



SEN1050A/1350A/SEN1650A Solventless Laminating machine

操作说明手册

Operation User Manual

This user's operation manual is for SSEN brand SEN-A model high speed Solventless Laminating Machine. For further questions please contact us by [+86 189 5877 6166](tel:+8618958776166), or send email via sally@dhbj.com

For Siemens PLC Control System (2024)



Chapter I Characteristics of Solventless lamination

Chapter II Safety instruction

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Chapter 1. Characteristic of Solventless lamination

- 1) Environmental, The glue consists of A. B glue without solvent.
- 2) Healthy, There is no solvent residue in the laminated products.
- 3) Energy saving, No need drying oven, the production consumption is approx. 20kw
- 4) High efficiency, Max laminating speed 500m/min
- 5) Safety, No solvent, no fire hazard, no explosion.
- 6) Less Space requirement, Dimension(L*W*H):6000mm*3000mm*2500mm

Chapter 2. Safety Instructions

- 1) The ground wire must be strictly connected during installation. Otherwise the machine cannot be started.
- 2) The air source must be pure without water and oil, otherwise the pneumatic components will be damaged. Under the condition of no air pressure, it is not allowed to swing the tension swing rollers back and forth, otherwise the low friction cylinder will be damaged.
- 3) Machine operators must be trained before they can operate the machine. Workers should not wear too long sleeves. The hem of clothes should be tied up and the long hair should be coiled up.
- 4) It is forbidden to clean the machine and equipment while the machine is running. If cleaning is required, it shall be carried out when the machine is stopped or powered off. And hard tools such as blades shall not be used for cleaning.
- 5) Before the production and operation of the machine, all moving parts should be lubricated and maintained.
- 6) The system parameters of the equipment shall not be changed, otherwise the machine cannot operate normally.
- 7) The output end of coupling must be connected with transfer rubber roller or short shaft for operation

Chapter 3. Environmental requirements

- 1) Temperature range: 20°C ~40°C
- 2) Humidity range : 30%~70%(*)
- 3) Workshop: Dust free workshop

Chapter 4. Operation panel Instructions

4.1 Coating operation panel ↓



Machine start: Start the machine

Machine stop: Speed down and stop the machine

Speed Up: Machine gets accelerated by pushing this button once, stop the acceleration by pushing the button twice.

Speed Down: Machine gets decelerated by pushing this button once, stop the deceleration by pushing the button twice.

Power On: Turn on the machine power

Power Off: Turn off the machine power

Press-roll ON/OFF: Press the switch light on, the coating roller will press together, when the switch light is off, the coating roller gets separated.

Emergency Stop: Machine will stop within 1 second after pushing this button, also the lamination nip roller, coating press roller and transfer rubber roller will automatically separate.

Exhaust Switch: The switch of the exhaust motor above the coating unit.

4.2 Side operation panel of coating unit↓



Window Up/Down: Control the up and down of observe window.

Forward/Reversal: Control the forward and reverse rotation of the scraper roller (R1).

It can be used for cleaning, preheating and removing knife lines.

Scraper-roll ON/OFF: Press the scraper roller(R1) and metering roller (R2) together, and keep a gap of 80μm to form a glue storage tank. When separating , it can drain the excess glue.

Transfer-roller ON/OFF: Control the press and separation of transfer rubber rollers

Coating Inching: Control the idling of metering roller (R2), transfer rubber roller (R3) and coating roller (R4).

Uniform glue: Control the idling of the metering roller (R2) and transfer rubber roller (R3). Used for transferring the glue from glue storage tank to the coating roller (R4).

Foot pedal: When the foot pedal on the floor of the coating side is jogged, the transfer rubber roller (R3) and coating nip roller (R5) will automatically separate, and then the metering roller (2), transfer rubber roller(3), and coating roller (4) will rotate at the same time for easy cleaning.

4.3 Side panel on coating unit & 1st unwinder↓



Tension Switch: For the tension of 1st unwinder.

4.4 Crossbar panel of coating unit & 1st unwinder↓



Material lock: Used for chucking and unloading the reel materials.

4.5 Crossbar panel of rewinder ↓



Move left/right: Used for controlling the horizontal move of rewinding rack and the alignment of rewinding paper core.

4.6 Side panel of rewinder ↓



Rewinder tension switch: Reset the rewinding reel diameters.

Rewinder-roller ON/OFF: Control the rewinding press roller clutch and rewinding tension switch.

4.7 Lamination panel ↓



Laminating Inching: Control the idling of lamination roller, Used for the cleaning and preheating of Lamination roller.

Laminating roll ON/OFF: Control the clutch of the lamination rubber roller.

Lighting: Switch of the machine lighting.

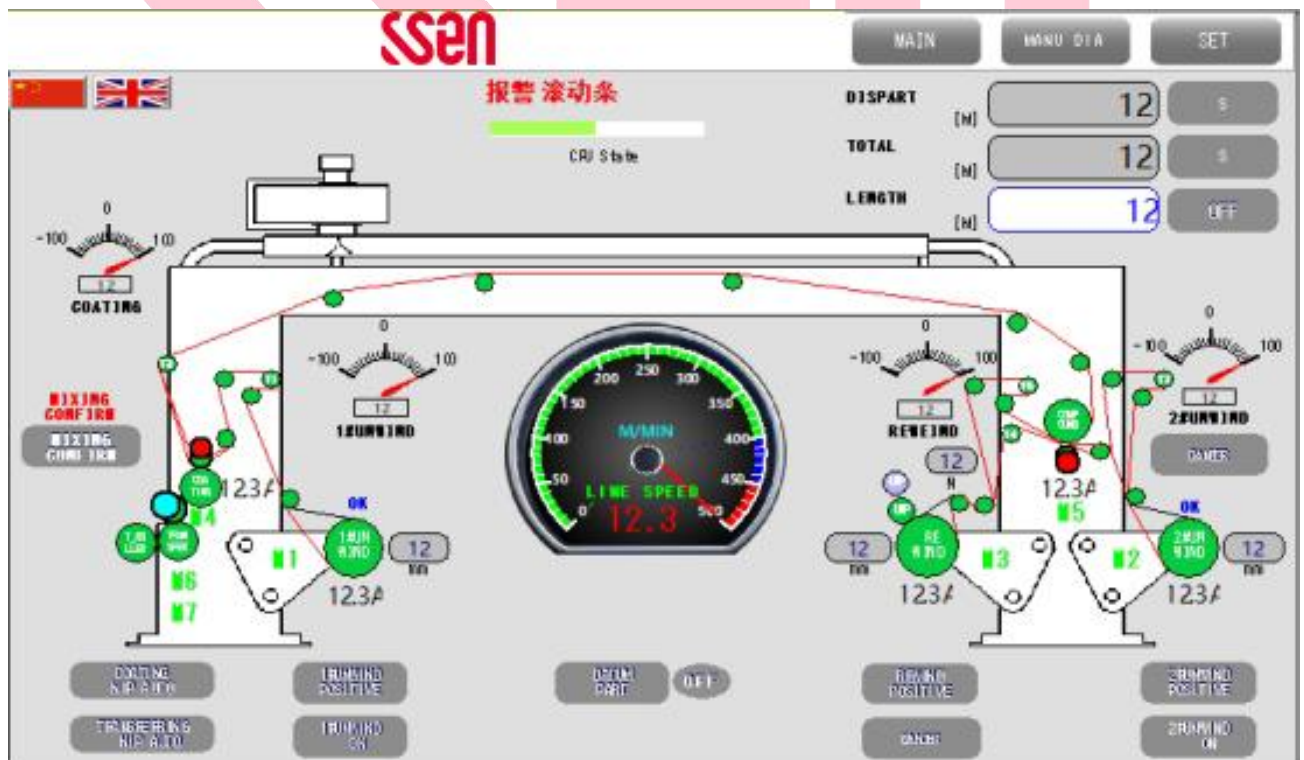
4.8 Side panel of lamination unit & 2nd unwinder ↓



Tension Switch: For the tension of 2nd unwinder.

Chapter 5. Touch screen Instructions

5.1 Main page



Dispart: Length of each rewinding reel material; **S**=(reset), clear the meters number.

Total:The total length of production; **S** (reset): clear the meters number.

Length: The preset length of the rewinding material. When the rewinding length reaches this setting data, machine will automatically stop.

OFF: [close this function]

1#Unwind: Display the position data of 1st unwinder's tension dancer roller.

Coating: Display the position data of coating channel's tension dancer roller.

2#Unwind: Display the position data of 2nd unwinder's tension dancer roller.

Mixing confirm: When the glue mixer alarms, the upper part of **【Mixing confirm】** will display (Notice the gluing), the machine will slow down and run at low speed. After checking the glue mixer is ok, click**【Mixing confirm】**to accelerate the machine.

Coating Nip Auto/manual: When in manual status,push the button **【 Press-roll ON/OFF】** to control the coating nip roller manually. When in Auto status,the coating nip roller will automatically get pressed together once machine start.

Transferring Nip Auto: When in manual status,push the button **【 Transfer-roller ON/OFF】** to control the transfer nip roller manually. When in Auto status,the transfer nip roller will automatically get pressed together once machine start.

※1#Unwind positive/negative: Choose according to the material placement direction.

Positive: Corona treated surface face down; Negative: corona treated surface face up.

※1#Unwind ON: When there's material on 1st unwinder,choose **【ON】** , no material choose **【OFF】**

※Rewind positive/negative: Choose according to the rewinding direction.

※2#Unwind positive/negative: Choose according to the material placement direction.

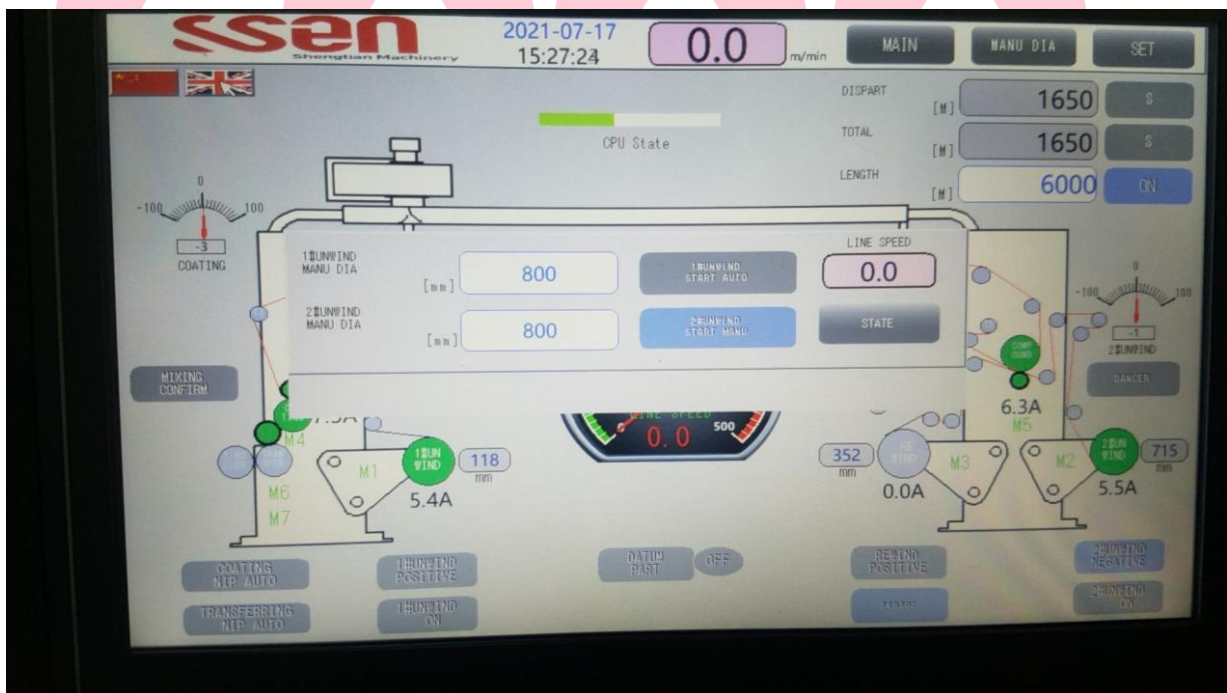
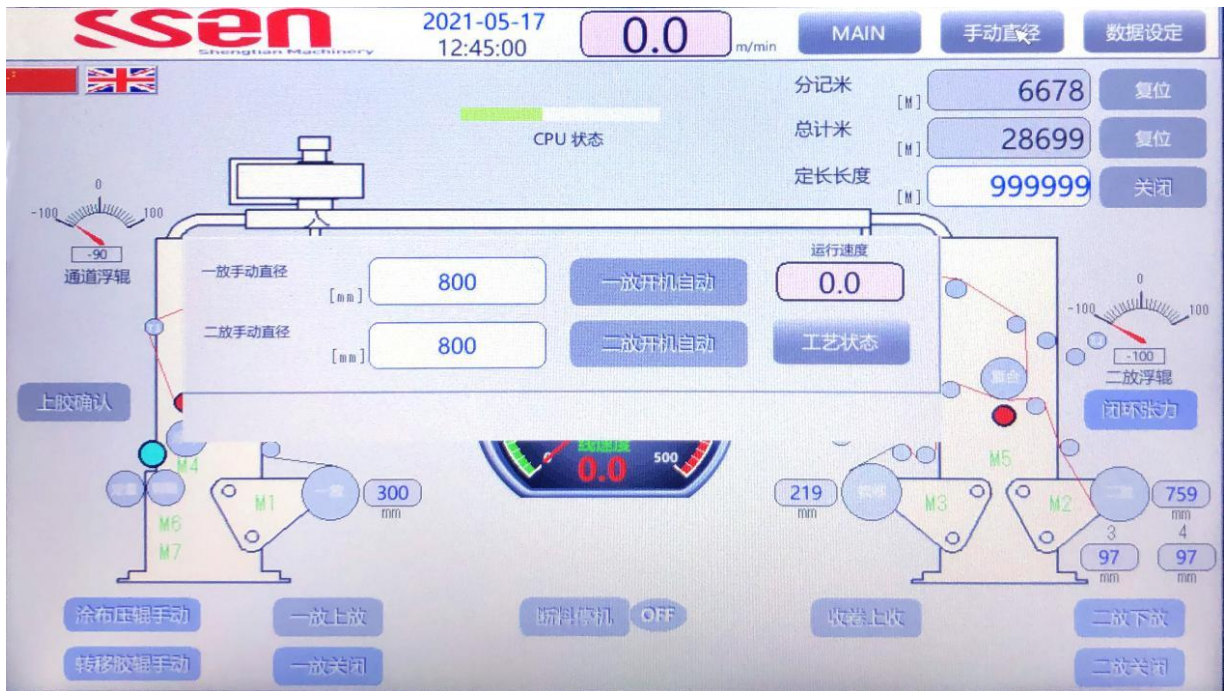
※2#Unwind ON/OFF: When there's material on 2nd unwinder,choose **【ON】** , no material choose **【OFF】**

※Datum Part ON/OFF: When it's "ON",means if the film on unwinder is break off,dancer rollers get to the outermost position and machine will automatically decelerate until stop; when it's "OFF",the film-break-stop function is closed.

※Sensor: There're 2 kinds of tension control methods for 2nd unwinder. One is "dancer roller tension", it can control the tension through adjusting the air pressure of dancer roller, the films must pass by the dancer rollers ; The other way is closed loop tension, The tension is controlled by setting the tension on the touch screen, so that the actual tension of the material is kept consistent with the set tension (error $\pm 2N$), and the material does not need to pass through the dancer rollers.

5.1-2 Process status interface

Manual Dia.:



※ **1#Unwind manual dia.:** The initial diameter of the unwinding material must be manually input and reset before the machine is started.

1#Unwind Start Auto: The initial diameter of unwinding material will be automatically reset to be 300mm when the machine is started, and the reel diameter will be automatically calculated when machine is running.

※ **2#Unwind manual dia.:** Same operation as the 1#unwind.

5.2 Data Set

速度1 100 m/min **速度2** 300 m/min

2020-12-25 10:48:15 0.0 m/min I/O list 配方管理 工艺状态

涂布		设定值	实际值
单动速度	[%]	10.0	
胶辊比率	[%]	20.00	0.0
钢辊比率	[%]	2.40	0.0
胶量设定	[g/m ²]	1.200	0.74
单位面积上胶量	[g/m ²]		1.350
A:B比例设置		100	75
涂胶宽度	[m]	0.510	

主机		设定值	实际值
最大速度	[m/min]	500	0.0
最小速度	[m/min]	20	
加速时间	[s]	90	
减速时间	[s]	60	
复合单动	[%]	3.0	
分记米	[M]	复位	24953

收卷		设定值	实际值
分段锥度	锥度(%)		
直径 1#	[mm]	150	20.0
直径 2#	[mm]	450	30.0
直径 3#	[mm]	1000	50.0

一放		设定值	实际值
实际直径	[mm]		109.1
报警直径	[mm]	150	
停机直径	[mm]	100.0	
直径偏差	[mm]	30	
降速度	[m/min]	100	

二放		设定值	实际值
实际直径	[mm]		300.0
报警直径	[mm]	150	
停机直径	[mm]	100.0	
直径偏差	[mm]	40	
张力设定	[N]	70	0

收卷		设定值	实际值
初始张力	[N]	40	0
理论张力	[N]		40
锥度设定	[%]	50.0	
锥度直径	[mm]	120	
报警直径	[mm]	600	
直径复位	[mm]	96	96.0

SET1 12 m/min **报警滚动条** 12.3 m/min **SET2** 12 m/min

ABCD ABCD I/O list Recipe STATE

COATING		SET	DIS.
INDEPENDENT	[%]	12.3	
ROLLER	[%]	12.35	12.3
TRANSFER	[%]	12.35	12.3
Amount set	[g/m ²]	12.346	12.35
Area of glue	[g/m ²]		12.346
A:B Scale Setting		12	12
Glue the width	[m]	12.346	

MAIN		SET	DIS.
MAX SPEED	[m/min]	12	12.3
MIN SPEED	[m/min]	12	
ACCEL TIME	[s]	12	
DECRE TIME	[s]	12	
INDEPENDENT	[%]	12.3	
DISPART	[M]	s	12

1#UNWIND		SET	DIS.
DIA.	[mm]		12.3
ALARM DIA	[mm]	12	
STOP DIA	[mm]	12.3	
DEVIATION	[mm]	12	
DECRE SPEED	[m/min]	12	

2#UNWIND		SET	DIS.
DIA.	[mm]		12.3
ALARM DIA	[mm]	12	
STOP DIA	[mm]	12.3	
DEVIATION	[mm]	12	
TENSION SET	[N]	12	12

REWIND		SET	DIS.
CURVE: DIA1#	[mm]	12	12.3
CURVE: DIA2#	[mm]	12	12.3
CURVE: DIA3#	[mm]	12	12.3
TENSION	[N]	12	12
SET TENSION	[N]		12
TAPER	[%]	12.3	
TAPER DIAMETE	[mm]	12	
ALARM DIA	[mm]	12	
DIA RESET	[mm]	12	12.3

※Users can set the speed by either (Set 1) or (Set 2)

5.2-1 Coating data set

涂布		
	设定值	实际值
单动速度 [%]	10.0	
胶辊比率 [%]	20.00	0.0
钢辊比率 [%]	2.40	0.0
胶量设定 [g/m ²]	1.200	0.74
单位面积上胶量 [g/m ²]		1.350
A:B比例设置	100	75
涂胶宽度 [m]	0.510	

COATING		
	SET	DIS.
INDEPENDENT [%]	20.0	
ROLLER [%]	20.00	0.0
TRANSFER [%]	3.20	0.0
Amount set [g/m ²]	1.600	0.00
Area of glue [g/m ²]		0.000
A:B Scale Settings	100	72
Glue the width [m]	0.512	

- ※ **Independent:** Refers to the idling speed of the metering roller(R2), transfer rubber roller(R3), and coating roller(R4) at the same time.
- ※ **Roller:** Refers to the speed ratio of the transfer rubber roller (R3). Changing this data can adjust the speed of the transfer rubber roller to control the amount of glue. This data generally does not change.
- ※ **Transfer:** Refers to the speed ratio of the metering roller (R2), this data cannot be changed, and the ratio will change when the (glue amount setting) is adjusted.
- ※ **Amount set:** Set the glue amount of the material. The data in the light blue box on the right (current value): the time value of the glue amount of the material. This data fluctuates greatly and is only for reference.
- ※ **Area of glue:** The actual glue amount calculated according to the meter count of the glue machine, the glue width, and the glue amount of AB glue. The glue amount of the material shall be subject to this data. (Glue amount per unit area) The data is synchronized with the data of the glue mixer.
- ※ **A:B scale settings:** Set the glue ratio according to the parameters provided by the glue manufacturer. This data is synchronized with the mixer data.
- ※ **Glue the width:** means coating width. Set this according to the actual width of the transfer rubber roller (R3). This data is synchronized with the mixer.

5.2-2 Main data settings

主机			
		设定值	实际值
最大速度	[m/min]	500	0.0
最小速度	[m/min]	20	
加速时间	[S]	90	
减速时间	[S]	60	
复合单动	[%]	3.0	
分记米	[M]	复位	24953

MAIN		
	SET	DIS.
MAX SPEED [m/min]	500	0.0
MIN SPEED [m/min]	20	
ACCEL TIME [S]	45	
DECRE TIME [S]	30	
INDEPENDENT [%]	3.0	
DISPART [M]		0

- ※ **Max Speed:** Max.laminating speed can be 500m/min.
- ※ **Min Speed:** After machine started, press (Speed up), the machine speed will accelerate to the initial speed (minimum speed), generally set to approx 20. When machine is 0-20m/min,the initial diameter of unwind material will be automatically calculated.
- ※ **Accel Time:** Time for acceleration
- ※ **Decre Time:** Time for deceleration
- ※ **Independent:** Used for preheating and cleaning.
- ※ **Dispart:** Refers to the meters of each unwinding roll material; **S=(reset):** clear to be zero.

5.2-3 Data setting of 1st unwinder

一放		
	设定值	实际值
实际直径 [mm]		109.1
报警直径 [mm]	150	
停机直径 [mm]	100.0	
直径偏差 [mm]	30	
降速速度 [m/min]	100	

1#UNWIND		
	SET	DIS.
DIA. [mm]		157.1
ALARM DIA [mm]	180	
STOP DIA [mm]	107.5	
DEVIATION [mm]	40	
DECRE SPEED [m/min]	150	

※**Dia.:** The actual diameters now for 1st unwinder.

※**Alarm Dia.:** When the actual diameter of the 1st unwinder is smaller than the (Alarm dia.), the machine will give an alarm and the screen will display the words “ 1st unwind diameter is small”. This data can be set according to the thickness of the material.

※**Stop Dia.:**When the actual diameter of the 1st unwinder is smaller than the (Stop dia.), the machine will make alarm and speed down to stop. This data can be set according to the thickness of the material on 1st unwinder.

※**Deviation:** Refers to the unwind diameter at which the machine decelerates in advance. When the actual diameter of the first unwinder is less than (Stop dia.) + (Stop dia.), the machine alarms and decelerates to (deceleration speed). This data can be set according to the thickness of material on 1st unwinder.

※Decre Speed: When the actual diameter of the first unwinder is less than (stop dia.) + (stop dia.), the machine alarms and decelerates to (deceleration speed). This speed can be set by users as per their demand.

5.2-4 Data setting of 2nd unwinder

二放		
	设定值	实际值
实际直径	[mm]	300.0
报警直径	[mm] 150	
停机直径	[mm] 100.0	
直径偏差	[mm] 40	
张力设定	[N] 70	0

自动停车关闭

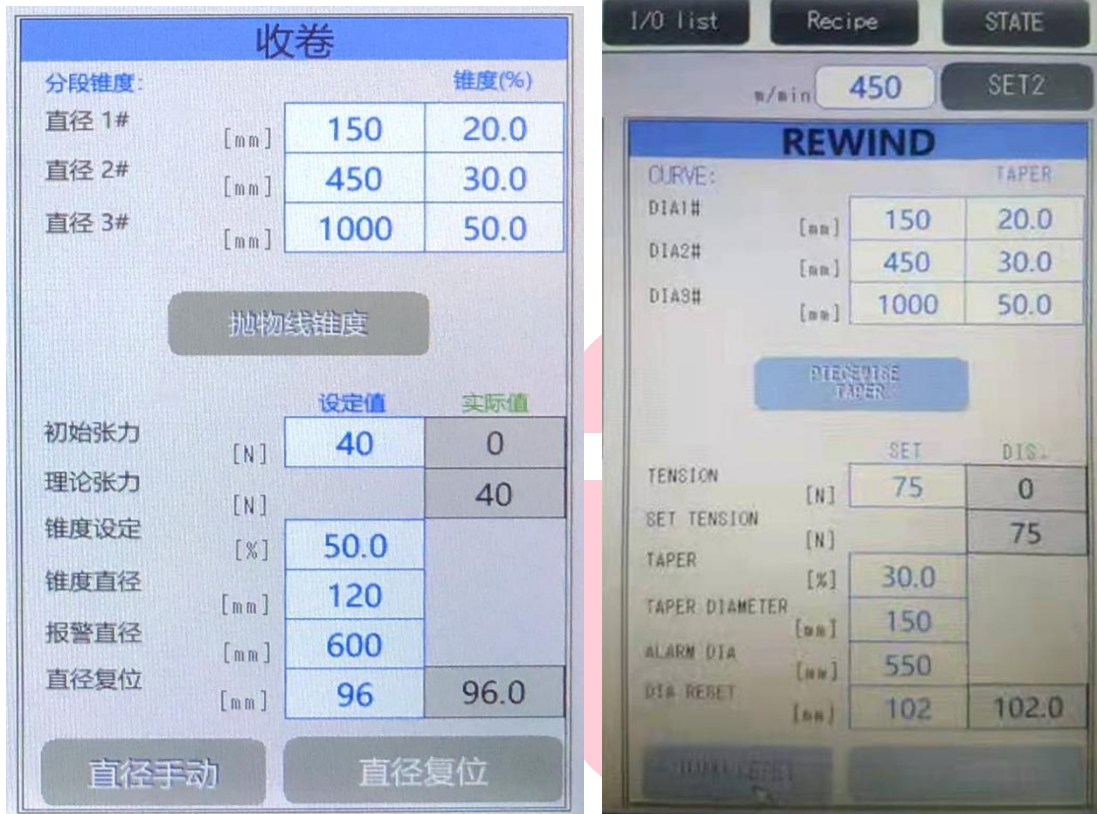
2#UNWIND		
	SET	DIS.
DIA.	[mm]	922.7
ALARM DIA	[mm] 220	
STOP DIA	[mm] 100.0	
DEVIATION	[mm] 70	
TENSION SET	[N] 12	0

AUTO STOP OFF 3#UNWIND

※Tension Set: When the second unwind tension is selected [closed loop tension], the tension of the 2nd unwind tension material is controlled by setting [tension setting] to keep the actual tension of the material consistent with the set tension (error $\pm 2N$).

※ **Auto Stop ON/OFF:** When [auto stop ON], the unwind material diameter is smaller than (stop dia.), the machine will alarm and decelerate to stop automatically. [Auto stop OFF], means the machine's automatic stop function is off.

5.2-5 Data setting of rewinder

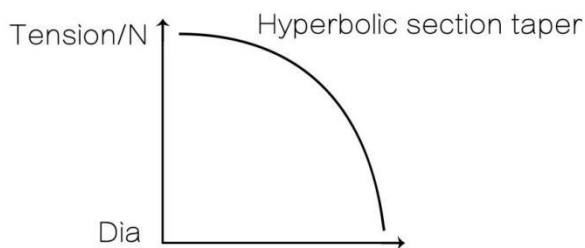
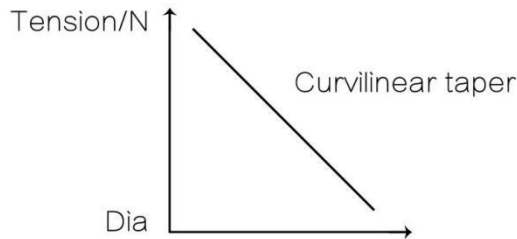
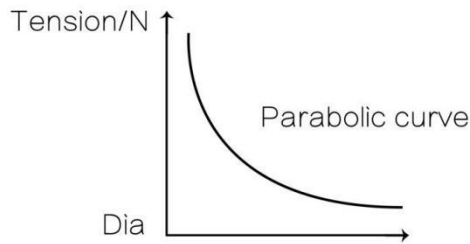


※ **Parabolic curve/Curvilinear taper/Hyperbolic section taper:**

(Parabolic taper) and (curvilinear taper) settings: three parameters including initial tension, taper tension setting, and taper diameter.

(Hyperbolic segment taper) settings: Diameter 1#, Diameter 2#, Diameter 3# and the corresponding taper.

The schematic diagram of the curve is as follows:



- ※ **Tension:** Initial tension of rewinding core.
- ※ **Set tension:** The rewinding tension is calculated according to the attenuation of the curve taper, and the actual rewinding tension remains consistent with the theoretical tension (error $\pm 2N$).
- ※ **Taper:** Set according to the thickness of the rewinding material, the bigger the taper is, the faster the tension attenuates; the smaller the taper is, the slower the tension attenuates.
- ※ **Taper diameter:** Refers to the diameter at which the rewinding tension begins to attenuate. The setting range of $\Phi 96$ paper tube (taper diameter) is 120~150, and the setting range of $\Phi 180$ paper tube (taper diameter) is 200~220.
- ※ **Alarm dia.:** When the rewinding diameter reaches (alarm dia.), the machine will alarm and decelerate to stop.
- ※ **Dia.reset:** Initial diameter of rewinder.
- ※ **Dia.auto/manual:** When in the status of (Dia.manual), the initial rewinding diameter need to be reset manually. When in the status of (Dia.auto), the initial rewinding diameter will be reset automatically when start. If the rewinding is stopped in the middle of receiving material and the tension is not stable, the rewinding effect will be better in the (Dia. manual) state. Generally select (Dia. manual)

5.3 PLC input /output page



※Display the working signal of each button switch and sensor switch



ABCD 12.3 m/min Input STATE SET

CPU_Input Module 2:00.0-00.7		Q_Input Module 1:02.0-03.7	
00.0	TRANSFER.PRESS ROLLER	02.0	UM.NO.1 - start
00.1	Coated - press roll	02.1	UM.NO.2 - start
00.2	LAMI.PRESS ROLLER	02.2	Coating - start
00.3	Rewinding roller	02.3	Compound - start
00.4	WARNING	02.4	Rewind - forward
00.5	Transfer - steel roll	02.5	Rewind - reverse
00.6	Well glue instructions	02.6	Compound - frequency conversion zero
00.7		02.7	
		03.0	Rewinding - tension
		03.1	Run the lock of material
		03.2	Host - start indication
		03.3	Coating - Single action
		03.4	Compound - Single action
		03.5	Roller pressure exhaust
		03.6	UM.NO.1 POWER
		03.7	UM.NO.2 POWER

※Display the working signal of each output point.

5.4 Recipe mangement

2021-05-17 12:45:36 0.0 m/min 报警浏览 存量浏览 工艺状态

配方管理

序号	配方名	胶量设定	胶辊比率	初始张力	锥度设定	锥度直径	直径 1#	直径 2#	直径 3#	锥度 1#	锥度 2#	锥度 3#

读取配方 下载配方

ABCD 12.3 m/min Alarm History Data STATE

Recipe

Num	Recipe name	Amount se	ROLLER	TENSION	TAPER	TER DIAME	DIA1#	DIA2#	DIA3#	TAPER 1#	TAPER 2#	TAPER 3#
0	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
1	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
2	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
3	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
4	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
5	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
6	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0
7	name	0.000	0.00	0	0.0	0	0	0	0	0.0	0.0	0.0

READ SAVE

※**Read**: Read the recipe parameters on the (data setting) page, indicate the recipe name and save it.

※**Save**: Click on the recipe name needed for production, and then click (Save recipe), the recipe data will be downloaded directly to the (data setting) page.

Chapter 6. Machine Operation and Running

6.1 Preparations before start-up

6.1.1 Make sure that the 3phase 5 wires power supply voltage ($380V \pm 5\%$) to the machine is normal, then turn on the machine power.

6.1.2 Confirm that the air pressure supplied to the machine is 0.45mp-0.5mp. The water supply pressure of the water temperature machine of the machine is 0.35mp.

6.1.3 After cleaning the water temperature machine filter, set the temperature of each water temperature machine according to the requirements, start the water temperature machine, preheat the scraper roller, metering roller, coating roller and laminate roller.

6.1.4 Check whether the glue A and B in the glue barrel of the glue mixer are sufficient, and add (replace) glue according to the laminate product. Before opening the rubber barrel cover, the gas source valve of the rubber barrel must be closed first, and the cover can only be opened after the pressure of the rubber barrel is relieved.

6.1.5 Open the glue outlet valve at the bottom of the glue barrel of the glue mixer, set the temperature according to the glue temperature requirements, and open the glue A heating, glue B heating and pipeline heating.

6.1.6 Change the transfer rubber roller according to the width of the production material.

6.1.7 Clean guide rollers and rollers.

6.1.8 Prepare production materials.

Note: when the machine is working or cleaning, the output end of the coupling must be connected with a transfer rubber roller or a short shaft to operate.

6.2 Machine operation

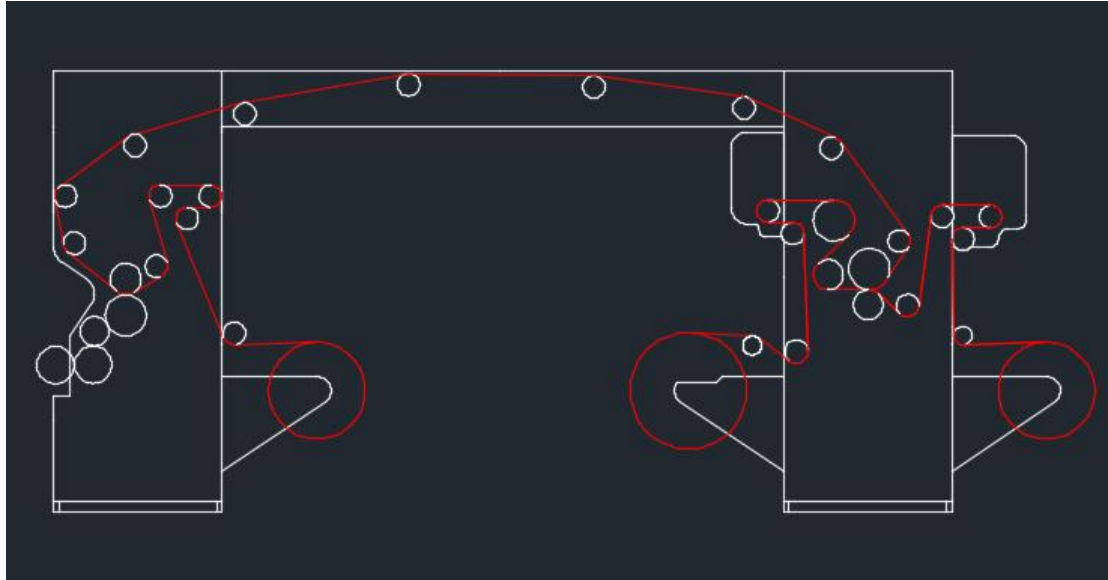
6.2.1 Upload material to machine

Upload the raw materials on the 1st and 2nd unwinder, make sure that the materials are locked and the [lock switch] is in the closed state. Confirm that the glue coating

surface (corona treated surface) on the 1st unwind is facing down and the laminating surface (corona treated surface) on the 2nd Unwind is facing up, make the material in the center and adjust the material to the web guide sensor head.

6.2.2 Web-going

Put the materials to the machine according to the below drawing:



6.2.3 Set Material Parameter

Open the touch screen [Process status] interface, confirm the correct direction/running status/tension control way of the 1st unwinder, 2nd unwinder and rewinder, Click (Reset Diameter) on the [Data Setting] interface to reset the rewinding diameter, or click the [Rewind tension switch] on the side panel of the winding to reset the rewinding diameter, meanwhile well set the 2nd unwind tension, rewinding tension, rewinding taper.and adjust the tension of 1st unwinder and coating tension.

6.2.4 Make the material straight and aligned

Press the laminate nip roller, coating nip roller and start the machine to operate to 5m/min, adjust the web guide correction sensor to center the material, and align the 1st and 2nd Unwind materials. After the materials are aligned, the machine stops, the tension is turned off, and the laminate nip roller and coating nip roller are disengaged.

6.2.5 Adjust the gap between scraper roller and metering roller

When the temperature of scrap roll and metering roll rises to one fixed temperature, click the [Scraper roll ON] switch on the operation panel to close the scrap roll, measure the gap between the scrap roll and metering roll with feeler gauge, and adjust the gap between the two rolls through the precise adjustment hand wheel (ball reducer) on both sides of the scraper roll. When the amount of glue on the material is less than 2gsm, the gap between the two rolls is 80μm; when the amount of glue on the

material is 2g-2.9gsm, the gap between the two rolls is 90 μ m; when the amount of glue on the material is 3gsm-3.9gsm, the gap between the two rolls is 1000 μ m.

6.2.6 Install the glue baffle

Clean the glue baffle, apply Vaseline evenly on the arc surface of the glue baffle, put it on the fixed rod, and then put the glue baffle between the scraper roller and the metering roller. Adjust the position of the glue baffle according to the width of the transfer roller, and fix the liquid level sensor switch on the left of glue baffle.

The glue spraying frame should be installed between the left and right limited area.

Note: when the glue baffle is clamped in, the tip of the glue baffle shall not be bent, otherwise the glue baffle will be damaged and leakage will occur.

6.2.7 Measure the proportion of glue A and glue B

After confirming that the heating temperature of glue A and B of glue mixer and pipeline rises to the set temperature, carry out the proportion test of glue A and B to determine whether the proportion is accurate, with an error of $\pm 1\%$. If the ratio of A and B glue is not accurate, check the following problems: A. whether there is glue shortage in the glue barrel; B. whether the valve at the bottom of the glue barrel is open; C. whether the pipe and the glue nozzle are blocked; D. whether the pipe is bent. After the problem is eliminated, carry out A and B glue proportion test again. Note: every morning before starting the machine, the proportion of glue A and B must be tested to determine the proportion for accurate reproduction.

6.2.8 Gluing.

Mount the glue mixer pipe MC10-32 (the outer diameter of the mixer pipe is 14mm, the inner diameter is 10mm, the length is 352mm, and the number of sections is 32) and the pipe sleeve on the spray nozzle, and then fix it on the spray rack. Turn the glue spray (**manual/automatic**) switch on the glue mixer panel to the automatic state, and then press the green (**start**) switch on the glue mixer to start the glue injection. When the glue is full (**liquid level switch**) light is ON, the glue machine will stop automatically.

6.2.9 Uniform Glue

Press the (**Uniform Glue**) Switch, metering roller and transfer roller to start the operation.

After the metering roller runs for one circle (the surface is evenly coated with glue for one circle), press the (**Transfer roller ON**) switch to press the transfer rubber roller.

After the transfer roller surface is evenly coated with glue for one circle, the coating roller automatically starts the operation.

After the glue is evenly transferred to the coating roller for 1-2 circles (the surface is evenly coated with glue for 1-2 circles), then press (**Uniform Glue**) switch, metering roller, Transfer roll and coating roll stop running, and glue leveling is finished.

6.2.10 Start up

Press and close the laminate press roll and coating press roll, press the (**Machine Start**) switch to start the machine. After the unwind and rewind tension are stable, the machine speed rises to 20m/min, and check and adjust the tension of each section. *Note:* if bubbles are found in the middle of the laminate material after the material glue is applied at the rewind place, the bubbles shall be punctured at the place where bubbles are generated to eliminate the bubbles in the middle of the laminate material.

6.2.11 Check tension

Stopped the rewind roll at round 2meters place, mark a “+” star with the blade in the gap of the rewind material, and check whether the tension of the two layers of laminate material matches, so as to confirm that the laminate product is flat and does not roll.

6.2.12 Determination of laminate strength by sampling

After a small part of the machine is rewind at a higher speed, take a small piece and put it into a small drying oven for drying, and then take it out for drying to check the composite strength.

6.2.13 Speed up

The machine can speed up manually and automatically.

Manual speed up: after the machine is started, press the (**Speed Up**) switch on the operation panel to rise to the required speed, release the (Speed Up) switch, and the machine stops speed up.

Automatic speed up: after the machine is started, input the required speed value in the (Speed Set)of the touch screen [Main page], and then click the (Constant) switch, the machine speed will automatically rise to the (Speed Set) value. (Constant Speed) switch are available on laminate panel, coating panel and touch screen.

6.2.14 Speed down

The machine can decelerate manually, automatically and stop in an emergency.

Manual deceleration: when the machine is running, press the (**Speed Down**) switch on the operation panel to reduce to the required speed, release the (Speed down) switch, and the machine stops deceleration.

Automatic deceleration: After the machine is started, enter the required speed value in the (set 1) or (set 2) on the touch screen, and then click (set 1) or (set 2), the machine speed will automatically decrease to the speed set value. When the diameter of the 1st and 2nd unwinding materials is reduced to (Stop dia.) + (deviation dia.), the machine will automatically alarm and decelerate to (deceleration speed) 100m/min.

Emergency stop deceleration: press the (**Emergency stop**) switch on the operation

panel, and the machine speed will decelerate to zero within 5s.

6.2.15 Machine stop

The machine can be stopped manually, automatically, brake stop and emergency.

Manual stop: during the operation of the machine, press the (**Machine Stop**) switch on the operation panel for the first time, the machine speed will be reduced to zero, and the unwinds and rewind will remain in tension state, it stops with tension; Press the (Machine stop) switch on the operation panel second time, the unwinds and rewind tension will be closed, and all motors will stop, then machine is completely stop.

Automatic stop: during the operation of the machine, when the diameter of the 1st and 2nd Unwind materials is reduced to (**D0**), the machine will automatically alarm and decelerate to zero, and the unwinds and rewind will maintain the tension. It stops the machine with tension.

Brake stop: the (**Break protection on**) switch of the touch screen [Basic parameters] is turned on, any material of unwinds and rewind is broken, the machine speed in operation is reduced to zero within 5s, the tension of unwinds and rewind is turned off to zero, all motors stop, that is, the machine stops.

Emergency stop: during the operation of the machine, press the (Emergency stop) switch on the operation panel, the machine speed will be reduced to zero within 5s, the unwinds and rewind tension will be closed to zero, and all motors will stop. At the same time, the laminate press roll, coating press roll and transfer roll are separated automatically. All operation panels are equipped with red mushroom head button switches, and there's pull switch installed in coating unit as well. all of which are (Emergency stop) switches, which can be used in case of any emergency or dangerous situations.

6.2.16 Change material

The speed of the machine is reduced to zero and the machine is stopped with tension. At this time, the unwinds or rewind rolls can be change with new rolls, the tension switch is closed, the web guide is automatically closed, and the (Material locking) on the crossbar is opened to unload. After change the new material roll, input the new material diameter in the [Material parameters] page in touch screen. (when the new material diameter is the same as that of the previous roll of material, it is not necessary to input the diameter again), and then press the (Tension reset) switch to turn on the tension and turn on the web guide.

6.2.17 Residual glue treatment

At the end of production, the glue storage between the scraper roller and the metering roller shall be used up as much as possible. During the production and operation of the machine, when the production is about to be finished or the transfer rubber roller is to be replaced on the same day, according to the amount of unwind materials and glue left in the glue storage tank, turn off the (**Switch of Mixer**) on the [Basic parameters] page of the touch screen in advance, and press the (Stop) switch of the glue mixer at the same time to stop the glue supply of the glue mixer. Stop the machine when the glue in the glue storage tank is used up or the material is finished.

Chapter 7. Laminating Production precautions

1.If bubbles are found in the middle of the laminate material after the coating glue is applied at the rewind place, the bubbles shall be punctured at the place where bubbles are generated to eliminate the bubbles in the middle of the laminate material.

2.In the operation and production of the machine, there is wrinkling and folding in the rewind, and the balance adjustment hand wheel of the rewinding pressure roll can be adjusted.

3.During the operation and production of the machine, the hand-held stroboscopic lamp is often used to illuminate the gluing part and the rewind part of the material to check whether the gluing is uniform and whether there are bubbles in the laminate material.

4.During the operation and production of the machine, when a knife line is generated at the gluing position, the (**Scraper roll forward/Reverse**) switch on the panel can be operated to make the scraper roll rotate forward and backward quickly to take away the impurities in the glue, so as to remove the knife line.

5.During the operation and production of the machine, pay attention to the (**Actual GSM**) actual glue quantity in the touch screen Main page. Ensure that the material reaches the required amount of glue.

6.The (**switch of mixer**) and (**shortage protection**) switches on the [Basic parameters] page are opened to ensure that there is glue in the glue storage tank, and the glue shortage will alarm and stop.

7.During the operation and production of the machine, pay attention to the unwind material is smaller and whether the alarm is sent to slow down the machine.

8.During the operation and production of the machine, press the (Emergency stop) switch in case of emergency, and press the (Machine stop) switch in case of normal

condition.

9. During the operation and production of the machine, it is strictly prohibited to wipe and clean each roller and guide roller.

10. During the high-speed operation of the machine, do not touch the edge of the material with your hands to prevent the material cutting hands.

11. When the machine is working or cleaning, the output end of the coupling must be connected with a transfer rubber roller or a short shaft to operate.

12. It is not allowed to use iron core, aluminum core and plastic core for unwinding and rewinding materials, and paper core shall not be seriously worn, otherwise the plug will slip and wear, the motor tension will be out of control, the swing arm will swing substantially and trigger the material break down and alarm.

13. For new glues and new laminate products: Proofing test--Trial-production--Small batch production -- Mass production.

Chapter 8. Machine Tension system

8.1 The product laminated by solventless glue has no initial adhesive force, and material stretching, wrinkling, curling, tunnel, irregularity and so on will occur if the machine tension setting is not properly.

※ The machine tension control is divided into four sections: 1st unwinder and the coating tension is controlled by dancer rollers, 2nd unwinder can be controlled by either dancer roller or Closed loop tension. The rewinding tension is controlled by closed loop tension.

The setting, matching and stability of tension will affect the effect and quality of the product.

8.2 Tension setting and matching:

8.2.1. Materials with high tensile strength are put in the first unwind, materials with low tensile strength are put in the second unwind, and pure aluminum is put in the second or third unwinding.

8.2.2. The tension shall be initially set according to the width, thickness and tensile strength of the material, and then the tension of each section shall be adjusted to achieve the tension balance according to the flatness of the laminate rewinding material.

8.2.3. When the machine is stop and without tension, the top of the laminate material is raised, which indicates that the tension of the bottom film is too big. It should reduce the tension of the second roll or increase the first unwind tension and the tension of the coating. The bottom of the laminate material is raised, which indicates that the tension of the surface material and the coating tension are too big. The first unwind tension and the tension of the coating should be reduced, or the tension of the second unwind can be increased.

8.2.4. When the machine is stop and rewind maintain with tension, use the blade to draw a cross star (+) at the material rewind part. If the material is upturned, it indicates that the surface roll tension and coating tension are too big. The 1st Unwind tension and the coating tension should be reduced or the tension of the 2nd Unwind should be increased. If the material is rolled down, it shows that the tension of the bottom film is too big, the tension of the 2nd Unwind should be reduced, or the tension of the 1st Unwind and Coating tension can be increased.

8.2.5. Set the tension of 1st unwinder and coating: adjust the precision pressure regulator on this operation panel to set the tension. When the 2nd unwinder select (dancer roller tension), the tension is set by adjusting the precision pressure regulating valve. When the 2nd unwinde select (closed loop tension), the tension is set on the touch screen (data setting) page.

8.2.6. Rewinding tension setting: Set the rewinding tension in the rewind (initial tension) area of the touch screen (data setting). This tension is the initial tension of the rewinding after replacing the paper tube.

(Taper setting): As the rewinding diameter becomes larger, the smaller the (rewinding taper) will be, the slower the rewinding tension will attenuate. (the greater the tightening); When the larger the (rewinding taper) is, the rewinding tension will attenuate faster (more loose after rewinding).

(Rewinding taper) Reference data: Generally set the value as 70, if the 2nd unwind PE thickness is less than 40µm, set to 75%-80% ; If the 2nd unwind PE thickness is more than 40µm, set to 80%-85%, and the CPP material can be set to 65%-75% .

8.3 Stability of Tension:

1. Unstable air supply to the machine will affect the stability of tension.
2. Improper tension setting, too big or too small will affect the stability of tension.
3. Set the wrong diameters in unwinds or rewind diameter, or the Rewind diameter is not Reset, which will affect the stability of tension.
4. Too little glue or too long machine stop time glue thickened, resulting in transfer roller, coating roller blocking, will affect the stability of tension.
5. If the plug of unwind and rewind slips, it will affect the stability of tension. If the

core of unwind and rewind material is iron tube, aluminum tube, plastic tube or paper core is worn, the plug will slip and lock the coil, causing the motor speed to be unstable, and the tension swing arm will swing greatly.

Chapter 9. Gluing Part

The quality of laminate products is directly affected by the quantity and uniformity of glue application.

9.1 Control of glue application amount:

9.1.1. Gap adjustment between scraper roller and metering roller. Close the scraper roller, measure the gap between the scraper roller and the metering roller with a feeler gauge, and adjust the gap between the two rollers through the precise adjustment handwheel on both sides of the scraper roller. The amount of glue on the material is 1.2g-1.9g, and the gap between the two rolls is 80 μ m; the amount of glue on the material is 2g-2.9g, and the gap between the two rolls is 90 μ m; the amount of glue on the material is 3g-3.9g, and the gap between the two rolls is 100 μ m. Measure and adjust the clearance according to the amount of glue applied, and lock the precise adjusting hand wheel. In the laminating production, the gap can no longer be measured and adjusted.

9.1.2 The coating coefficient controls the coating amount. Set the target coating amount (Coating GSM), the actual glue amount is less than the target amount in the laminate production, reduce the coating coefficient, the coating amount will be larger; the actual coating amount is bigger than the target amount, increase the coating coefficient, the coating amount will be smaller. This is by adjusting the coating coefficient to fine tune the speed ratio of the transfer roller, so as to control the glue amount.

9.2 Uniformity of glue application:

9.2.1 The gap between the scraper roller and the metering roller shall be the same on both sides, and the gap shall not be large on one side and small on the other, so as to ensure that the thickness of the glue brought out by the metering roller is uniform.

9.2.2 Install transfer roller correctly. The bearings at both ends of the transfer rubber roller are flexible. During installation, the right bearing shall be embedded in the bearing position of the machine. After the bearing is in place, the coupling shall be connected as required, and the coupling cover shall be locked. The gap between the two sides of the coupling cover shall be uniform. If the transfer rubber roller is not installed in place, it will cause the transfer rubber roller to shake and uneven glue application.

9.2.3 When the transfer rubber roller is pressed, both ends shall be pressed down evenly and at the same time, and the pressure shall be even, and there shall be no gap on both sides, so as to ensure that the transfer rubber roller glue is transferred evenly.

9.2.4 When the coating press roll is pressed, both ends are pressed evenly and simultaneously, and the pressure is even, and there is no gap on both sides, so as to ensure the film coating is even.

9.2.5 In laminating production, when the coating roller has a knife line, the glue amount at the knife line will be less. This knife line caused by dirt such as particles in the rubber storage tank. At this time, the machine should be stopped to remove the dirt. The small particles can be quickly taken away by the positive and negative inching of the rubber roller through the (Scraper roller Forward/Reverse) switch.

9.2.6 The surface of the five gluing rollers shall be clean and free of dirt, particles, rubber blocks, pits, etc.

Chapter 10. Machine alarms

1. Air pressure alarm

When the air supply pressure of the machine is less than 0.4MP, the machine will give an alarm and pop up the subtitle prompt (insufficient air pressure) on the touch screen.

2. (Work/cleaning) switch conversion alarm

When the (Work/cleaning) switch is in the cleaning state, pressing the (Machine start) switch will not start, the machine will give an alarm and pop up the subtitle prompt on the touch screen (the cleaning state is not closed).

3. (Emergency stop) switch not reset alarm

If the (Emergency stop) switch is pressed, the machine does not rotate to reset before starting. If the (Machine start) switch cannot be started, the machine alarms and pops up a caption prompt on the touch screen (the emergency stop button is not reset).

4. Glue mixer machine does not start alarm

During the operation and production of the machine, the (Switch of Mixer) on the [basic parameters] of the touch screen is in the ON state. If the glue mixer is not started (the glue mixer lights yellow), the machine will alarm and stop, and the subtitle prompt will pop up on the touch screen (glue mixer machine is not started).

5. Glue shortage alarm

When the glue of glue mixer is almost used up, the lower limit of glue barrel will give an alarm. The glue adding alarm is released in 150s, and the glue mixing machine is

not stopped in 150s. The machine will alarm and stop and pop up the subtitle prompt on the touch screen (glue machine is short of glue).

6.Material break alarm

The touch screen [basic parameters] page (Break protection switch) is in the ON state. If the material of the running machine is broken, the machine will alarm and stop, and the subtitle prompt (Break protection) will pop up on the touch screen.

7.Small unwind diameter alarm

During the operation of the machine, when the unwind diameter is reduced to the alarm diameter, the machine will alarm and slow down; when the unwind diameter is reduced to the Stop diameter, the machine will alarm and stop, and the digital frame of the U/W Dia on the touch screen [Main page] will flash and shining.

8.Rewind length set alarm

When the meters of rewind roll reaches the set length (R/W Length Set) of the touch screen [basic parameters], the machine will slow down in advance and give an alarm to stop.

9.Motor fault alarm

During the operation of the machine, when the motor fails, the machine will alarm and stop, and the subtitle prompt (motor failure) will pop up on the touch screen. The frequency converter will display the fault code, find out and eliminate the fault, then cut off the main power supply, and power on again when the frequency converter has no display.

10.Cooling fan fault alarm

When the air switch of the cooling fan of the servo motor trips and the power is cut off, the alarm of the machine will be triggered and the subtitle prompt (cooling fan failure) will pop up on the touch screen.

Note: in case of fault alarm, the machine can only be started after troubleshooting.

Chapter 11. Machine Maintenance

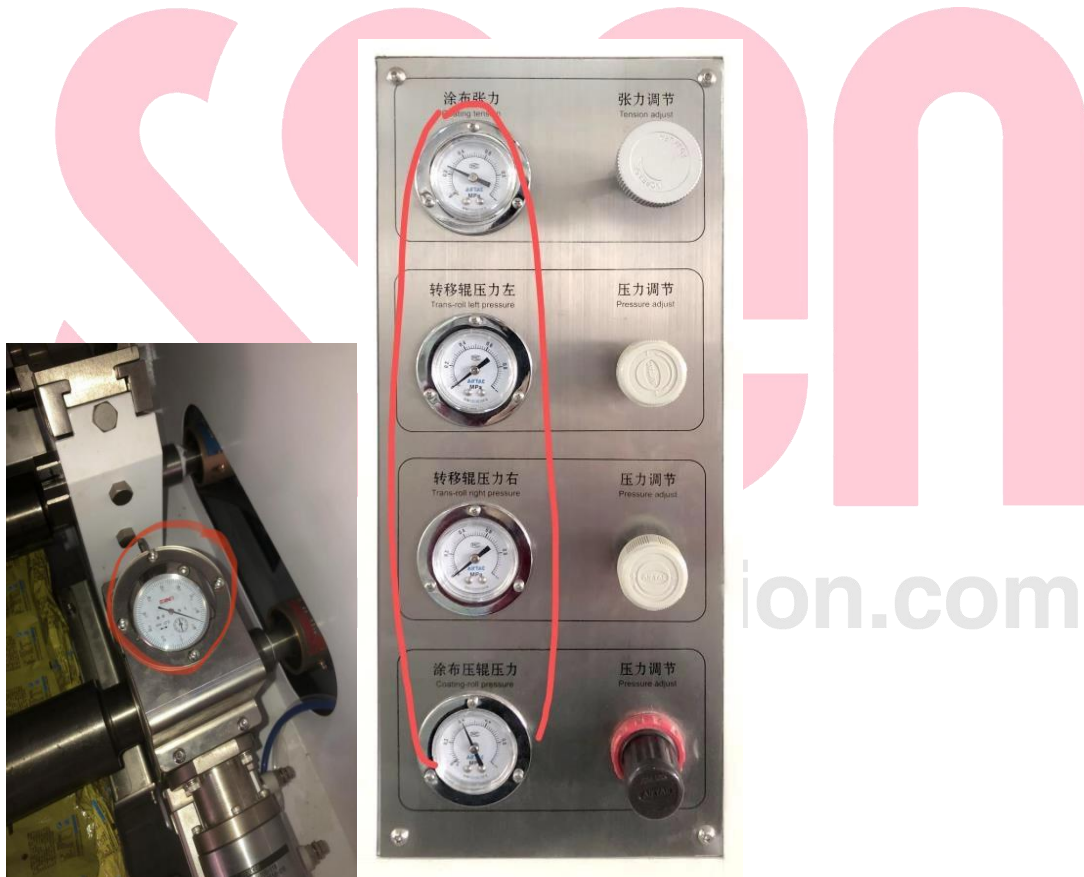
11.1 Machine cleaning

At the end of start-up preparation and production, all guide rollers and rollers on the machine shall be cleaned. Note: the cleaning must be carried out in the Stop state, and the surface of roller and guide roller cannot be scraped with blade or hard tool,

otherwise it will lead to scars.

Coating five roller cleaning: after the production, the (work/cleaning) switch on the coating side operation panel will switch to the Cleaning state, separate the scraper roller to release the glue in the glue storage tank (glue in the glue storage tank will be used up as much as possible), remove the rubber baffle and clean it. When cleaning the five rollers, the foot step (foot switch) metering roller, transfer roller and coating roller will rotate. Wipe off the remaining glue on the roller with white cotton cloth, then clean five rollers with ethyl acetate from top to bottom, and dry them with dry cloth after cleaning. After cleaning, the roller surface is not sticky, rubber block, particle and smooth.

*Note: the surface of the following air pressure gauge and dial indicator observation window are all plexiglass, and cannot be wiped with ethyl acetate.



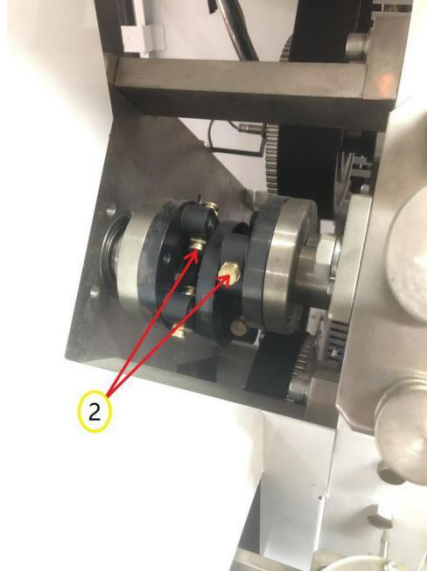
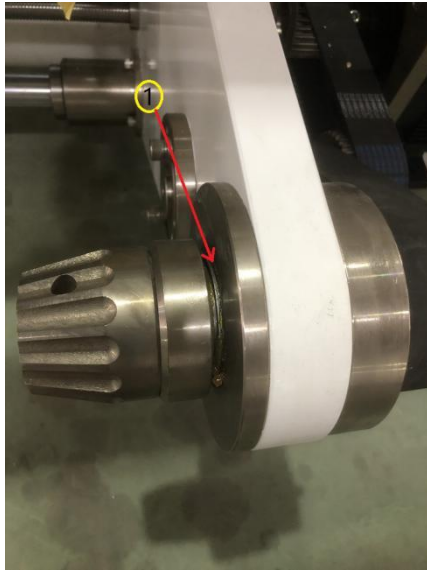
11.2 Machine lubrication



Point (1), Remove the bearing cover of the laminate press roll and backup press roll, and add high temperature grease (once a month).
 Point (3) : fill lubricating oil at sliding guide rail (once a week).

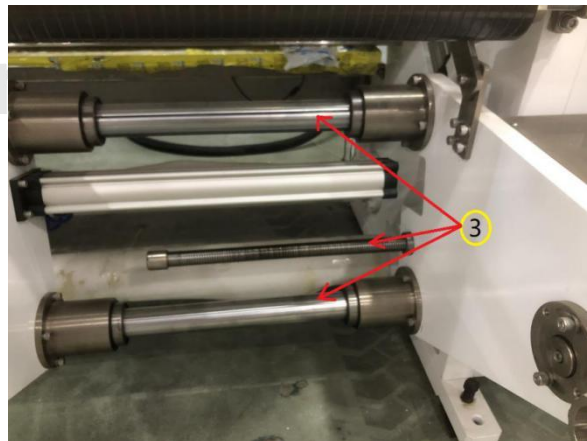


Point (1) Remove the coating roller bearing cover and add high temperature grease (once a month).
 Point (3) Place: fill lubricating oil at sliding guide rail (once a week).



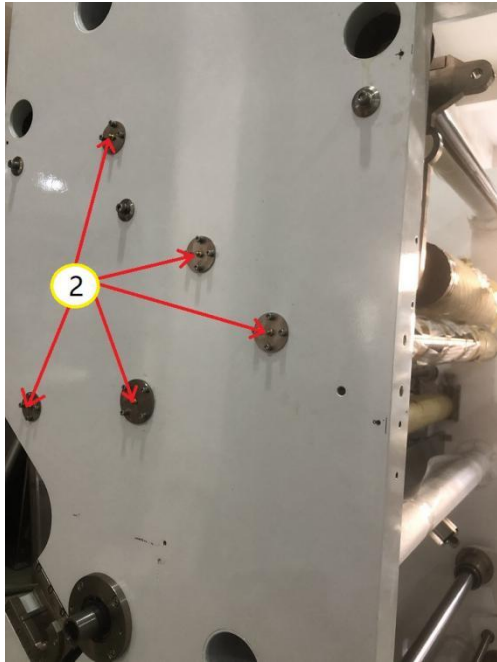
Point (1): fix the bearing with the plug for unwinds and rewind parts, and add high temperature grease (once a month).

Point(2): transfer rubber roller coupling is filled with common grease (once a month).



Point(2) Place: add common grease (once a month) to the fixed bearing of unwinds and rewind screw rod.

Point(3) Place: unwind webguide screw rod, rewind screw rod, add oil (once a week).



Point (2) Add common grease to guide roller bearing (once a month).

Chapter 11. Circuit diagram (Will be sent separately)

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