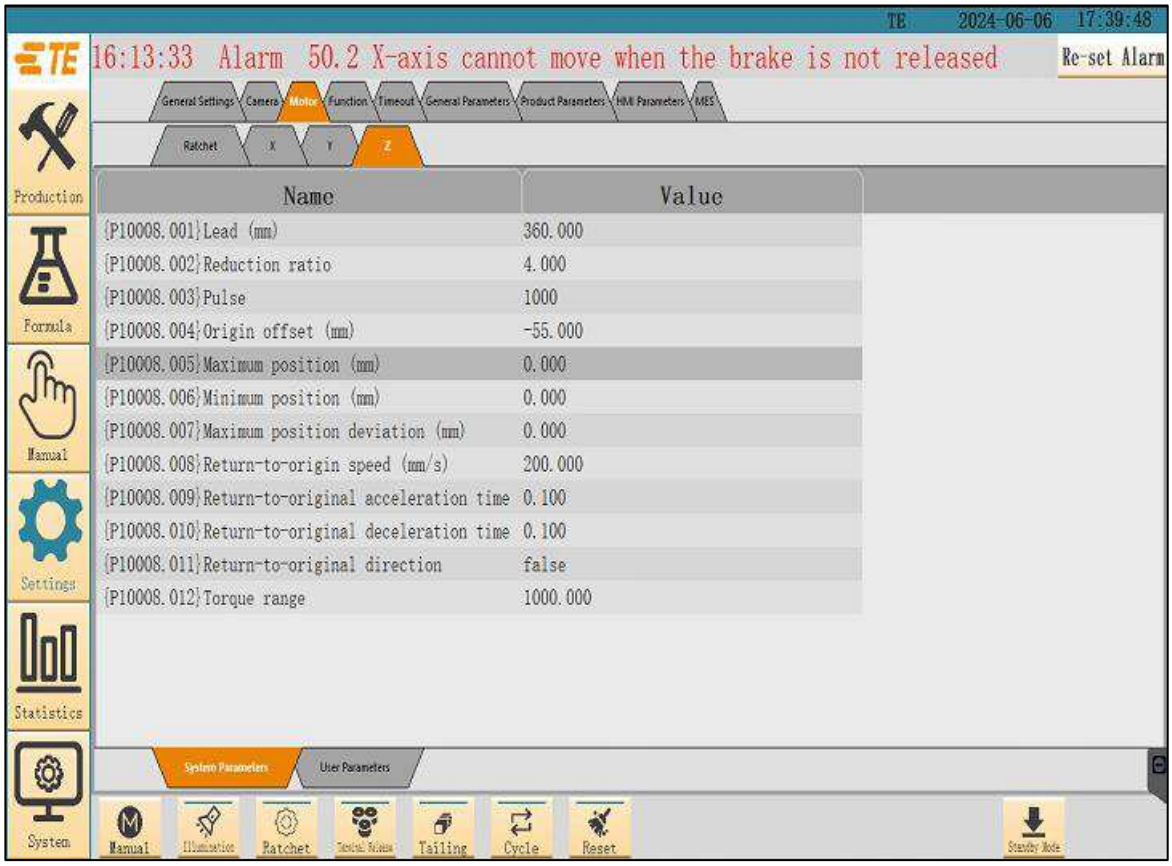


Figure 92: Z motor



7.6.4 Functions

Mode column: 1. If all the boxes are unchecked, it is the in normal trial production mode.

2. If you only check the box of tune-up, it switches to the tune-up mode (one time of idle operation without material).

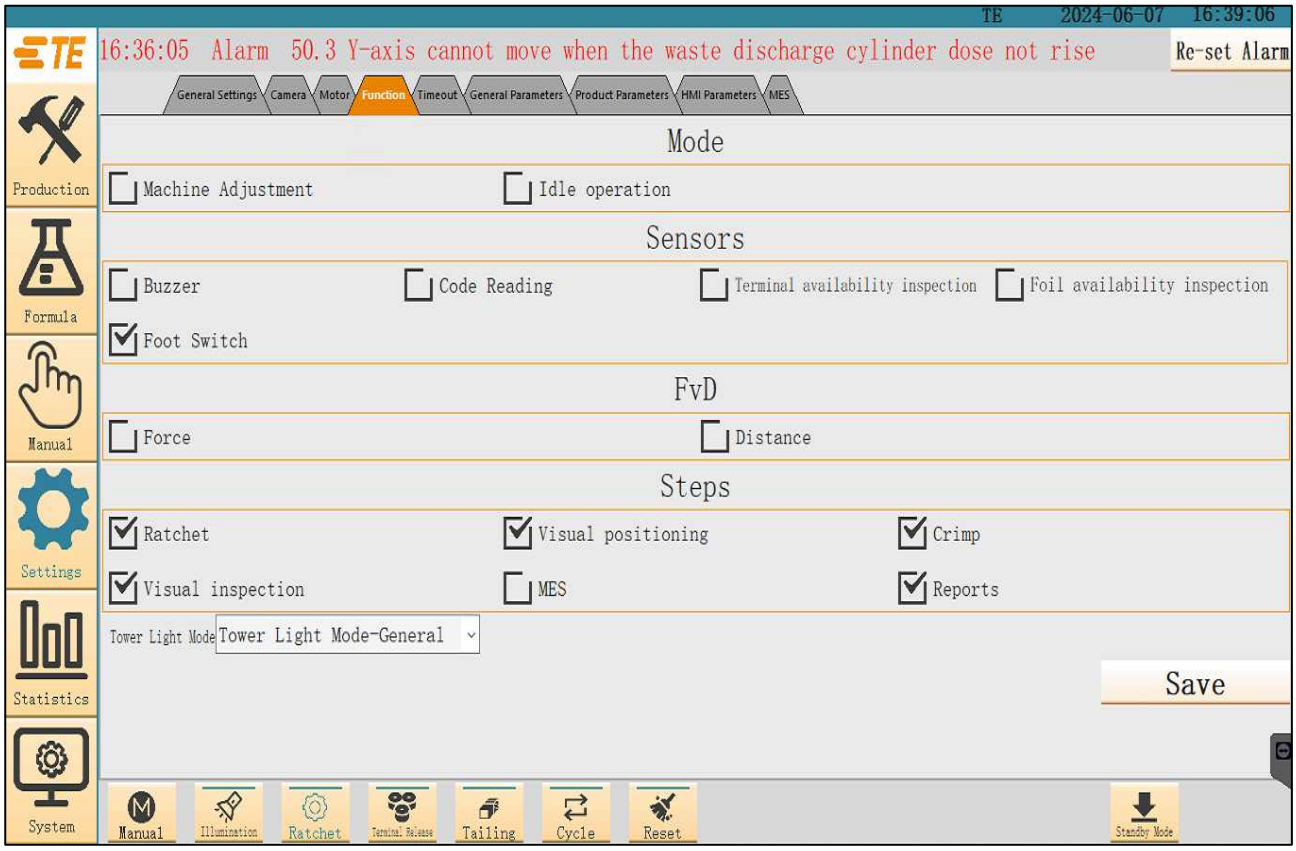
3. If you check the box of idle operation, it switches to the idle operation mode (continuous idle operation without material).

Sensor column: Check the box to enable the functions

FVD column: Check the box to enable the functions

Step column: Check the box to enable the functions

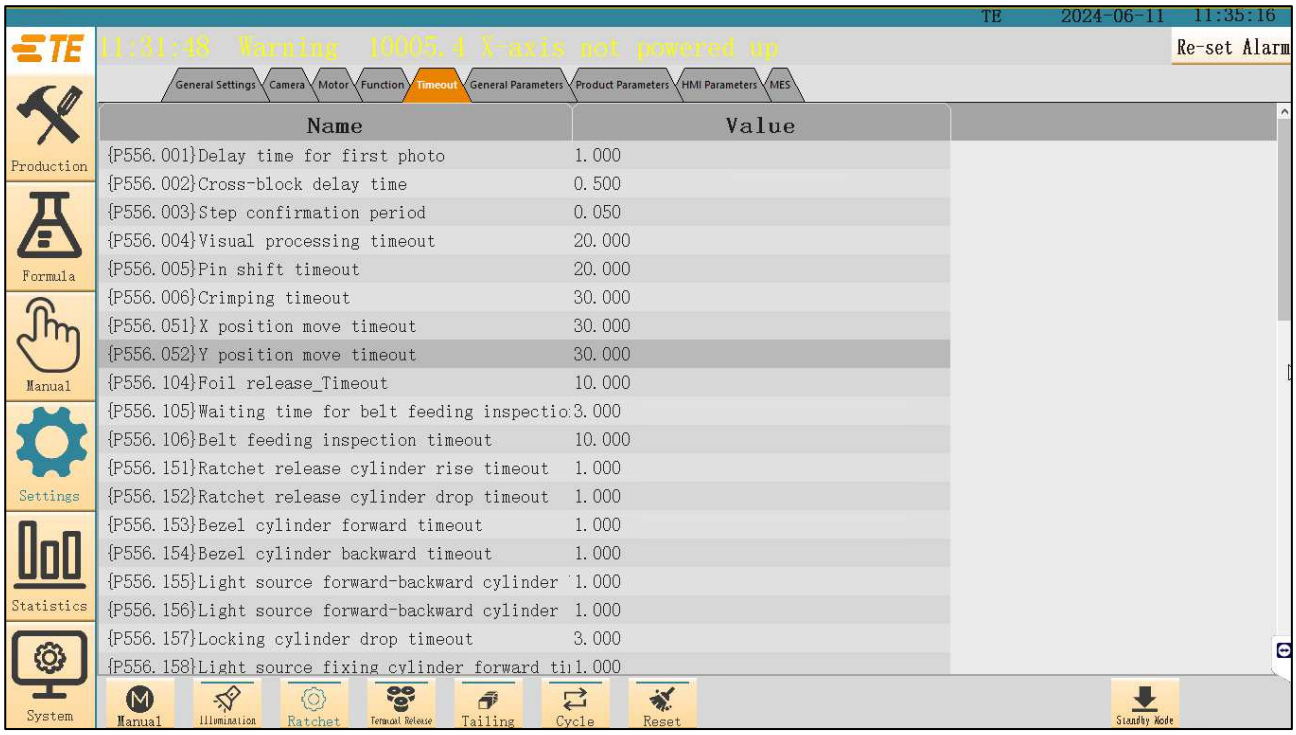
Figure 93: Functions



7.6.5 Timeout

In general, keep the default settings.

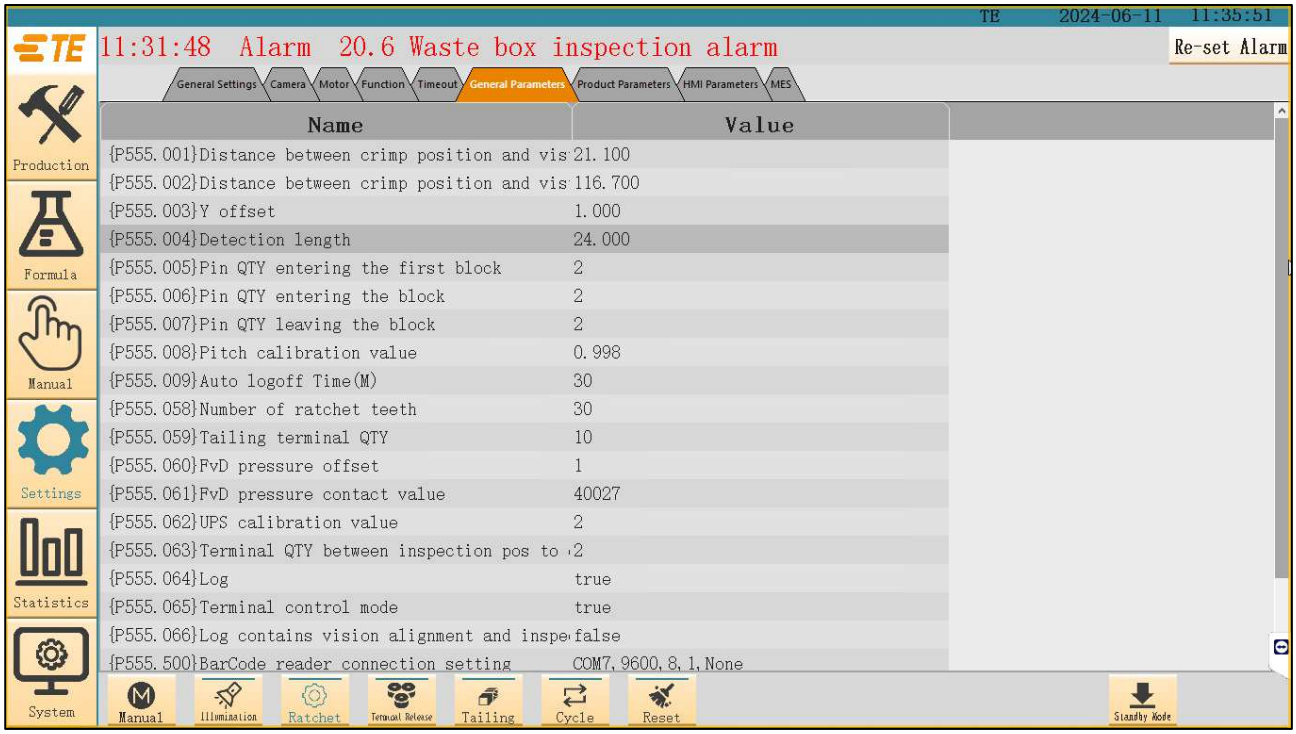
Figure 94: Timeout



7.6.6 General parameters

It is necessary to box-select the X and Y coordinate area, and at the same time, you can set the offset value for different products.

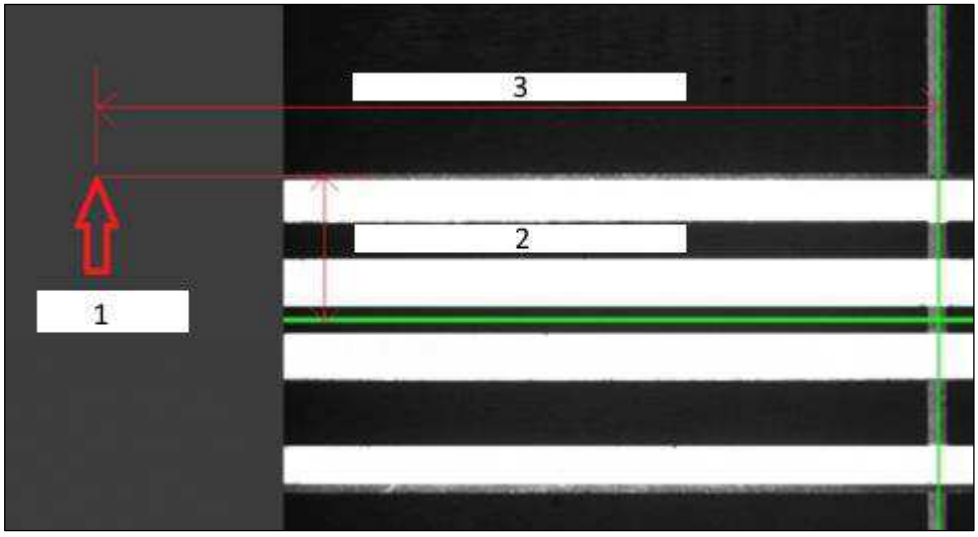
Figure 95: General parameters



[Distance between crimp position and visual Y-axis]: The value needs to be increased as the distance increases.

[Distance between crimp position and visual X-axis]: The value needs to be increased as the distance increases.

Figure 96: Distance b/w axis



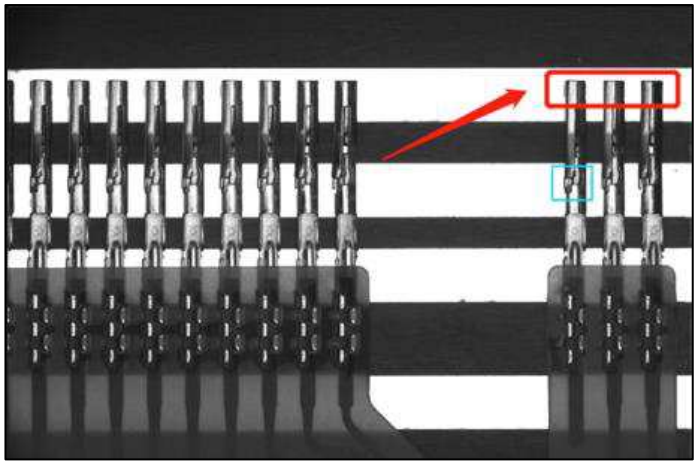
1 Crimp position

2 Distance between crimp position and visual Y-axis

3 Distance between crimp position and visual X-axis

[Y inspection offset]: You need to move the topmost part of the terminal to the topmost white area. In the field of view, the terminal needs to be moved up and this value needs to be increased.

Figure 97: Y inspection offset



[Detection length]: Maximum length in X direction that the clamp can place the Foil.

[Number of copper tapes entering the first block]:

[Number of copper tapes entering the block]:

[Number of copper tapes leaving the block]:

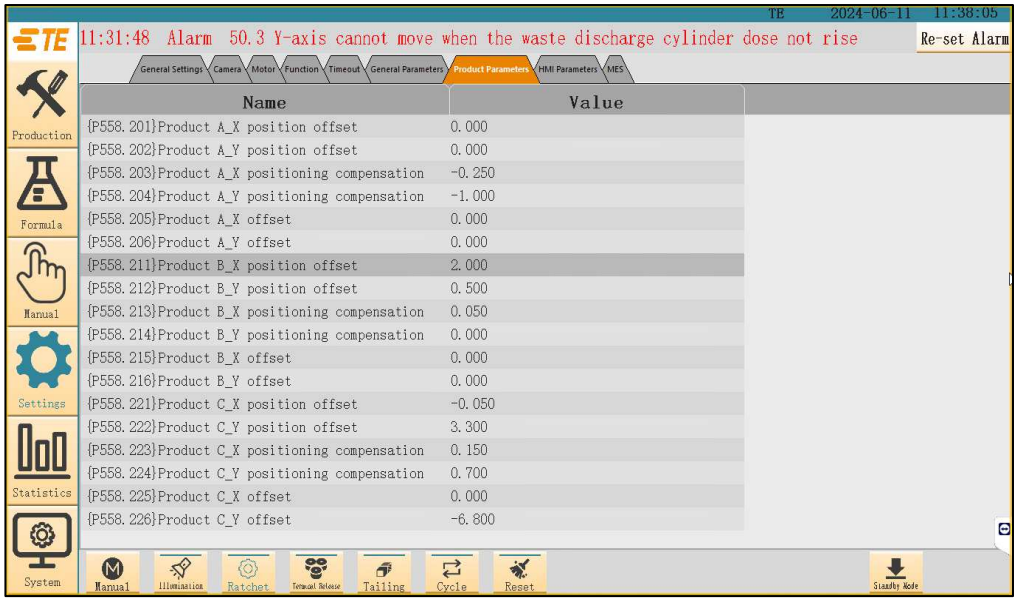
[Number of ratchet teeth]:

[Number of tailing terminals]: When this number is not detected continuously, the tailing mode ends.

7.6.7 Product parameters

Keep the default parameters.

Figure 98: Product parameters

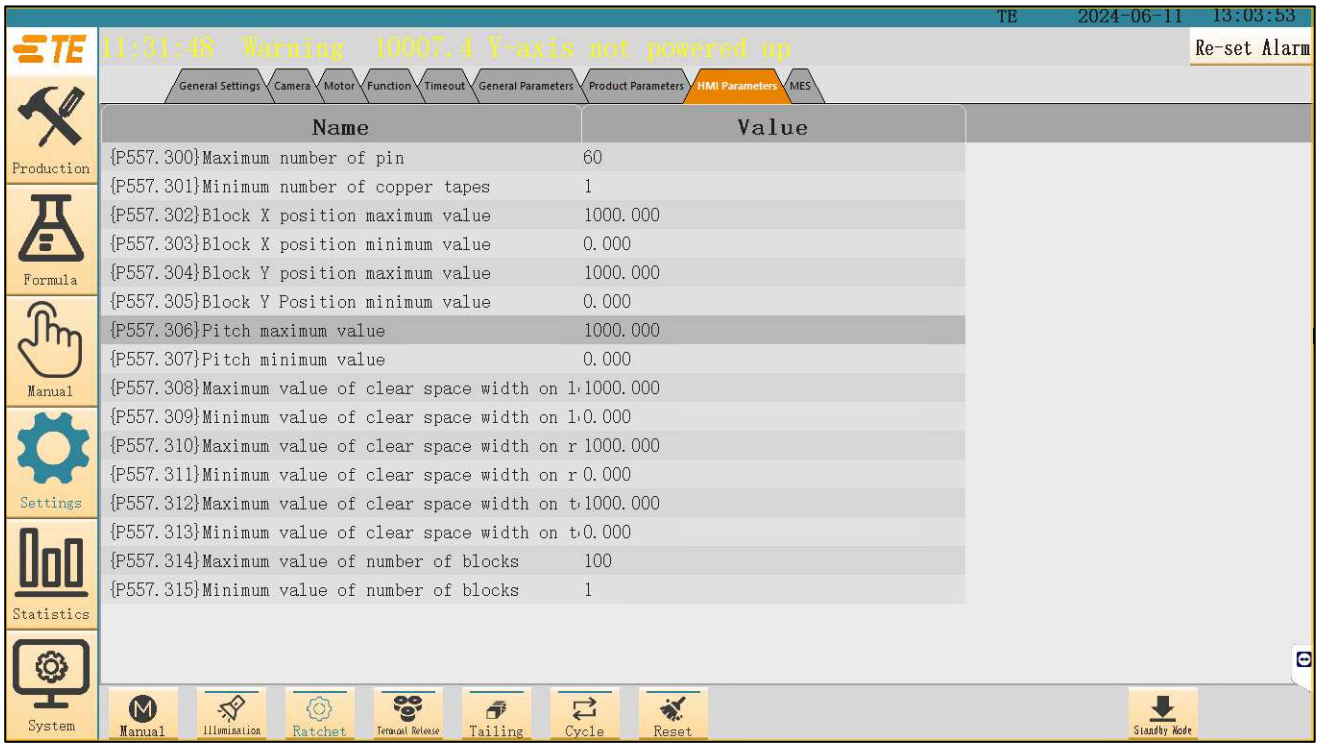


Y position offset: The head moves in the positive direction of the Y axis and the value is increased.

7.6.8 HMI parameters

It is necessary to box-select the X and Y coordinate area, and at the same time, you can set the offset value for different products.

Figure 99: HMI Parameters



7.6.9 MES

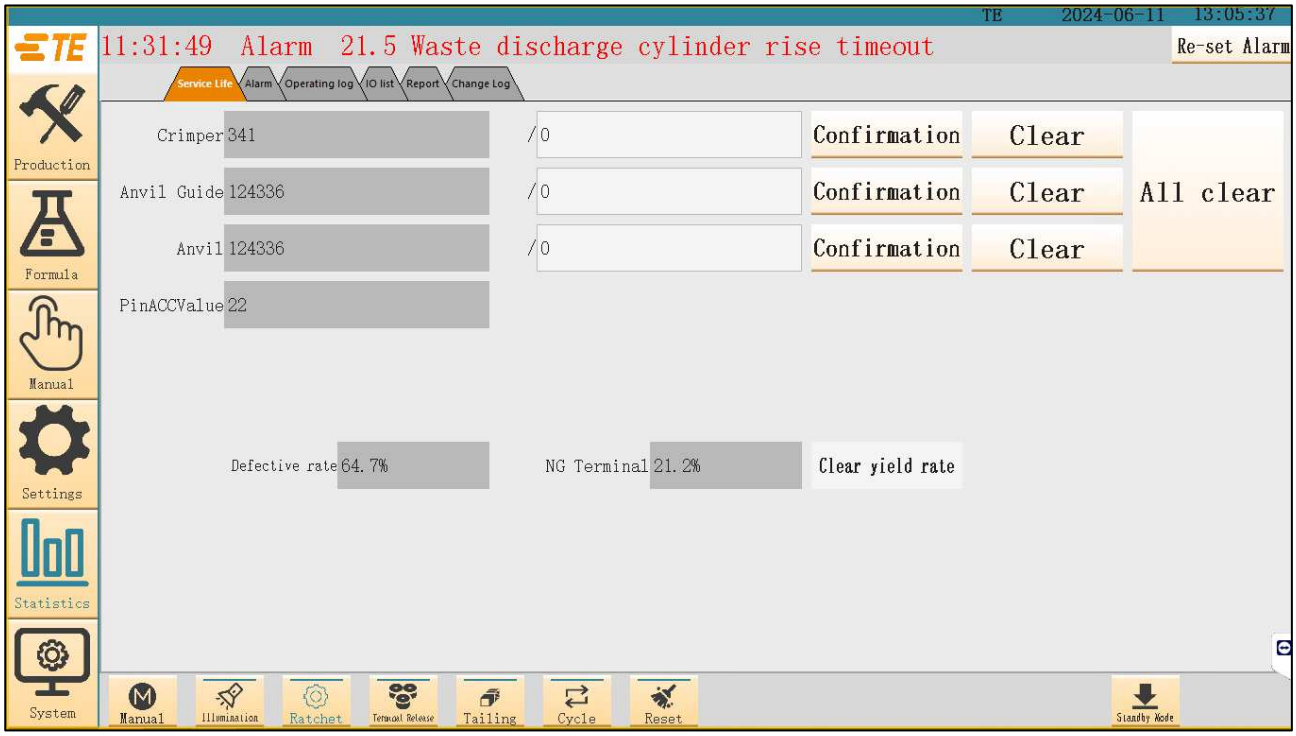
If necessary, please contact the sales team.

7.7 Statistics interface

The following parameters need to be set when the camera is used for the first time or when the camera is replaced. After the settings are completed, the default can be selected for Formal Production.

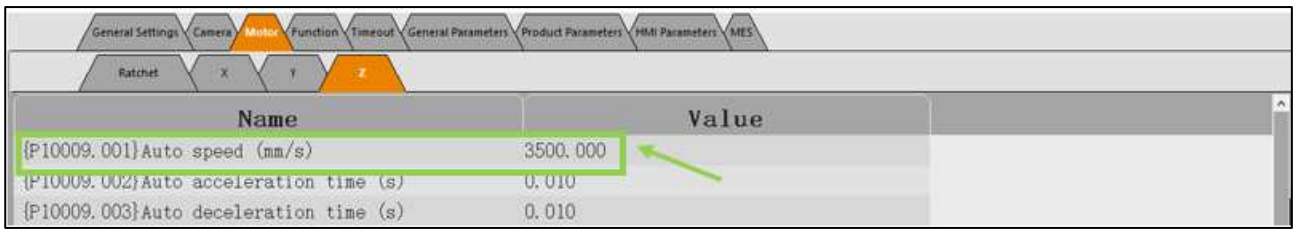
7.7.1 Lifetime

Figure 100: Service life



The speed of fatigue test is the automatic speed of Z-axis. The locking cylinder will not follow the movement of Z-axis during the fatigue test.

Figure 101: Motor for Z-axis



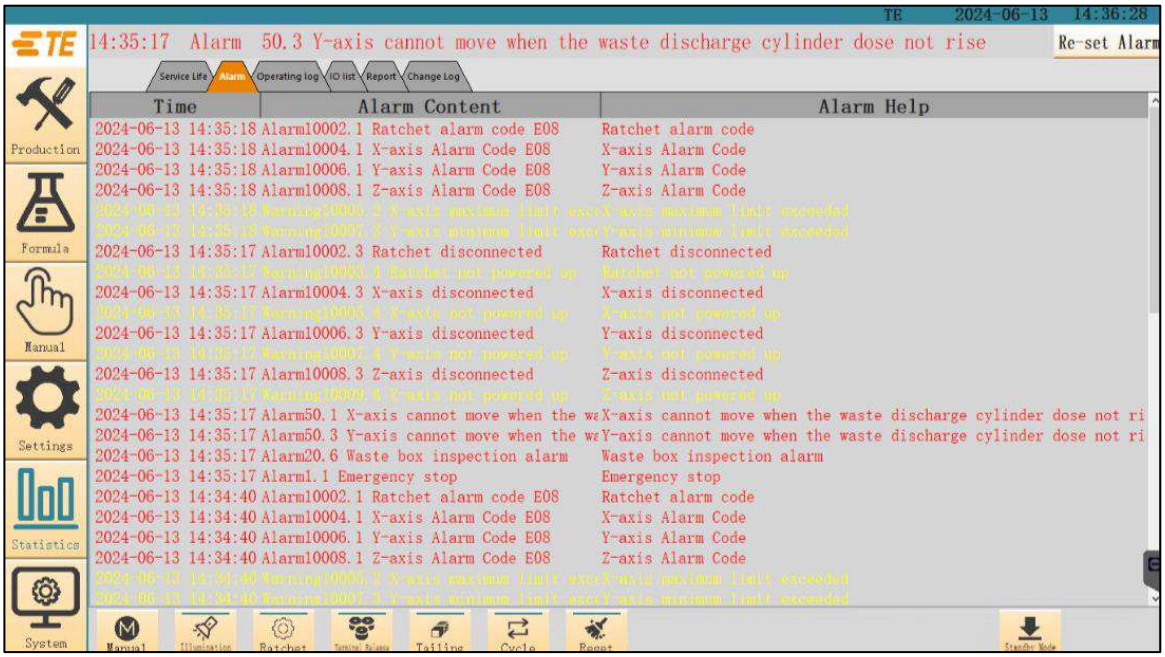
7.7.2 Alarms

Alarm category: red font

Warning category: yellow font

Tip category: white font

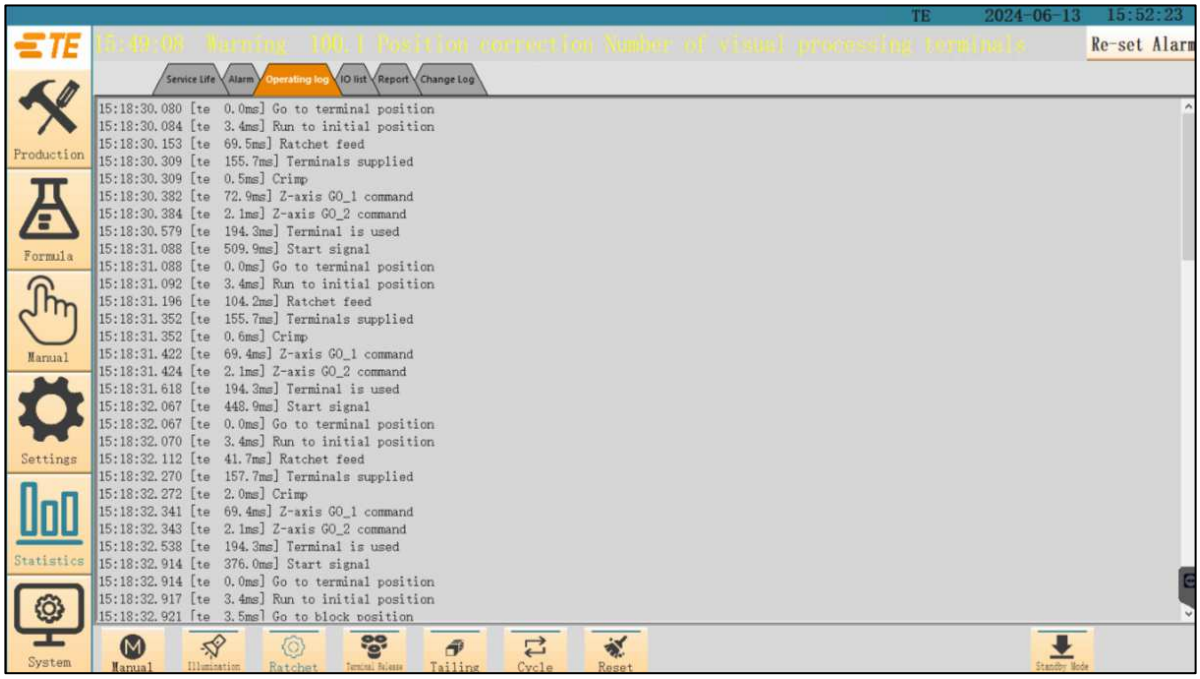
Figure 102: Alarms



7.7.3 Operating log

All operating logs from the time the software was turned on are shown here. When the software is turned off, the operating log is cleared.

Figure 103: Operation log

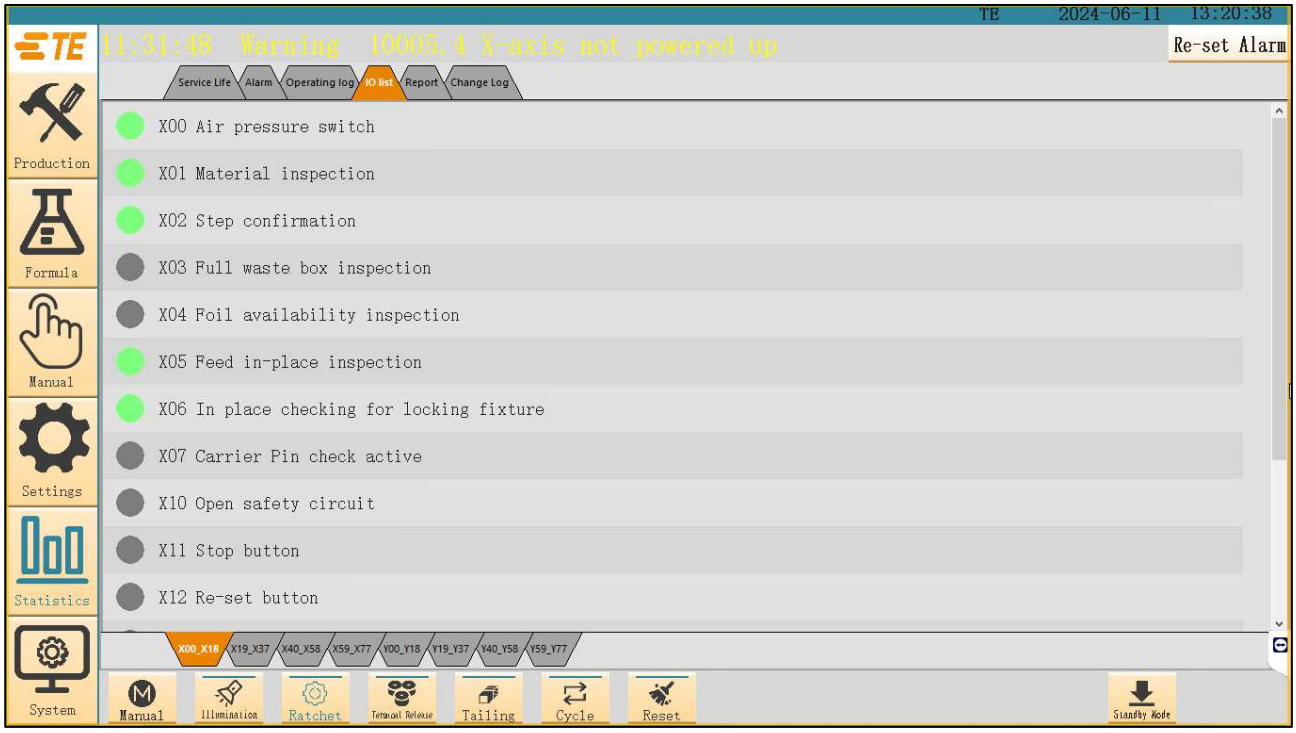


7.7.4 IO list

X00-X31 and X32-X47 are DI lists. They show green when there is a signal. They show gray when there is no signal.

Y00-Y31 and Y32-Y47 are DI lists. They show green when there is output. They show gray when there is no output.

Figure 104: IO list



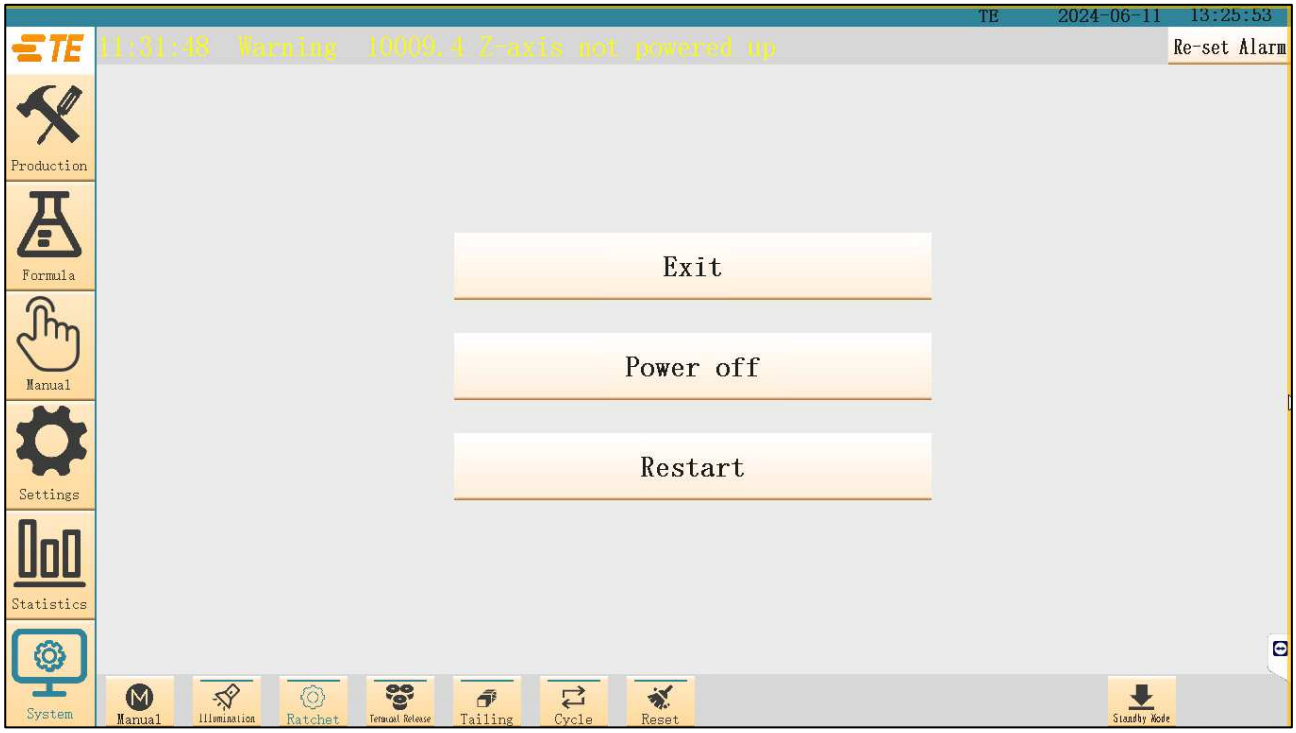
7.8 System interface

Exit: Click on Exit and the FFC software will close.

Power Off: Click on Power Off and the computer will be powered off.

Reboot: Click on Reboot and the computer will reboot.

Figure 105: System interface



- Close each protective door.
- Release the Emergency Stop switch.
- Press the reset button [Reset] to clear the error message.
- Press the return button [Origin] and the machine will enter the initial standby position.
- Click Open Formula in the formula interface, select the desired production formula and click Open.
- urn the rotary key switch to switch to the automatic button [Auto] and touch screen to switch to the production interface.

8 New Product Commissioning

The proposed commissioning process for a new product is as follows:

- Call the prepared production formula, set the equipment to manual mode and then click on the [Start] button  to operate in CYCLE  mode step by step.
- After manual pressing, check the crimping height and position degree of the sample terminal.
- If necessary, adjust the production formula or the visual processing formula until it meets the required crimping height and position degree, and then switch to automatic production mode.
- In automatic mode, make a proof again and check the terminal crimping height and position degree, and, if it passes, send the profile for inspection or start production.

8.1 Calling the formula to produce in automatic mode

- Call the prepared production formula and set the equipment to manual mode.
- The operator places the Foil through the feeder so that its edges are against the front block and the right side of the block.
- Press the start button  or step on the foot switch when the Foil is in place, and then the clipping mechanism will hold the Foil and start to move the load inside the protective cover; at this time, the operator can take his/her hand away
- After that, the Foil will be loaded back to the loading position and the clipping mechanism will release.
- The operator can then remove the Foil.

8.2 Use of MES

The operation of a customized MES may vary from customer to customer, please refer to the MES operating manual for details.

9 Troubleshooting

NOTE

If the machine is in the state of reporting error:

- *the orange signal light flashes or the buzzer sounds.*
- *The machine stops and the reset button (yellow) lights up.*
- *An Error message is displayed on the HMI.*

9.1 General troubleshooting information

- Perform the operation systematically and concentrate on the relevant steps even if you are short of time. Random, indiscriminate disassembly and changes to settings can lead to the original cause of the fault no longer being able to be located.
- See how the machine works.
- Try to determine if the machine was operating normally before the fault occurred.
- Try to determine if any modifications were made.
  - Have the operating conditions or application changed?
  - Has the machine been modified (e.g. converted) or repaired (electrical system, control)? If so: specify the modifications.
  - Has the machine been used for the intended purpose?
  - How does the fault make itself noticed?
- Develop a clear understanding of the cause of the fault. If necessary, consult the responsible operator or technician.
- Before carrying out time-consuming troubleshooting measures, check to make sure that the power supply and compressed air supply are available.

NOTE

- *Errors must be eliminated in the Manual mode of the machine, the Mode switch on the Operator Panel must be switched to Manual.*
- *If the operator cannot eliminate the error then a special educated technician needs to be contacted.*
- *If the customer's personnel are unable to resolve the error, it is necessary to contact a TE Field Service Engineer.*

9.2 Errors and their description

NOTE

- *The mentioned errors in the following table are failures which can occur during normal production mode.*
- *If the personnel of the customer is not able to solve the error then the TE Field Service needs to be contacted.*

9.2.1 Error message

Explanation: The content in () represents the sensor code. For example, ratchet feed error (E1002): E1002 means that the sensor E1002 may be faulty and the code is applied to the sensor in the form of a line number.

- Open safety circuit (E1008): The Emergency Stop switch is pressed or the protection cover is open. Note that the machine does not indicate if the motor has been manually moved when the safety circuit is open, but you must perform a return to origin before producing again.
- Abnormal air pressure (E1000): Air inlet pressure from air source is less than the set value.
- SM101 X-axis: Motor [Limit Error]: Motor limit is exceeded, please check the hard limit and soft limit.
- EA100 Y-axis: Motor [Limit Error]: Motor limit is exceeded, please check the soft limit.
- Emergency Stop switch pressed (E1104): Emergency Stop switch is pressed.
- CY100-Foil Clipping Cylinder [Home Position Alarm]: Cylinder home position sensor is not lit on or in-place sensor is not lit off.
- CY100-Foil Clipping Cylinder [In-Place Alarm]: Cylinder home position sensor is not lit off or in-place sensor is not lit on.
- CY101-Bezel forward-backward cylinder [Home Position Alarm]: Cylinder home position sensor is not lit on or in-place sensor is not lit off.
- CY101-Bezel forward-backward cylinder [In-Place Alarm]: Cylinder home position sensor is not lit off or in-place sensor is not lit on.
- CY103-Locking cylinder [Home Position Alarm]: Cylinder home position sensor is not lit on or in-place sensor is not lit off.
- CY103-Locking cylinder [In-Place Alarm]: Cylinder in-place sensor is not lit on or home position sensor is not lit off.
- CY104-Ratchet release cylinder [Home Position Alarm]: Cylinder home position sensor is not lit on or in-place sensor is not lit off.
- CY104-Ratchet release cylinder [In-Place Alarm]: Cylinder in-place sensor is not lit on or home position sensor is not lit off.
- SM100 Ratchet: Motor [OFF in progress]: motor is not enabled.
- SM100 Ratchet: Motor [Alarm in progress]: motor has alarm.
- SM100 Ratchet: Motor [Positioning Abnormal]: Motor positioning command was executed incorrectly.
- SM101 X-axis: Motor [OFF in progress]: Motor is not enabled.
- SM101 X-axis: Motor [Alarm in progress]: Motor has an alarm.
- SM101 X-axis: Motor [Positioning Abnormal]: Motor positioning command was executed incorrectly.
- SM102 Crimp: Motor [OFF in progress]: Motor is not enabled.
- SM102 Crimp: Motor [Alarm in progress]: Motor has an alarm.

- SM102 Crimp: Motor [Positioning Abnormal]: Motor positioning command was executed incorrectly.
- EA100 Y-axis: Motor [OFF in progress]: Motor is not enabled.
- EA100 Y-axis: Motor [Alarm in progress]: Motor has an alarm.
- EA100 Y-axis: Motor [Positioning Abnormal]: Motor positioning command was executed incorrectly.
- Reel Discharge Timeout (E1001): The allowable time for discharge has been exceeded and the discharge signal E1001 is still detected.
- Ratchet Feed Error (E1002): The state of the feed detection signal E1002 is incorrect.
- FVD Measurement Timeout: The waveform measurement completion signal is not received after the specified time.
- Ratchet Not In-place (E1108): Ratchet is not in the correct position.
- AOI Photo Processing Timeout: The AOI photo completion signal is not received after the specified time.
- No Terminals Selected: No crimping terminals were selected in the Production Formula - Crimping Selection window.
- No Terminal Detected (E1005): No terminal was detected at the terminal crimping position.
- AOI Software Not Running: The visual processing software is not turned on or is not online.
- FVD Parameter Writing Failure: Pressure amplifier parameter writing failed.
- Press-fit Force Range Setting Error (formula): The press-fit force range in the formula is set incorrectly.
- Crimping Height Range Setting Error (formula): The crimping height range in the formula is set incorrectly.
- AOI Data Save Timeout: AOI data save completion signal is not received after the specified time.
- AOI Detects that Foil Is Put out of Place: Foil is not put properly. Please take it out and put it in again.
- Locking Mechanism Not Raised in Place (E1006): Locking mechanism is not raised to high point normally.
- Crimping Height Failed: Crimping height failure is detected.
- Aviation Plug Not Inserted (E1007): The aviation plug connecting the reel stand to the machine is not inserted (for desktop only).
- Anvil End of Life: The tool reaches end of life. Please check/replace tool.
- Anvil Guide End of Life: The tool reaches end of life. Please check/replace tool.
- Crimper End of Life: The tool reaches end of life. Please check/replace tool.
- Changeover Not Completed (E1003): The changeover was not done correctly.
- AOI Detects That the Actual Foil Does Not Match the Formula Setting: The actual Foil placed does not match the formula setting.

- Maximum Press-Fit Force Failed: Failure of the maximum press-fit force is detected.
- Waveform Monitor Alarm: There is an alarm (Kistler) on the waveform monitor.

9.2.2 Alarm message

- Not Return to Origin: Return to Origin is not completed. This message also appears in the following cases: 1. The servo motor/cylinder is turned off manually; 2. JOG/STEP is performed manually to the crimping motor; 3. The servo motor/cylinder sends alarm.
- CY100-Foil clipping cylinder [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- CY101-Bezel forward-backward cylinder [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- CY102-Waste suction [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- CY103-Terminal locking cylinder [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- CY104-Ratchet release cylinder [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM100 Ratchet feed: standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM100 Ratchet feed: Nano standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM100 Ratchet feed: MQS standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: initial correction [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: initial termination [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: initial size [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: target correction [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: target crimping [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: target size [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: Mark inspection-obverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.

- SM101 X-axis transfer: Mark inspection-reverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM101 X-axis transfer: target Mark inspection [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM102 Crimping: standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- SM102 Crimping: vertex position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: target crimping [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Mark inspection-obverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Mark inspection-reverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: target Mark inspection [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Correction inspection-obverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: standby position [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Mark inspection-obverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Mark inspection-reverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: Correction inspection-obverse [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- EA100 Y-axis transfer: size measurement [Manual-Automatic Inconsistency]: The cylinder is operated in the manual screen. Please restore the cylinder status.
- lease put Foil [Warning]: Prompt to put Foil.
- Please enter Foil barcode [Warning]: Prompt to enter barcode.
- The current Foil type does not match the formula [Warning]: The actual Foil detected does not match the formula setting.
- Please disengage the ratchet [Warning]: Please disengage the ratchet from the strap.
- Please take off the Foil [Warning]: Prompt to take off the Foil.
- Target yield is reached [Warning]: The set target yield is reached.
- Please check if there is any terminal residue [Warning]: Please check and clean the residual terminals before producing again.

- Barcode reading timeout [Warning]: The barcode is not read after the specified time.
- No valid barcode was read [Warning]: The barcode read does not match the formula setting.

CAUTION

Be cautious of hand injuries!

Extremities may be crushed during accidental movement of electrical components.

- *Before Maintenance and repair at the machine, the machine must be disconnected from electrical and pneumatic power.*
- *Main switch and pneumatic maintenance unit must be secured against unauthorized power on*

NOTE

Troubleshooting is only allowed by special educated personnel.

If the personnel of the customer is not able to resolve the problem, then the TE Field Service needs to be contacted. Restart of the Production is allowed after the maintenance personnel or the TE Field Service resolved the failure and gives the OK to restart the machine.

10 Maintenance

The generic term maintenance is understood to be:

- Inspection (determining and assessing the equipment condition)
- Maintenance (maintaining the required equipment condition)
- Repair (restoration to a desired state)

Only regular inspections allow (normal) wear of individual components to be identified in good time.

As part of necessary (normal) maintenance to be carried out periodically, wearing parts can also be replaced. This avoids expensive downtimes.

10.1 Inspection and maintenance items

Table 22: Inspection and maintenance items

Type of Maintenance	Object	Maintenance Contents
Daily Maintenance	Equipment surfaces	Clean external surfaces with flexible cleaner and soft rags.
	Waste bag	Empty the waste bag and put the waste into the corresponding waste container.
	Paper tape reel	If the paper tape reel is full, remove the wrapped paper tape.
Monthly maintenance	Moving parts	Use a grease gun to pump grease (Mobil Vactra™ Oil No.2 SLC) into the grease injection port, and check that the old grease being pushed out of the corresponding parts by the new grease.
	Electrical cabinet intake fan	Use an air gun to clean the dust on the air intake fan filter.
	Slide area	Clean the slide area of loose terminals, scrap, grease and other debris.

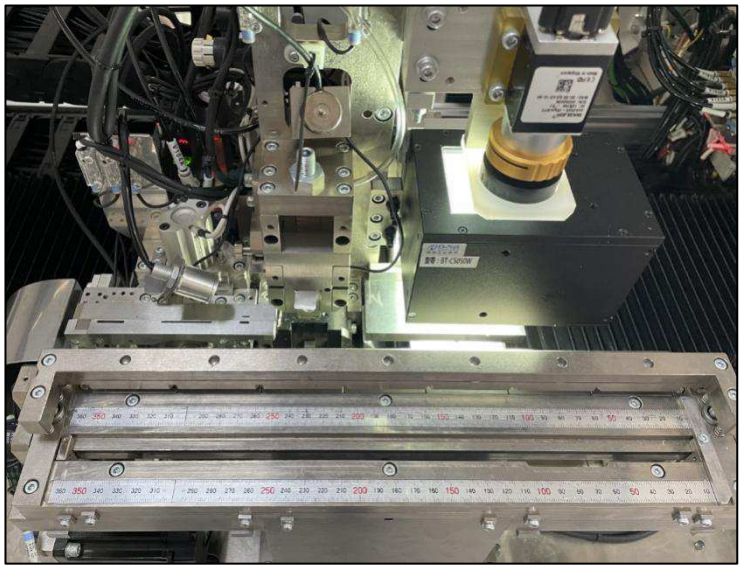
NOTE

Only the maintenance work described below are permitted to perform by specially trained personnel from the operating company.

All other maintenance work is recommended to be done by a TE Field Service Engineer.

10.1.1 Clean the equipment surfaces

Figure 106: clean surfaces

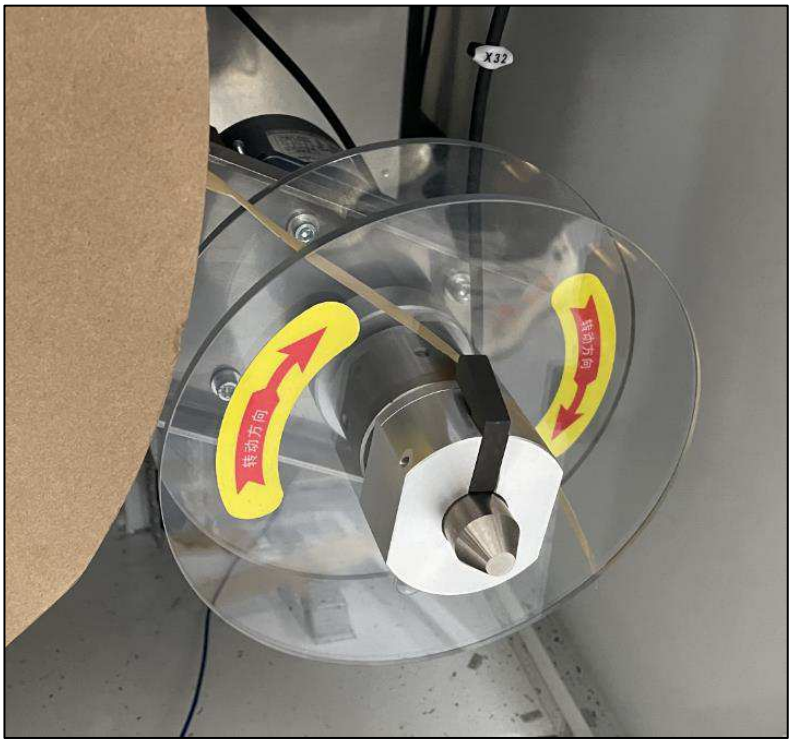


10.1.2 Empty the waste bin

Figure 107: waste bin

10.1.3 Empty the paper tape reel

Figure 108: paper tape reel

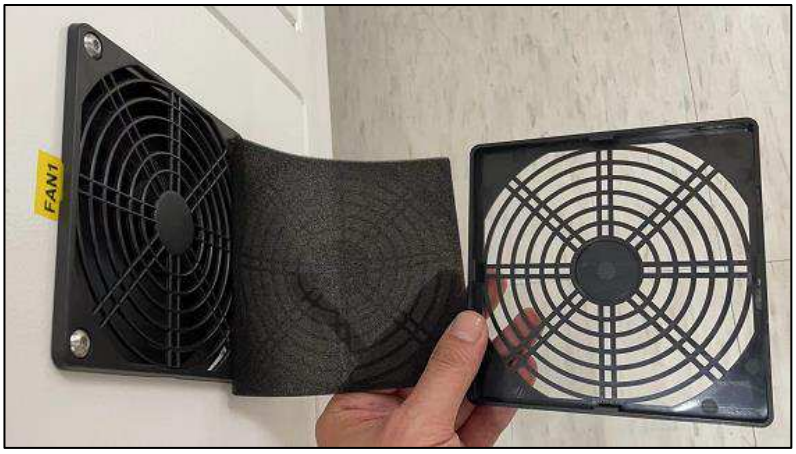


10.1.4 Grease injection port

Figure 109: Grease injection port

10.1.5 Electrical cabinet air intake fan

Figure 110: Electrical cabinet air intake fan



10.2 Maintenance work

Maintenance may only be carried out by specially trained personnel from the machine manufacturer (FSE for TE) or by personnel with specialized operator training!

The maintenance personnel must:

- know the functions and operations of the equipment and must know the safety installations of it
- be able due to his education to recognize possible Risks during maintenance,
- authorized from the operating company to do maintenance work at the designated ma-chine.

During Maintenance Work:

- use suitable tools
- Spare and Wear parts only to be exchanged with spare and wear parts of the manufacturer.
- Standard parts only to be replaced by parts of the same classification or with a higher classification.

After Maintenance Work:

- Ensure that all tools and replaced parts are out of the machine.

- Ensure that all safety installations are mounted and functioning.
- Functional check of the equipment.
- Release the equipment for production after the functional check has indeed been completed.

11 Spare and wearing parts

See the Table 23 & Table 24 below for a list of parts:

Table 23: Spare parts list

Spare parts list		
Part Number	Description	Quantity
8-2439352-0	Ratchet for NANO MQS	1
4-2413734-5	Ratchet reset spring	1
2-2413732-1	Forming blade	1
1-2413732-7	Shuffle block	1
6-2439353-7	Shuffle seat guide	1
5-2439352-1	Eccentric shaft	1
8-2413732-9	Sliding block for eccentric shaft	1
4-2439352-3	Cutting knives	1
3-2413732-4	Link cutter	1
1-2413734-1	Proximity sensors	1
9-2439354-0	Spring	3
5-2413734-2	Speed control valve	1
1-2413734-7	Decrease Speed	1
5-2413734-6	Tape	1
2-2439354-0	Bearing	1
4-2413735-9	SOL.	1
2-2439354-4	Pressure Sensors	1
5-2413734-8	CONTO.	1
4-2413735-7	Reading head	1
6-2413737-9	Cable Plug	1
1-2413737-6	Rear Nut Sockets	1
4-2413737-5	Leakage circuit breaker	3
4-2413737-6	Contactors	2

Table 24: List of wearing parts

List of wearing parts		
Part Number	Description	Quantity
8-2439352-0	Ratchet for NANO MQS	1
4-2413734-5	Ratchet reset spring	1
2-2413732-1	Form cutter	1
1-2413732-7	Shuffle block	1
6-2439353-7	Shuffle seat guide	1
5-2439352-1	Eccentric shaft	1
8-2413732-9	Sliding block for eccentric shaft	1
4-2439352-3	Cutting knives	1
3-2413732-4	Link cutter	1
1-2413734-1	Proximity sensors	1
9-2439354-0	Spring	3
5-2413734-2	Speed control valve	1
1-2413734-7	Decrease Speed	1
5-2413734-6	Tape	1
2-2439354-0	Bearing	1
4-2413735-9	SOL.	1

12 Shutting down the machine

12.1 Shutting down the machine

- Powering down the IPC after closing the application via the visual processing monitor
  - Switch off the machine at the main switch.
  - Disconnect the mains supply.
- Disconnecting the triplex switching valve
  - Clean the machine.

12.2 Storage

If the machine is no longer required, it must be stored dry and clean under the dust cover.

13 Disposal

Dispose of the machine in compliance with the locally applicable regulations for special waste, electrical waste, recyclable waste, etc.

Figure 111: Electrical waste symbol

The symbol on the product or in the product manual shows that this product must not be dis-posed of together with other waste.

This waste must be taken to a suitable recycling facility.

WEEE Directive

In accordance with the WEEE Directive, TE Connectivity supports recycling of the waste of electrical and electronic equipment.

Relevant information can be found on the following website:

http://www.tycoelectronics.com/customersupport/rohssupportcenter/

On this website, select "E-waste Recycling" and follow the instructions.

Disposal must take place in compliance with the local regulations.

In case of doubt, the machine can be sent to TE for disposal.

14 Drawings, parts lists, circuit diagrams

See the appendix (it will be sent with the machine, or please contact us for more information).

15 Replacement and repair

Stock and control a complete inventory to prevent lost time when replacement of parts is necessary. Order or return parts through your TE representative, or go to TE.com and click the **Shop TE Store** link at the top of the page.

For field service, go to the Service and Repair page on the TE website, or send an e-mail to the address for your region in Table 25.

Figure 112: Service and repair

Table 25: Field service e-mail addresses

Region	Address
Asia	Tefe1ap@te.com
EMEA (including India)	Tefe1@te.com
North America	Fieldservicesnortharmerica@te.com
South America	FSE@te.com

Application Tooling