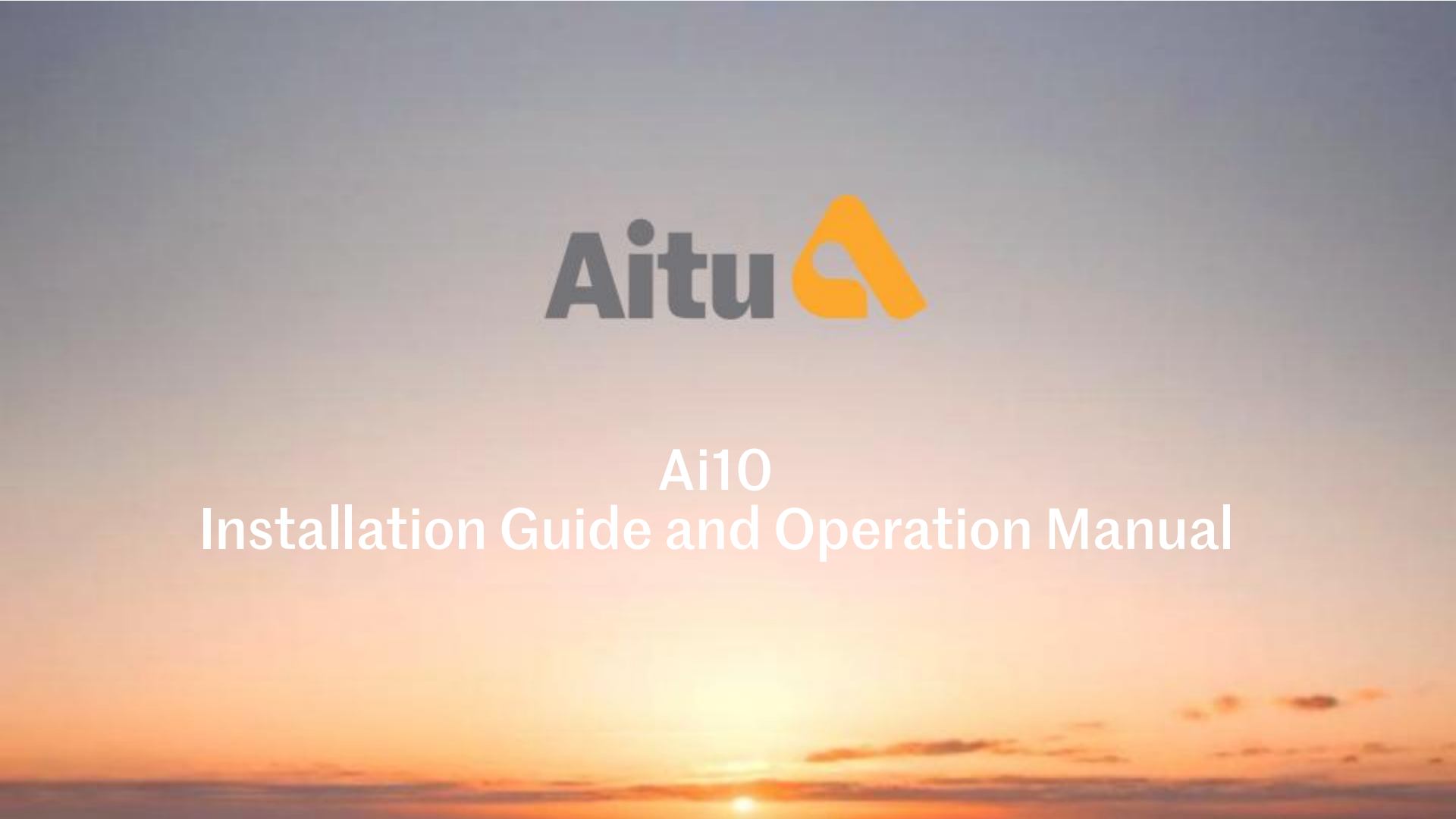


Ai10
Installation Guide and Operation Manual

CONCENTS

Installation tools

No.	Description
1	8MM Open-end wrench
2	10MM Open-end wrench
3	14MM Open-end wrench
4	2.0MM Hex key
5	Adjustable wrench
6	Slotted screwdriver
7	Pistol drill
8	Hammer
9	Long-nose pliers

Thread rack installation

①

Insert the thread reel support rod fully into the thread reel.

②

Insert the thread reel pad and anti-loosening claw into the support rod in the specified order.

③

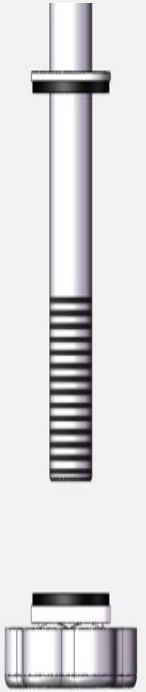
Fasten the component prepared in Step 2 to the thread guide rod of the lower thread rack.

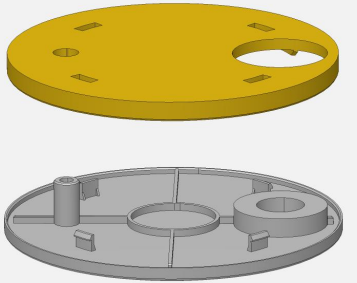
④

Insert the lower thread rack, the thread rod of the upper thread rack, and the protective plug into the thread rod in sequence, then tighten the screws.

Thread rack installation

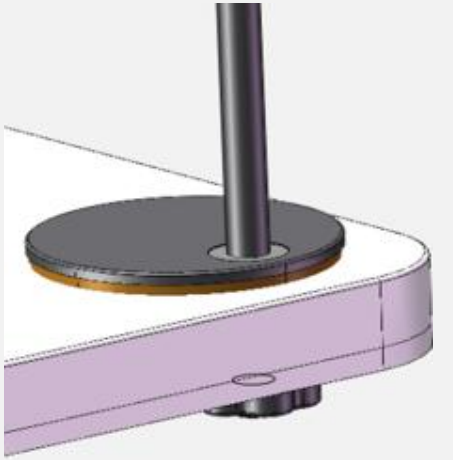
⑤



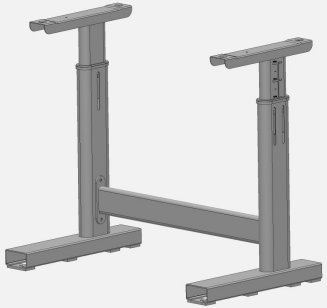


When installing the circular base of the cable rack, place the upper base on top, align it with the snap fasteners of the lower base, and press firmly to secure.

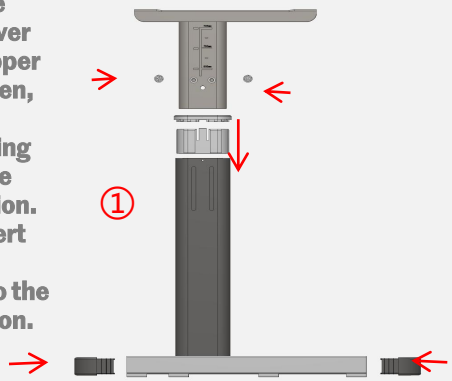
⑥

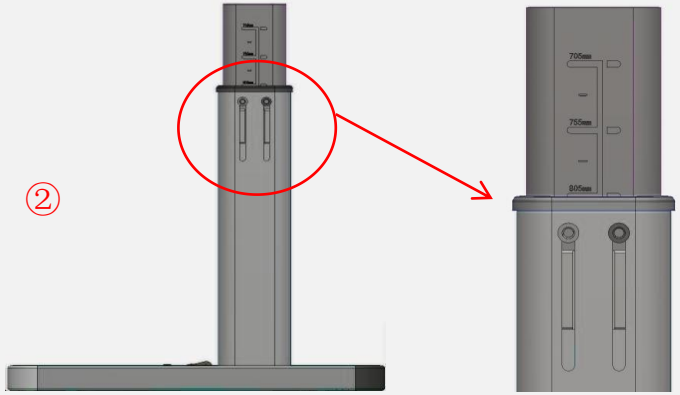


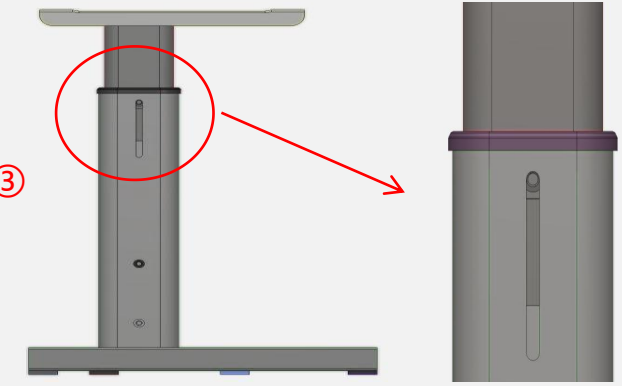
Installation of the Rack Support Assembly



First, fit the bracket cover onto the upper section. Then, install the bracket fixing block on the upper section. Finally, insert the upper section into the lower section.



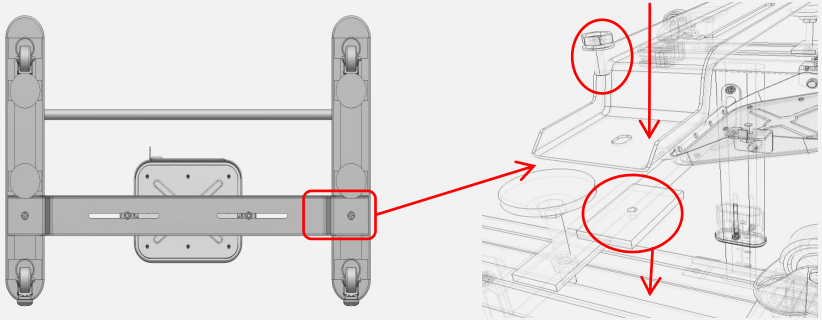




The required torque for the screw is 55 N·m.

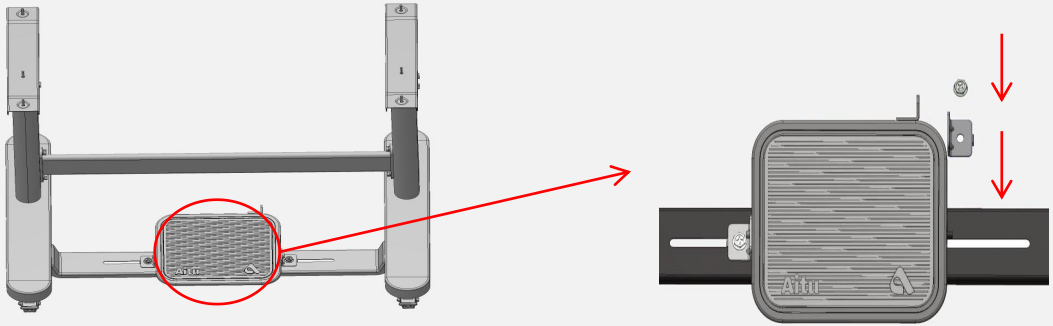
Tabletop Installation

①



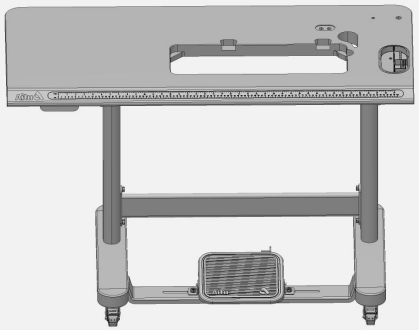
The crossbeam position can be adjusted ±5cm forward or backward as needed; the required torque for the screws is 55 N·m.

②

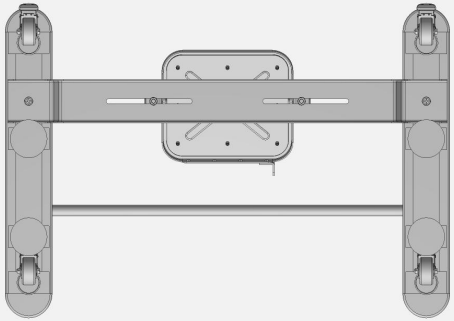


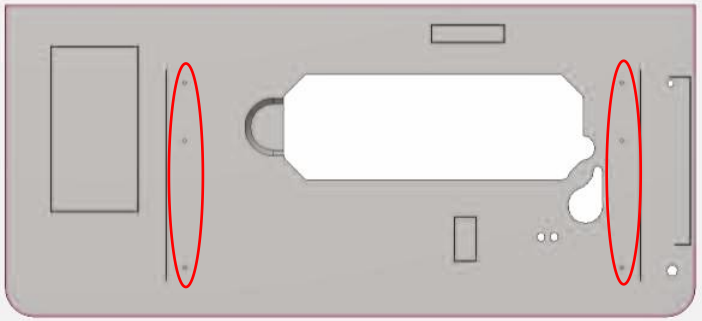
The position of the foot pedal can be adjusted ±3cm left or right as needed; the required torque for the screws is 55 N·m.

Tabletop Installation

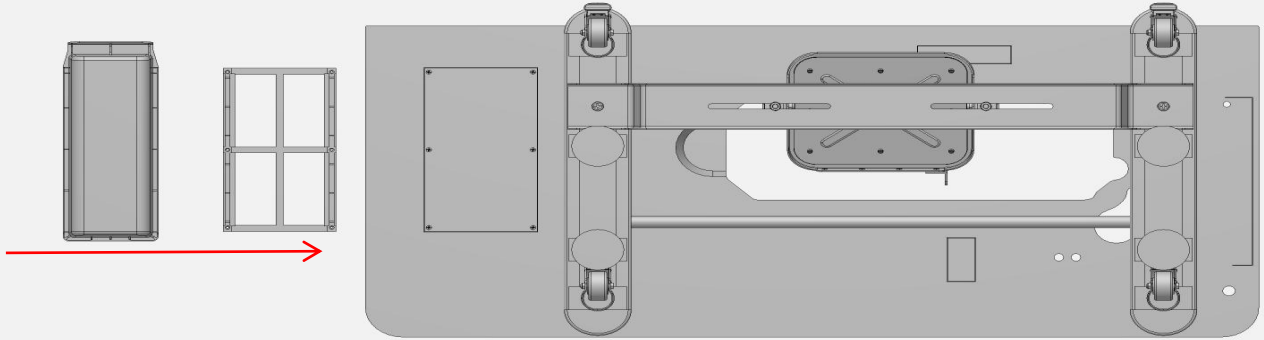


①



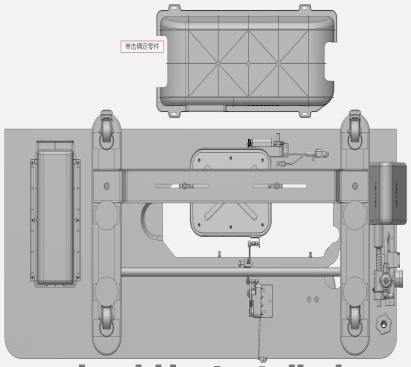


②

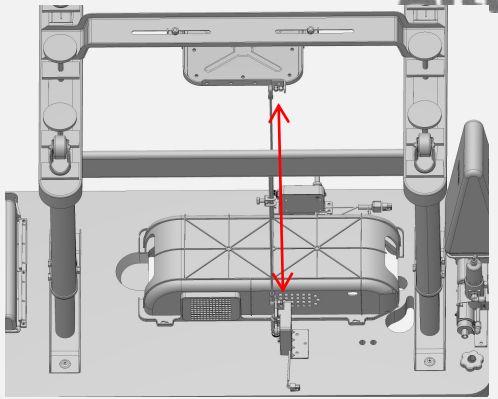


The tabletop and the guide rail of the parts box should be installed according to the preset hole positions; the required torque for the screws is 45 N·m.

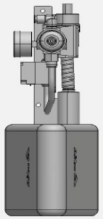
Tabletop Installation

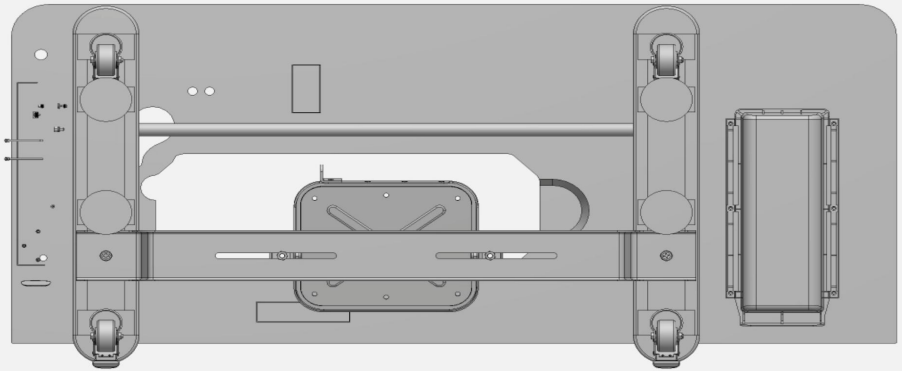


The oil pan should be installed according to the preset hole positions.



Align the foot controller with the foot pedal.





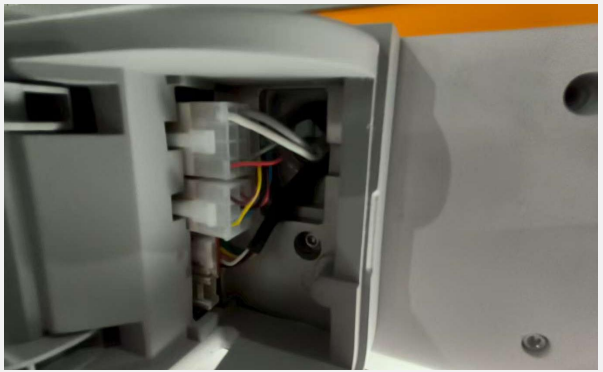
The air suction device should be installed according to the position specified in the diagram.

Machine Installation

Reinforce the rubber pad of the machine head with nails.

Install the machine head.

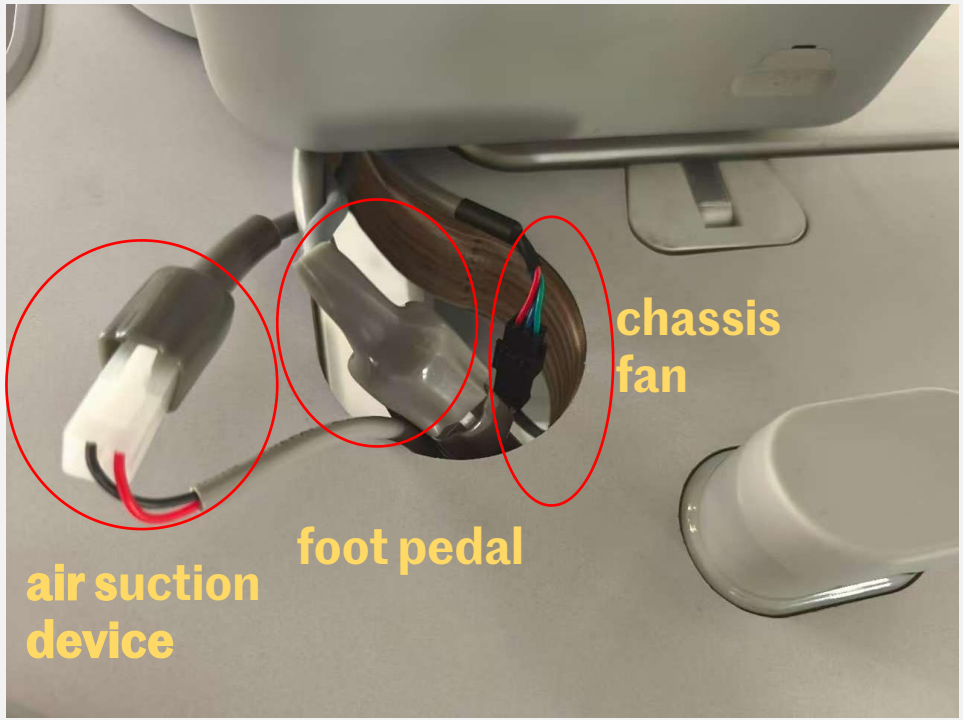
Install the operation panel.



Tighten the hexagon socket screws (3.0 mm) of the operation panel.

Machine Installation

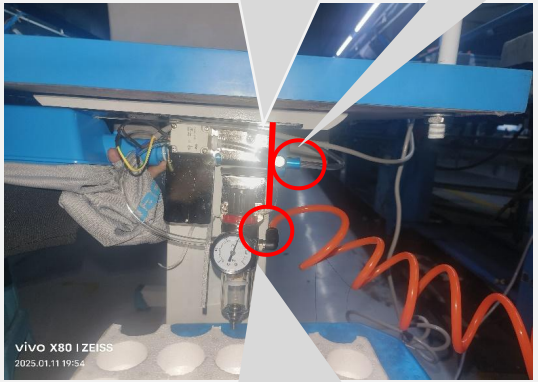
There are three connected devices in total, each with a distinct design. Simply match them with their corresponding plugs.



Machine Installation: Air Pipe Routing Scheme for Pneumatic Air Suction Device

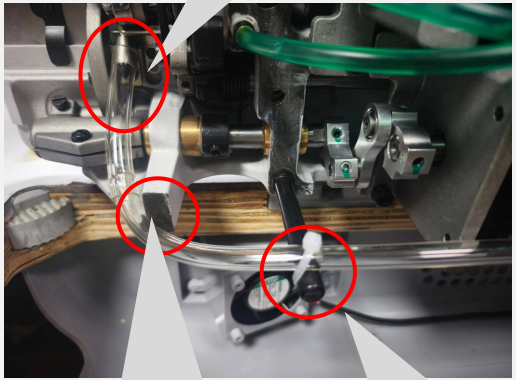
1.Install the air suction device at the position shown in the diagram

2.Connect one end of the white air pipe to this connector



3.Connect the factory air source to this interface

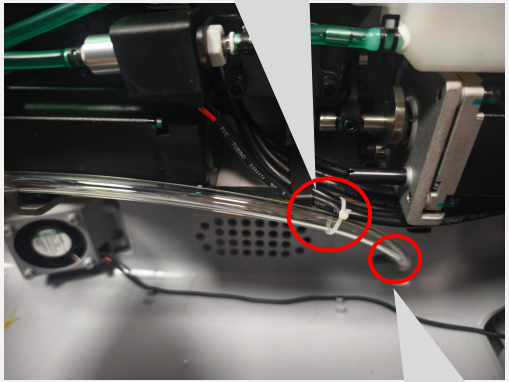
4.Connect the adapter air pipe (50-60mm) of the white air pipe to the air suction port



5.Route the air pipe through the L-angle on the left side of the blank

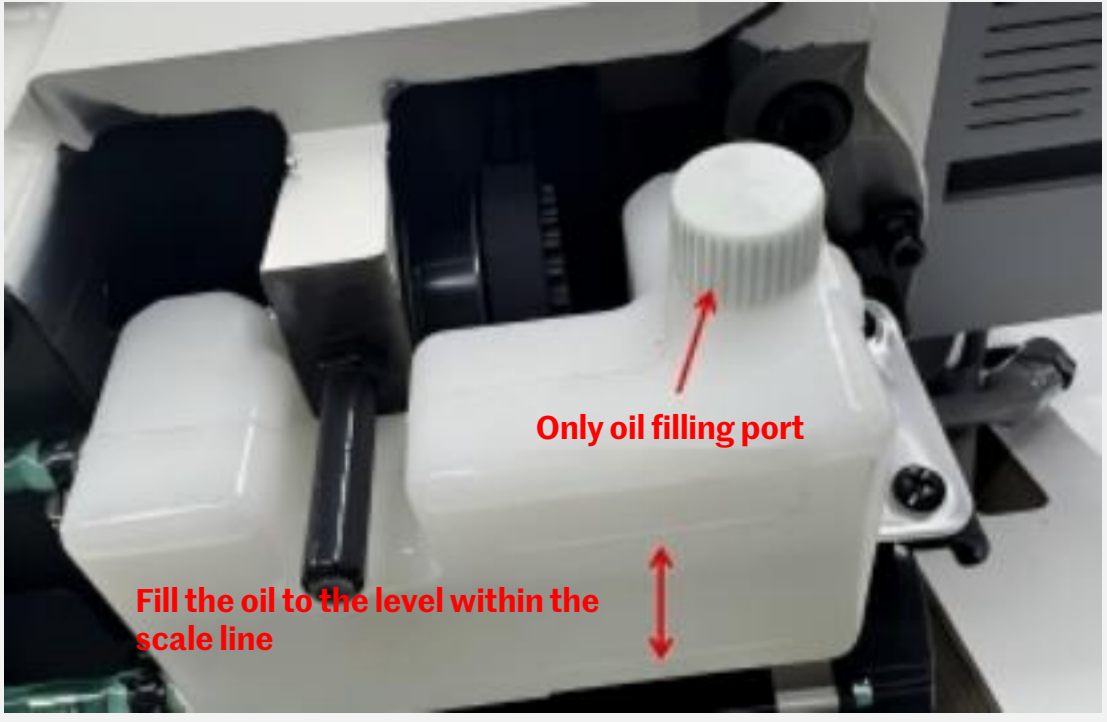
6.Bind the air pipe to the inside of the base pillar

7.Bind the air pipe together with the motor wire



8.Route the air pipe into the tray through the wire outlet

Machine Installation (Oil Filling Note)

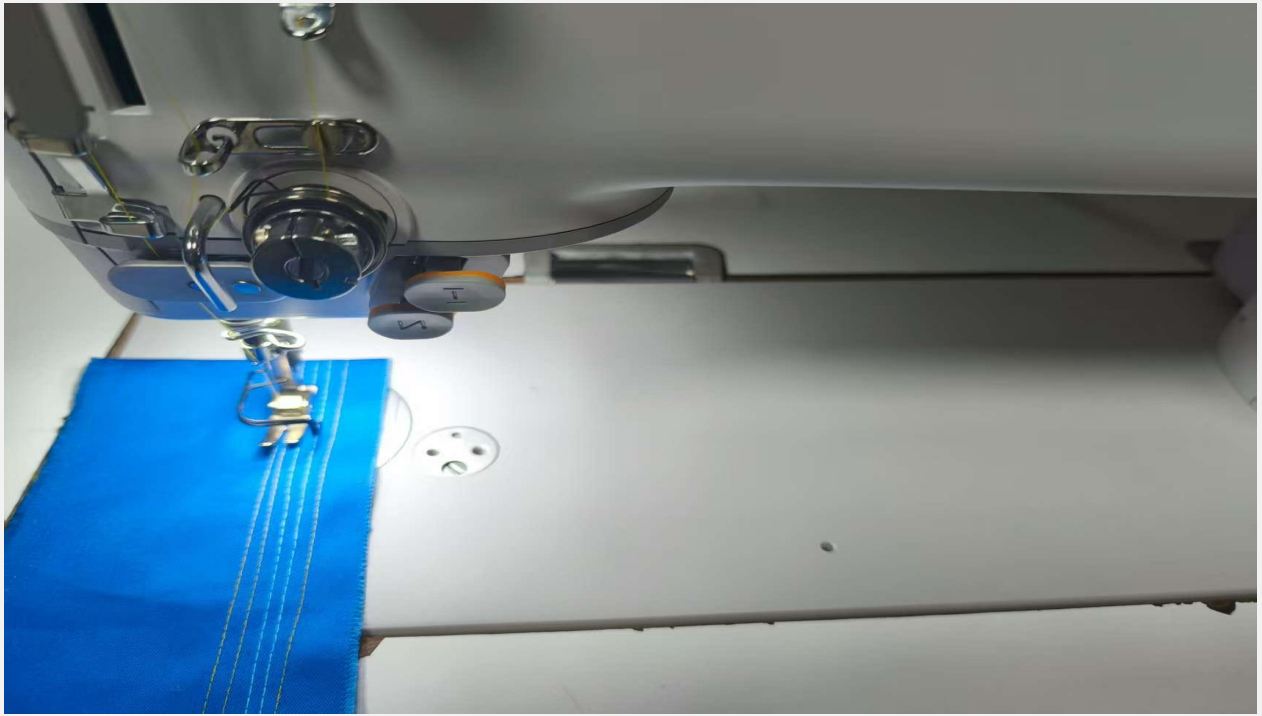


Strictly prohibit oil filling at the gearbox position marked by the red circle; otherwise, severe oil leakage will occur!

The oil pot opening at the bottom of the machine is the only oil filling port for the entire machine. Fill the oil to the level within the scale line

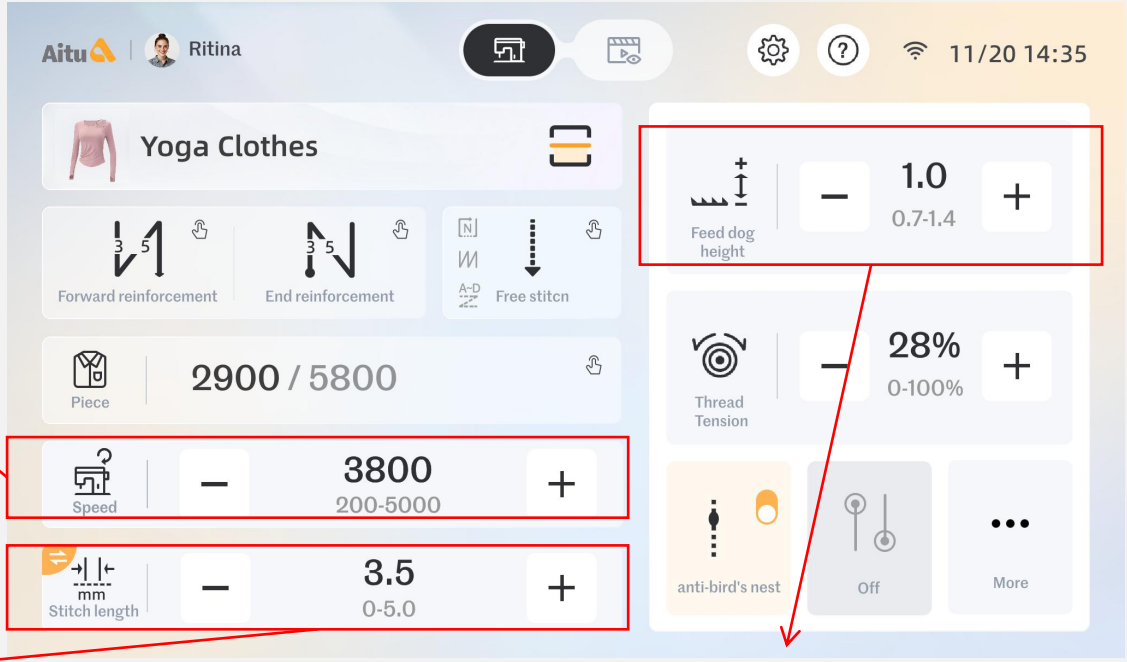
Machine Testing

Use the machine to sew fabric to test the stitch; check if there is any fault in the thread trimming and automatic presser foot lifting functions; and check if the machine makes any abnormal noise.



Machine Testing

Test whether the rotation speed changes when pressing the "+" and "-" buttons.

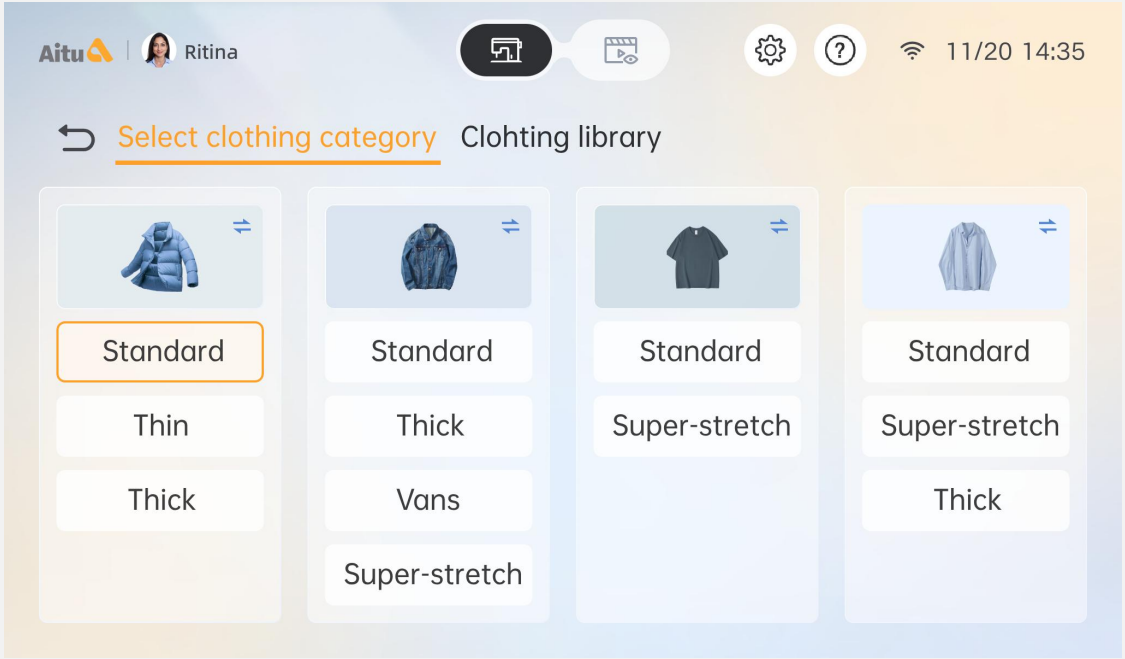


Test whether pressing the stitch length button switches the unit to inches, and whether pressing the "+" and "-" buttons changes the stitch length.

Test whether pressing the "+" and "-" buttons changes the height of the feed dog.

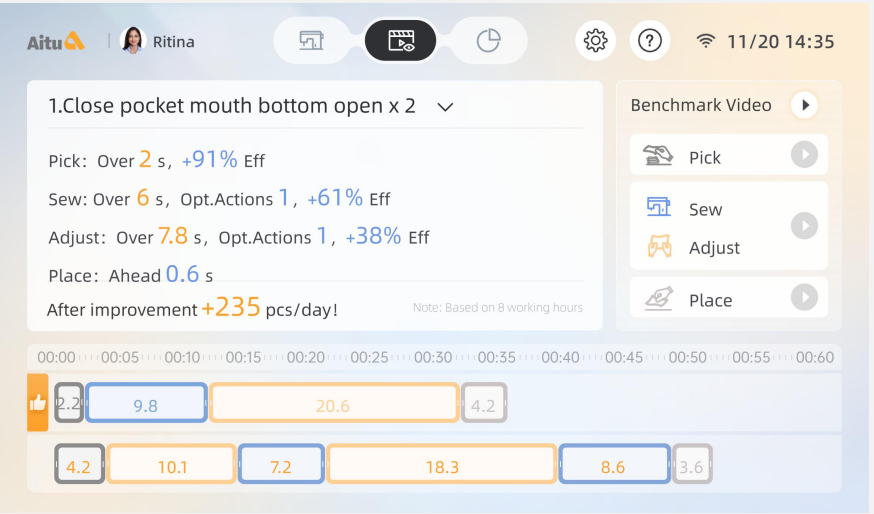
Machine Testing

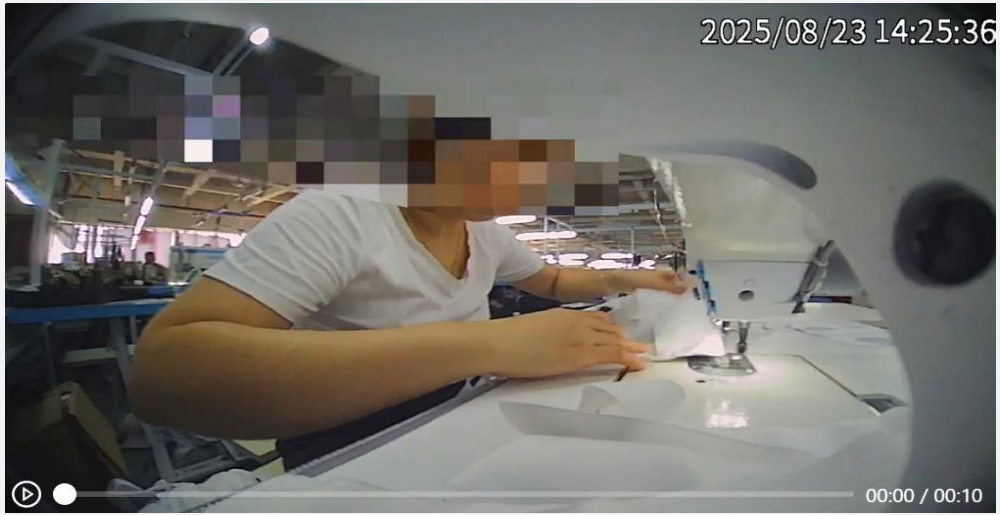
The clothing library mode is "real-time saving upon modification". Each panel has an independent library. Every time the panel parameters are modified, the clothing library will be updated and finally saved



Test whether the parameters of the clothing library change when switching the library

Machine Testing

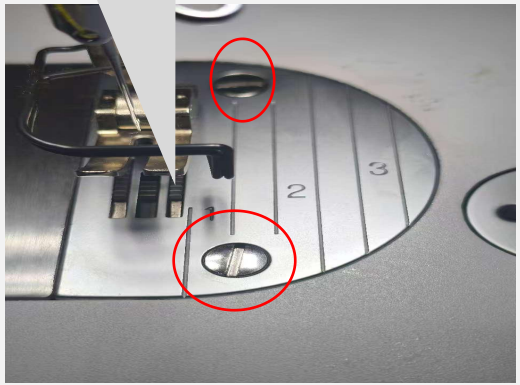




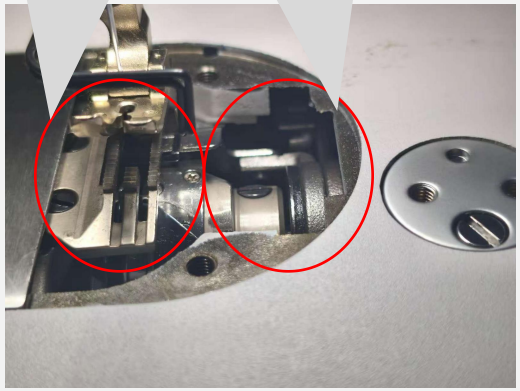
Tap the video interface to test whether the camera works normally

1.4 Equipment Daily Maintenance

Step1.Use a flat-head screwdriver to loosen the screws and open the needle plate.



Step2.Daily cleaning of thread ends and lint on the feed dog should be done using an air blow gun.



Step3.Perform daily cleaning on the thread ends and lint at the hook with an air blow gun.

Step4.Daily cleaning of thread ends and lint at the lock core should be carried out using an air blow gun.

CONCENTS

Overview of Ai10 Product Functions

Garment Library

Touchscreen

Oil-free Head

Electronic Thread Tension

Fabric Thickness Detection

Electronic Thread Clamping

Stepper Presser Foot Lift

Stepper Dual-knife Thread Trimming

Anti-Birdnesting (No fixed knife presser foot)

Oil-free Needle Guard Hook + Precision Oil Supply

Electronic Feed + Riser (Electronically controlled: Stitch Length + Tooth Height + Trajectory + Synchronization Timing)

Large Working Space

Oil-free Machine (Timing Belt)

Camera Gesture Recognition + QR Code Scanning

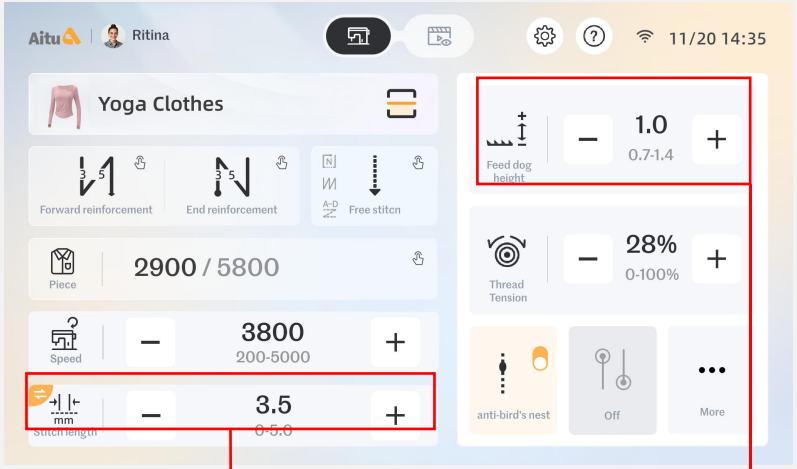
Integrated Back-mounted Electronic Control + USB

Function and Performance Improvement Description		
NO.	Function	Feature Descriptions
1	Electronic Feed + Riser	Control feed and riser via motors, enabling electronic adjustment of stitch length, tooth height, trajectory, and synchronization timing.
2	Electronic Thread Tension	The wire tension is controlled by electromagnets to achieve electronic adjustment of wire tension
3	Oil-free Machine (Timing Belt)	No white oil lubrication in the whole machine, uses imported bearings and timing belt drive, completely eliminating oil stain issues.
4	Oil-free Head	Head uses grease lubrication, paired with large-bearing type engineering plastic thread take-up lever, longer service life, completely eliminates oil stains, clean sewing.
5	Stepper Dual-knife Thread Trimming	1.Uses stepper motor drive for trimming, more stable trimming, lower noise.2.Dual knives enable thread ends after trimming to be within 3mm.
6	Reduces birdnesting	1.Reduces birdnesting at the start of sewing, while controlling thread ends within 6mm, resulting in more aesthetically pleasing stitches. 2.No fixed knife presser foot and thread wiping device
7	Oil free Needle Guard Hook + Precision Oil Supply	1.Hook inner cavity uses polymer material, can operate normally under oil-free conditions with low temperature rise. 2.The bobbin hook employs needle guard technology. When changing from a #11 to a #9 needle, no hook gap adjustment is required, and skipped stitches are prevented
8	Fabric Thickness Detection Function	1.Pre-set sewing conditions for thin and thick fabrics. 2.When sewing from thin to thick fabric, automatically detects and adjusts stitch length to prevent hard breakage and stitch densification.
9	Touchscreen Function	Simple and easy-to-understand operation, easy to use.
10	Camera Gesture Recognition	Camera can perform gesture recognition, AI analysis.
11	Camera QR Code Scanning + Garment Library	Built-in with multiple garment presets, capable of automatically switching garment presets via QR code scanning

CONCENTS

Electronic Feed + Riser

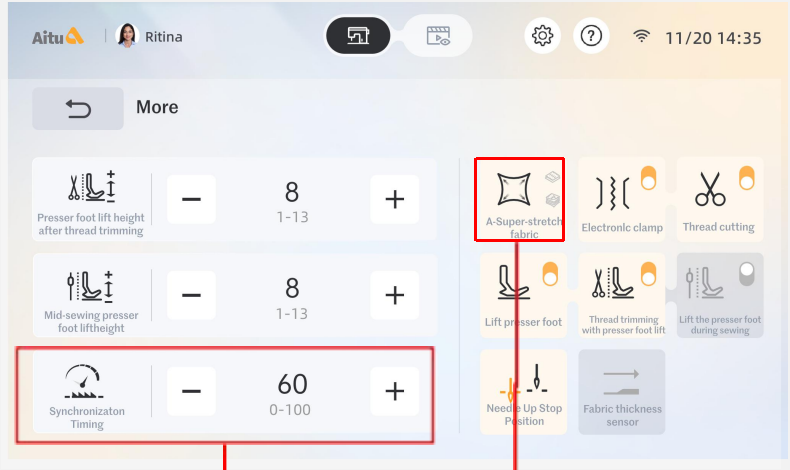
Electronic Control Related Parameter Introduction – Core 360 Feed Tuning Parameters (without using database)



Adjust with +/-, value is current stitch length.
Note: Click the switch icon to change to inch mode.

Tooth Height Setting

Adjust with +/-. The value is the current tooth height. Parameter range: 0.6-1.3mm, corresponds to tooth height.



Synchronization Timing

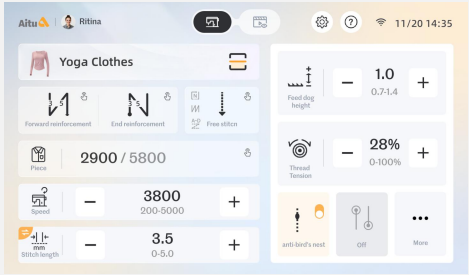
Standard value 60 corresponds to standard Three-Levels position.
Decreasing value helps prevent needle breakage.
Increasing value helps with thread uptake.
Recommended adjustment range not exceeding ±30.

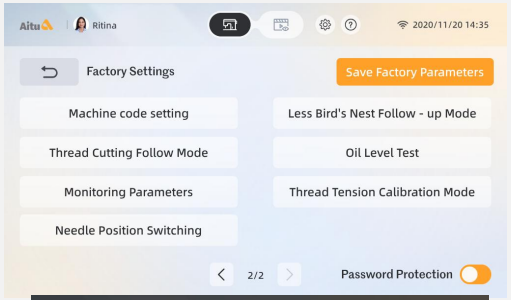
Feed Trajectory Mode

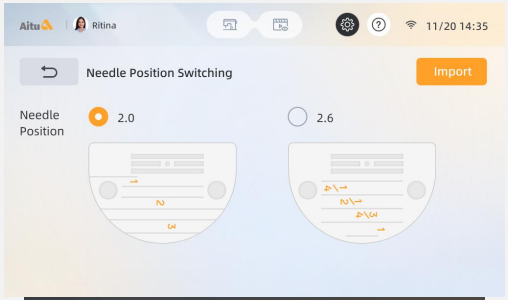
Switch A, M, H via Garment Library.
A - Suitable for super elastic, thin
M - Suitable for 90% conventional fabrics
H - Suitable for thick, stiff

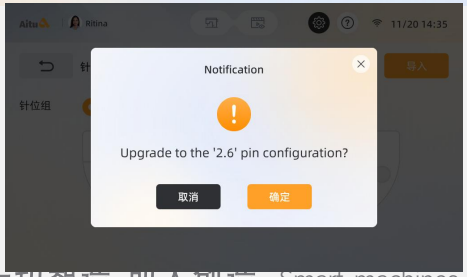
Electronic Feed + Riser

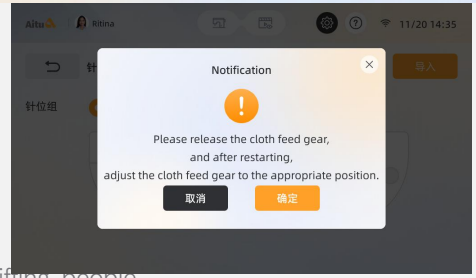
Re-calibration of electromechanical position after needle position group replacement.











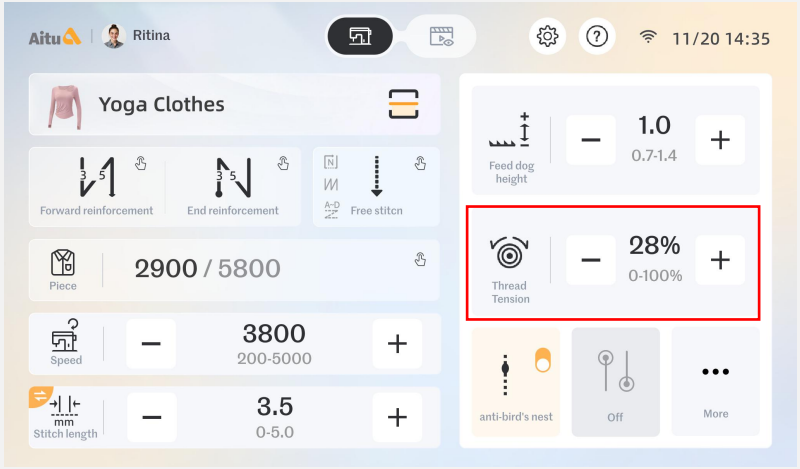
Step 1 Hardware Replacement:
① Keep power on. Remove the original needle plate and feed dog from the machine.
② Install the new feed dog, do not install the needle plate yet.
③ Loosen the feed bar seat screw.

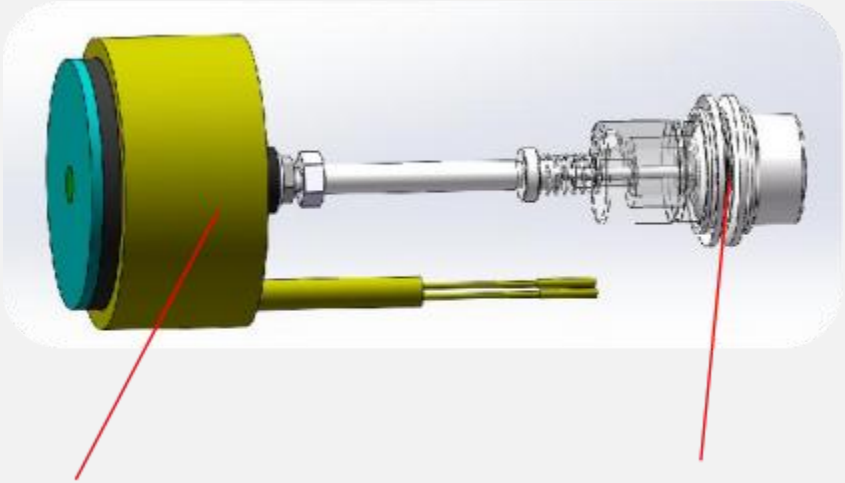
Step 2: Align Feed Dog Front-Rear Position
① Install the needle plate.
② Set stitch length to 5. Choose M mode from the A, M, H modes.
③ Adjust the angle of the feed bar seat so that the feed dog movement is centered front-to-back when rotating the handwheel one full turn. Then tighten the feed bar seat screw.

Step 3: Align Feed Dog Height Position
① Install the needle plate.
② Set tooth height to 1mm. Choose M mode from the A, M, H modes.
③ Observe the tooth height at the highest point of the feed dog movement when rotating the handwheel one full turn. Standard is 1mm. If lower than 1mm, increase the Riser Center C13 parameter; if higher than 1mm, decrease it.

Electronic Thread Tension

Upper Thread Tension Adjustment Description





Solenoid

Thread Tension

Thread Tension Adjustment: :

On the main interface, press the thread tension "+" "-" keys to modify the parameter. The parameter is saved automatically after modification.

Electronic Thread Tension

Take-up Spring Tension Adjustment Description

Insert a flathead screwdriver into the tension assembly slot. Turn clockwise to increase take-up spring tension, counterclockwise to decrease.

Stepper Double-knife Thread Trimming

Aitu

Uses stepper motor drive for trimming, more stable trimming, lower noise.
Dual moving knives trim threads. Thread ends after trimming are within 3mm, No need for further trimming, saving time, reducing labor costs.

Double-knife

Standard Rotary Knife

3mm

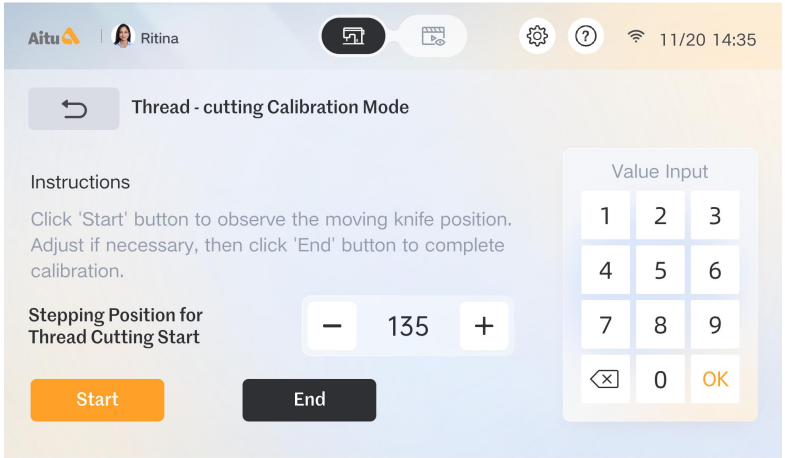
Stepper Double-knife Thread Trimming

Thread Trimming Calibration Mode

Access: Press successively: Icon, Factory Settings, Thread Trimming Calibration Mode.

Applicable Scenario:

Trimming effect not ideal (length varies). Press Start to check if the moving knife just barely moves slightly. If the movement amplitude is too large, decrease the value. If there is no movement, increase the value, then press Start again to check.



Stepper Double-knife Thread Trimming

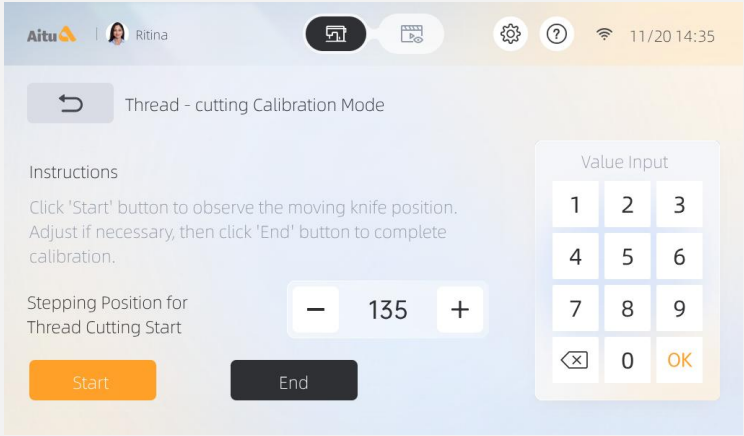
Aitu

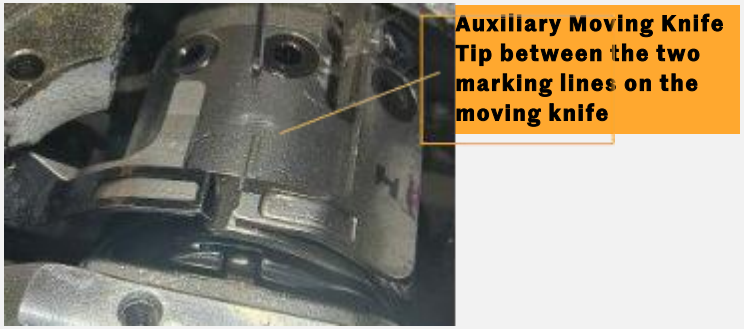
Thread Trimming Calibration Mode:

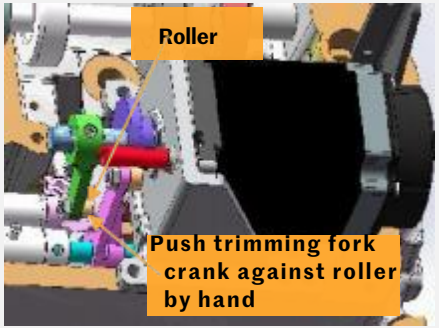
Access Method:Press the icon → Factory Settings → Thread Trimming Calibration Mode in sequence

Application Scenario:

If the thread trimming effect is unsatisfactory (thread end is sometimes long and sometimes short), press "Start" to check if the moving knife moves slightly. If the movement range is too large, decrease the value; if there is no movement, increase the value. Then press "Start" again to check







Stepper Double-knife Thread Trimming

Thread Trimming/Thread Dividing Start Main Shaft Angle C16 (Page 1):

Applicable: When trimming is unstable (short thread ends, cutting double threads, etc.), check if the start trimming main shaft angle is correct (trimming starts when rotating hook aligns with moving knife tip). Adjust size by pressing "+" or entering a number. Re-enter Trimming Follow Mode and rotate handwheel to confirm.

Thread Trimming/Thread Dividing End Main Shaft Angle C17 (Page 1)

Max Position Knife Engagement Start Angle C19 (Page 2):

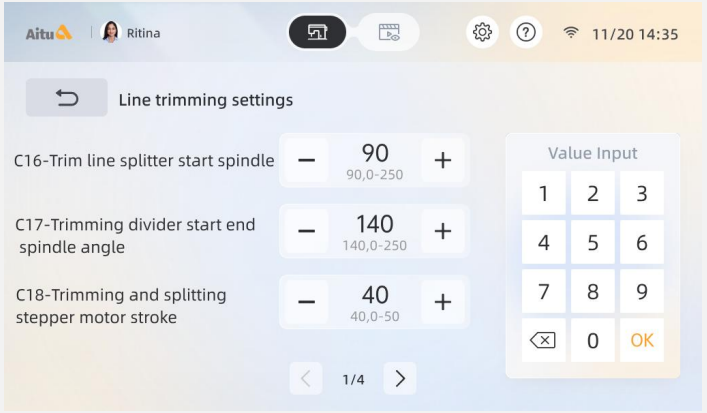
Applicable: When trimmed thread end length is unstable, adjust these two parameters together larger or smaller.

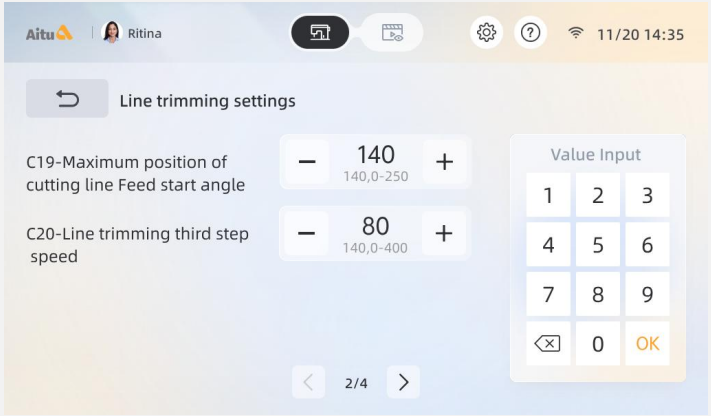
Thread Trimming/Thread Dividing Stepper Motor Travel C18 (Page 1):

Applicable: When engagement amount is incorrect, fine-tune this parameter, then reconfirm in Knife Adjustment Mode.

Third Knife Engagement Stepper Speed C22 (Page 2):

Applicable: When trimmed thread ends are short or frayed, fine-tune this parameter (must not be less than 50).





Anti-Bird nesting Function

Feature: No thread end on the front side of the fabric and no bird's nest on the back side at the start of sewing. For the bottom thread end of the bird's nest at the start of sewing, the length shall be ≤5mm (when front dense stitching is enabled); without front dense stitching, the thread end length increases by 3.5mm based on the sewing stitch length

New Anti-Bird nesting

Anti-Birdnesting **Follow Mode**

Access Method: Press the icon → Factory configuration → Bird's Nest Follow Mode in sequence.

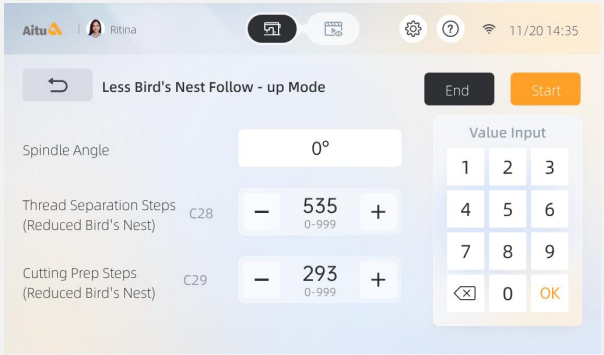
Application Scenario: Needle breakage or thread breakage at the start of sewing. Press "Start" and then turn the handwheel to check if the bird's nest function works correctly.

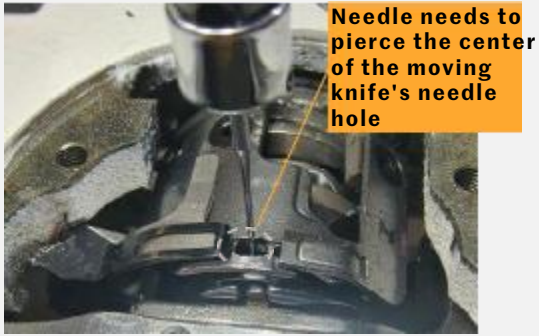
Bird's Nest Thread Separation Stepper Stroke (C28):

Application Scenario: If needle breakage occurs at the start of sewing, enter the bird's nest follow mode and check if the needle is inserted into the middle of the needle hole of the moving knife. Adjust the value by pressing "+" or "-" or entering a number, then press "Start" and turn the handwheel to re-confirm.

Bird's Nest Thread Trimming Preparation Stepper Stroke (C29):

Application Scenario: Needle breakage or thread breakage at the start of sewing. In the bird's nest follow mode, check if the distance between the knife tip and the needle is 1-1.5mm and ensure the thread pressing piece covers the edge of the bulge. Adjust the value by pressing "+" or "-" or entering a number, then press "Start" and turn the handwheel to re-confirm.

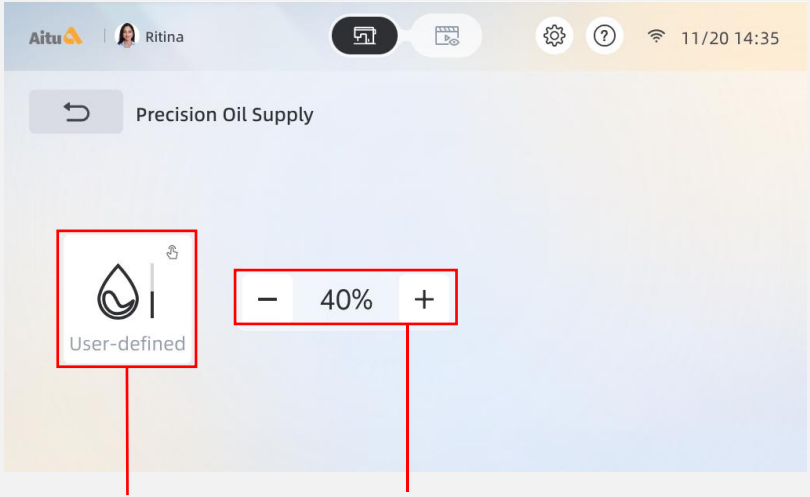


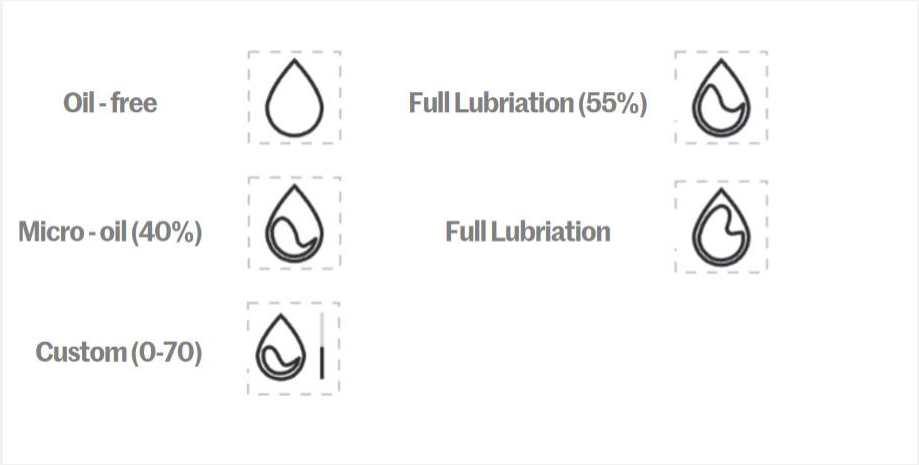


Oil-free Needle Guard Rotating Hook and Precise Oil Supply

Oil Quantity Adjustment Interface:

Parameter Settings → Precise Oil Supply (Gear Selection)



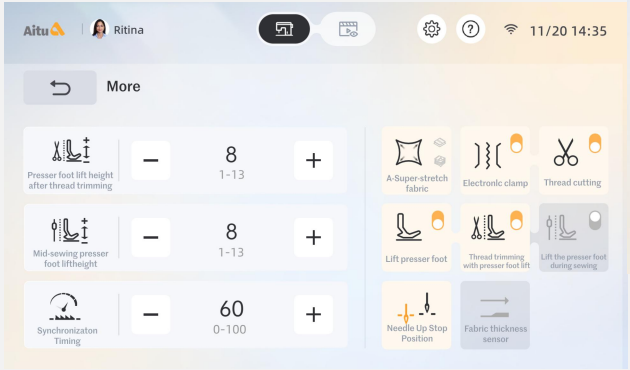


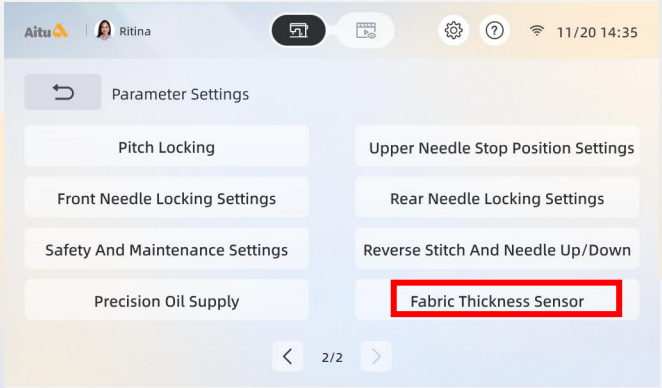
Tap this area to switch gears.

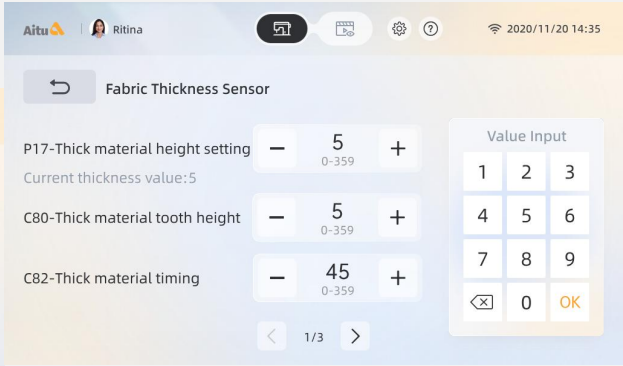
In custom gear, use the "+" and "-" buttons above to adjust the oil quantity.
(Gears: Oil-free (20%), Sufficient Lubrication (55%), Minimal Oil (40%), Full Oil, Custom)

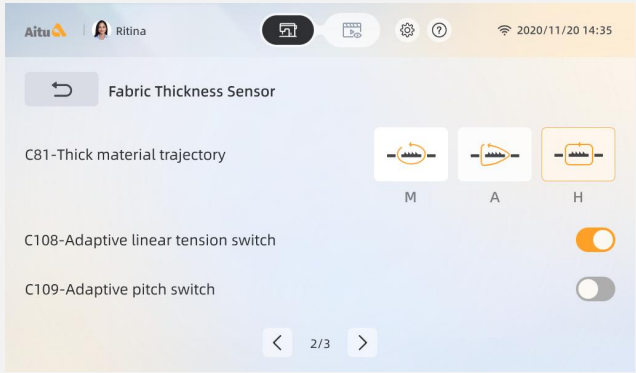
Thick/Thin Fabric Detection Function

Adjust the thick fabric detection parameters in the "Parameter Settings" menu.





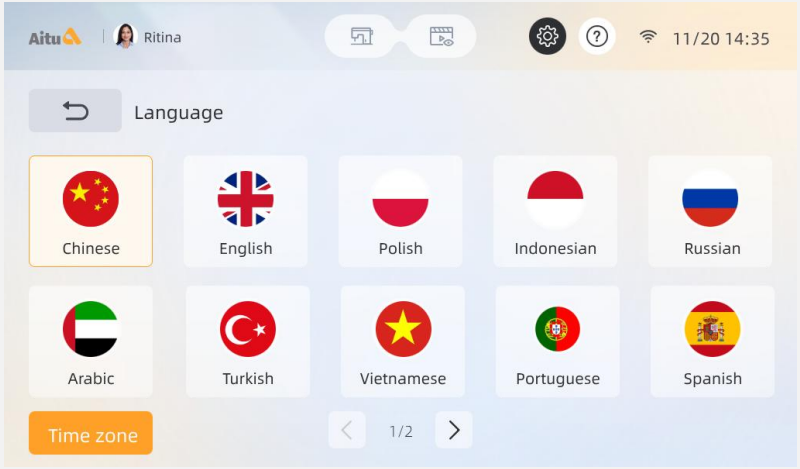


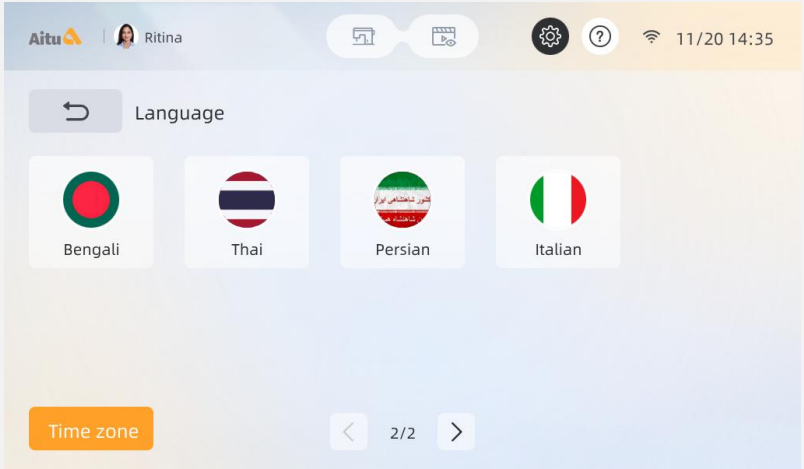


Tap the button in the "More Functions" section on the main interface to turn the function on or off.

Multiple Languages

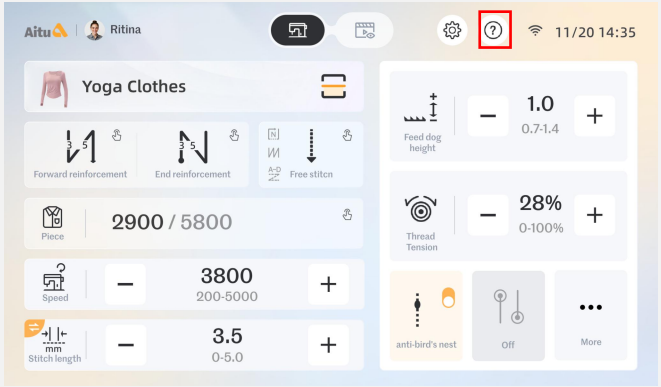
Supported languages:
Chinese, English, Polish, Indonesian, Russian, Arabic, Turkish, Vietnamese, Portuguese, Spanish, Bengali, Thai.

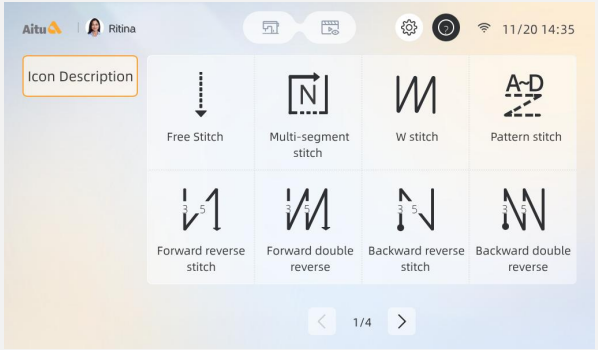


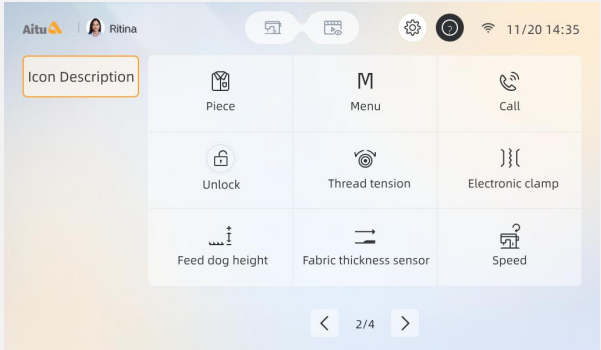


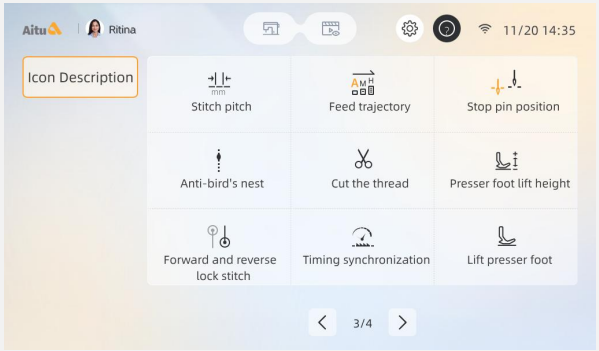
CONCENTS

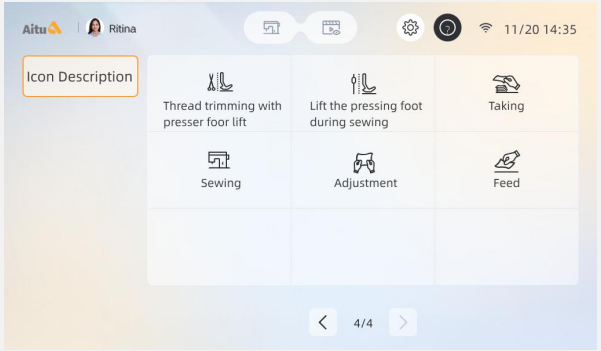
Panel Operation Instructions - Help Interface





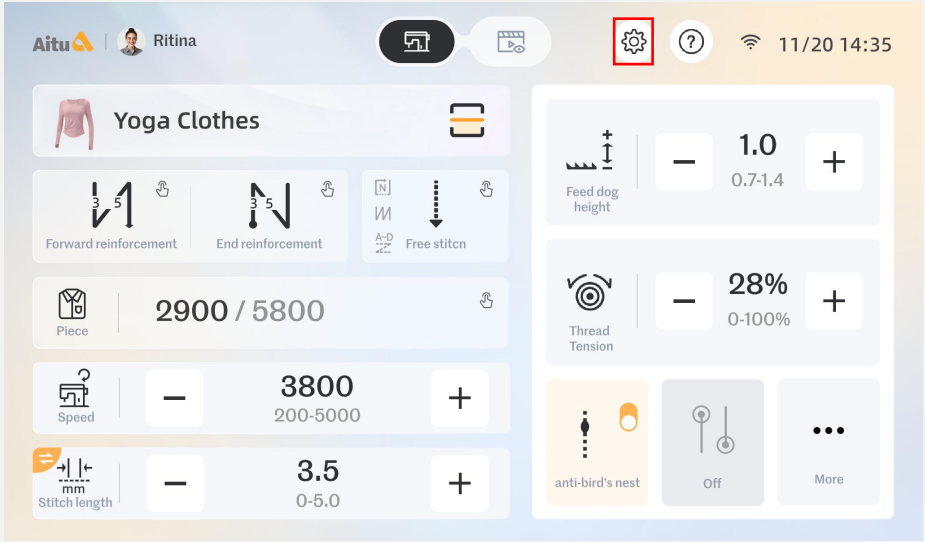


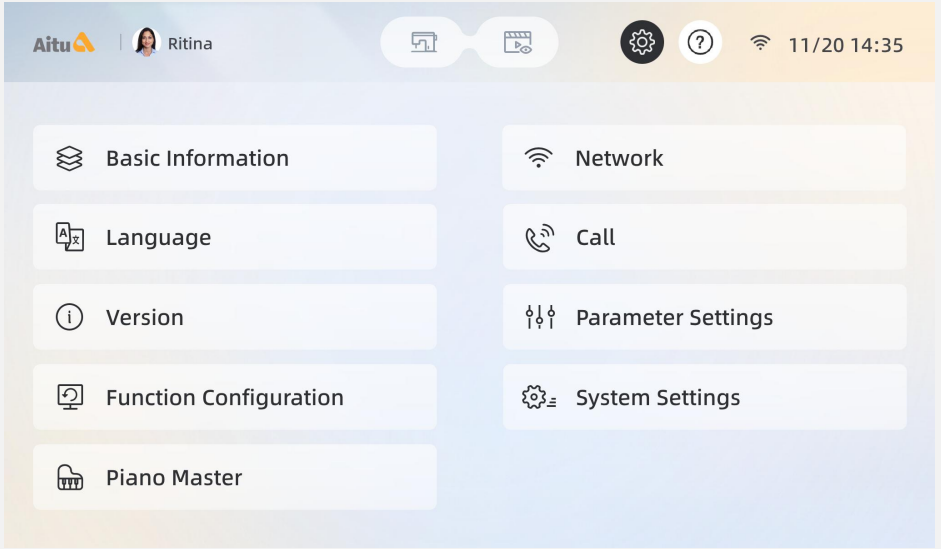




Tap the "Help" button to view the meaning of each icon.

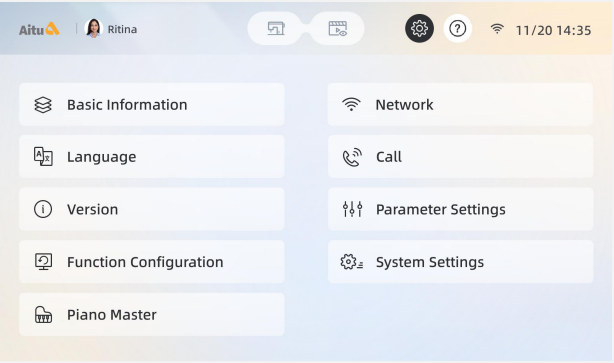
Panel Operation Instructions - Settings Interface Description



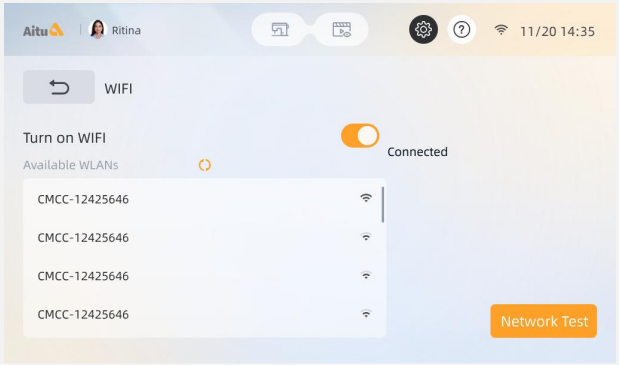


Tap the gear icon to enter the settings interface.

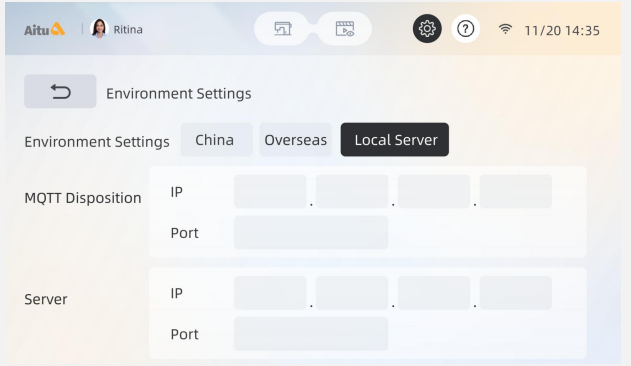
Panel Operation Instructions - Network Settings



Tap "Network" to enter the network settings interface.

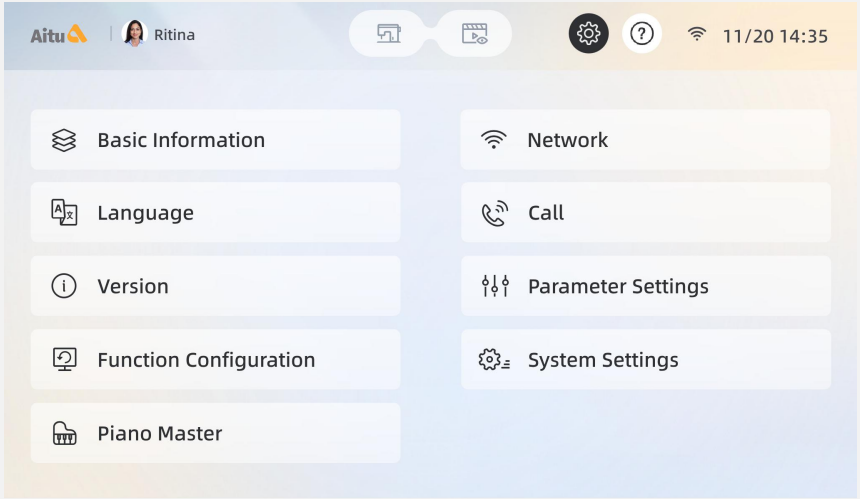


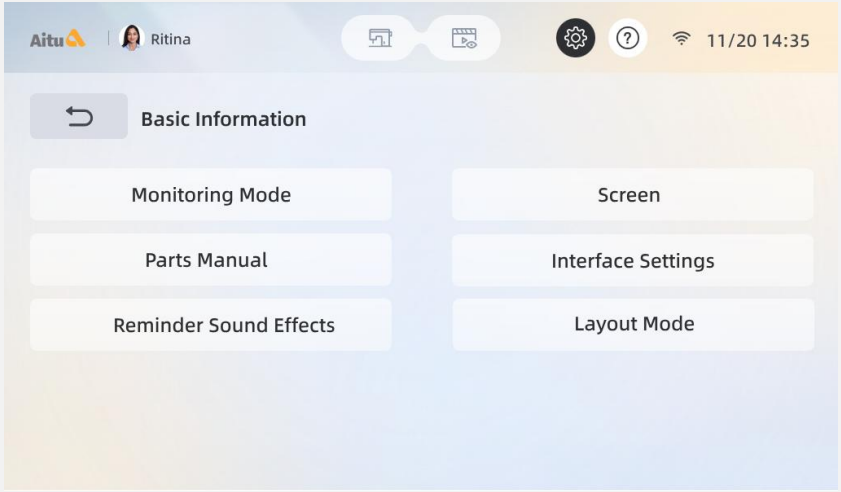
Select the corresponding WiFi and enter the password to connect.



Select the domestic or overseas HTTPS server for connection.

Panel Operation Instructions - Basic Information





Tap "Basic Information" to enter the basic information interface.

Panel Operation Instructions - Monitoring Mode

Enter the monitoring mode to view various operating parameters of the machine.

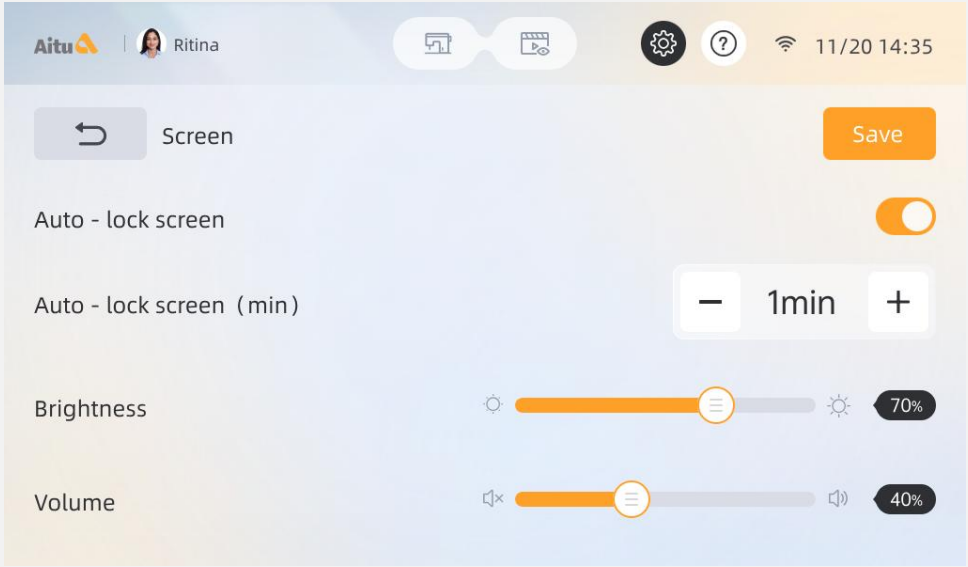
Monitoring Item	Description
Spindle Speed Feedback Value	Oil Quantity Detection Port Value
Foot Pedal AD Value	Tilt Switch Value
Stepper Zero Position	Working Status Value
Bus Voltage	Motion Command Value
Spindle Zero Position	Foot Pedal Status Value
Stepper Encoder Value (0~4000)	Thread Trimming Status Value
Spindle Encoder Value (0~2880)	Panel Version Number
Tilt Switch IO Port Value	Main Control Version Number
Reverse Stitch Switch IO Port Value	Main Control Secondary Version Number
Half-stitch Compensation Switch IO Port Value	Panel Voice Chip (distinguishing 688 and 600D)
Stitch Compensation Switch IO Port Value	Panel BOOT Version Number
Servo Motor Overcurrent Fault Detection Port Value	Mainboard BOOT Version Number
Stepper Motor Overcurrent Fault Detection Port Value	Mainboard APP Version 1 (XXYY: XX = year, YY = month)
Oil Quantity Detection Port Value	Mainboard APP Version 2 (XXYY: XX = date, YY = time)
Spindle Motor Initial Electrical Angle Value	Panel APP Version 1 (XXYY: XX = year, YY = month)
Mechanical Angle Value	Panel APP Version 2 (XXYY: XX = date, YY = time)

Monitor Parameter Table

Parameter Item	Parameter Definition (English)
M0	Spindle Speed Feedback Value
M1	Foot Pedal AD Value
M2	Stepper Motor Zero Position
M3	Bus Voltage
M4	Spindle Zero Position
M5	Stepper Encoder Value (0~4000)
M6	Reserved
M7	Reserved
M8	Reserved
M9	Reserved
M10	Reserved
M11	Reserved
M12	Reserved
M13	Reserved
M14	Spindle Encoder Value (0~2880)
M15	Tilt Switch I/O Port Value
M16	Reverse Sewing Switch I/O Port Value
M17	Half-Stitch Switch I/O Port Value
M18	Tack Stitch Switch I/O Port Value
M19	Servo Motor Overcurrent Fault Detection Port Value
M20	Stepper Motor Overcurrent Fault Detection Port Value
M21	Oil Level Detection Port Value
M22	Spindle Motor Initial Electrical Angle Value
M23	Mechanical Angle Value
M24	Oil Level Detection Port Value
M25	Tilt Switch Value
M26	Work Status Value
M27	Motion Command Value
M28	Foot Pedal Status Value
M29	Thread Trimming Status Value
M30	Reserved
M31	Reserved
M32	Reserved
M33	Reserved
M34	Reserved
M35	Reserved
M36	Reserved
M37	Reserved
M38	Reserved
M39	Panel Version Number
M40	Main Control Version Number
M41	Main Control Sub-Version Number
M42	Panel Voice Chip (Distinguishes 688 and 600D)
M43	Panel BOOT Version Number
M44	Main Board BOOT Version Number
M45	Main Board APP Version Number 1 (XXYY: XX=Year, YY=Month)
M46	Main Board APP Version Number 2 (XXYY: XX=Day, YY=Time)
M47	Panel APP Version Number 1 (XXYY: XX=Year, YY=Month)
M48	Panel APP Version Number 2 (XXYY: XX=Day, YY=Time)
M49	Reserved
M50	Reserved

Aitu

Panel Operation Instructions - Screen Settings

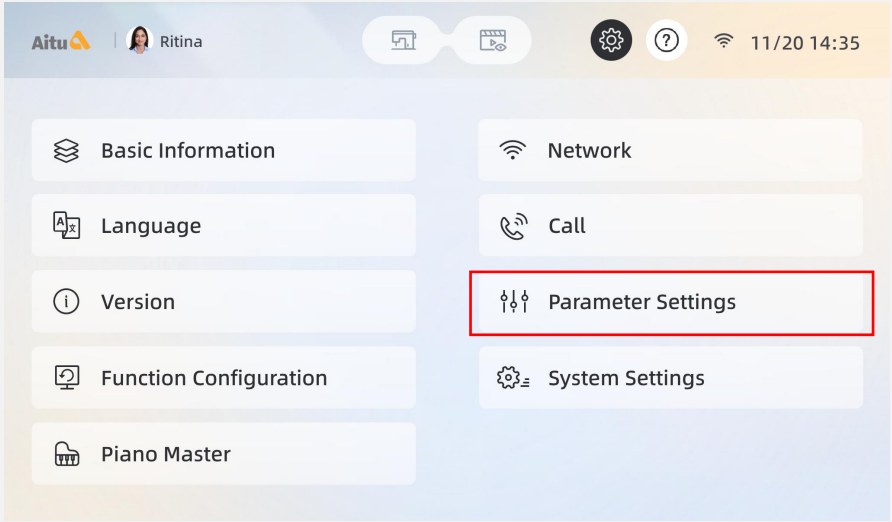


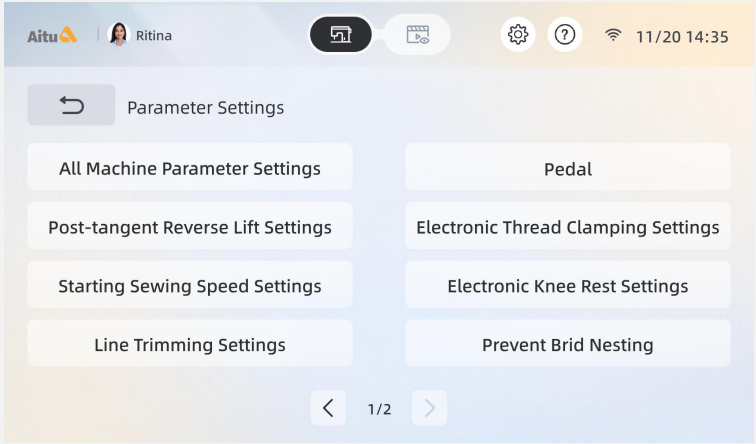
Tap "Screen" in the settings interface to enter the screen settings interface. Slide your finger to adjust the brightness and volume. Tap the icon ( ) to enable or disable the screen lock function. If automatic screen lock is disabled, the lock time cannot be adjusted. Press the "+" or "-" button to adjust the relevant parameters; the parameters will be saved automatically after modification.

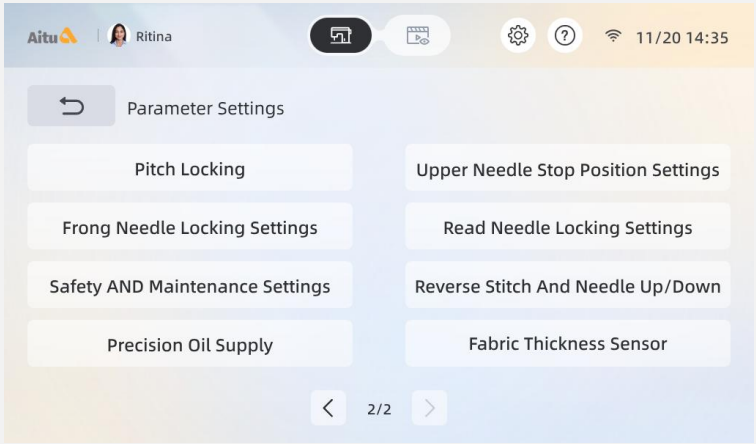
Panel Operation Instructions - Restore Factory Settings

Enter the "Restore Factory Settings" interface and tap "Restore Factory Settings" to perform a partial reset. All parameters except the factory settings will be restored to default values.

Panel Operation Instructions - Parameter Settings

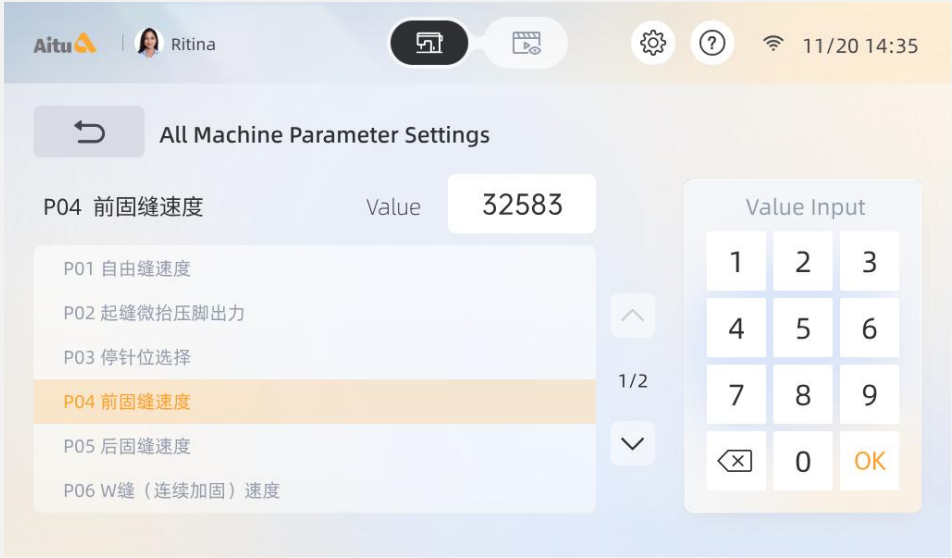






Tap "System Settings" to enter the parameter settings interface.

Panel Operation Instructions - All Parameters



1.Tap the page-turning button to switch pages.

2.After selecting a parameter, its description and corresponding value changes will be displayed.

3.Tap "OK" to confirm; otherwise, the value will be restored.;

Panel Operation Instructions - All Parameters

Parameter Item	Range	Default Value	Parameter Definition (English)
P01	200-5000	3800	Free Sewing Speed
P02	1-100	56	Start Sewing Slight Presser Foot Lift Force (0~100%)
P03	0~1	1	Needle Stop Position Selection: 0 is Up, 1 is Down
P04	200~3000	1800	Forward Reinforcement Sewing Speed
P05	200~3000	1800	Backward Reinforcement Sewing Speed
P06	200~3000	1800	W-Stitch Maximum Speed
P07	200~4000	3700	Multi-Segment Sewing Maximum Speed
P08	0~1	0	Start Sewing Presser Foot Slight Lift Switch
P09	0~1	0	Slow Start Sewing Switch
P10	1~9	2	Slow Start Sewing Stitch Count
P11	100~800	400	Slow Start Sewing Speed
P12	(-8~8)	2	1/2 Multi-function Key
P13	200~4000	3200	Reverse Sewing Maximum Speed
P14	100~800	200	Tack Stitch Speed
P15	0~3	1	Tack Stitch Mode: 0: Off, 1: Time Controlled, 2: Half Stitch, 3: One Stitch
P16	0~9999	3200	Thick/Thin Detection Zero Point Value
P17	0~9999	2700	Thick Material Detection High Value
P18	0~50	5	Thick Material Seam Crossing Mode Stitch Count
P19	200~4000	2000	Seam Crossing Speed
P20	(-50~50)	5	Seam Crossing Stitch Length Compensation Value
P21	0~50	0	Thick/Thin Detection Sensitivity
P22	1~4	4	Seam Crossing Trajectory
P23	0~4095	1100	Analog Value for Foot Pedal Thread Cutting Position (Auto Presser Foot Lift OFF)
P24	0~4095	550	Analog Value for Foot Pedal Thread Cutting Position (Auto Presser Foot Lift ON)
P25	0	0	Reverse Sewing Solenoid ON
P26	0	0	Reverse Sewing Solenoid OFF

Panel Operation Instructions - All Parameters

P27	10~100	36	Thread Trimming Force
P28	0~359	130	Thread Clamping Start Angle (Front Reinforcement & W-stitch Enabled)
P29	0~359	320	Thread Clamping End Angle (Front Reinforcement & W-stitch Enabled)
P30	0~359	130	Thread Clamping Start Angle (Front Dense Stitch Enabled)
P31	0~359	340	Thread Clamping End Angle (Front Dense Stitch Enabled)
P32	0~100	80	Presser Foot Slow Lifting Duty Cycle
P33	0~80	55	Thread Clamping Electromagnet Holding Duty Cycle
P34	0~1	1	Oil Quantity Detection Switch
P35	0~3000	800	Speed of the 1st Stitch at Start
P36	0~3000	1500	Speed of the 2nd Stitch at Start
P37	0~3000	0	Speed of the 3rd Stitch at Start
P38	0~4000	1000	First Stitch Speed Limit (Reinforcement Stitch Enabled)
P39	0~4000	0	Second Stitch Speed Limit (Reinforcement Stitch Enabled)
P40	0~4095	900	Foot Pedal Half-press Position (Presser Foot Lifting)
P41	0~4095	1650	Foot Pedal Neutral Position
P42	0~4095	400	Foot Pedal Forward Press Low-speed Start Position (Relative to Neutral)
P43	0~4095	800	Foot Pedal Forward Press Low-speed End Position (Relative to Neutral)
P44	0~4095	4000	Maximum Foot Pedal Analog Value
P45	0	80	Thread Pulling Electromagnet Duty Cycle
P46	0	0	Thread Trimming Reverse Pull Function Switch
P47	200~360	359	Thread Trimming Reverse Pull Angle
P48	0~1	0	Presser Foot Lifting in Advance
P49	100~500	250	Thread Trimming Speed
P50	100~500	200	Full Power Time of Presser Foot Lifting Electromagnet
P51	0-9999	3200	Thin Fabric Thickness
P52	100~500	50	Presser Foot Lowering Motor Operation Delay Time
P53	0~1	1	Presser Foot Lifting Switch
P54	0~255	5	Automatic Test Operation Time
P55	0~255	3	Automatic Test Stop Time
P56	0~1	1	Auto Needle Stop Position Detection on Power-on

Panel Operation Instructions - All Parameters

P57	1~60	10	Presser Foot Solenoid Protection Time (Seconds)
P58	0~359	275	Upper Needle Stop Mechanical Angle (Relative to Z Signal)
P59	0~359	160	Lower Needle Stop Adjustment Angle (Relative to Upper Stop)
P60	200~5000	3800	Auto Test Run Speed
P61	0~1	0	Encoder Zeroing Flag
P62	0~15	0	Special Operation Mode Select (0: Normal Sewing, 1: Simple Sew, 2: THETA0 Test, 3: Auto Test)
P63	0~1	0	Start Dense Stitching Switch
P64	0~1	0	End Dense Stitching Switch
P65	60-990	65	Cutter Return Time
P66	0~1	1	Safety Switch Enable
P67	0~3000	0	Main Shaft Seek Angle Value
P68	200~5000	3800	Free Sewing Maximum Speed Limit
P70	0-3	0	Call Parameter
P71	50~350	104	Presser Foot Soft Release Time
P72	0~1	1	Needle Break Prevention Function Switch
P73	0-99	0	IoT Channel Selection
P74	100~2500	1000	Start Dense Stitching Speed
P75	0~12	2	Start Dense Stitching Stitch Count
P76	100~2500	1800	End Dense Stitching Speed
P77	0~12	2	End Dense Stitching Stitch Count
P78	10~359	130	Thread Clamping Start Angle
P79	0~359	320	Thread Clamping End Angle
P80	0~359	110	Thread Clamp Start Angle (Anti-Birdnesting Enabled)
P81	0~359	230	Thread Clamp End Angle (Anti-Birdnesting Enabled)
P82	0~359	335	Thread Wiper Solenoid Start Angle
P83	0~359	359	Thread Wiper Solenoid End Angle
P84	200~3000	2000	Pattern Sewing Maximum Speed
P85	0~1	0	Multi-Segment Pattern Sewing Switch
P86	0~50	8	Start Dense Stitching Stitch Length
P87	0~1	1	Start Dense Stitching Direction (1: Forward, 0: Reverse)
P88	0~50	5	End Dense Stitching Stitch Length
P89	0~1	1	End Dense Stitching Direction (1: Forward, 0: Reverse)
P90	0~1	0	Stitch Length Lock Switch (for Panel Use): 0 = Off, 1 = On

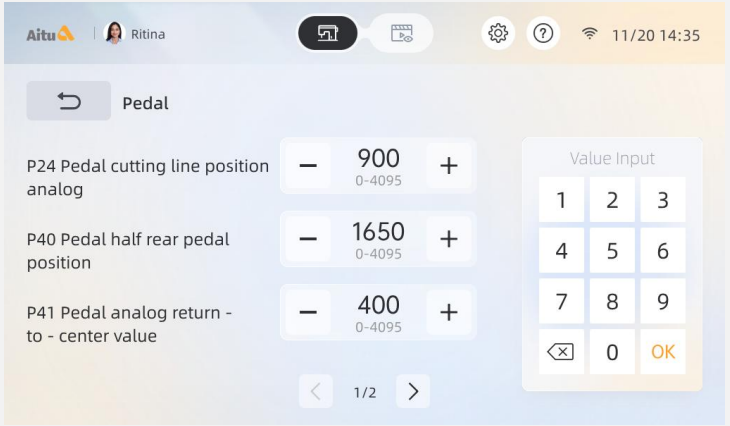
Panel Operation Instructions - All Parameters

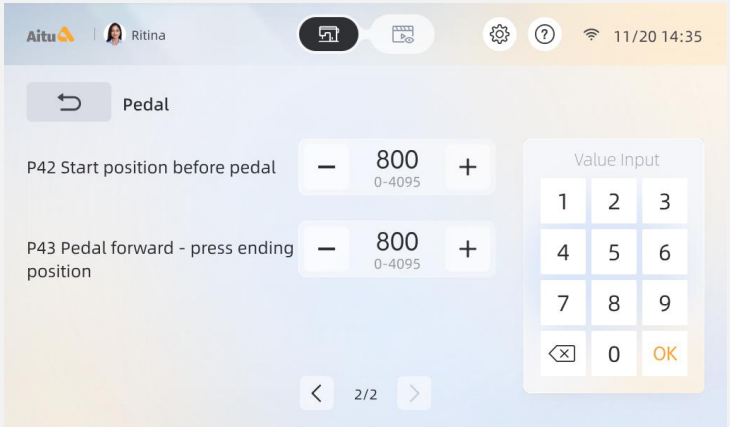
P91	0~70	50	Maximum Stitch Length
P92	-99~99	0	W-stitch First Segment Reduction
P93	-99~99	0	W-stitch Last Segment Reduction
P94	0-1	0	Inch Mode Switch (Not Processed by Main Control)
P95	0	0	1/2 Key Working Mode: 0 = Foot Control, 1 = One Tap One Stitch
P96	0-80	55	Thread Clamping Force (Bird's Nest Enabled)
P97	0~2	0	Voice Broadcast Mode Selection
P98	0~31	25	Voice Volume
P99	0~15	0	Voice Selection
P100	0~9999	0	Tens Digit Compensation for Free Sewing & Multi-segment Stitch (Segments A, B, C, D)
P101	0~9999	0	Tens Digit Compensation for W-stitch (Segments A, B, D)
P102	0-1	1	Extra Forward Stitch After Front Reinforcement
P103	100-250	250	Speed Limit When Spindle Mechanical Angle < 160掳 (Bird's Nest Enabled)
P104	0~9999	0	Current Stitch Count
P105	0~9999	0	Current Piece Count
P106	1~50	1	Stitch Count Unit
P107	0~9999	9999	Total Stitch Count
P108	0~6	0	Stitch Count Mode
P109	1~50	1	Piece Count Unit
P110	0~9999	9999	Total Piece Count
P111	0~6	0	Piece Count Mode
P120	1~180	100	Half-stitch Compensation Delay Judgment Time
P121	150~250	200	Full-stitch Compensation Delay Judgment Time
P122	100~800	200	Initial Sewing Speed
P123	0~999	500	Stitch Length Compensation
P124	0-9999	100	Spindle & Stepper Synchronization Adjustment
P125	0-9999	100	Reserved
P126	1~60	10	Reverse Stitch Button Protection Time
P127	1~200	4	Thread Clamping Electromagnet Full Power Time
P128	0~359	100	Forward/Reverse Stitch Switch Compensation Angle
P129	1~500	500	Thread Clamping Electromagnet Protection Time
P130	0~1	0	Safety Switch Logic
P131	1~500	300	Safety Switch Alarm Confirmation Time
P132	1~200	50	Safety Switch Alarm Recovery Time
P133	0~1	1	Thread Loosening Switch
P134	0~1	0	High-power Feeding Switch
P135	0~500	50	Oil Quantity Detection Interval Time
P136	0~3	0	Foot Pedal Speed Control Curve Mode
P137	0~1	0	Power Speed Control Curve Auxiliary Parameter
P138	0~1	0	Extra Reverse Stitch After Front Reinforcement
P139	0~1	0	Reinforcement Function After Thread Trimming in Fixed Stitch Sewing
P140	0~359	0	Thread Trimming Start Angle

Panel Operation Instructions - All Parameters

P141	0~359	100	Thread Trimming Force Increase Angle
P142	0~359	196	Thread Trimming End Angle
P143	0~359	20	Needle Break Prevention Start Mechanical Angle
P144	0~359	110	Needle Break Prevention End Mechanical Angle
P145	0~359	0	Start Sewing Slight Presser Foot Lift Start Angle
P146	0~359	200	Start Sewing Slight Presser Foot Lift End Angle
P147	0~1000	120	Start Sewing Presser Foot Lift ON Duration Limit
P148	1~500	150	Pedal Presser Foot Lift Confirmation Time
P149	0~4000	1500	Two-Stage Slope: Interrupt Breakpoint Speed
P150	0~4095	2700	Two-Stage Slope: Intermediate Pedal Analog Value
P151	0~900	90	Presser Foot Solenoid Soft Release Freewheeling Discharge Time
P152	0~1	1	Thread Loosening Switch
P153	0~359	0	Thread Loosening Start Angle
P154	0~359	196	Thread Loosening End Angle
P155	1~60	10	Thread Loosening Solenoid Protection Time
P156	1~200	120	Thread Loosening Solenoid Full Power Time
P157	0~200	80	Thread Loosening Solenoid Duty Cycle
P158	0~359	150	Start Sewing Thread Loosening End Angle
P159	1~20	2	Thread Trimming Solenoid Protection Time
P160	0~300	150	Thread Trimming Solenoid Full Power Time
P161	0~100	46	Thread Trimming Solenoid Duty Cycle
P162	0~80	37	Presser Foot Solenoid Holding Phase Duty Cycle
P163	0~80	10	Presser Foot Solenoid Soft Release Duty Cycle
P164	0~9999	0	Machine Lock Password
P166	100~200	100	Trajectory 1 Stepper Forward to Reverse First Stitch Compensation
P167	100~200	100	Trajectory 1 Stepper Reverse to Forward First Stitch Compensation
P168	100~200	100	Trajectory 2 Stepper Forward to Reverse First Stitch Compensation
P169	100~200	100	Trajectory 2 Stepper Reverse to Forward First Stitch Compensation
P170	100~200	100	Trajectory 3 Stepper Forward to Reverse First Stitch Compensation
P171	100~200	100	Trajectory 3 Stepper Reverse to Forward First Stitch Compensation
P172	100~200	100	Trajectory 4 Stepper Forward to Reverse First Stitch Compensation
P173	100~200	100	Trajectory 4 Stepper Reverse to Forward First Stitch Compensation
P174	0~1	0	Multi-Segment Sewing Operation Mode Select (1: Auto trim and reinforce after each segment)
P175	0~9999	0	Machine Lock Function Current Running Hours
P176	0~60	0	Reserved
P177	0~9999	0	Machine Lock Countdown Timer
P178	0~9999	0	User-Defined Parameter Checksum Value
P179	0~9999	CHECK	Parameter Power-Down Storage Verification
P180	0-1	0	Serial Port Print Switch

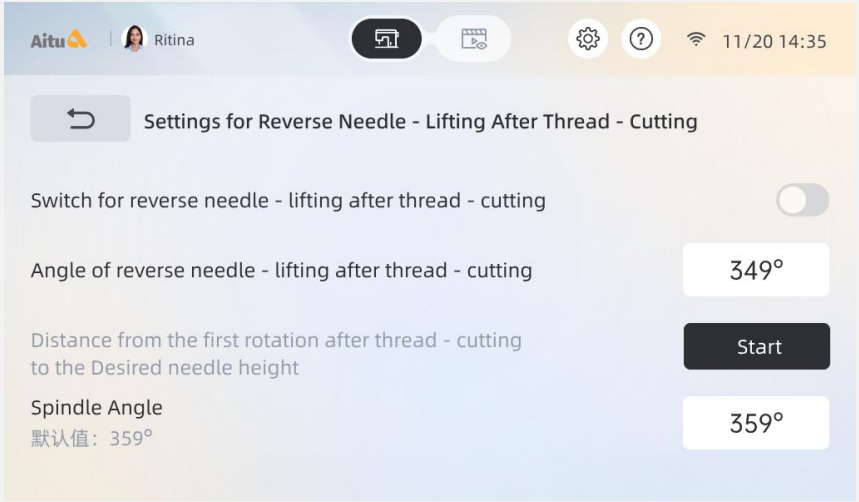
Panel Operation Instructions - Foot Pedal





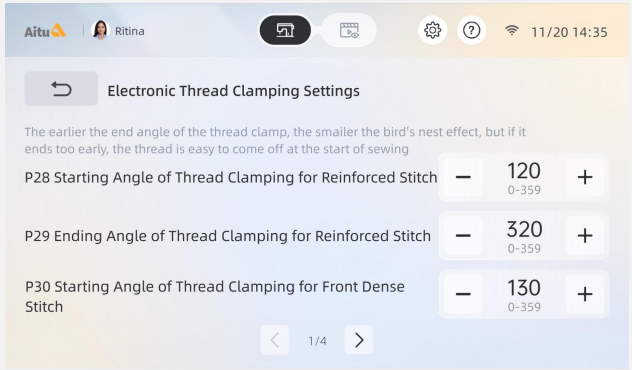
Tap "Foot Pedal" in the parameter settings interface to enter the foot pedal settings interface (2 pages in total). In the foot pedal settings interface, press the "+" or "-" button to adjust the relevant parameters, or select the parameter value and enter the value directly. The parameters will be saved automatically after modification.

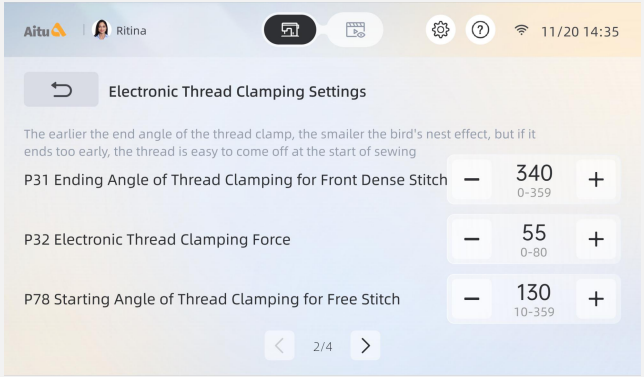
Panel Operation Instructions - Needle Lifting Setting After Thread Trimming Reverse

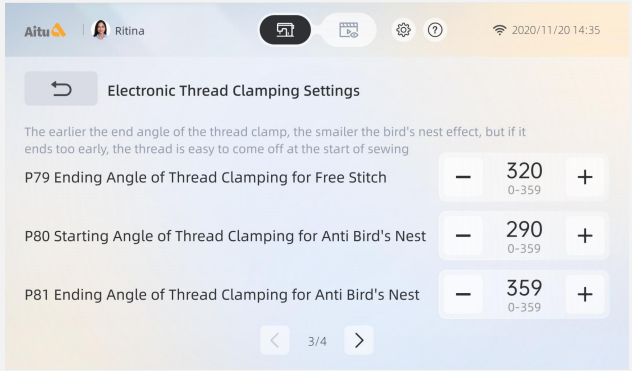


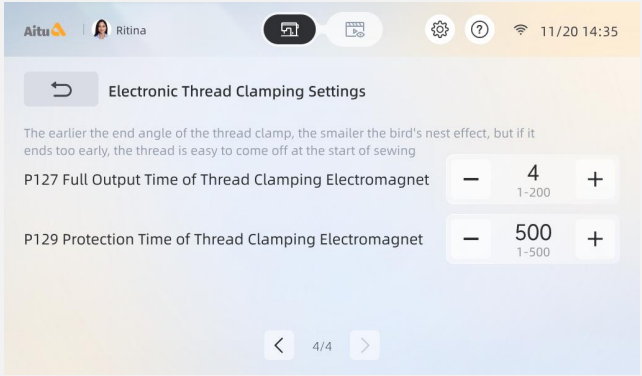
Tap "Needle Lifting Setting After Thread Trimming Reverse" in the parameter settings interface to enter the corresponding settings interface. Turn the handwheel to adjust the spindle angle to the normal range, and tap the switch to enable or disable needle lifting after thread trimming reverse.

Panel Operation Instructions - Electronic Thread Clamping Settings







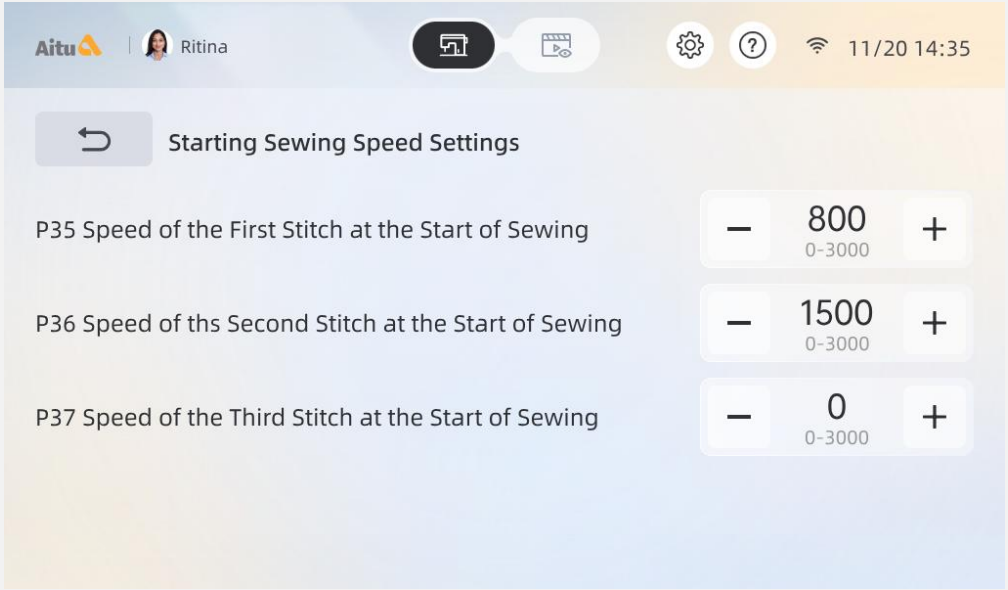


Tap "Electronic Thread Clamping Settings" in the parameter settings interface to enter the electronic thread clamping settings interface (4 pages in total).

In the electronic thread clamping settings interface, press the "+" or "-" button to adjust the relevant parameters.

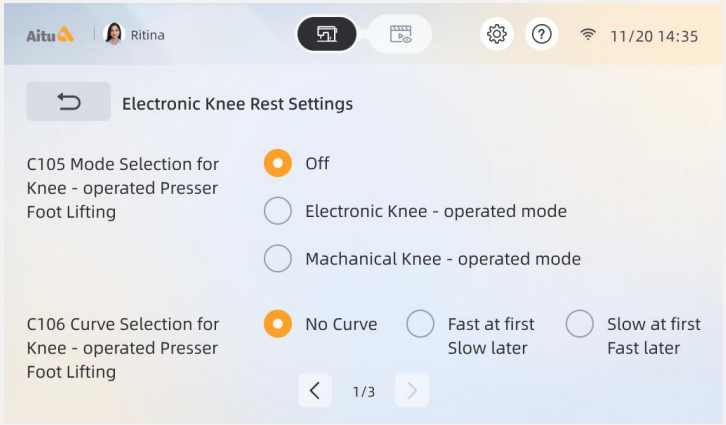
The parameters will be saved automatically after modification.

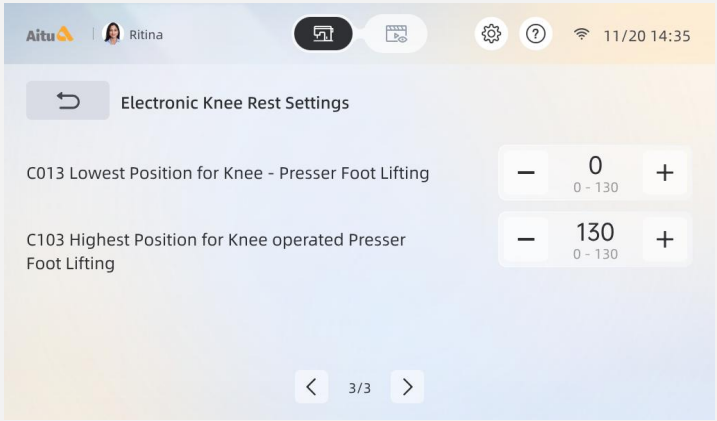
Panel Operation Instructions - Initial Sewing Speed Settings

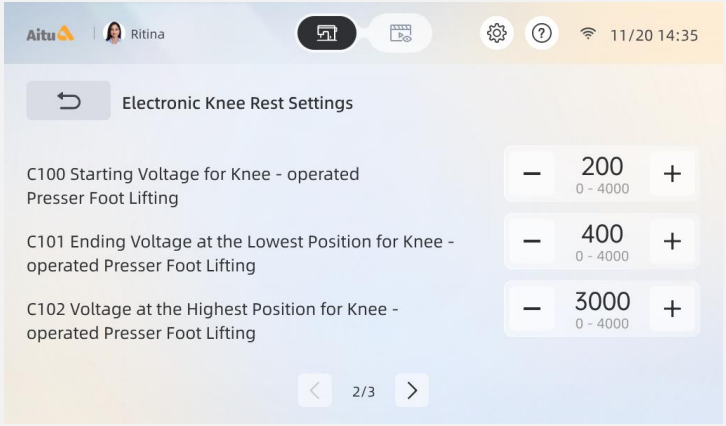


Tap "Initial Sewing Speed Settings" in the parameter settings interface to enter the initial sewing speed settings interface. Press the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification.

Panel Operation Instructions - Electronic Knee Control Settings





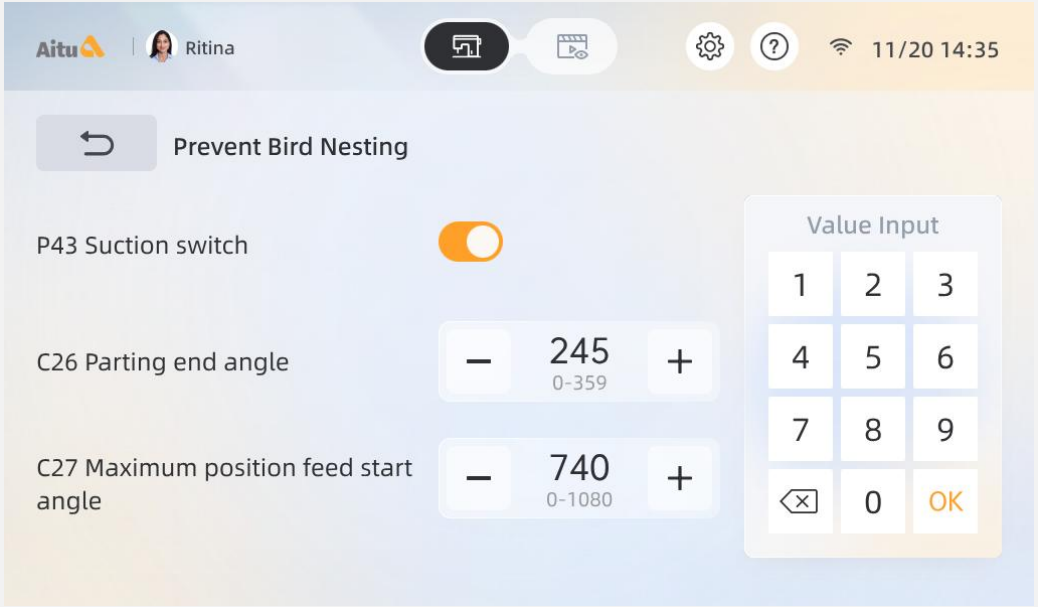


The electronic knee control adopts an ergonomic design, which can significantly reduce physical exertion during operation and alleviate operator fatigue.

Tap "Electronic Knee Control Settings" in the parameter settings interface to enter the initial presser foot micro-lift settings interface (2 pages in total).

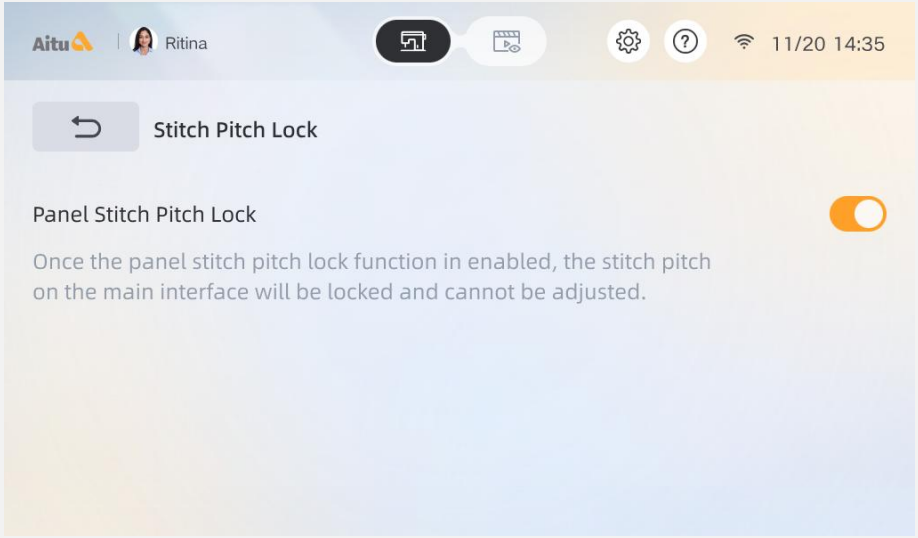
In the electronic knee control settings interface, press the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification.

Panel Operation Instructions - Anti-BirdNesting Settings



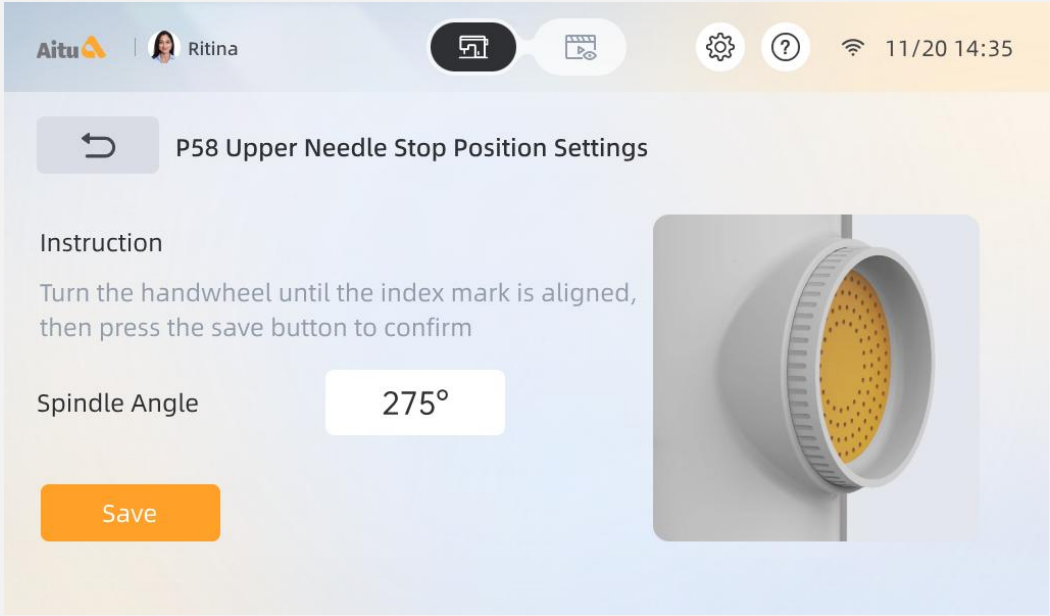
Tap "Bird's Nest Air Suction Settings" in the parameter settings interface to enter the bird's nest settings. Tap the switch to enable or disable bird's nest air suction. Press the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification.

Panel Operation Instructions - Stitch Length Lock



Tap "Panel Stitch Length Lock Function" in the parameter settings interface to enter the stitch length lock function interface. Tap the icon to enable or disable the panel stitch length lock function.
This function only locks the stitch length on the main interface; the stitch length in the clothing library is not locked.

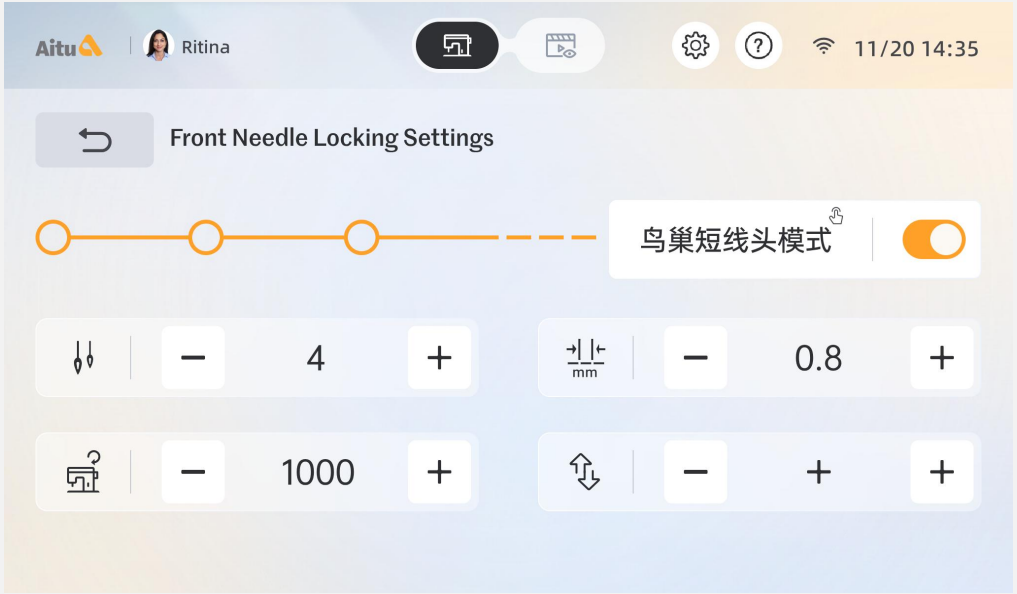
Panel Operation Instructions - Upper Needle Stop Position Setting



1.Users can set the upper needle stop position according to their needs. Tap the menu button on the main interface to enter the menu interface.

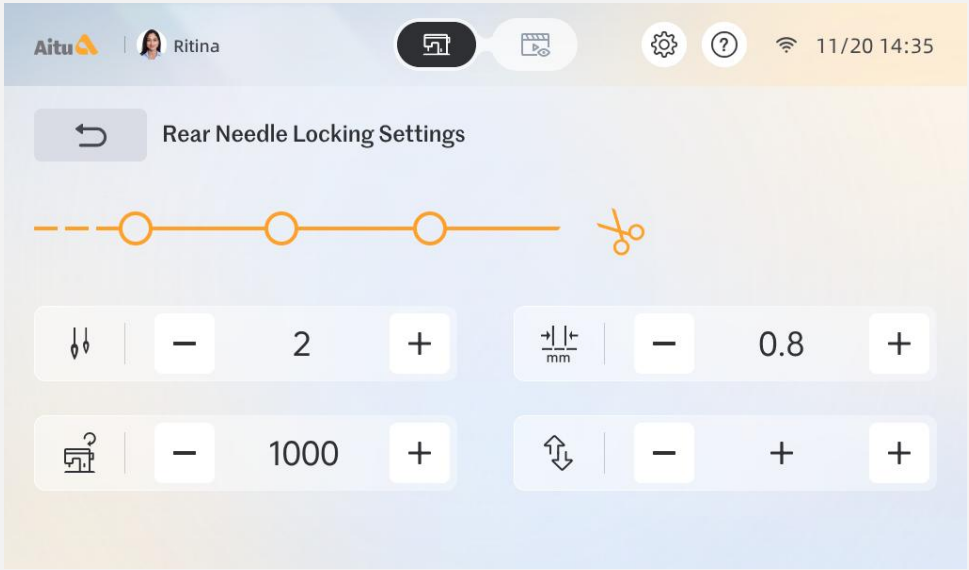
2.Select "Parameter Settings", turn to Page 2, then tap "Upper Needle Stop Position Setting". Turn the handwheel to adjust the needle stop position, and tap "Save" to complete the setting.

Panel Operation Instructions - Front Lock Stitch Settings



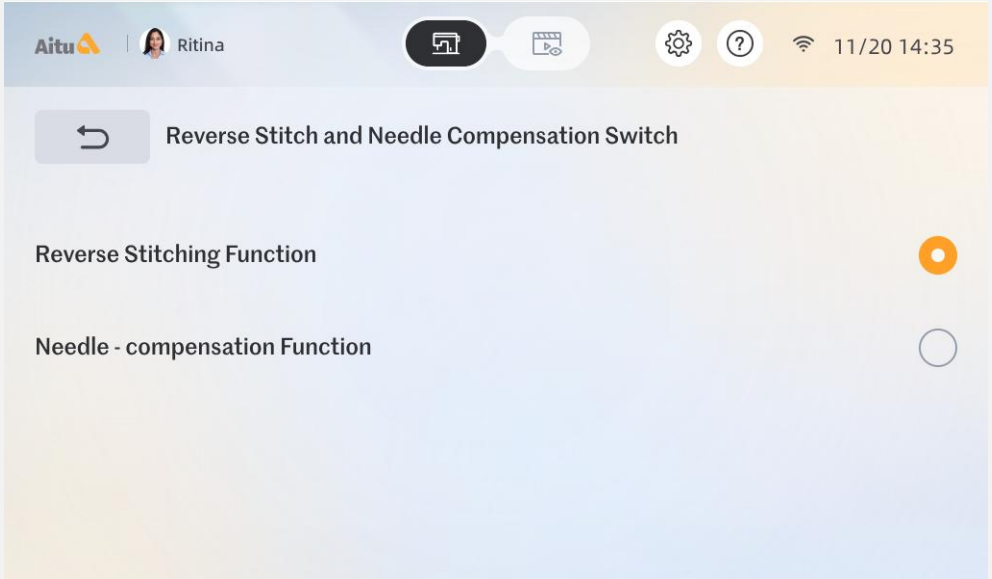
Tap "Front Lock Stitch Settings" in the parameter settings interface to enter the front lock stitch settings interface. Press the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification. The four parameters are: number of stitches, total distance, sewing speed, and sewing direction (forward or reverse).

Panel Operation Instructions - Rear Lock Stitch Settings



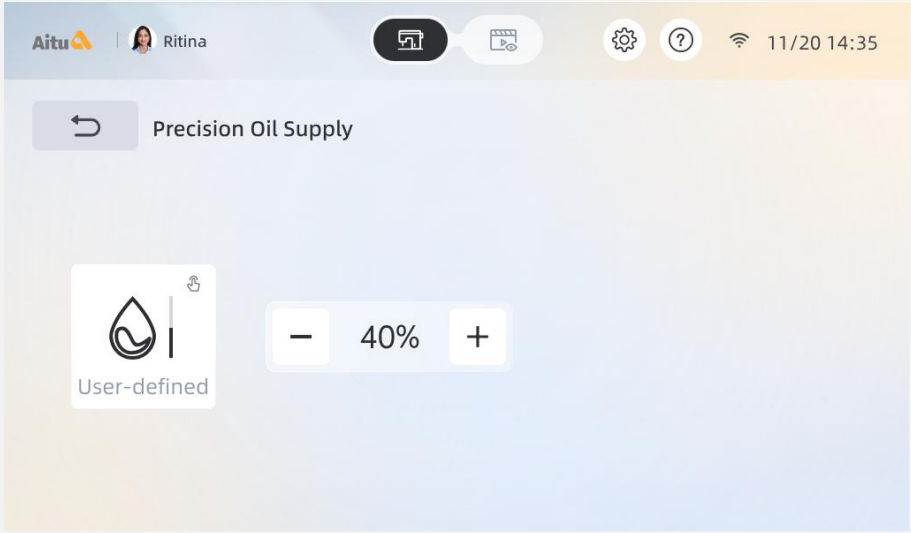
Tap "Rear Lock Stitch Settings" in the parameter settings interface to enter the rear lock stitch settings interface. Press the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification. The four parameters are: number of stitches, total distance, sewing speed, and sewing direction (forward or reverse).

Panel Operation Instructions - Reverse Stitch and Stitch Compensation Switch



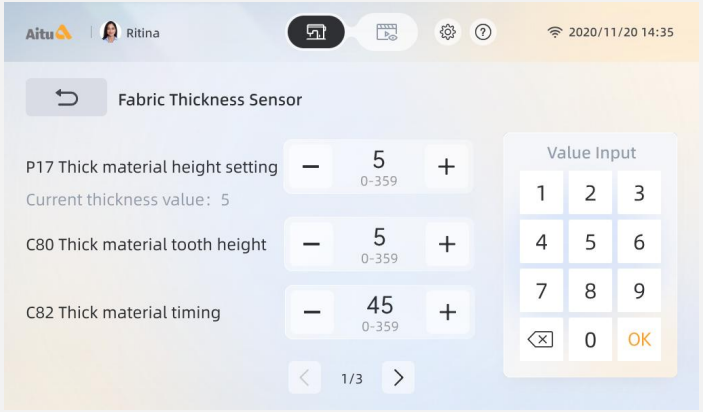
Tap "Reverse Stitch and Stitch Compensation Switch" in the parameter settings interface to enter the reverse stitch and stitch compensation switch settings interface. Tap the button to switch between the reverse stitch function and the stitch compensation function.

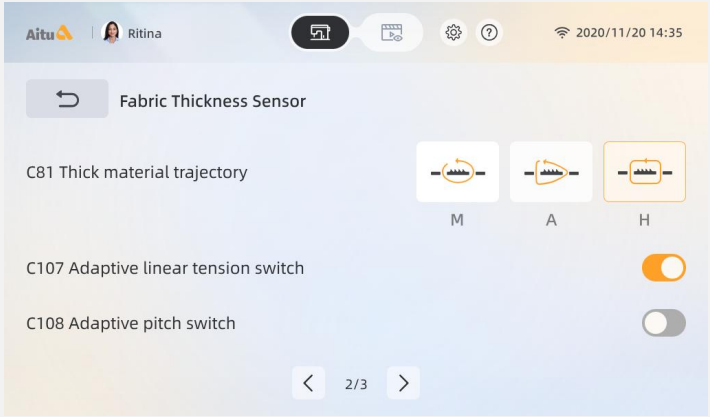
Panel Operation Instructions - Precise Oil Supply

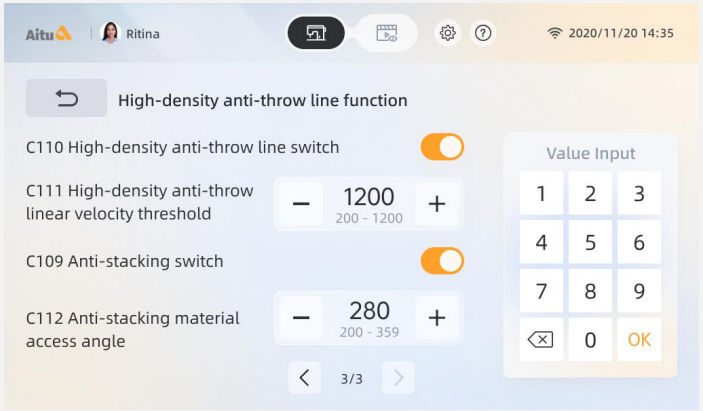


Tap "Precise Oil Supply Settings" in the parameter settings interface to enter the precise oil supply settings. Tap the icon to switch the oil supply mode. In the custom mode, use the "+" or "-" button to adjust the relevant parameters. The parameters will be saved automatically after modification.

Panel Operation Instructions - Thick/Thin Detection Settings

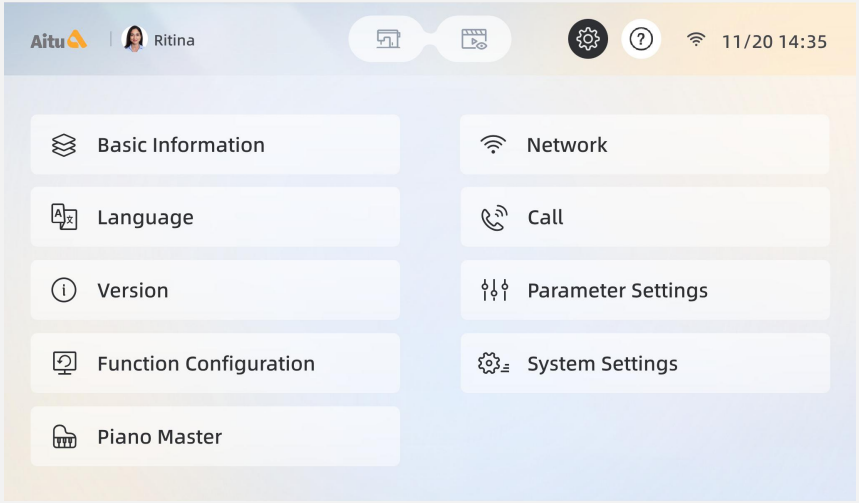


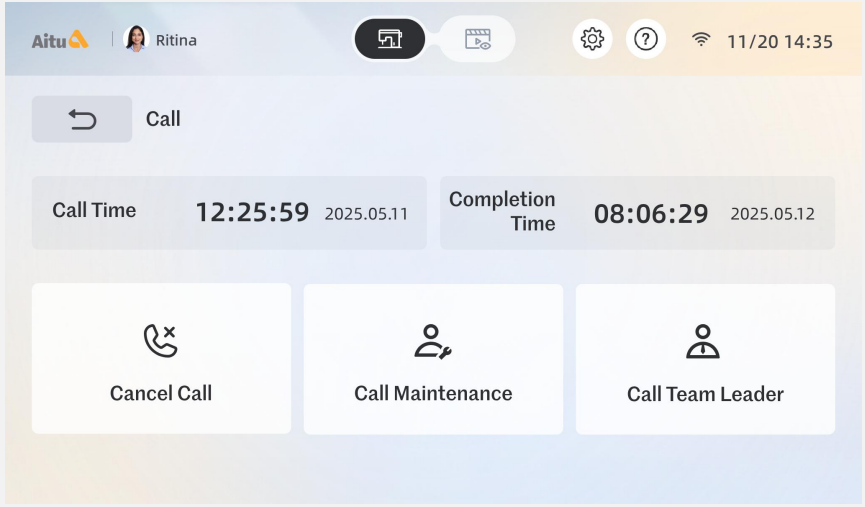




Tap "Thread Trimming Settings" in the parameter settings interface to enter the thread trimming settings. Press the "+" or "-" button to adjust the relevant parameters. Enter the value using the keypad and press "OK" to save.

Panel Operation Instructions - Call





Tap "System Settings" to enter the call interface, and tap "Call Mechanic" or "Call Supervisor".

Fault Alarm Operation Instructions

Error Code	Code Meaning	Solution
Error-02	Spindle Circuit Hardware Overcurrent	1. Power off the system. Wait 30 seconds, then restart. If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-04	Bus Overvoltage	1. Power off the system. Check if the input voltage exceeds AC 275V. If it does, restart the controller after the voltage returns to normal. If the system still does not function normally after the voltage normalizes and the system is restarted, please contact your local service provider or call 400-887-6858.
Error-05	Spindle Motor Position Overshoot	1. Power off the system. Check if the spindle rotates smoothly. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-08	Spindle Motor Stall	1. Check for foreign objects entangled in the handwheel. Check if thread is jammed in the hook assembly. 2. Check if the thread trimming mechanism has returned to its home position and is interfering with the needle. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-10	Panel Communication Error	1. Check if the cable connecting the operation panel and the electronic control is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-11	Spindle Motor Homing Timeout	1. Manually rotate the handwheel to check for mechanical jams or stalls. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-15	Spindle Motor Speed Loop Deviation Error	1. Check if the spindle motor power cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.

Fault Alarm Operation Instructions

Error Code	Code Meaning	Solution
Error-16	Spindle Motor Circuit Sampling Fault	If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-17	Spindle Motor Encoder Communication Timeout	1. Check if the spindle encoder cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service parovider or call 400-887-6858.
Error-18	Spindle Motor Encoder Position Calibration Failure	1. Check if the spindle encoder cable or power cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-19	Spindle Motor Power Line Not Connected	1. Check if the spindle power cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-23	Spindle Motor Overspeed	1. Check if parameter P68 or the panel speed setting is abnormal. 2. Check if the spindle encoder cable or power cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-24	Electronic Control EEPROM Error	If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-27	Spindle Rotation Abnormal	1. Check if the spindle encoder cable or power cable is disconnected, loose, or broken. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.

Fault Alarm Operation Instructions

Error Code	Code Meaning	Solution
Error-35	Stepper Motor Position Overshoot	1. Check the thread trimming and presser foot lift mechanisms for abnormal jamming. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-38	Stepper Motor Stall	1. Check the thread trimming and presser foot lift mechanisms for abnormal jamming. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-41	Stepper Motor Homing Timeout	1. Check the thread trimming and presser foot lift mechanisms for abnormal jamming. 2. Check the connection of the stepper motor power cable and encoder cable to the electronic control unit. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-46	Stepper Motor Circuit Sampling Fault	If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-49	Stepper Motor Power Line Not Connected	1. Check the connection of the stepper motor power cable to the electronic control unit. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-51	Stepper Motor Id Direction Error	1. Check the thread trimming and presser foot lift mechanisms for abnormal jamming. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-53	Stepper Motor Overspeed	1. Check the connection of the stepper motor power cable and encoder cable to the electronic control unit. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.

Fault Alarm Operation Instructions

Error Code	Code Meaning	Solution
Error-62	Lifter Motor Hardware Overcurrent	1. Power off the system. Wait 30 seconds, then restart. If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-64	Lifter Motor Bus Overvoltage	1. Power off the system. Check if the input voltage exceeds AC 275V. If it does, restart the controller after the voltage returns to normal. If the system still does not function normally after the voltage normalizes and the system is restarted, please contact your local service provider or call 400-887-6858.
Error-65	Lifter Motor Position Overshoot	1. Check the lifter crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-68	Lifter Motor Stall	1. Check the lifter crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-71	Lifter Motor Homing Timeout	1. Check the lifter crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. 2. Check the connection of the lifter motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-75	Lifter Motor Speed Loop Deviation Error	1. Check the connection of the lifter motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-76	Lifter Motor Circuit Sampling Fault	If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.

Fault Alarm Operation Instructions

Error Code	Code Meaning	Solution
Error-80	Lifter Motor Encoder Not Connected	1. Check the connection of the lifter motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-81	Lifter Motor ID Direction Error	1. Check the lifter crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-83	Lifter Motor Overspeed	1. Check the connection of the lifter motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-92	Feed Motor Hardware Overcurrent	1. Power off the system. Wait 30 seconds, then restart. If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-94	Feed Motor Bus Overvoltage	1. Power off the system. Check if the input voltage exceeds AC 275V. If it does, restart the controller after the voltage returns to normal. If the system still does not function normally after the voltage normalizes and the system is restarted, please contact your local service provider or call 400-887-6858.
Error-95	Feed Motor Position Overshoot	1. Check the feed crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-98	Feed Motor Stall	1. Check the feed crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.

Fault Alarm Operation Instructions

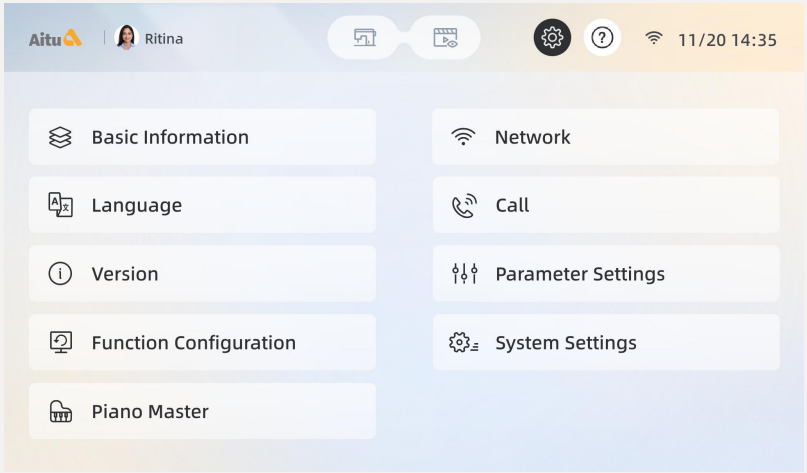
Error Code	Code Meaning	Solution
Error-101	Feed Motor Homing Timeout	1. Check the feed crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. 2. Check the connection of the feed motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-105	Feed Motor Speed Loop Deviation Error	1. Check the connection of the feed motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-106	Feed Motor Circuit Sampling Fault	If the system still does not function normally after restarting, please contact your local service provider or call 400-887-6858.
Error-109	Feed Motor Power Line Not Connected	1. Check the connection of the feed motor power cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-110	Feed Motor Encoder Not Connected	1. Check the connection of the feed motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-111	Feed Motor ID Direction Error	1. Check the feed crank assembly, oscillating shaft, and feed bar seat for abnormalities, jamming, or seizure. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.
Error-113	Feed Motor Overspeed	1. Check the connection of the feed motor encoder cable to the electronic control unit for good contact or obvious damage. If the system still does not function normally after resolving the issue and restarting, please contact your local service provider or call 400-887-6858.

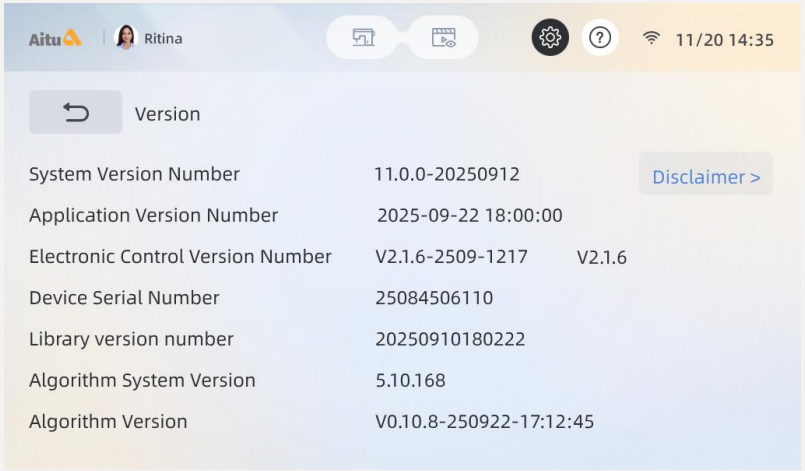
Fault Alarm Operation Instructions

Warning Code	Description	Measures
A01	Flip Switch Protection	When the sewing machine is tilted with the safety flip switch turned on, a tilt alarm interface will pop up, and the sewing machine will not operate. Press "Confirm" to cancel the alarm.
A02	Stitch Count Full Alarm	-
A03	Piece Count Full Alarm	-
A04	Machine Head Button Short Circuit	Press "Confirm" to cancel the alarm; the machine head button will not take effect for the rest of the power-on session.

CONCENTS

Screen Terminal Configuration Instructions - Version Check



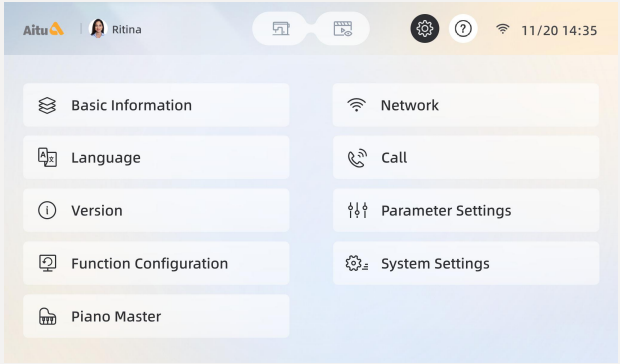


Click the gear icon on the main interface to access the settings interface, then click "Version".

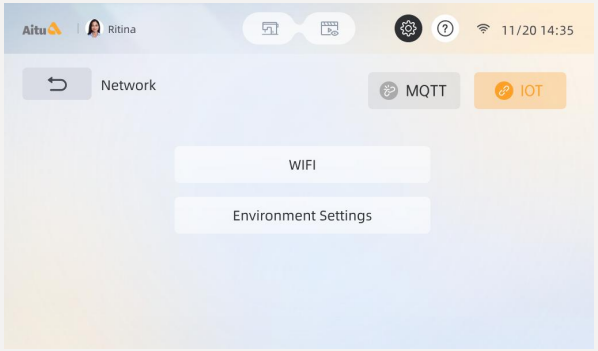
1.Verify that the device serial number matches the nameplate on the back of the machine.

2.Confirm the correctness of the machine program version (system version number, application version number, electronic control version number, library version number, algorithm system version number, algorithm version number).

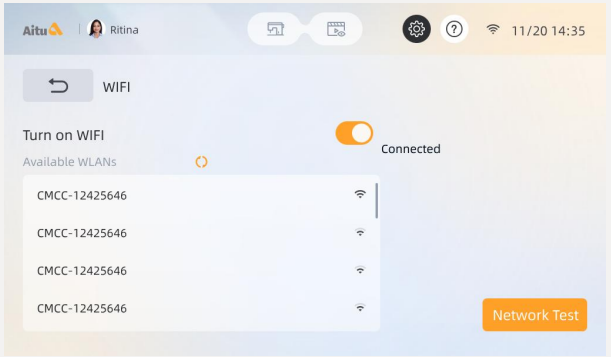
Screen Terminal Configuration Instructions - Wi-Fi



Tap the "gear icon" on the main interface to access the settings interface, then tap "Network" and select "Wi-Fi".



TapWIFI

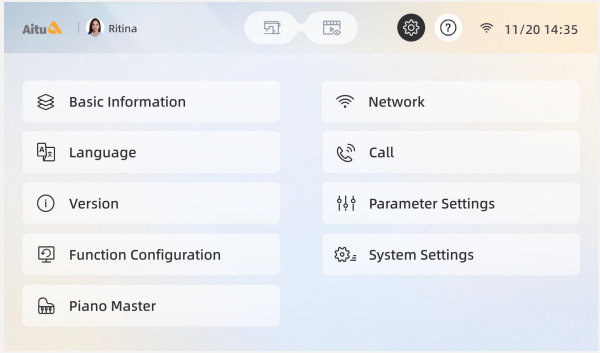


1.With Wi-Fi enabled, select the corresponding Wi-Fi network, enter the password, and click "Confirm".

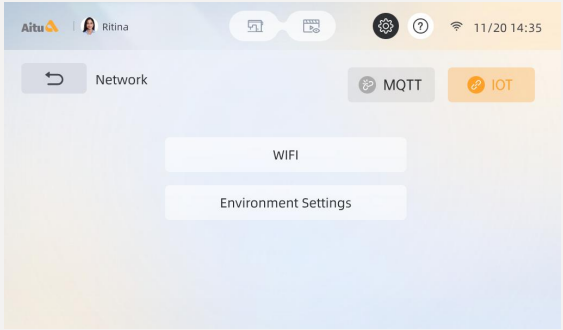
2.Wait for the Wi-Fi icon in the upper right corner to indicate a connected status; the time will be synchronized automatically.

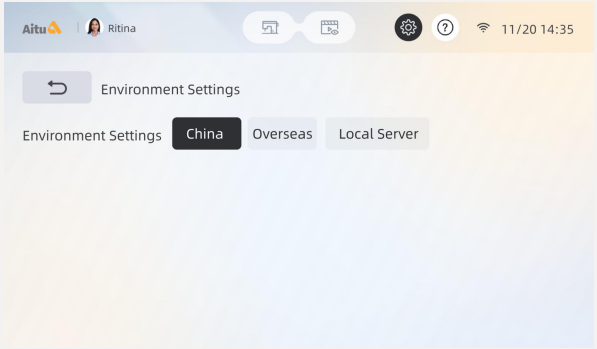
Screen Terminal Configuration Instructions - Address Configuration

Click the "gear icon" on the main interface to access the settings interface, then click "Network".

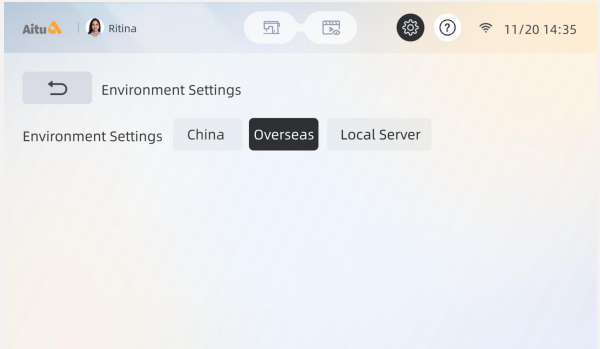


Select “Environment Configuration"

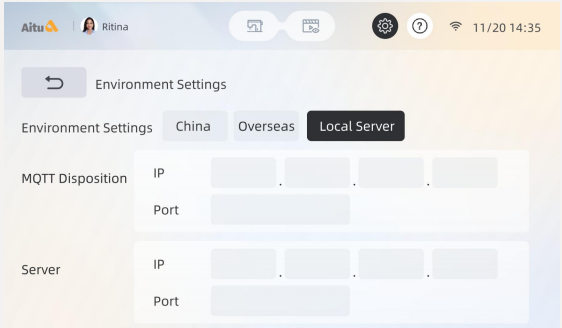




Choose either "Domestic" or "Overseas".

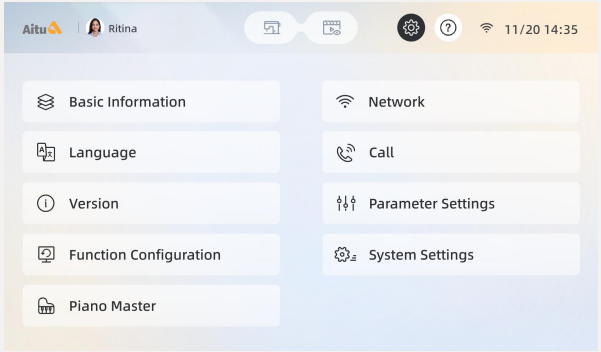


Choose either "Domestic" or "Overseas".

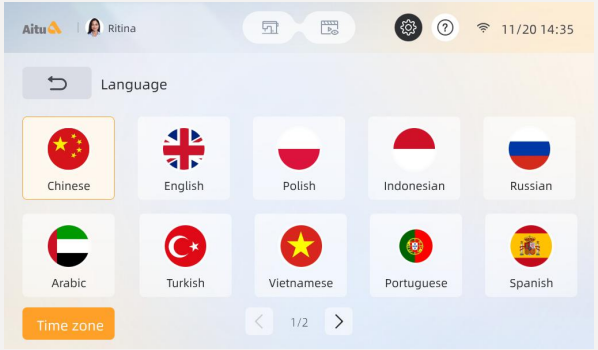


Choose “Local Server".

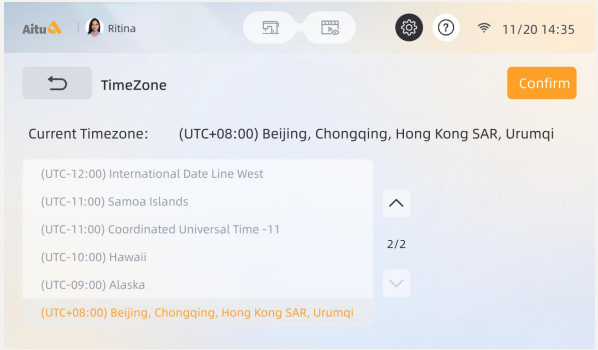
Screen Terminal Configuration Instructions - Time Zone



Click the gear icon on the main interface to access the settings interface, then click "Language".



1. Click the language of the target country to switch; a restart prompt will appear after switching. Currently, selecting Vietnamese or Chinese will automatically switch the time zone.
2. For time zone adjustment in other countries, click the time zone option in the lower left corner to access the time zone selection interface.



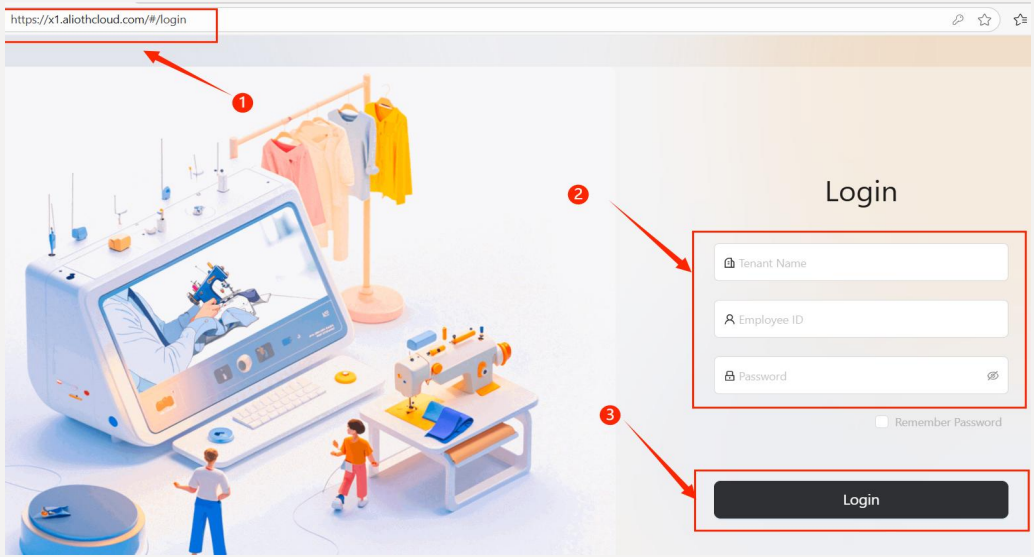
Select the time zone of the corresponding country, click "Confirm", and a restart prompt will appear.

PC Computer User Manual - Login

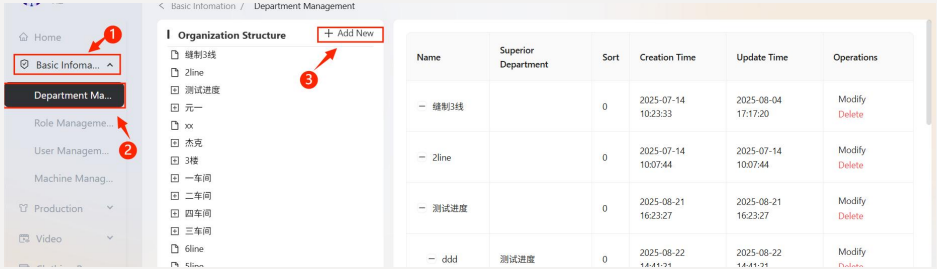
1.Open Google Chrome and enter the system URL:
- Domestic - https://x1.aliothcloud.com/#/login;
- Overseas - https://en-x1.aliothcloud.com/#/login.

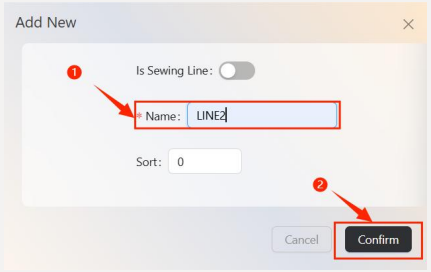
2.Fill in the "Tenant Name", "Account", and "Password" in sequence.

3.Finally, click "Login".



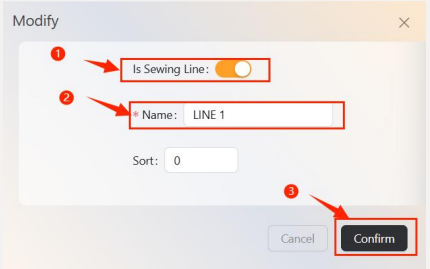
PC Computer User Manual - Department Management





1.Open the [Basic Data] - [Department Management] menu and click "Add".

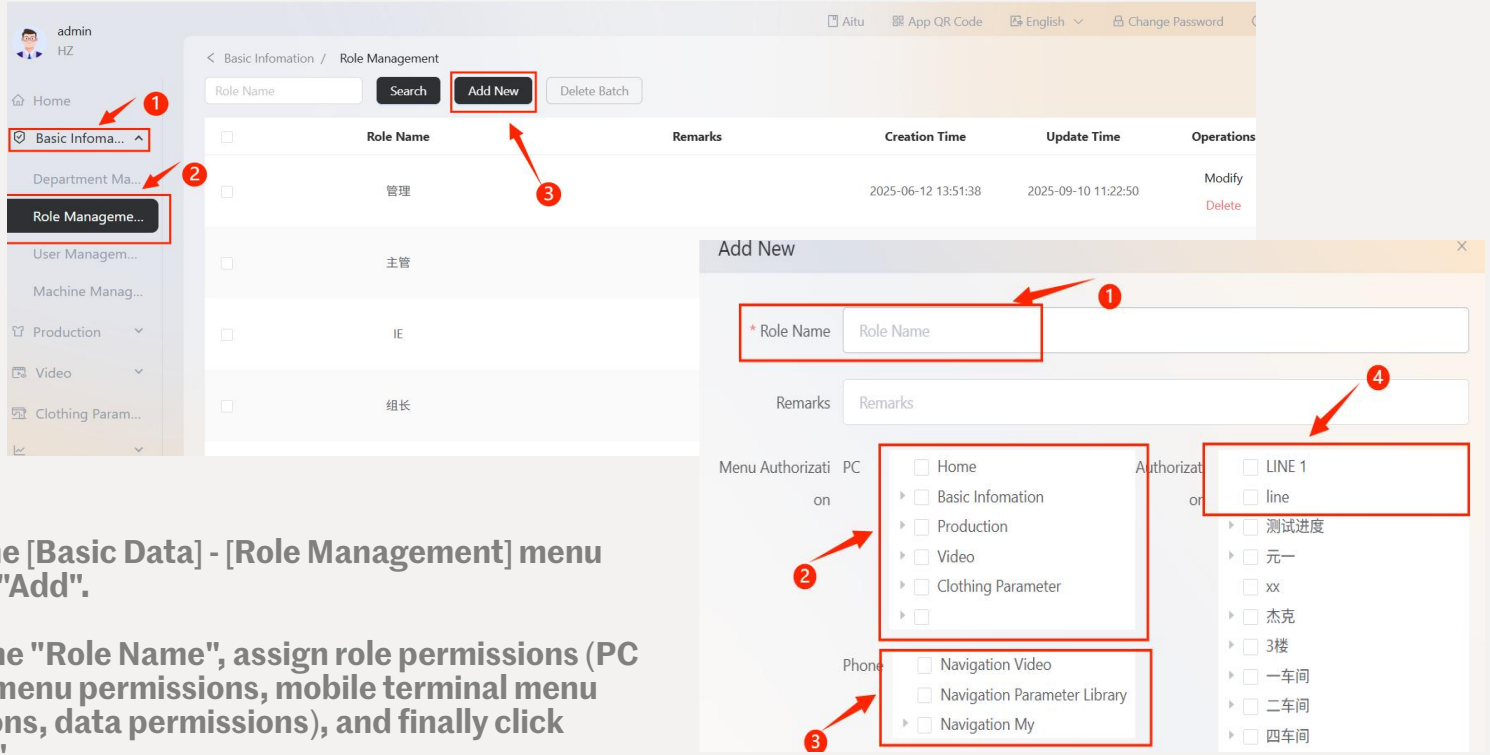
2.Enter the "Company Name" and click "Confirm".



3.Under the "Company Name", click "+" to add a new production line.

4.Enable the "Sewing Line Switch", enter the "Line Group Name", and click "Confirm".

PC Computer User Manual - Role Management

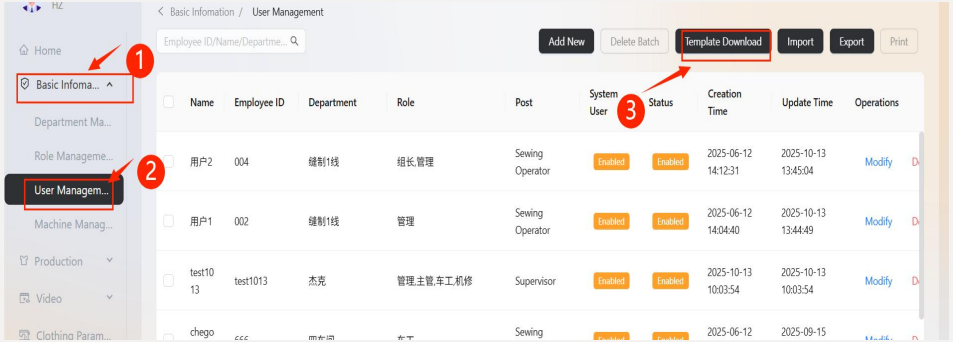


1. Open the [Basic Data] - [Role Management] menu and click "Add".

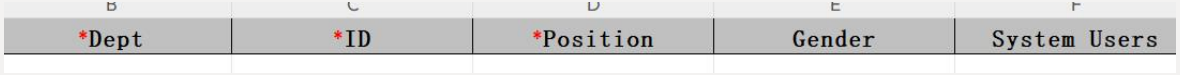
2. Enter the "Role Name", assign role permissions (PC terminal menu permissions, mobile terminal menu permissions, data permissions), and finally click "Confirm".

PC Computer User Manual - Employee Management

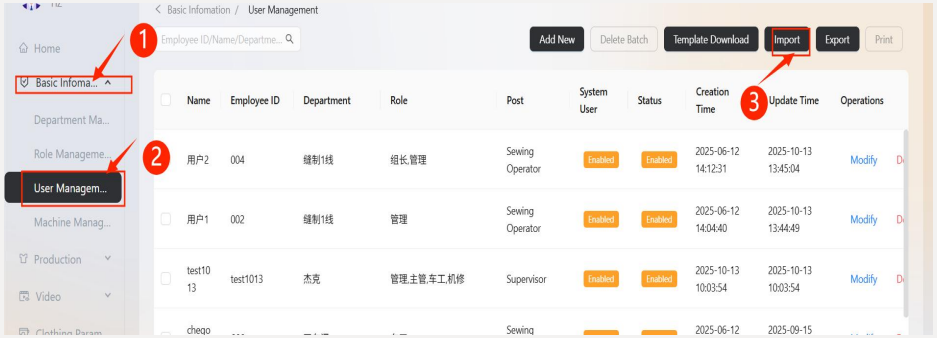
1.Open the [Basic Data] - [Employee Management] menu and click "Template Download".



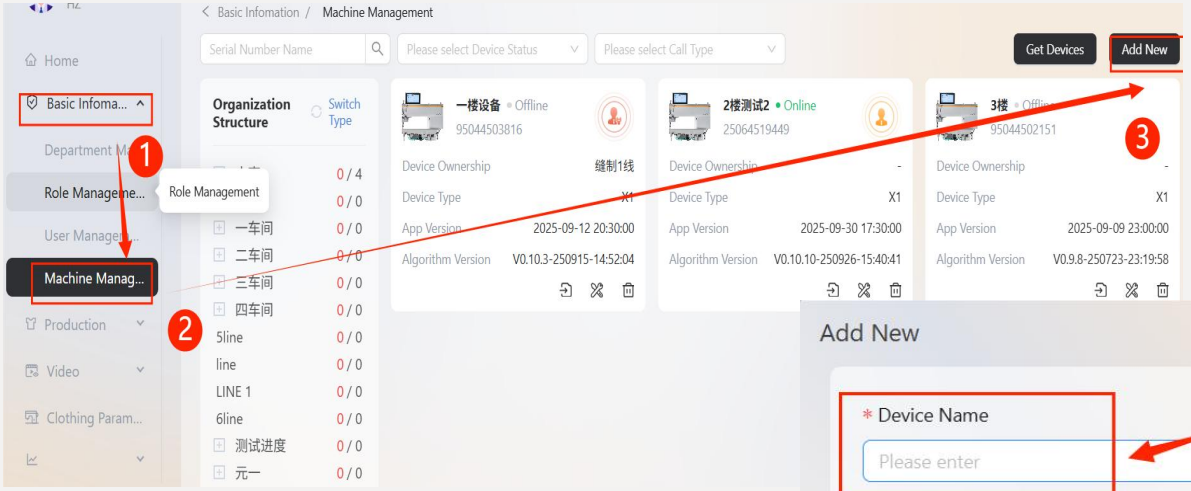
2.Fill in the "Employee Information" in accordance with the template and save the file.

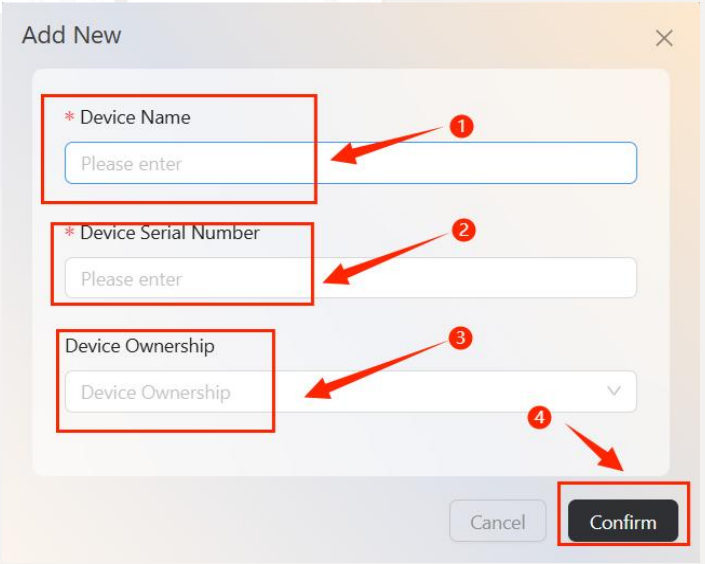


3.Open the [Basic Data] - [Employee Management] menu and click "Import".



PC Computer User Manual - Equipment Management





1.Open the [Basic Data] - [Equipment Management] menu and click "Add".

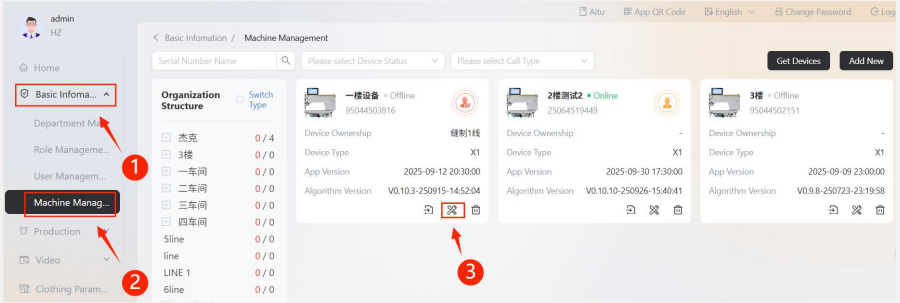
2.Enter the "Equipment Name" and "Equipment Serial Number", then select the "Production Line" to which the equipment belongs.

Notes:

(1) It is recommended to format the equipment name as "Machine Model - Team" for ease of management.

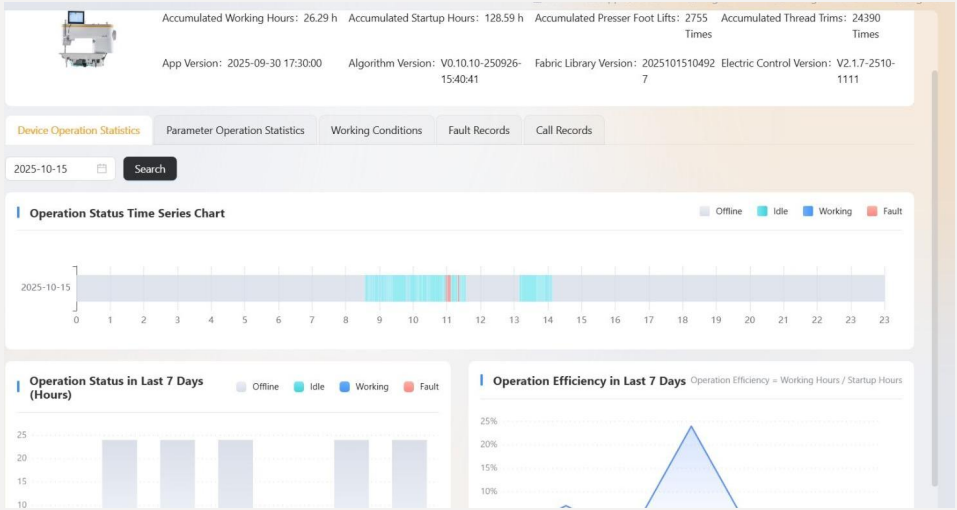
(2) Replace the first digit of the equipment serial number with "9".

PC Computer User Manual - Device Details



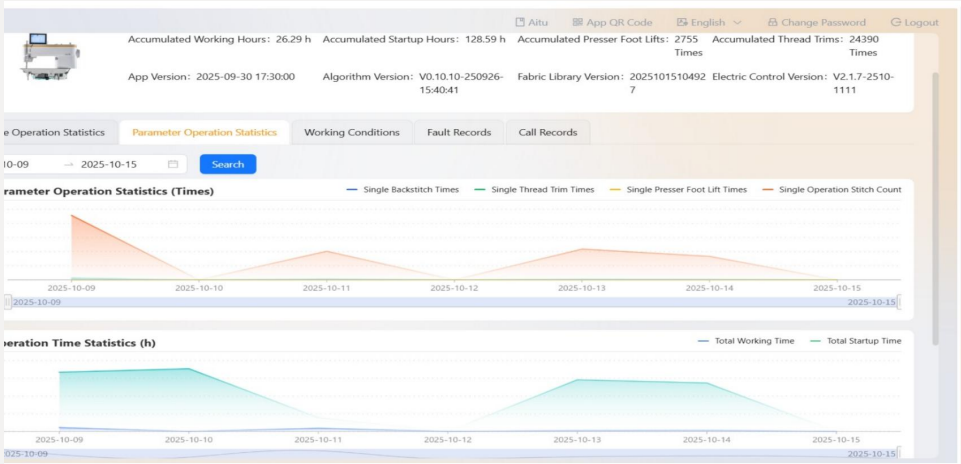
1.Open the [Basic Data] - [Equipment Management] menu and click the "Details" button to access the device details page.

2.View the "Equipment Operation Statistics" page, which displays the device's online status, operating status over the past seven days, and operating efficiency.

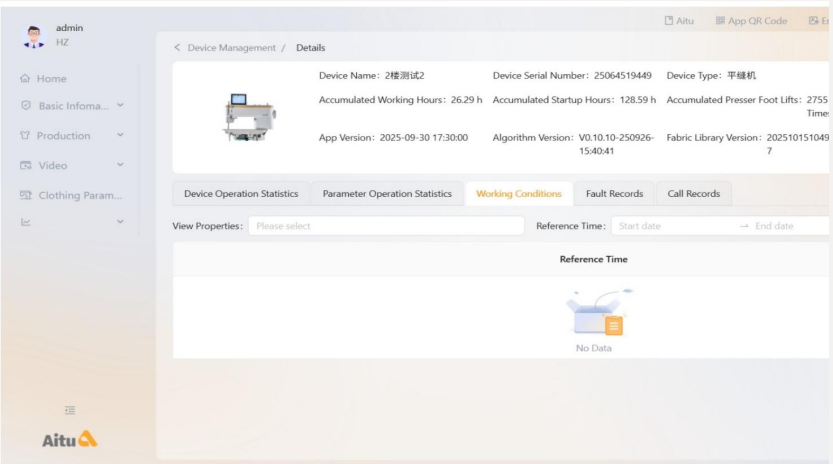


PC Computer User Manual - Device Details

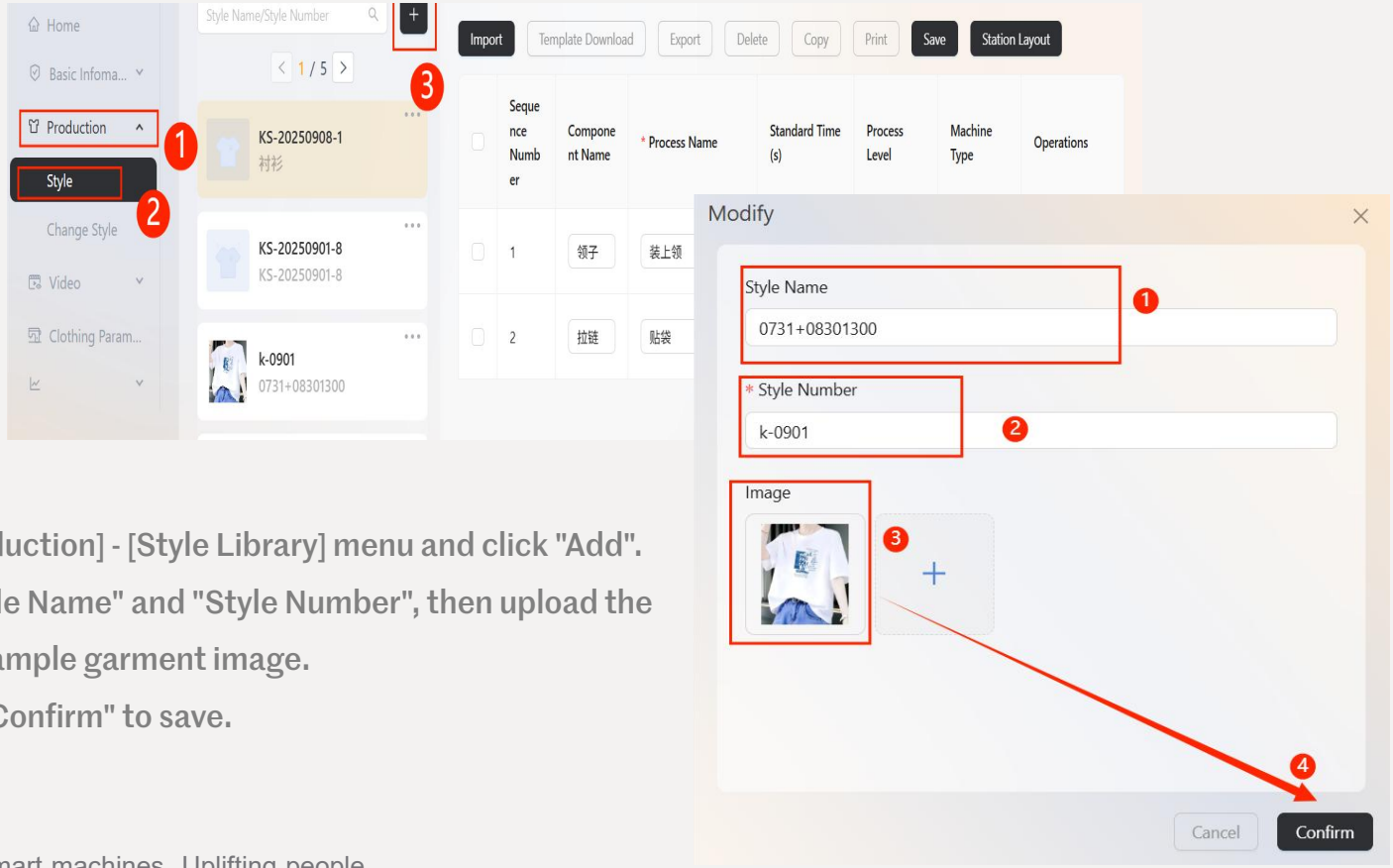
3.View the "Parameter Operation Statistics" page, which shows the "Parameter Operation Statistics (Times)" and "Operation Time Statistics (h)" over the past seven days.



4.View the "Working Condition" page to check the machine's parameter details (real-time working condition, historical working condition, processing statistics).



PC Computer User Manual - Style library



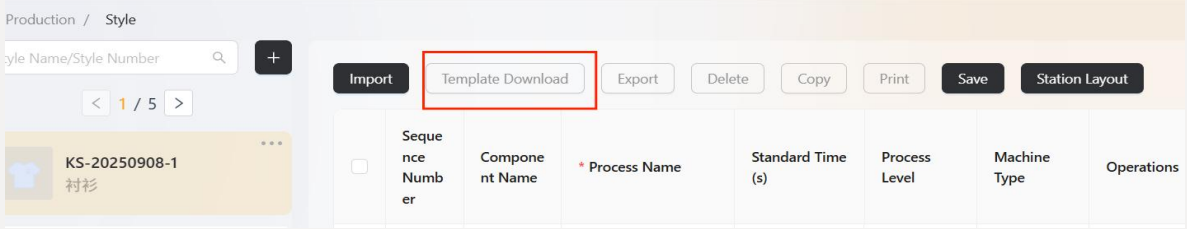
1.Open the [Production] - [Style Library] menu and click "Add".

2.Enter the "Style Name" and "Style Number", then upload the style image or sample garment image.

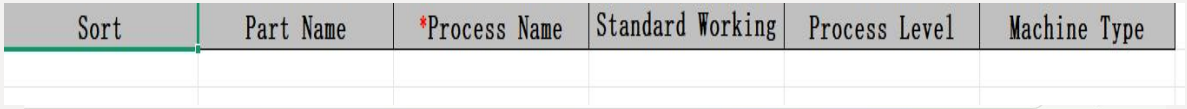
3.Finally, click "Confirm" to save.

PC Computer User Manual - Style library

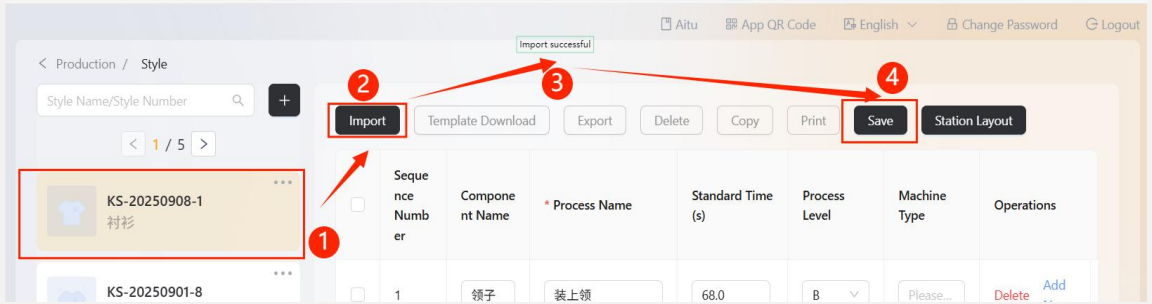
4.Select the target "Style" on the left and click "Template Download".



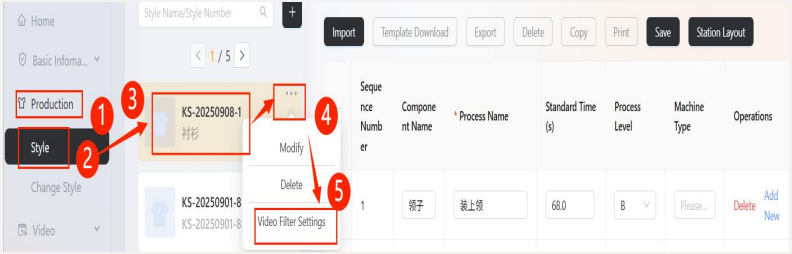
5.Fill in the "Process Information" according to the template and save the file.



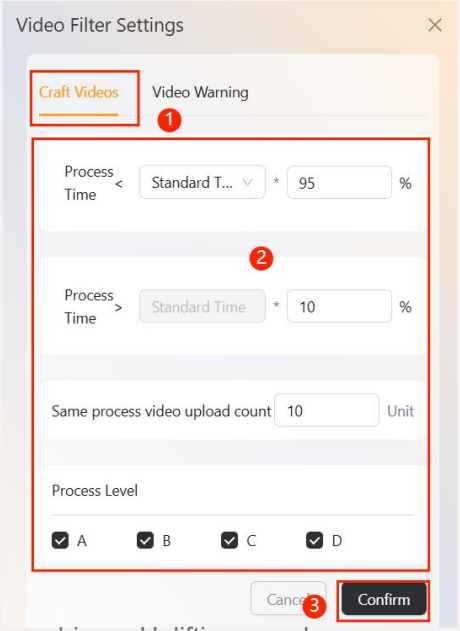
6.Return to the [Style Library] interface, click "Import", verify the correctness of the process, and finally click "Save".



PC Computer User Manual - Video filtering strategy



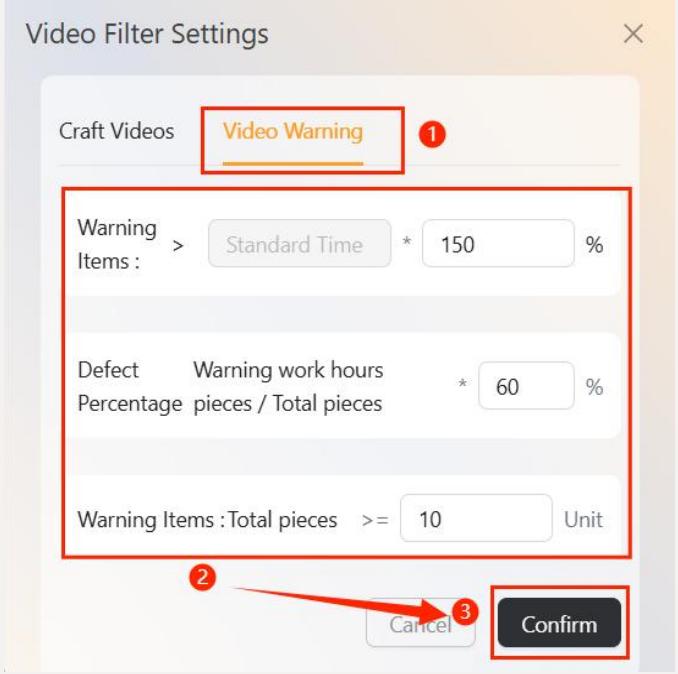
1.Open the [Production] - [Style Library] menu, locate the style to be produced, and click the "Filter Icon".



2.Select "Process Video" and configure the video collection rules, then click "Confirm".

Rule Description:

(1) Define the collection range for process videos. For example, the system will only collect videos with a duration within a specific range (greater than X seconds and less than Y seconds).
(2) "Number of Uploaded Videos for the Same Process" means the system can collect a maximum of 10 videos for the same process.
(3) "Process Level" specifies which levels of processes the system will collect videos for.

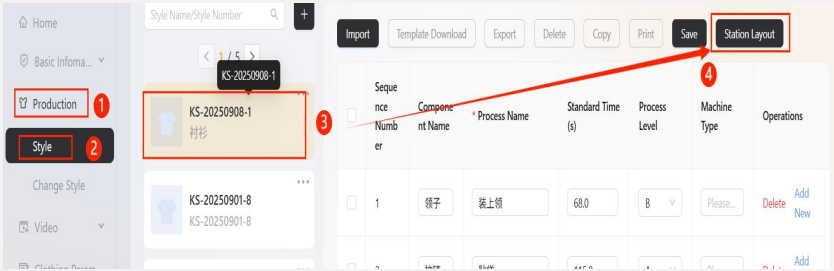


3.Select "Video Warning" and configure the video warning strategy, then click "Confirm".

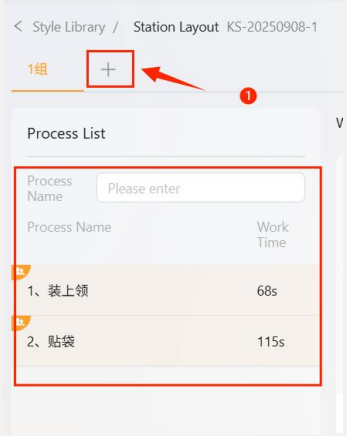
Rule Description:

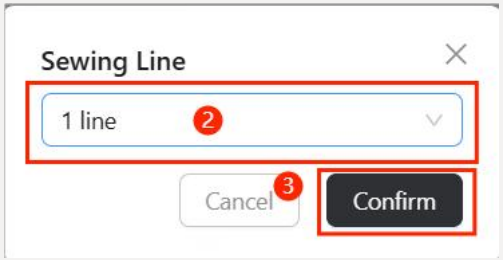
(1) Warning Working Hours: The number of seconds beyond the standard working hours that triggers a video warning.
(2) Warning Threshold: The number of videos required on the screen terminal to activate the warning function (including both normal and warning videos).
(3) Warning Ratio:
Number of Pieces with Warning Working Hours: The actual number of warning videos on the screen terminal.
Total Pieces * 60%: The target number of warning videos; a warning is triggered if this target is exceeded. For example: Actual warning count = 5, Total video count = 10; Warning target = 10 * 60% = 6; 5/6 = 0.83 (less than 1), so the system will not store these 5 warning videos.
(4) By default, the system saves only 3 warning videos for the same process very day.

4.Open the [Production] - [Style Library] menu, locate the style to be produced, and click "Workstation Layout".



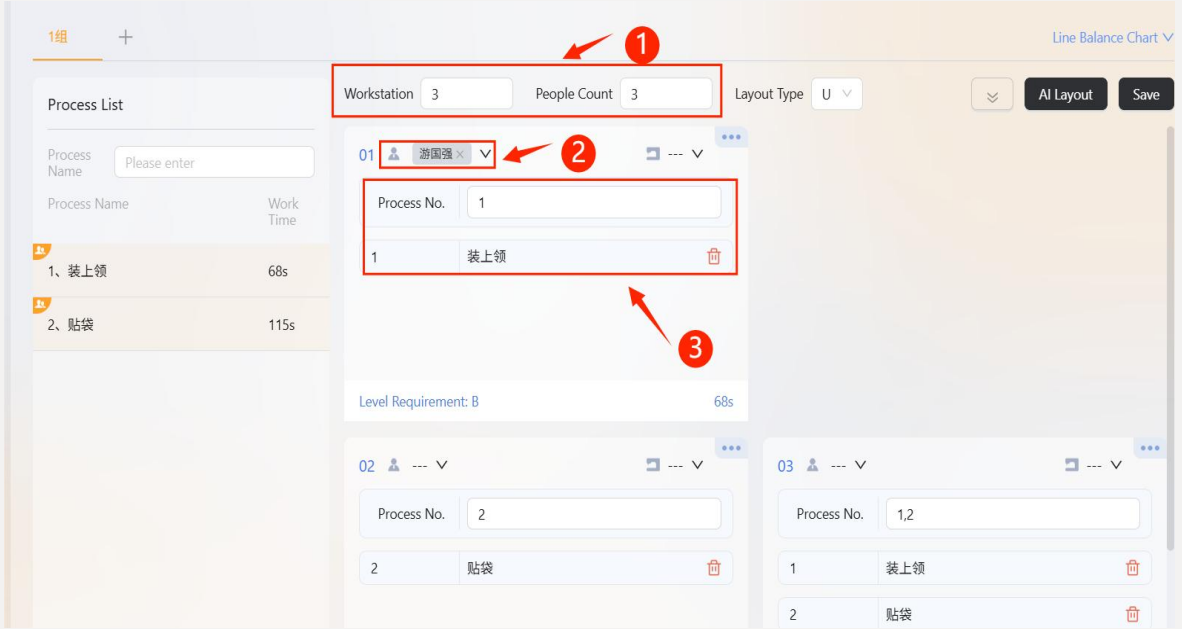
5.Click the "+" icon, select the "Sewing Line" for production, and click "Confirm".





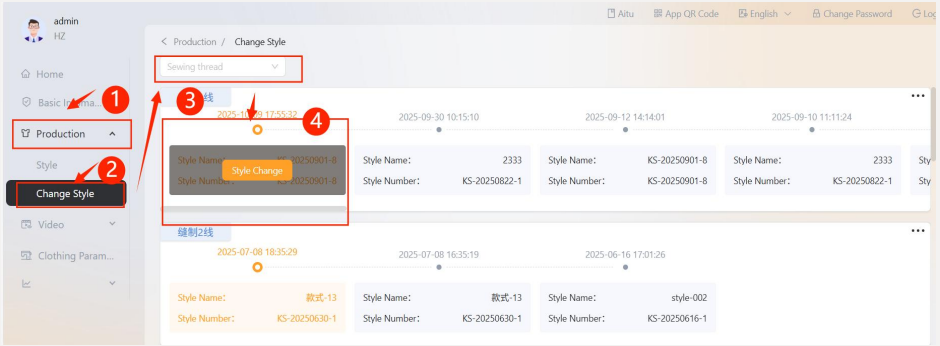
6.Enter the "Number of Workstations" and "Number of Personnel" for the sewing line, then select the "Layout Method".

7.Assign "Workers" and "Processes" based on the workstation number.
Finally, click "Save".
Note:
The system supports assigning multiple processes to a single workstation.
(AI video analysis only supports a single process)

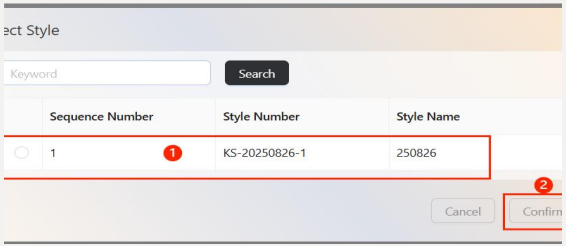


PC Computer User Manual - Production line switching models

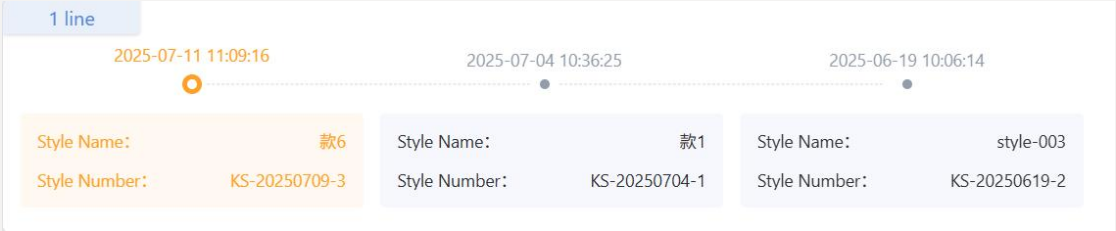
1.Open the [Production] - [Production Line Switching Models] menu, select the "Sewing Line" for production, and click the "Switch Model" button.



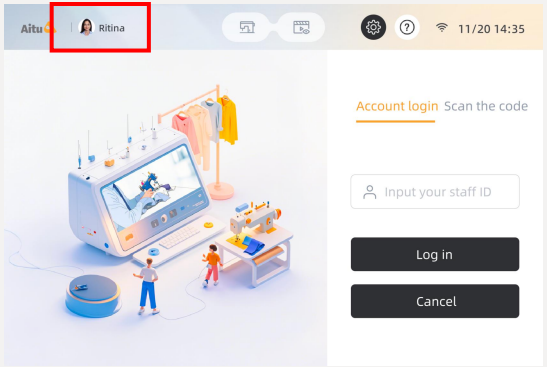
2.Select the order to be replaced and click "Confirm".



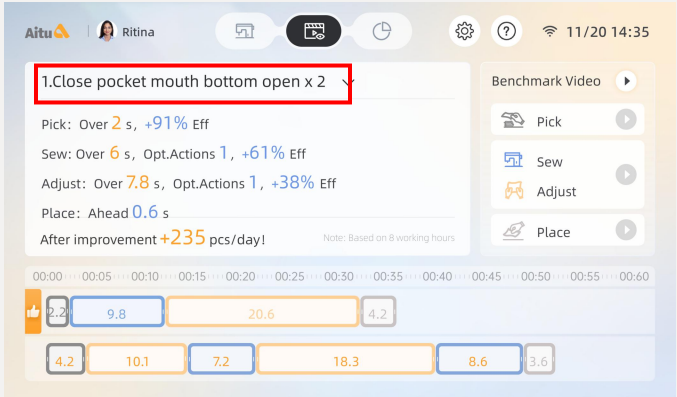
3.After successful replacement, the system will record each model switch, and all devices under the production line will be automatically switched to the new style. (The user needs to log in again on the "screen terminal".)

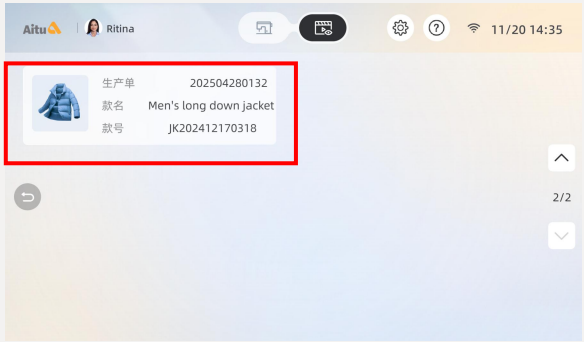


Screen terminal configuration instructions - Process selection

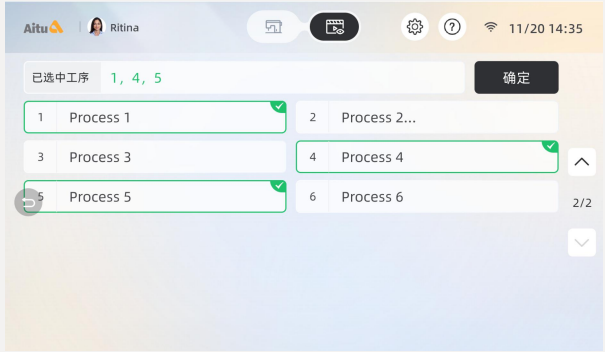


Log in to the system, click "User Name", select "Account Login", enter the "Employee ID", and finally click "Login".



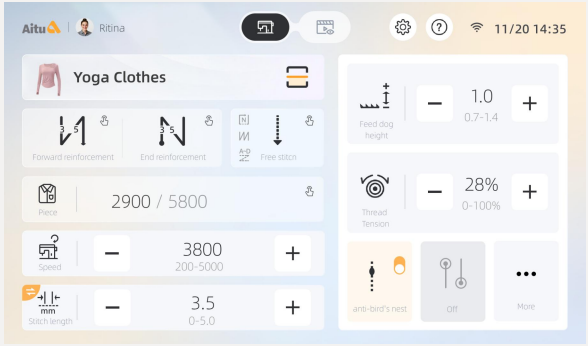


Select the style to be produced

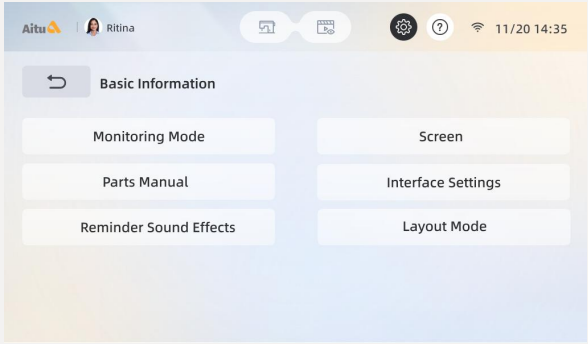


Choose the "Process" to be performed, and click "Confirm". (AI video analysis only supports a single process) Click the "Process Name".

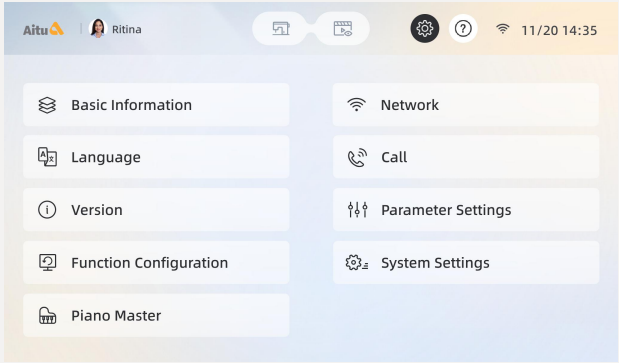
Screen configuration description - Switch process interface



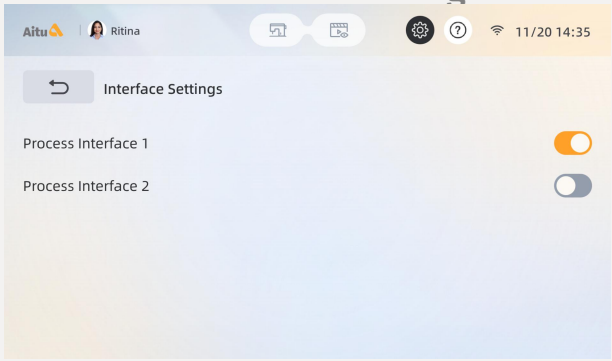
Tap the "Settings" icon



Tap "Interface Settings"



Select "Parameter Settings"



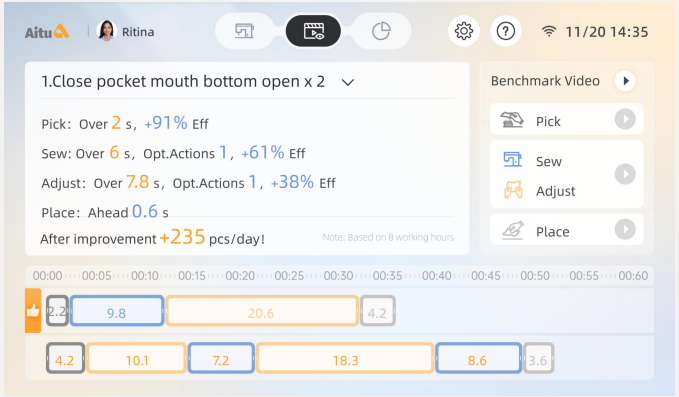
Choose the "Process Interface" that meets the requirements

Screen Configuration Instructions - Video Learning (Interface 1)

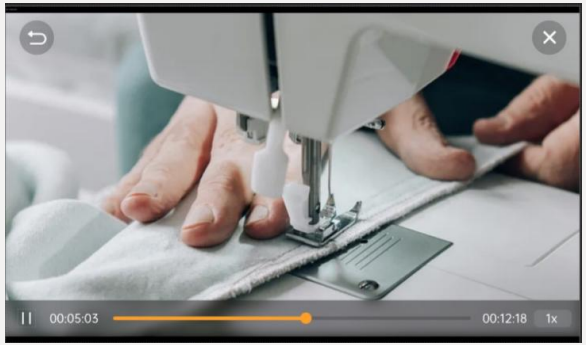
1.After an employee completes sewing a piece, AI will compare the sewing process with the benchmark video to identify differences and help the employee improve efficiency.

2.Click the play icon " " to learn the movements in the benchmark video.

1



2



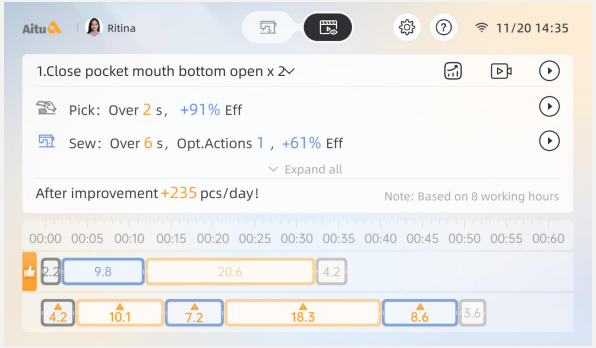
Screen Configuration Instructions - Video Learning (Interface 2)

1.After an employee completes sewing a piece, AI will compare the sewing process with the benchmark video to identify differences and help the employee improve efficiency.

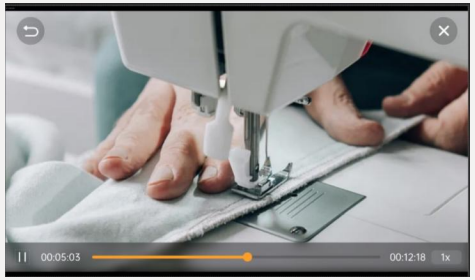
2.Click the play icon " " to learn the movements in the benchmark video.

3.Click the video icon " " to view the video list. (The screen terminal can store 100 videos.)

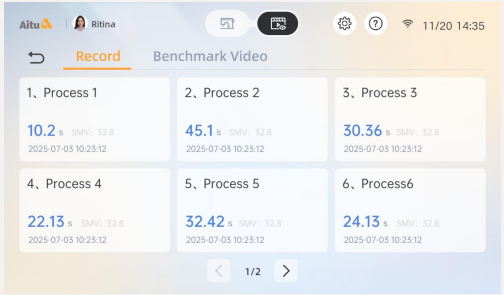
4.Click the efficiency icon " " to view the duration of the four movements (taking, sewing, arranging, placing) by date.



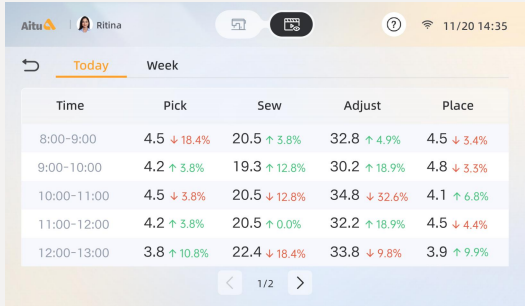
1



2



3



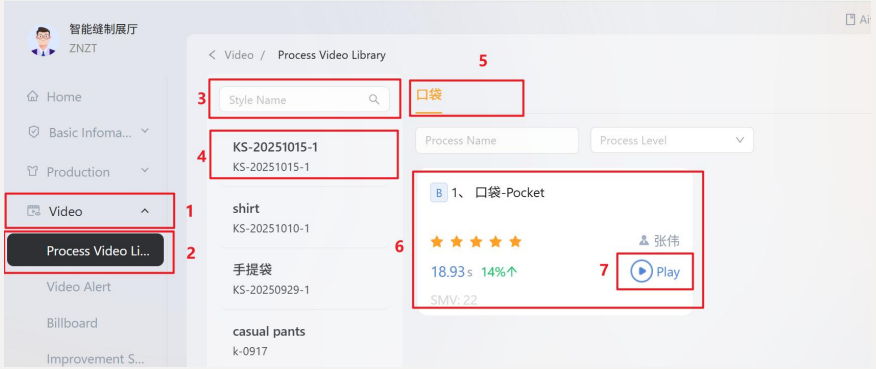
4

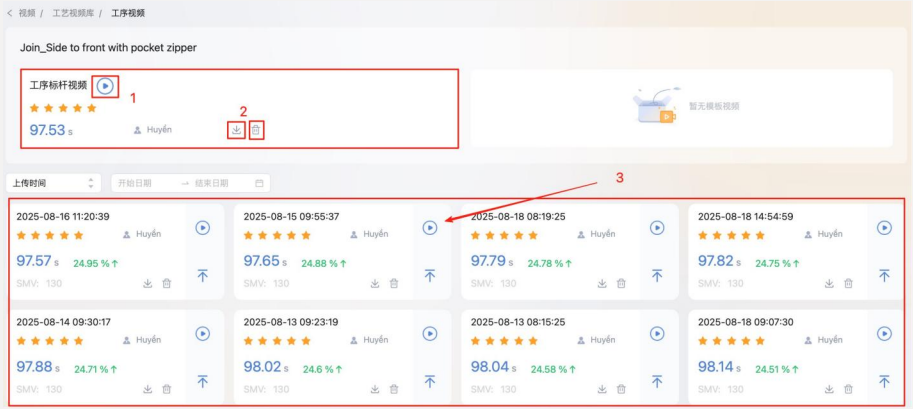
PC Computer User Manual - Craft Video Library

1. Open the [Video] - [Craft Video Library] menu and locate the style to be viewed.

2.Filter by "Part" category, select the "Process" to be viewed, and click the "Process Play" button to watch the benchmark video.

3.Click the "Process Card" to navigate to the details page.。





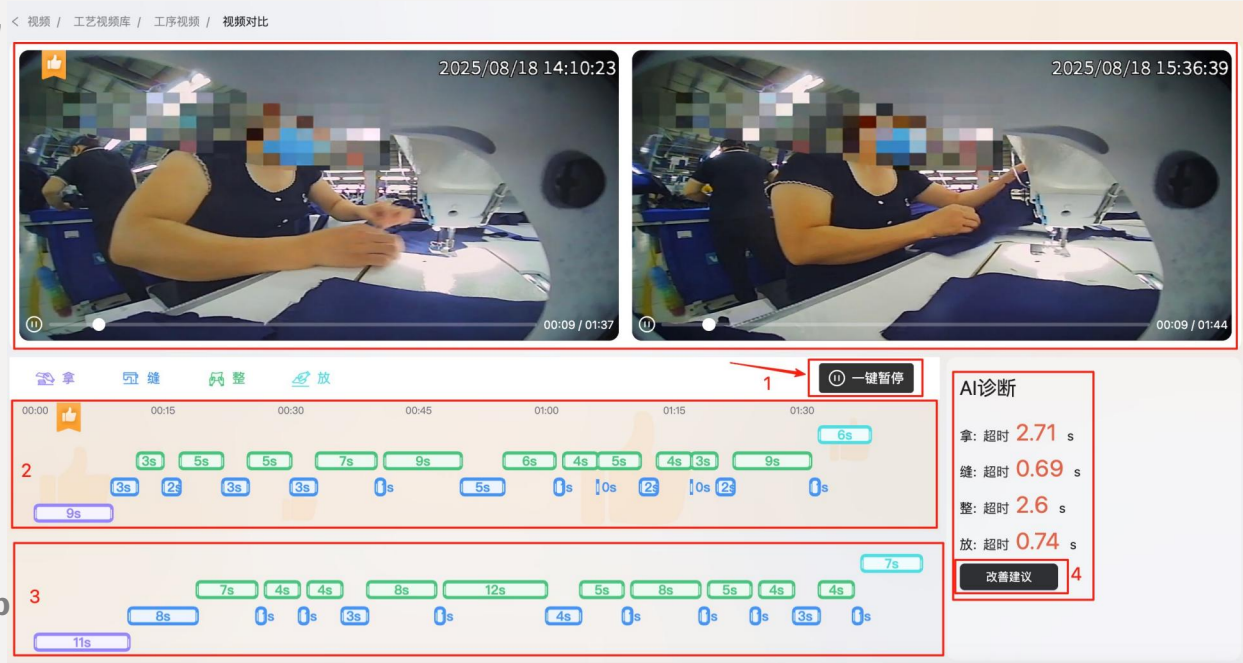
4.Upper left page: Mainly used to view the "benchmark video" of the process, download videos, and delete videos.

5.Lower left page: Click the "Play" button to compare with the benchmark video, analyze differences, and identify discrepancies.。

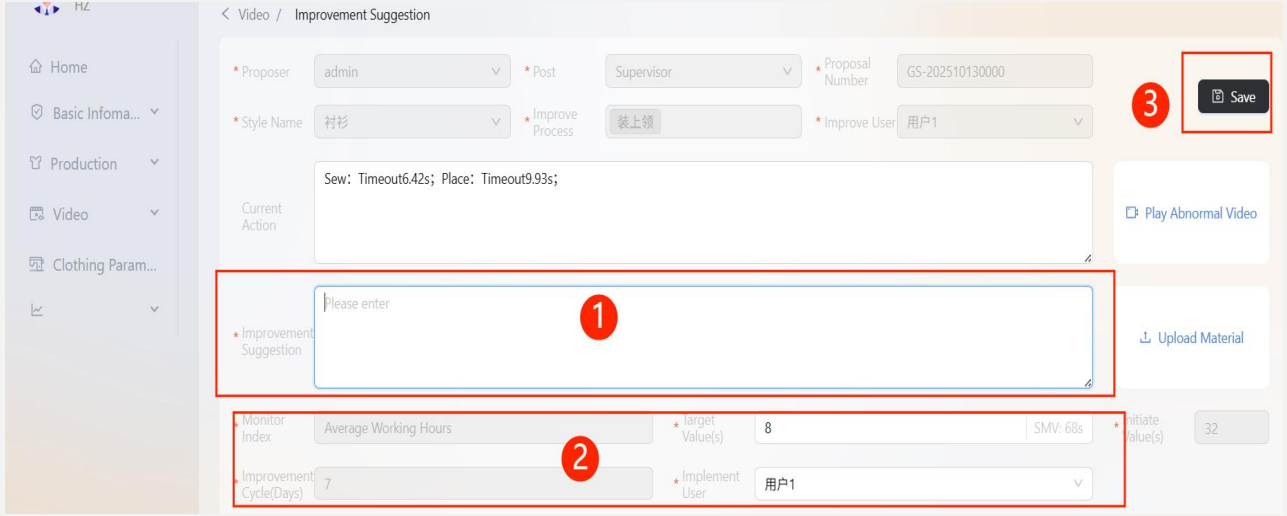
6.Click "One-click Play/One-click Pause" to control video playback and pause.

7.Timeline Area: The system uses four colors to distinguish the duration of the four movements (taking, sewing, arranging, placing).

8.By comparing with the benchmark video, AI will conduct data analysis and provide "AI" diagnosis results.
Click "Improvement 9.Suggestions" to input recommendations for employees to improve their movements and develop plans to track progress in real time.



PC Computer User Manual - Craft Video Library and Improvement Suggestions

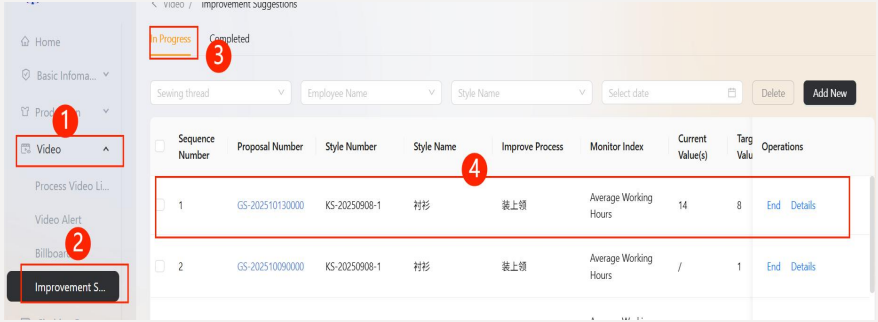


10.Based on the "Current Practice" and combined with IE experience, fill in the "Improvement Suggestions".

11.Set the "Target Value", define the "Improvement Cycle", assign the "Implementer", and click "Save".
Definition of Terms:
Initial Value: The duration of the current video in seconds.
Target Value: The set target for improvement.
Improvement Cycle: The planned period for implementing improvements.
Implementer: The person responsible for carrying out the improvements.

PC Computer User Manual - Craft Video Library and Improvement Suggestions

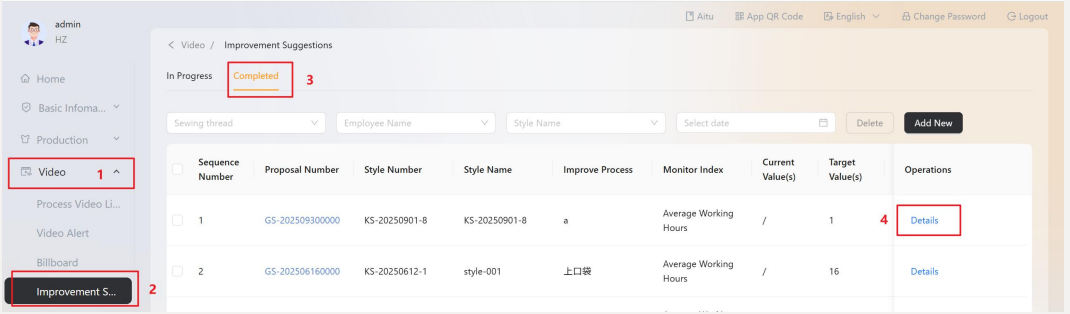
12.Open the [Video] - [Improvement Suggestions] menu and select "In Progress" to view the number of ongoing tasks.



13.Click "Details" to monitor daily improvement progress, identify issues promptly, and provide timely support to employees.

PC Computer User Manual - Craft Video Library and Improvement Suggestions

14. Open the [Video] - [Improvement Suggestions] menu and select "Completed" to view the number of finished tasks.

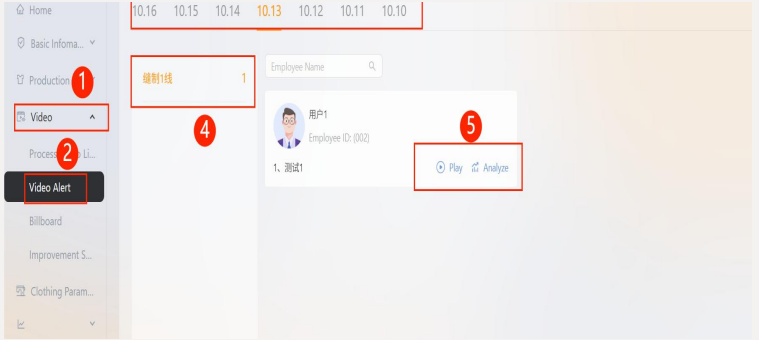


15. Click "Details" to review the progress of historically completed improvements.

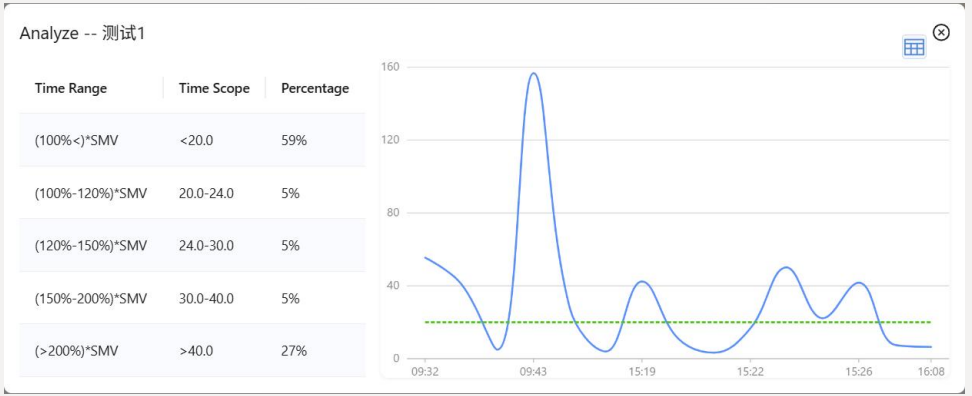
PC Computer User Manual - Video warning

1.Open the [Video] - [Video Warning] menu.

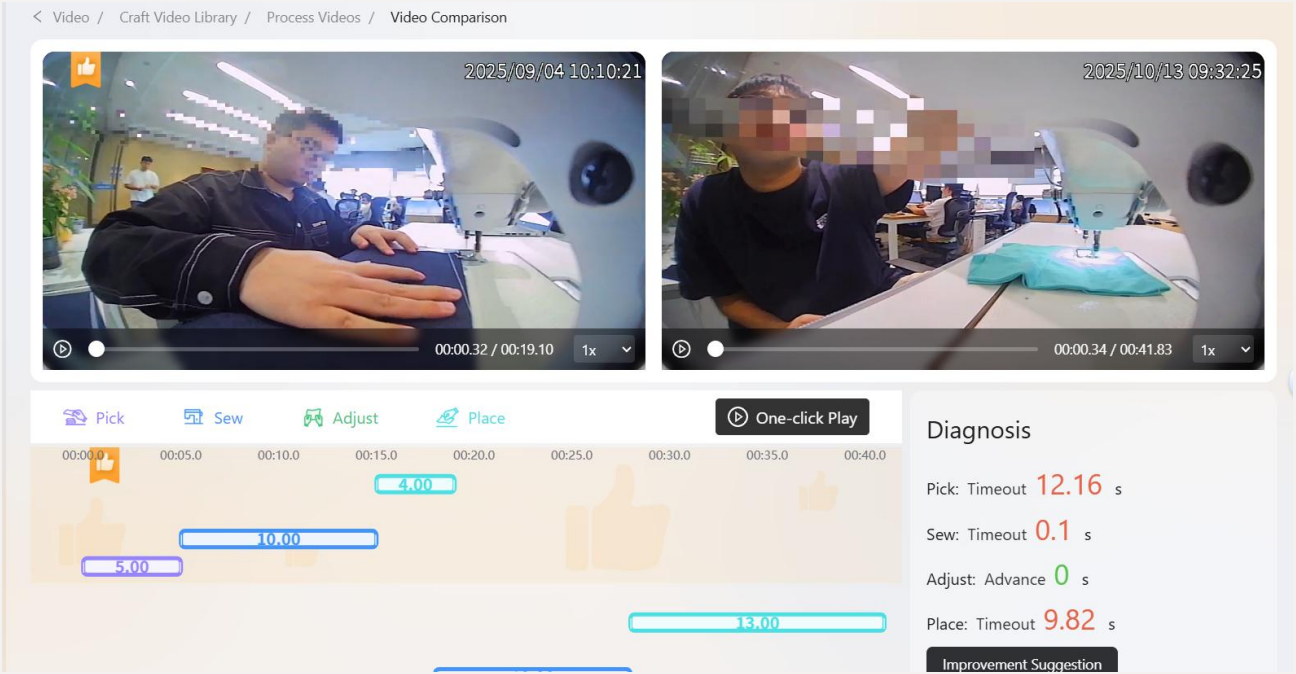
2.Select the warning "Date" and "Sewing Line" to identify which employees and processes under the sewing line have warnings and require guidance from IE or team leaders.



3.Click the "Analysis" button to view the distribution of actual working hours spent by employees on the process across different time periods.



4.Click the "Play" button to compare the warning video with the benchmark video. Team leaders or IE personnel will analyze the causes based on "AI Diagnosis" and assist employees in making improvements.

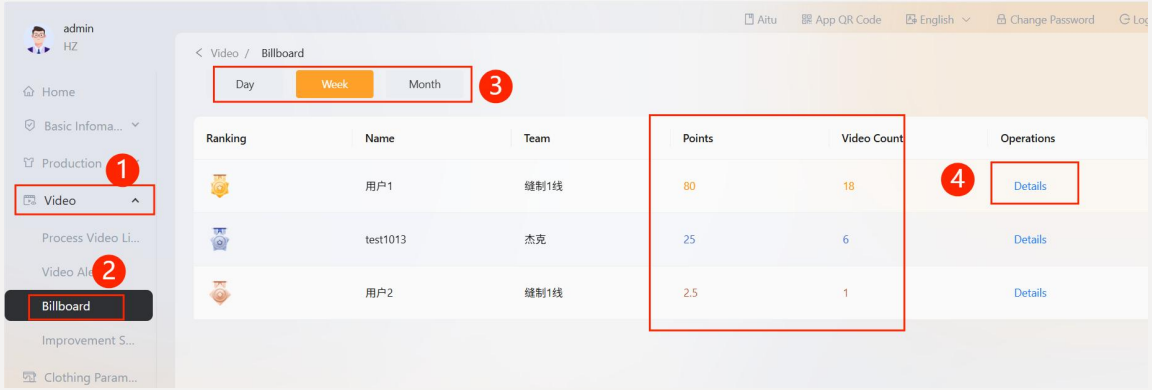


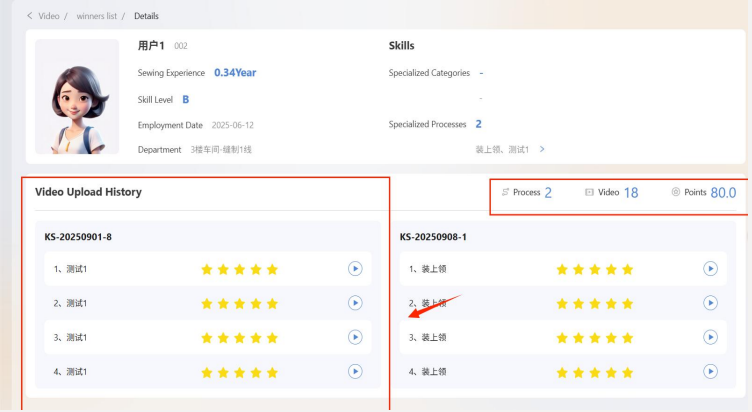
PC Computer User Manual - Dragon and Tiger List

1.Open the [Video] - [Dragon and Tiger List] menu.

2.Filter by "Date Type" to view employee rankings.

3.To check an employee's points details, click the "Details" button to access the details page.





4.The right side displays the number of processes, videos, and points the employee is responsible for on the current day.

5.The left list shows the videos for which the employee has earned points.

6.Click the "Play" icon in the left list to view the sewing process.

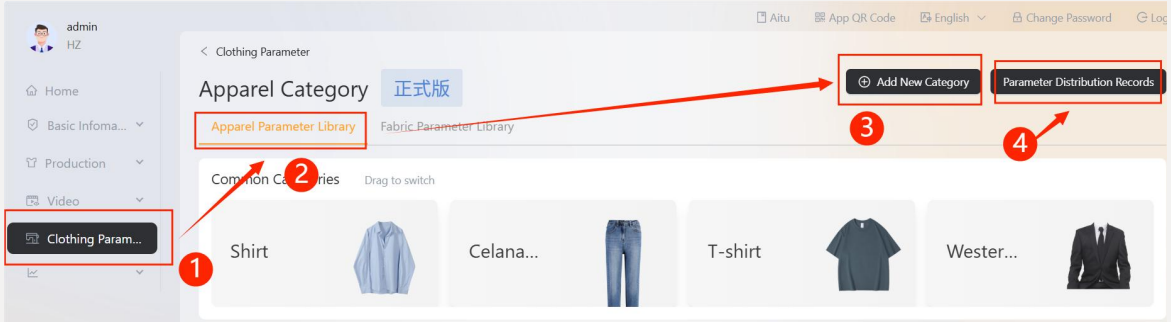
Points Explanation:

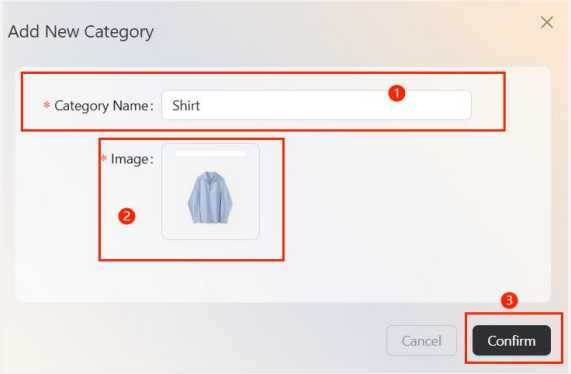
The system automatically converts the duration of the employee's sewing processes and the number of uploaded videos into points for ranking. (1 ⭐ represents 1 point)

PC Computer User Manual- Add Clothing parameter library

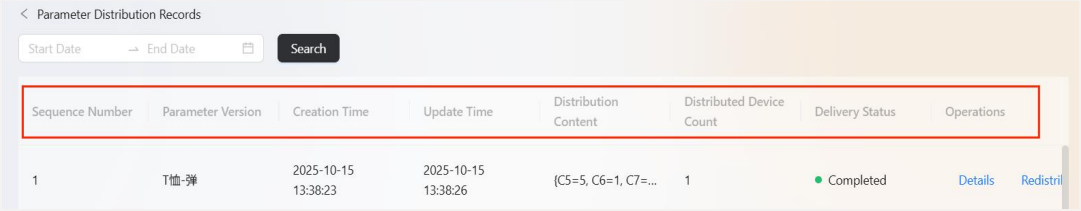
1.Open the [Clothing Parameter Library] menu and select "Clothing Parameter Library".

2.Click "Add Category", enter the "Category Name", upload the "Category Image", and click "Confirm".



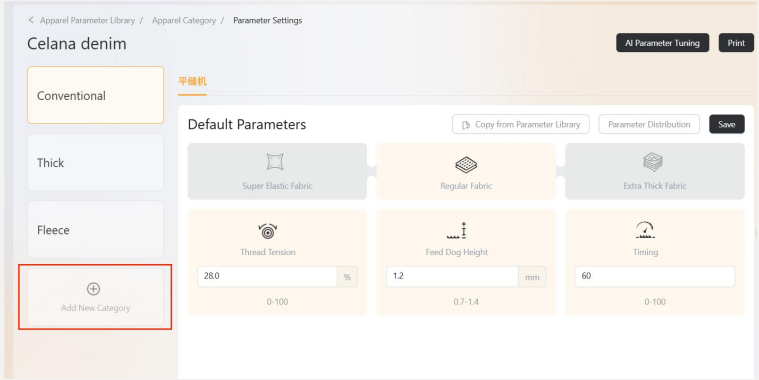


3.Click "Parameter Distribution Record" to view historical records of remote machine parameter distribution.

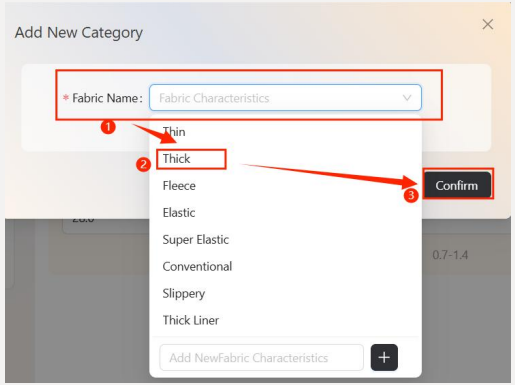


PC Computer User Manual- Add Clothing parameter library

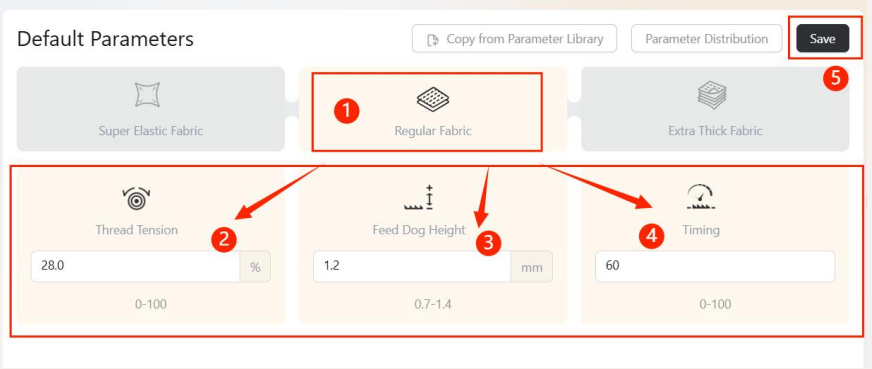
4.Click "Add Category".



5. Based on the fabric characteristics of the category, select the appropriate "Fabric Name" and click "Confirm".



6.Select "Sewing Trajectory", enter the "Thread Tension", "Tooth Height", and "Timing Sequence", and finally click "Save".

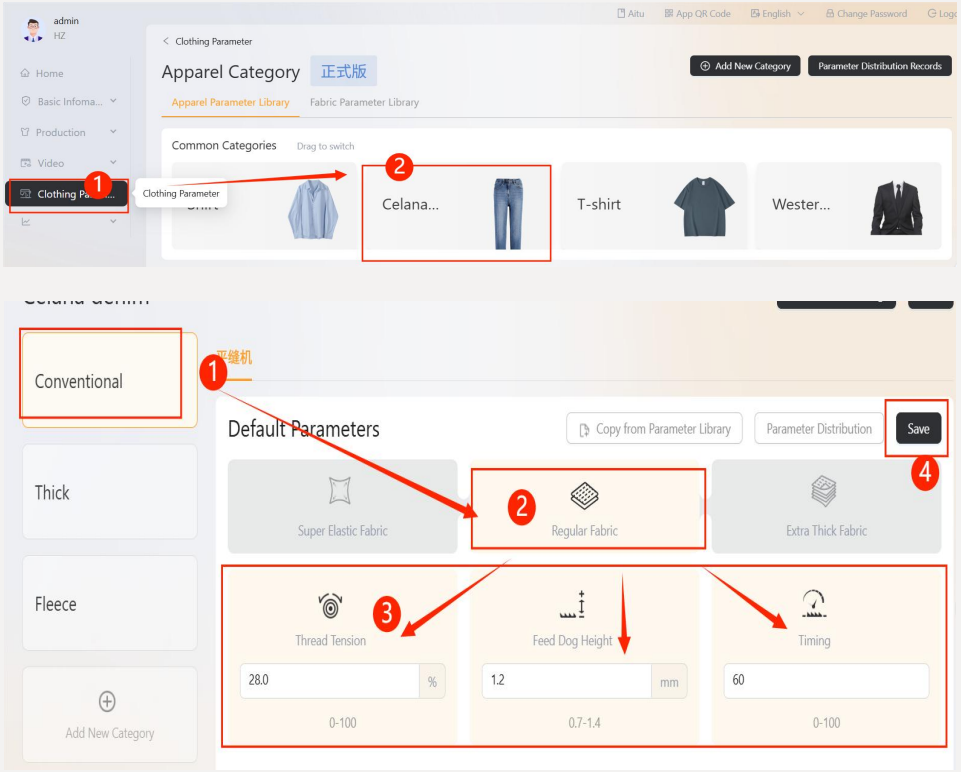


PC Computer User Manual - Modify the clothing parameter library

1.Open the [Clothing Parameter Library] menu and click the "Shirt" category.

2.Based on the characteristics of the "Shirt" category, select the corresponding "Sewing Trajectory" and modify the "Thread Tension", "Tooth

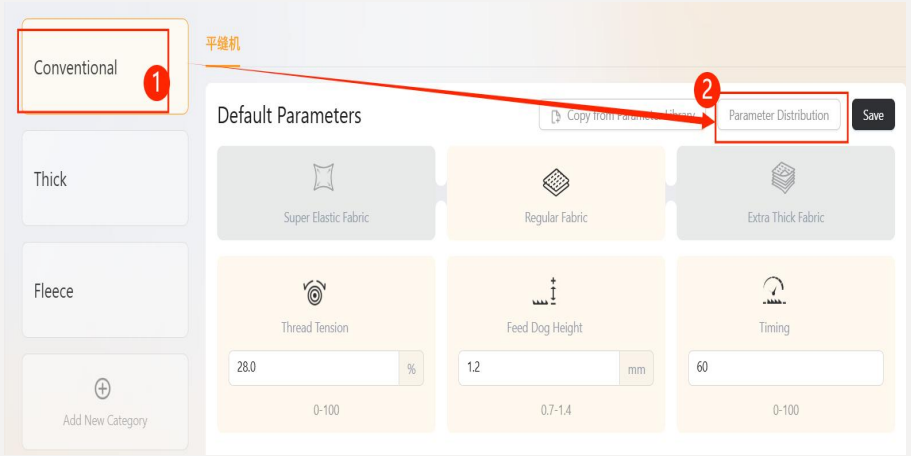
3.Height", and "Timing Sequence". Finally, click "Save".
Sewing Trajectory Description:
(1) M: Suitable for conventional fabrics.
(2) H: Suitable for ultra-thick fabrics.
(3) A: Suitable for ultra-elastic fabrics.



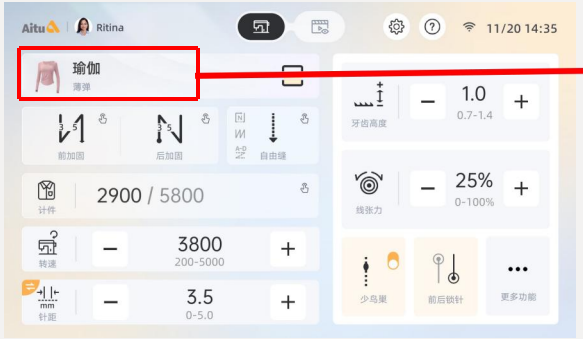
PC Computer User Manual - Distributing the clothing parameter library

1.Open the [Clothing Parameter Library] menu and click the "Shirt" category.

2.Select the appropriate category characteristics (e.g., "Conventional") and click "Parameter Distribution".



Screen terminal configuration instructions - Update clothing library

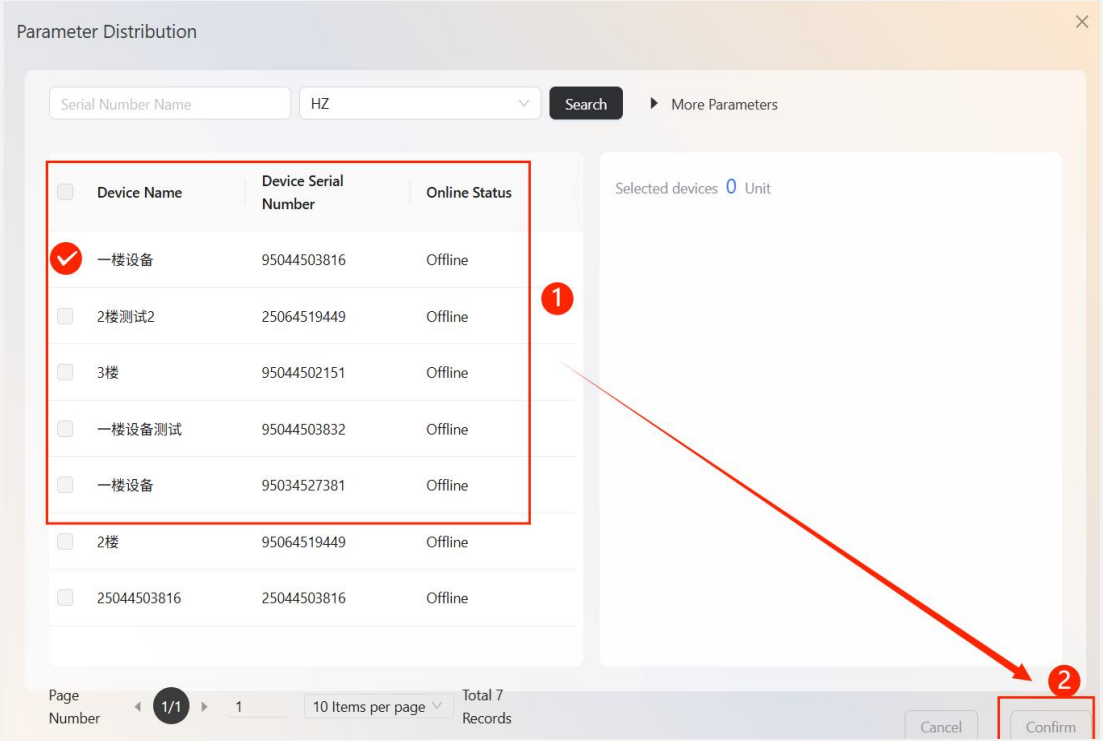


On the screen terminal's home page, click "Parameter Library"

Select "Clothing Parameter Library"

Click "Update Clothing Library".

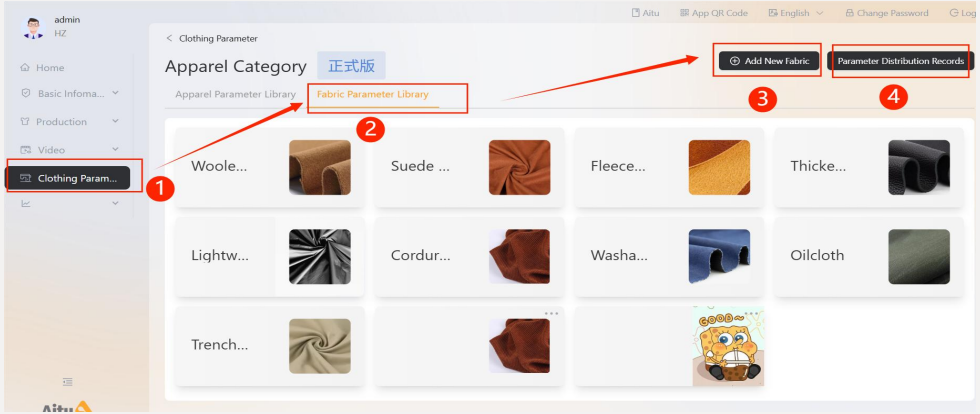
3. Select the "Equipment Number(s)" to receive the parameters and click "Confirm". The system will automatically modify the machine parameters remotely.

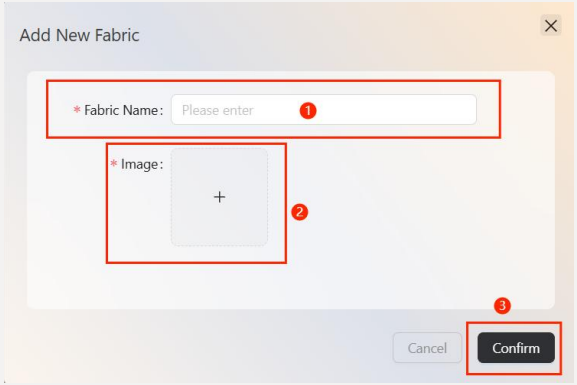


PC Computer User Manual - Fabric parameter database

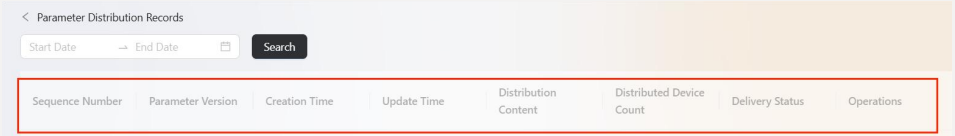
1.Open the [Clothing Parameter Library] menu and select "Fabric Parameter Library".

2.Click "Add Fabric", enter the "Fabric Name", upload the "Fabric Image", and click "Confirm".





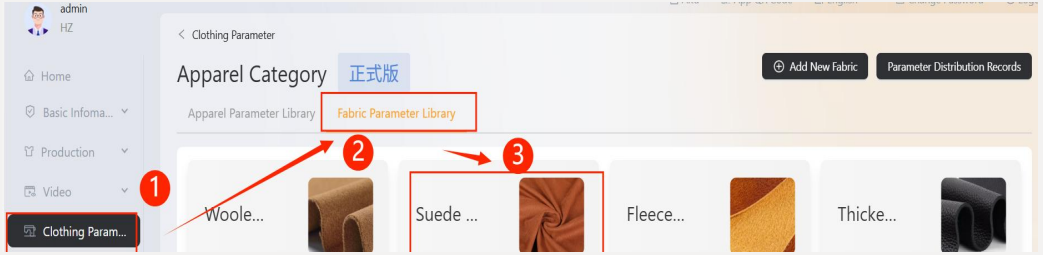
3.Click "Parameter Distribution Record" to view historical records of remote machine parameter distribution.

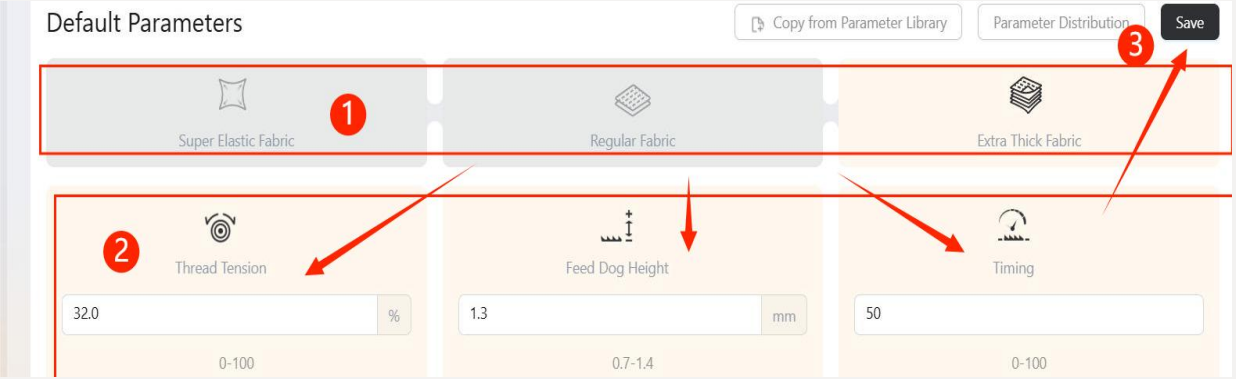


PC Computer User Manual - Modify the fabric parameter database

1.Open the [Clothing Parameter Library] menu, select "Fabric Parameter Library", and click the "Corduroy" fabric.
2.Based on the characteristics of "Corduroy", select the corresponding "Sewing Trajectory" and modify the "Thread Tension", "Tooth Height", and "Timing Sequence". Finally, click "Save".

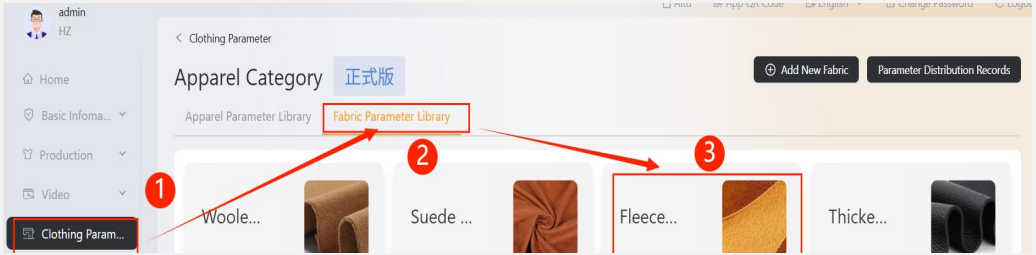
Sewing Trajectory Description:
(1) M: Suitable for conventional fabrics.
(2) H: Suitable for ultra-thick fabrics.
(3) A: Suitable for ultra-elastic fabrics.



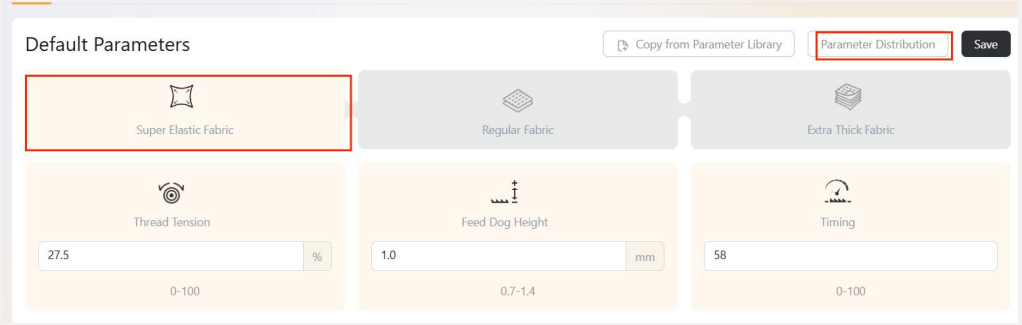


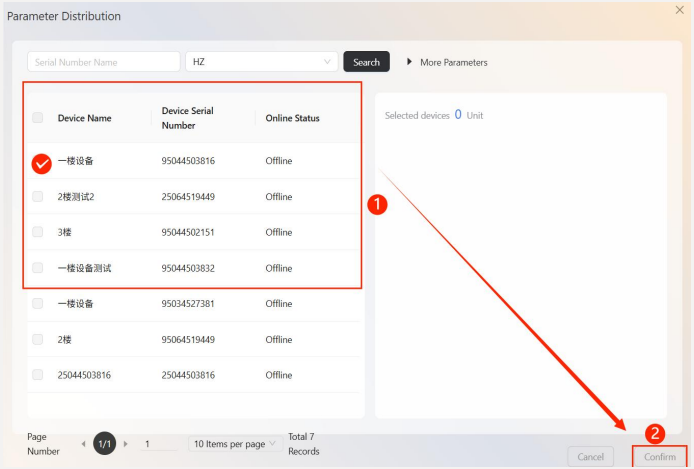
PC Computer User Manual - Distributing the fabric parameter library

1.Open the [Clothing Parameter Library] menu, select "Fabric Parameter Library", and click the "Corduroy" fabric.

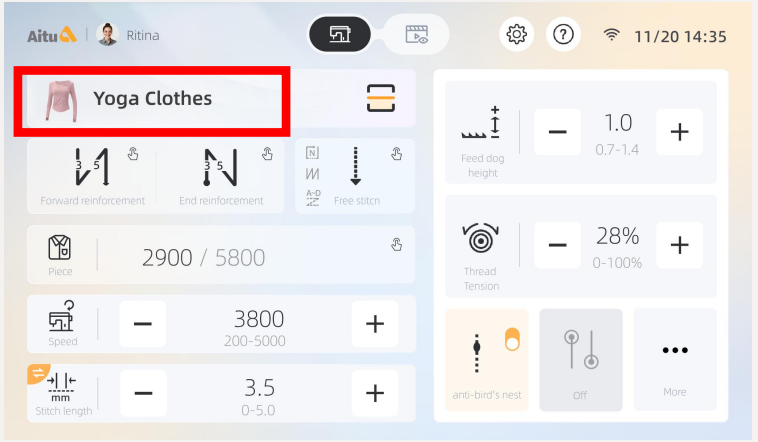


2. Click "Parameter Distribution", select the "Equipment Number(s)" to receive the parameters, and click "Confirm". The system will automatically modify the machine parameters remotely.

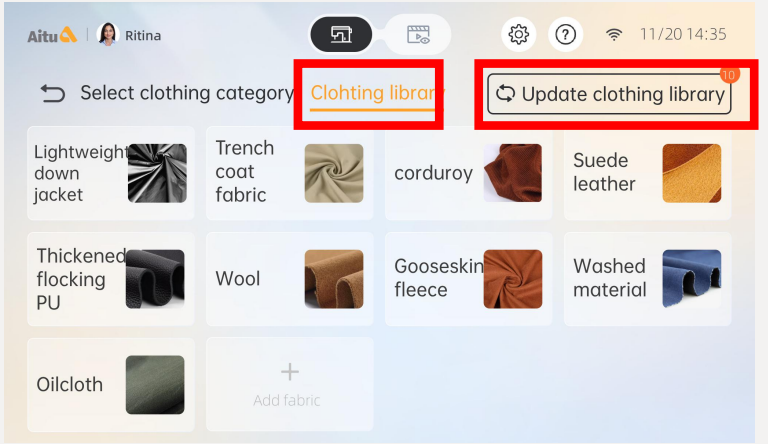




Screen terminal configuration instructions - Update the fabric library

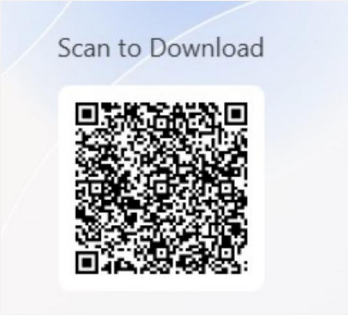


On the screen terminal's home page, click "Parameter Library"

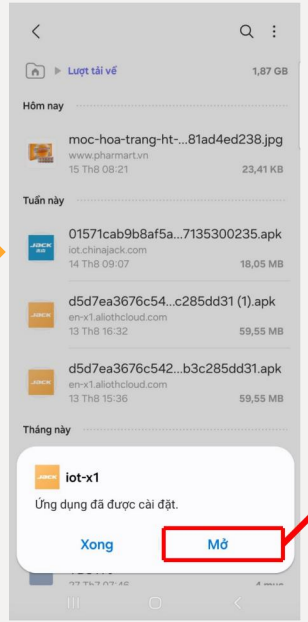


Select "Fabric Parameter Library", and click "Update Fabric Library".

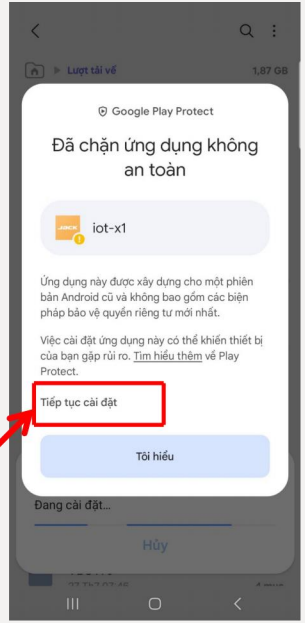
AI10 User Manual - APP Download and Login



Overseas Download Path



Download AI10

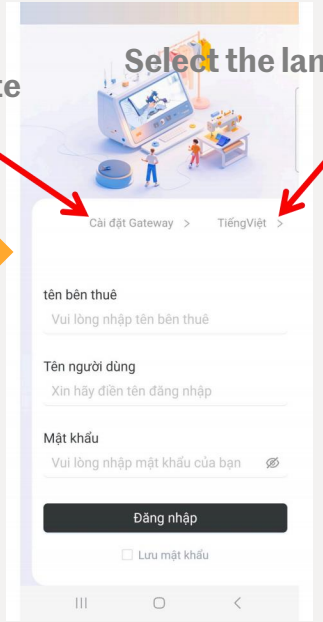


Install AI10

Open the AI10 APP

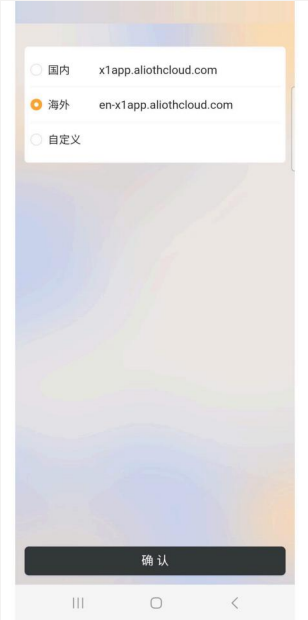
Select the site

Select the language

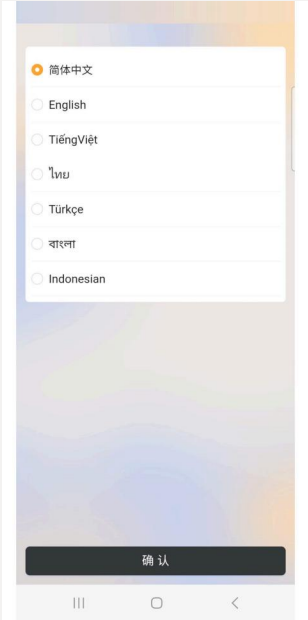


Log in to the APP

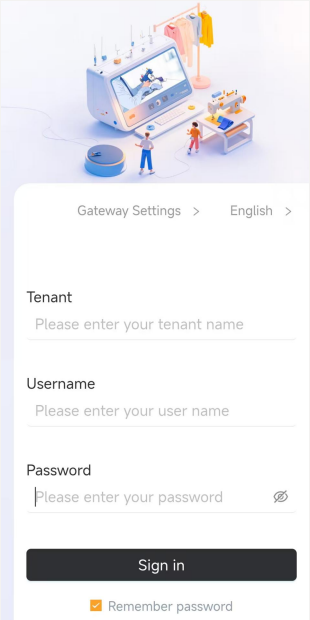
AI10 User Manual - (AI10) login



Click "Gateway Configuration", select the domestic or overseas environment, and click "Confirm".

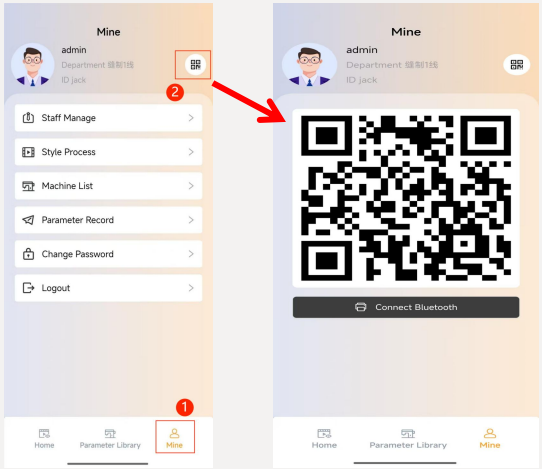


Click "Language Configuration", select the language, and click "Confirm".

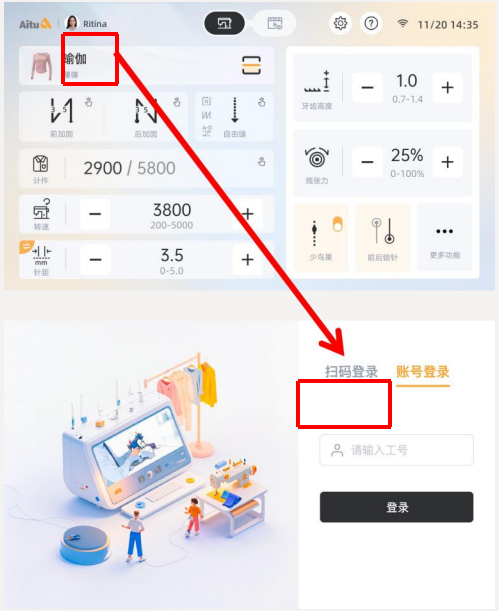


1.Enter the tenant, username, and password, then click "Login".
2.The PC terminal will assign corresponding permissions (Worker/Mechanic/IE/Leader) to the account.

AI10 User Manual - Machine Scan Code Login



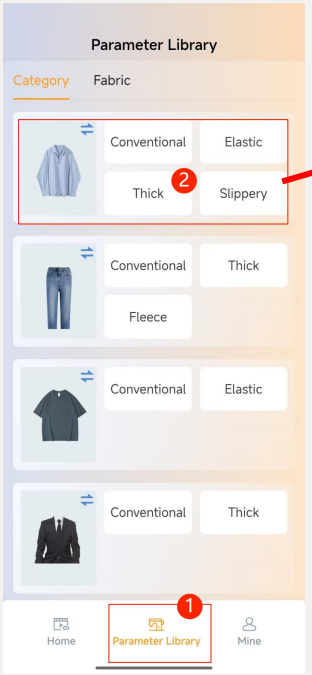
On the mobile terminal, click "Me", then click the QR code icon in the upper right corner. The QR code can be printed via a Bluetooth printer.



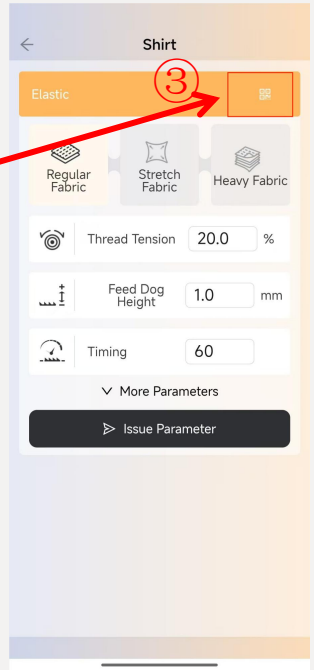
Click the username in the upper left corner of the machine screen to access the user scan code login interface.

Align the mobile phone's QR code with the camera frame. After successful recognition, the scan code interface will close automatically, and the employee will be logged in.

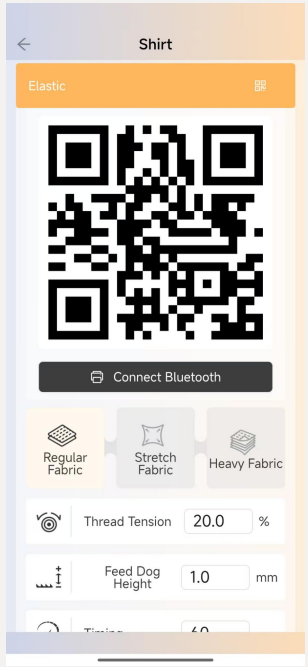
AI10 User Manual - Category Parameter Switch



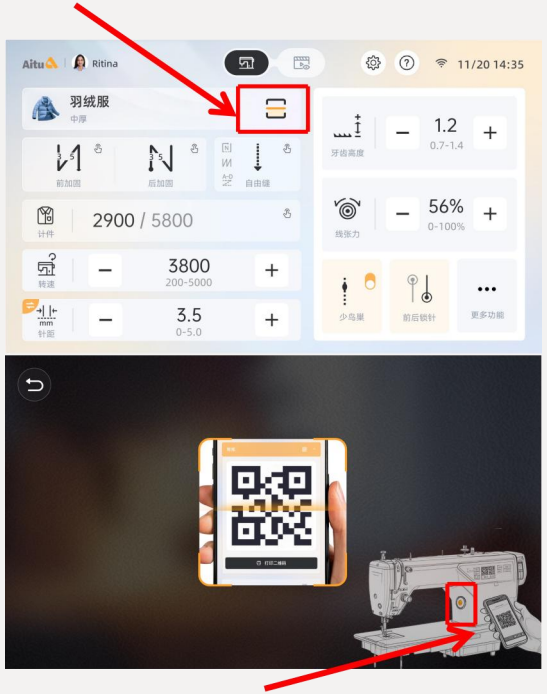
Click [Parameter Library] - "Category Name".



Click the fabric QR code icon.

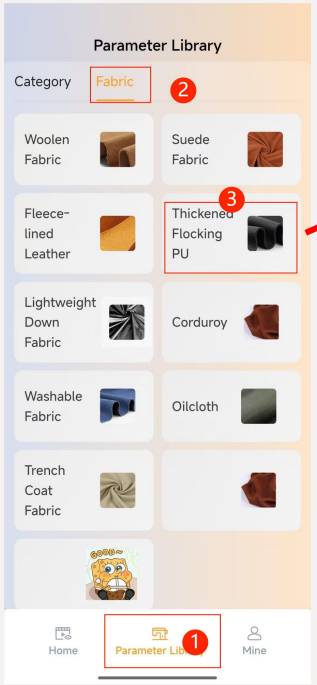


The QR code can be printed using a Bluetooth printer.

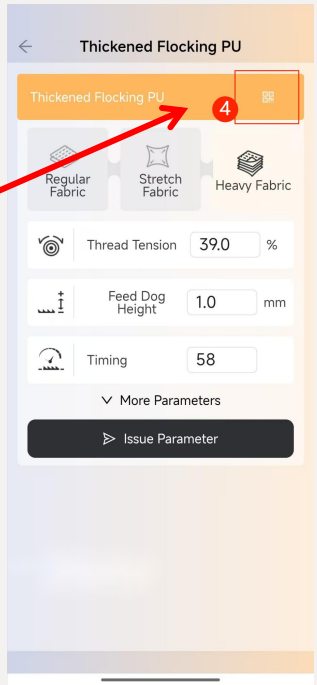


Align the QR code with the camera to switch the fabric and update the device parameters simultaneously.

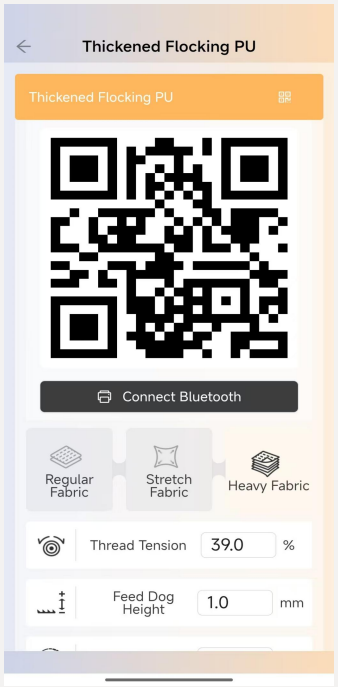
AI10 User Manual - Fabric Parameter Switch



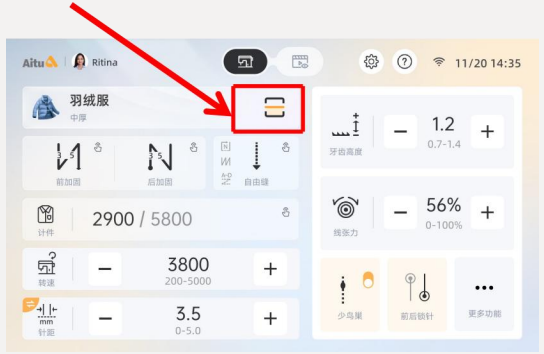
Click [Parameter Library] - "Category Type".



Click the fabric QR code icon.

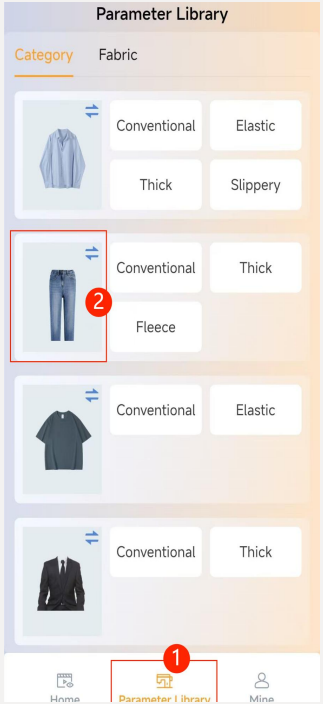


View the fabric QR code.

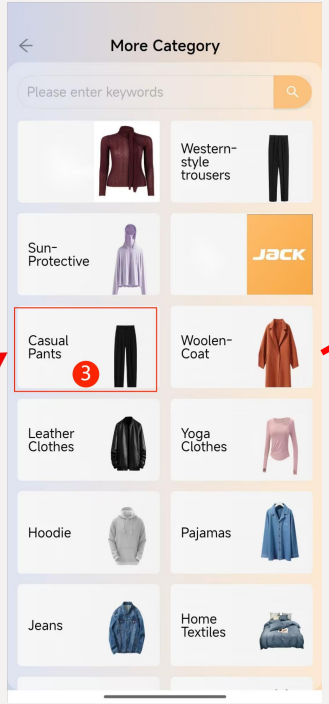


Align the QR code with the camera to switch the fabric and update the device parameters simultaneously.

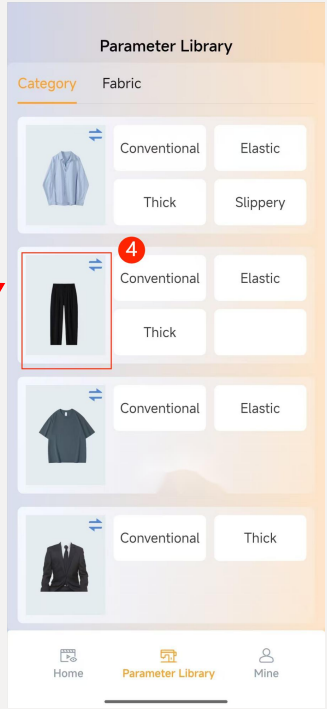
AI10 User Manual - Common Product Category Switch



Click [Parameter Library] - "Category Picture".

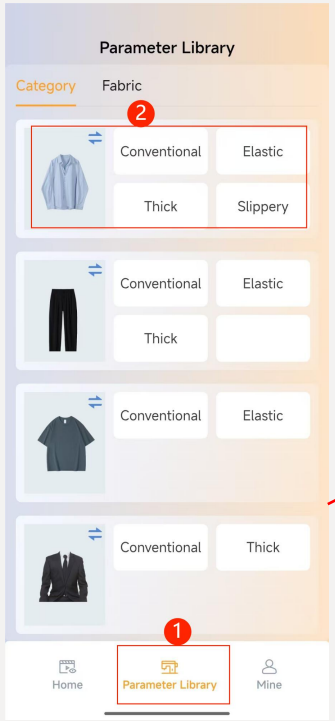


Select the category picture to be switched.

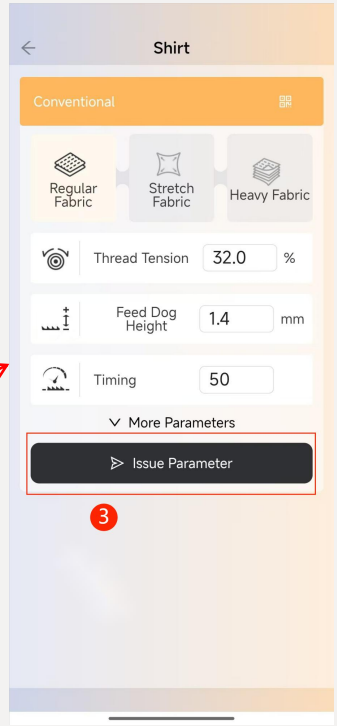


The common category switch is completed successfully.

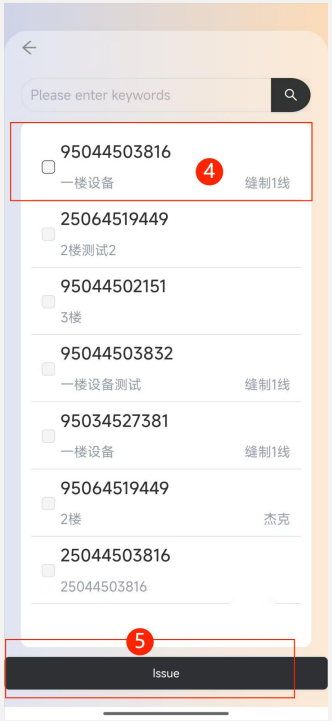
AI10 User Manual - Issuing machine parameters



Click [Parameter Library] - "Category Type".

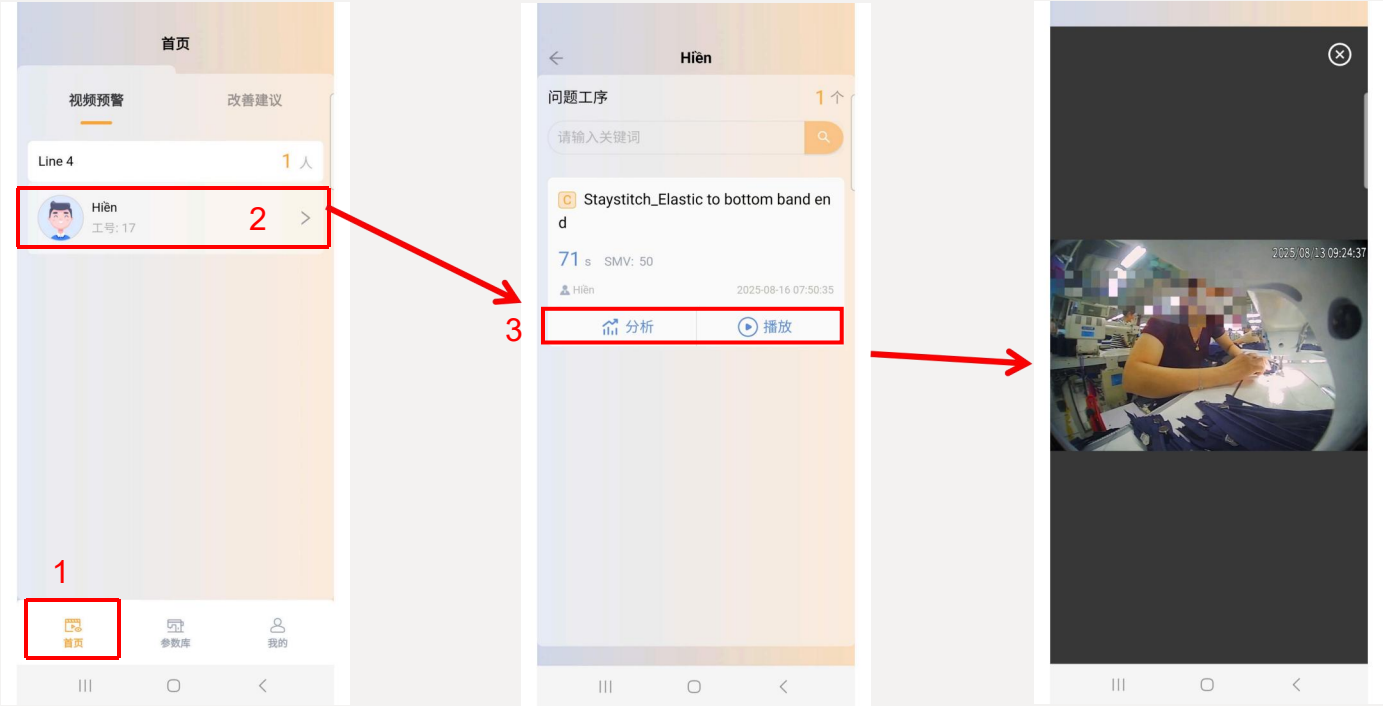


Confirm and adjust the parameter values, then click "Issue Parameters".



Select the equipment to receive the parameters and click "Issue". The machine will automatically synchronize the parameters.

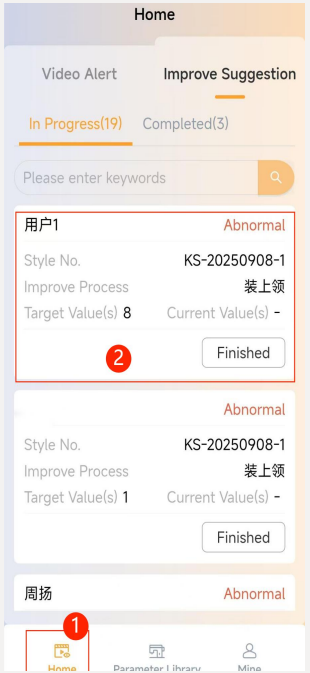
AI10 User Manual - (AI10) video warning

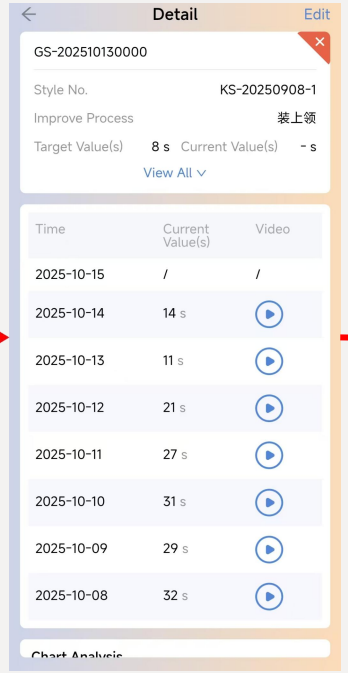


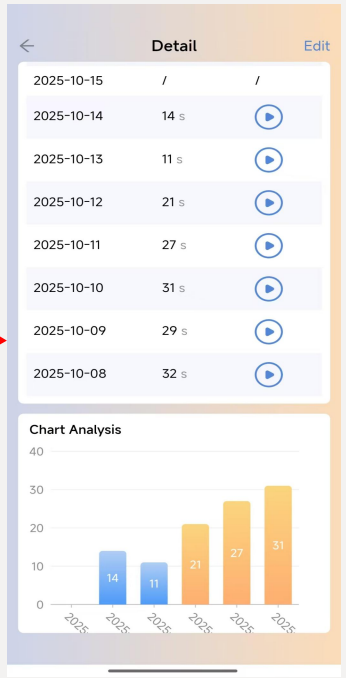
Click [Home Page] - "Video Warning" and select an employee.

Click the "Play" button to analyze the causes and identify areas for self-improvement.

AI10 User Manual - (AI10) improvement suggestions







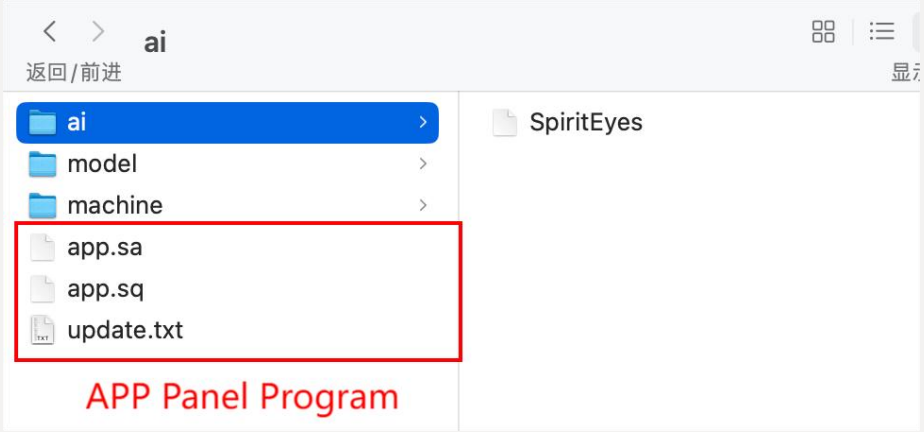
Click [Home Page] - [Improvement Suggestions] - "In Progress" to view the improvement progress.

Check the improvement details

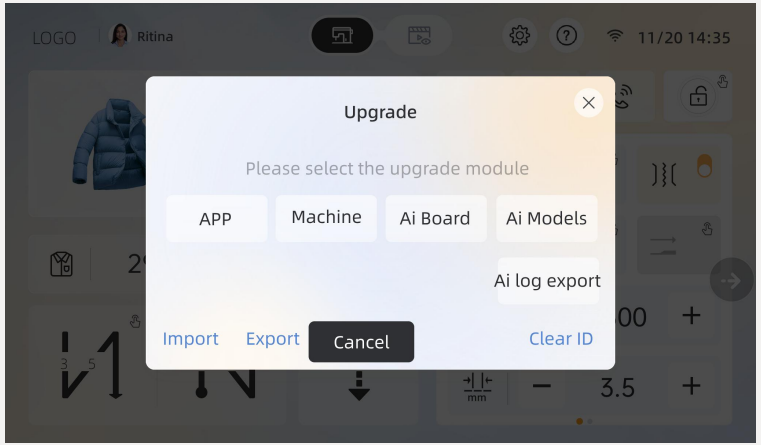
Monitor the daily progress.

CONCENTS

Upgrade the APP panel program

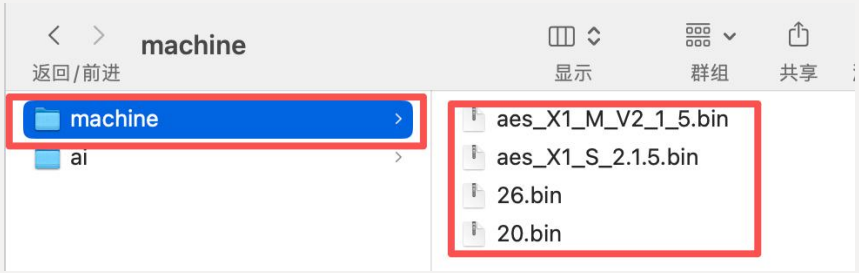


Place three program packages in the root directory of the USB flash drive.Program names: app.sa, app.sq, update.txt



Insert the USB flash drive into the right side of the machine's screen terminal, select "APP", click "Confirm", and the system will upgrade automatically.

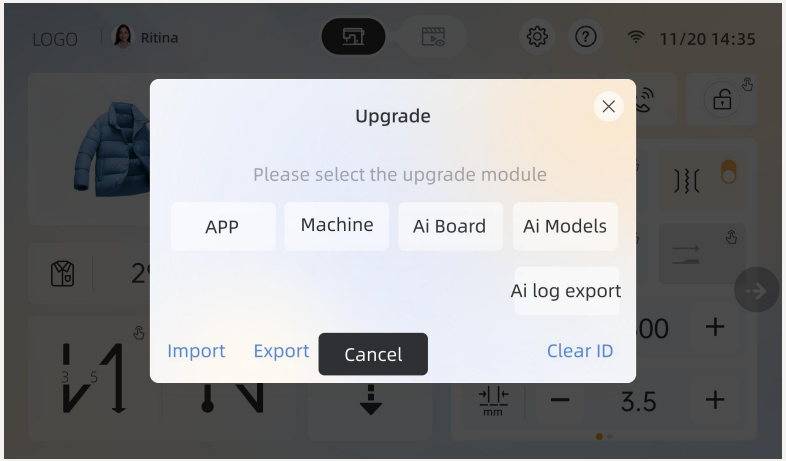
Upgrade the electronic control program



1.Create a folder named "machine" in the root directory of the USB flash drive and place the electronic control upgrade program package in it.

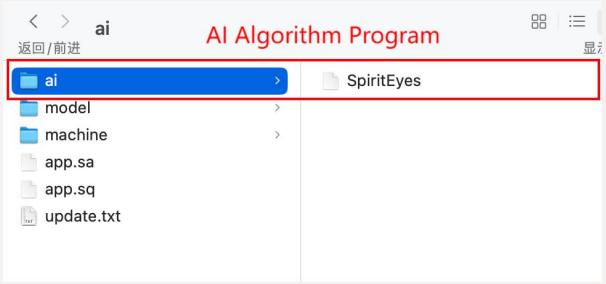
2.Description of electronic control files: M main machine, S slave machine, 2.0 needle plate group, 2.6 needle plate group.

Note: Adjust parameter P68 to 5000; the rotation speed can reach 5000 under M trajectory and 4mm stitch length.

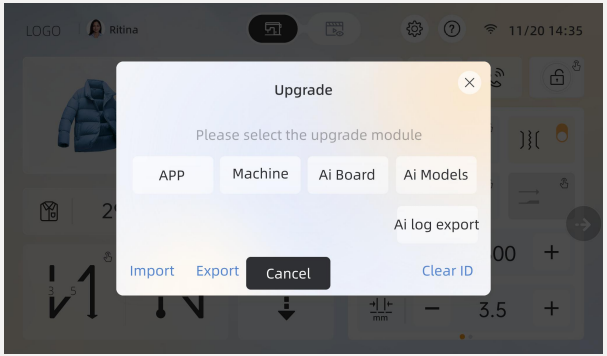


3.Insert the USB flash drive into the right side of the machine's screen terminal, select "Electronic Control", click the corresponding upgrade file, then click "Confirm", and the system will upgrade automatically.

Upgrade AI algorithms and AI models



Create a folder named "ai" in the root directory of the USB flash drive and place the AI algorithm program package in it.

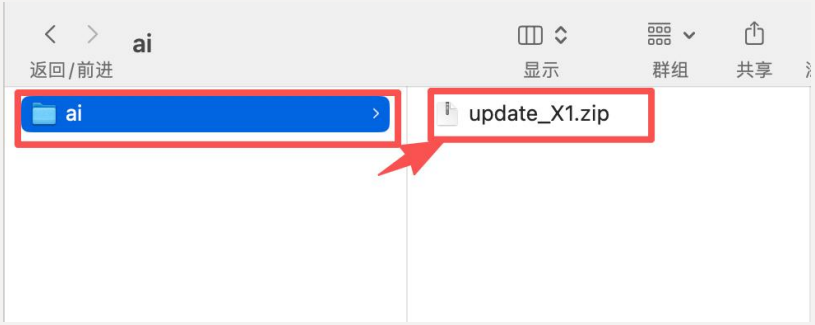


Create a folder named "model" in the root directory of the USB flash drive and place the AI algorithm model program package in it.

1.Insert the USB flash drive into the right side of the machine's screen terminal, select "Algorithm Model", and upgrade the tsm file first, then the mstcn file.

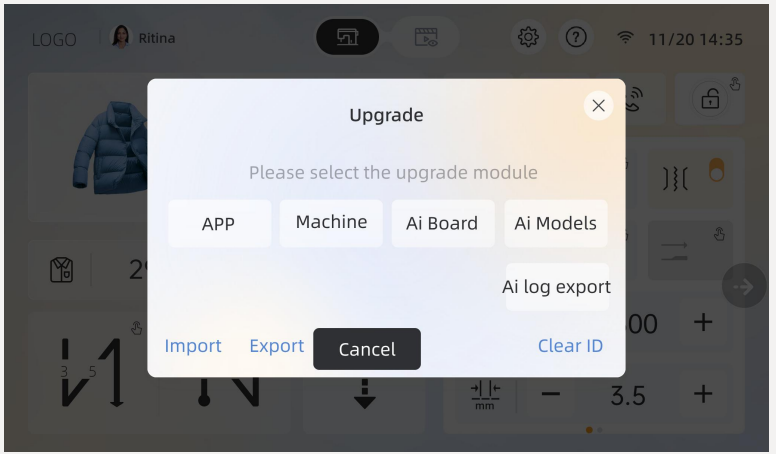
2.Reinsert the USB flash drive, select "Algorithm Board", and click the "SpiritEyes" file.

Special Upgrade: Upgrade AI algorithms and AI models (major version)



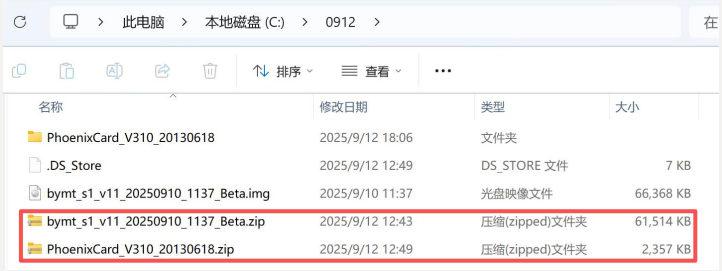
Create a folder named "ai" in the root directory of the USB flash drive and place the compressed package "update_X1.zip" in it.

(Note: This upgrade method is only for major versions.)



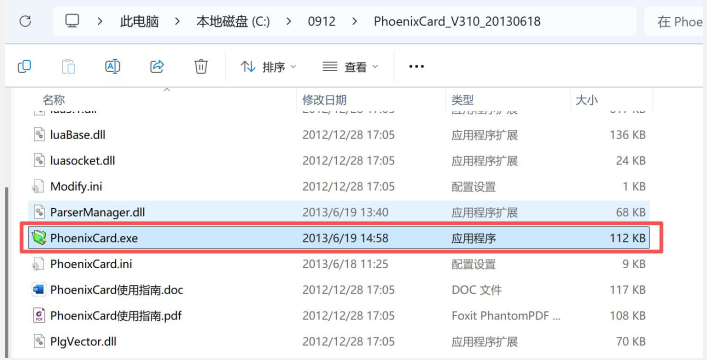
Insert the USB flash drive into the right side of the machine's screen terminal, select "Algorithm Board", click "Confirm", and the system will automatically upgrade the "AI Algorithms + AI Models".

Special Upgrade: Upgrade the system and panel program (major version)

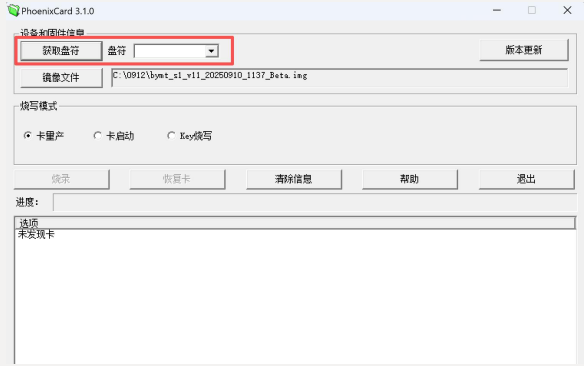


Unzip the Beta.zip image file and the PhoenixCard system card software.

After unzipping, enter the PhoenixCard folder.

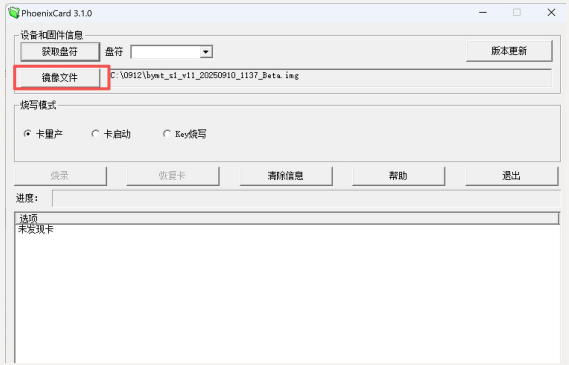


Double-click to open the "PhoenixCard.exe" program.

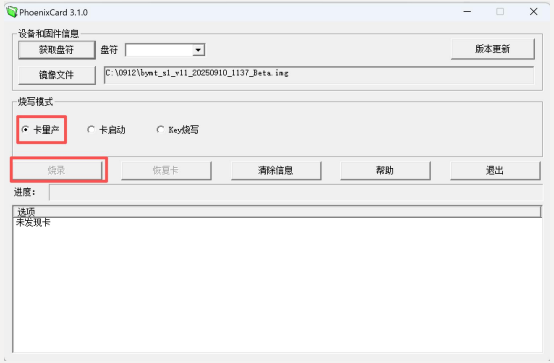


Insert a TF card into the computer and click "Get Drive Letter".

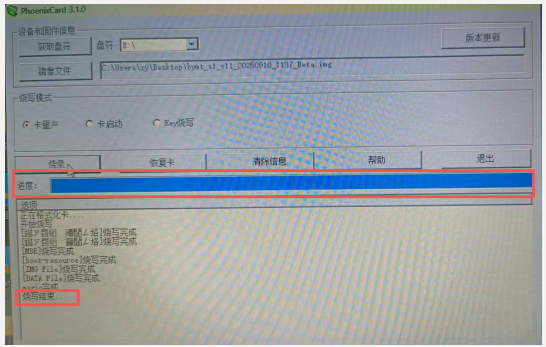
Special Upgrade: Upgrade the system and panel program (major version)



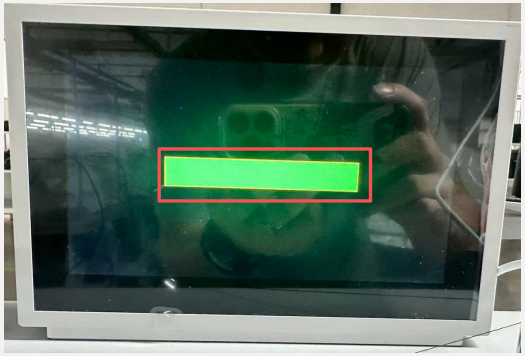
Click "Image File" and select the previously unzipped image file.



Select "Card Mass Production" and click the "Burn" button.



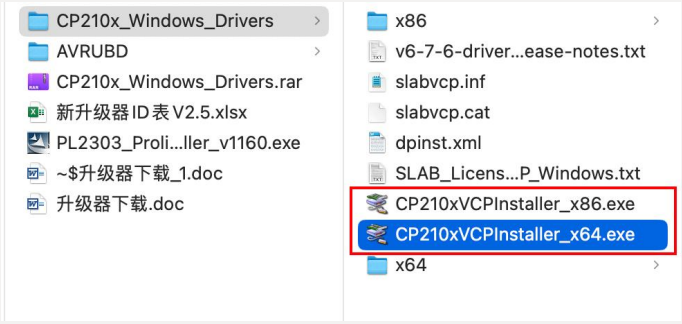
Check if the "progress bar" is completed and the log shows "Burning Completed", which indicates that the system program has been successfully written into the TF card.

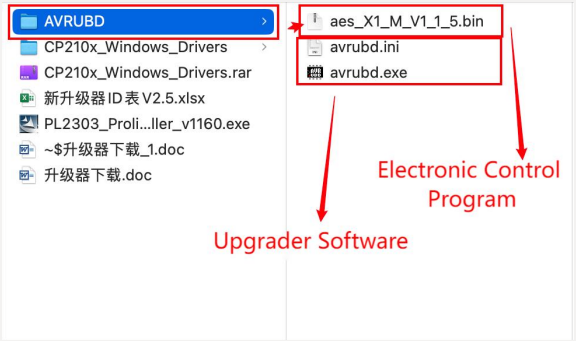


(1) Insert the TF card into the panel, turn off the machine and restart it.
(2) When the "progress bar" shows completion, pull out the TF card and restart the machine to finish the system upgrade.

Special Upgrade: Upgrade the electronic control program (Old version)

Step 1: According to the computer configuration, run and install the driver "CP210xVCPInstaller_x64.exe" or "CP210xVCPInstaller_x86.exe" as an administrator.

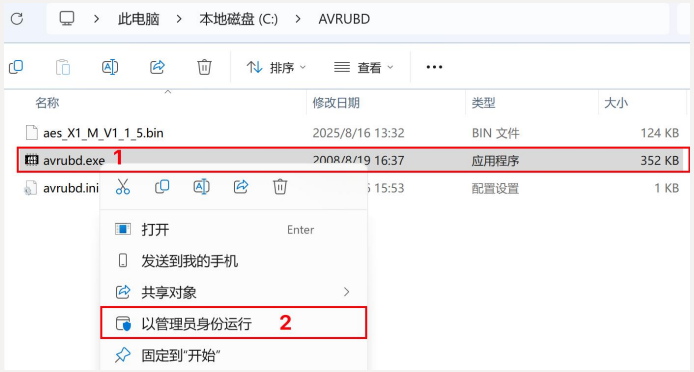


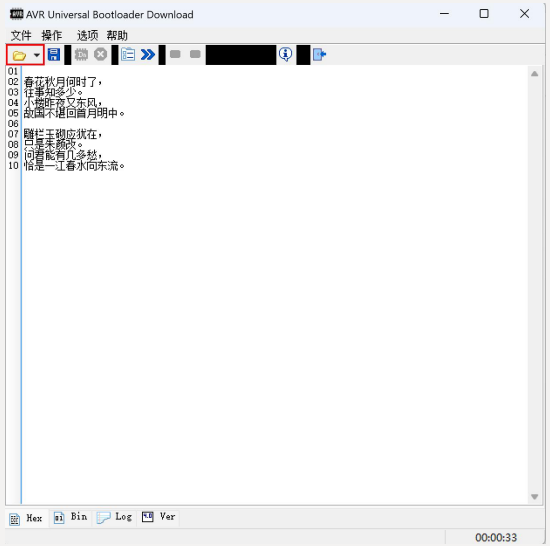


Step 2: Place the file named "aes_X1_M_V1_1_5.bin" into the "AVRUBD" folder.

Step 3: Copy the "AVRUBD" folder and place it in the root directory of the C drive of the computer.

Special Upgrade: Upgrade the electronic control program (Old version)



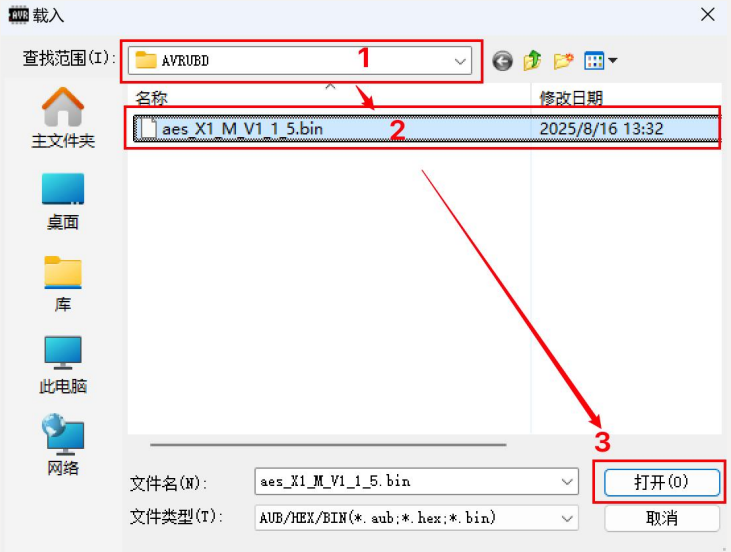


Step 4: Use a "Micro-USB" data cable to connect the "electronic control tool" to the computer's USB port.
(Set the tool switch to the "Electronic Control" position.)

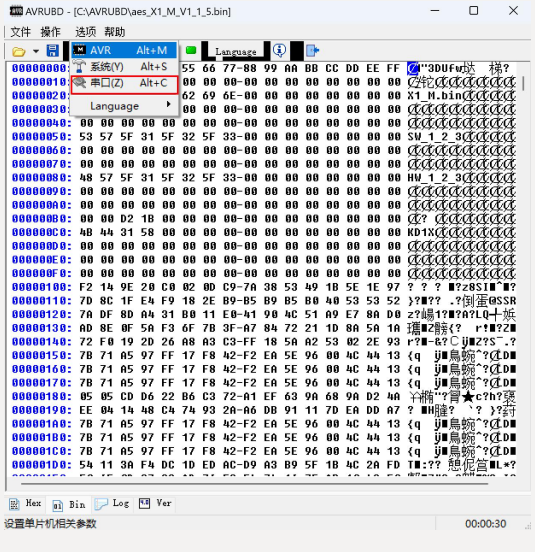
Step 5: Open the "AVRUBD" folder under the C drive and run the "avrubd.exe" program as an administrator.

Step 6: Click the "Folder" icon."

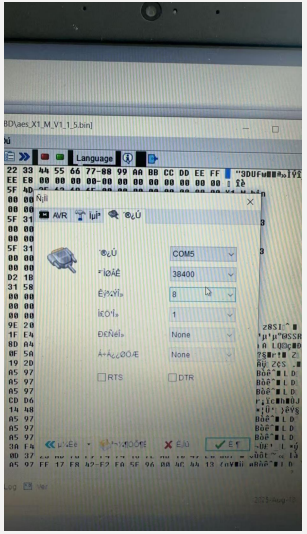
Special Upgrade: Upgrade the electronic control program (Old version)



Step 7: Select the "AVRUBD" folder under the C drive and open the file "aes_X1_M_V1_1_5.bin".

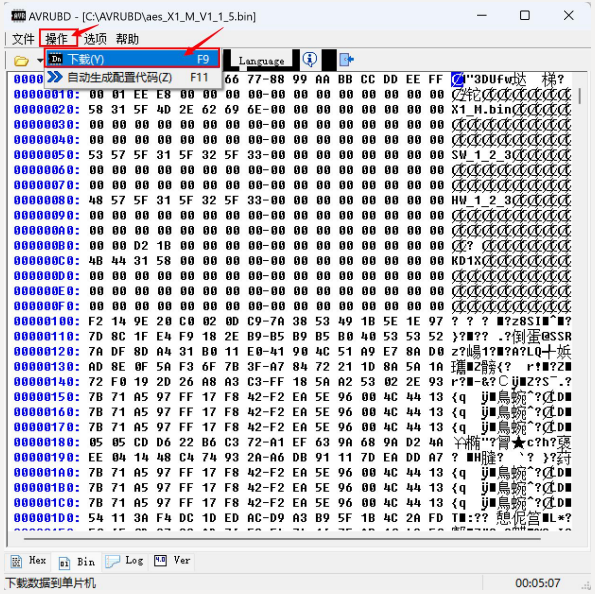


Step 8: Click "Options" - "Window" tool.



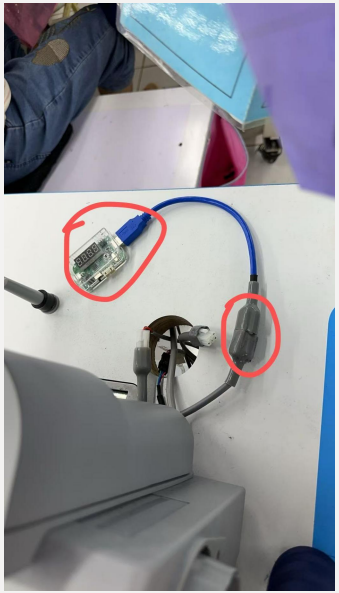
Step 9: Change the "Serial Port" to COM5 and click "Confirm".

Special Upgrade: Upgrade the electronic control program (Old version)



Step 10: Click the "Operation" - "Download" button to download the electronic control program into the "electronic control tool".

(The tool will beep when the download is completed.)



Step 11: After turning off the machine, connect the "electronic control tool" to the machine. The machine will upgrade automatically when it is turned on.

(The tool will beep when the upgrade is completed.)

目录

CONCENTS

List of Special Parts

Serial Number	Part Identifier	Part Description (English)	Notes
1	116018003	Oil-free Needle Guard Hook	/
2	11601600100	Presser Foot Assembly	/
3	11473003000	H7-1022 Electronic Knee Lift Assembly	Optional Component
4	116003005	A60+-A-0308 Needle Bar Lower Bushing	/
5	116013004	Presser Bar Lower Bushing Thread Guide	/
6	116003006	Presser Bar Lower Bushing	/
7	116022002	Needle Bar Lower Bushing Oil Seal	/
8	115303003	A5F-0612 Thread Trimming Shaft Front Bushing	/
9	116004013	Thread Trimming Fork Crank	/
10	116002008	Thread Trimming Drive Shaft	/
11	115308002	A5F-0613 Thread Trimming Shaft Retaining Ring	/
12	115303002	A5F-0611 Thread Trimming Shaft Rear Bushing	/
13	11601900600	Anti-Birdnesting Knife Holder Assembly	/
14	116012002	Thread Trimming Knife Holder	Loose Part
15	116019001	Moving Knife	Loose Part
16	116019002	Auxiliary Moving Knife	Loose Part
17	11601900300	Auxiliary Thread Trimming Knife Holder Assembly	Loose Part
18	116019003	Auxiliary Thread Trimming Knife Holder	Loose Part
19	14126005	Thread Trimming Drive Pin	Loose Part
20	113S17002	Screw SM11/64"x40 L=4.4	Loose Part
21	131S01002	Screw SM11/64"x40 L=4	Loose Part
22	114S16004	Nut SM11/64"x40	Loose Part
23	113S20001	Connecting Link Screw SM11/64"x40	Loose Part
24	114112013	A5-0651 Connecting Link	Loose Part
25	116019007	Fixed Knife	Loose Part
26	116012024	Thread Pressing Plate	/
27	116009001	Air Suction Inlet	/

List of Special Parts

28	11601202500	Presser Foot Front Lever Assembly	/
29	116012005	Presser Foot Rear Lever	/
30	1150NS20003	Universal Link Shaft Positioning Screw	/
31	11601200600	Universal Link Assembly	/
32	116004012	Presser Foot Drive Front Crank	/
33	116002009	Presser Foot Drive Shaft	/
34	116004011	Presser Foot Drive Rear Crank	/
35	116003012	Presser Foot Drive Shaft Rear Bushing	/
36	116003011	Presser Foot Drive Shaft Front Bushing	/
37	11603301000	Stepper Motor Assembly	/
38	116033010	Stepper Motor	Loose Part
39	1160NS13001	Hex Socket Head Combination Screw M5×16	Loose Part
40	116001009	Stepper Motor Mounting Bracket	Loose Part
41	136S20003	Roller Screw	Loose Part
42	115409002	A4G-0608 Thread Trimming Roller	Loose Part
43	136S17005	Roller Nut	Loose Part
44	S10118	Hex Socket Cup Point Set Screw M6×0.75×6	Loose Part
45	116004014	Thread Trimming Drive Crank	Loose Part
46	115410002	Presser Foot Cam	Loose Part
47	116026004	Limit Pin	Loose Part
48	113S11004	Thread Loosening Guide Plate Screw	Loose Part
49	116012011	Rear Thread Pressing Plate	Loose Part

List of Special Parts

50	11603300800	Feed Motor Assembly	/
51	11603300900	A60+-A-0554 Lifter (Riser) Motor Assembly	/
52	11603000100	Touchscreen	/
53	11603300100	All-in-One Controller	/
54	116033002	Main Spindle Motor	/
55	116008001	Feed Retaining Ring	/
56	11600700300	A60+-A-0544 Feed Bar Seat Assembly	/
57	116026006	Motor Bracket Positioning Pin	/
58	116002001	Feed Shaft	/
59	116002002	Lifter (Riser) Shaft	/
60	116003003	Feed Front Shaft Bushing	/
61	116003004	Feed Rear Shaft Bushing	/
62	1160NS13001	Hex Socket Head Combination Screw M5脑16	/
63	H030008	Feed Shaft External Circlip	/
64	20628014	External Circlip Washer	/
65	116030014	Cooling Fan	/
66	Not Assigned	Cross Recessed Pan Head Tapping Screw - Type C ST4.8脑19	/
67	186103016	Push Rod Shaft Bushing	/
68	116002015	Thread Tension Push Rod (33.3mm)	/
69	116003018	Cylindrical Spacer Block	/
70	116002016	Thread Loosening Pin (22.8mm)	/
71	114126003	Auxiliary Thread Loosening Pin	/
72	11601301900	Thread Tension Assembly	/
73	112811005	Thread Loosening Solenoid Cover	/
74	S050096	A60+-A-0398 SM3/16x28 L=26	/
75	1150NS13002	SM3/16x28 L=10	/
76	S05949	Hex Socket Head Cap Screw M4脑8	/
77	11603001500	Thread Loosening Solenoid Assembly (Temporary)	/
78	/	Camera	/

List of Special Parts

79	B100008	Deep Groove Ball Bearing 61804-2RZNR	/
80	116003007	Upper Shaft Middle Bushing	/
81	B060011	Deep Groove Ball Bearing 61904-2RZ	/
82	B100007	Deep Groove Ball Bearing 6004-2RZNR	/
83	116002005	Upper Shaft	/
84	11602500100	Upper Shaft Synchronous Pulley Assembly	/
85	116022004	Synchronous Belt 5GT 550	/
86	116002006	Lower Shaft	/
87	116003008	Lower Shaft Rear Bushing	/
88	141703035	Lower Shaft Rear Bearing Sleeve	/
89	B060012	Deep Groove Ball Bearing 61901-2RZ	/
90	116024004	Thrust Ball Bearing	/
91	116025004	Lower Shaft Gear	/
92	116002007	Lower Synchronous Pulley Shaft	/
93	116003014	Synchronous Pulley Shaft Front Bearing Sleeve	/
94	B060011	Deep Groove Ball Bearing 61904-2RZ	/
95	116003010	Synchronous Pulley Shaft Front Bushing	/
96	116025005	Drive Large Gear	/
97	116003009	Synchronous Pulley Shaft Rear Bushing	/
98	116022008	Oil Seal 20*12*5	/
99	B100007	Deep Groove Ball Bearing 6004-2RZNR	/
100	11602500300	Lower Synchronous Pulley Assembly	/
101	116012007	Gearbox Cover Plate	/
102	116022005	Gearbox Sealing Gasket	/
103	13502008	Plunger	/
104	13527006	Plunger Spring	/
105	1160NS15001	Plunger Screw	/
106	116044001	Small Oil Can	/

List of Special Parts

107	116044002	Oil Filler Port Cap	/
108	116022007	O-Ring	/
109	1160NS12001	Base Plate Support Pillar	/
110	116003015	A60+-A-1032 Lower Shaft Front Bushing Assembly	/
111	143s12002	A8 Base Plate Support Pillar	/
112	116012010	Front Thread Pressing Plate	/
113	116012013	Oil Can Bracket	/
114	B040031	Deep Groove Ball Bearing 61804-2RZ (Imported)	/
115	B100009	Deep Groove Ball Bearing 61904-2RZNR (Imported)	/
116	/	Tray	/
117	S10121	A60+-A-0557 Hex Socket Cup Point Set Screw M5脳5	/
118	S10122	A60+-A-0558 Hex Socket Cup Point Set Screw M6脳0.75脳6	/
119	116027002	Spring (Electronic Thread Tension)	/
120	11603001700	A60+-A-0347-00 Fabric Thickness Detection Light	/
121	115214001	A8+-0503 Feed Dog 21 Tooth	/
122	115215003	A8+-0502 Needle Plate 2.0 (E16)	/
123	1150NS11004	Lower Shaft Oil Limiting Screw	/
124	115022044	O-Ring 6x0.8	/
125	1150NS30006	Oil Adjustment Screw Plug	/
126	115036010	Small Hole Oil Return Nozzle	/
127	115030194	Solenoid Valve	/
128	115001049	Solenoid Valve Bracket	/
129	141921020	In-line Cylindrical Filter	/
130	116022009	O-Ring 7.1x1.8	/
131	11603002100	Electronic Thread Tensioner Assembly	/
132	704132	A60+-A Flatbed Suction Barrel (Pneumatic Bag)	Optional Component

Wearing parts list

No.	Parts No.	English Description
1	10117025	Machine Needle DB×1#9
2	11217001	Machine Needle DB×1#11
3	11402034	Needle Bar (DLC Treated)
4	115015007	2.6 Needle Plate (E16)
5	115215003	2.0 Needle Plate (E16)
6	11601600100	Presser Foot Assembly
7	115214004	Feed Dog
8	115214001	Feed Dog (21 Tooth)
9	116018003	HIROSE Hook (Oil-free Needle Guard)
10	10118003	Bobbin
11	11218504	Bobbin Case
12	10112016	Hook Positioning Catch
13	113827006	Thread Take-up Spring
14	1411300600	Bobbin Thread Tensioner
15	11419001	Thread Cutter Knife
16	1383103900	Bobbin Winder Assembly
17	104S11006	Needle Clamp Screw (Imported) SM1/8"x44 L=4.5
18	104S17002	Needle Plate Screw (Imported) SM11/64"x40 L=6.5
19	101S11009	Presser Foot Screw SM9/64"x40 L=10.5
20	101S15007	Presser Bar Guide Bracket Screw SM1/4"x40 L=8
21	14112001	Thread Separator Plate
22	116019002	Auxiliary Moving Knife
23	116019001	Moving Knife
24	116019004	Fixed Knife (Old Version)
25	116012001	Thread Pressing Plate (Old Version)
26	116019007	Fixed Knife (New Version)
27	116012024	Thread Pressing Plate (New Version)

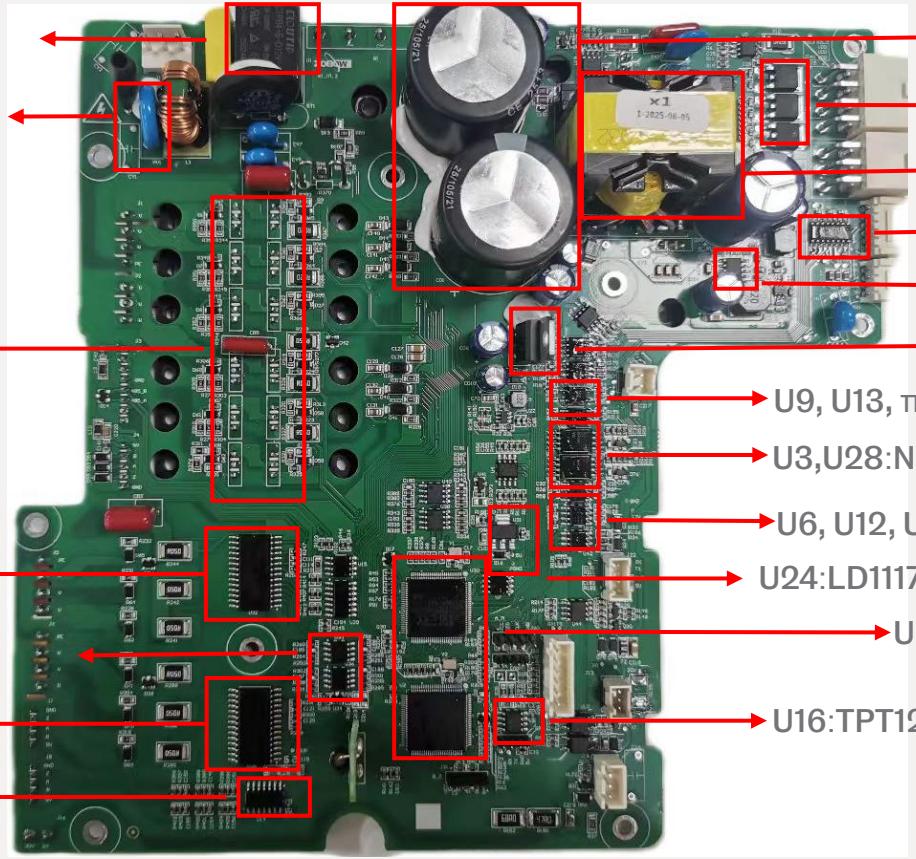
CONCENTS

Ai10 Zhongbang Electrical Control
CODE： 11603000800

Ai10 Panel
CODE：11603002900

Ai10 Main Board
CODE：

Understanding the Electrical Control Main Board - Main Components



U1:RelayDE3F-N-A

RV1:561KD14

Q18-Q29:
KGT15N60FDA

U32:SDH2136U

U33,U36：SGM8557

U35:SDH2136U

U14:74VHC14D

CD1,CD2：330uF/450V

MOS:NCE0130KA

T1：Transformer

U8:SP3232EEN

U23:SGM61431XPS8G/TR

U24:KIA7815API

U9, U13, π120u30

U3,U28:NSI1200-DSWVR

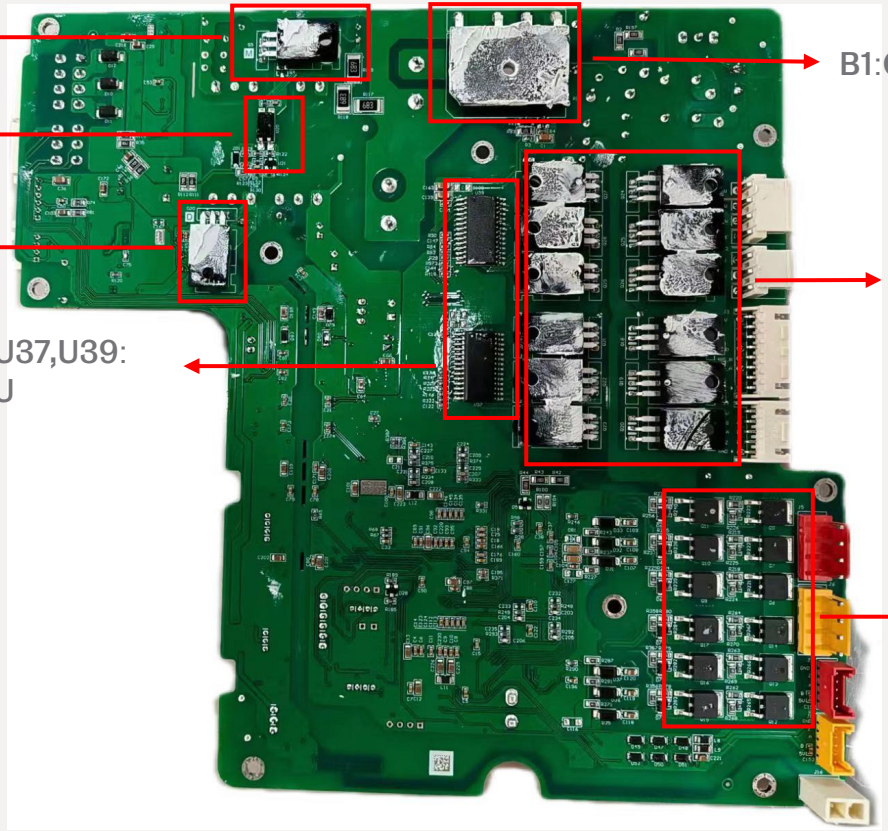
U6, U12, U42, U44:Π121u31

U24:LD1117AG-33

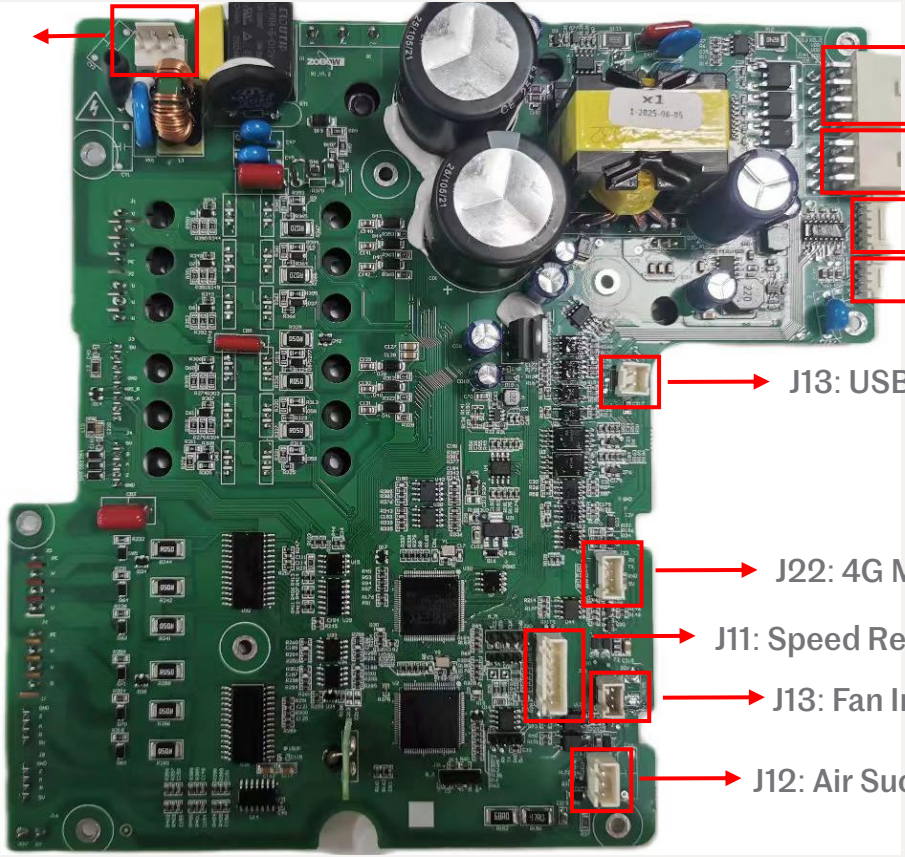
U2, U30:AT32F403AVCT7

U16:TPT1256-SO1R

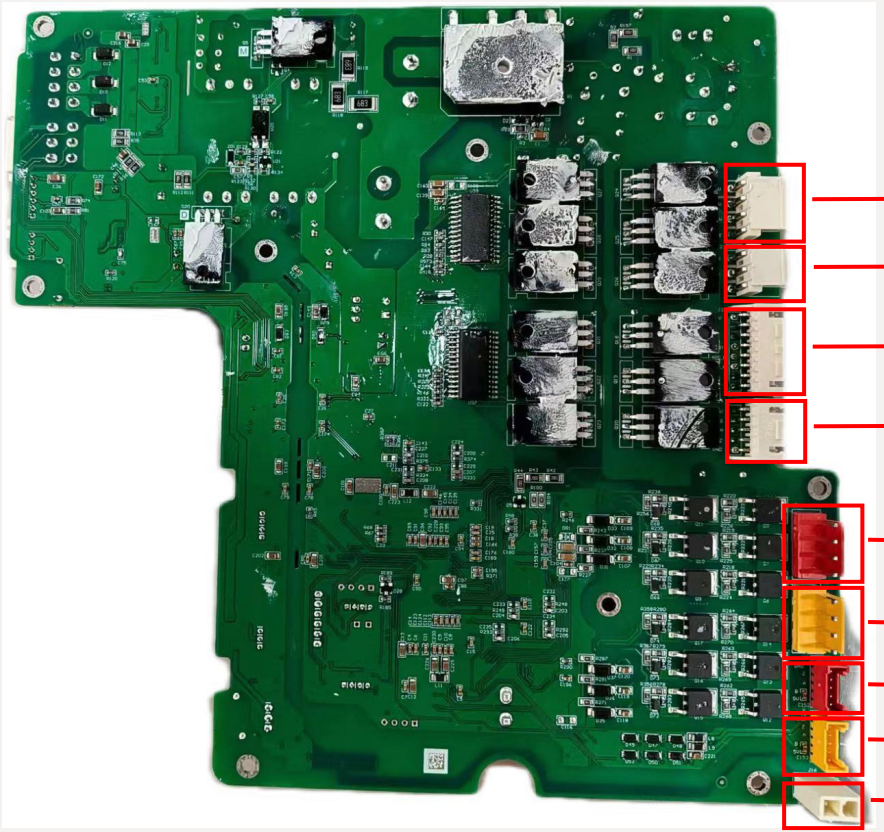
Electronic control motherboard-main components



Understanding the Electrical Control Main Board - Interface Introduction



Understanding the Electrical Control Main Board - Interface Introduction



J1: Spindle Motor Power Line Interface

J2: Stepper Motor Power Line Interface

J3: Spindle Motor Encoder Interface

J4: Stepper Motor Encoder Interface

J5: Feeding Motor Power Line Interface

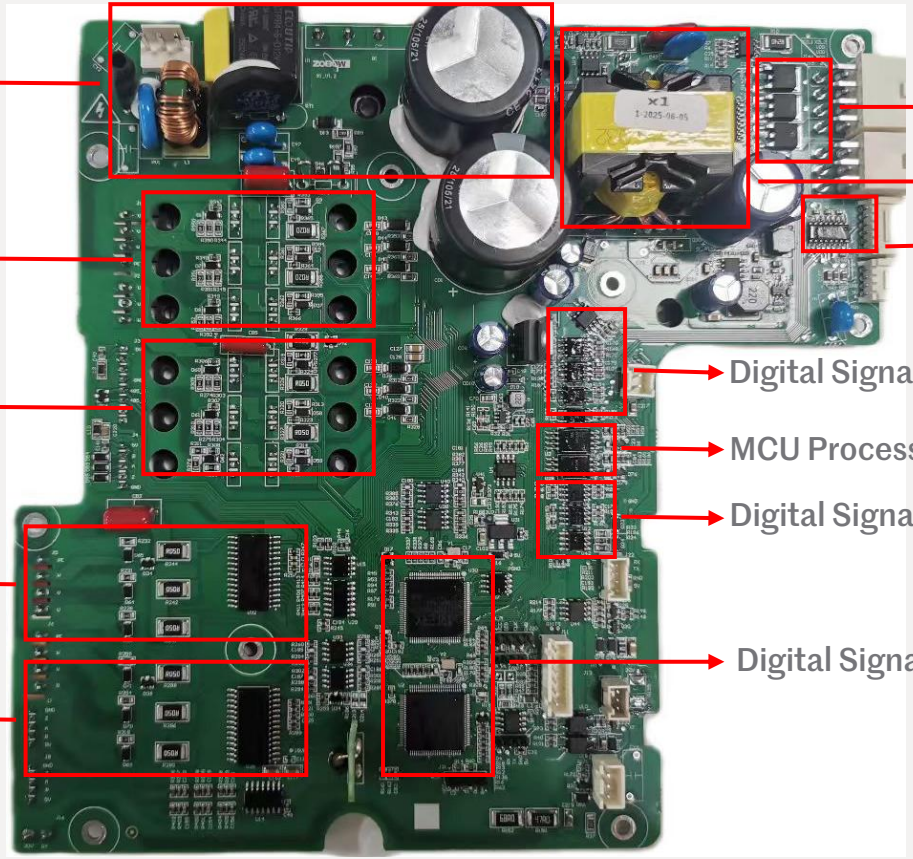
J6: Tooth Lifting Motor Power Line Interface

J7: Feeding Motor Encoder Interface

J8: Tooth Lifting Motor Encoder Interface

J16: Precise Oil Supply Interface

Understanding the Electrical Control Main Board - Circuit Division



EMC High-Voltage Input Circuit

Spindle Motor Drive Circuit

Stepper Motor Drive Circuit

Feeding Motor Drive Circuit

Tooth Lifting Motor Drive Circuit

Electromagnet Drive Circuit

Switching Power Supply Circuit

Panel Communication Circuit

Digital Signal Processing Circuit

MCU Processing Circuit

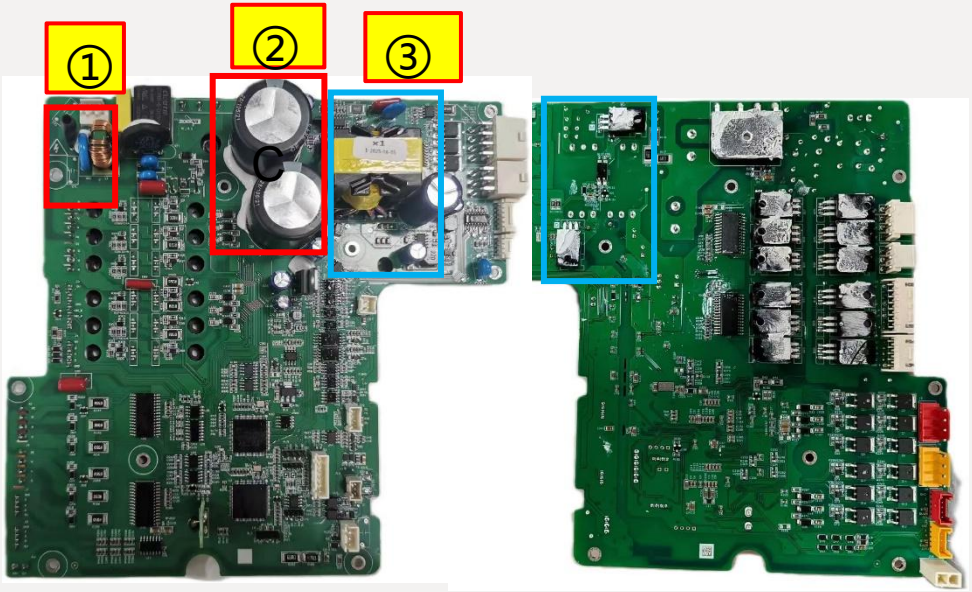
Digital Signal Processing Circuit

Digital Signal Processing Circuit

Brief Introduction to Each Functional Circuit

- EMC High-Voltage Input Circuit: Filters, rectifies, and stores the input 220V AC to output a relatively stable 310V DC.
- Switching Power Supply Circuit: Steps down the stable 310V to generate 30V and 19V through a flyback power circuit. The 30V supplies power to the electromagnet; meanwhile, it is stepped down to 12VS via the U23 (SGM61431 chip) to power the touch screen and fan. The 12VS is further stepped down to 5VS via the TPS54202 chip to power the head lamp assembly, 4G module, USB, etc. The 19V is stepped down to 15VP via the KIA7815API chip to power motor driver chips and relays; it is also stepped down to MCU5V via the TPS560430 chip to power motor encoders. Finally, the MCU5V is stepped down to 3.3V via the LD1117AG to power the MCU and operational amplifiers.
- Motor Drive Circuit: Amplifies and processes the drive signals from the MCU chip to form drive signals that control the on/off of each IGBT, thereby regulating the rotation of the four motors.
- Analog Signal Processing Circuit: Isolates and processes analog input signals (e.g., thickness detection) and outputs signals receivable by the MCU.
- Digital Signal Processing Circuit: Isolates and processes digital input signals (e.g., reverse stitching, needle compensation) and outputs signals receivable by the MCU.
- Electromagnet Drive Circuit: Isolates and processes control signals from the MCU to form drive signals that control the on/off of each MOS tube, thus regulating the operation of the electromagnet.

Main Board Maintenance



1. Preliminary Visual Inspection

① Check if the fuse and varistor are damaged or exploded. If damaged, replace them and inspect components related to the high-voltage power supply.

② Check if the large electrolytic capacitors (CD1, CD2) and electrolytic capacitors (CD3-CD8, CD10, CD11) have bulging, liquid leakage, or other defects. If so, replace the faulty capacitors and inspect components related to the high-voltage power supply.

③ Check if the switching power supply circuit is burned out. If the damage is severe (focus on inspecting the switching power supply MOS tube Q5 and sampling resistor R133), return the board to the factory for maintenance.

Main Board Maintenance

④ Check if the spindle drive sampling resistors (R367, R368, R370) are damaged. If damaged, replace them. Inspect the IGBTs (Q24-Q29) in the spindle drive circuit for signs of explosion; if found, replace the faulty IGBTs and inspect components related to the drive circuit.

⑤ Check if the stepper drive sampling resistors (R326, R327, R329) are damaged. If damaged, replace them. Inspect the IGBTs (Q18-Q23) in the stepper drive circuit for signs of explosion; if found, replace the faulty IGBTs and inspect components related to the drive circuit.

⑥ Check if the feeding drive sampling resistors (R241, R242, R244) are damaged. If damaged, replace them. Inspect the IGBTs (Q6-Q11) in the feeding drive circuit for signs of explosion; if found, replace the faulty IGBTs and inspect components related to the drive circuit.

⑦ Check if the tooth lifting drive sampling resistors (R285, R286, R288) are damaged. If damaged, replace them. Inspect the IGBTs (Q12-Q17) in the tooth lifting drive circuit for signs of explosion; if found, replace the faulty IGBTs and inspect components related to the drive circuit.

Power-On Detection

If static measurements are normal, proceed with power-on detection. Narrow down the fault range by measuring voltages at key points during power-on, observing the electrical control status after power-on, and referencing fault codes reported by the electrical control system to resolve issues quickly.

The power-on process involves risks; ensure safety!

Before power-on: Set the switch to "Off", plug in the power cord, and ensure no conductive objects are on the circuit board or under the heat dissipation base (to avoid short circuits). Then turn on the switch and observe the electrical control status. A normal power-on circuit board will produce a relay-closing sound, and the 3.3V LED light will remain on.

Power-On Voltage Measurement Points:

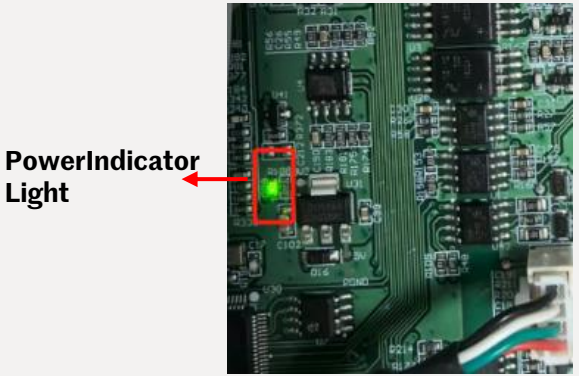
220V AC: Pins 2 and 3 of the rectifier bridge

BUS+ (310V DC): Pins 1 and 4 of the rectifier bridge

30V DC: Both ends of capacitor CD4 12VS DC: Both ends of capacitor CD11

5VS DC: Both ends of capacitor CD6 15VP DC: Both ends of capacitor CD8

MCU5V DC: Both ends of capacitor CD10 3.3V DC: Pins 1 and 2 of LDO U31



Fault Code Table

Fault Code	Code Meaning	Fault Code	Code Meaning
E02	Spindle Motor Hardware Overcurrent	E23	Spindle Motor Overspeed
E03	System Undervoltage	E24	Electrical Control Memory Abnormality
E04	System Overvoltage	E27	Spindle Motor Startup Failure
E05	Spindle Motor Position Abnormality	E32	Stepper Motor Hardware Overcurrent
E08	Spindle Motor Lockup	E35	Stepper Motor Position Abnormality
E11	Spindle Motor Origin Seeking Failure	E38	Stepper Motor Lockup
E13	Spindle Motor Software Overcurrent	E41	Stepper Motor Origin Seeking Failure
E15	Spindle Motor Speed Abnormality	E43	Stepper Motor Software Overcurrent
E16	Spindle Motor Current Detection Circuit Abnormality	E46	Stepper Motor Current Detection Circuit Abnormality
E17	Spindle Encoder Communication Abnormality	E49	Stepper Motor Power Cable Disconnected
E18	Spindle Motor Encoder Calibration Failure	E51	Stepper Motor Lockup at Startup
E19	Spindle Motor Power Cable Disconnected	E53	Stepper Motor Overspeed

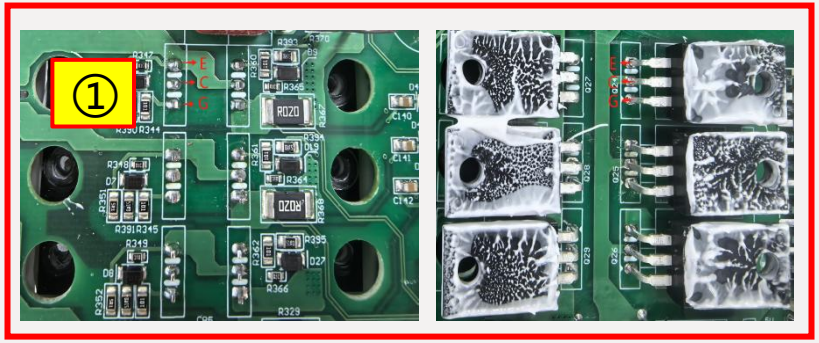
Fault Code Table

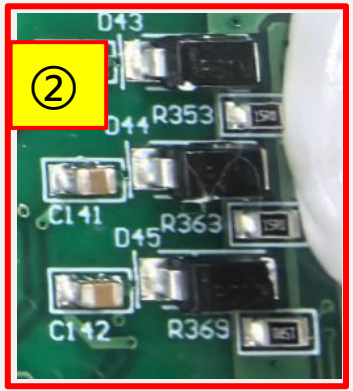
E56	Stepper Motor Operation Timeout	E92	Feeding Motor Hardware Overcurrent
E62	Tooth Lifting Motor Hardware Overcurrent	E95	Feeding Motor Position Abnormality
E64	System Overvoltage	E98	Feeding Motor Lockup
E65	Tooth Lifting Motor Position Abnormality	E101	Feeding Motor Origin Seeking Failure
E68	Tooth Lifting Motor Lockup	E103	Feeding Motor Software Overcurrent
E71	Tooth Lifting Motor Origin Seeking Failure	E105	Feeding Motor Speed Abnormality
E73	Tooth Lifting Motor Software Overcurrent	E106	Feeding Motor Current Detection Circuit Abnormality
E75	Tooth Lifting Motor Speed Abnormality	E109	Feeding Motor Power Cable Disconnected
E76	Tooth Lifting Motor Current Detection Circuit Abnormality	E110	Feeding Motor Encoder Disconnected
E79	Tooth Lifting Motor Power Cable Disconnected	E111	Feeding Motor Lockup at Startup
E80	Tooth Lifting Motor Encoder Disconnected	E113	Feeding Motor Overspeed
E81	Tooth Lifting Motor Lockup at Startup	E401	Communication Abnormality
E83	Tooth Lifting Motor Overspeed	/	/

Warning Code Table

Warning Code	Code Meaning
A01	When the safety flip switch is turned on, if the sewing machine tips over, a tip-over alarm interface will pop up, and the sewing machine will not operate.
A02	Stitch Count Full Alarm
A03	Piece Count Full Alarm
A04	Head Button Short Circuit
A05	Low Oil Level Alarm
A06	Foot Pedal Insertion Alarm (Detected at startup, not displayed if unplugged during operation)
A07	Electrical Control Shutdown
A08	Base Plate Fan Abnormality

E02 Spindle Motor Hardware Overcurrent Fault Maintenance





Fault Description:

During startup or operation, if the spindle motor current is detected to be too large, the system will stop working for automatic protection, and E02 will be displayed on the screen.

Troubleshooting Methods:

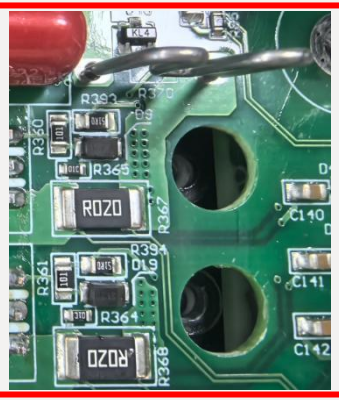
① Visually inspect the spindle drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the spindle drive IGBTs (Q24-Q29) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Use the diode range to measure the voltage drop of D43-D45 (normal value: approximately 0.5V) and test R353, R363, R369 (normal value: approximately 15Ω). Replace if abnormal.

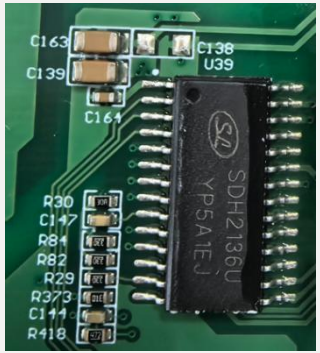
③ Test the 15VP power supply (normal value: 15V±3%). If abnormal, test whether the voltage at pins 1 and 2 of LDO U24 is approximately 19V; if yes, replace U24; if no, maintain the switching power supply.

E02 Spindle Motor Hardware Overcurrent Fault Maintenance

④



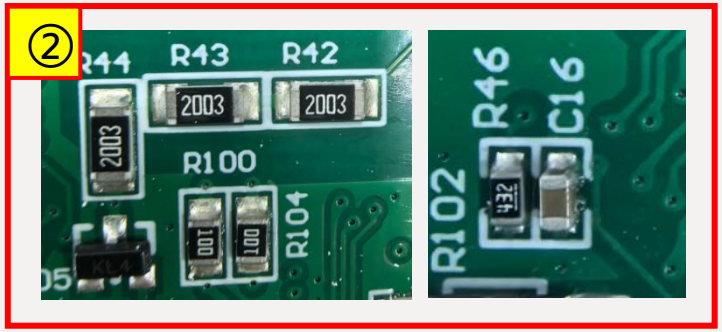
⑤



④ Use a multimeter (resistance range) to test the sampling resistors R367 (20mΩ), R368 (20mΩ), R370 (25mΩ); replace if abnormal.

⑤ Test the resistors R129, R30, R82, R84 around the driver chip U39; replace if abnormal. Test the impedance between pin 8 of U39 and 3.3V (normal value: 1KΩ) and the impedance between pin 9 of U39 and PGND (normal value: approximately 220Ω). If the impedance is abnormal, first test resistor R371 (normal value: 1KΩ); replace the resistor if abnormal. If the resistor is normal, try replacing U39 first; if the fault persists after replacement, consider replacing the MCU.

E03/E04 System Undervoltage/Overvoltage Fault Maintenance



Fault Description:

When the servo system detects the DC bus voltage during startup and finds it lower than the normal operating voltage, the system will stop working for automatic protection, and E03 will be displayed on the operation panel. If the system detects the DC bus voltage higher than the set threshold during standby or operation, it will stop working for automatic protection, and E04 will be displayed on the panel.

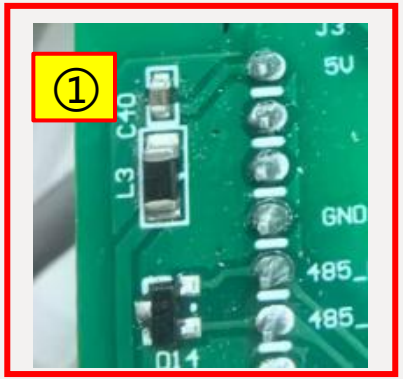
Troubleshooting Methods:

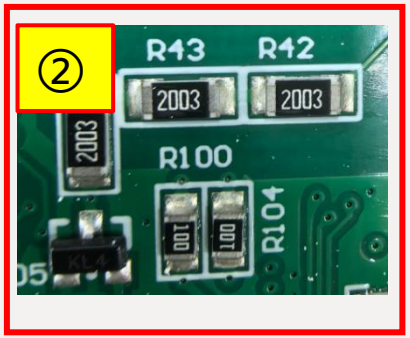
① After the mains power is turned on and the system starts normally, click "Settings" - "System Settings" - "Monitoring Mode" - "M4 Bus Voltage Detection" on the panel; the AC input voltage should be displayed normally. If the deviation is large, power off and proceed to the next step.

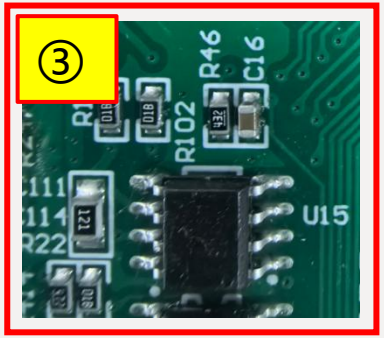
② Use a multimeter (resistance range) to test resistors R42, R43, R44 (each should be 200KΩ), resistor R46 (4.3KΩ), and capacitor C16 (0.1μF). Use the diode range to test the voltage drop between pin 1 and pin 3, and between pin 2 and pin 3 of diode D5 (normal value: 0.2-0.4V); replace if damaged.

③ If the above are normal, check whether resistor R45 (1KΩ) is normal and whether pin 26 of MCU U30 has cold solder or solder bridging.

E17 Spindle Encoder Communication Abnormality Fault Maintenance







Fault Description:

If the spindle encoder communication is abnormal during startup, the system will stop working and enter the automatic protection mode, and fault E17 will be displayed on the panel.

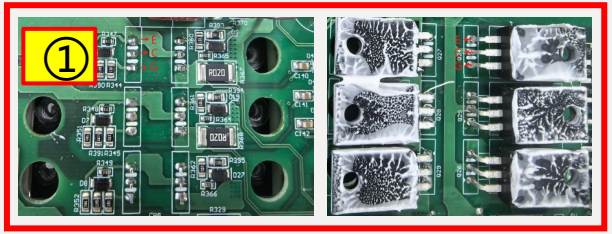
Troubleshooting Methods:

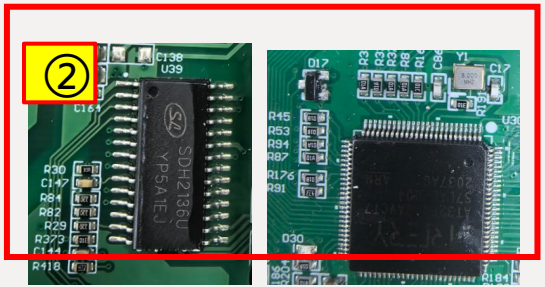
① After power-on, check if the encoder power supply connection is normal. Use a multimeter to test the voltage between pin 5 and pin 8 of J3 (should be 5V). If not, check if L3 is normal; replace L3 if damaged. If L3 is normal, maintain the MCU5V power supply.

② Check if the components in the communication circuit are normal. Use a multimeter (diode range) to test the voltage drop between pin 1 and pin 3, and between pin 2 and pin 3 of diode D14 (normal value: 0.4-0.5V). Use the resistance range to test resistors R100, R104 (each should be 10Ω), R22 (100Ω), R102, R103 (each should be 1KΩ); replace if any resistor is abnormal.

③ If the above checks are normal or the fault persists after replacing damaged components, consider replacing the communication chip U15.

E05/E08 Spindle Motor Position Abnormality/Lockup, E15 Spindle Motor Speed Abnormality Fault Maintenance





Fault Description:

During startup or operation, if the system detects that the spindle motor does not operate according to the given position, or the spindle motor output current exceeds a certain threshold for a certain period of time, the system will stop working for automatic protection, and the corresponding fault will be displayed on the screen. This part is related to the drive circuit, and the following unified troubleshooting method applies.

Troubleshooting Methods:

① Visually inspect the spindle drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the spindle drive IGBTs (Q24-Q29) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Check if pins 2-7 and 14-28 of the driver chip U39 have solder bridging, and check if the corresponding pins of MCU U30 have cold solder or solder bridging. If no problem is found, consider replacing the driver chip.

③ Encoder faults may also cause such faults. If the above are normal, check and replace the circuits corresponding to the E17 fault.

E11 Spindle Motor Origin Seeking Failure,
E19 Spindle Motor Power Cable Disconnected

Fault Description:

During startup, if the system detects that the spindle motor does not operate according to the given command, it will stop working for automatic protection, and the corresponding fault will be displayed on the screen.

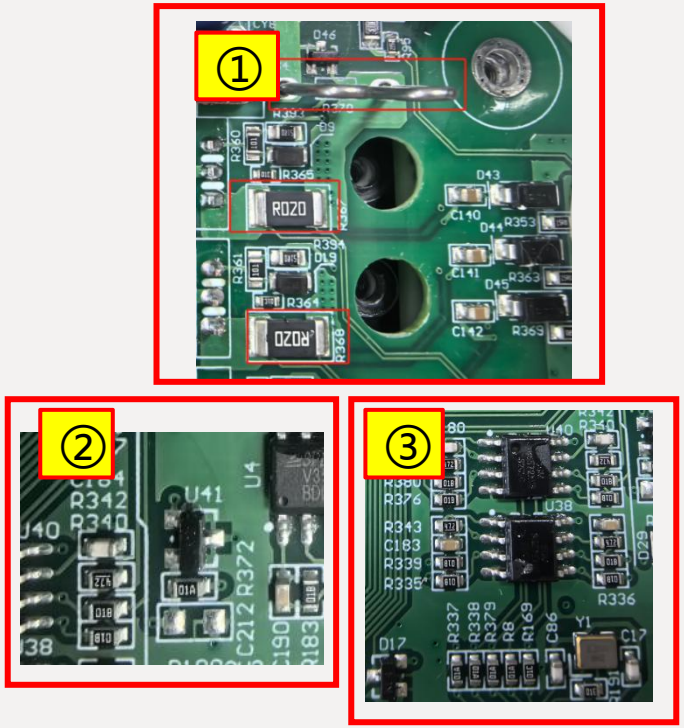
Troubleshooting Methods:

① Check if the spindle motor power cable socket J1 is loose or has cold solder; replace if necessary.

② Maintain the circuits related to the spindle drive part; refer to the troubleshooting methods for E05/E08/E15 in the previous chapter.

③ Maintain the circuits related to the spindle encoder; refer to the troubleshooting method for E17 spindle encoder communication abnormality.

E16 Spindle Motor Current Detection Circuit Abnormality



Fault Description:

After the system is powered on, the MCU detects the current of the spindle motor in the standby state. If the detected value exceeds a certain range, the system will stop working and enter the protection mode, and fault E16 will be displayed on the panel.

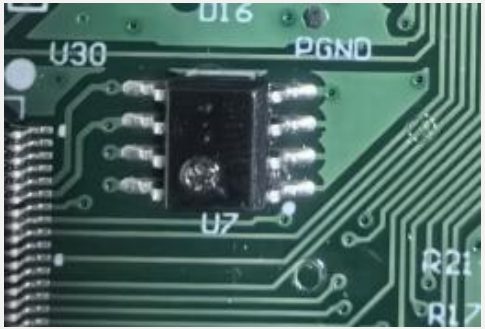
Troubleshooting Methods:

① Use a multimeter (resistance range) to check the current detection resistors R368 (20mΩ) and R367 (20mΩ) in the spindle drive circuit; replace if abnormal.

② Use a multimeter (resistance range) to test resistors R372, R386, R387; replace if abnormal. After power-on, test the voltage across C212 (should be around 1.65V); if abnormal, consider replacing U41.

③ Use a multimeter (resistance range) to test resistors R376, R377, R380, R381, R374, R375, R382, R385, R8, and R379; replace if any resistor is abnormal. After power-on, test the output of pins 1 and 7 of U40, and the voltage at the pins of R379 and R8 close to the MCU (should be around 1.65V). If the output voltage is incorrect, consider replacing the operational amplifier U40 and the MCU.

E24 Electrical Control Memory Abnormality



Fault Description:

If the MCU encounters an abnormality when writing data to the EEPROM, it will stop working for self-protection, and fault E24 will be prompted on the screen.

Troubleshooting Methods:

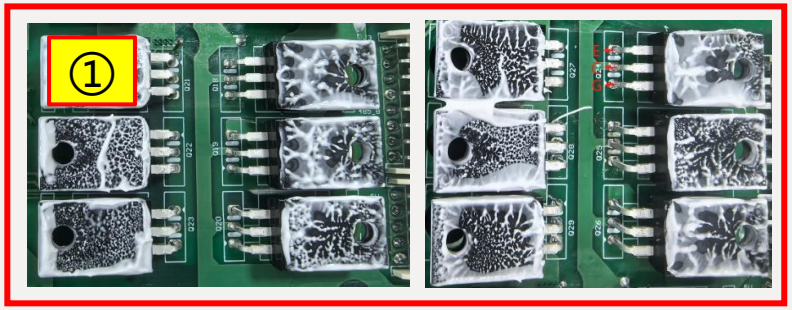
① Use a multimeter (resistance range) to check the resistance of R67 and R68 (2KΩ); replace if abnormal.

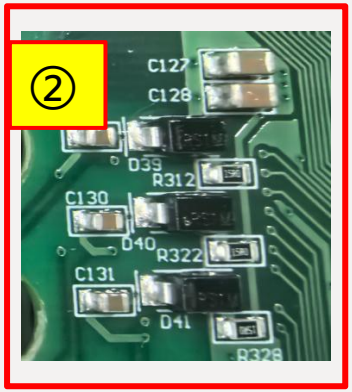
② Use a multimeter to test the 3.3V voltage; maintain the 3.3V power supply if abnormal.

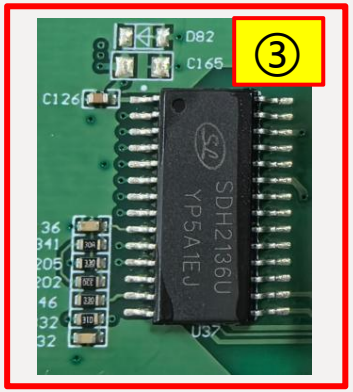
③ If the above are normal, replace the EEPROM chip U7.

④ If the above methods do not solve the problem, consider replacing the MCU U30.

E32 Stepper Motor Hardware Overcurrent Fault Maintenance







Fault Description:

During startup or operation, if the stepper motor current is detected to be too large, the system will stop working for automatic protection, and E02 will be displayed on the screen.

Troubleshooting Methods:

① Visually inspect the stepper drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the stepper drive IGBTs (Q18-Q23) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Use the diode range to measure the voltage drop of D39-D41 (normal value: approximately 0.5V) and test R312, R322, R328 (normal value: approximately 15Ω); replace if abnormal.

③ Test the 15VP power supply (test point: across C165) (normal value: 15V±3%). If abnormal, test whether the voltage at pins 1 and 2 of LDO U24 is approximately 19V; if yes, replace U24; if no, maintain the switching power supply.

E32 Stepper Motor Hardware Overcurrent Fault Maintenance

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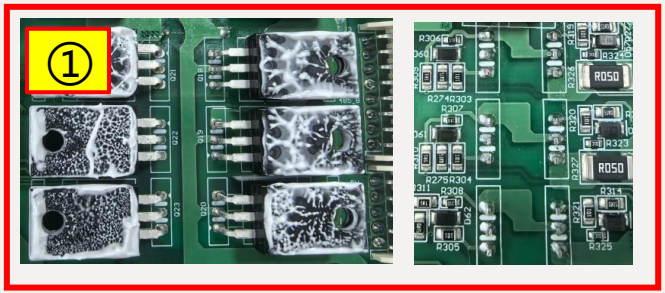
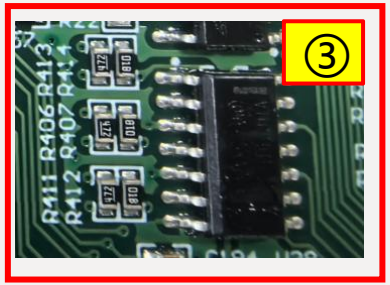
④ Use a multimeter (resistance range) to test the sampling resistors R329 (50mΩ), R326 (50mΩ), R327 (50mΩ); replace if abnormal.

⑤ Test the resistors R146, R202, R205, R341 around the driver chip U37; replace if abnormal. Test the impedance between pin 8 of U37 and 3.3V (normal value: 1KΩ) and the impedance between pin 9 of U37 and PGND (normal value: approximately 220Ω). If the impedance is abnormal, first test resistor R330 (normal value: 1KΩ); replace the resistor if abnormal. If the resistor is normal, try replacing U39 first; if the fault persists after replacement, consider replacing the MCU.

E35/E38 Stepper Motor Position Abnormality/Lockup, E53/E56 Stepper Motor Overspeed/Operation Timeout





Fault Description:

During startup or operation, if the system detects that the stepper motor does not operate according to the given position, or the stepper motor output current exceeds a certain threshold for a certain period of time, the system will stop working for automatic protection, and the corresponding fault will be displayed on the screen. This part is related to the drive circuit, and the following unified troubleshooting method applies.

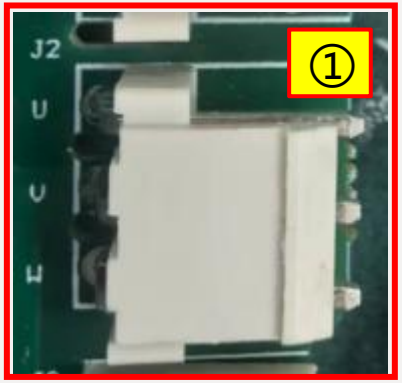
Troubleshooting Methods:

① Visually inspect the stepper drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the spindle drive IGBTs (Q18-Q23) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Check if pins 2-7 and 14-28 of the driver chip U37 have solder bridging, and check if the corresponding pins of MCU U30 have cold solder or solder bridging. If no problem is found, consider replacing the driver chip.

③ Encoder faults may also cause such faults. If the above are normal, check the encoder-related resistors R406, R407, R411, R412, R413, R414 and TVS diodes D53-D55; replace if abnormal. If the fault persists after replacement, consider replacing U29.

E41 Stepper Motor Origin Seeking Failure, E19 Stepper Motor Power Cable Disconnected



Fault Description:

During startup, if the system detects that the stepper motor does not operate according to the given command, it will stop working for automatic protection, and the corresponding fault will be displayed on the screen.

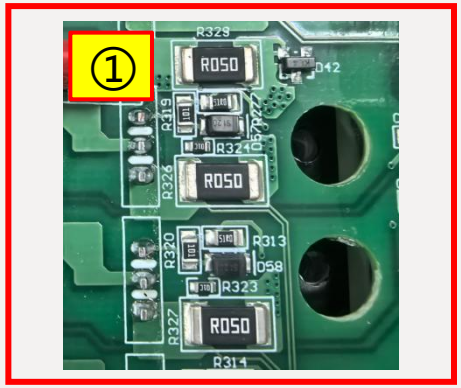
Troubleshooting Methods:

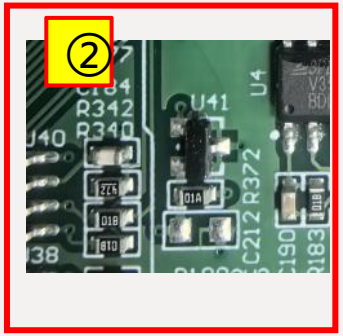
① Check if the stepper motor power cable socket J2 is loose or has cold solder; replace if necessary.

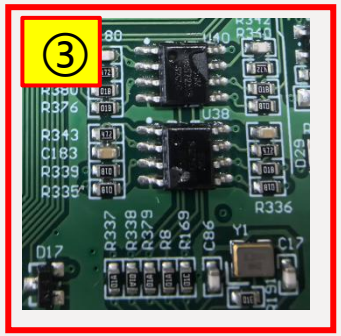
② Maintain the circuits related to the stepper drive part; refer to the troubleshooting methods for E35/E38/E53 in the previous chapter.

③ Maintain the circuits related to the stepper encoder; refer to the troubleshooting method in the previous chapter.

E46 Stepper Motor Current Detection Circuit Abnormality







Fault Description:

After the system is powered on, the MCU detects the current of the stepper motor in the standby state. If the detected value exceeds a certain range, the system will stop working and enter the protection mode, and fault E46 will be displayed on the panel.

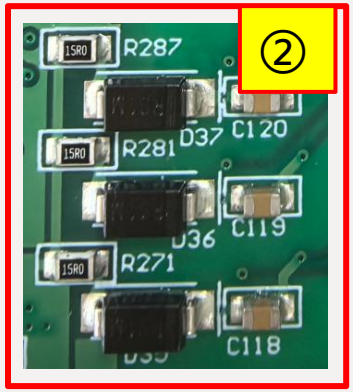
Troubleshooting Methods:

① Use a multimeter (resistance range) to check the current detection resistors R327 (50mΩ) and R326 (50mΩ) in the spindle drive circuit; replace if abnormal.

② Use a multimeter (resistance range) to test resistors R372, R386, R387; replace if abnormal. After power-on, test the voltage across C212 (should be around 1.65V); if abnormal, consider replacing U41.

③ Use a multimeter (resistance range) to test resistors R335, R336, R339, R340, R333, R334, R342, R343, R337, and R338; replace if any resistor is abnormal. After power-on, test the output of pins 1 and 7 of U38, and the voltage at the pins of R337 and R338 close to the MCU (should be around 1.65V). If the output voltage is incorrect, consider replacing the operational amplifier U38 and the MCU.

E62 Tooth Lifting Motor Hardware Overcurrent Fault Maintenance



Fault Description:

During startup or operation, if the stepper motor current is detected to be too large, the system will stop working for automatic protection, and E02 will be displayed on the screen.

Troubleshooting Methods:

① Visually inspect the stepper drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the tooth lifting drive IGBTs (Q12-Q17) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Use the diode range to measure the voltage drop of D35-D37 (normal value: approximately 0.5V) and test R271, R281, R287 (normal value: approximately 15Ω); replace if abnormal.

③ Test the 15VP power supply (test point: across C117) (normal value: 15V±3%). If abnormal, test whether the voltage at pins 1 and 2 of LDO U24 is approximately 19V; if yes, replace U24; if no, maintain the switching power supply.

E62 Tooth Lifting Motor Hardware Overcurrent Fault Maintenance

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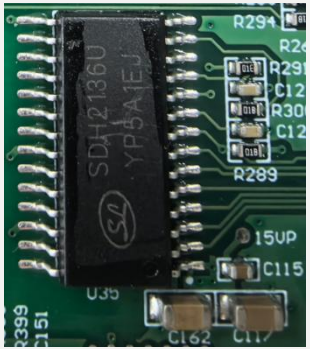
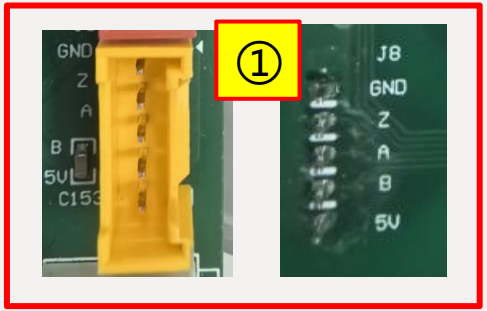
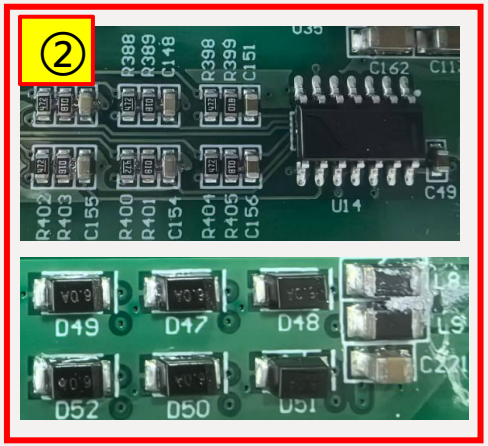


④ Use a multimeter (resistance range) to test the sampling resistors R285 (50mΩ), R286 (50mΩ), R288 (50mΩ); replace if abnormal.

⑤ Test the resistor R300 around the driver chip U35; replace if abnormal. Test the impedance between pin 8 of U35 and 3.3V (normal value: 1KΩ) and the impedance between pin 9 of U35 and PGND (normal value: approximately 1KΩ). If the impedance is abnormal, first test resistor R289 (normal value: 1KΩ); replace the resistor if abnormal. If the resistor is normal, try replacing U35 first; if the fault persists after replacement, consider replacing the MCU.

E80 Tooth Lifting Motor Encoder Disconnected Fault Maintenance





Fault Description:

During startup or operation, if the tooth lifting motor encoder signal is detected to be abnormal, the system will stop working for automatic protection, and E80 will be displayed on the screen.

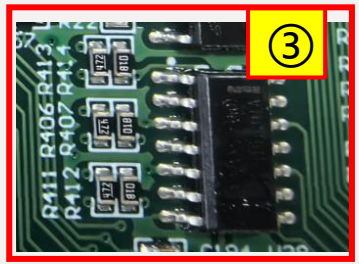
Troubleshooting Methods:

① Visually inspect the tooth lifting motor encoder socket J8 for looseness or cold solder. If no such issue exists, test the voltage between pin 1 and pin 5 of J8 after power-on (should be 5V). If the voltage is abnormal, test whether the electrical control MCU5V is normal; if MCU5V is normal, test whether L9 is normal (replace L9 if abnormal); if MCU5V is abnormal, maintain the relevant power supply.

② Use the diode range to measure D50-D52, and test resistors R400-R405 and capacitors C154-C156; replace if damaged.

③ If the above are normal, test the power supply voltage of U14 (should be 5V); maintain the power supply if abnormal. If normal, try replacing U14.

E65/E68 Tooth Lifting Motor Position Abnormality/Lockup, E75/E83 Tooth Lifting Motor Speed Abnormality/Stepper Motor Overspeed



Fault Description:

During startup or operation, if the system detects that the tooth lifting motor does not operate according to the given position, or the tooth lifting motor output current exceeds a certain threshold for a certain period of time, the system will stop working for automatic protection, and the corresponding fault will be displayed on the screen. This part is related to the drive circuit, and the following unified troubleshooting method applies.

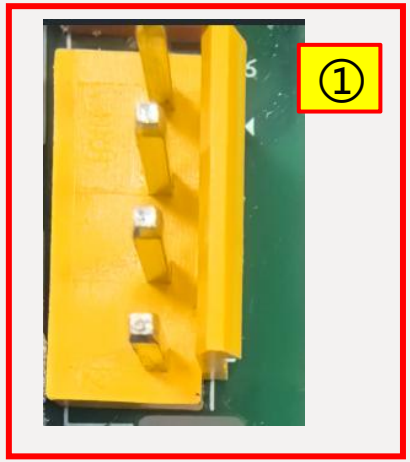
Troubleshooting Methods:

① Visually inspect the tooth lifting drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the spindle drive IGBTs (Q12-Q18) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Check if pins 2-7 and 14-28 of the driver chip U35 have solder bridging, and check if the corresponding pins of MCU U2 have cold solder or solder bridging. If no problem is found, consider replacing the driver chip.

③ Encoder faults may also cause such faults. If the above do not solve the problem, refer to the troubleshooting method for E80.

E71 Tooth Lifting Motor Origin Seeking Failure
E79 Tooth Lifting Motor Power Cable Disconnected



Fault Description:

During startup, if the system detects that the tooth lifting motor does not operate according to the given command, it will stop working for automatic protection, and the corresponding fault will be displayed on the screen.

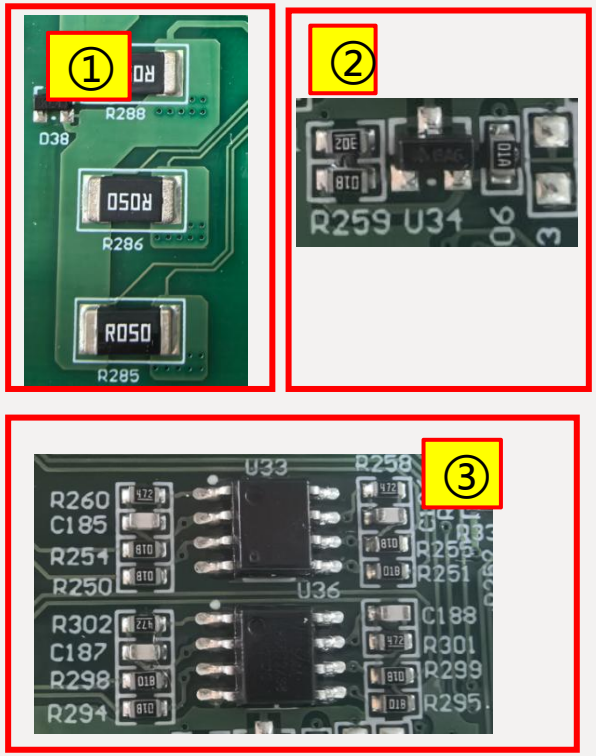
Troubleshooting Methods:

① Check if the tooth lifting motor power cable socket J6 is loose or has cold solder; replace if necessary.

② Maintain the circuits related to the tooth lifting drive part; refer to the troubleshooting methods for E65/E68/E75 in the previous chapter.

③ Maintain the circuits related to the tooth lifting motor encoder; refer to the relevant chapter on E80 fault maintenance.

E76 Tooth Lifting Motor Current Detection Circuit Abnormality



Fault Description:

After the system is powered on, the MCU detects the current of the tooth lifting motor in the standby state. If the detected value exceeds a certain range, the system will stop working and enter the protection mode, and fault E76 will be displayed on the panel.

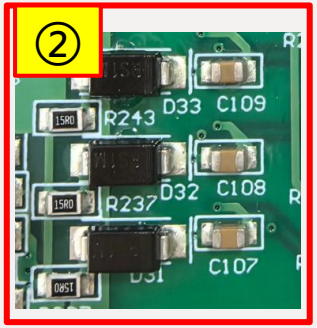
Troubleshooting Methods:

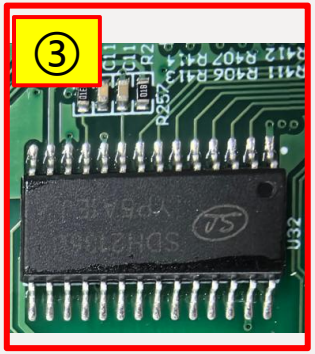
① Use a multimeter (resistance range) to check the current detection resistors R285 (50mΩ) and R286 (50mΩ) in the spindle drive circuit; replace if abnormal.

② Use a multimeter (resistance range) to test resistors R106, R259, R261; replace if abnormal. After power-on, test the voltage across C212 (should be around 1.65V); if abnormal, consider replacing U34.

③ Use a multimeter (resistance range) to test resistors R293-R295, R298, R299, R301, R302, R296, R297; replace if any resistor is abnormal. After power-on, test the output of pins 1 and 7 of U36, and the voltage at the pins of R396 and R397 close to the MCU (should be around 1.65V). If the output voltage is incorrect, consider replacing the operational amplifier U36 and the MCU.

E92 Feeding Motor Hardware Overcurrent Fault Maintenance





Fault Description:

During startup or operation, if the stepper motor current is detected to be too large, the system will stop working for automatic protection, and E02 will be displayed on the screen

Troubleshooting Methods:

① Visually inspect the stepper drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the feeding drive IGBTs (Q6-Q11) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Use the diode range to measure the voltage drop of D31-D33 (normal value: approximately 0.5V) and test R312, R322, R328 (normal value: approximately 15Ω); replace if abnormal.

③ Test the 15VP power supply (test point: refer to other drive circuits) (normal value: 15V±3%). If abnormal, test whether the voltage at pins 1 and 2 of LDO U24 is approximately 19V; if yes, replace U24; if no, maintain the switching power supply.

E92 Feeding motor hardware overcurrent fault repair

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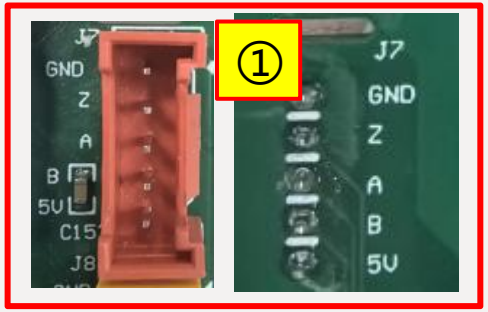
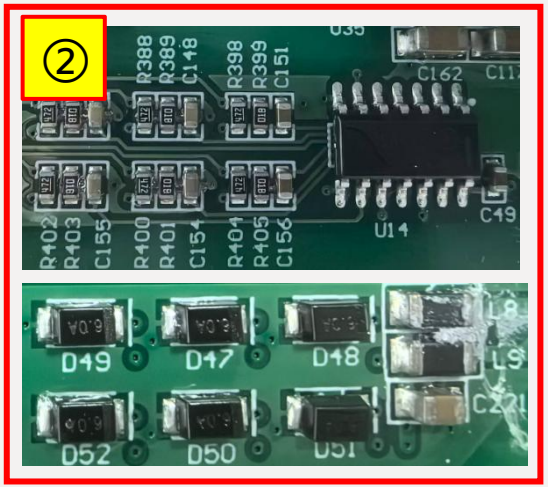
④ Use a multimeter (resistance range) to test the sampling resistors R241 (50mΩ), R242 (50mΩ), R244 (50mΩ); replace if abnormal.

⑤ Test the resistor R257 around the driver chip U32; replace if abnormal. Test the impedance between pin 8 of U32 and 3.3V (normal value: 1KΩ) and the impedance between pin 9 of U32 and PGND (normal value: approximately 1KΩ). If the impedance is abnormal, first test resistor R245 (normal value: 1KΩ); replace the resistor if abnormal. If the resistor is normal, try replacing U35 first; if the fault persists after replacement, consider replacing the MCU.

E110 Feeding Motor Encoder Disconnected Fault Maintenance





Fault Description:

During startup or operation, if the feeding motor encoder signal is detected to be abnormal, the system will stop working for automatic protection, and E110 will be displayed on the screen.

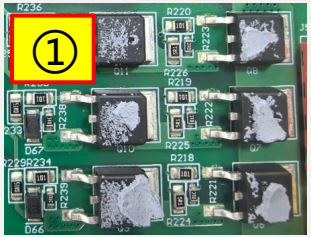
Troubleshooting Methods:

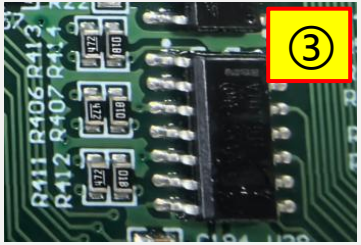
① Visually inspect the tooth lifting motor encoder socket J7 for looseness or cold solder. If no such issue exists, test the voltage between pin 1 and pin 5 of J7 after power-on (should be 5V). If the voltage is abnormal, test whether the electrical control MCU5V is normal; if MCU5V is normal, test whether L8 is normal (replace L8 if abnormal); if MCU5V is abnormal, maintain the relevant power supply.

② Use the diode range to measure D47-D49, and test resistors R388, R389, R396-R399 and capacitors C148, C150, C151; replace if damaged.

③ If the above are normal, test the power supply voltage of U14 (should be 5V); maintain the power supply if abnormal. If normal, try replacing U14.

E95/E98 Feeding Motor Position Abnormality/Lockup, E105/E113 Tooth Lifting Motor Speed Abnormality/Stepper Motor Overspeed





Fault Description:

During startup or operation, if the system detects that the tooth lifting motor does not operate according to the given position, or the tooth lifting motor output current exceeds a certain threshold for a certain period of time, the system will stop working for automatic protection, and the corresponding fault will be displayed on the screen. This part is related to the drive circuit, and the following unified troubleshooting method applies.

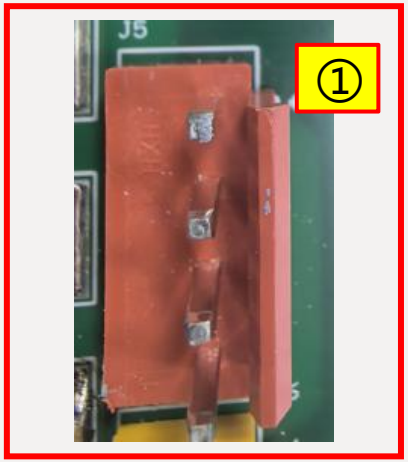
Troubleshooting Methods:

① Visually inspect the tooth lifting drive part for obvious component damage; replace if any. Use a multimeter (resistance range) to test the resistance between the G pole and E pole of the spindle drive IGBTs (Q6-Q11) (normal value: 10KΩ), and use the diode range to check if the diodes between the C pole and E pole of the IGBTs are normal. If any requirement is not met, judge the IGBT as damaged, replace it, and then test. If no IGBT damage is found or the fault persists after replacing the damaged IGBT, proceed to the next maintenance step.

② Check if pins 2-7 and 14-28 of the driver chip U32 have solder bridging, and check if the corresponding pins of MCU U2 have cold solder or solder bridging. If no problem is found, consider replacing the driver chip.

③ Encoder faults may also cause such faults. If the above do not solve the problem, refer to the troubleshooting method for E110.

E101 Feeding Motor Origin Seeking Failure
E109 Feeding Motor Power Cable Disconnected



Fault Description:

During startup, if the system detects that the tooth lifting motor does not operate according to the given command, it will stop working for automatic protection, and the corresponding fault will be displayed on the screen.

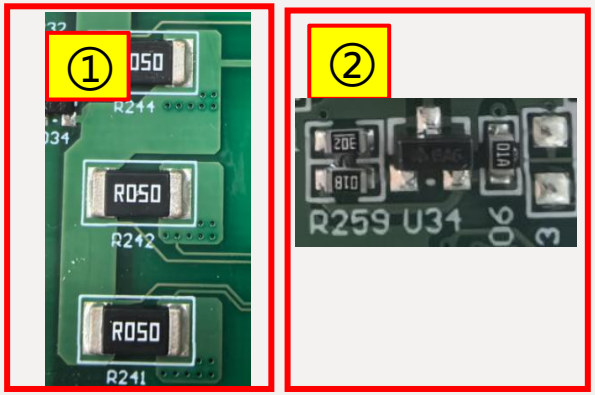
Troubleshooting Methods:

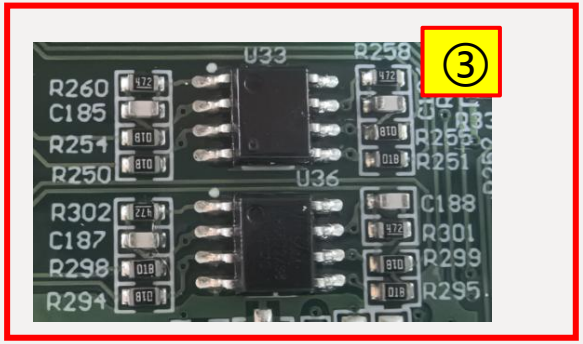
① Check if the feeding motor power cable socket J5 is loose or has cold solder; replace if necessary.

② Maintain the circuits related to the feeding drive part; refer to the troubleshooting methods for E95/E98/E105 in the previous chapter.

③ Maintain the circuits related to the feeding motor encoder; refer to the relevant chapter on E110 fault maintenance.

E106 Feeding Motor Current Detection Circuit Abnormality





Fault Description:

After the system is powered on, the MCU detects the current of the feeding motor in the standby state. If the detected value exceeds a certain range, the system will stop working and enter the protection mode, and fault E106 will be displayed on the panel.

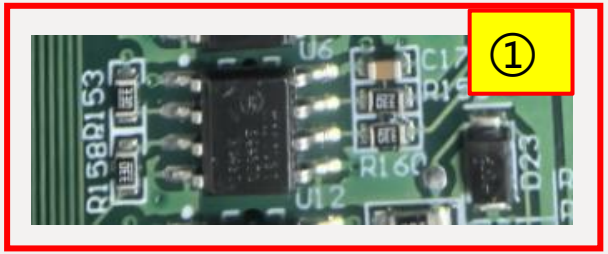
Troubleshooting Methods:

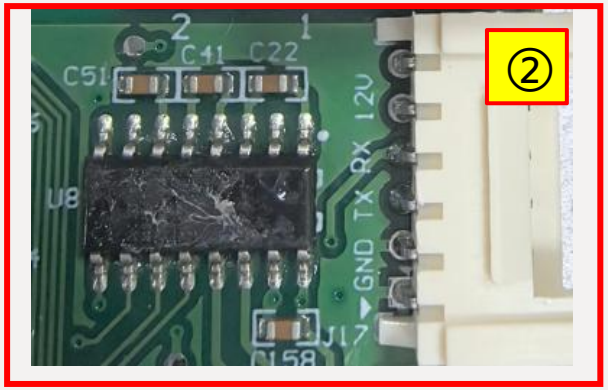
① Use a multimeter (resistance range) to check the current detection resistors R241 (50mΩ) and R242 (50mΩ) in the spindle drive circuit; replace if abnormal.

② Use a multimeter (resistance range) to test resistors R106, R259, R261; replace if abnormal. After power-on, test the voltage across C212 (should be around 1.65V); if abnormal, consider replacing U34.

③ Use a multimeter (resistance range) to test resistors R248-R251, R254, R255, R258, R260, R252, R253; replace if any resistor is abnormal. After power-on, test the output of pins 1 and 7 of U36, and the voltage at the pins of R252 and R253 close to the MCU (should be around 1.65V). If the output voltage is incorrect, consider replacing the operational amplifier U33 and the MCU.

E401 Communication Abnormality Fault Maintenance





Fault Description:

After the system is powered on, if the communication mechanism between the electrical control and the panel fails to be established effectively, an error will be reported, and fault E401 will be displayed on the screen.

Troubleshooting Methods:

① Use a multimeter (resistance range) to test resistors R153, R158-R160 (each should be 33Ω); replace if abnormal. Use a multimeter to test the voltage between pin 1 and pin 4 of U12 (should be 3.3V) and between pin 5 and pin 8 of U12 (should be 5V); consider replacing U12 if abnormal.

② Use a multimeter to test the capacitors around U8 (C22, C41, C50, C51) (all should be normal), and test the voltage at pin 1 and pin 16 of U8 (should be 5V). Check the voltage between pin 1 and pin 6 of J17 (should be 12V) and ensure the J17 connector has no looseness or cold solder; replace if abnormal. If the problem persists after replacement, consider replacing the chip U8.

List of Wearing Parts - Wearing Parts

Material Code	Material Description	Main Board Position No.
198200244	Z1	Zener Diode / BZT52C12 / SOD-123 / Yangjie
910000348	D23, D24, D47, D48, D49, D50, D51, D52, D53, D54, D55, D79	SMD Transient Voltage Suppressor Diode / SMF6.0A / SOD-123
198900018	D20	Fast Recovery Diode / MUR2040FCT / ITO-220-AB / Gude
98900009	Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29	IGBT / KGT15N60FDA / TO-220IS / KEC
198300072	Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17	IGBT / KGF15N65DDA / TO-252 / KEC
198400234	U32, U35, U37, U39	Driver Chip / SDH2136U / SOP-28
198900014	Q5	MOS Tube / 12N80L-TF3-T / TO-220F / UTC
98400629	U9, U13, U27	π120U30 / Dual-Channel Digital Isolator Chip
198400109	U6, U12, U42, U44	Capacitance Isolation Chip / Π121u31 / SOP-8
198300074	Q1, Q33, Q34	MOS Tube / NCE0130KA / TO-252-2L

CONCENTS

8.1Video Teaching

Sewing Worker Operation Video

Table Board Installation Video

Mobile Terminal Teaching

Mechanical Repair and Maintenance

Software Tutorial Video

THANK YOU!