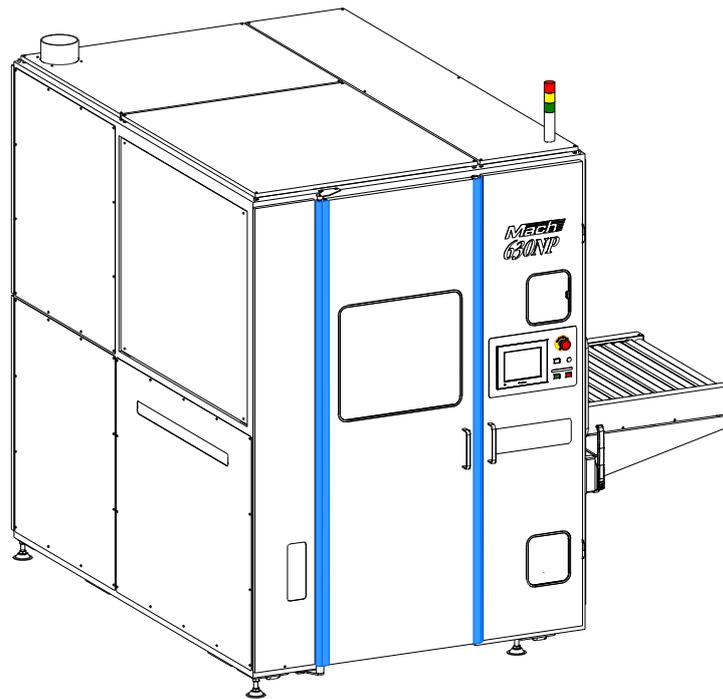


DRY FILM AUTO CUTTING LAMINATOR

Mach *630NP*

Instruction Manual



Revision 3.00



Oct. / 2018

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■ Introduction

Thank you for choosing the Dry-Film Auto-Cutting Laminator system manufactured by Hakuto Co., Ltd.

This manual describes the methods of operation and maintenance for the system. Read this manual before using the system, and refer to it as necessary.

Please note that this manual is based on the standard specifications, which may differ slightly from those of your system.

If you have any question regarding the specifications of your system, please contact Hakuto Co., Ltd. or its agent.

This instruction manual has the following structure.

Part I "Operation"

This Part explains to users how to operate the system.

Part II "Maintenance"

This Part explains the methods of daily maintenance, regular maintenance, and the replacement procedure of the consumable parts. "Operation" of Part I is explained to those who fully understood.



This manual explains system that move PWBs from left to right.

For units that move PWBs in the opposite direction, read "left" as "right", and "right" as "left".

Be sure to gain a full understanding of the contents of this manual to ensure the optimal performance of the system.

- The copyright on this manual belongs to Hakuto Co., Ltd.
- This manual is provided only to support the Auto-Cutting laminator system marketed by Hakuto Co., Ltd., and shall not be used for other purposes.
- This manual shall not be used or reproduced, in whole or in part, for purposes other than those described above, without the written permission of Hakuto Co., Ltd.
Reproduction includes the translation of this manual into other languages or formats, and the rewriting of this manual.
- Customers who purchase an Auto-Cutting Laminator system marketed by Hakuto Co.,Ltd. are requested to gain a full understanding of the methods and processes for use of the system, and to use it at their own risk.
- The customer who uses this instruction manual should provide an environment in which workers can take proper actions to keep safety and health and also establish proper rules and restrictions before using the system.
- The contents of this manual are subject to change without notice.

■ Guarantee Clauses

Application of warranty clause

1. The warranties listed below are applicable to the system delivered by Hakuto or its official agent to the end user. It is non-transferable.
2. Any part of the warranty may be exempted or modified when such changes are agreed upon in writing by both Hakuto and the end user to whom the system is delivered.

Warranties

1. Term and period

12 months after delivery.

2. Warranties

If a fault occurs within the warranty period and the user sends a written claim to Hakuto, a repaired or alternate system can be provided by Hakuto at the discretion of Hakuto after the system is returned to Hakuto.

Also, at our company, we will dispatch our service staff if we decide that a business trip repair to the site is necessary.

3. Scope

The warranties are applicable to the Hakuto system only. Hakuto is not responsible for any personal injury or any damage of production caused by other damaged equipment or stopped processes.

In addition, transportation costs for returning replacement parts shall be borne by the user.

Hakuto is not responsible to give the warranties:

- A. When no claim is requested within the warranty period
- B. When the system or part in question is consumable.
- C. When the fault is caused by any user other than Hakuto who handles or installs the system not instructed in operation procedures, warnings, and cautions listed in the instruction manual.
- D. When repair or remodeling is done by any agent other than our agent's approval.
- E. When the fault is caused by natural disasters or any other unavoidable accidents.
- F. When the fault or damage is caused by improper handling at the responsibility of the third party other than Hakuto during transport and movement.

The above-mentioned warranty are all and do not offer other the warranty of any.

■ After Sales Service

Before requesting repairs, please read this Instruction Manual again and inspect the system according to the procedures outlined herein. If the error persists contact your local Hakuto representative or Hakuto. When you request repairs please provide the following items:

- Model number
- Product number and serial number stamped on the nameplate
- Operation condition and environment
- A detailed description of the problem

If the damage is extensive, the user may be requested to send a part or all of the system to Hakuto, in which case it may take a long time to complete repairs.

■ Contact Information

If you need information regarding operation, maintenance, or repair of the machine not provided in this manual, please contact your local Hakuto representative or Hakuto as below.

Hakuto Co., Ltd.
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1-1-13, Shinjuku, Shinjuku-ku, Tokyo 160-8910 JAPAN
<http://www.hakuto.co.jp/english/>

Sales	TEL +81-3-3225-8973
Technical support	TEL +81-3-3225-8745

■ Revision History

Rev. No.	Description	Date
Rev.2.00	First revision. - NEW	April / 2017
Rev2.01	Change contact	April / 2018
Rev.3.00	Operation method change of registered recipe	Oct. / 2018

Part I

Operation

This instruction manual is based on the standard specification and the flow direction of the board is left to right.

The contents of the operation panel and touch panel may differ from the your machine.

1. For sefty

This machines uses high voltages for operation and has the parts may become high temperatures..

If it is not handled in a proper way, it may cause a risk.

Please read and fully understand this chapter to use the machine in a safe and proper way.

1.1. Indication mark

The indication mark shown in this manual is mentioned here.

1.1.1. Definitions of WARNING, CAUTION and NOTE

The meaning of the indication mark being written in this manual is as follows.



This mark indicates that there is a danger of serious or minor injury if the user ignores the related instructions in using the machine



This mark indicates the danger of damaging the machine or auxiliary machines (property damage) if the user ignores the related instructions in using the machine.



Indicates an item recommended for the user to understand for safe and comfortable operation of the machine.

The above "serious and minor injuries," "property damage," and "user" have the meanings specified below.

Serious injury	Blindness, injury, burns (high- and low-temperature), electric shock, fractures, and toxicosis that accompany after-effects, and injuries that require admission or long-term hospital stays.
Minor injury	Injury, burns (high- and low-temperature), and electric shock that do not require admission or long-term hospital stays.
Property Damage	Secondary damage to the production line, peripheral devices, or other auxiliary equipment.
User	Users of the unit, including the purchaser and those who are requested to operate the unit by the purchaser.

1.2. Notes on Handling

This section describes notes for using the machine in a safe and machine way. Before using this machine, please read and understand this manual thoroughly.

1.2.1. General Precautions

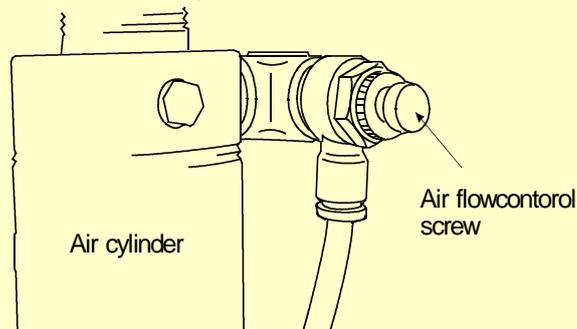
This section provides general precautions which the user should understand well for using the machine.



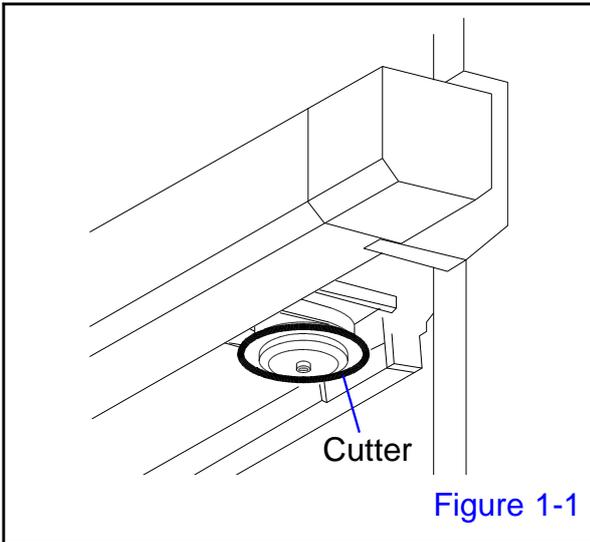
- Do not open doors unnecessarily during operation.
- Before starting manual operation for maintenance, make sure that nobody is at the back of or inside the machine and does not touch the machine.
- Do not modify the machine structure (including cables).
An electrical shock, fire, or faults may be caused.
- Do not touch the machine with wet hand for operation or maintenance. An electrical shock may be caused.
- Do not generate flammable gas or corrosive gas around the machine.
Fire, current leakage, or faults may be caused.
- If smokes, abnormal sounds, or abnormal smells are observed on the machine, immediately turn off the main breaker and make sure that the abnormal state stops.
Then contact Hakuto or your local dealer.
Continued operation in abnormal condition may cause fire, electric shock, damage to the machine.

CAUTION

- When any work is made inside the machine, such as maintenance, clean the inside of the machine with a vacuum cleaner after working.
- Clean the inside of the machine with a vacuum cleaner once or more a month.
- Take care not to allow loose screws and nuts.
At shipping, screws and nuts are fixed with screw lock agents at important sections. If such screws or nuts are loosened for maintenance, coat a screw lock agent and tighten screws and nuts.
- Do not loosen the flow control valve screw (speed controller) mounted on the air cylinder.
It is adjusted at shipping. If the screw is required to be adjusted again, rotate the screw carefully and tighten the lock nut firmly.



1.2.2. Cutter



The unit has a rotary cutter for cutting films. Be careful when handling it, as its circumference is razor sharp.

WARNING



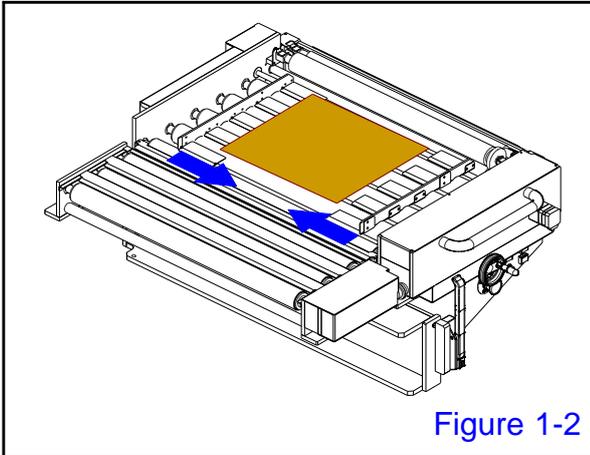
- Do not touch the circumference when holding the cutter.
- Use the specified tools to replace the cutter.
- Keep the cover closed even when the Cutter module is not in operation.

CAUTION



Do not drop or apply an impact to the cutter, as it may break.

1.2.3. Centering Mechanism



The input conveyor of the unit has a PWB centering mechanism that is driven by an air cylinder.

WARNING



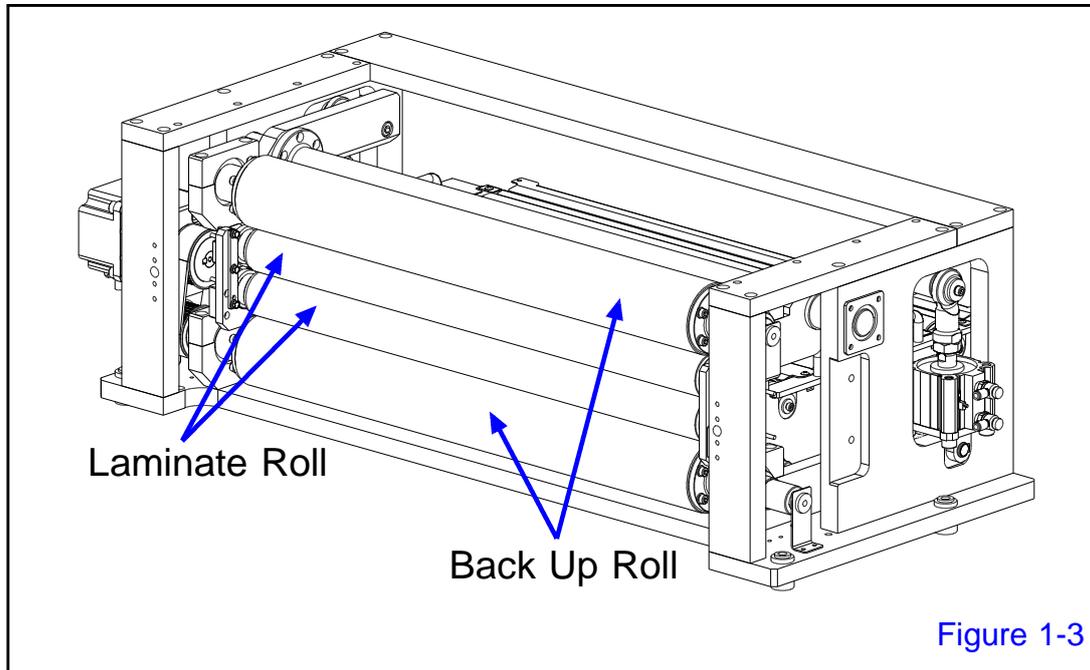
- Do not touch the input conveyor when it is in operation in order to prevent fingers from being caught.
- Close the front door when it is in operation.

CAUTION



Do not adjust the centering mechanism so that it is smaller than the width of PWB, as the input conveyor may be damaged.

1.2.4. Backup Roll and Laminating Roll



The lamination module of the machine has the backup rolls and laminating rolls that rotate at high temperatures.

Be careful, as it is hot even when the machine is not in operation.

WARNING

- Do not insert your hand into the unit (even when it is not in operation), or your fingers may be caught and burnt.
- Do not touch the roll when it is hot or in operation, or your fingers may be caught and burnt. When it is necessary to touch it, wait until it stops and cools down.
- The cleaning work must be performed after pulling the lamination roll unit out to the output conveyor side.

CAUTION



- Do not insert foreign articles into the machine, or the laminating roll may be damaged.
- Do not use solvents other than those specified by Hakuto Co., Ltd. to clean the laminating roll, or its surface may deteriorate.
- Do not strike or apply impact to the laminating roll, or it may be damaged.
- Do not heat the laminating roll unnecessarily, or it may prematurely deteriorate.
- Do not apply excessively large loads or impacts to the lamination roll unit when it is pulled out, or the pull-out rails may be damaged.

1.3. Warning Labels

This Section explains the definitions and locations of the warning label that is affixed to the unit.

1.3.1. Description of Warning Labels

The warning labels are affixed in several place in the unit to call attention to the user. This section explain the content and the location of each labels.

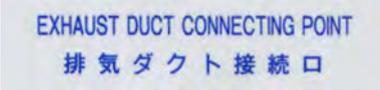
Warning Label Table

No.	Type of label	Description	Location
1		Caution: Electric Shock	<ul style="list-style-type: none"> ● Blower-fan power supply connection ● Laminating roll slip ring ● Control box
2		Caution: High temperature	<ul style="list-style-type: none"> ● Laminating roll ● Backup roll ● Tacking heater cover
3		Caution: Keep fingers away to prevent them from being caught.	<ul style="list-style-type: none"> ● Laminating roll ● Input conveyor rail ● Output conveyor rail ● Centering plate

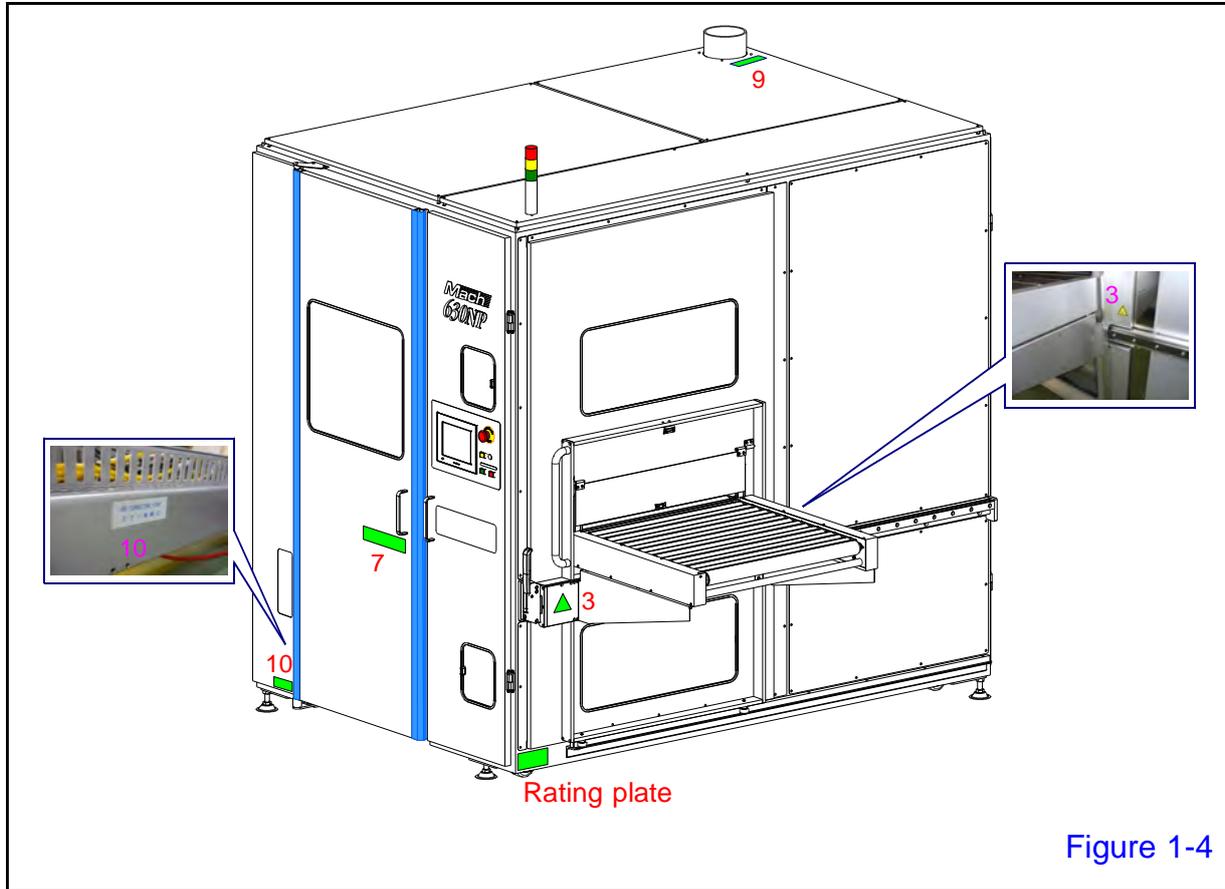
Warning Label Table (continued)

No.	Type of label	Description	Location
4		Caution: Keep fingers away to prevent from being caught.	● Input conveyor
5		Caution: Keep away from the cutter	● Cutter unit
6		Warning for the danger inside the unit	● Control box *back face breaker side
7		Close the cover	● Front door
8		Power supply connection	● Cover under the back face control box

Warning Label Table (continued)

No.	Type of label	Description	Location
9		Exhaust duct connection	● Exhaust duct
10		Air connection	● Primary source connection
11		Caution: Be careful to prevent injury by the electrode.	● Anti static bar

1.3.2. Location of label Front side



Back side

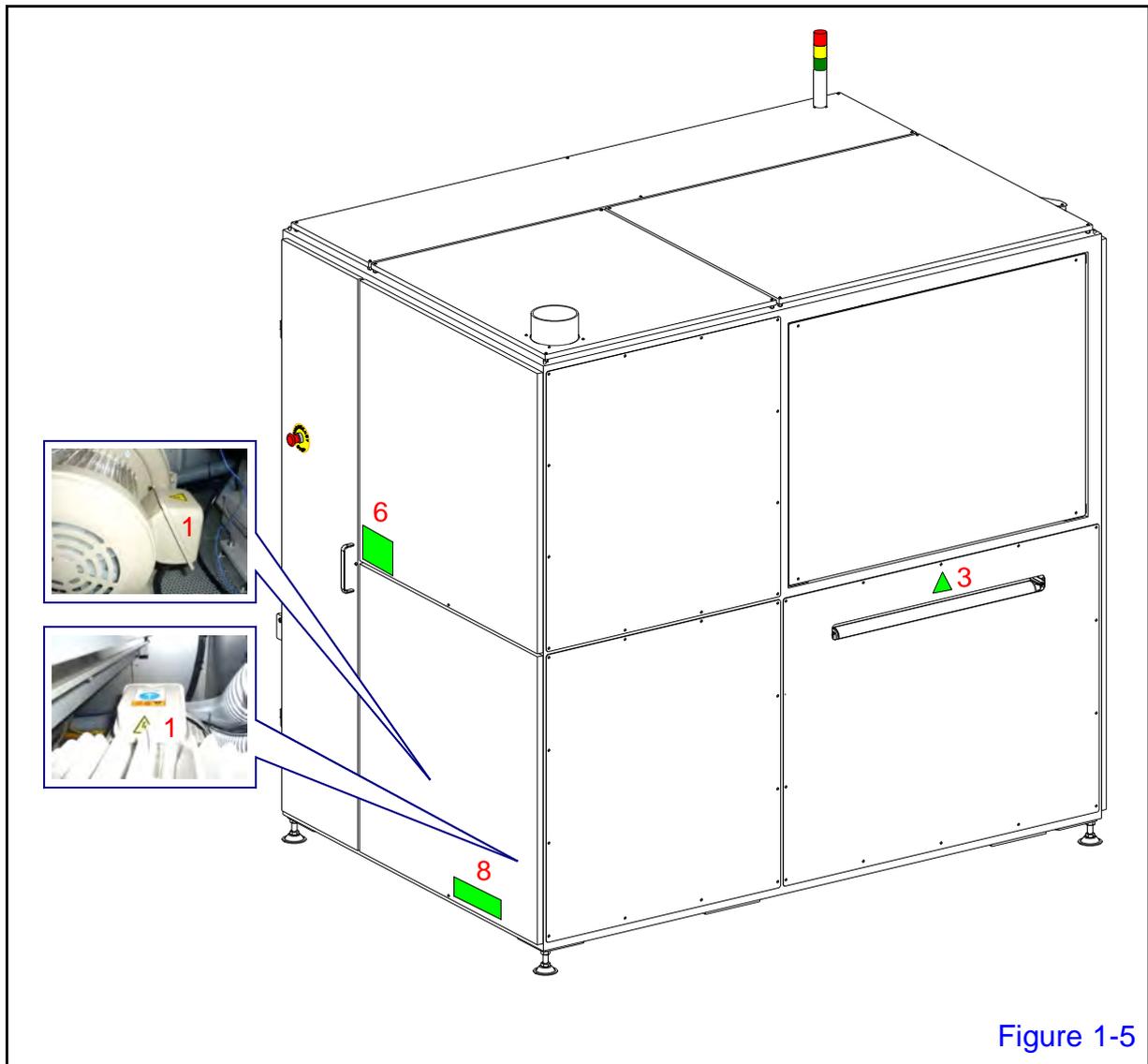


Figure 1-5

Inside the unit

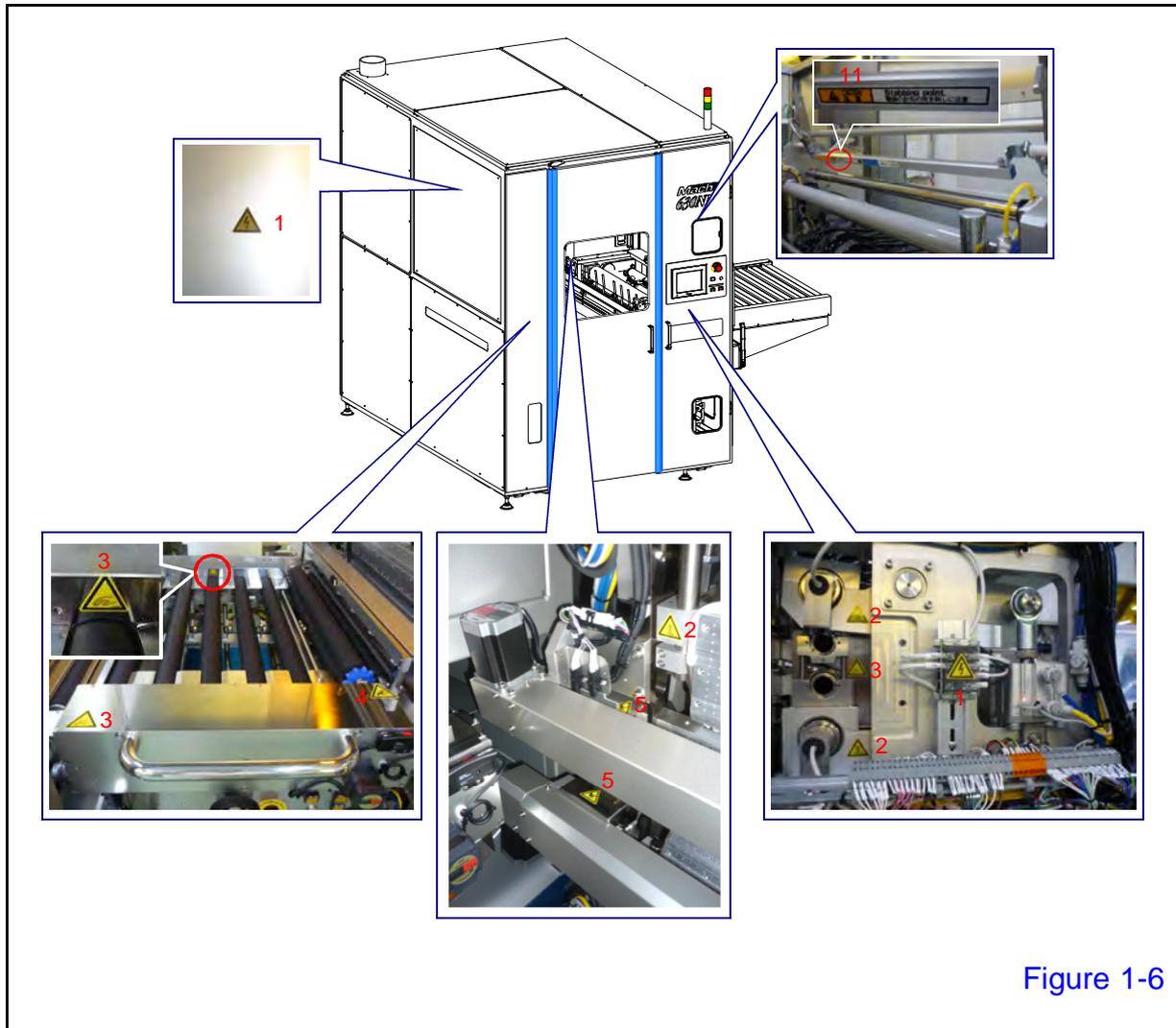


Figure 1-6

1.4. Safety Device

The machine has safety devices to prevent danger in the event that it is incorrectly operated, and to ensure preparedness for emergencies.

CAUTION



When the unit is stopped by a safety device, its operation cannot be guaranteed following resetting, unlike in cases in which it is stopped by the normal procedure.

Do not use the emergency stop buttons except in an emergency (when the unit emits smoke, fire, noise, or odor, or when injury is anticipated).

1.4.1. Emergency Stop Buttons

Emergency stop buttons are located on the operation panel, backside door and under the input conveyor. In the event of a problem, press one of the emergency stop buttons. The unit will immediately stop and enter a state identical to pressing the Power off button on the operation panel.

- The emergency stop buttons are at the locations indicated below.

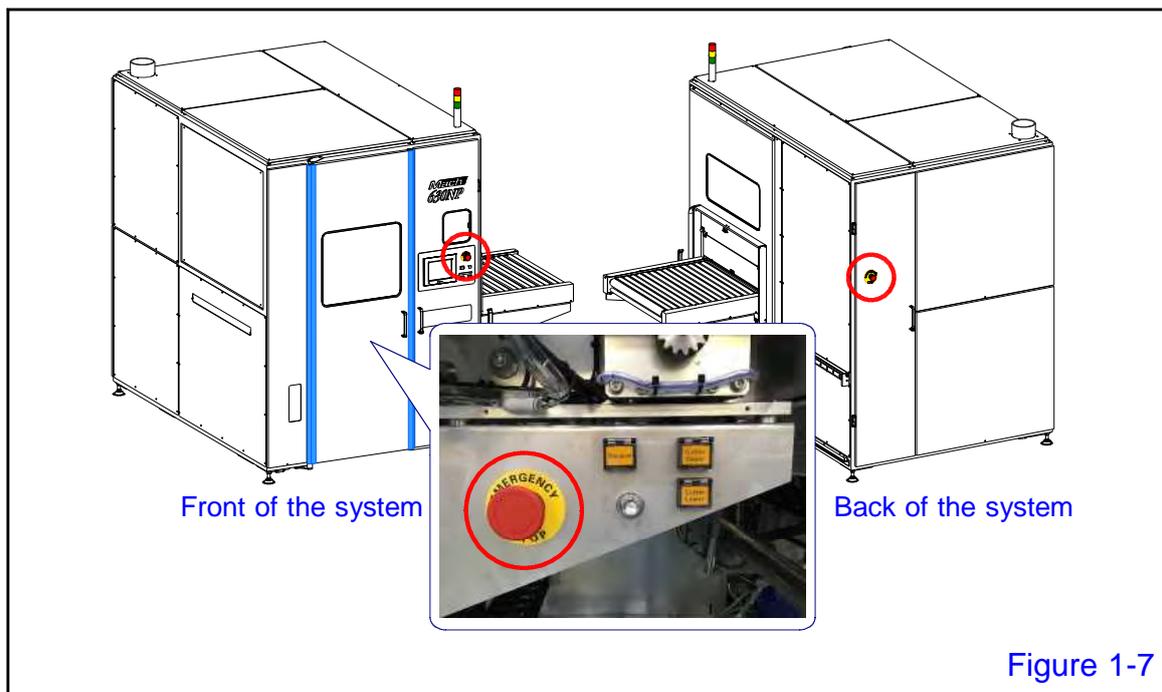
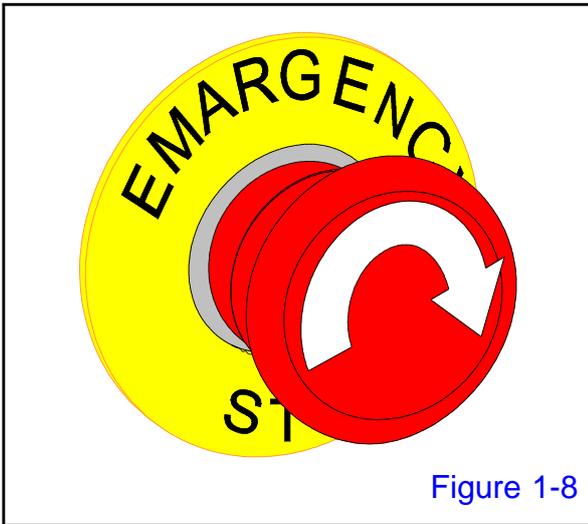


Figure 1-7



After correcting the problem, turn the button clockwise to release.

Press the Power on button on the operation panel to resume normal operation.

2. Overview of the machine



This section outlines the basic principle of this machine.
Please understand as prior knowledge before driving.

2.1. Basic principle

This machine is constructed to heat-laminate dry film to the specified portions of both sides of a printed wiring board (PWB) automatically.

- Load a dry film roll consisting of a carrier film, a photo-resist and a cover film into the DF unit (or the DF bulk unit).
- The cover film is first separated from the dry film in DF unit. Then the dry film is passed through the film-running route to a PWB for tacking. The separated cover film is wound into the eco-roll.
- The photo-resist surface of the dry film is heat-laminated to the copper foil surface of a PWB by the rotation of the laminating rolls.
- The PWB with the heat-laminated dry film is transferred to the downstream unit (the next production process) by the output conveyer module.

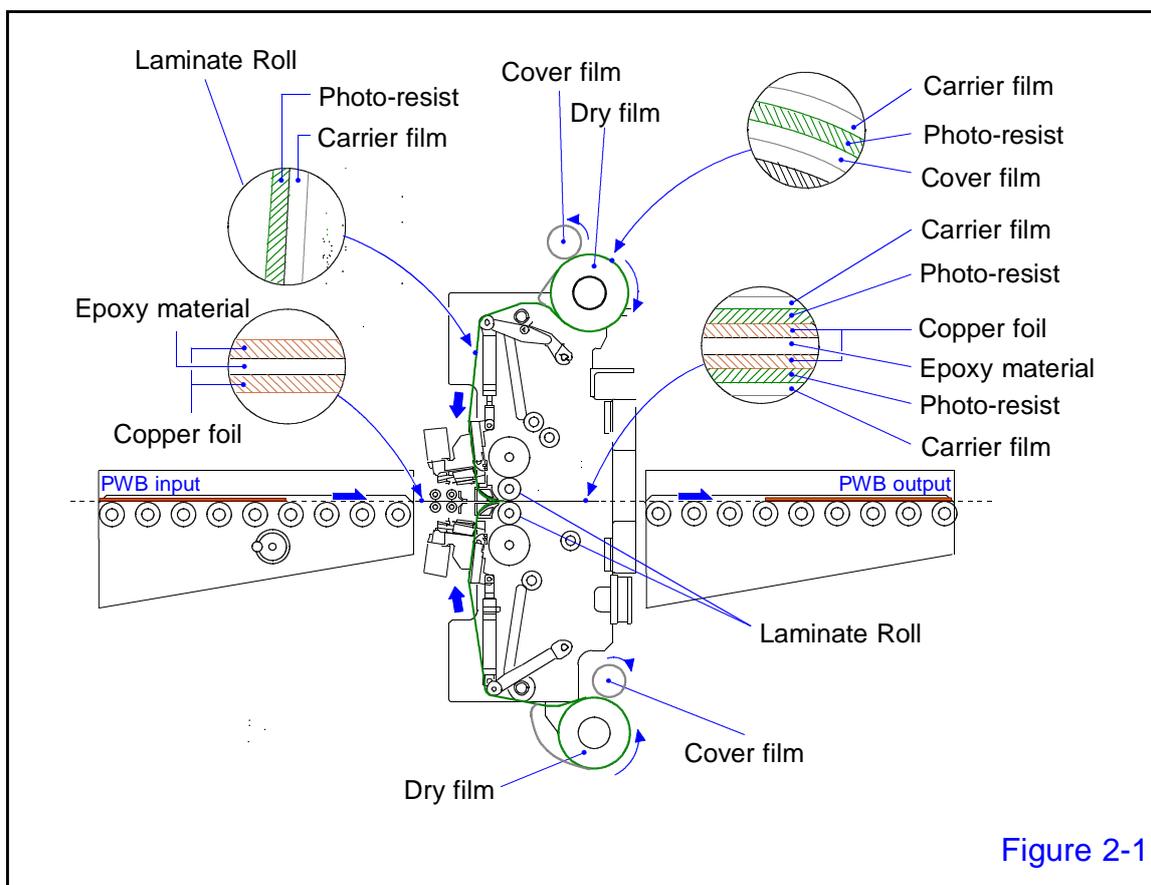
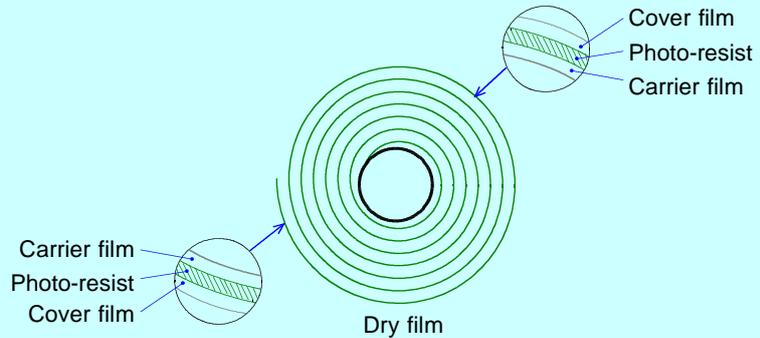


Figure 2-1



How to call dry film

Most cases of the dry film used in the Mach 630NP have a three-layer structure as shown in the figure below.

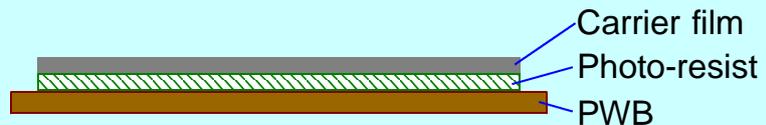


Also, the naming of each layer is also various at each dry film manufacturer.

However, most manufacturers call the bottom layer the carrier film or base film, and the top layer is called the cover film or protective film.

In the operation manual of Mach 630NP, the bottom layer is called the carrier film and the top layer is called the cover film.

In addition, the remaining two layers (carrier film and photoresist) after peeling the cover film before laminating is called a laminate film.

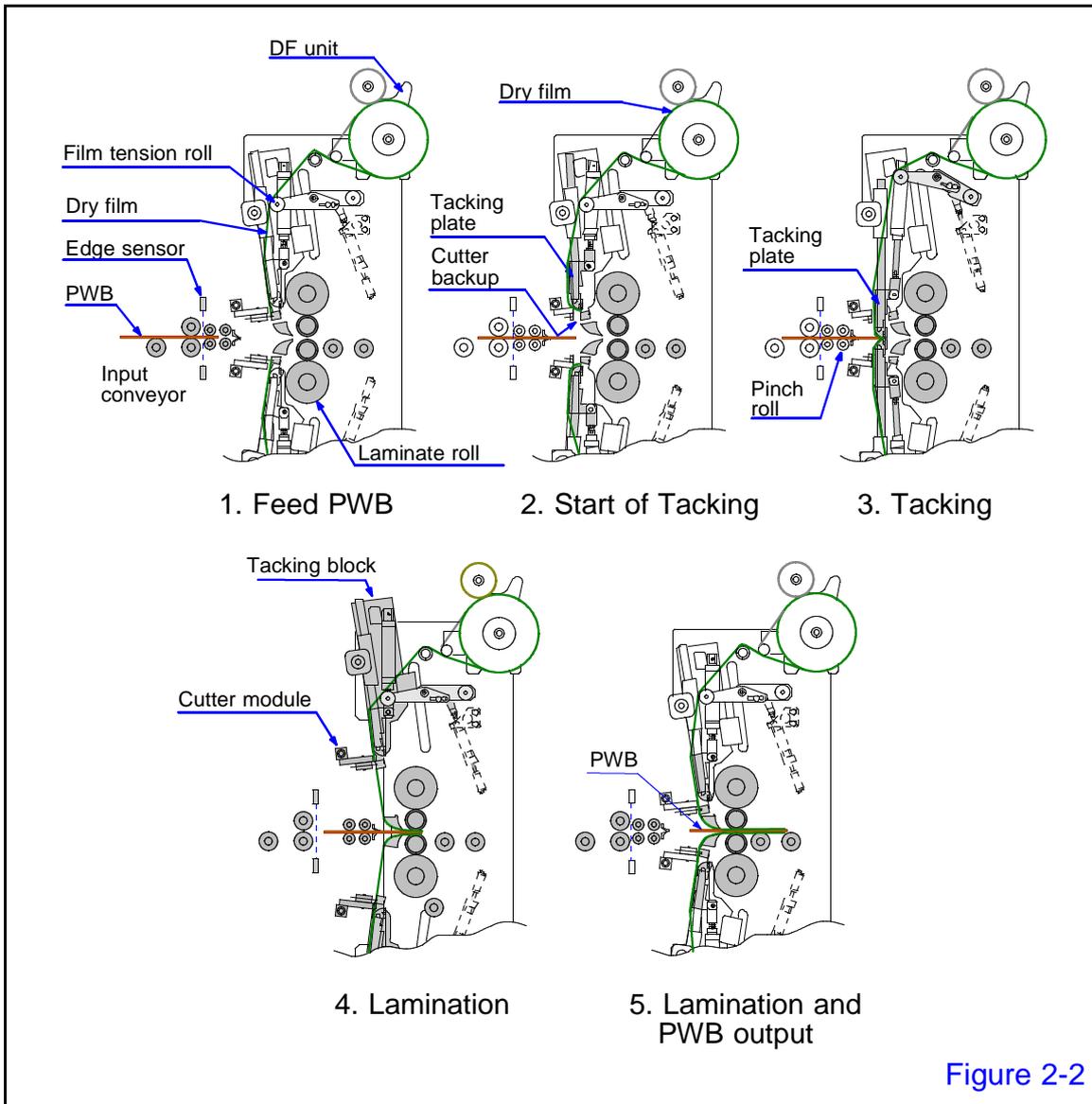


$$\text{Laminate film} = \begin{matrix} \text{Carrier film} \\ + \\ \text{Photo-resist} \end{matrix}$$

- In the film peeling device in the post process of Mach 630NP, it seems that there are many cases where the carrier film is called the cover film in many cases.

2.2. Operation Sequence

Automatic operation is performed in this machine in the following operation sequence.



1. Feed PWB

- ① The front edge of the PWB transported by the input conveyor is detected by the edge sensor.
- ② The pulse signal of the rotary encoder mounted on the inlet conveyor starts counting from the point when the edge sensor detects the position.

2. Start of Tacking

- ① When the pulse signal generated by the rotary encoder reaches the preset count number, the input conveyor stops and the front edge of the PWB at that time becomes the Tacking position.
- ② When the tacking plate starts to move, the tip of the laminate film in the cutter backup moves to the tacking rubber part of the tacking plate.

3. Tacking

- ① The tacking plate tacks the tip of the film from the top and bottom to the PWB.
- ② The film tension roll is activated, causing the film to have slack.

4. Laminate

- ① The tacking plate and the tacking block move away from the PWB and the PWB is fed in together with the pinch roll part.
- ② The film is thermocompression bonded to the PWB by the rotation of the laminate roll.
- ③ The pinch roll section retracts back and only PWB continues to be sent to the laminating section.
- ④ When the edge sensor detects the rear end of the PWB, it begins to count the pulse signal of the rotary encoder installed on the laminating part drive shaft.
- ⑤ When the preset count number is reached, the tacking block will approach the PWB at the same speed as the film.
During this time the film is cut by running the cutter module.

5. Lamination and PWB output

- ① The cut film is laminated to the PWB while being held by film guide.
- ② The PWB with the film thermocompression-bonded to a predetermined position is sent to the next process by the outlet conveyor.

2.3. Recipe

Recipes are those in which set values of the parameters (roll speed, roll temperature, roll pressure, etc.) required for the operation of this machine are grouped.

For example, if the size of the product is different, it need to change the film size parameter to handle it. It means that the recipe is already different.

The machine operates using that recipe.

Recipes used for driving the machine are called Operation Recipes.

With this machine, there is a function to register and store the recipe with a number added.

Registered saved recipe is called Registration Recipe.

There are two methods of operating the machine as follows.

1. How to call the registered recipe suitable for the product and drive it as a Operation Recipe
2. How to operate the direct Operation Recipe by editing it according to the product without using the Registration Recipe.



- Up to 50 Registration Recipe can be registered and saved.。
- If using a Registration Recipe, it can not change the Operation Recipe during the automatic operation of the machine.
If not use the Registration Recipe, it can change the Operation Recipe during automatic operation of the machine.

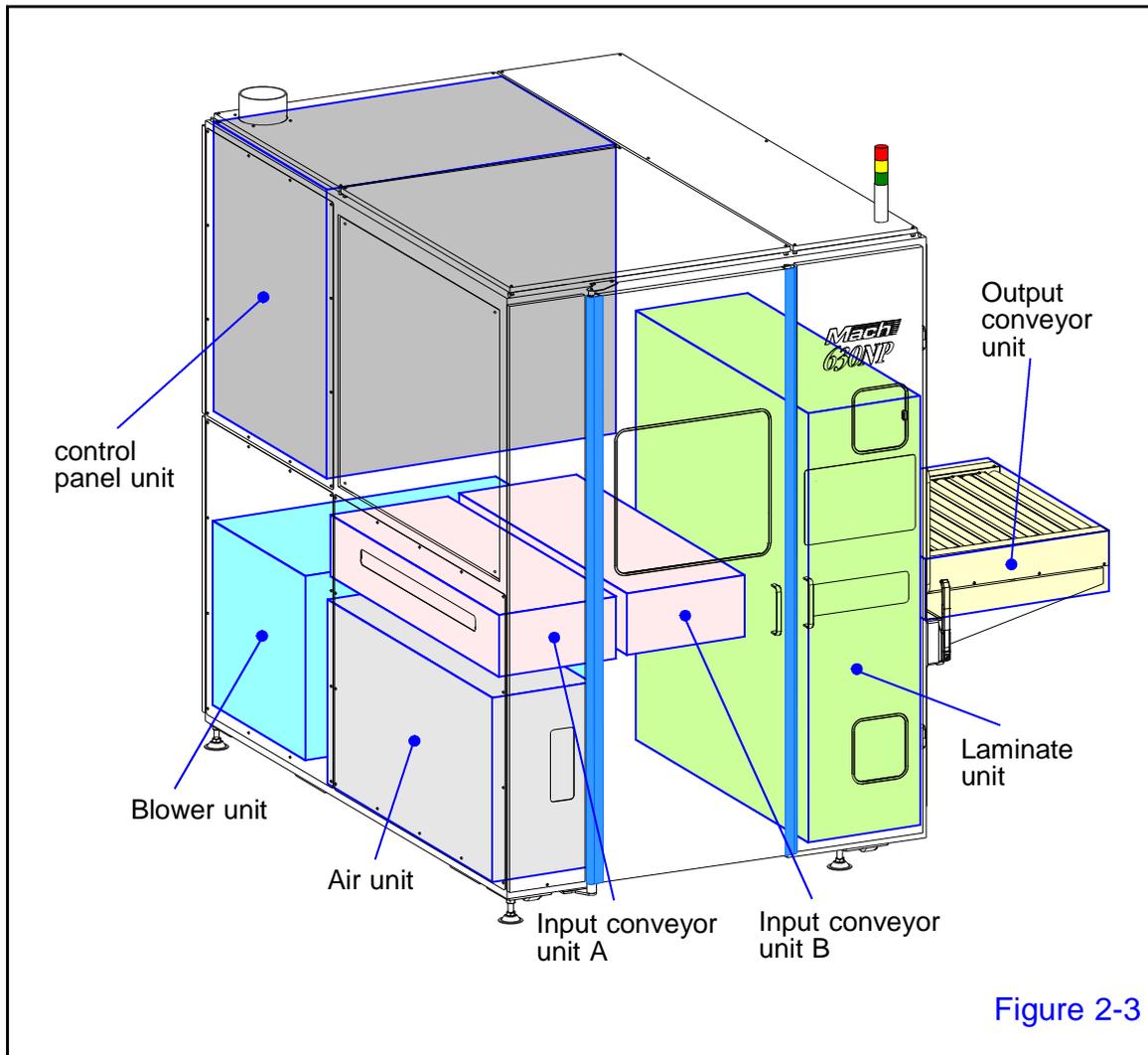
The above operation method 1 is suitable for customers who wish to manage recipes.

The operation method of 2. is suitable for customers who wish to change the recipe during operation of the machine.

The above two operation methods can not be used in combination.
Please decide your driving method and contact Hakuto Co., Ltd.

2.4. Content and position of each unit

This machine is divided into an input conveyor unit, a laminate unit, an output conveyor unit, a control panel unit, a blower unit, and an air unit. In addition, each position is as shown in Figure 2-3.



Input conveyor unit

It performs feed and positioning (centering, PWB end detection) of the input PWB.

The input conveyor unit B is structured so that it can be moved to the rear of the unit so that the maintenance of the laminate unit is easy.

Laminate unit

It is the main unit of this machine which performs film loading (DF module, DF bulk module), feeding, tacking, cutting, thermocompression bonding by laminate rolls and the like.

Output conveyor unit

Send the board to the downstream machine.

The output conveyor unit has a structure that can be moved to the back of the unit so that the maintenance of the laminate unit is easy.

Control panel unit

It contains electric control parts such as programmable controller(PLC) DC power supply etc.

Blower unit

There are blower fans for sucking film chips during film holding and film cutting.

Air unit

It contains a factory air inlet, a regulator and solenoid valve block that distributes air to each unit.

2.5. Machine appearance

The following is the machine appearance and name.



Please use the name of each part of the machine when inquiring to our service department etc.

Front side of the machine

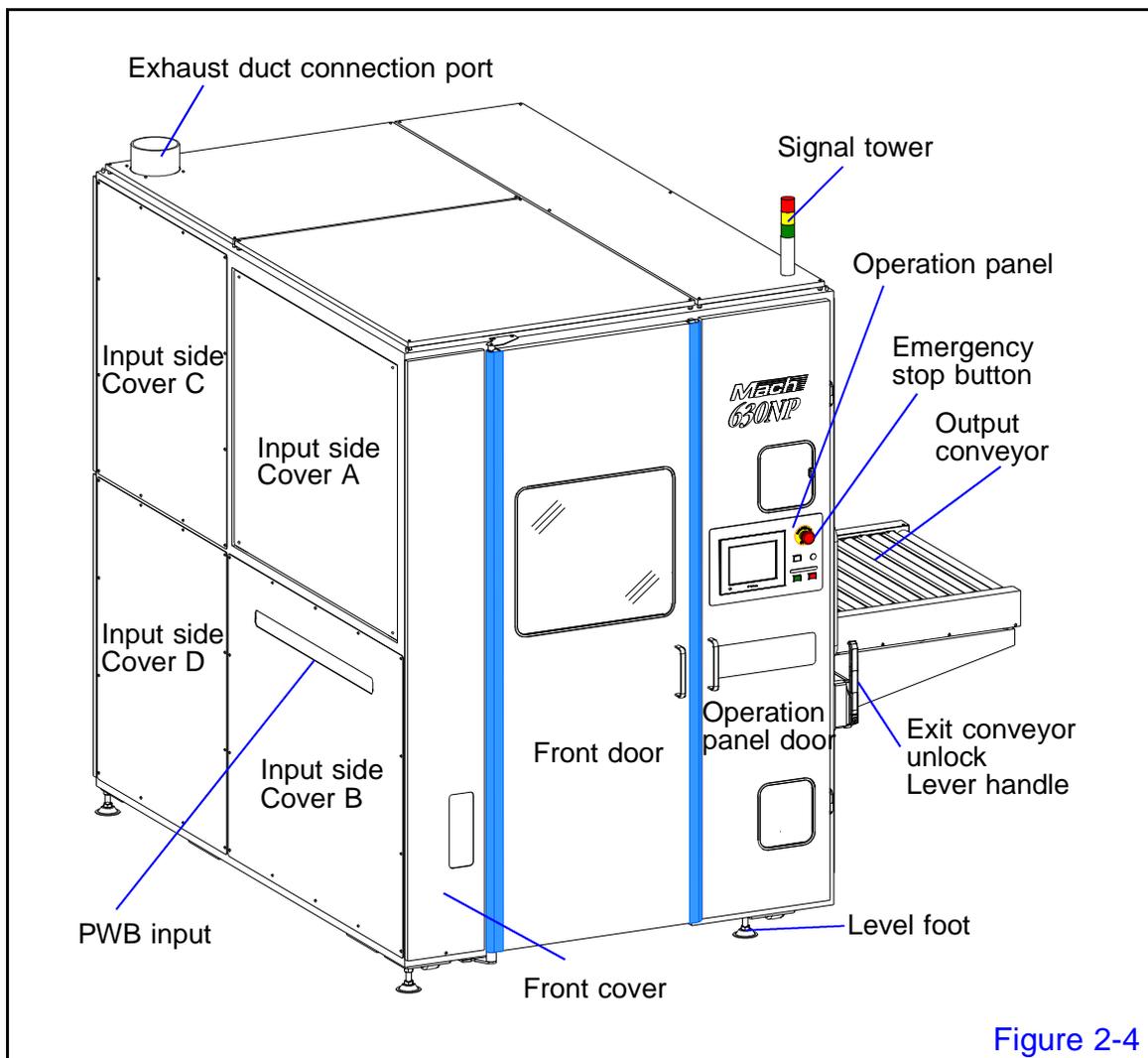
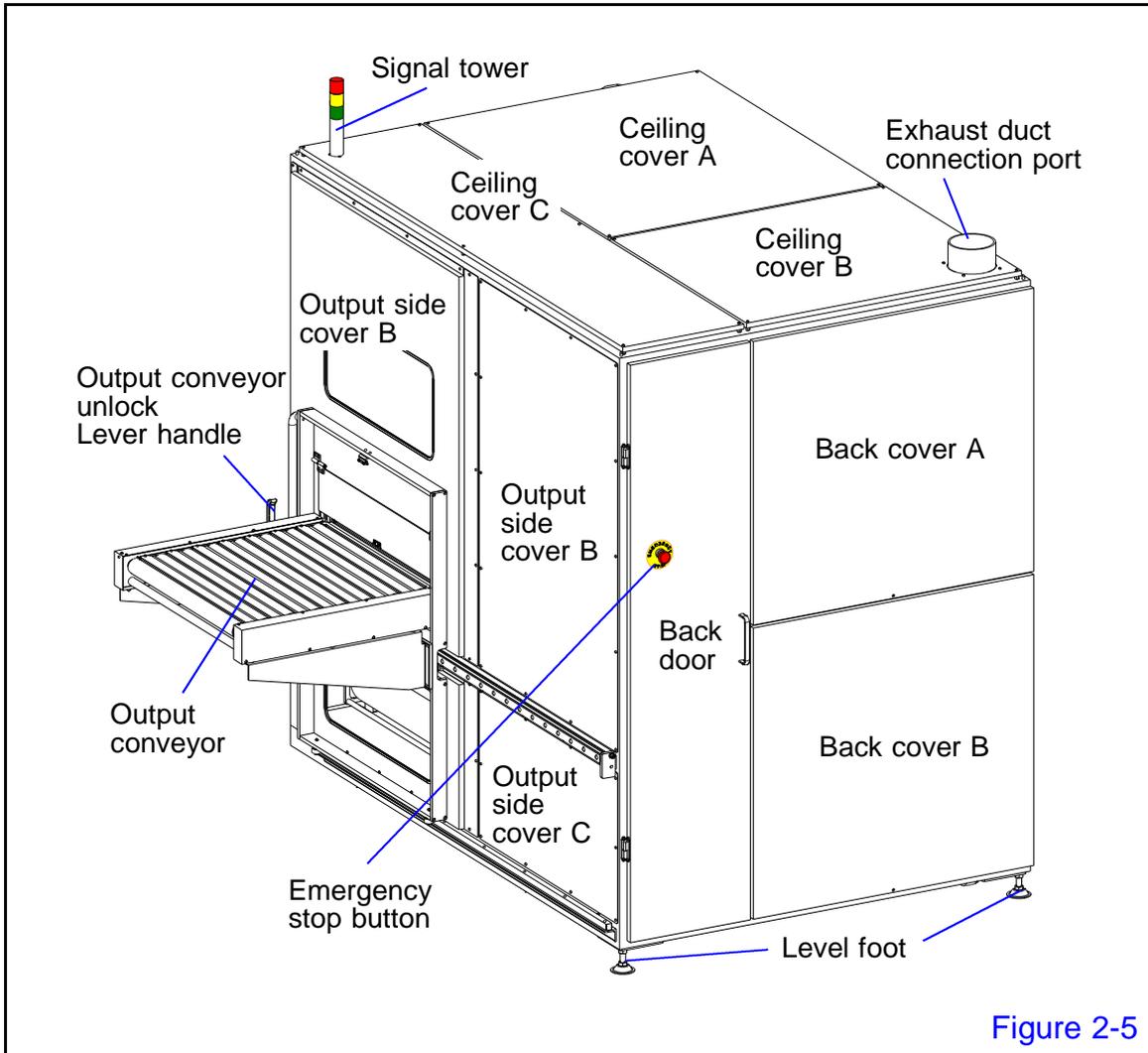
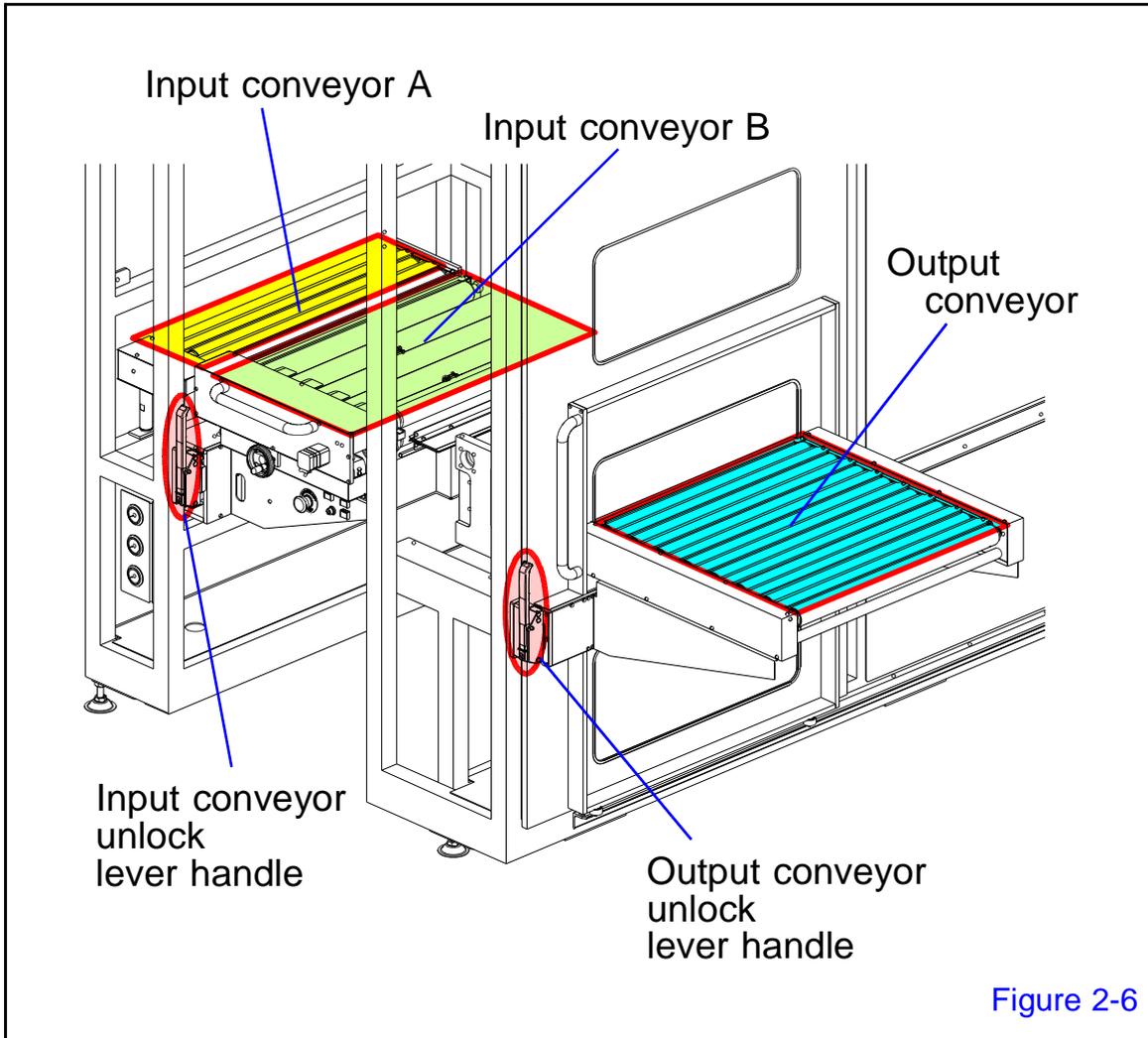


Figure 2-4

Back side of the machine



Conveyor



2.6. System block diagram

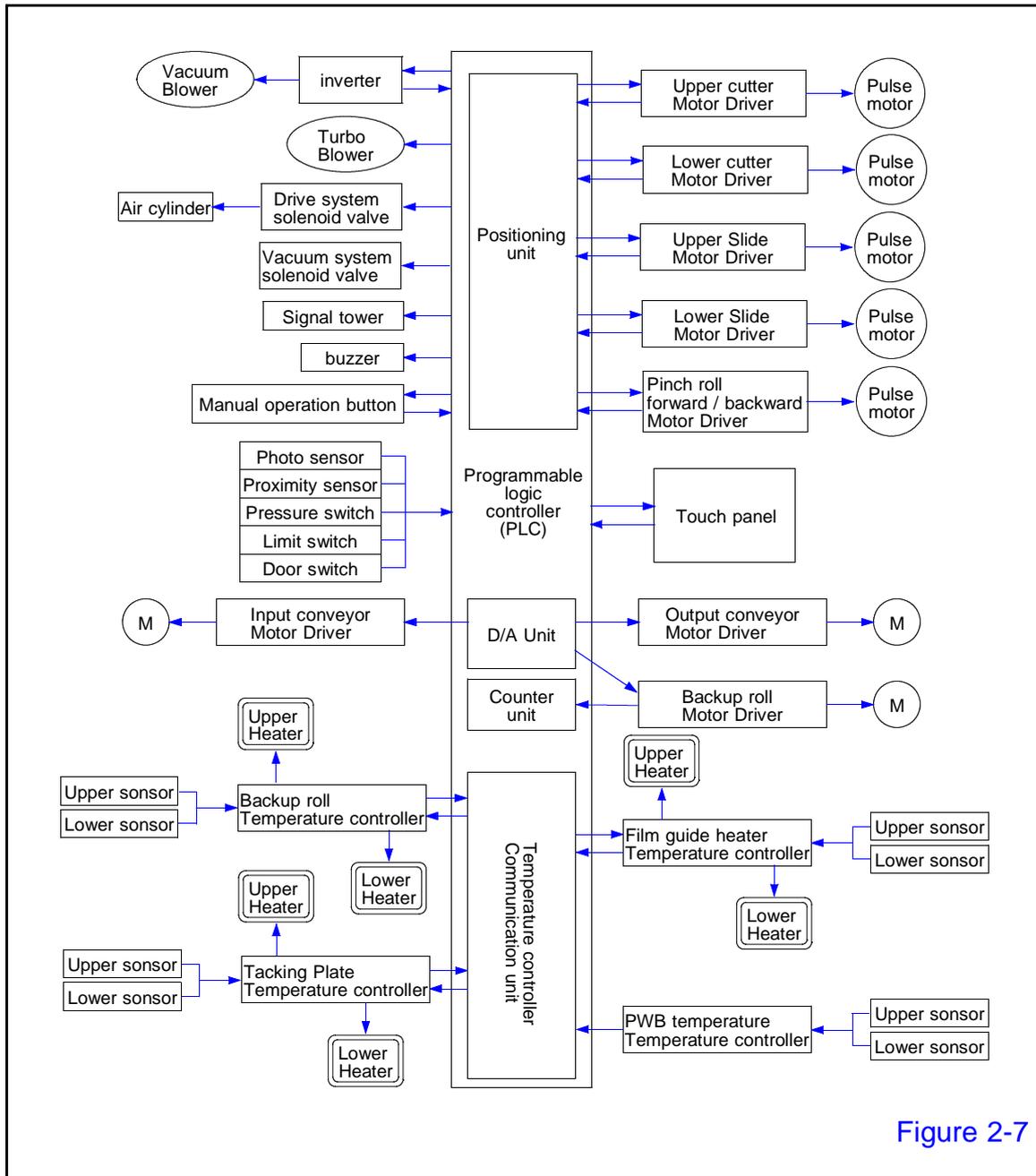


Figure 2-7

3. Operation Panel

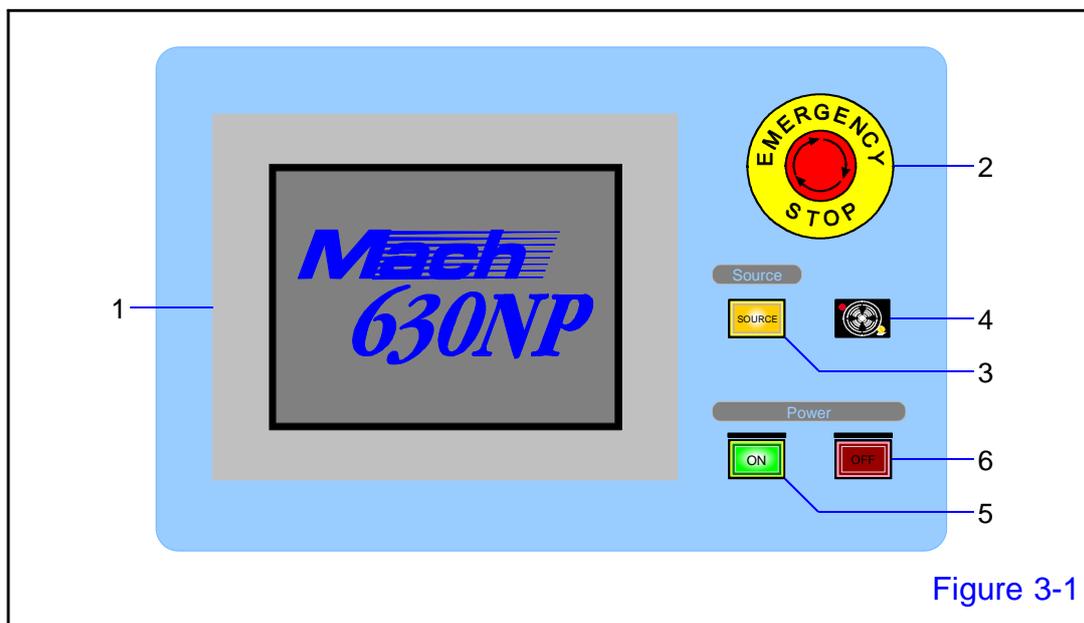
This chapter explains the contents of the operation panel and the touch panel in the operation panel.

3.1. Operation Panel

The operation panel has the button, touch panel, buzzer and emergency stop button for operating the machine.

3.1.1. Main Operation Panel

The main operation panel is on the front side of the machine.



1. Touch panel

Displays machine controls, and is used to operate the machine in both manual and automatic modes. It provides information on alarms, parameter preset values, and actual production conditions, etc.

2. Emergency stop Button

It is used in case of emergency or some sort of fault in the equipment. When pressed, it will be in the same state as when the power OFF button is pressed immediately, and an emergency stop will be made. It turns and cancels clockwise after removing an obstacle.

3. Source lamp

If the power supply is supplied to the primary main breaker side, the lamp will light up.

4. Buzzer

Beeps when the error occurred.

5. POWER ON button / lamp

Used to turn on the power supply to machine components.

The POWER ON lights.

This switch has a protection cover to prevent it from being pushed by mistake.

6. POWER OFF button / lamp

Used to turn off the power supply to machine components.

The POWER OFF lights.

The switch has a protection cover to prevent it from being pushed by mistake.

3.1.2. Input Conveyor Operation Panel

The input conveyor operation panel is on the input conveyor through the front door.

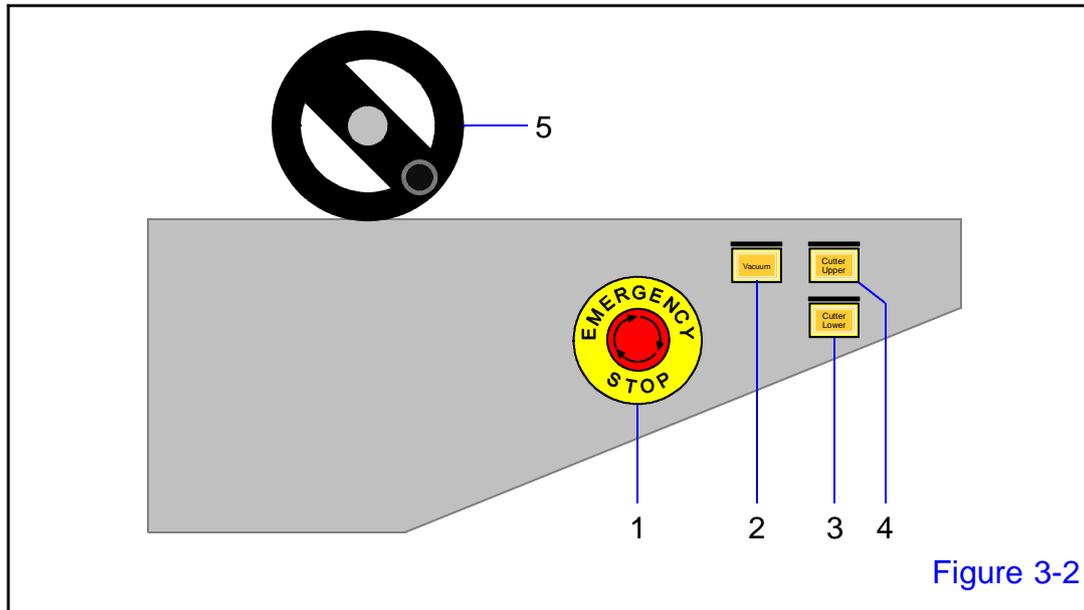


Figure 3-2

1. Emergency stop Button

If it pushes, it will be in the same state as the time of a power supply off-button being pushed immediately, and a scram will be carried out.

It turns and cancels clockwise after removing an obstacle. The button of Loder and Unloder also carries out same operation.

This has the same fuction with the emergency button on the main operation panel.

2. Vacuum button / lamp

To turn on the power supply to the blower fan for the vacuum plate, film guide and cutter backup. The POWER ON lights.

To stop the supply of power, press it again.

This switch has a protection cover to prevent it from being pushed by mistake.

3. Vacuum button / lamp

To turn on the power supply to the blower fan for the vacuum plate, film guide and cutter backup. The POWER ON lights.

To stop the supply of power, press it again.

This switch has a protection cover to prevent it from being pushed by mistake.

Use this button to set up or change the upper dry film.

4. Lower cutter button / lamp

To run the lower cutter, press this button. Only while the button is pressed, the cutter is running.

The button is light up while the cutter is running.

This switch has a protection cover to prevent it from being pushed by mistake.

Use this button to set up or change the lower dry film.



The cutter traveling button has the following lamp lighting state.

Lamp is off	: Cutter home position
Lamp lit	: Cutter running
Lamp slow blink	: Cutter homing unfinished (Cutter is outside of home position)
Lamp fast blink	: Cutter homing unfinished (The cutter is home position)

When the cutter button is blinking, homing operation is necessary.

Move the cutter module to the Home sensor on the left and right sides and then press the "cutter run" button for 2 seconds or longer.



The user can choose the action of the cutter when the cutter button is pressed from the following 2 settings.

1. The cutter is running only while the button is pressed.
2. The cutter runs from end to end only by pressing the button once.

The setting 1 is default for the user's safety. Please contact Hakuto or your local agent to change this setting.

5. Centering Adjustment Handle

To adjust the width of the centering plates on the input conveyor to match the width of the PWB.

When this is turned clockwise, the width is narrowed. When it is turned counterclockwise, it is wider.

3.2. Touch Panel

The touch panel is a display with several hierarchies based on the main screen and is used to control the machine in both automatic mode and manual mode. A typical touch panel screen of this machine has the following screen.

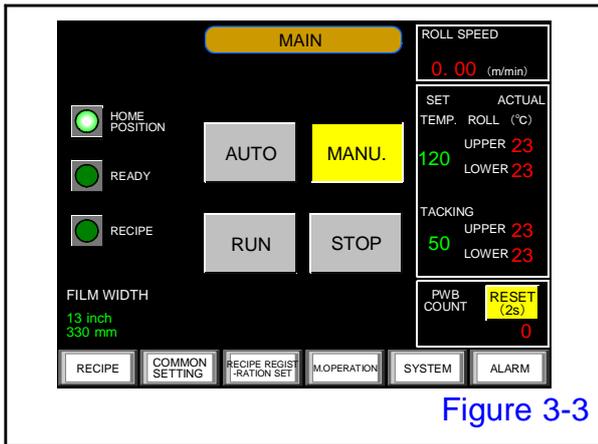


Figure 3-3

MAIN screen

The screen initially displayed on the touch panel when the Power on button is pressed. The user can go in "Automatic mode" from this screen.

For the details, please refer to 3.2.1. MAIN Screen.

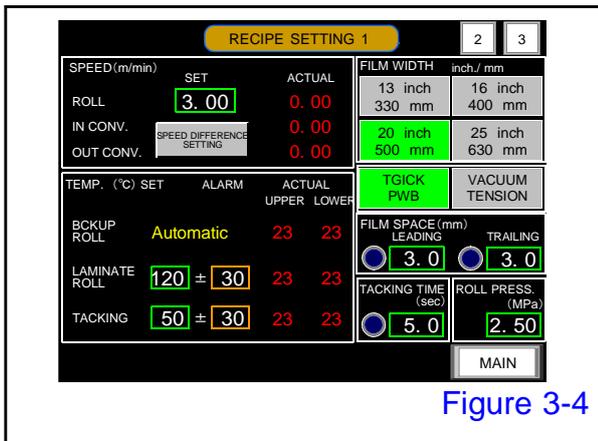


Figure 3-4

RECIPE SETTING screen

In the setting that does not use the Registration Recipe, this screen will be displayed by pressing the "RECIPE" button. This is the screen for checking and setting Operation Recipe.

For the details, please refer to 3.2.2. RECIPE SETTING 1 Screen.

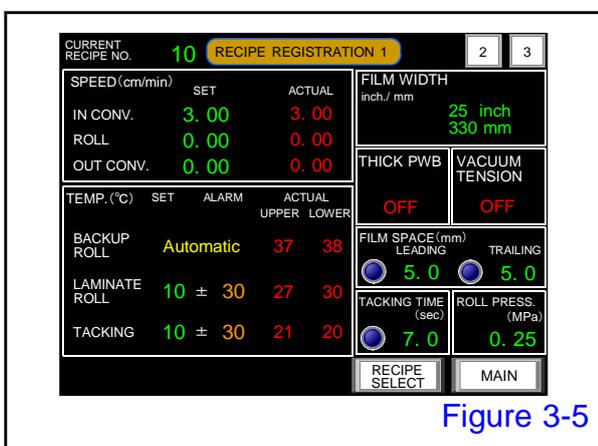


Figure 3-5

RECIPE REGISTRATION screen

In the setting that uses the Registration Recipe, this screen is displayed when the "RECIPE" button is pushed.

Displays the contents of the currently selected Registration Recipe.

For the details, please refer to 3.2.3. RECIPE REGISTRATION screen.

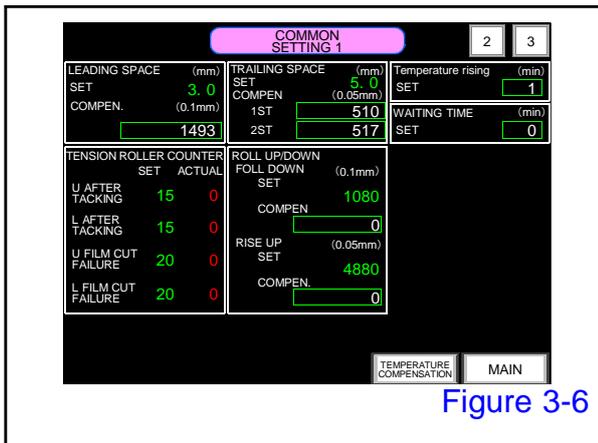


Figure 3-6

COMMON SETTING screen

It is a parameter setting screen of contents used by the maintenance personnel of the equipment.

A password is required to display this screen.

For the details, please refer to 3.2.4. COMMON SETTING screen.

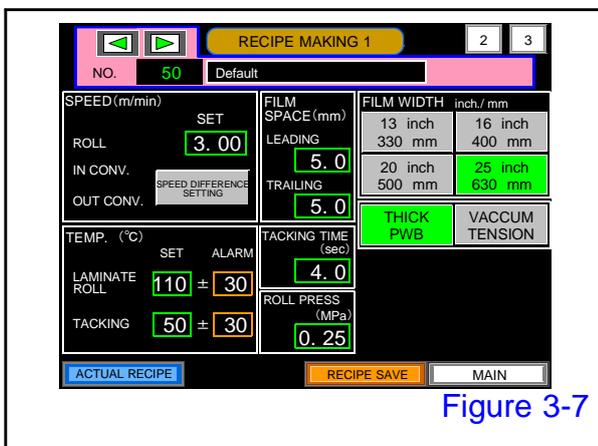


Figure 3-7

RECIPE MAKING screen

It is a screen for making a recipe for registering and saving in memory.

Recipes on this screen cannot be directly Operated Recipes.

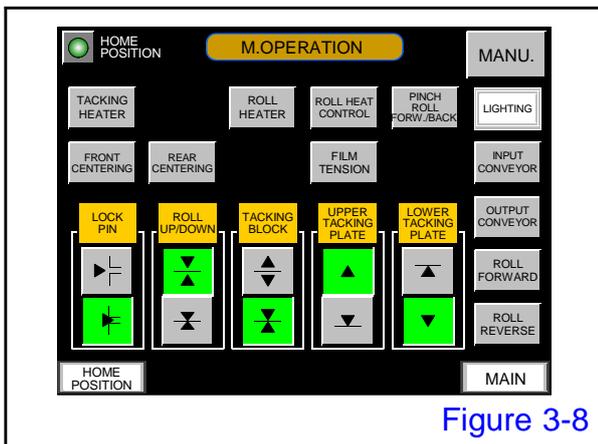


Figure 3-8

M.OPERATION screen

It is an individual operation switch of each mechanism part.

For the details, please refer to 3.2.6. M.OPERATION screen.

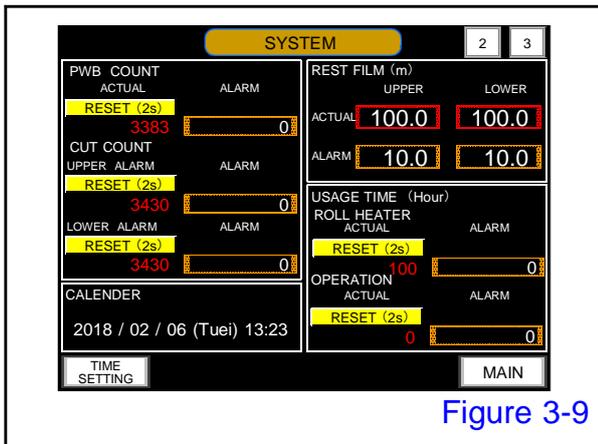


Figure 3-9

SYSTEM screen

On this screen, Each alarm value and language can be reviewed and edited.

The user can go in the calibration screen.

For the details, please refer to 3.2.7. SYSTEM screen.

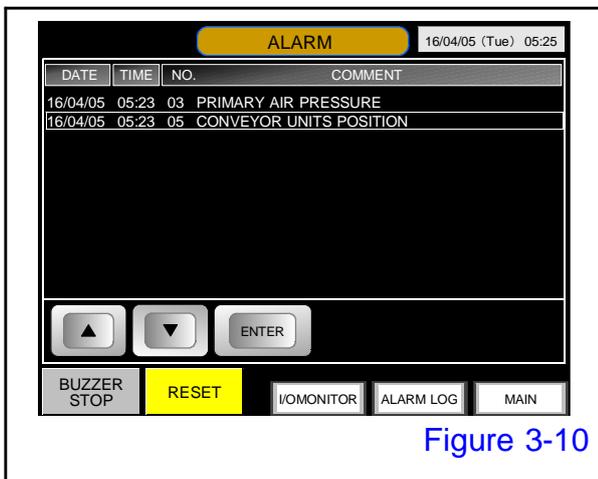


Figure 3-10

ALARM screen

Displays the alarms occurred on the unit.

Alarm logs also can be reviewed.

For the details, please refer to 3.2.8. Alarm screen.

Touch panel hierarchy

The hierarchy of the touch panel changes depending on the setting of the machine (Registration Recipe is used or not used).

Whether the current machine is setting to use Registration Recipe or not to use Registration Recipe can be confirmed in the following part.

- When the RECIPE lamp on the main screen is lit, it is a setting to use Registration Recipe.
- The setting will be understood according to the destination of the screen when pushing the "RECIPE" button on the main screen.
 - In the case of setting using Registration Recipe, it will shift to the RECIPE REGISTRATION screen.
 - In the case of setting not use Registration Recipe, it will shift to the RECIPE SETTING 1 screen.



What is the recipe?

A set of values for the parameters (roll speed, roll temperature, roll pressure, etc.) required for operation of this machine is called a recipe. The device operates using that recipe.

Recipes used for operating the machine are called Operation Recipes.

In addition, this machine has a function to add a number to the created recipe and save it.

The saved recipe is called a Registration Recipes.

The hierarchy of various screens on the touch panel is as the following flow chart.

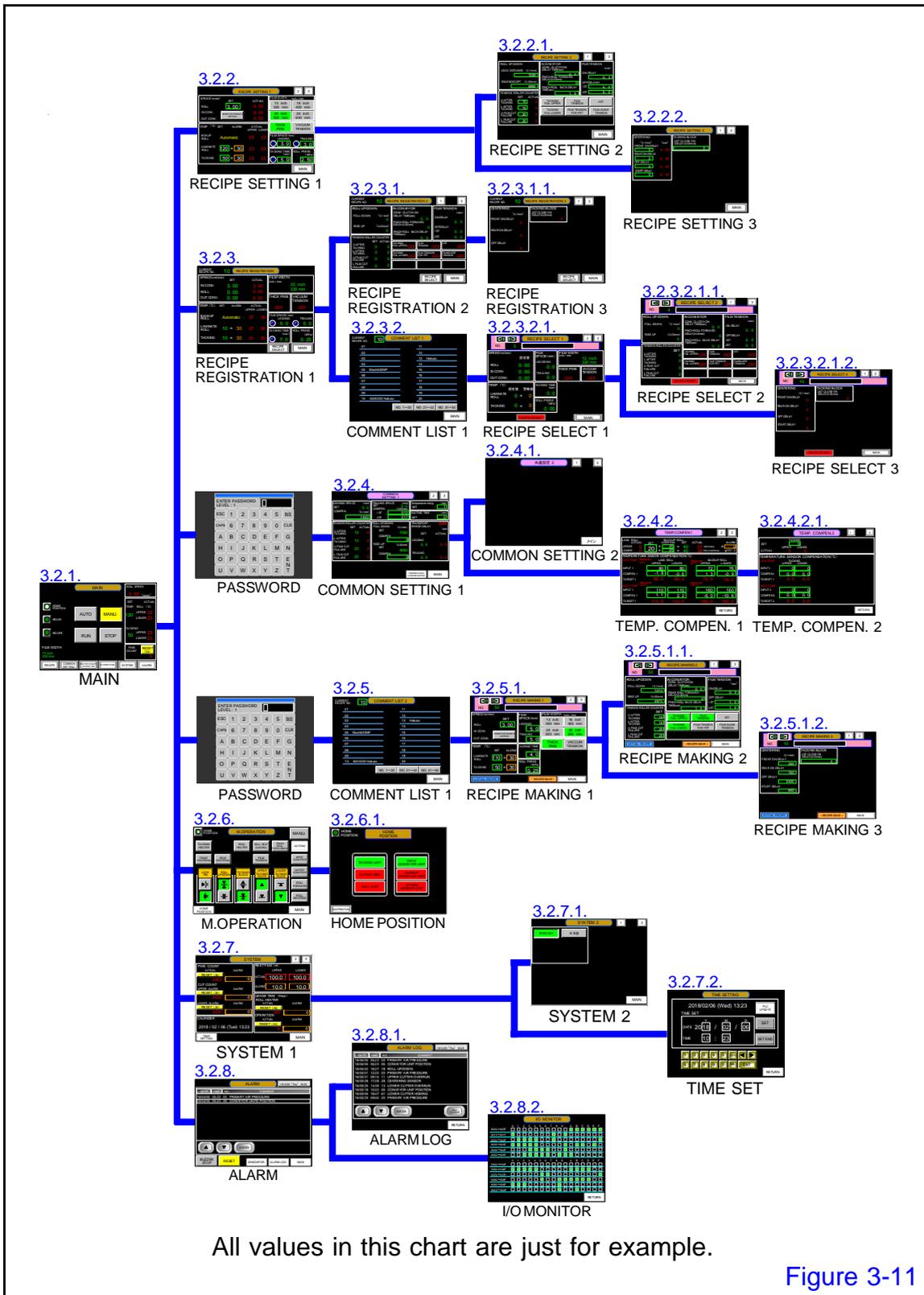
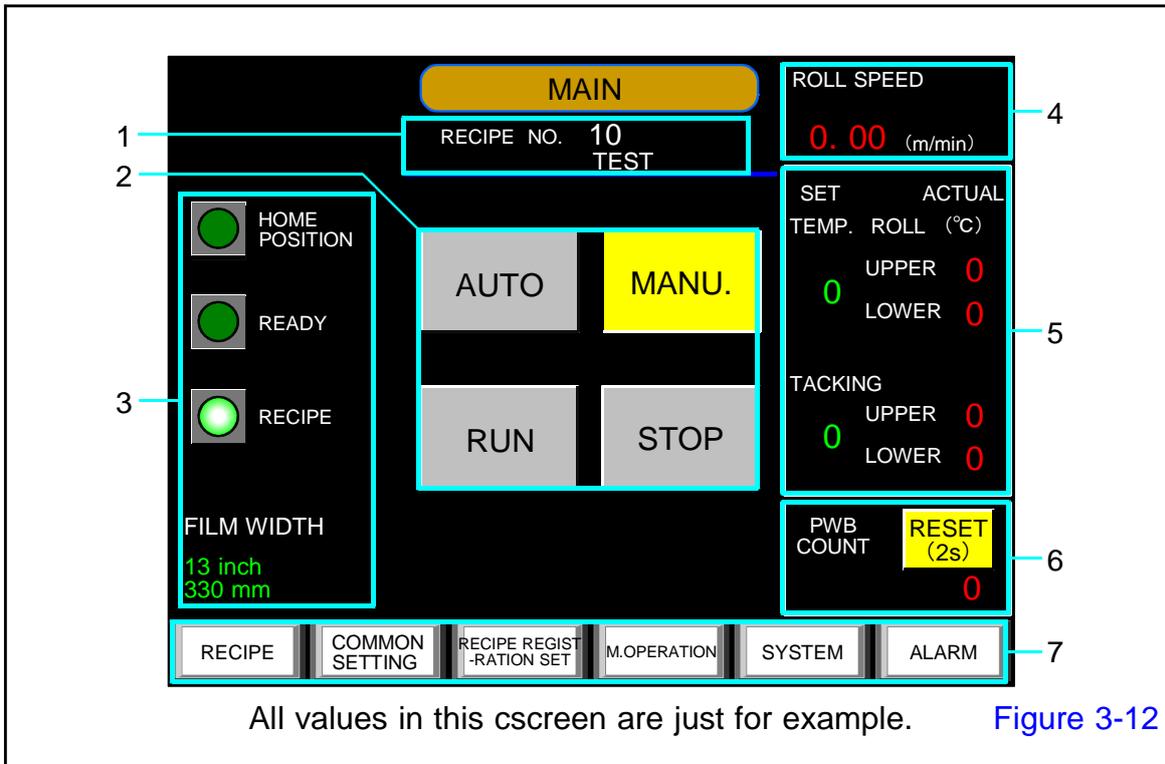


Figure 3-11



- Movement between each hierarchy is performed with buttons on each screen, and even if the current operation mode is "automatic operation" or "manual operation", it can be arbitrarily shifted.
- The machine can be operated from the manual operation screen, but only when the "Manual operation" mode is set on the main screen.
- To protect the backlight, the display on the touch panel automatically disappears if the panel isn't touched for 30 minutes. To reactivate the display, touch the panel.

3.2.1. MAIN screen



1. Registration Recipe number

Displayed only when using Registration Recipe.

The registration recipe number currently selected and its comment.



What is "Registration Recipe"?

Parameter

It is a setting item necessary to operate this machine, and film size, roll temperature, conveyor speed, etc., various correction values are called parameters.

It must be changed depending on the product to be manufactured.

Recipe

A recipe is a thing in which the parameters necessary for operating this machine are grouped.



What is "Registration Recipe"?(Continued)

Operation Recipe

The recipe that the machine is currently using for operation is called the Operation Recipe.

Registration Recipe

Recipes can be saved with numbers.

It call the saved recipe a Registration Recipe.

This machine can save up to 50 registered recipes.

2. Button

AUTO button

Pushing the button puts the machine in automatic mode.

The button lights up in green while in automatic mode.

MANU. button

Pushing the button puts the machine in manual mode.

The button lights up in yellow while in manual mode.



Only one selectable "AUTO" or "MANU.".

It's not selectable both at same time.

Manual mode is selected when the power is ON.

RUN button

When select the automatic mode, automatic operation is started with this button.

The button lights up in green during automatic operation.

STOP button

It is a button to stop automatic operation.

The button lights up red while automatic operation is stopped.



Both "RUN" button and "STOP" button are off when the power is turned on.

When push the "AUTO" button and select the automatic mode, the "STOP" button will light up.

3. Status lamp

HOME POSITION lamp

It lights up when the ON / OFF state of each drive unit and sensor of the machine is in the home position.

READY lamp

It will light when automatic operation can be started.

- It does not light unless the temperature of the laminate roll reaches the set value.

RECIPE lamp

This lamp lights up when it is set to use the Registration Recipe.

FILM WIDTH display

Display the film width memorized by the current Present recipe.
It is displayed in units of both inches and millimeters.

4. ROLL speed (Unit : m/min)

Displays the actual laminate roll speed.

5. TEMPERATURE (Unit : °C)

TEMP. ROLL

SET : This is the laminate roll temperature set in the Operation Recipe.

ACTUAL

UPPER : The current temperature of the upper laminate roll.

LOWER : The current temperature of the Lower laminate roll.

TACKING

SET : This is the tacking plate temperature set in the Operation Recipe.

ACTUAL

UPPER : The current temperature of the upper tacking plate.

LOWER : The current temperature of the lower tacking plate.

6. PWB COUNT

Displays the total number of processed sheets since the last reset.

To reset it to "0," hold down the "RESET" button for more than two seconds.

8. Screen switch button

RECIPE button

In case of setting not to use Registration Recipe, It shift to the 3.2.2. RECIPE SETTING 1 screen.

In case of setting to use Registration Recipe, It shift to the 3.2.3. RECIPE REGISTRATION screen.

COMMON SETTING button

When this button is pushed, it shifts to 3.2.4. COMMON SETTING screen through the password screen.

RECIPE MAKING button

When this button is pushed, it shifts to 3.2.5. RECIPE MAKING screen through the password screen.

M.OPERATION button

Push this button will shift to the 3.2.6. M.OPERATION screen.

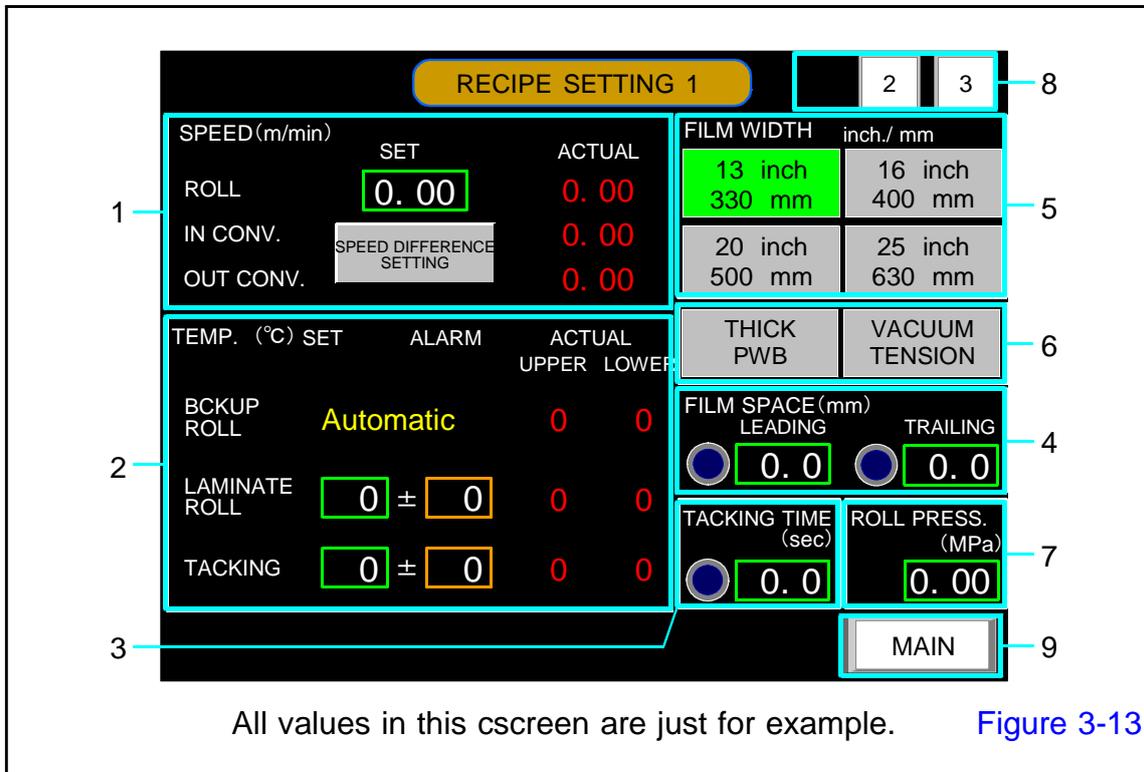
SYSTEM button

Push this button will shift to the 3.2.7. SYSTEM screen.

ALARM button

Push this button will shift to the 3.2.8. ALARM screen.

3.2.2. RECIPI SETTING 1 screen



NOTE

This screen is a screen to be displayed on a machine that does not use the Registration Recipe function.

Display and set the current Operation Recipe.

1. SPEED (Unit: m/min)

Displays the speed set value of the input conveyor, laminate roll, and output conveyor and the current speed.

By pushing the "SPEED DIFFERENCE SETTING" button it can fine-tune the speed of the input and output conveyors.

Set the difference with the roll speed with plus / minus.

2. TEMP. (Unit: °C)

Temperature setting value, alarm value, current value of laminating roll and tacking plate are displayed.

Also make those settings here.

3. TACKING TIME (Unit: sec)

During the tacking operation, set the time during which the upper and lower Tacking plates sandwich the board.

While the timer is measuring, the lamp beside the setting value will blink.

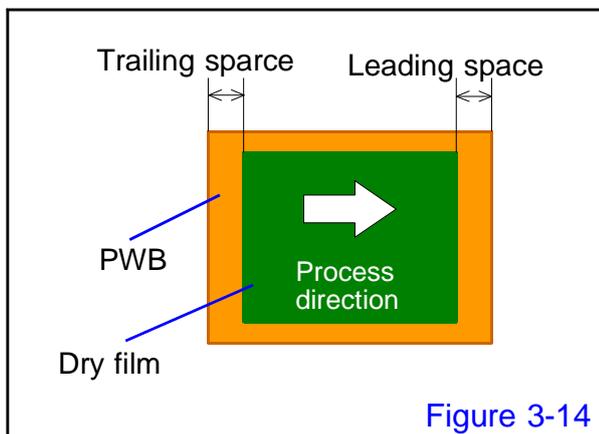


NOTE

What is "Tacking"?

When attaching a dry film to PWB, the process of determining the position of the beginning of PWB sticking and temporarily adhering about 2 mm is called Tacking

4. FILM SPACE (Unit: mm)



Set the position to paste the film onto the PWB.

Regarding to the meaning of "Leading" and "Trailing," please refer to Figure 3-14.

During the Leading and Trailing space counting, the lamp beside the setting value will blink.

5. FILM WIDTH (Unit: inch/mm)

The width of the laminate film that can be selected with this machine is displayed.

Please push the button of film width to process and select it.

The selected film width lights up in green.

6. Function selection button

THICK BWP button

Select ON / OFF for THICK PWB function.

When it is ON, the button lights up in green.



What is "Thick PWB"?

When "Thick PWB" function ON is selected, the roll is lowered (pressurized) at the front end of the PWB and switched to rise at the rear end of the PWB.

It rises when the next PWB comes up, it descends (pressurizes) at the tip of PWB and it rises at the rear end of PWB.

- The PWB does not enter to the roll during automatic operation.
- Scratches the roll at the tip of the PWB. It is effective in the above case.

VACUUM TENSION button

Select ON / OFF of the VACUUM TENSION function.

Lights up when the vacuum tension function is ON.



What is "Vacuum Tension"?

Vacuum of the tacking plate, cutter backup, film guide is normally turned OFF after the tacking action finished, and it turns ON before the cutter run.

If the VACUUM TENSION button is turned "ON", Vacuum plate, Cutter backup and Film guide vacuum will turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

7. ROLL PRESS (Option) (Unit: MPa)

Set the air pressure applied to the cylinder for lowering backup roll (pressurizing). The relationship between the numerical value set here and the pressure applied to the actual laminating roll is as follows.

Roll pressure setting	Roll pressing force
0.20 MPa	approx. 210 kg
0.25 MPa	● approx. 260 kg
0.30 MPa	approx. 305 kg
0.40 MPa	approx. 400 kg
0.50 MPa	approx. 490 kg

● It is factory setting



This setting item is not available on standard machine.
For standard machines, set the roll pressure by turning the knob of the air regulator.

8. Screen move button

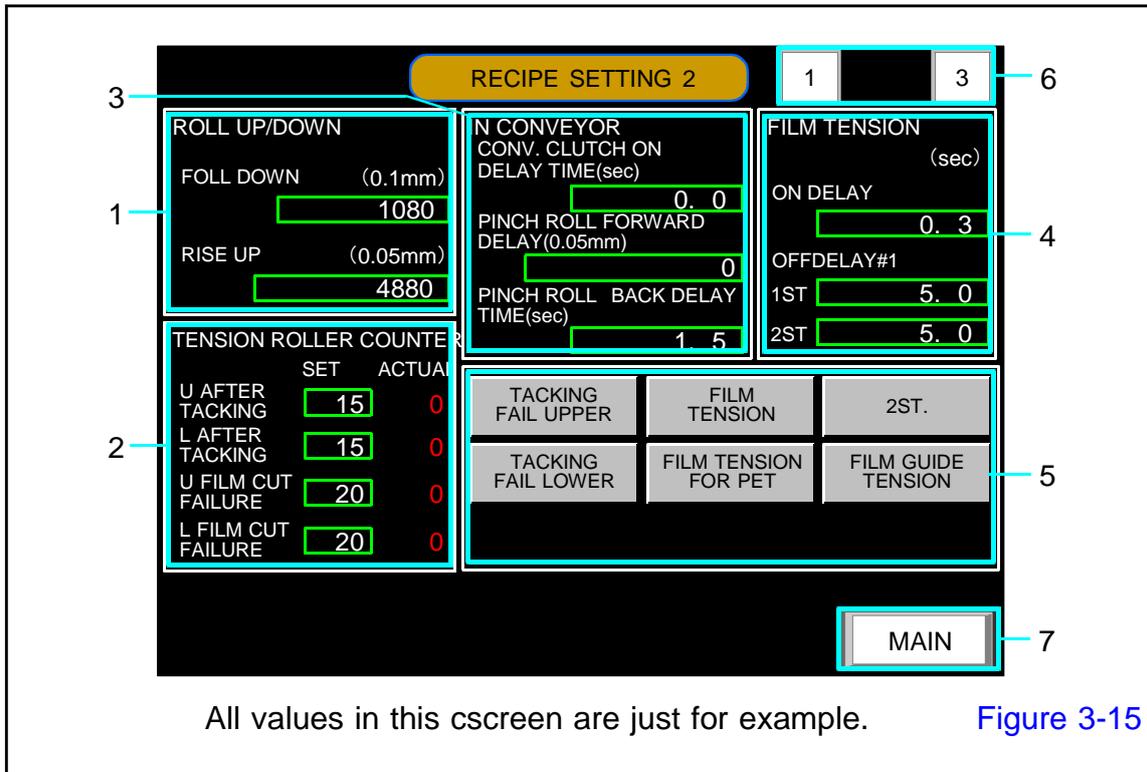
It is a move button within the same name screen.

This button moves to RECIPE SETTING 2 or RECIPE SETTING 3 screen.

9. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.2.1. RECIPE STETTING 2 screen



This screen is a screen to be displayed on a machine that does not use the Registration Recipe function.

1. ROLL UP/DOWN

Set the timing of roll up / down when "THICK PWB" function is used.

ROLL DOWN (Unit : 0.1mm 、 Default : 1080)

Set the timing at which the laminate roll moves from the upper position to the pressed position with the PWB position.

Movement distance of PWB after restart of stopped conveyor for tacking action.

- As the number increases, the roll pressurization start position moves to the rear of the PWB.
- When decreasing the value, the roll pressurization start position moves to the front of the PWB.

RISE UP (Unit : 0.05mm 、 Default : 4880)

Set the timing at which the laminate roll moves from the pressurizing (Lower) position to the upper position with the PWB position.

Travel distance of PWB after Edge Sensor(Reference sensor) detects PWB trailing edge.

- When the number is increased, the roll pressure end position moves to the rear of the PWB.
- When the numerical value is decreased, the roll pressure end position moves to the front of the PWB.

2. TENSION ROLL counter

The set value for detecting the tacking error and film cut error.

Detect and count the dimples on the tension roll with the sensor.

(1 count = about 6.6 mm)

U AFTER TACKING (Unit : Count Default : 15)

Number of counts of the upper tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

L AFTER TACKING (Unit : Count Default : 15)

Number of counts of the lower tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

U CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the upper tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

L CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the lower tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

SET

Enter the above four items of alarm setting values.

ACTUAL

The measured value of one cycle before is displayed.

3. IN CONVEYOR

It is a setting value for the input conveyor.

CONV. CLUTCH ON DELAY TIME (Unit : sec , Default : 0.0)

Time from the time-up of the tacking timer to the restart of the conveyor

PINCH ROLL FORWARD DELAY (Unit : 0.05mm , Default : 0)

Set the distance until the pinch roll starts to advance after restarting the input conveyor.

PINCH ROLL BACK DELAY (Unit : sec , Default : 1.5)

Set the time from when the pinch roll reaches the forward end until the start of backward movement.

4. FILM TENSION

It is a set value to control the operation of film tension roll.

ON DELAY (Unit : sec , Default : 0.3)

Set the time from when the Tacking Plate sandwiches the PWB until the tension roll starts to move.

OFF DELAY**1ST (Unit : sec , Default : 1.0)**

It is a valid setting when "2ST" button is OFF (dark).

Set the time from ON to OFF of the tension roll.

2ST (Unit : sec 、 Default : 1.0)

It is a valid setting when "2ST" button is ON (lit).

Set the time for the pinch roll from the start of advance to the turning off of the tension roll.

5. Function selection button

Select ON / OFF of the following functions to be used automatic operation.

Each time press the button, ON / OFF changes.

It is a setting that uses the function when the green lamp is lit (ON) and does not use the function in the lit OFF state (OFF).

TACKING FAIL UPPER (Default : ON)

It is ON / OFF button of upper TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

Please set it to OFF when doing single sided sticking only on the lower side.

TACKING FAIL LOWER (Default : ON)

It is ON / OFF button of lower TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

Please set it to OFF when doing single sided sticking only on the upper side.

FILM TENSION (Default : ON)

This is the ON / OFF button of the film tension function (the function to operate the tension roll at the end of tacking to slacken the film).

It is ON when the button lights up in green.

FILM TENSION FOR PET (Default : OFF)

This is ON / OFF button for "FILM TENSION FOR PET" function .

It is ON when the button lights up in green.

**What is "Film Tension for PET"?**

It is a function to loosen the film before the approach operation of the Tacking Plate.

Operation before starting operation

The tension roll turns ON until after 3 seconds from the start of automatic operation from the vacuum ON at film setting.



What is "Film Tension for PET"? (continued)

Operation after start of operation

The tension roll turns on from roll down to roll up.

2ST (Default : OFF)

This is ON / OFF button of 2 step ST (stroke) function.

It is ON when the button lights up in green.

FILM GUIDE TENSION (Default : OFF)

This is ON / OFF button of FILM GUIDE TENSION function.

It is ON when the button lights up in green.

Can not be used with VACUUM TENSION function.

When both functions are ON, the vacuum tension function takes precedence.



What is "Film Guid Tension"?

From the Vacuum Tension function, it removes only vacuum plate adsorption.

If the FILM GUIDE TENSION button is turned "ON",

Cutter backup and Film guide vacuum will be turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

6. Screen move button

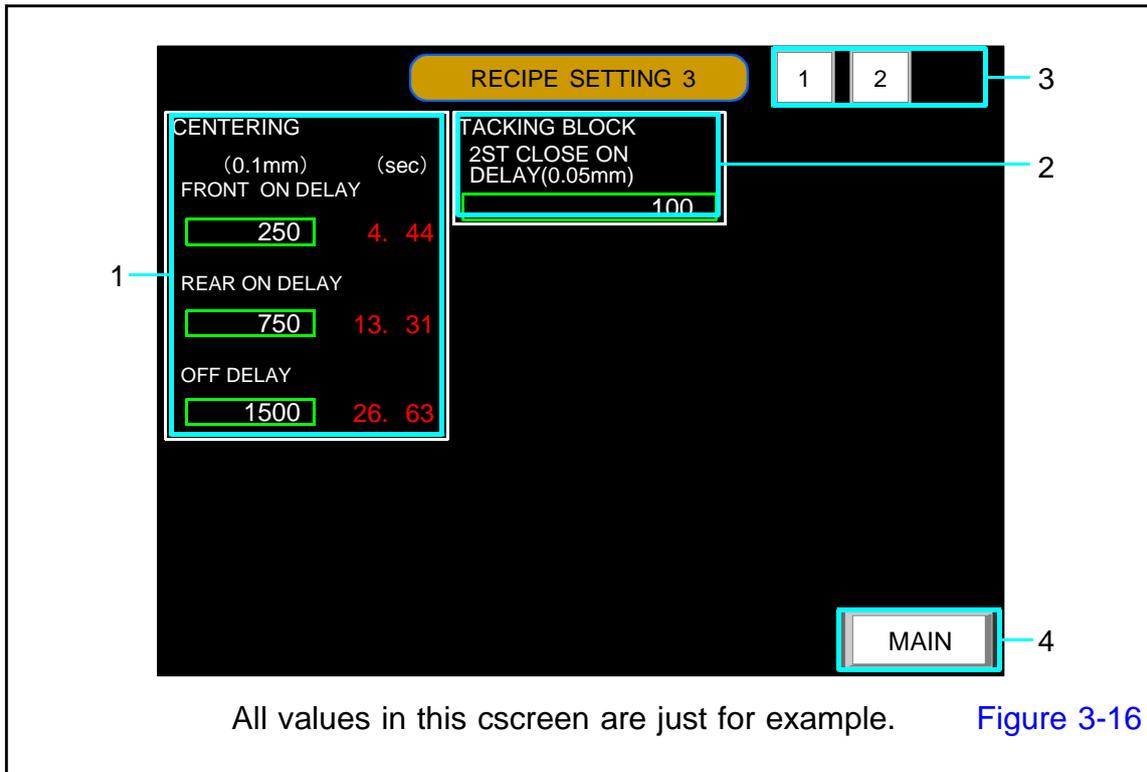
It is a move button within the same name screen.

This button moves to RECIPE SETTING 1 or RECIPE SETTING 3 screen.

7. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

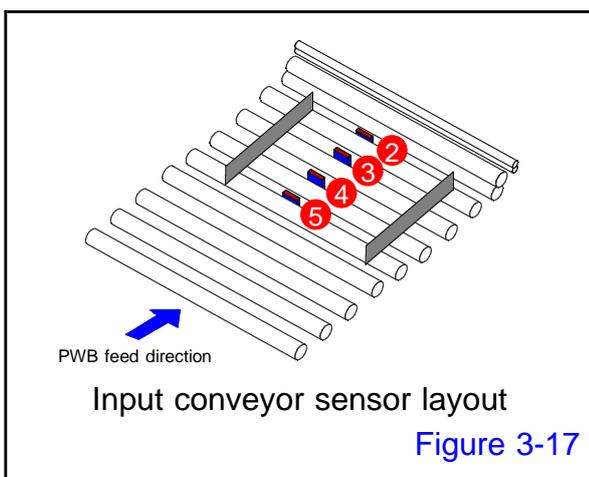
3.2.2.2. RECIPE STETTING 3 screen



NOTE

This screen is a screen to be displayed on a machine that does not use the Registration Recipe function.

1. CENTERING (Unit : 0.1mm)



Set the timing when the centering bar opens and closes.

The distance advanced by PWB after the sensor of ④ in Figure 3-17 is turned on is the start timing of each.

FRONT ON DELAY (Default : 250)

Set the timing to start the closing operation of the front centering bar.

REAR ON DELAY (Default : 750)

Set the timing to start the closing operation of the rear centering bar.

OFF DELAY (Default : 1500)

Closed centering bar Set the timing to open the front side and rear centering bar.

2. TACKING BLOCK (Unit : 0.05mm 、 Default : 100)

2ST CLOSE ON DELAY

This is the setting when 2ST is used.

Set the timing to move from the position where the Tacking block is opened by 120 mm to the position opened by 50 mm.

From the input conveyor restart after tacking, set by the distance the PWB moved.

3. Screen move button

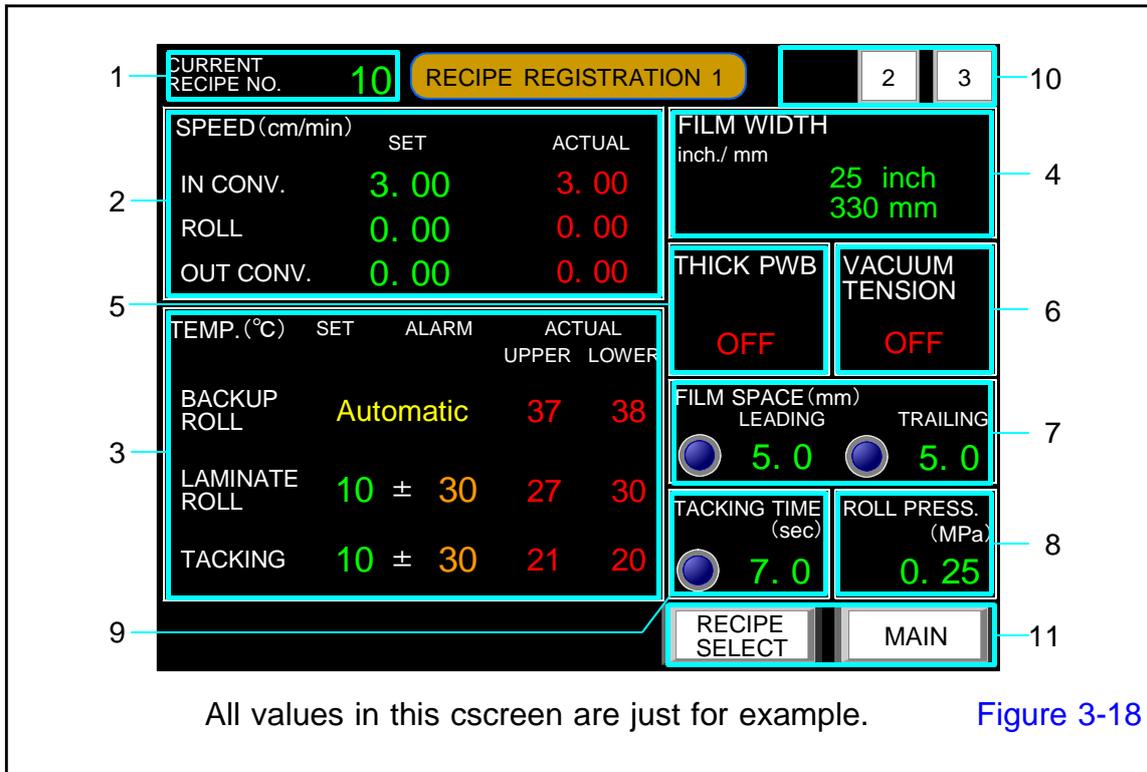
It is a move button within the same name screen.

This button moves to RECIPE SETTING 1 or RECIPE SETTING 2 screen.

4. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3. RECIPE REGISTRATION 1 screen



NOTE

This screen is a screen to be displayed on a machine that uses the Registration Recipe function.

Displays the currently selected Registration Recipe.

Regarding the Registration Recipe, please refer to "3.2.1. Main screen, NOTE - What is Registered recipe?".

1. CURRENT RECIPE NO.

Displays the number of the Registration Recipe currently being used (displayed).

2. SPEED (Unit : m/min)

Displays the set value of the input conveyor, laminate roll, output conveyor and the current speed.

3. TEMP (Unit : °C)

Displays the set value, alarm value, current value of each backup roll, laminate roll and tacking plate.

4. FILM WIDTH

Displays the currently selected film width.

5. THICK PWB

The setting (ON / OFF) state of the THICK PWB function is displayed.



What is "Thick PWB"?

When "Thick PWB" function ON is selected, the roll is lowered (pressurized) at the front end of the PWB and switched to rise at the rear end of the PWB.

It rises when the next PWB comes up, it descends (pressurizes) at the tip of PWB and it rises at the rear end of PWB.

- The PWB does not enter to the roll during automatic operation.
- Scratches the roll at the tip of the PWB. It is effective in the above case.

6. VACUUM TENSION

VACUUM TENSION function setting (ON / OFF) status is displayed.



What is "Vacuum Tension"?

Vacuum of the tacking plate, cutter backup, film guide is normally turned OFF after the tacking action finished, and it turns ON before the cutter run.



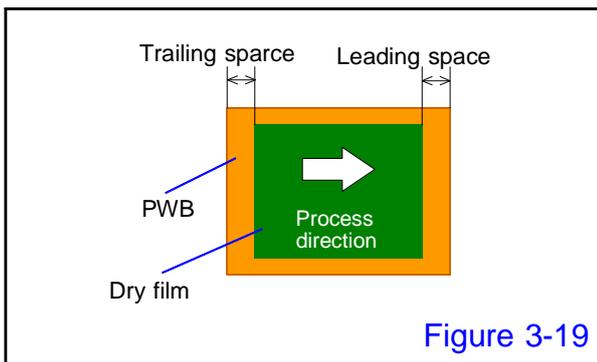
What is "Vacuum Tension"? (continued)

If the VACUUM TENSION button is turned "ON", Vacuum plate, Cutter backup and Film guide vacuum will turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

7. FILM SPACE (Unit : mm)



Displays the set value of the pasting space of the film.

Figure 3-19

8. ROLL PRESS (Option) (Unit : Mpa)

Displays the air pressure applied to the cylinder for back-up roll lowering (pressurizing).

Roll pressure setting	Roll pressing force
0.20 MPa	approx. 210 kg
0.25 MPa	● approx. 260 kg
0.30 MPa	approx. 305 kg
0.40 MPa	approx. 400 kg
0.50 MPa	approx. 490 kg

● It is factory setting



This setting item is not available on standard machine.

For standard machines, set the roll pressure by turning the knob of the air regulator.

9. TACKING TIME (Unit : sec)

Set the TACKING TIME (time during which the upper and lower tacking plates sandwich PWB during Tacking operation).

During the timer measurement, the lamp beside to the setting value will flash.

10. Screen move button

It is a move button within the same name screen.

This button moves to RECIPE REGISTRATION 2 or RECIPE REGISTRATION 3 screen.

11. Screen switch button

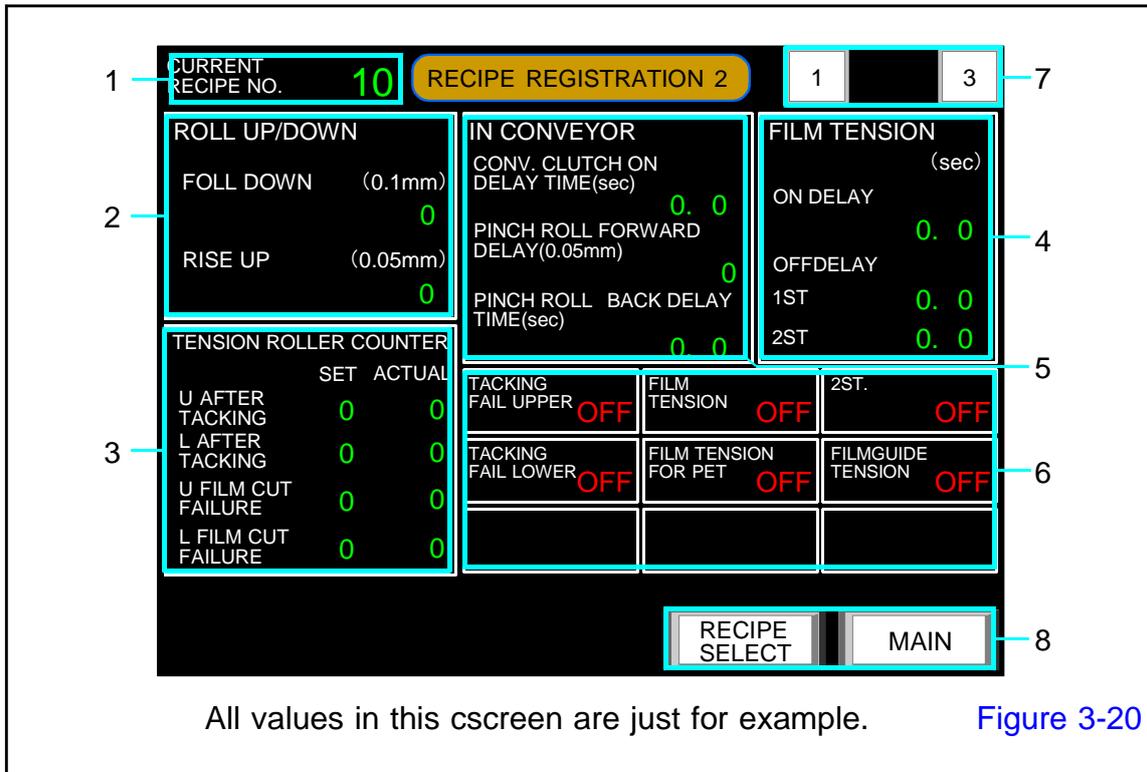
RECIPE SELECT

When this button is pushed, it shifts to 3.2.3.1. COMMENT LIST 1 screen.

MAIN

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3.1 . RECIPE REGISTRATION 2 screen



This screen is a screen to be displayed on a machine that uses the Registration Recipe function.

1. CURRENT RECIPE NO.

Displays the number of the Registration Recipe currently being used (displayed).

2. ROLL UP/DOWN

Set the timing of roll up / down when "THICK PWB" function is used.

ROLL DOWN (Unit : 0.1mm)

Displays the timing when the laminate roll moves from the raised position to the pressurized position.

- As the number increases, the roll pressurization start position moves to the rear of the PWB.
- When decreasing the value, the roll pressurization start position moves to the front of the PWB.

RISE UP (Unit : 0.05mm)

The timing at which the laminate roll moves from the lowering (pressurizing) position to the upper position is displayed.

- When the number is increased, the roll pressure end position moves to the rear of the PWB.
- When the numerical value is decreased, the roll pressure end position moves to the front of the PWB.

3. TENSION ROLL counter

The set value for detecting the tacking error and film cut error.

Detect and count the dimples on the tension roll with the sensor.

(1 count = about 6.6 mm)

U AFTER TACKING (Unit : Count Default : 15)

Number of counts of the upper tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

L AFTER TACKING (Unit : Count Default : 15)

Number of counts of the lower tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

U CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the upper tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

L CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the lower tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

4. FILM TENSION

It is a set value to control the operation of film tension roll.

ON DELAY (Unit : sec 、 Default : 0.3)

It is the time from when the tacking plate sandwiches the PWB until the tension roll begins to move.

OFF DELAY

1ST (Unit : sec 、 Default : 1.0)

It is a valid setting when "2ST" button is OFF (dark).

This is the time from ON to OFF of the tension roll.

2ST (Unit : sec 、 Default : 1.0)

It is a valid setting when "2ST" button is ON (lit).

It is the time from when the pinch roll advances until the tension roll comes off.

5. IN CONVEYOR

It is a setting value for the input conveyor.

CONV. CLUTCH ON DELAY TIME (Unit : sec 、 Default : 0.0)

Time from the time-up of the tacking timer to the restart of the conveyor

PINCH ROLL FORWARD DELAY (Unit : 0.05mm 、 Default : 0)

The travel distance of the PWB until the pinch roll advances after restarting the input conveyor.

PINCH ROLL BACK DELAY (Unit : sec 、 Default : 1.5)

It is the time from when the pinch roll reaches the forward end until the backward movement starts.

6. Function selection button

The ON / OFF status of the following functions used for automatic operation is displayed.

TACKING FAIL UPPER

It is ON / OFF condition display of upper TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

TACKING FAIL LOWER

It is ON / OFF condition display of lower TACKING FAIL alarm.
When OFF, alarm of TACKING FAIL will not be output.

FILM TENSION

This is the ON / OFF condition display of the film tension function (the function to operate the tension roll at the end of tacking to slacken the film).

FILM TENSION FOR PET

This is ON / OFF condition display for "FILM TENSION FOR PET" function .

**What is "Film Tension for PET"?**

It is a function to loosen the film before the approach operation of the Tacking Plate.

Operation before starting operation

The tension roll turns ON until after 3 seconds from the start of automatic operation from the vacuum ON at film setting.

Operation after start of operation

The tension roll turns on from roll down to roll up.

2ST This is ON / OFF condition display of 2 step ST (stroke) function.

**What is "2ST (stroke)" ?**

2ST is a function to switch OPEN / CLOSE distance of "Tacking block" in two steps.
Normally "Tacking block" open / close operation is performed at 80 mm.
In the 2ST ON state, it opens 120 mm after tacking action and closes 70 mm with the film adsorbed on the tacking plate as PWB advances.



What is "2ST (stroke)" ? (continued)

With the above operation, the tension of the film applied to the board can be reduced as much as possible.

It is an effective function for processing ultrathin PWB etc.

FILM GUIDE TENSION

This is ON / OFF condition display of FILM GUIDE TENSION function.



What is "Film Guid Tension"?

From the Vacuum Tension function, it removes only vacuum plate adsorption.

If the FILM GUIDE TENSION button is turned "ON",

Cutter backup and Film guide vacuum will be turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

7. Screen move button

It is a move button within the same name screen.

This button moves to RECIPE REGISTRATION 1 or RECIPE REGISTRATION 3 screen.

8. Screen switch button

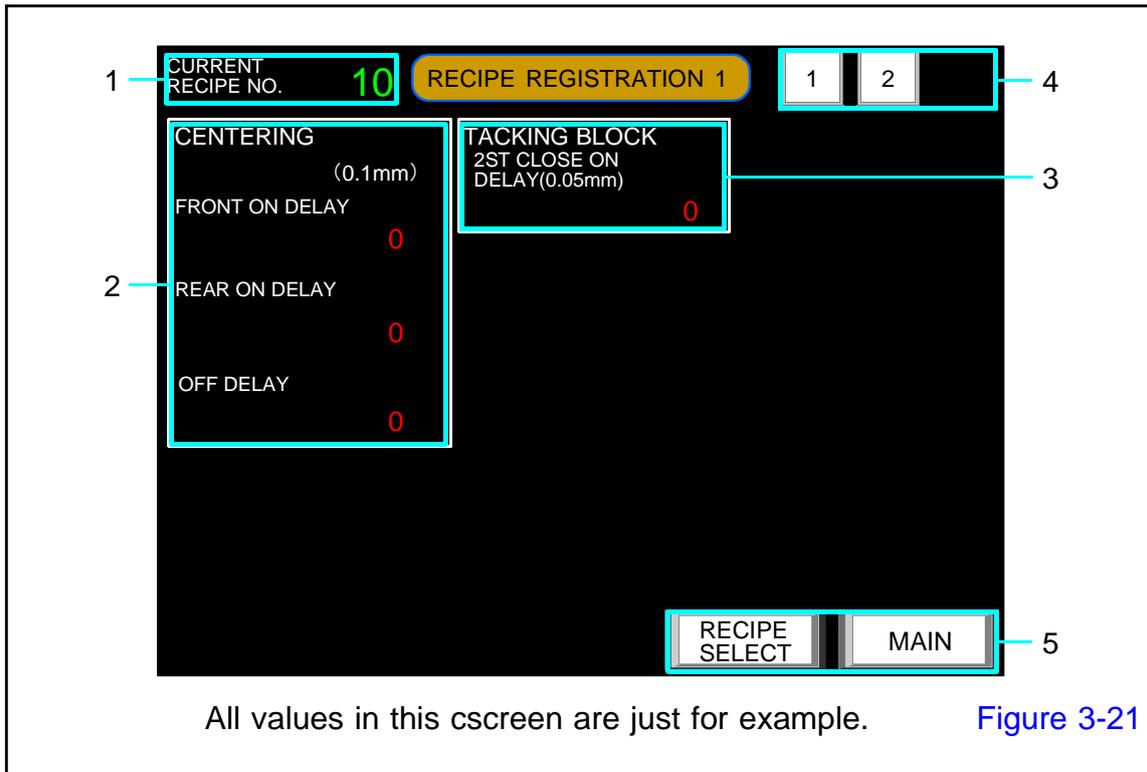
RECIPE SELECT

When this button is pushed, it shifts to 3.2.3.1. COMMENT LIST 1 screen.

MAIN

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3.1.1. RECIPE REGISTRATION 3 screen



NOTE

This screen is a screen to be displayed on a machine that uses the Registration Recipe function.

1. CURRENT RECIPE NO.

Displays the number of the Registration Recipe currently being used (displayed).

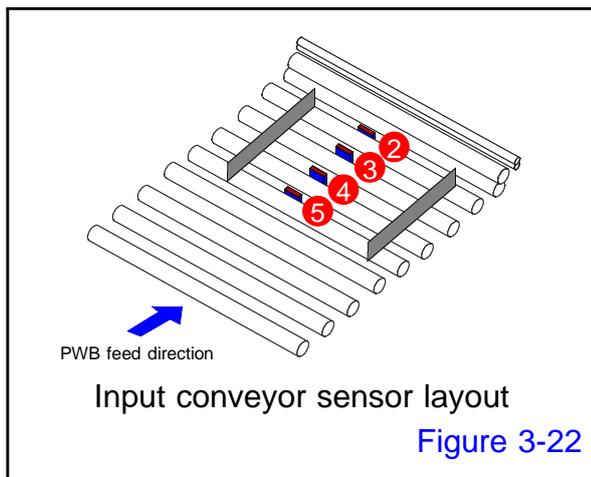
2. CENTERING (Unit : 0.1mm)

It is the timing when the centering bar opens and closes.

The distance advanced by PWB after the sensor of ④ in Figure 3-24 is turned on is the start timing of each.

FRONT ON DELAY (Default : 250)

It is the timing to start the closing operation of the front side centering bar.



REAR ON DELAY (Default : 750)

It is the timing to start the closing operation of the rear centering bar.

OFF DELAY (Default : 1500)

It is the timing to open the closed front and rear centering bars.

3. TACKING BLOCK (Unit : 0.05mm 、 Default : 100)

2ST CLOSE ON DELAY

This is the setting when 2ST is used.

It is the timing to move from the position where the Tacking block is opened by 120 mm to the position opened by 50 mm.

From the input conveyor restart after tacking, set by the distance the PWB moved.

5. Screen switch button

It is a move button within the same name screen.

This button moves to RECIPE SERECT 1 or RECIPE SERECT 2 screen.

6. Screen switch button

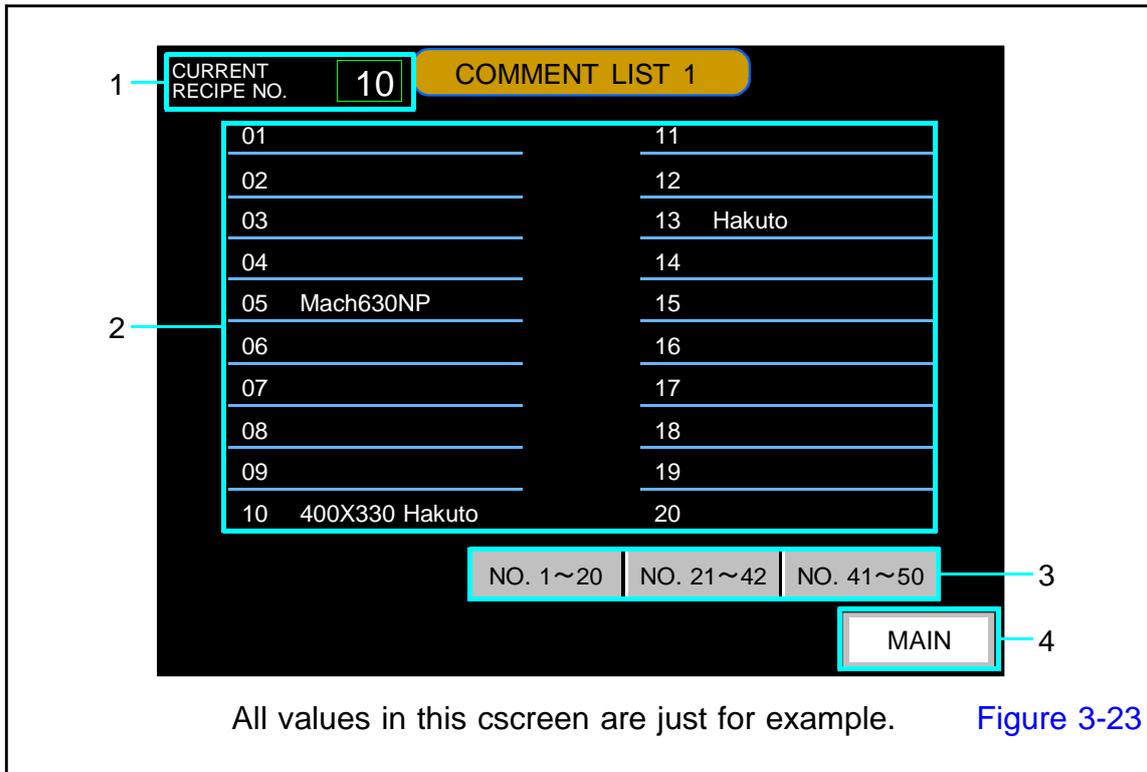
RECIPE SELECT

When this button is pushed, it shifts to 3.2.3.1. COMMENT LIST 1 screen.

MAIN

When this button is pushed, it shifts to 3.2.1. MAIN screen

3.2.3.2. COMEENT LIST 1 screen



This screen is a screen to be displayed on a machine that uses the Registration Recipe function.

1. CURRENT RECIPE NO.

Displays the number of the Registration Recipe currently being used (displayed).

2. Comment display

Display the comment written in the Registration Recipe.

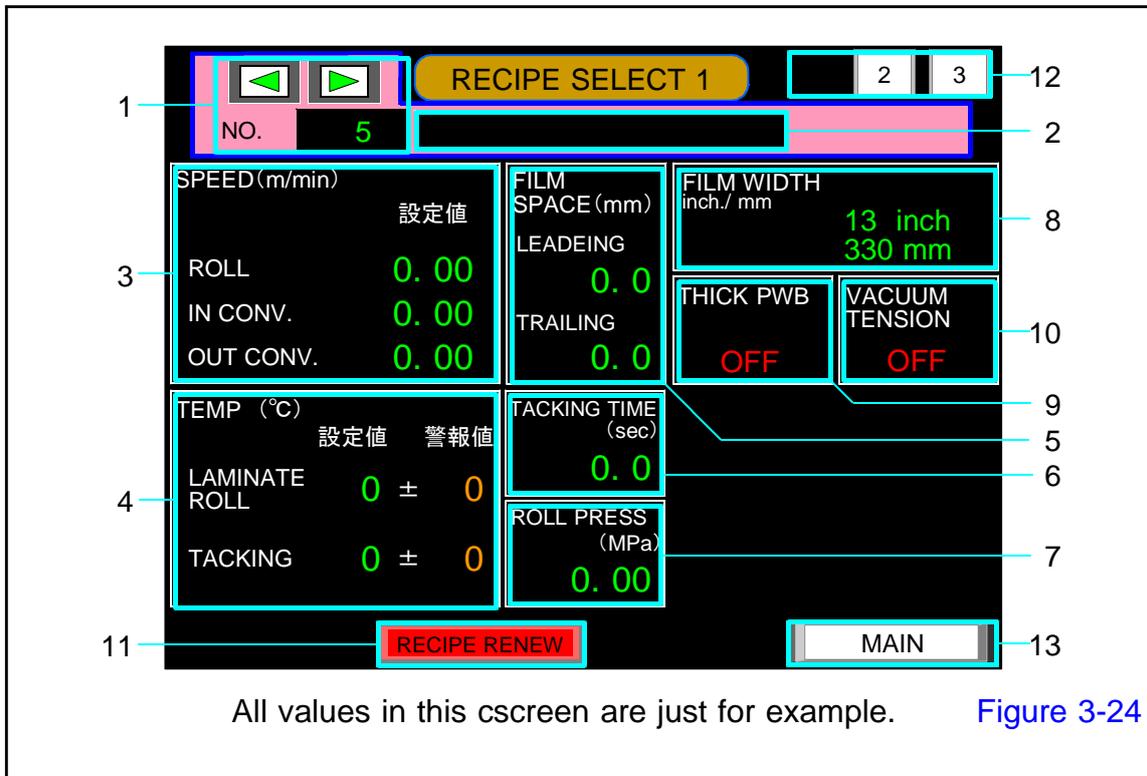
3. Select comment display range

Select the range of Registration Recipe for displaying comments.

4. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3.2.1. RECIPE SERECT 1 screen



NOTE

This screen is a screen to be displayed on a machine that uses the Registration Recipe function.



NOTE

RECIPE SELECT screen is a screen for confirming the contents of Registration Recipe and changing it to Operation Recipe. It is not possible to change the contents of the recipe.

1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 1 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.

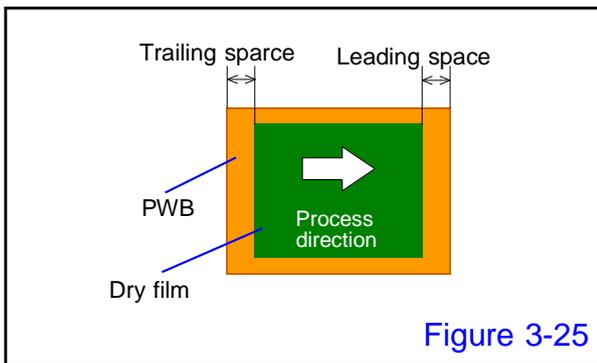
3. SPEED (Unit : cm/min)

Display speed setting values of input conveyor,output conveyor and laminate roll.

4. TEMP. (Unit: °C)

Displays the set temperature and alarm setting of the laminate roll and tacking plate.

5. FILM SPACE (Unit: mm)



The set value of the film pasting position is displayed.

Refer to Figure 3-25 for the meaning of the READING and TRALING.

6. TACKING TIME (Unit: sec)

During the tacking operation, the time when the upper and lower tacking plates are sandwiching the PWB is displayed.

7. ROLL PRESS (Option) (Unit: Mpa)

Displays the air pressure applied to the cylinder for back-up roll lowering (pressurizing).

Roll pressure setting	Roll pressing force
0.20 MPa	approx. 210 kg
0.25 MPa	● approx. 260 kg
0.30 MPa	approx. 305 kg
0.40 MPa	approx. 400 kg
0.50 MPa	approx. 490 kg

● It is factory setting



This setting item is not available on standard machine.

For standard machines, set the roll pressure by turning the knob of the air regulator.

8. FILM WIDTH

Displays the currently selected film width.

9. THICK PWB

The setting (ON / OFF) state of the THICK PWB function is displayed.



What is "Thick PWB"?

When "Thick PWB" function ON is selected, the roll is lowered (pressurized) at the front end of the PWB and switched to rise at the rear end of the PWB.

It rises when the next PWB comes up, it descends (pressurizes) at the tip of PWB and it rises at the rear end of PWB.

- The PWB does not enter to the roll during automatic operation.
- Scratches the roll at the tip of the PWB. It is effective in the above case.

10. VACUUM TENSION

The setting (ON / OFF) state of the THICK PWB function is displayed.



What is "Vacuum Tension"?

Vacuum of the tacking plate, cutter backup, film guide is normally turned OFF after the tacking action finished, and it turns ON before the cutter run.



What is "Vacuum Tension"? (continued)

If the VACUUM TENSION button is turned "ON", Vacuum plate, Cutter backup and Film guide vacuum will be turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

11. RECIPE RENEW button

Set the Registration Recipe currently displayed on the screen as an Operation Recipe.

12. Screen switch button

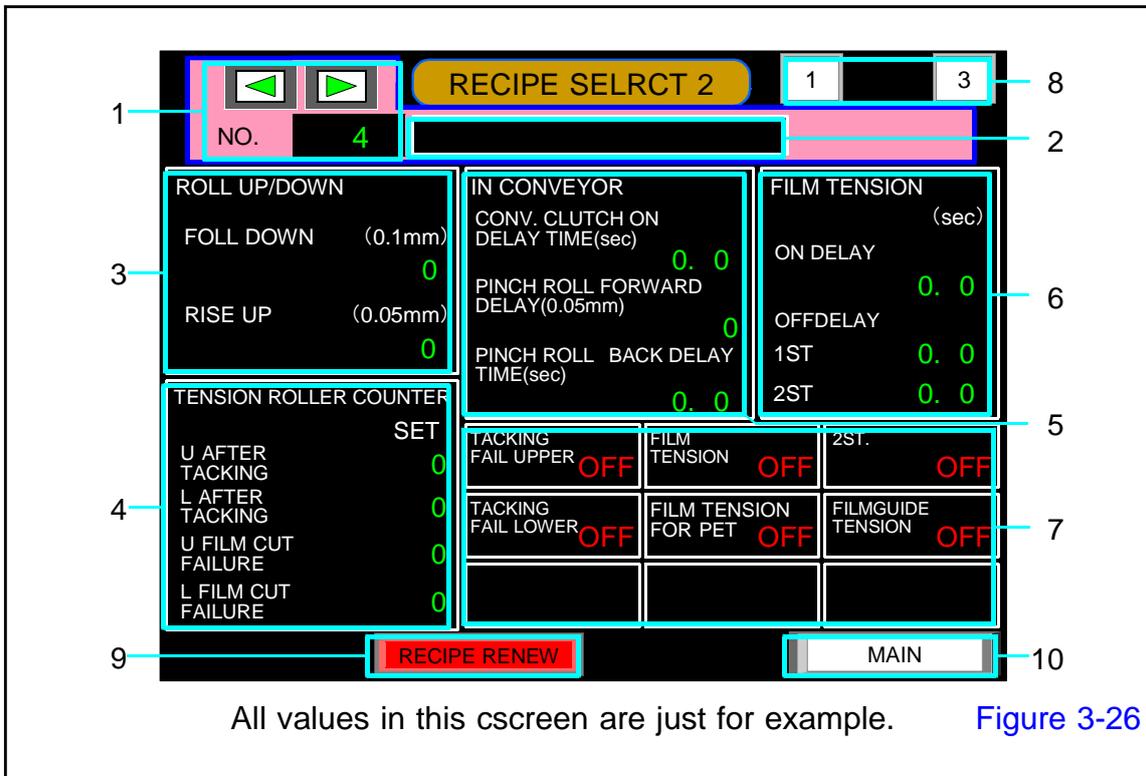
It is a move button within the same name screen.

This button moves to RECIPE SERECT 1 or RECIPE SERECT 2 screen.

13. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3.2.1.1. RECIPE SERECT 2 screen



NOTE

RECIPE SELECT screen is a screen for confirming the contents of Registration Recipe and changing it to Operation Recipe. It is not possible to change the contents of the recipe.

1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 1 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.

3. ROLL UP/DOWN

Set the timing of roll up / down when "THICK PWB" function is used.

ROLL DOWN (Unit : 0.1mm)

Displays the timing when the laminate roll moves from the raised position to the pressurized position.

- As the number increases, the roll pressurization start position moves to the rear of the PWB.
- When decreasing the value, the roll pressurization start position moves to the front of the PWB.

RISE UP (Unit : 0.05mm)

The timing at which the laminate roll moves from the lowering (pressurizing) position to the upper position is displayed.

- When the number is increased, the roll pressure end position moves to the rear of the PWB.
- When the numerical value is decreased, the roll pressure end position moves to the front of the PWB.

4. TENSION ROLL counter

The set value for detecting the tacking error and film cut error.

Detect and count the dimples on the tension roll with the sensor.

(1 count = about 6.6 mm)

U AFTER TACKING (Unit : Count Default : 15)

Number of counts of the upper tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

L AFTER TACKING (Unit : Count Default : 15)

Number of counts of the lower tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

U CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the upper tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

L CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the lower tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

5. IN CONVEYOR

It is a setting value for the input conveyor.

CONV. CLUTCH ON DELAY TIME (Unit : sec , Default : 0.0)

Time from the time-up of the tacking timer to the restart of the conveyor

PINCH ROLL FORWARD DELAY (Unit : 0.05mm , Default : 0)

The travel distance of the PWB until the pinch roll advances after restarting the input conveyor.

PINCH ROLL BACK DELAY (Unit : sec , Default : 1.5)

It is the time from when the pinch roll reaches the forward end until the backward movement starts.

6. FILM TENSION

It is a set value to control the operation of film tension roll.

ON DELAY (Unit : sec , Default : 0.3)

It is the time from when the tacking plate sandwiches the PWB until the tension roll begins to move.

OFF DELAY**1ST (Unit : sec , Default : 1.0)**

It is a valid setting when "2ST" button is OFF (dark).

This is the time from ON to OFF of the tension roll.

2ST (Unit : sec 、 Default : 1.0)

It is a valid setting when "2ST" button is ON (lit).

It is the time from when the pinch roll advances until the tension roll comes off.

7. Function selection button

The ON / OFF status of the following functions used for automatic operation is displayed.

TACKING FAIL UPPER

It is ON / OFF condition display of upper TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

TACKING FAIL LOWER

It is ON / OFF condition display of lower TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

FILM TENSION

This is the ON / OFF condition display of the film tension function (the function to operate the tension roll at the end of tacking to slacken the film).

FILM TENSION FOR PET

This is ON / OFF condition display for "FILM TENSION FOR PET" function .

**What is "Film Tension for PET"?**

It is a function to loosen the film before the approach operation of the Tacking Plate.

Operation before starting operation

The tension roll turns ON until after 3 seconds from the start of automatic operation from the vacuum ON at film setting.

Operation after start of operation

The tension roll turns on from roll down to roll up.

2ST

This is ON / OFF condition display of 2 step ST (stroke) function.

**What is "2ST (stroke)" ?**

2ST is a function to switch OPEN / CLOSE distance of "Tacking block" in two steps.

Normally "Tacking block" open / close operation is performed at 80 mm.

In the 2ST ON state, it opens 120 mm after tacking action and closes 70 mm with the film adsorbed on the tacking plate as PWB advances.

With the above operation, the tension of the film applied to the board can be reduced as much as possible.

It is an effective function for processing ultrathin PWB etc.

FILM GUIDE TENSION

This is ON / OFF condition display of FILM GUIDE TENSION function.

**What is "Film Guide Tension"?**

From the Vacuum Tension function, it removes only vacuum plate adsorption.

If the FILM GUIDE TENSION button is turned "ON",

Cutter backup and Film guide vacuum will be turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

8. Screen switch button

It is a move button within the same name screen.

This button moves to RECIPE SERECT 1 or RECIPE SERECT 3 screen.

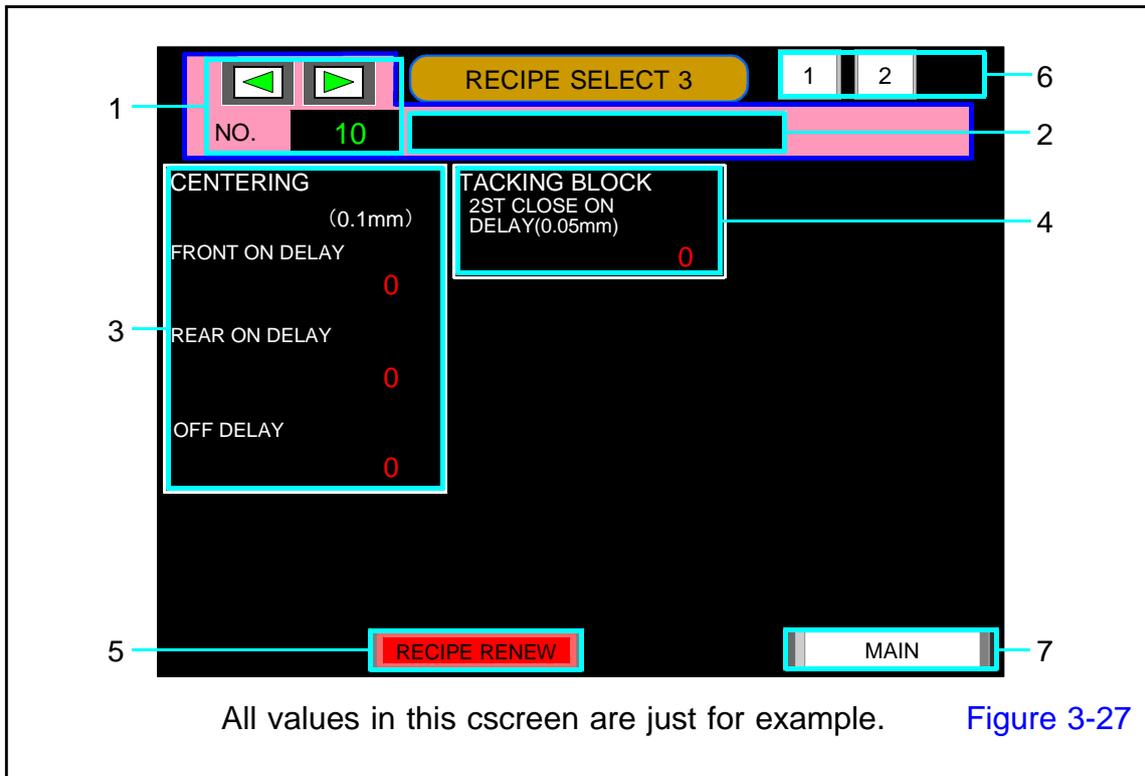
9. RECIPE RENEW

Set the Registration Recipe currently displayed on the screen as an Operation Recipe.

10. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.3.2.1.2. RECIPE SELECT 3 screen



NOTE

RECIPE SELECT screen is a screen for confirming the contents of Registration Recipe and changing it to Operation Recipe. It is not possible to change the contents of the recipe.

1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 1 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

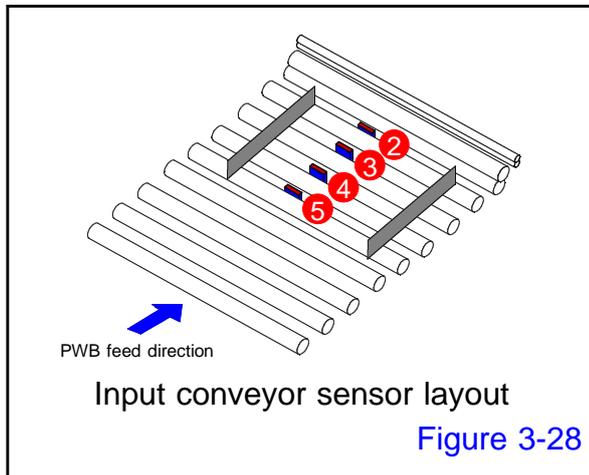
Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.

3. CENTERING (Unit : 0.1mm)

It is the timing when the centering bar opens and closes.

The distance advanced by PWB after the sensor of ④ in Figure 3-28 is turned on is the start timing of each.



FRONT ON DELAY (Default : 250)

It is the timing to start the closing operation of the front side centering bar.

REAR ON DELAY (Default : 750)

It is the timing to start the closing operation of the rear centering bar.

OFF DELAY (Default : 1500)

It is the timing to open the closed front and rear centering bars.

4. TACKING BLOCK (Unit : 0.05mm 、 Default : 100)

2ST CLOSE ON DELAY

This is the setting when 2ST is used.

It is the timing to move from the position where the Tacking block is opened by 120 mm to the position opened by 50 mm.

From the input conveyor restart after tacking, set by the distance the PWB moved.

5. RECIPE RENEW

Set the Registration Recipe currently displayed on the screen as an Operation Recipe.

6. Screen switch button

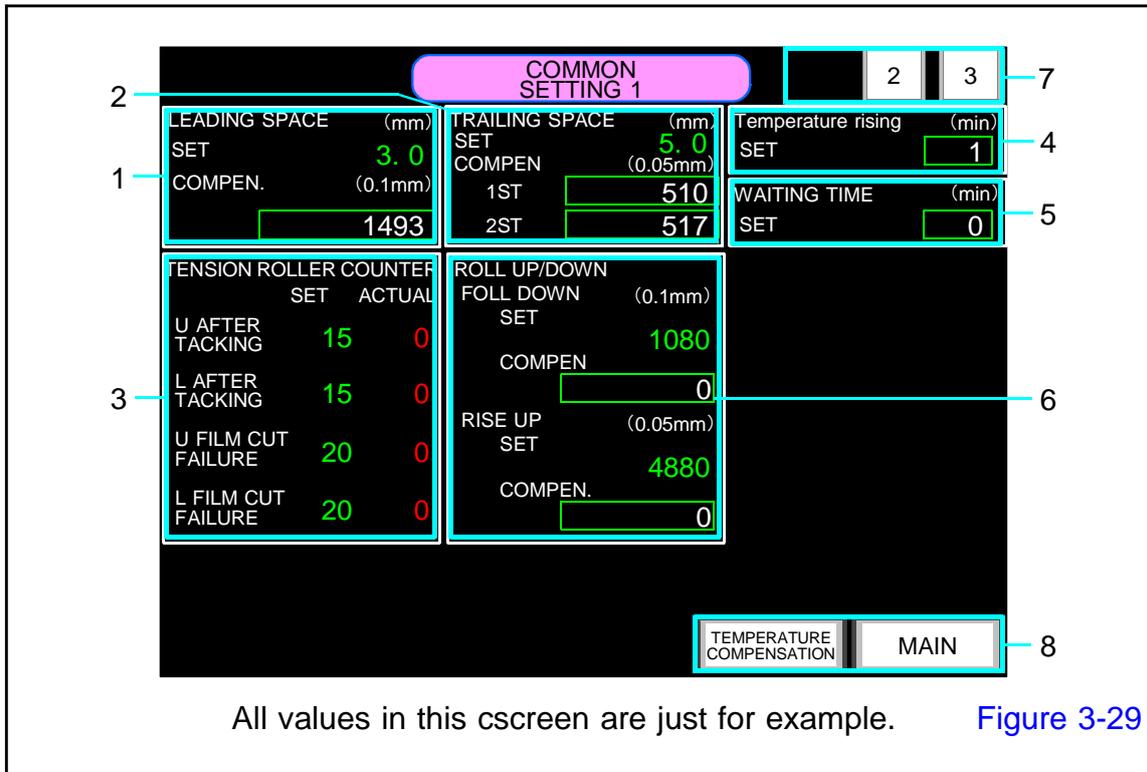
It is a move button within the same name screen.

This button moves to RECIPE SERECT 1 or RECIPE SERECT 2 screen.

7. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.4. COMMON SETTING 1 screen

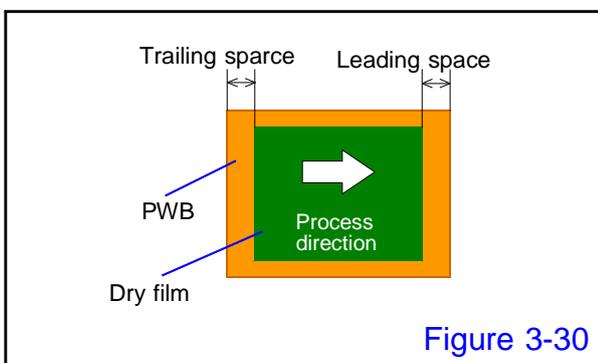


The common setting is a setting of common parameters used for operation separately from the recipe.

For actual operation, we are driving with parameters of Operation Recipe + COMMON SETTING screen.

1. LEADING SPACE

Correct the pasting position (LEADING SPACE) of the film here.



SET (Unit : mm)

This is the setting value of the LEADING SPACE set for the current operation recipe.

COMPEN (Unit : 0.1mm)

Reduce the number if the space is large than the set value.

Increase the number if the space is smaller than the set value.

2. TRAILING SPACE

Correct the pasting position (TRAILING SPACE) of the film here.

SET (Unit : mm)

This is the setting value of the TRAILING SPACE set for the current operation recipe.

COMPEN (Unit : 0.05mm)

Increase the number if the space is larger than the set value.

Reduce the number if the space is smaller than the set value.

If the two-step stroke function is ON, the value is in the 2ST frame, and if the two-step stroke function is OFF, it will operate using the numerical value in the 1ST frame.

3. TENSION ROLL COUNTER

On this screen, it can not change the setting value only with the display.

SET

This is the set value of the counter currently set as the Operation Recipe.

COMPEN

The measured value of one cycle before is displayed.

4. temperatue rising (Unit : min)

When the roll heater is on, the roll temperature will not rise unless the backup roll is lowered.

If the backup roll is not in the descent state for the time set here, it will be output as an alarm.

5. WAITINGTIME (Unit : min)

If the board is not inserted into this equipment within the set time during automatic operation, it outputs an alarm and warns the operator.

Depending on the type of dry film, there are things that can not be used if you touch the air for more than a certain period of time.

This is to call attention to operators when restarting operation.

If 0 is input as the set value, no alarm will be generated.

6. ROLL UP/DOWN

It is the timing correction value of the roll up and down when selecting the THICK PWB function.

ROLL DOWN (Unit : 0.1mm)

SET

This is the setting value of the roll lowering set for the current Operation Recipe.

COMPEN

- As the number increases, the roll pressurization start position moves to the rear of the PWB.
- When decreasing the value, the roll pressurization start position moves to the front of the PWB.

RISEUP (Unit : 0.05mm)

SET

This is the set value of the roll rise currently set for the Operation Recipe.

COMPEN

- When increasing the value, the roll pressure end position moves to the rear of the PWB.
- When the numerical value is decreased, the roll pressure end position moves to the front of the PWB.

7. Screen move button

It is a move button within the same name screen.

This button moves to COMMON SETTING 2 or COMMON SETTING 3 screen.

8. Screen switch button

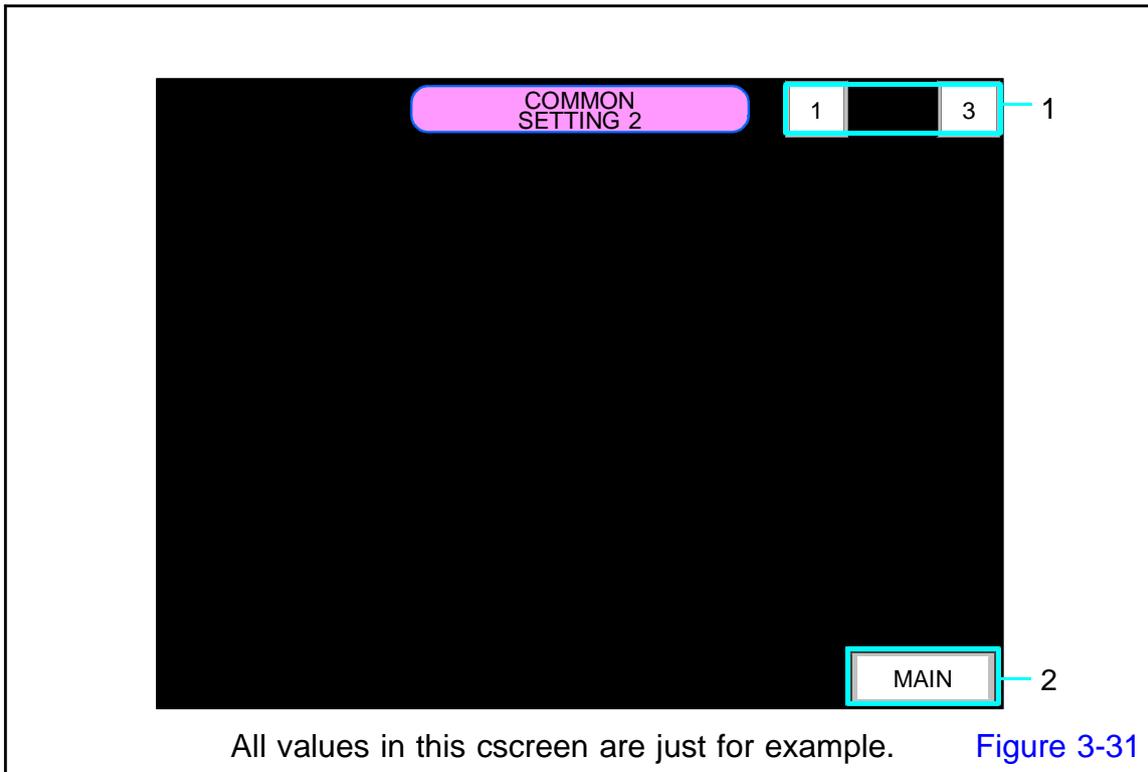
TEMPERATURE COMPENSATION

Push the button to shift to the TEMP. COMPEN.1 screen.

MAIN

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.4.1. COMMON SETTING 2 screen



NOTE

This is a spare screen of common setting 1. There are currently no setting items on the standard machine.

1. Screen move button

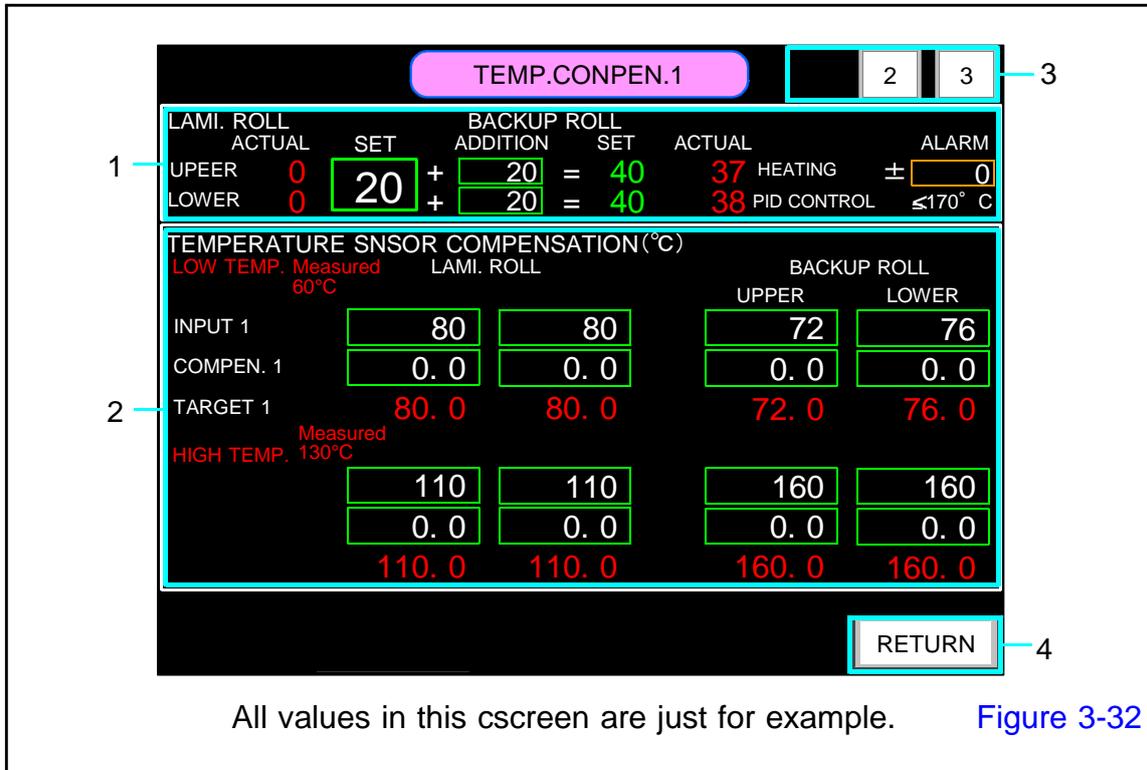
It is a move button within the same name screen.

This button moves to COMMON SETTING 2 or COMMON SETTING 3 screen.

2. MAIN button

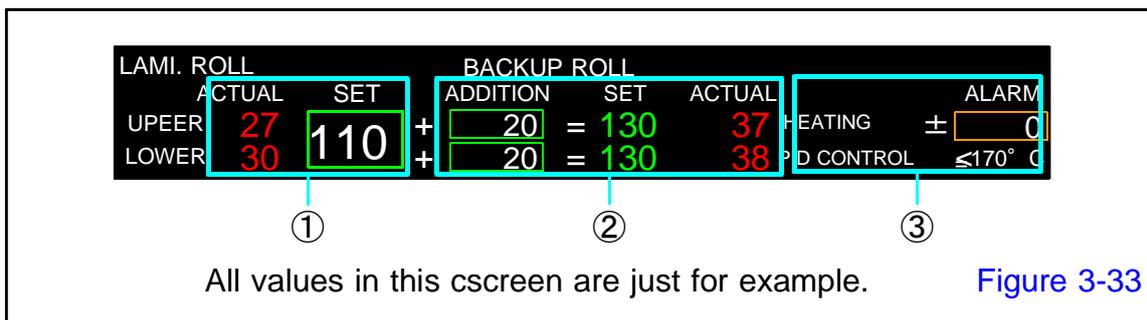
When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.4.2. TEMP. COMPEN 1 screen



It is the screen to perform temperature setting details of backup roll and temperature display correction.

1. Temperature setting value



①. LMMI. ROLL temperature

ACTUAL

Displays the temperature of the current laminate roll.

SET

It is the temperature set value of the laminate roll.

②. BACKUP ROLL temperature**ACTUAL**

Displays the temperature of the current backup roll.

ADDITION

In order to set the temperature of the backup roll, set the temperature to be added to the laminate roll temperature set value.

SET

It is the temperature set value of the backup roll.



For the temperature setting value of the backup roll, use the temperature for laminate roll set value + addition value.

③. Backup roll temperature alarm value

It is an alarm set value when the backup roll temperature is increased.

2. TEMPERATURE SENSOR COMPENSATION (Unit: °C)

Performs display correction of backup roll temperature and laminate roll temperature.

The slope of the correction value is calculated by using the two points for low temperature (1) and high temperature (2) for the temperature correction of this machine.

LOW TEMP. Measured 80°C LAMI. ROLL

Enter when the actual value of the laminate roll reaches approximately 80°C.

INPUT 1

Enter the ACTUAL value when 0 (zero) is input as the correction value.

(The ACTUAL value when the correction value is 0 is called the INPUT value.)

COMPEN 1

It is a value to correct input 1 value.

Enter a numerical value here so that the display of target value 1 becomes the same as the actual measurement value.

TARGET 1

It is input value + correction value.

Displays the value obtained by adding the correction value 1 to the input value 1.

HIGH TEMP. Measured 110°C LAMI. ROLL

Enter when the actual value of the laminate roll reaches approximately 110°C.

The meanings of the input value, correction value, and target value are the same as "Measuring low temperature 80°C laminate roll".

LOW TEMP. Measured 80°C BACKUP ROLL

Enter when the actual value of the backup roll reaches approximately 80°C.

The meanings of the input value, correction value, and target value are the same as "Measuring low temperature 80°C laminate roll".

HIGH TEMP. Measured 160°C BACKUP ROLL

Enter when the actual value of the backup roll reaches approximately 160°C.

The meanings of the input value, correction value, and target value are the same as "Measuring low temperature 80°C laminate roll".

3. Screen move button

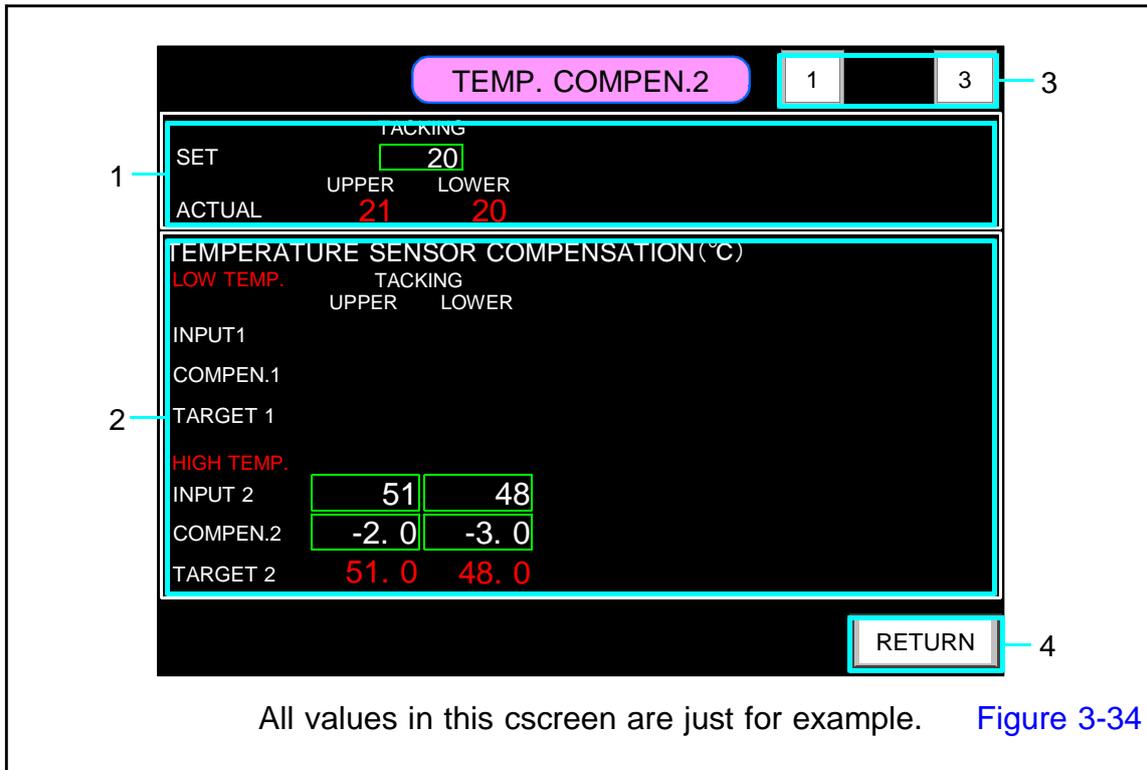
It is a move button within the same name screen.

This button moves to TEMP.CONPEN. 2 or TEMP.CONPEN. 3 screen.

4. RETURN button

Push this button to return to the COMMON SETTING screen.

3.2.4.2.1. TEMP. COMPEN 2 screen



This is the screen to correct the temperature display of the Tacking plate.

1. TACKING

ACTUAL

Displays the current temperature of the Tacking plate.

SET

Temperature setting value of the Tacking plate.

2. TEMPERATURE SENSOR COMPENSATION (Unit: °C)

It is the temperature correction value of the Tacking plate.

INPUT 1

Enter the current displayed temperature.

COMPEN 1

It is a value to correct input 1 value.

Enter a numerical value here so that the display of target value 1 becomes the same as the actual measurement value.

TARGET 1

It is input value + correction value.

3. Screen move button

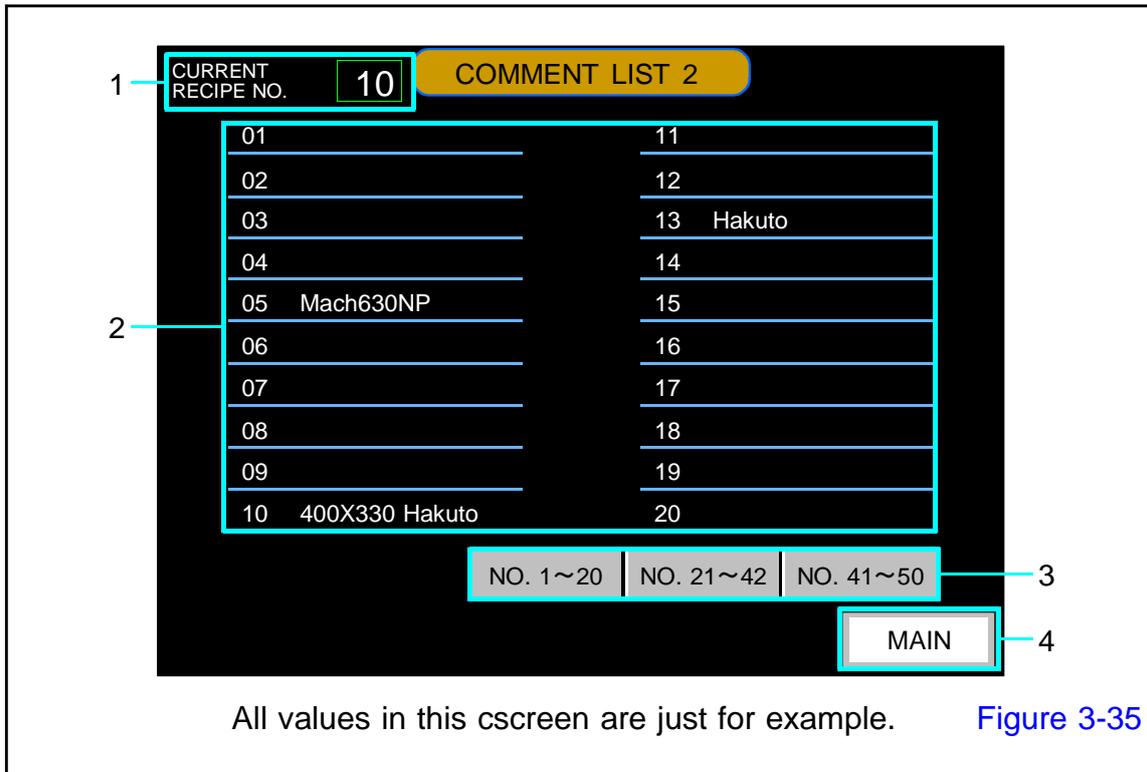
It is a move button within the same name screen.

This button moves to TEMP.CONPEN. 1 or TEMP.CONPEN. 3 screen.

4. RETURN button

Push this button to return to the COMMON SETTING screen.

3.2.5. COMMENT LIST 2 screen



1. CURRENT RECIPE NO.

Displays the number of the Registration Recipe currently being used (displayed).

2. Comment display

Display the comment written in the Registration Recipe.

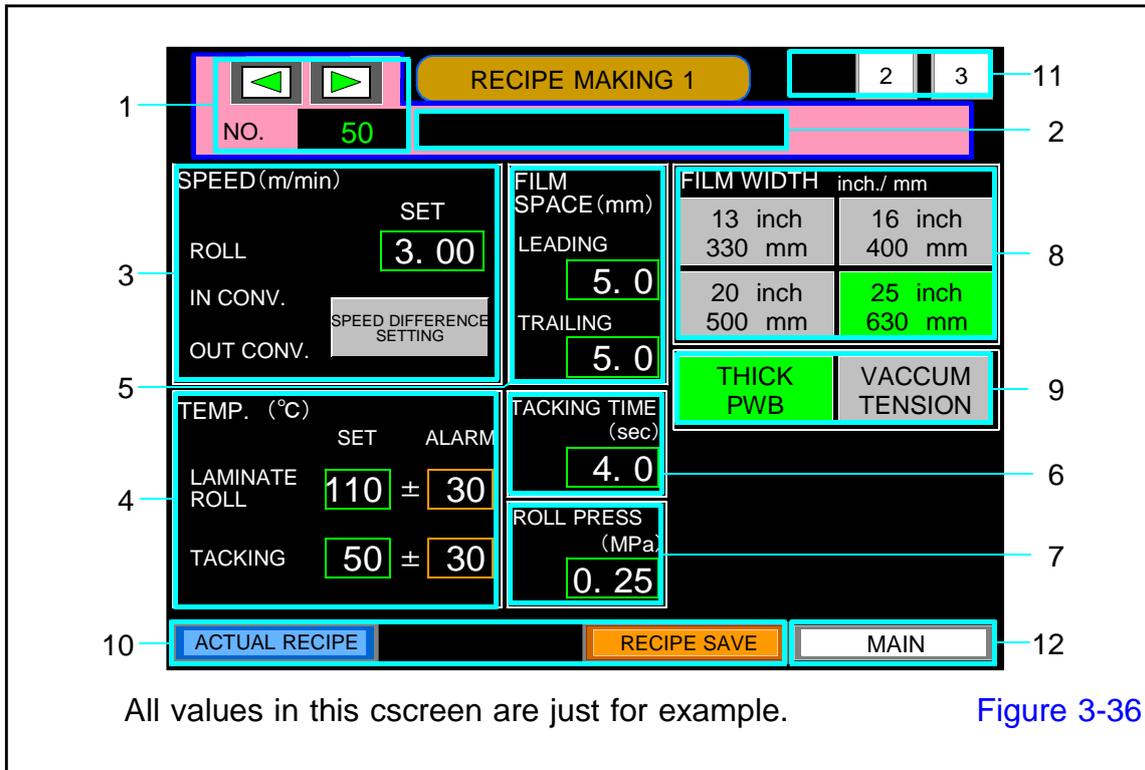
3. Select comment display range

Select the range of Registration Recipe for displaying comments.

4. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.5.1. RECIPE MAKING 1 screen



1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 2 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.



Comments entered or changed on the RECIPE MAKING screen are reflected on the comment list screen after pushing the "RECIPI SAVE" button.

3. SPEED (Unit : m/min)

Sets the speed of the laminate roll.

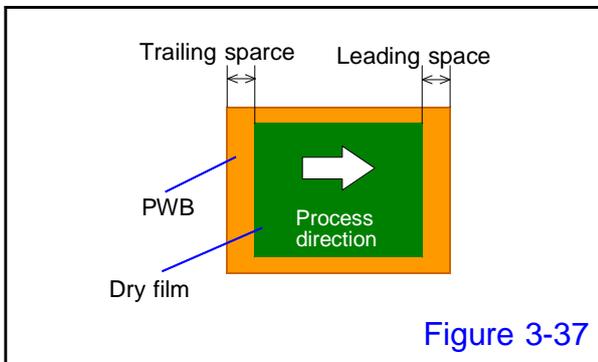
If set the speed of the Input conveyor or the Output conveyor to a speed different from that of the laminate roll, press the "SPEED DIFFERENCE SETTING" button to set it.

4. TEMP. (Unit: °C)

Set the temperature of lamination roll and tacking plate here.

Also, set the temperature alarm value here.

5. FILM SPACE (Unit: mm)



Set the position to paste the film onto the PWB.

Regarding to the meaning of "Leading" and "Trailing," please refer to Figure 3-37.

6. TACKING TIME (Unit: sec)

During the tacking operation, set the time during which the upper and lower Tacking plates sandwich the board.

7. ROLL PRESS (Option) (Unit: MPa)

Set the air pressure applied to the cylinder for lowering backup roll (pressurizing). The relationship between the numerical value set here and the pressure applied to the actual laminating roll is as follows.

Roll pressure setting	Roll pressing force
0.20 MPa	approx. 210 kg
0.25 MPa	● approx. 260 kg
0.30 MPa	approx. 305 kg
0.40 MPa	approx. 400 kg
0.50 MPa	approx. 490 kg

● It is factory setting



This setting item is not available on standard machine.

For standard machines, set the roll pressure by turning the knob of the air regulator.

8. FILM WIDTH (Unit: inch/mm)

The width of the laminate film that can be selected with this machine is displayed. Please push the button of film width to process and select it. The selected film width lights up in green.

9. Function selection button

THICK BWP button

Select ON / OFF for THICK PWB function. When it is ON, the button lights up in green.



What is "Thick PWB"?

When "Thick PWB" function ON is selected, the roll is lowered (pressurized) at the front end of the PWB and switched to rise at the rear end of the PWB.

It rises when the next PWB comes up, it descends (pressurizes) at the tip of PWB and it rises at the rear end of PWB.

- The PWB does not enter to the roll during automatic operation.
- Scratches the roll at the tip of the PWB. It is effective in the above case.

VACUUM TENSION button

Select ON / OFF of the VACUUM TENSION function. Lights up when the vacuum tension function is ON.



What is "Vacuum Tension"?

Vacuum of the tacking plate, cutter backup, film guide is normally turned OFF after the tacking action finished, and it turns ON before the cutter run.

If the VACUUM TENSION button is turned "ON", Vacuum plate, Cutter backup and Film guide vacuum will turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

10. Recipe transfer button

It is a button to transfer Operation Recipe and Registered Recipe parameters.

ACTUAL RECIPE BUTTON

Transfer the parameters memorized as the current Operation Recipe to this screen.

RECIPE SAVE button

Overwrite and save the Registration Recipe parameters displayed on this screen.

11. Screen move button

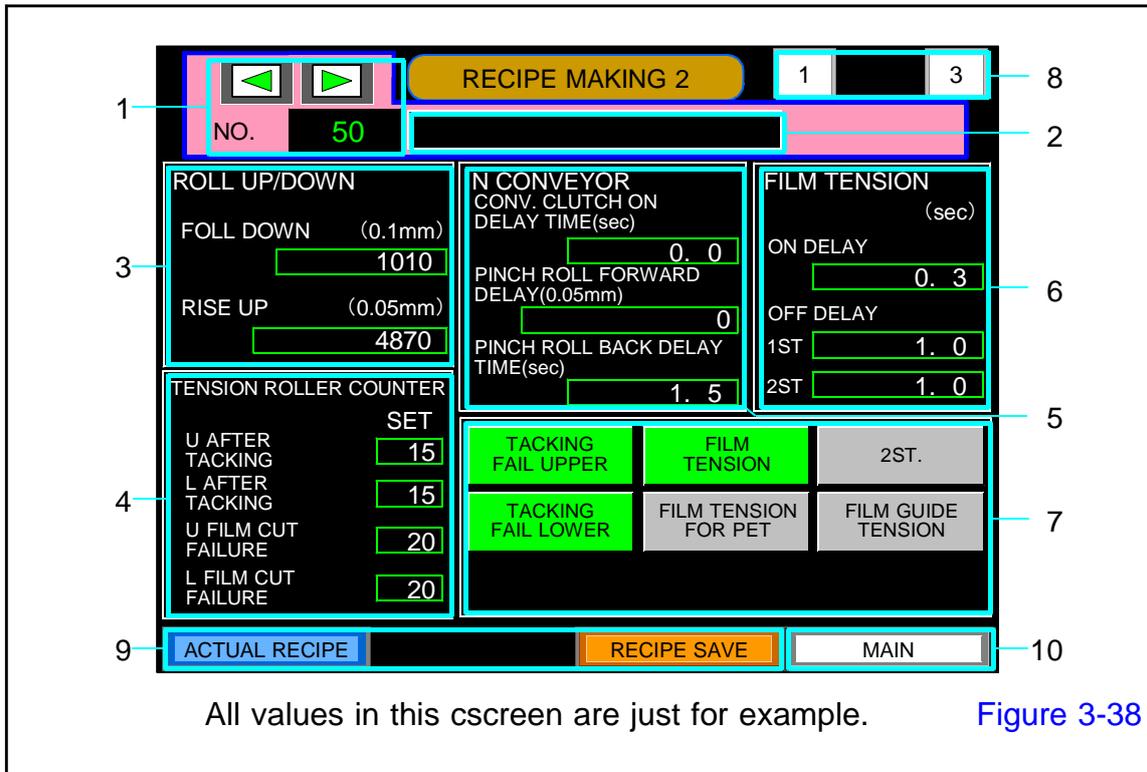
It is a move button within the same name screen.

This button moves to RECIPE MAKING 2 or RECIPE MAKING 3 screen.

12. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.5.1.1. RECIPE MAKING 2 screen



1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 2 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.



Comments entered or changed on the RECIPE MAKING screen are reflected on the comment list screen after pushing the "RECIPI SAVE" button.

3. ROLL UP/DOWN

Set the timing of roll up / down when "THICK PWB" function is used.

ROLL DOWN (Unit : 0.1mm 、 Default : 1080)

Set the timing at which the laminate roll moves from the upper position to the pressed position with the PWB position.

Movement distance of PWB after restart of stopped conveyor for tacking action.

- As the number increases, the roll pressurization start position moves to the rear of the PWB.
- When decreasing the value, the roll pressurization start position moves to the front of the PWB.

RISE UP (Unit : 0.05mm 、 Default : 4880)

Set the timing at which the laminate roll moves from the pressurizing (Lower) position to the upper position with the PWB position.

Travel distance of PWB after Edge Sensor(Reference sensor) detects PWB trailing edge.

- When the number is increased, the roll pressure end position moves to the rear of the PWB.
- When the numerical value is decreased, the roll pressure end position moves to the front of the PWB.

4. TENSION ROLL counter

The set value for detecting the tacking error and film cut error.

Detect and count the dimples on the tension roll with the sensor.

(1 count = about 6.6 mm)

U AFTER TACKING (Unit : Count Default : 15)

Number of counts of the upper tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

L AFTER TACKING (Unit : Count Default : 15)

Number of counts of the lower tension roll until the Tacking block moves to the approach end after the Tacking timer counts up.

An alarm is output if it does not exceed the set count value.

U CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the upper tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

L CUT FAILURE (Unit : Count Default : 20)

Count the pulses of the lower tension roll with the following timing.

- During 3 seconds after the tacking block moved to the approach end
- After moving the tacking block to the approaching end, until the tacking operation start of the next board

An alarm is output when the set count value is exceeded.

SET

Enter the above four items of alarm setting values.

5. IN CONVEYOR

It is a setting value for the input conveyor.

CONV. CLUTCH ON DELAY TIME (Unit : sec 、 Default : 0.0)

Time from the time-up of the tacking timer to the restart of the conveyor

PINCH ROLL FORWARD DELAY (Unit : 0.05mm 、 Default : 0)

Set the distance until the pinch roll starts to advance after restarting the input conveyor.

PINCH ROLL BACK DELAY (Unit : sec 、 Default : 1.5)

Set the time from when the pinch roll reaches the forward end until the start of backward movement.

6. FILM TENSION

It is a set value to control the operation of film tension roll.

ON DELAY (Unit : sec 、 Default : 0.3)

Set the time from when the Tacking Plate sandwiches the PWB until the tension roll starts to move.

OFF DELAY**1ST (Unit : sec 、 Default : 1.0)**

It is a valid setting when "2ST" button is OFF (dark).

Set the time from ON to OFF of the tension roll.

2ST (Unit : sec 、 Default : 1.0)

It is a valid setting when "2ST" button is ON (lit).

Set the time for the pinch roll from the start of advance to the turning off of the tension roll.

7. Function selection button

Select ON / OFF of the following functions to be used automatic operation.

Each time press the button, ON / OFF changes.

It is a setting that uses the function when the green lamp is lit (ON) and does not use the function in the lit OFF state (OFF).

TACKING FAIL UPPER (Default : ON)

It is ON / OFF button of upper TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

Please set it to OFF when doing single sided sticking only on the lower side.

TACKING FAIL LOWER (Default : ON)

It is ON / OFF button of lower TACKING FAIL alarm.

When OFF, alarm of TACKING FAIL will not be output.

Please set it to OFF when doing single sided sticking only on the upper side.

FILM TENSION (Default : ON)

This is the ON / OFF button of the film tension function (the function to operate the tension roll at the end of tacking to slacken the film).

It is ON when the button lights up in green.

FILM TENSION FOR PET (Default : OFF)

This is ON / OFF button for "FILM TENSION FOR PET" function .

It is ON when the button lights up in green.



What is "Film Tension for PET"?

It is a function to loosen the film before the approach operation of the Tacking Plate.

Operation before starting operation

The tension roll turns ON until after 3 seconds from the start of automatic operation from the vacuum ON at film setting.

Operation after start of operation

The tension roll turns on from roll down to roll up.

2ST (Default : OFF)

This is ON / OFF button of 2 step ST (stroke) function.
It is ON when the button lights up in green.



What is "2ST (stroke)" ?

2ST is a function to switch OPEN / CLOSE distance of "Tacking block" in two steps.
Normally "Tacking block" open / close operation is performed at 80 mm.
In the 2ST ON state, it opens 120 mm after tacking action and closes 70 mm with the film adsorbed on the tacking plate as PWB advances.
With the above operation, the tension of the film applied to the board can be reduced as much as possible.
It is an effective function for processing ultrathin PWB etc.

FILM GUIDE TENSION (Default : OFF)

This is ON / OFF button of FILM GUIDE TENSION function.

It is ON when the button lights up in green.

Can not be used with VACUUM TENSION function.

When both functions are ON, the vacuum tension function takes precedence.

**What is "Film Guid Tension"?**

From the Vacuum Tension function, it removes only vacuum plate adsorption.

If the FILM GUIDE TENSION button is turned "ON",

Cutter backup and Film guide vacuum will be turned on at the timing when PWB enters the laminate roll after the tacking operation is completed.

The action of applying tension to the film with the force of vacuum suction makes the tension of the film stronger than during normal operation.

Please select according to product specifications and dry film specifications.

8. Screen move button

It is a move button within the same name screen.

This button moves to RECIPE MAKING 1 or RECIPE MAKING 3 screen.

9. Recipe transfer button

It is a button to transfer Operation Recipe and Registered Recipe parameters.

ACTUAL RECIPE BUTTON

Transfer the parameters memorized as the current Operation Recipe to this screen.

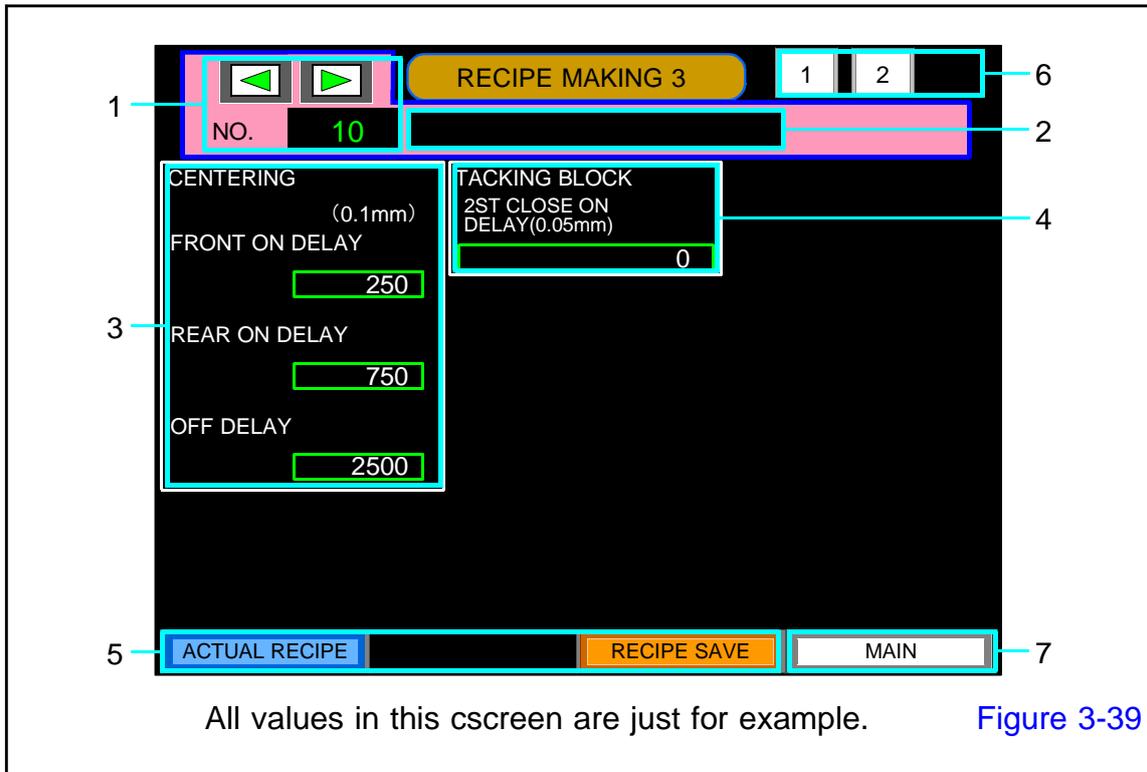
RECIPE SAVE button

Overwrite and save the Registration Recipe parameters displayed on this screen.

10. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.5.1.2. RECIPE MAKING 3 screen



1. Registration Recipe number selection

"Registered Recipe" it can store 50 types from No. 1 to No. 50.

By pushing the NO frame, it can move to the COMMENT LIST 2 screen and select another registered recipe.

Also, it can select the recipe number by pressing "◀" or "▶" button.

2. Comment display

Comments can be displayed as 20 characters as supplementary explanation at the same time as the recipe number.

This comment will be displayed on the comment list screen.

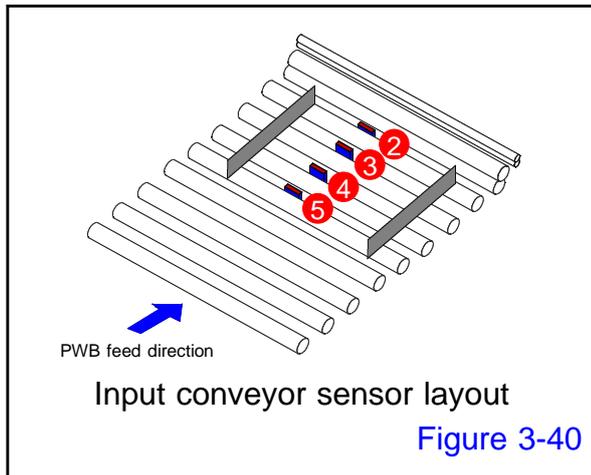


Comments entered or changed on the RECIPE MAKING screen are reflected on the comment list screen after pushing the "RECIPI SAVE" button.

3. CENTERING (Unit : 0.1mm)

Set the timing when the centering bar opens and closes.

The distance advanced by PWB after the sensor of ④ in Figure 3-40 is turned on is the start timing of each.



FRONT ON DELAY (Default : 250)

Set the timing to start the closing operation of the front centering bar.

REAR ON DELAY (Default : 750)

Set the timing to start the closing operation of the rear centering bar.

OFF DELAY (Default : 1500)

Closed centering bar Set the timing to open the front side and rear centering bar.

4. TACKING BLOCK (Unit : 0.05mm 、 Default : 100)

2ST CLOSE ON DELAY

This is the setting when 2ST is used.

Set the timing to move from the position where the Tacking block is opened by 120 mm to the position opened by 50 mm.

From the input conveyor restart after tacking, set by the distance the PWB moved.

5. Recipe transfer button

It is a button to transfer Operation Recipe and Registered Recipe parameters.

ACTUAL RECIPE BUTTON

Transfer the parameters memorized as the current Operation Recipe to this screen.

RECIPE SAVE button

Overwrite and save the Registration Recipe parameters displayed on this screen.

6. Screen move button

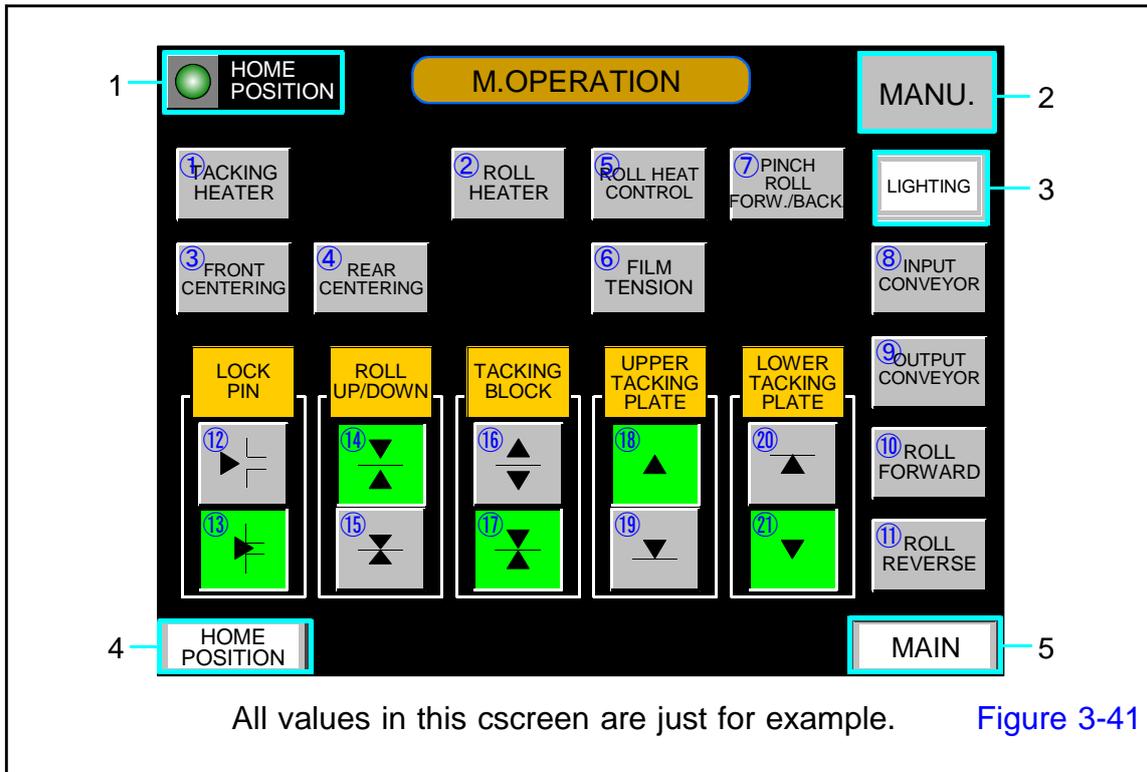
It is a move button within the same name screen.

This button moves to RECIPE MAKING 1 or RECIPE MAKING 2 screen.

7. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.6. M.OPERATION screen



① TACKING HEATER button

It is a button to turn ON / OFF the tacking heater.

It switches on and off each time the button is pushed.

The lamp of the button indicates the following condition.

Lit on : ON

Lit off : OFF

Flicker : Heating

When the tacking plate temperature reaches the set value, the button changes from flashing to light.

② ROLL HEATER button

It is a button to turn ON / OFF the roll heater.

It switches on and off each time the button is pushed.

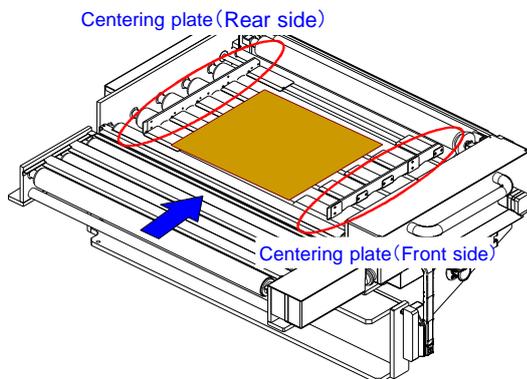
The lamp of the button indicates the following condition.

Lit on: ON

Lit off: OFF

Flicker: Heating
When the roll temperature reaches the set value, the button changes from flashing to light.

③ FRONT CENTERING button



It is a button to turn ON / OFF the front centering plate.

When the lighted out button is pushed, the centering plate moves forward and the lamp of the button lights green.

When the lighted green button is pushed, the plate pulls back and the button lighted off.

Figure 3-42

④ REAR CENTERING button

It is a button to turn ON / OFF the back centering plate.

When the lighted out button is pushed, the centering plate moves forward and the lamp of the button lights green.

When the lighted green button is pushed, the plate pulls back and the button lighted off.

⑤ ROLL HEAT CONTROL button

It is available when the roll heater is ON.

When the lighted out button is pushed, the button will light up and the following conditions will be set and the temperature rise of the roll will start.

"ROLL FORWARD" is ON

"ROLL UP / DOWN - Lower" (pressurization) is ON

When the lighted "ROLL HEAT CONTROL" button is pushed, it turns off all of the above.



When "ROLL HEAT CONTROL" button is ON, if "ROLL HEATER", "ROLL FORWARD" or "ROLL UP / DOWN - Lower" are OFF, ROLL HEAT CONTROL will also turn OFF.

⑥ FILM TENSION button

It is a button to turn ON / OFF the upper and lower film tension bars.

When the lighted out button is pushed, the upper and lower tension bars operate and the lamp of the button lights green.

This button turns ON only while it is pushed, and turns OFF when release it.

⑦ PINCH ROLL FORW./ BACK button

It is a button to turn ON / OFF the pinch roll module.

When the lighted out button is pushed, the pinch roll module moves forward and the lamp of the button lights green.

When the lighted green button is pushed, the pinch roll module moves backward and the button goes out.

- In case of input conveyor ON : It operates at the speed synchronized with the input conveyor.
- In case of input conveyor OFF : It works at maximum speed.

⑧ INPUT CONVEYOR button

It is a button to turn ON / OFF the input conveyor.

When the lighted out button is pushed, the conveyor rotates and the lamp of the button lights green.

When the lighted green button is pushed, the conveyor stops and the button goes out.

⑨ OUT PUT CONVEYOR button

It is a button to turn ON / OFF the output conveyor.

When the lighted out button is pushed, the conveyor rotates and the lamp of the button lights green.

When the lighted green button is pushed, the conveyor stops and the button goes out.

⑩ ROLL FORWARD button

When the lighted out button is pushed, the laminate roll rotates and the lamp of the button lights green.

When the lighted green button is pushed, the laminate roll stops and the button goes out.

⑪ ROLL REVERSE button

When the lighted out button is pushed, the laminate roll reverses rotation and the lamp of the button lights green.

Because roll cleaning is done from the exit side, for safety reason, it rotates only while pushing the button.

⑫ LOCK PIN – Release button

It is a button to put the lock pin in the release position.

(Tacking block becomes operable.)

It is usable when the lock pin is in the lock position.

The button will light green in unlocked state.

⑬ LOCK PIN – Lock button

It is a button to put the lock pin in the fixed position. (Fix the Tacking block)

It is usable when the lock pin is in the release position.

The button will light green in locked state.

⑭ ROLL UP/DOWN – Raise button

It is a button to raise the laminate roll.

It can be used when the laminate roll is in the lower state.

The button will light green when the laminate roll is raised.

⑮ ROLL UP/DOWN – Lower button

This button lowers (pressurizes) the laminate roll.

It can be used when the laminate roll is in the raise state.

The button lights up in green when the laminate roll is lowered.

⑯ TACKING BLOCK – Open button

It is a button that open the tacking block.

It is available when the tacking block is in the close state.

The button lights up in green when the tacking block is open position.

⑰ TACKING BLOCK – Close button

It is a button that close the tacking block.

It is available when the tacking block is in the open state.

The button lights up in green when the tacking block is close position.

⑱ UPPER TACKING PLATE – Raise button

It is a button to raise the upper tacking plate.

It is usable when the upper tacking plate is in the lower state.

On the upper tacking plate raise state the button lights green.

⑲ UPPER TACKING PLATE – Lower button

It is a button to lower the upper tacking plate.

It is usable when the upper tacking plate is in the raise state.

On the upper tacking plate lower state the button lights green.

⑳ LOWER TACKING PLATE – Rise button

It is a button to raise the lower tacking plate.

It is valid when the lower tacking plate is in the lower state.

The button is light up green when the lower tacking plate is in the raised state.

㉑ LOWER TACKING PLATE – Lower button

It is a button to lower the lower tacking plate.

It is valid when the lower tacking plate is in the raised state.

The button is light up green when the lower tacking plate is in the lower state.

1. HOME POSITION lamp

It lights up when the ON / OFF state of each drive unit and sensor of the machine is in the home position.

2. MANU. button

It is the same function as the manual button on the main screen.

When this button is pushed, the machine enters the manual mode and the button lights in yellow.

The operation buttons on the manual operation screen are effective when the manual mode is on.

3. LIGHTING button

It is a button to turn on / off interior lighting.

The light turns on and the button lights yellow.

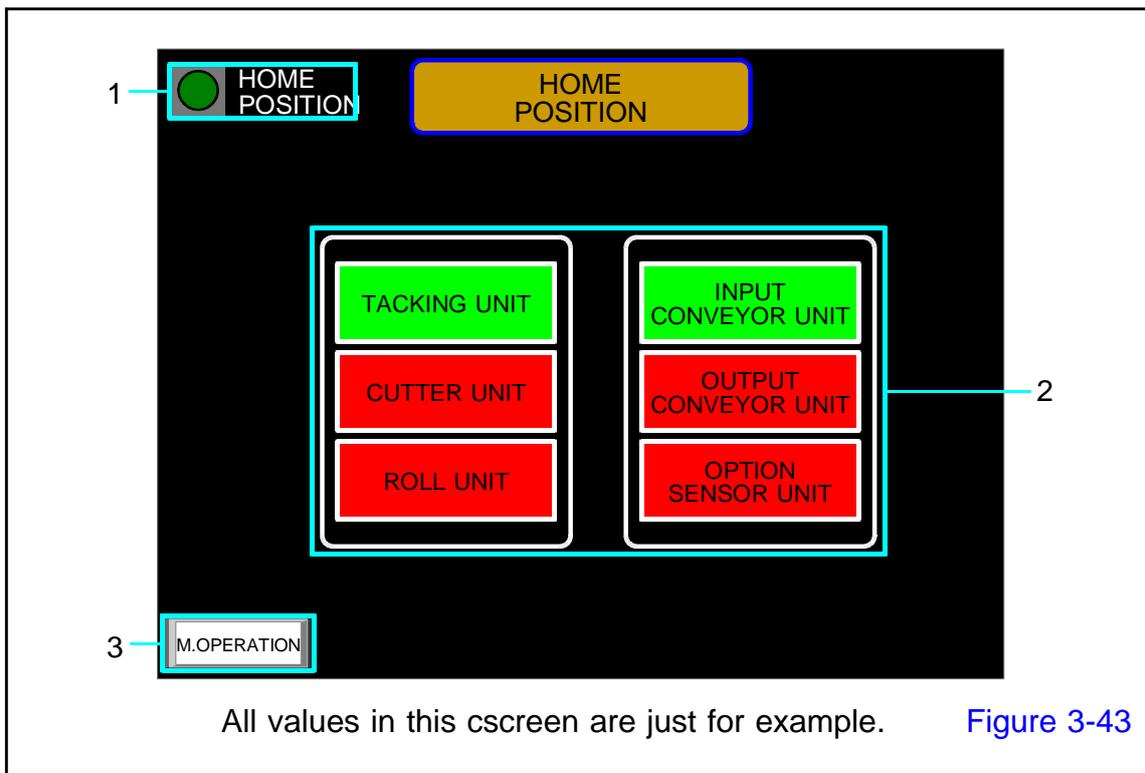
4. HOME POSITION button

It shifts to the "3.2.6.1. HOME POSITION screen".

5. MAIN button

It shifts to the "3.2.1. MAIN screen".

3.2.6.1. HOME POSITION screen



1. HOME POSITION lamp

It lights up when the ON / OFF state of each drive unit and sensor of the machine is in the home position.

2. Section status display

It can check the home position for each unit in the machine.

If the unit is lit in green, the unit is in the home position.

If the unit is blinking red, that unit is not in the home position state.

When push the character part of the each unit, it changes to the detail display of that unit.

(Refer to Figure 3-44 Detailed Diagram of Home Position Screen.)

3. M.OPERATION button

When push this button will move to 3.2.6. M.OERATION screen.

Home Position Screen Detail

When you press the character part of each unit on the home position screen, you will move to the details screen of each unit as shown in Figure 3-44. Push the "return" button on each detail screen to return to the home position screen.

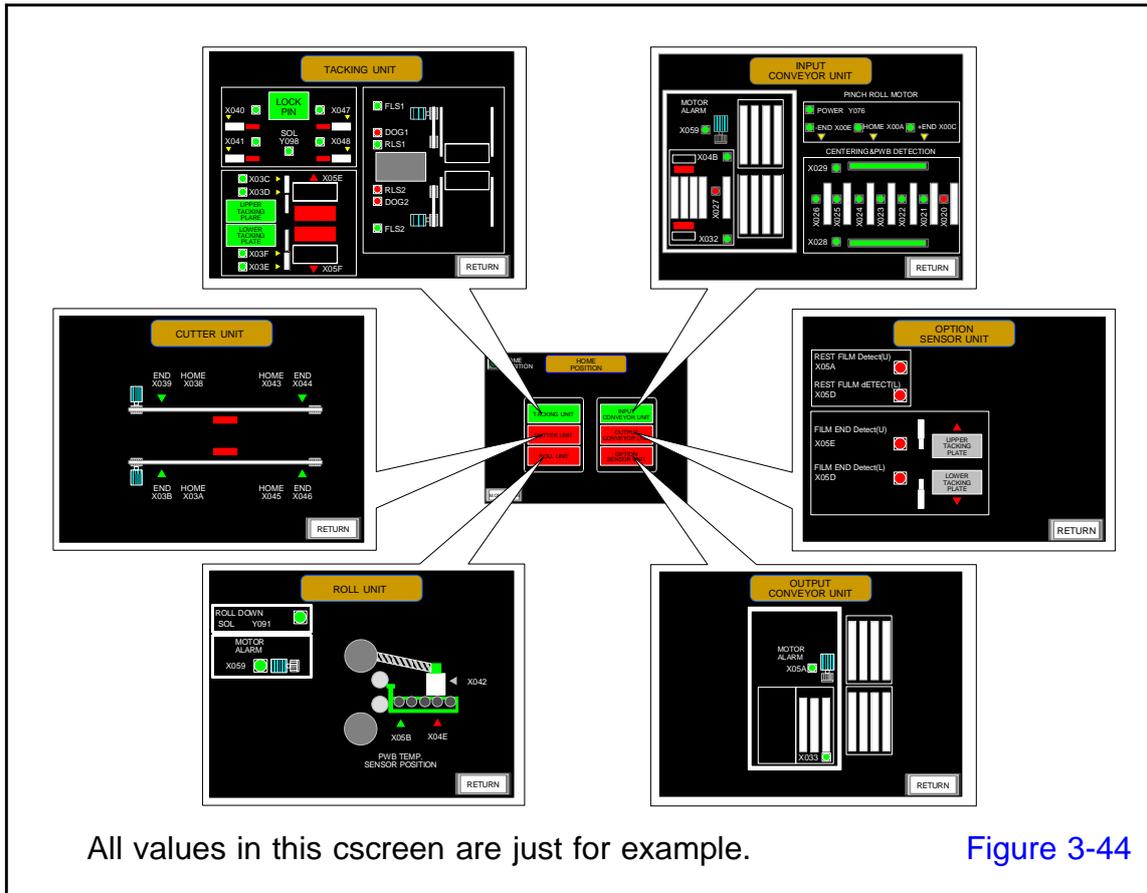
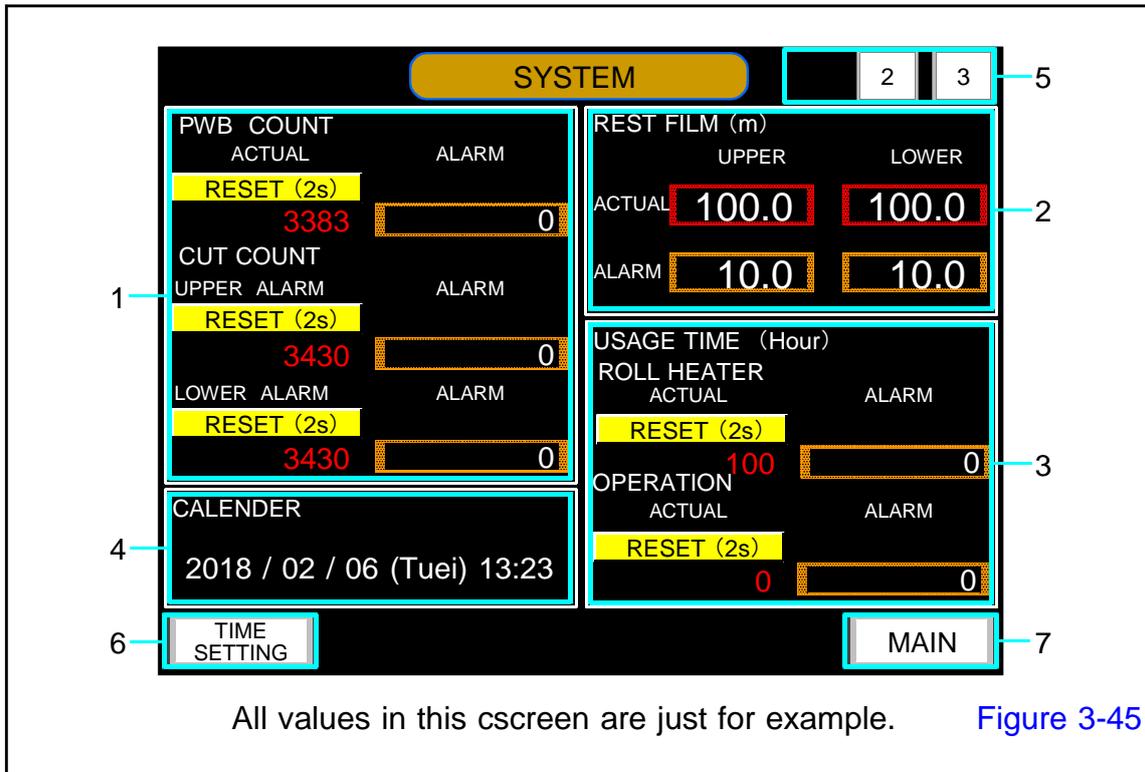


Figure 3-44



For details of the home position screen please contact Hakuto Co., Ltd. service.

3.2.7. SYSTEM 1 screen



1. COUNTER

The number of laminated boards and the number of times the cutter has run are displayed in count-up counter.

PWB COUNT

This is the number of processed PWBs.

ACTUAL

It is the total number of laminated sheets processed since the reset operation previously.

ALARM

When the current value reaches the alarm value, "57 PRODUCTION BOARD COUNTS" alarm is output.

CUT COUNT

It is the number of cut films.

ACTUAL

It is the total number of cuts from the time when the reset operation was performed before to the present.

ALARM

When the current value reaches the alarm value, an alarm of "91 UPPER CUTTER CUT COUNTS" or "92 LOWER CUTTER CUT COUNTS" is output.

RESET button

It can reset the current value by pressing each reset button for more than 2 seconds.



If 0 (zero) is set for the alarm value of each count-up counter, this alarm is not used.

2. CALENDER

Displays the contents (date, time) of the clock currently used in the machine.

3. USAGE TIME (Unit : Hour)

It is Hour integrator of addition formula.

ROLL HEATER

It is the integrated energization time of the roll heater.

ACTUAL

It is the cumulative energization time from the time when the reset operation was performed before to the present.

ALARM

When the current value reaches the alarm value, an alarm of "93 ROLL HEATER USE TIME" is issued.

OPERATION

It is the cumulative time of automatic operation.

ACTUAL

This is the total operating time from the time when the reset operation was performed previously to the present.

ALARM

When the current value reaches the alarm value, an alarm of "94 AUTO RUN TIME" is issued.

RESET button

It can reset the current value by pressing each reset button for more than 2 seconds.

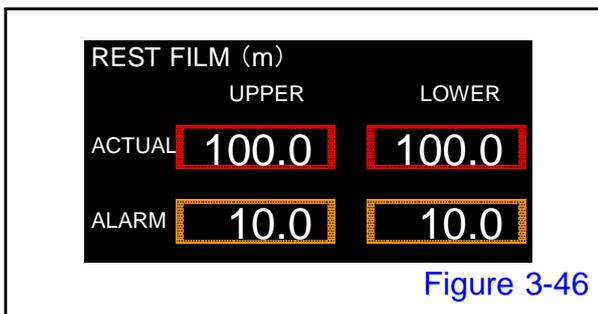


Setting 0 (zero) as the alarm value for each integration time will result in setting not to use this alarm.

4. REST FILM

There are three types of this item: "REST FILM counter" of standard machine, "USED FILM counter" using optional photoelectric sensor, and "REST FILM amount" using optional ultrasonic sensor.

REST FILM counter (Unit : m)



It is a function that is standardly installed in the machine.

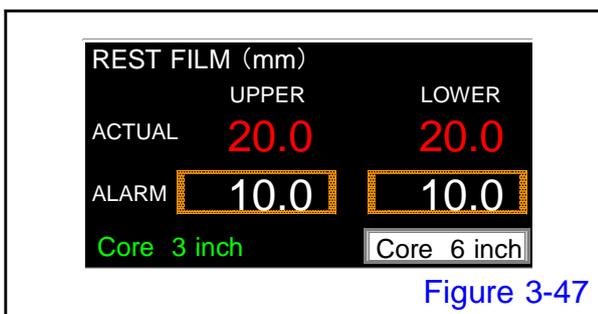
Enter the current film amount in the ACTUAL (upper / lower) frame.

Enter the numerical value to alarm on the ALARM (upper / lower) frame.

When lamination is performed, the ACTUAL value is subtracted and displayed, and when the ACTUAL value reaches the ALARM value, the following alarm is output.

- ALARM 54 : REST UPPER FILM
- ALARM 55 : REST LOWER FILM

REST FILM amount (Unit : mm)



For equipment with an optional ultrasonic sensor, the thickness of the film from the film core is displayed as the current value.

The maximum value to display is 50 mm and it is a subtractive formula.

When the current value becomes the alarm value, the following alarm is output.

ALARM 74 : REST UPPER FILM

ALARM 75 : REST LOWER FILM

When zero (0) is set as the alarm value, no alarm is output.

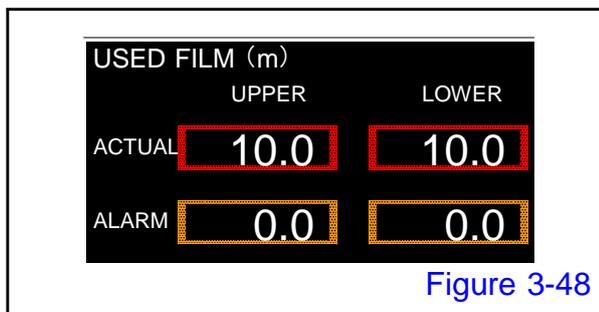


In order to use this function, input of core diameter is necessary.

For machine using both 3 inch and 6 inch core diameters, there is a button for switching the core diameter in the lower right part.

In the lower left, the current core diameter is displayed in green.

USED FILM counter (Unit : m)



For machine equipped with an optional photoelectric sensor, it check the presence or absence of film at the sensor position.

When the sensor judges that there is no film, it begin to display the film usage (addition formula) from that time in the frame of the ACTUAL.

When the used amount of film reaches the alarm value, the following alarm is output.

ALARM 41 : REST UPPER FILM

ALARM 42 : REST LOWER FILM

4. CALENDER

Displays the contents (date, time) of the clock currently used in the machine.

5. Screen move button

It is a move button within the same name screen.

This button moves to SYSTEM 2 or SYSTEM 3 screen.

6. TIME SETTING button

When this button is pushed, it shifts to 3.2.7.2. TIME SETTING screen.

6. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.7.1 SYSTEM 2 screen

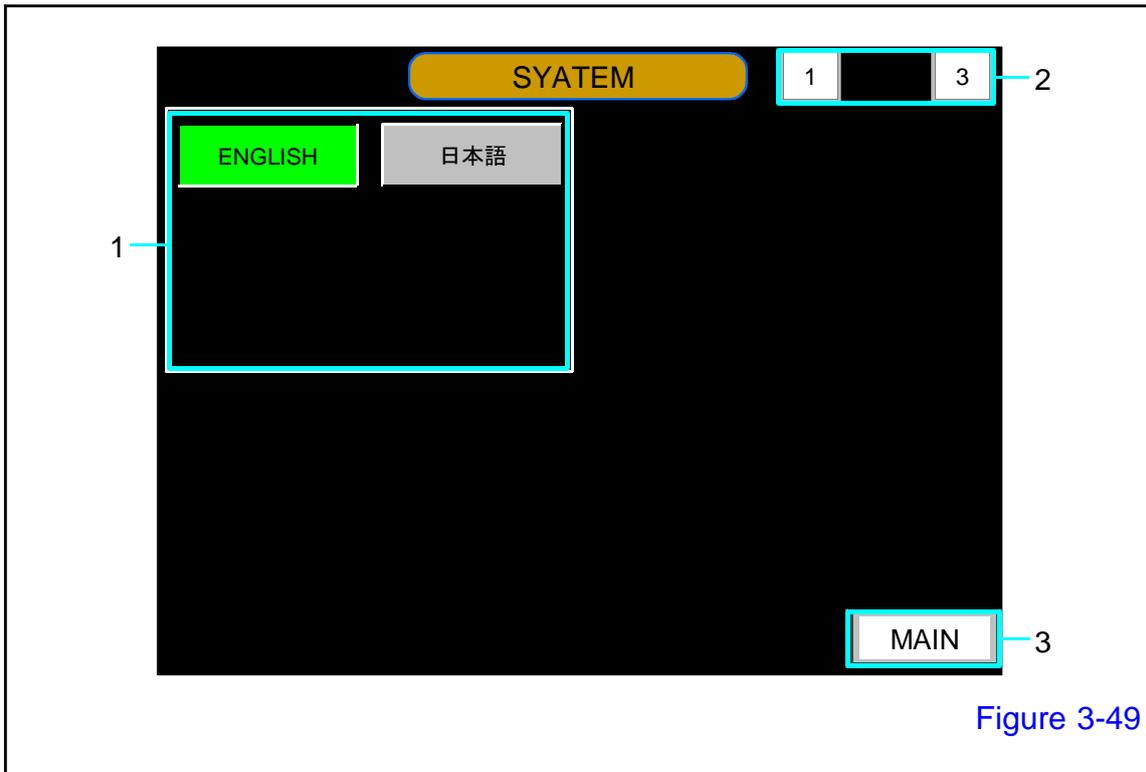


Figure 3-49

1. Language select button

Buttons of selectable language are displayed.
The selected button will light green.

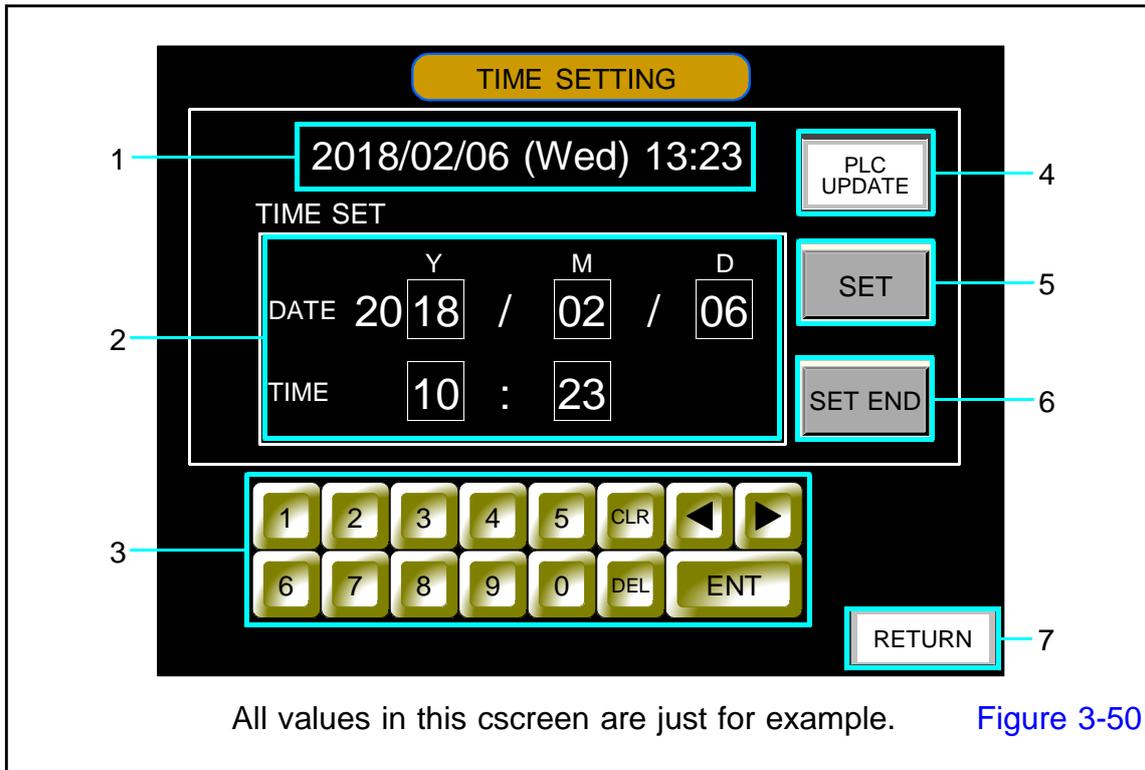
2. Screen move button

It is a move button within the same name screen.
This button moves to SYSTEM 1 or SYSTEM 3 screen.

3. MAIN button

When this button is pushed, it shifts to 3.2.1. MAIN screen.

3.2.7.2. TIME SETTING screen



1. Clock display

Displays the contents (date, time) of the clock currently used in the machine.

2. Time setting

Set the time of the clock used in the machine.

3. Numeric keypad

It is used to change the numerical value within the time setting frame.

Use the "ENT" key to determine the value.

4. PLC UPDATE

It is a button to adjust the time with the clock in the PLC (programmable controller) and the clock in the touch panel.

Send time data of touch panel to PLC.

5. SET button

When this button is pushed, the button lights up in white and input within the time setting frame becomes possible.

Enter the numbers sequentially from the "Y" frame, shift to the next frame with the "ENT" button, and when all the inputs are completed the button will go out.

6. SET END button

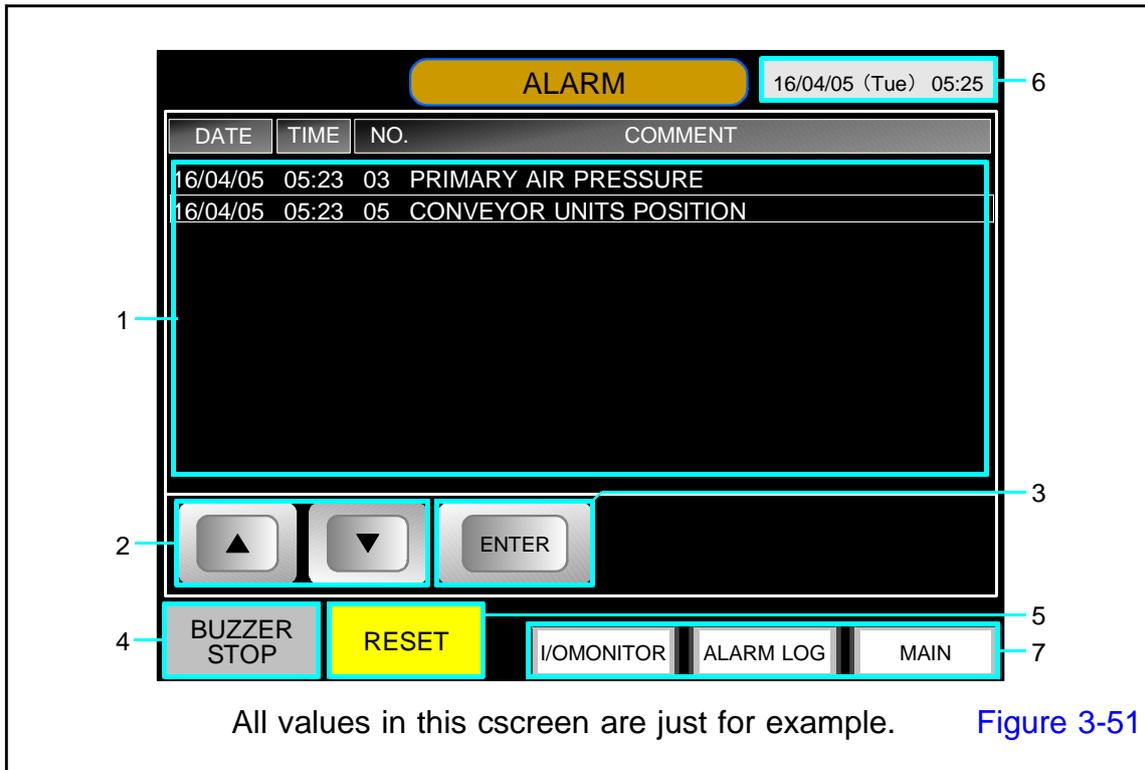
Pushing this button memory the changed date and time.

The date and time at the top of the screen are rewritten and the change is completed.

7. RETURN button

It returns to the SYSTEM 1 screen.

3.2.8. ALARM screen



If a trouble is happened on the machine, this screen is shown.

1. Information screen

Display the date, day of week, time, alarm number, and the alarm comment.

2. ▲/▼ button

Select the alarm by pressing this button.

This button become enable once touch anywhere in the information screen.

The selected alarm is framed by the cursor.



Only one line can be selected by touching the alarm shown on the screen, too. The selected line can move up/down by ▲/▼ button.

3. ENTER button

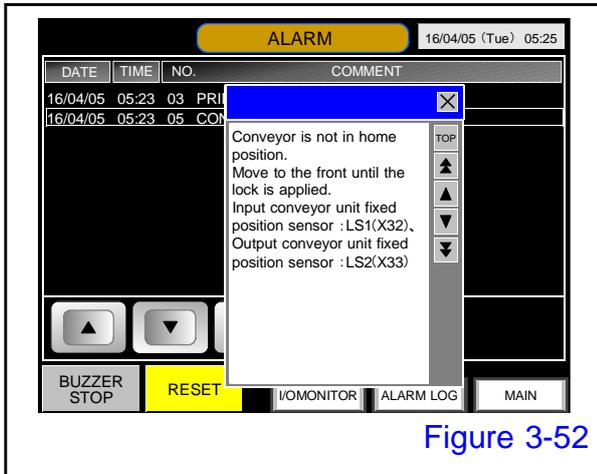


Figure 3-52

The workaround can be shown by pressing the "ENTER" button when the alarm is selected.

4. BUZZER STOP button

When the button turned red, the buzzer can be stopped by pushing this button. Nothing is happened if the button is pushed when the button is not turned red.

5. RESET button

By pushing the lit buzzer stop button, the reset button lights in yellow. The alarm is reset when the button turned yellow is pushed. Then, the button is turned off.

6. Date

Display the current date, day of week and time.

7. Screen switch button

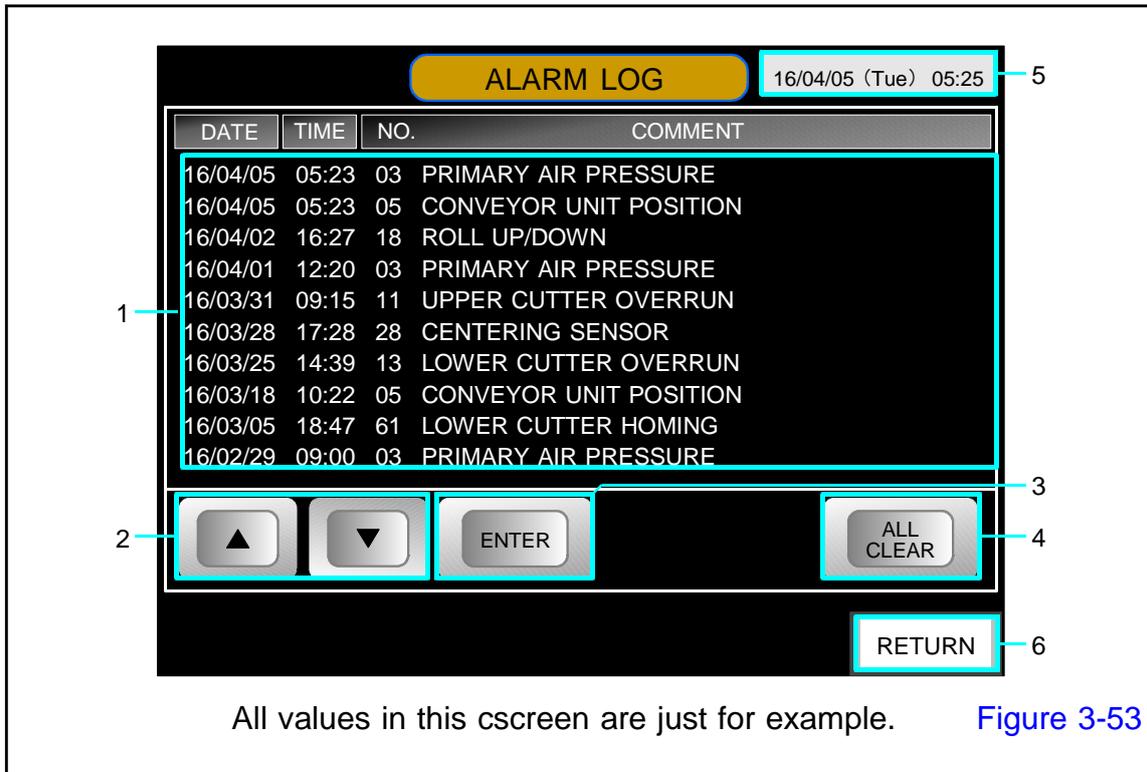
ALARM LOG button

It shifts to the "3.2.8.1. Alarm log screen".

MAIN button

It shifts to the "3.2.1. Main screen".

3.2.8.1. ALARM LOG screen



Display the alarm log happened after pressing "ALL CLEAR" button

1. Information screen

Display the date, day of week, time, alarm number, and the alarm comment.

2. ▲/▼ button

Select the alarm by pressing this button.

This button become enable once touch anywhere in the information screen.

The selected alarm is framed by the cursor.



NOTE

Only one line can be selected by touching the alarm shown on the screen, too.

The selected line can move up/down by ▲/▼ button.

3. ENTER button

The workaround can be shown by pushing the "ENTER" button when the alarm is selected. (Refer to Figure 3-52)

4. ALL CLEAR button

Clear all alarm logs.

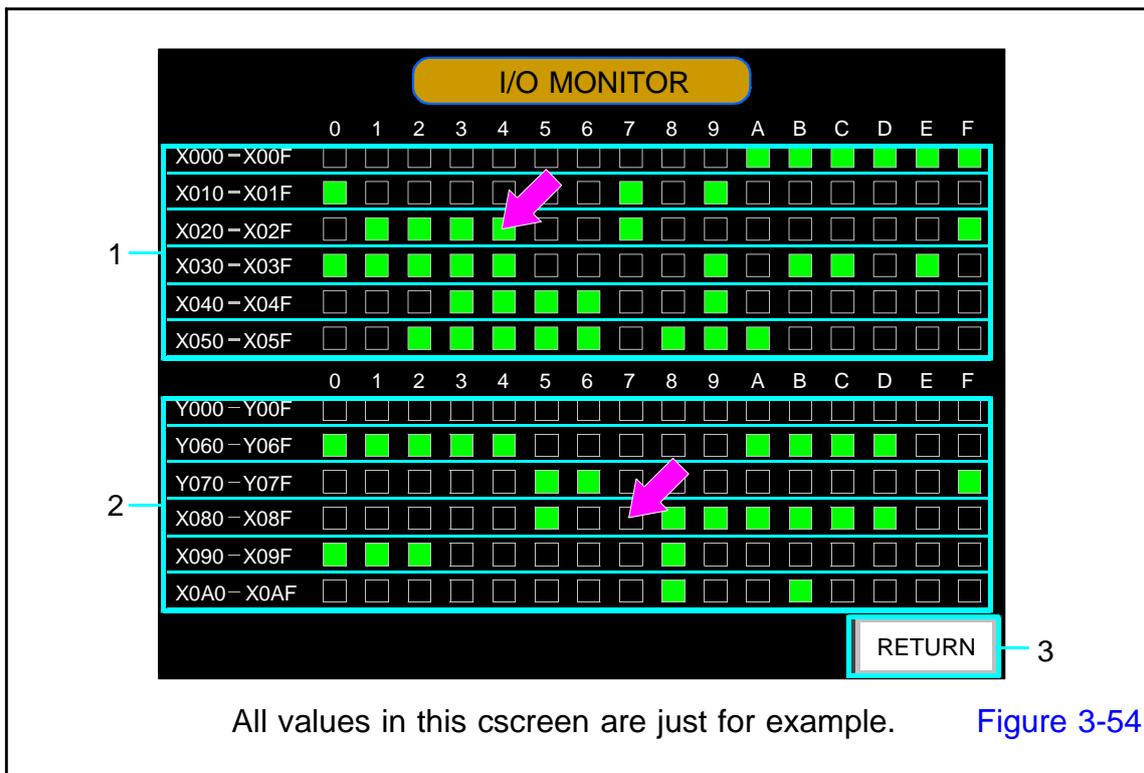
5. Date

Display the current date, day of week and time.

6. RETURN button

It returns to the "3.2.8. ALARM screen".

3.2.8.2. I/O MONITOR screen



This is a screen to confirm I / O status of PLC.

The status of the I / O in the PLC can be checked in real time.

1. INPUT

It can check the state of the input from address X000 to X05F.

The input of the address where the square frame is lit in green is ON.

Example : The address X 024 of the location of the arrow is currently ON.

2. OUTPUT

The status of the output from address Y000 to Y0AF can be confirmed.

The output of the address where the square frame is lit in green is ON.

Example : The address Y 087 of the location of the arrow is currently OFF.

3. RETURN button

It returns to the "3.2.6. ALARM screen".

4. Preparation for Operation



Before starting automatic operation, follow the steps specified below to install dry film and set the PWB information.

4.1. Loading of Dry Film

Two methods are available for loading dry film depending on the specifications of the unit; using the DF unit or the DF bulk unit.

See each section below according to the specifications of the unit used.

4.1.1. Dry film unit (DF unit)

DF unit is a unit which can set a dry film in a machine by a cassette method.

By preparing multiple sets of DF units, it is possible to set dry film to DF units outside of the machine while the unit is in operation, minimizing downtime of the machine when replacing dry fill.



NOTE

There are two types of DF units: 3 inch core dry film and 6 inch core dry film.

Depending on the specifications of the machine, only one of the two DF units can be used.

Also, even if the DF unit for 6 inch core is selected, the dry film that can be used is only 6 inches and the dry film of 3 inch core can not be used.

4.1.1.1. Name of each part of DF unit

Upper DF unit

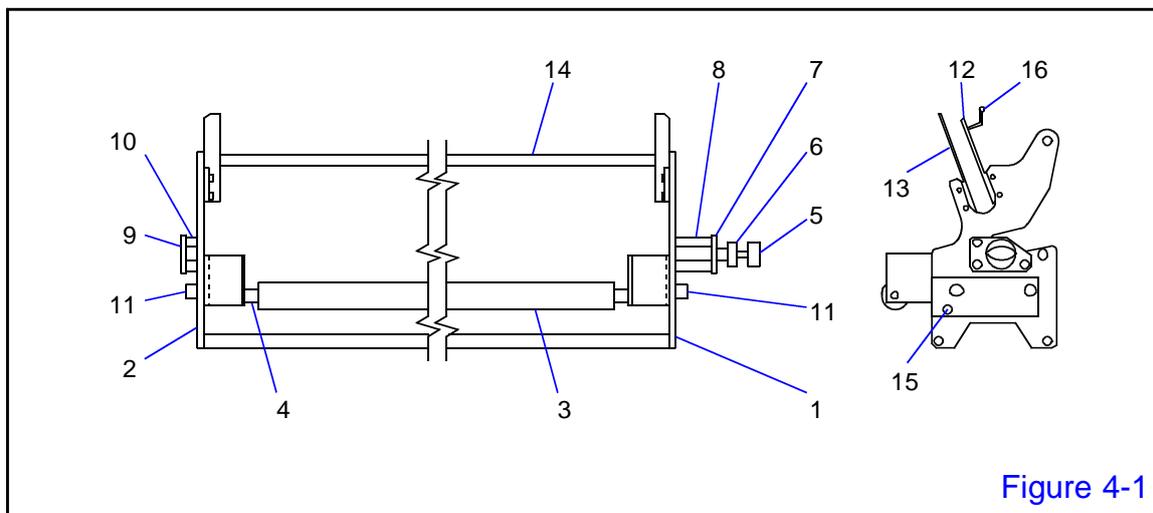


Figure 4-1

Lower DF unit

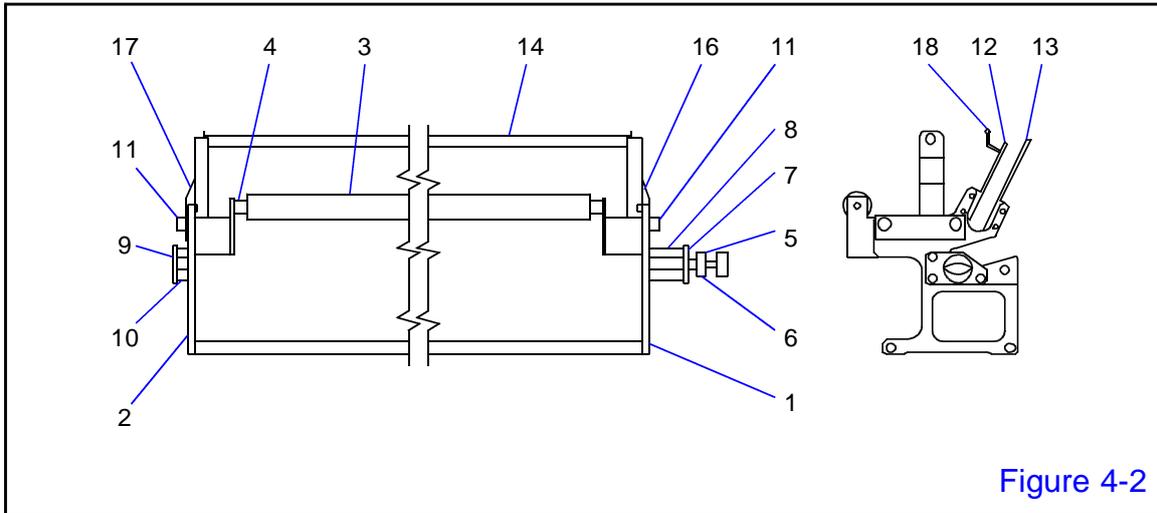


Figure 4-2

Name of each part of DF unit

No.	Name	No.	Name
1	Side plate (right)	10	Spacer B
2	Side plate (left)	11	Cam follower
3	Cover-film separation roll	12	Guide A
4	Roll shaft	13	Guide B
5	Axial-direction adjustment handle	14	Tie rod
6	Locknut	15	Protective plate *Only DF unit (Upper)
7	Handle-fixing plate	16	Bracket (right) *Only DF unit (Lower)
8	Spacer A	17	Bracket (left) *Only DF unit (Lower)
9	Film roll-shaft receiving plate	18	Winding-roll holding bracket

4.1.1.2. Loading Dry Film into the DF Unit

The methods for loading dry film differ for the upper and lower DF unit, as explained below.

This section explains the methods of loading dry film into the each of the upper and lower DF units.

Loading Dry Film into the Upper DF Unit

1.

Place the upper DF unit on a level and stable work bench.

CAUTION



The weight of the 3 inches core DF unit is pproximately 10 kg when loaded with dry film.

Also, The weight of the 6 inches core DF unit is pproximately 20 kg when loaded with dry film.

Load the dry film on the floor or a stable work bench capable of supporting the weight. Secure a sufficiently large work space.

2.

Remove the dry film from the crating and packing bag.



NOTE

Dry film will be exposed when exposed to light for a long time, so it is always covered with shading packaging bag etc. in storage condition.

When removing it from the packaging bag and installing it to the DF unit, please avoid under strong light and work under the environment such as yellow light.

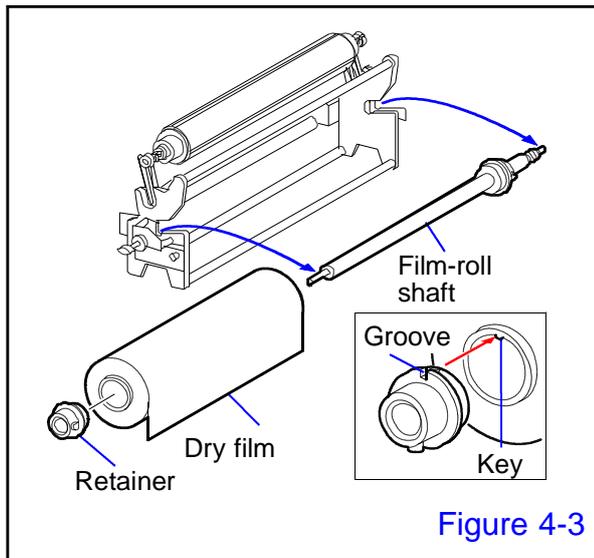


Figure 4-3

3. Remove the film-roll shaft from the DF unit and position the dry film at approximately the center of the shaft.
Set film width scale on the film roll shaft as a guide.

- When positioning the dry film, align the key of its core with the groove of the retainer.

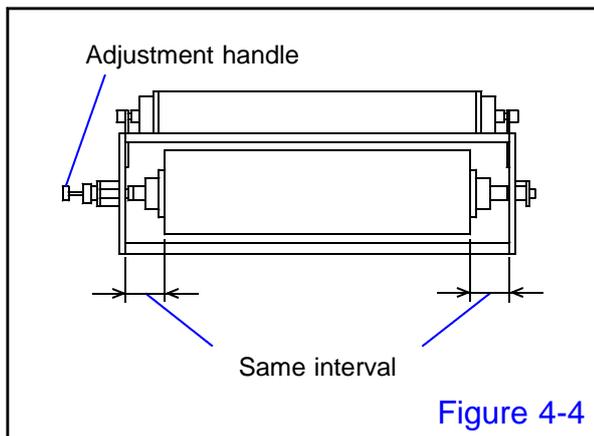


Figure 4-4

4. Place the film-roll shaft loaded with the dry film into the DF unit.

- Use the axial-adjustment knob to position the dry film so that it is laterally symmetrical when measured from the side plates at the edges of the unit.

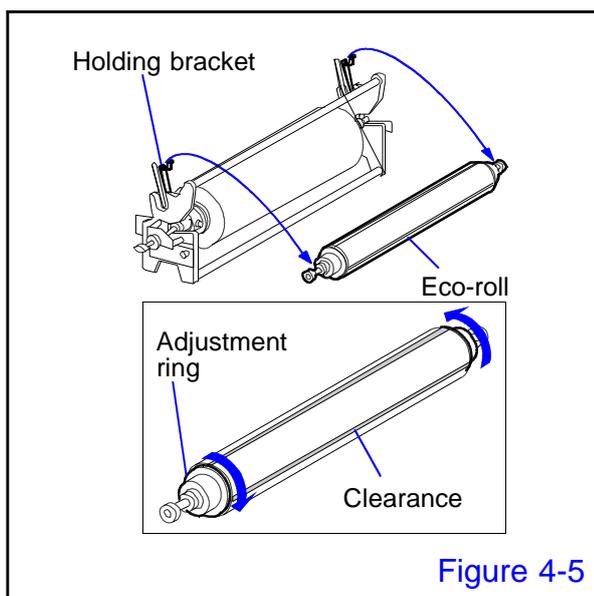


Figure 4-5

5. Remove the Eco-roll from the DF unit and turn the adjustment ring to make a clearance on the external circumference.

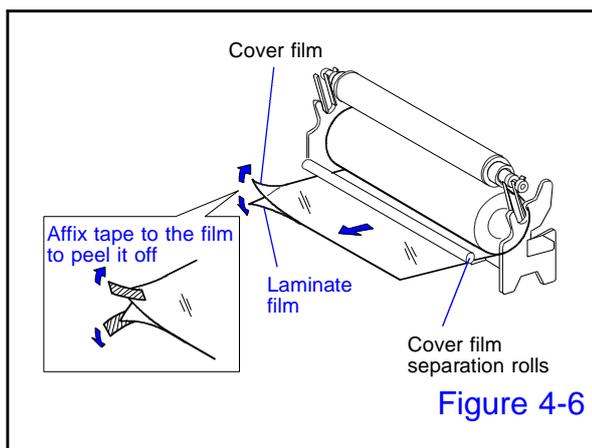
- Making a clearance with the adjustment ring expands the diameter of the Eco-roll slightly.



- After a roll of dry film is used up, reducing the diameter of the Eco-roll by turning the adjustment ring makes the removal of the cover film easier.
- The cover film must be removed every time a roll of dry film is used up. Otherwise, the additional cover film will increase the diameter of the cover film on the Eco-roll to a point where it interferes with other components, potentially causing a malfunction.

6.

After the Eco-roll has been prepared, place it in the Eco-roll holding bracket of the DF unit.



7.

Pull out the dry film, and run it under the cover-film separation roll to separate the laminate film from the cover film.



- The dry film consists of a cover film and a laminate film. And the laminate film consists of a carrier film and a photo-resist.
- Affix a piece of tape to the top and another to the bottom of the film. Pull upward and downward to separate the cover and laminate films.

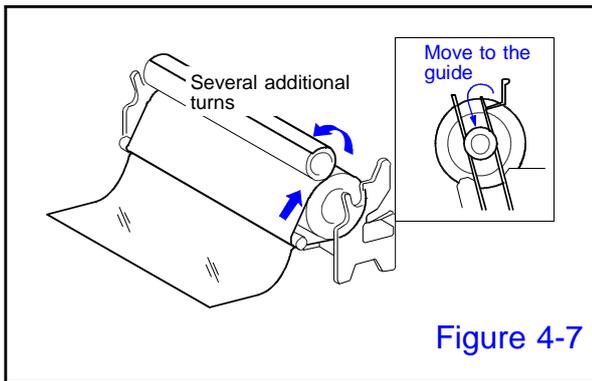


Figure 4-7

8. Fix the cover film to the Eco-roll, and transfer the Eco-roll from the holding bracket to the guide section. While separating it from the laminate film, wind the cover film several additional turns.



Avoid using adhesive tape or inserting cover film into the clearance of the Eco-roll when fixing the cover film to the Eco-roll, as it is harder to remove the cover film.

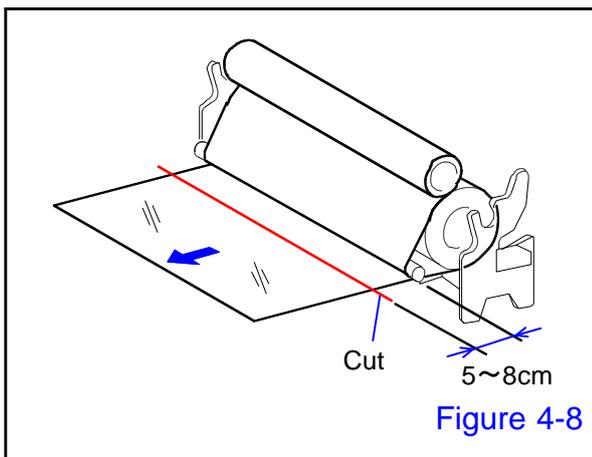


Figure 4-8

9. Cut the laminate film leaving a section 5 cm to 8 cm in length extending from the cover-film separation roll.

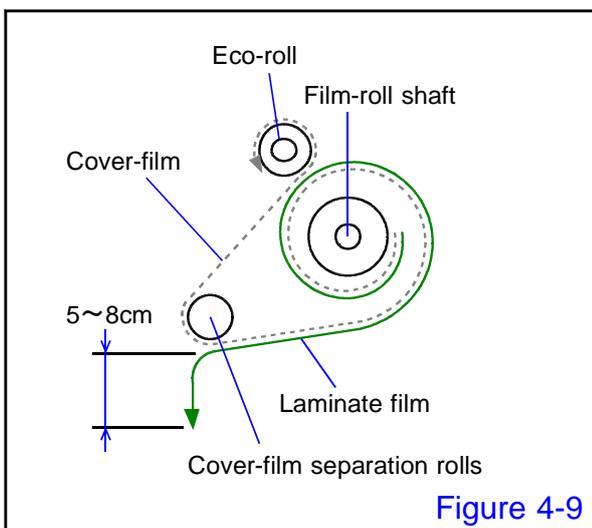


Figure 4-9

10. The dry film has now been loaded into the upper DF unit, along the route shown in the illustration to the left.

Loading Dry Film into the Lower DF Unit

1.

Place the lower DF unit on a level and stable work bench.



The weight of the 3 inches core DF unit is pproximately 10 kg when loaded with dry film.

Also,The weight of the 6 inches core DF unit is pproximately 20 kg when loaded with dry film.

Load the dry film on the floor or a stable work bench capable of supporting the weight. Secure a sufficiently large work space.

2.

Remove the dry film from the crating and packing bag.



Dry film will be exposed when exposed to light for a long time, so it is always covered with shading packaging bag etc. in storage condition.

When removing it from the packaging bag and installing it to the DF unit, please avoid under strong light and work under the environment such as yellow light.

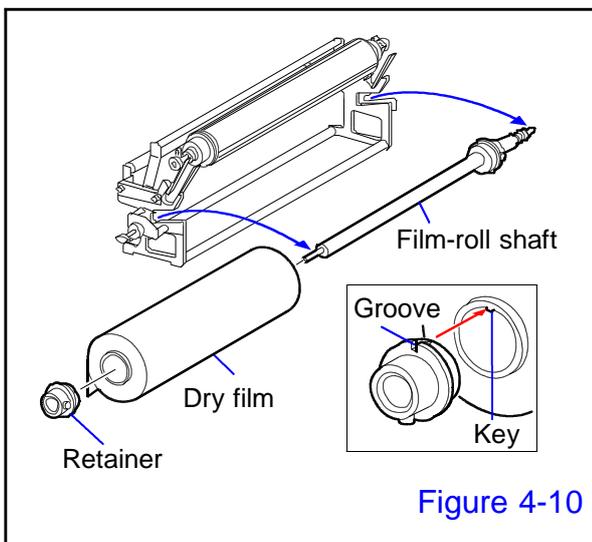


Figure 4-10

3.

Remove the film-roll shaft from the DF unit and position the dry film at approximately the center of the shaft.

Set film width scale on the film roll shaft as a guide.

- When positioning the dry film, align the key of its core with the groove of he retainer.

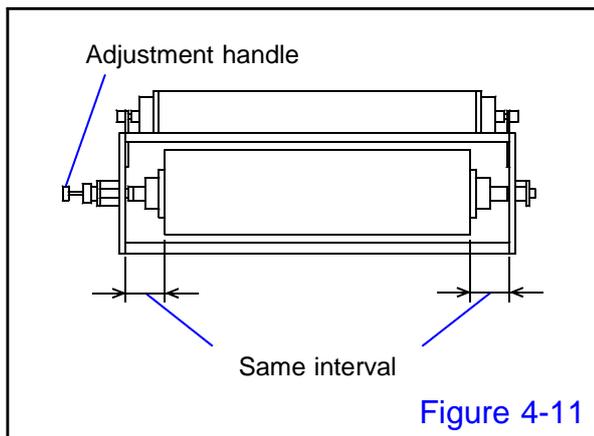


Figure 4-11

4.

Place the film-roll shaft loaded with the dry film into the DF unit.

- Use the axial-adjustment knob to position the dry film so that it is laterally symmetrical when measured from the side plates at the edges of the unit.

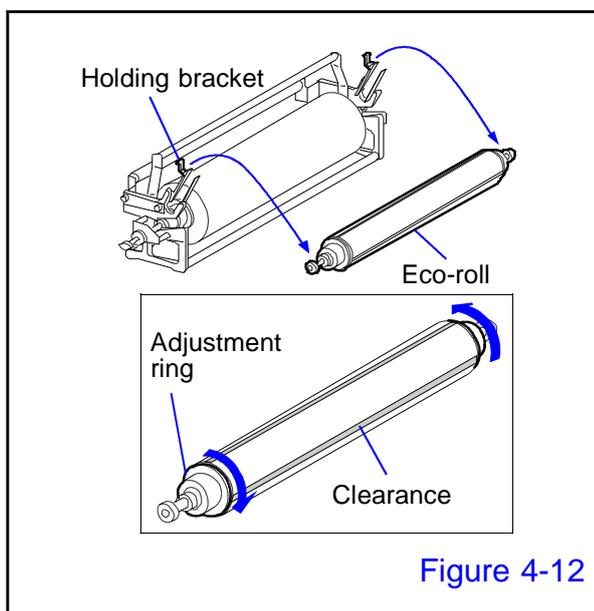


Figure 4-12

5.

Remove the Eco-roll from the DF unit and turn the adjustment ring to make a clearance on the external circumference.

- Making a clearance with the adjustment ring expands the diameter of the Eco-roll slightly.



- After a roll of dry film is used up, reducing the diameter of the Eco-roll by turning the adjustment ring makes the removal of the cover film easier.
- The cover film must be removed every time a roll of dry film is used up. Otherwise, the additional cover film will increase the diameter of the cover film on the Eco-roll to a point where it interferes with other components, potentially causing a malfunction.

6.

After the Eco-roll has been prepared, place it in the Eco-roll holding bracket of the DF unit.

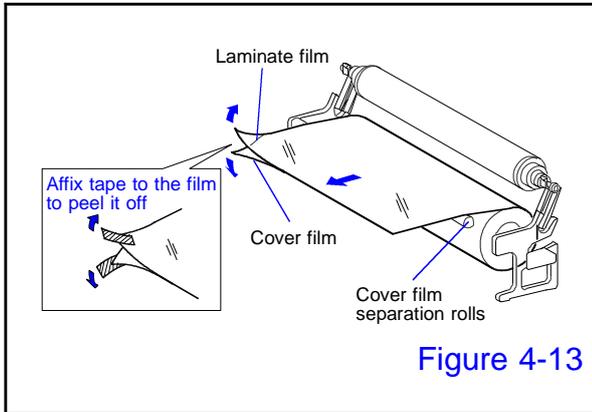


Figure 4-13

7.

Pull out the dry film, and run it under the cover-film separation roll to separate the laminate film from the cover film.



NOTE

- The dry film consists of a cover film and a laminate film. And the laminate film consists of a carrier film and a photo-resist.
- Affix a piece of tape to the top and another to the bottom of the film. Pull upward and downward to separate the cover and laminate films.

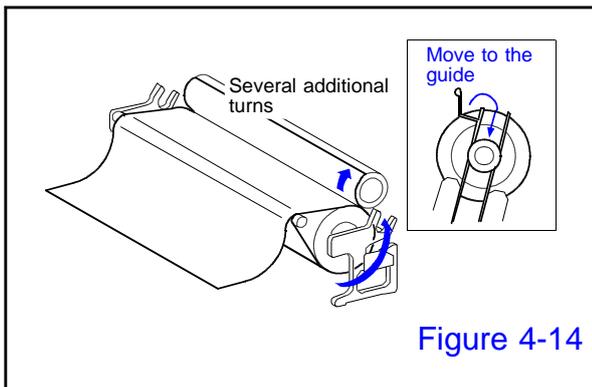


Figure 4-14

8.

Fix the cover film to the Eco-roll, and transfer the Eco-roll from the holding bracket to the guide section.

While separating it from the laminate film, wind the cover film several additional turns.



NOTE

Avoid using adhesive tape or inserting cover film into the clearance of the Eco-roll when fixing the cover film to the Eco-roll, as it is harder to remove the cover film.

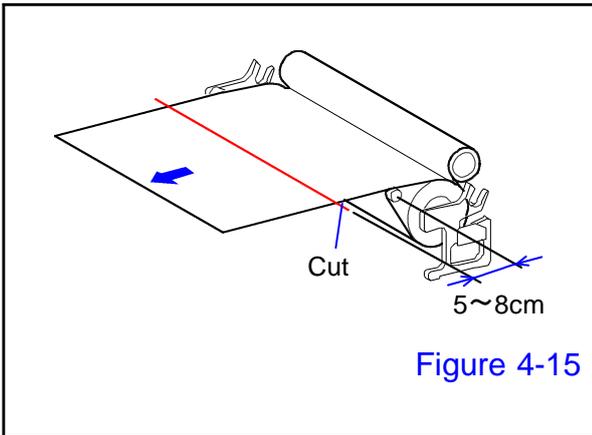


Figure 4-15

9.

Cut the laminate film leaving a section 5 cm to 8 cm in length extending from the cover-film separation roll.

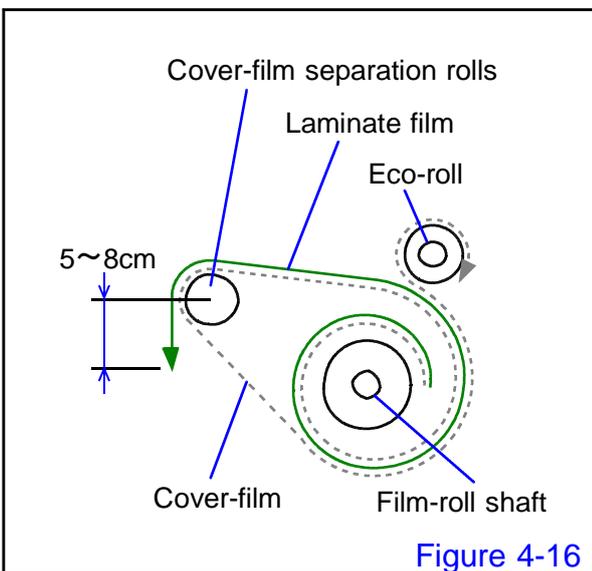


Figure 4-16

10.

The dry film has now been loaded into the lower DF unit, along the route shown in the illustration to the left.

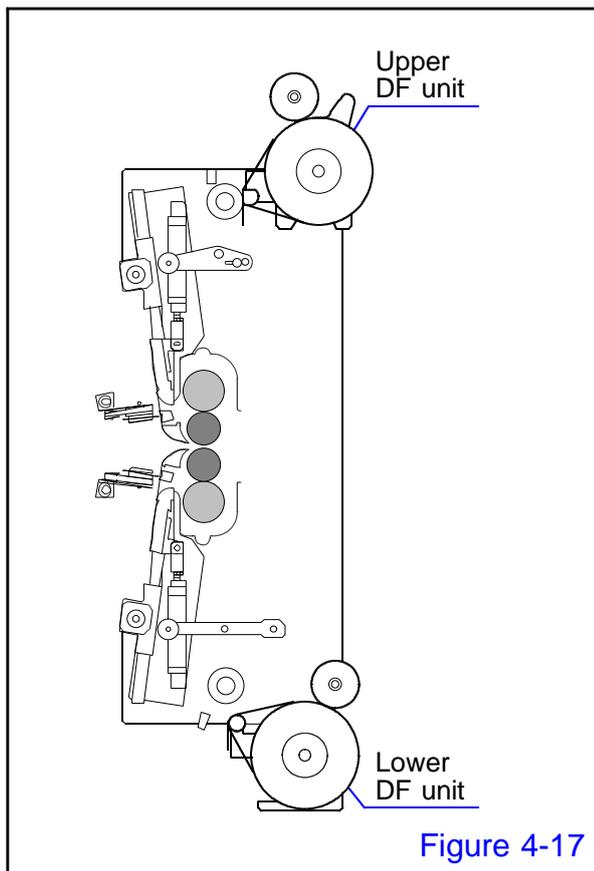
4.1.1.3. Loading of the DF unit

This Section explains the method for loading a DF unit containing dry film into the lamination module.

To unload the DF unit, perform the loading procedure in reverse.



The weight of the 3 inches core DF unit is pproximately 10 kg when loaded with dry film.
 Also, The weight of the 6 inches core DF unit is pproximately 20 kg when loaded with dry film.
 Use caution when loading and unloading it to and from the lamination module.



Place the upper and lower DF units at the positions of the lamination unit shown in the illustration left, then run the laminate film to the lamination unit.

Loading of the upper DF unit

1.

Open the front door and move the input / output conveyor unit to the film exchange position.

CAUTION



Load the upper DF unit with the power switch turned ON. The lamination unit contains high-temperature and high-voltage parts, so be careful to prevent burns and electric shock.

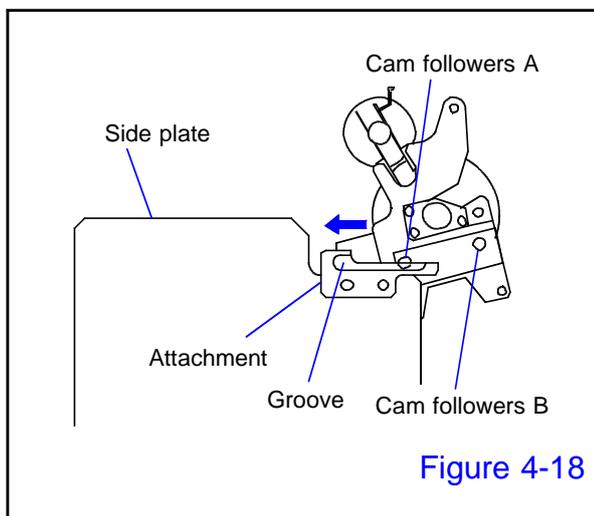


Figure 4-18

2.

Place the front and rear cam followers A of the upper DF unit in the grooves of the attachment. Lift cam followers B and insert the DF unit in the direction indicated by the arrow.

- At this time, if it tilt too much, the eco-roll may fall off.

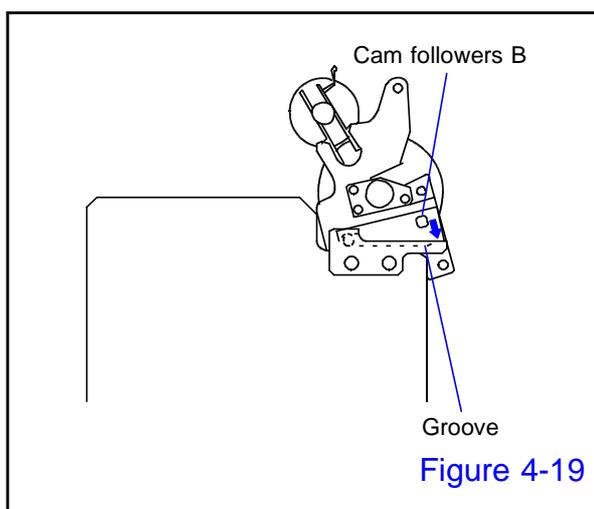
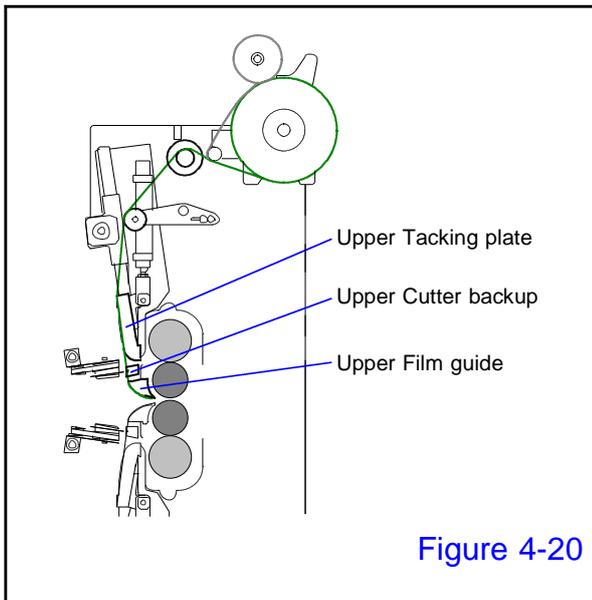


Figure 4-19

3.

Slide cam followers A to the end of the groove, and lower cam follower B to fix the upper DF unit in the groove of the attachment.

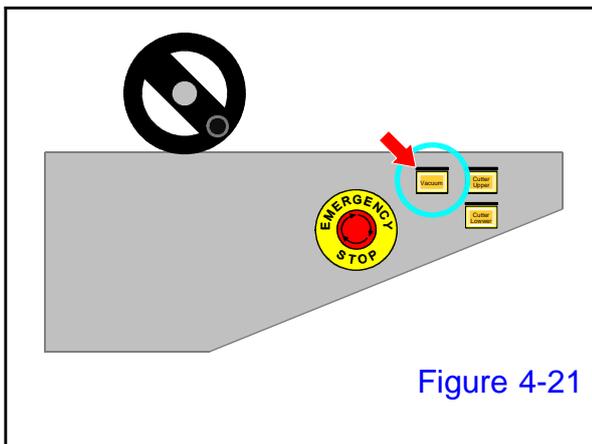


4. Run the laminate film along the film-running surface as shown in the illustration to the left.

CAUTION



Be careful, as the lamination unit contains high-temperature parts.



5. Push the "vacuum" button on the input conveyor control panel and thread the laminate film through the film guide.

- The blower fan is activated, the tacking plate, the cutter backup, and the film guide start the vacuum operation.



NOTE

This operation is not necessary if already loaded the lower DF unit.

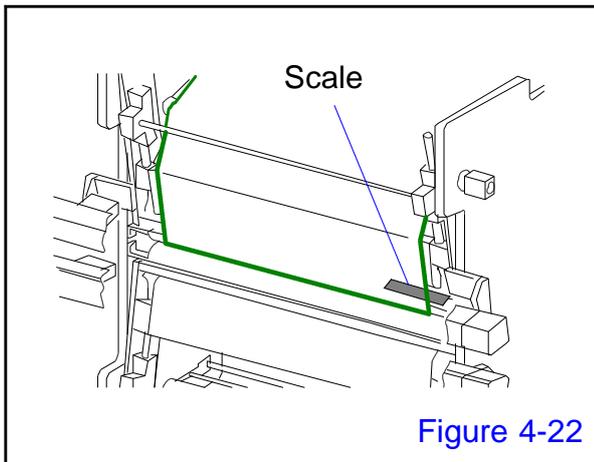


Figure 4-22

6. Extend the film along the film-running surface while maintaining its tautness.

- While doing so, center it by referring to the scale on the cutter backup.

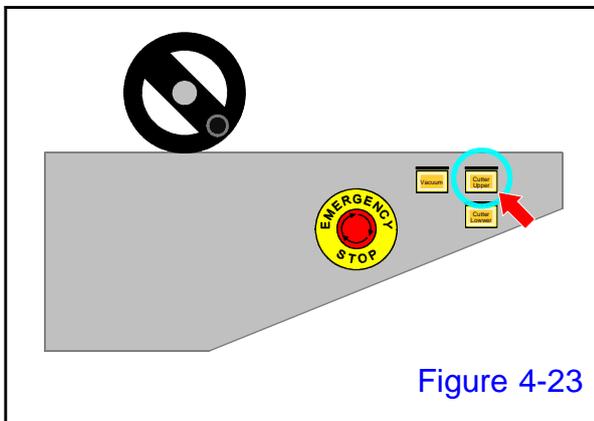


Figure 4-23

7. Push the "Cutter Upper" button on the input conveyor control panel.

- The upper cutter module will run to cut the excess-film section.

CAUTION

- Be careful when running the cutter to cut the film with the lamination unit pulled out.
- Keep the cutter cover closed even when the cutter is not in operation.

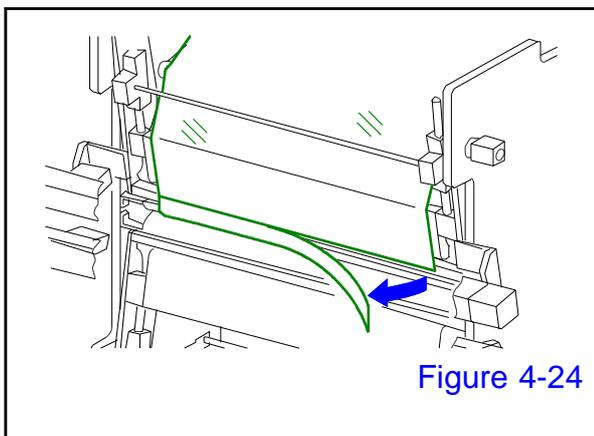


Figure 4-24

8. Remove the excess film that has been cut off.

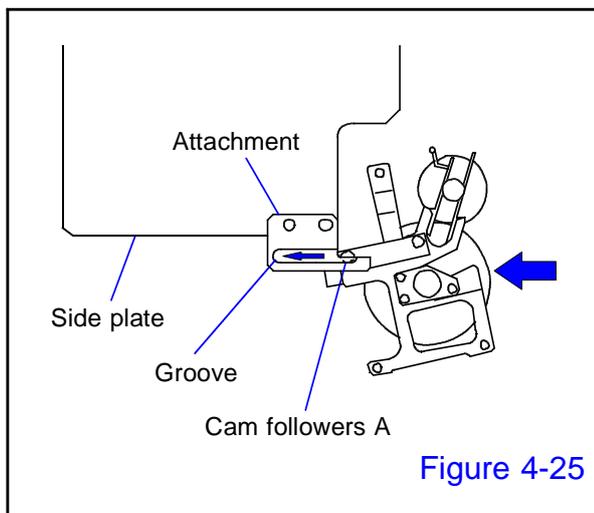
- Loading of the upper DF unit is now complete.
- Return the input / output conveyor unit to the home position and close the front door. However, this operation is not necessary when loading the lower DF unit continuously.

Loading of the lower DF unit

1.

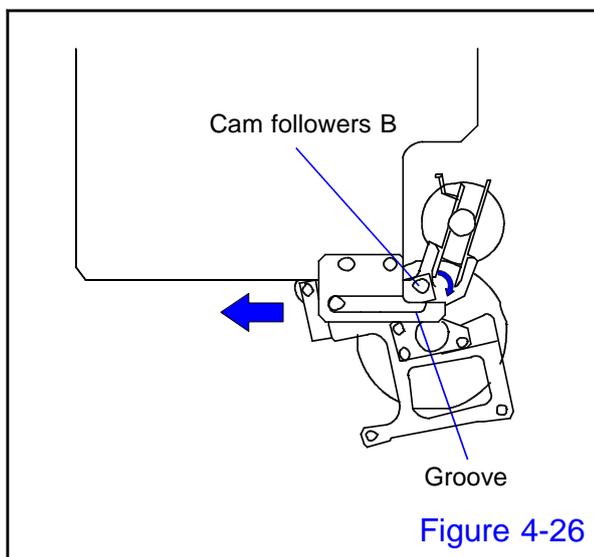
Open the front door and move the input / output conveyor unit to the film exchange position.

- If continue loading the lower DF unit after the upper DF unit loading work, this step is not necessary because the conveyor unit is already in the film replacement position.



2.

Place the front and rear cam followers A of the lower DF unit in the groove of the attachment. Lift cam followers B and insert the DF unit in the direction indicated by the arrow.



3.

Slide cam followers A to the end of the groove, and lower cam followers B to the groove in order to fix the lower DF unit to the attachment.



Confirm that cam followers A and B are in the left and right grooves.

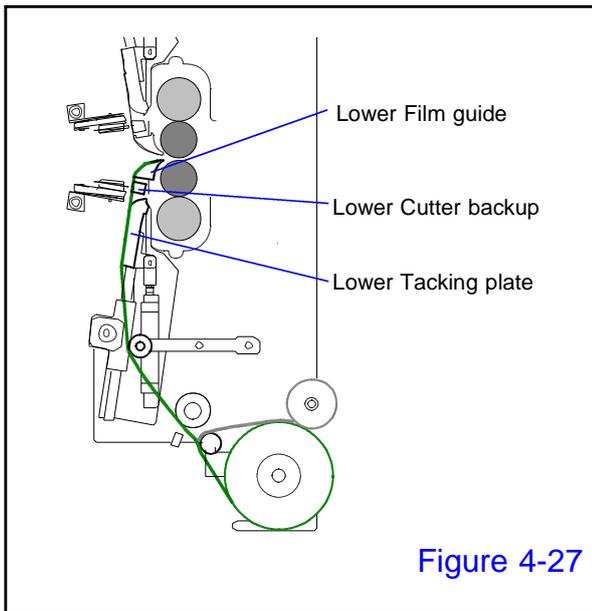


Figure 4-27

4. Run the laminate film along the film-running surface as shown in the illustration to the left.



CAUTION Be careful, as the lamination unit contains high-temperature parts.

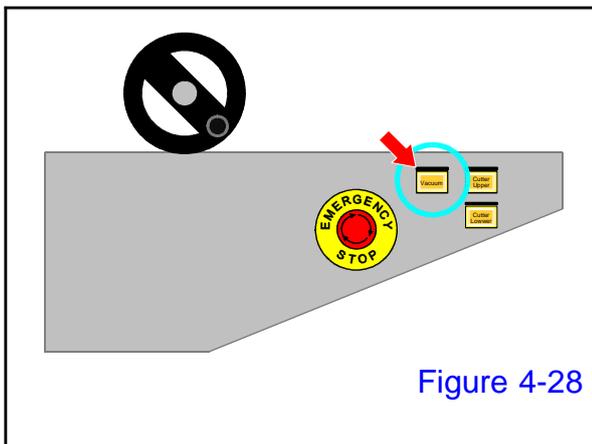


Figure 4-28

5. Push the "vacuum" button on the input conveyor control panel and thread the laminate film through the film guide.

- The blower fan is activated, the tacking plate, the cutter backup, and the film guide start the vacuum operation.



NOTE This operation is not necessary if already installed the upper DF unit.

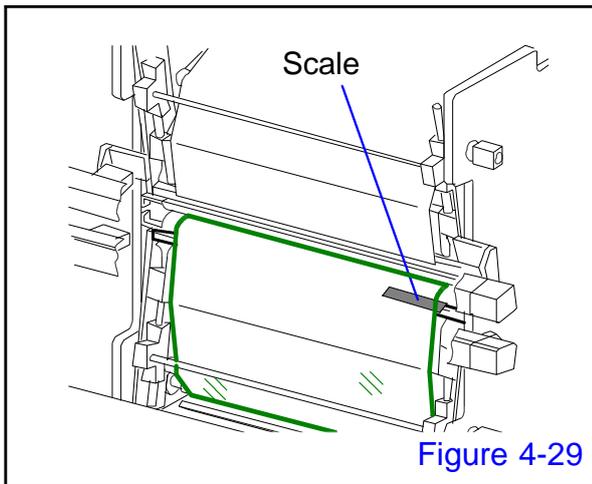


Figure 4-29

6. Extend the film along the film-running surface while maintaining its tautness.

- While doing so, center it by referring to the scale on the cutter backup.

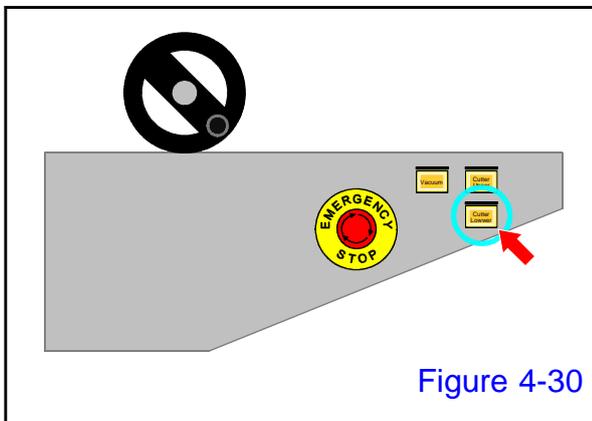


Figure 4-30

7. Push the "Cutter lower" button on the input conveyor control panel.

- The lower cutter module will run to cut the excess-film section.

CAUTION

- Be careful when running the cutter to cut the film with the lamination unit pulled out.
- Keep the cutter cover closed even when the cutter is not in operation.

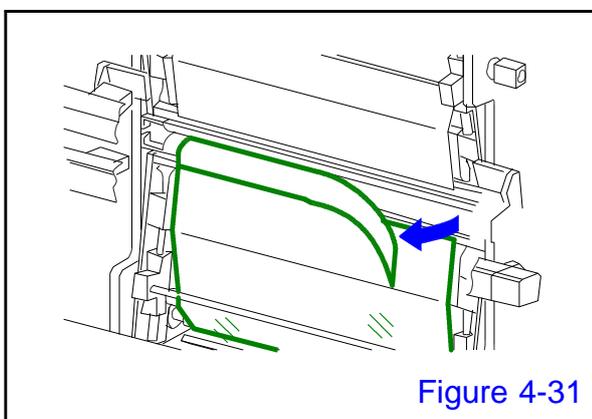


Figure 4-31

8. Remove the excess film that has been cut off.

- Loading of the lower DF unit is now complete.
- Return the input / output conveyor unit to the home position and close the front door.

4.1.2. Dry film Bulk unit (DF Bulk Unit)

DF Bulk Unit is a unit used to set dry film in the machine.

Although it is possible to use both dry film of 3 inch core and 6 inch core, attachment of dry film to the machine is time-consuming compared with DF unit because it can not be prepared outside the equipment.

4.1.2.1. Loading Dry Film into the DF Bulk Unit

The methods for loading dry film differ for the upper and lower DF Bulk unit, as explained below.

This section explains the methods of loading dry film into the each of the upper and lower DF Bulk units.

Loading Dry Film into the Upper DF Bulk Unit

1.

Open the front door and move the input / output conveyor unit to the film exchange position.

- If continue loading the upper DF Bulk unit after the lower DF Bulk unit loading work, this step is not necessary because the conveyor unit is already in the film replacement position.

CAUTION



Load the upper DF Bulk unit with the power switch turned ON.

The lamination unit contains high-temperature and high-voltage parts, so be careful to prevent burns and electric shock.

2.

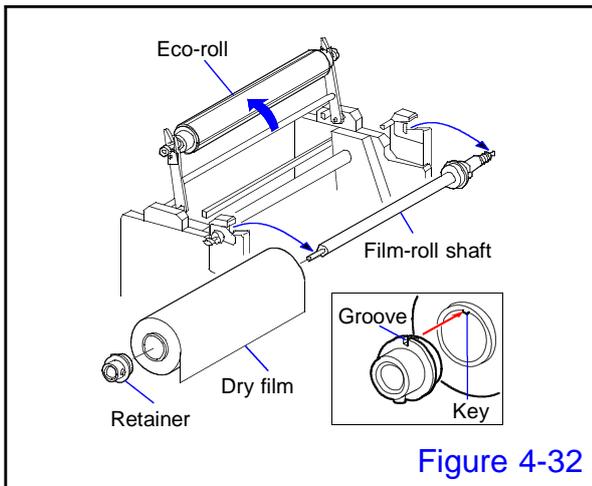
Remove the dry film from the crating and packing bag.



NOTE

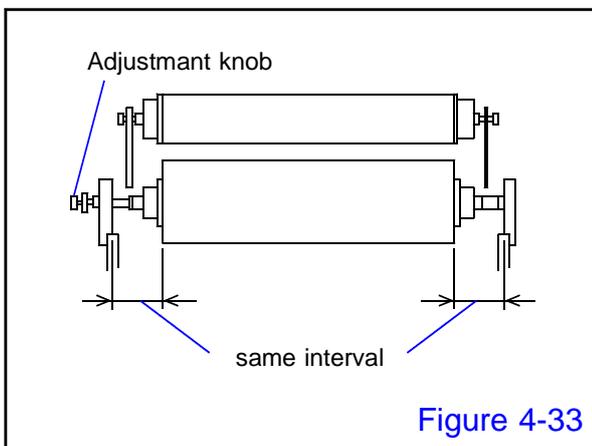
Dry film will be exposed when exposed to light for a long time, so it is always covered with shading packaging bag etc. in storage condition.

When removing it from the packaging bag and installing it to the DF unit, please avoid under strong light and work under the environment such as yellow light.



3. Lift the Eco-roll of the upper DF bulk unit, remove the film-roll shaft and position the dry film at approximately the center of the shaft.

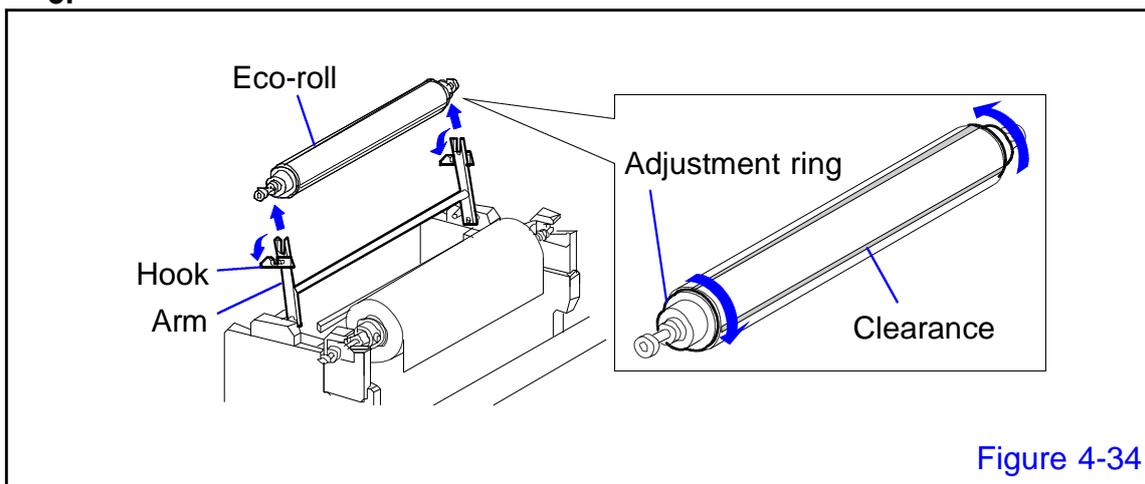
- When positioning the dry film, align the key of its core with the groove of the retainer.



4. Place the film-roll shaft loaded with the dry film into the upper DF bulk unit.

- Use the axial-adjustment knob to position the dry film so that it is laterally symmetrical when measured from the side plates at the edges of the unit.

5.



Open the hook to remove the Eco-roll from the arm of the upper DF bulk unit, and turn the adjustment ring to make a clearance on the external circumference.

- Making a clearance with the adjustment ring expands the diameter of the Eco-roll slightly.



NOTE

- After a roll of dry film is used up, reducing the diameter of the Eco-roll by turning the adjustment ring makes the removal of the cover film easier.
- The cover film must be removed every time a roll of dry film is used up. Otherwise, the additional cover film will increase the diameter of the cover film on the Eco-roll to a point where it interferes with other components, potentially causing a malfunction.

6.

After adjusting with the adjustment ring, return the eco-roll to the arm and fix with the hook.

7.

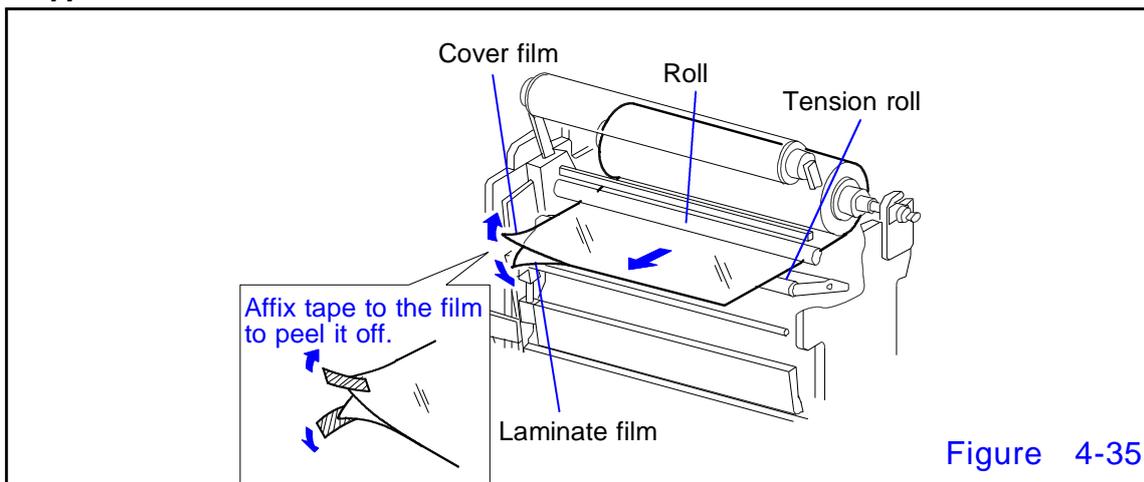


Figure 4-35

Pull out the dry film, run it between the roll and the tension roll to separate the laminate film from the cover film.



NOTE

- The dry film consists of a cover film and a laminate film. And the laminate film consists of a carrier film and a photo-resist.
- Affix a piece of tape to the top and another to the bottom of the film. Pull upward and downward to separate the cover and laminate films.

8.

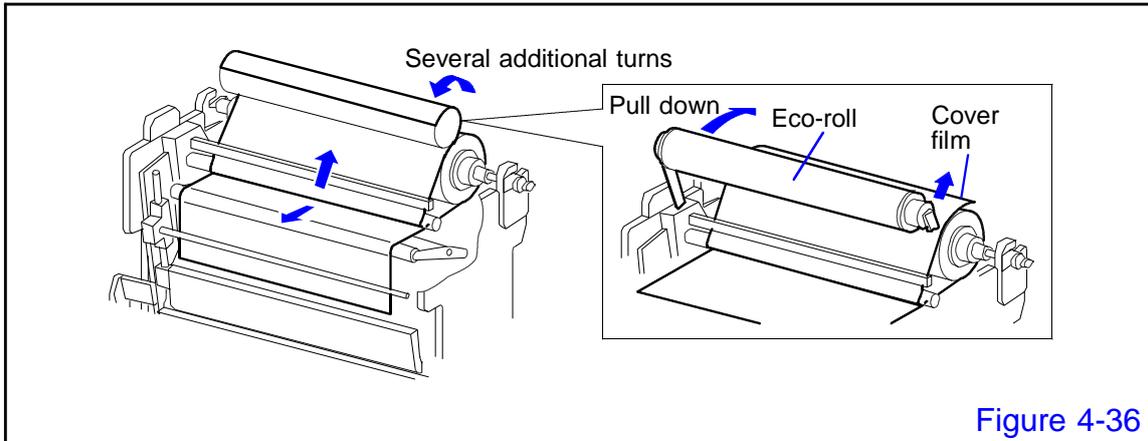


Figure 4-36

Fix the cover film to the Eco-roll, and pull down the Eco-roll so it rests on the dry film.

While separating the laminate film from the cover film, wind the cover film several additional turns.



Avoid using adhesive tape or inserting cover film into the clearance of the Eco-roll when fixing the cover film to the Eco-roll, as it is harder to remove the cover film.

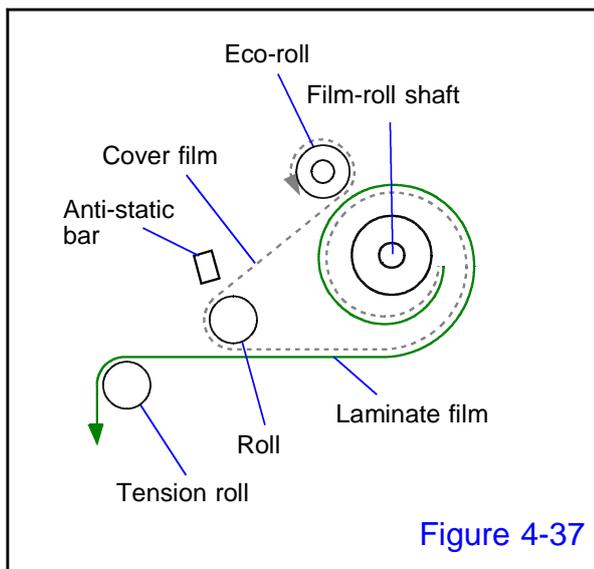
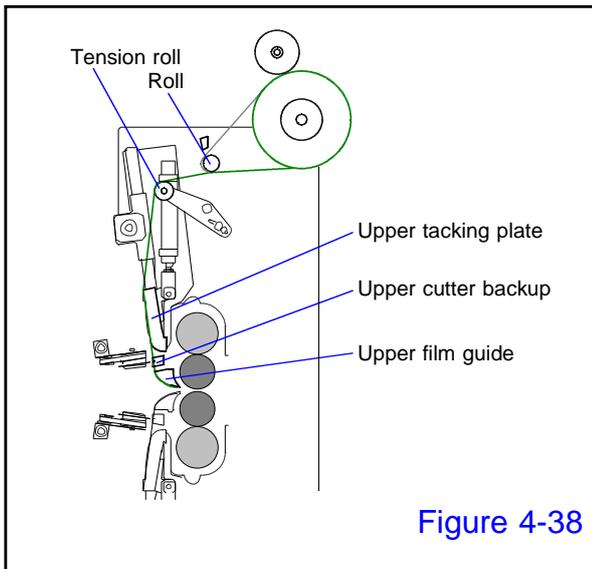


Figure 4-37

9.

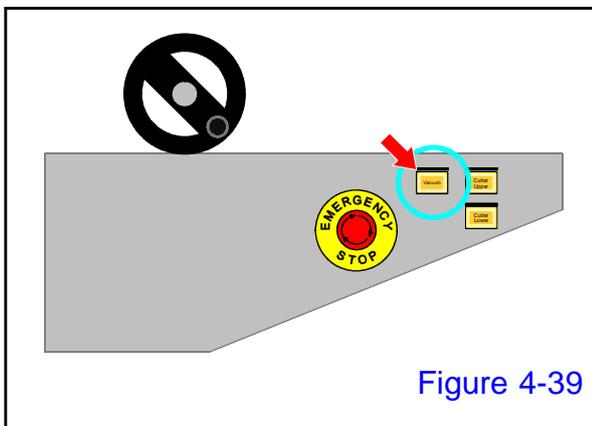
The dry film has now been loaded into the upper DF bulk unit, along the route shown in the Figure 4-37.



10. Run the laminate film along the film-running surface as shown in the Figure 4-38.

CAUTION

Be careful, as the lamination module contains high-temperature parts.



11. Push the "vacuum" button on the input conveyor control panel and thread the laminate film through the film guide.

- The blower fan is activated, the tacking plate, the cutter backup, and the film guide start the vacuum operation.

NOTE

This operation is not required if Loading Dry Film into the Lower DF Bulk Units is done first.

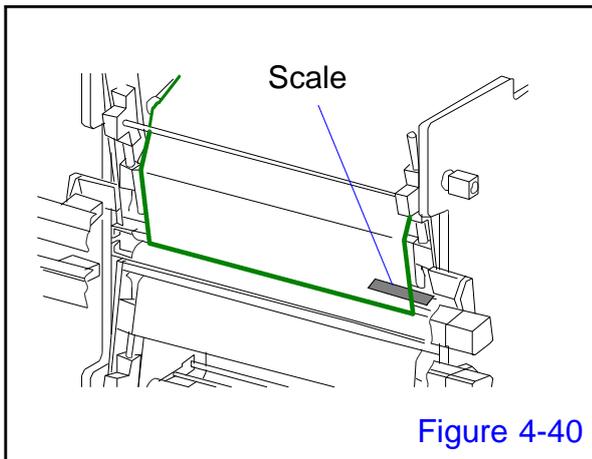


Figure 4-40

12.

Extend the film along the film-running surface while maintaining its tautness.

- While doing so, center it by referring to the scale on the cutter backup.

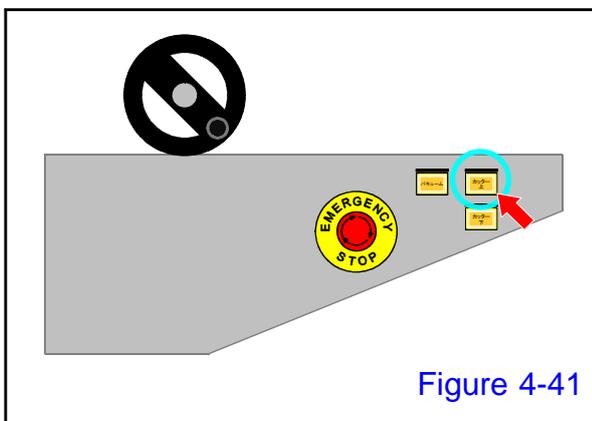


Figure 4-41

13.

Press the "Upper Cutter" button on the operation panel.

- The cutter assembly will run to cut the excess-film section.

CAUTION

- Be careful when running the cutter to cut the film with the lamination module pulled out.
- Keep the cutter cover closed even when the cutter is not in operation.

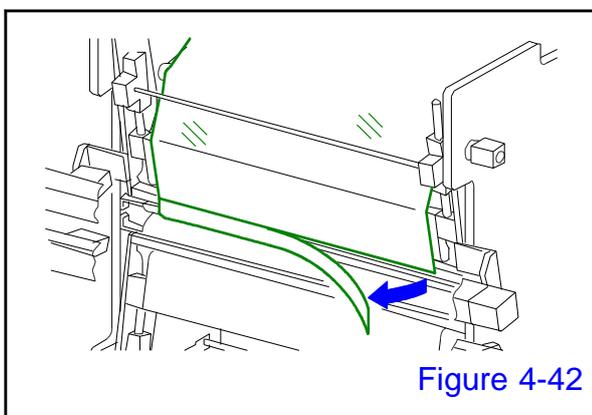


Figure 4-42

14.

Remove the excess film that has been cut off.

- Loading Dry Film into the Upper DF Bulk Unit is finished.
- Return the input / output conveyor unit to the home position and close the front door. However, this operation is not necessary when loading the lower DF bulk unit continuously.

Loading Dry Film into the Lower DF Bulk Unit

1.

Open the front door and move the input / output conveyor unit to the film exchange position.

- If continue loading the lower DF Bulk unit after the upper DF Bulk unit loading work, this step is not necessary because the conveyor unit is already in the film replacement position.

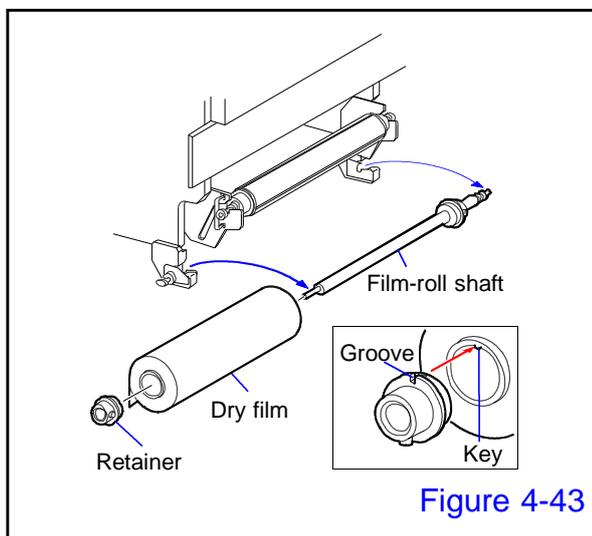
2.

Remove the dry film from the crating and packing bag.



NOTE

Dry film will be exposed when exposed to light for a long time, so it is always covered with shading packaging bag etc. in storage condition. When removing it from the packaging bag and installing it to the DF unit, please avoid under strong light and work under the environment such as yellow light.



3.

Remove the film-roll shaft from the lower DF bulk unit and position the dry film at approximately the center of the shaft.

- When positioning the dry film, align the key of its core with the groove of the retainer.

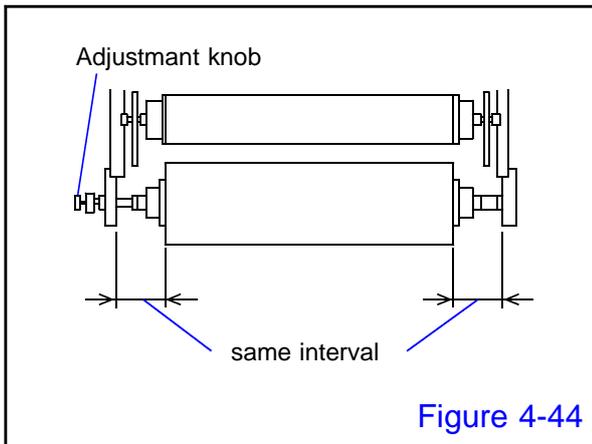


Figure 4-44

4.

Place the film-roll shaft loaded with the dry film into the lower DF bulk unit.

- Use the axial-adjustment knob to position the dry film so that it is laterally symmetrical when measured from the side plates at the edges of the unit.

5.

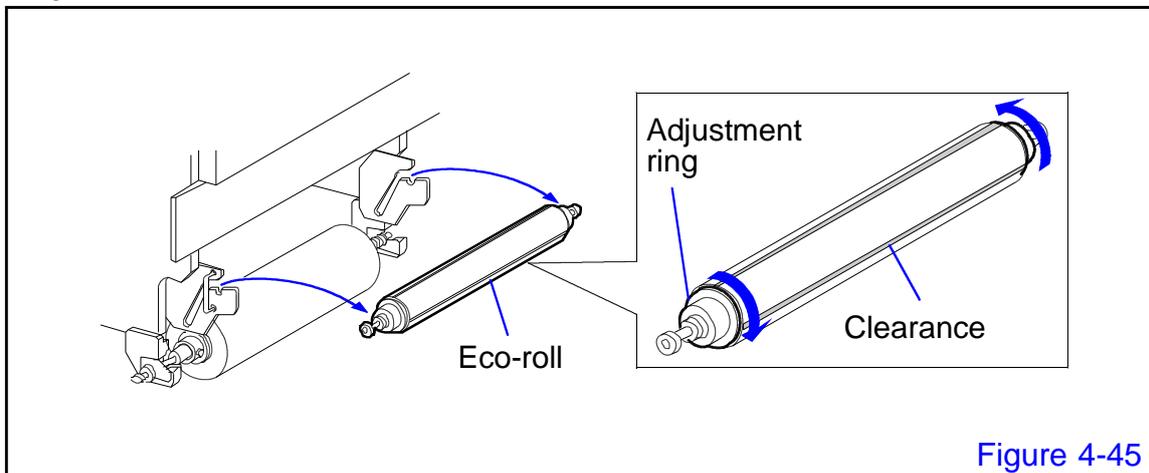


Figure 4-45

Remove the eco-roll from the lower DF bulk unit and turn the adjustment ring to make a clearance on the external circumference.

- Making a clearance with the adjustment ring expands the diameter of the eco-roll slightly.



- After a roll of dry film is used up, reducing the diameter of the Eco-roll by turning the adjustment ring makes the removal of the cover film easier.
- The cover film must be removed every time a roll of dry film is used up. Otherwise, the additional cover film will increase the diameter of the cover film on the Eco-roll to a point where it interferes with other components, potentially causing a malfunction.

6.

After adjusting with the adjustment ring, return the eco-roll to the lower DF bulk unit.

7.

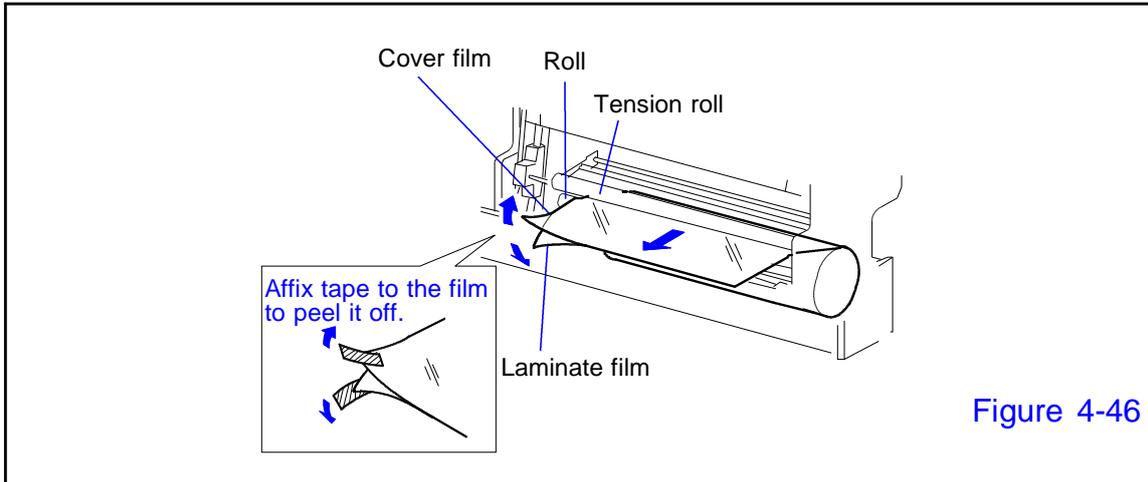


Figure 4-46

Pull out the dry film, run it between the roll and the tension roll to separate the laminate film from the cover film.



- The dry film consists of a cover film and a laminate film. And the laminate film consists of a carrier film and a photo-resist.
- Affix a piece of tape to the top and another to the bottom of the film. Pull upward and downward to separate the cover and laminate films.

8.

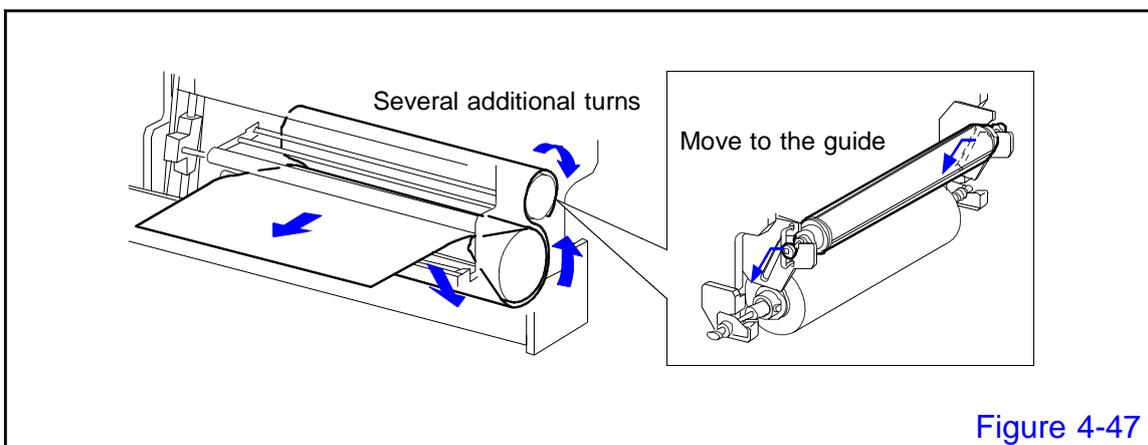


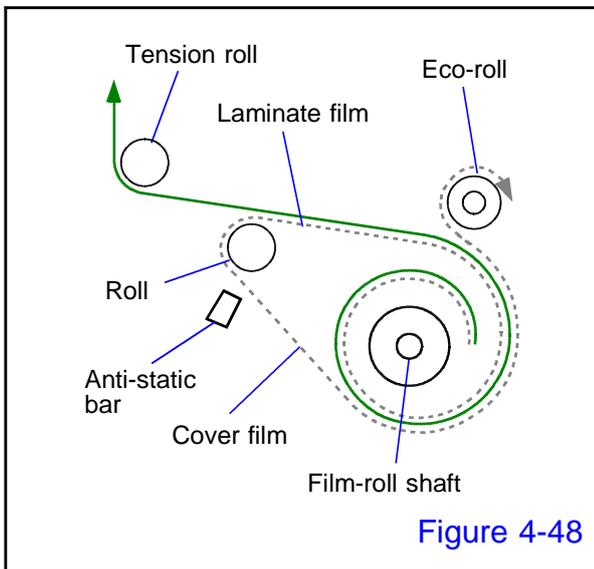
Figure 4-47

Fix the cover film to the eco-roll by running it under the dry film, and transfer the ecoroll from the holding groove to the guide section so it rests on the dry film. While separating the laminate film from the cover film, wind the cover film several additional turns.



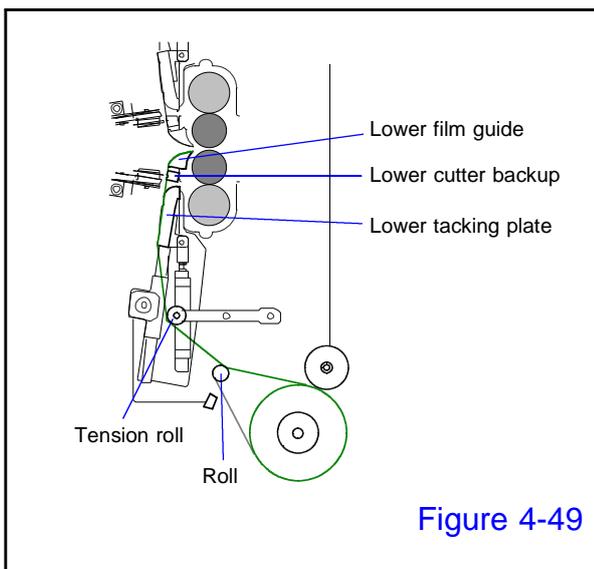
NOTE

Avoid using adhesive tape or inserting cover film into the clearance of the Eco-roll when fixing the cover film to the Eco-roll, as it is harder to remove the cover film.



9.

The dry film has now been loaded into the lower DF bulk unit, along the route shown in the Figure 4-48.



10.

Run the laminate film along the film-running surface as shown in the Figure 4-49.

	<p>Be careful, as the lamination module contains high-temperature parts.</p>
---	--

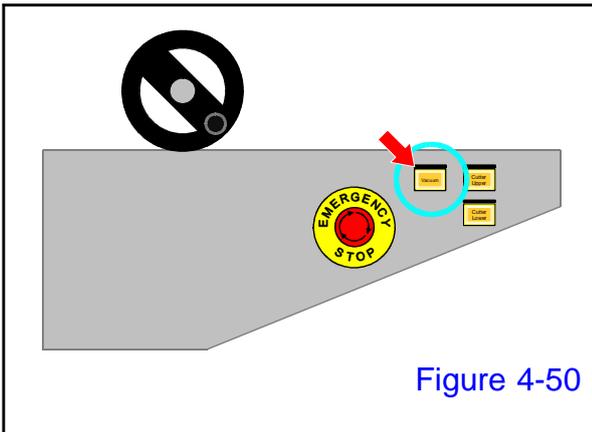


Figure 4-50

11. Push the "vacuum" button on the input conveyor control panel and thread the laminate film through the film guide.

- The blower fan is activated, the tacking plate, the cutter backup, and the film guide start the vacuum operation.

 <p>NOTE</p>	<p>This operation is not necessary if already loaded the upper DF bulk unit.</p>
--	--

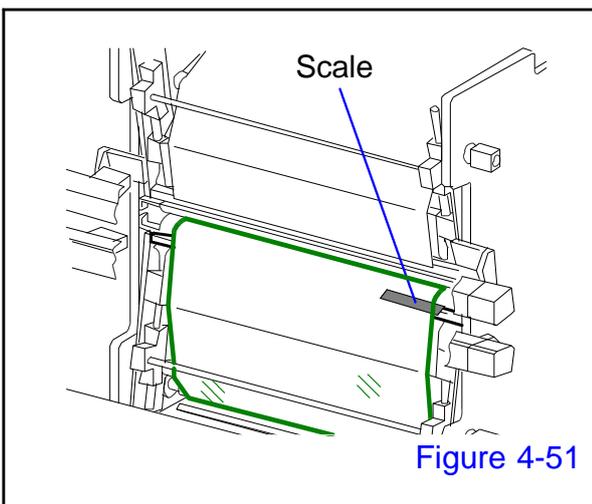
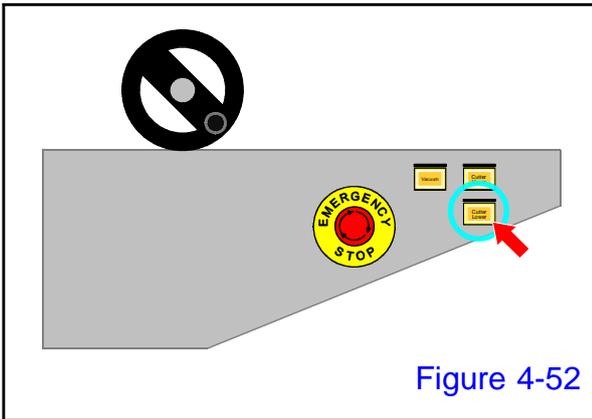


Figure 4-51

12. Extend the film along the film-running surface while maintaining its tautness.

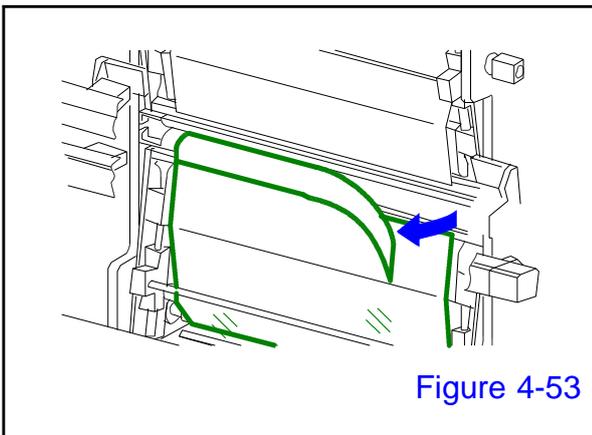
- While doing so, center it by referring to the scale on the cutter backup.



13.
Push the "Cutter Lower" button on the input conveyor control panel.

- The lower cutter module will run to cut the excess-film section.

	<ul style="list-style-type: none">● Be careful when running the cutter to cut the film with the lamination unit pulled out.● Keep the cutter cover closed even when the cutter is not in operation.
--	--



14.
Remove the excess film that has been cut off.

- Loading of the lower DF bulk unit is now complete.
- Return the input / output conveyor unit to the home position and close the front door.

4.2. Registration Recipe

There are two types of settings (settings using Registration Recipe or settings not using Registration Recipe) for this device. It is possible to select which setting to use before installation.

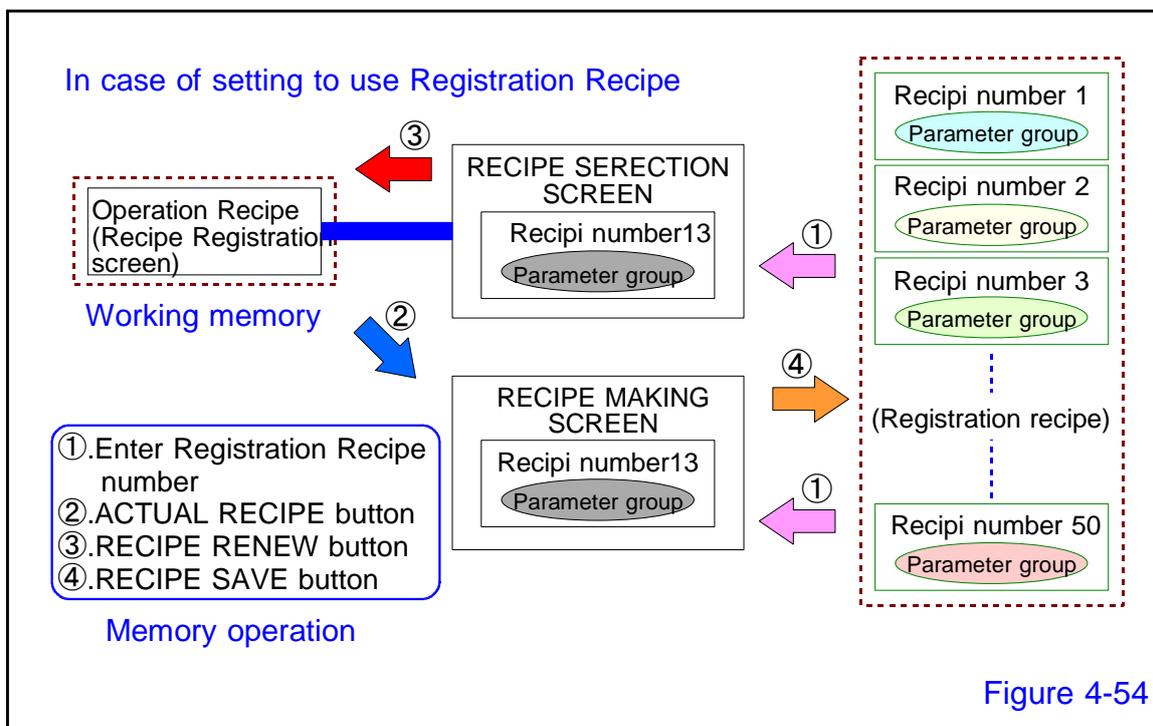
4.2.1. Operation Recipe & Registration Recipe

The set values of the parameters (roll speed, roll temperature, roll pressure, etc.) required for operation of this machine are grouped and called a recipe.

Recipes currently used for operation the machine are called "Operation Recipes". If the product to be produced changes, you will need to change the recipe.

Registration Recipe is a function that allows recipes to be numbered and saved. Depending on the product, parameters in Operation Recipe that were changed each time can be easily used as Operation Recipe by using the saved Registration Recipe.

The following is the idea when using Registration Recipe.





- Operation Recipe is used to operate this machine. "Operation Recipe" will not disappear even if turn off the power of this machine. When the next power ON, the recipe having the same contents as when it was turned OFF is set.
- Registration Recipe parameters can be set and changed even if the machine setting does not use Registration Recipe.
- In the setting using Registration Recipe, it is not possible to directly change the parameters of Operation Recipe. Changes are made by transferring data from the RECIPE SELECT screen.

4.2.2. Making of Registration Recipe

The procedure to create a new Registration Recipe (parameter group) is explained here.



Registration Recipe parameters can be set and changed even if the machine setting does not use Registration Recipe.

In making of the registered recipe, set the following parameters.

RECIPE MAKING 1 screen

- SPEED
- TEMP.
- FILM SPACE
- TACKING TIME
- FILM WIDTH
- ROLL PRESS.(Option)

RECIPE MAKING 2 screen

- ROLL UP / DOWN
- TENSION ROLLER COUNTER
- IN CONVEYOR
- FILM TENSION
- ON / OFF of special function

RECIPE MAKING 3 screen

- CENTERING
- TACKING BLOCK



A test recipe has already been entered in the machine at the time of factory shipment..

The test recipe is saved in Registration Recipe number 50.

It is recommended that when making of the new recipe, by copying and changing the data of Registration Recipe No.50.

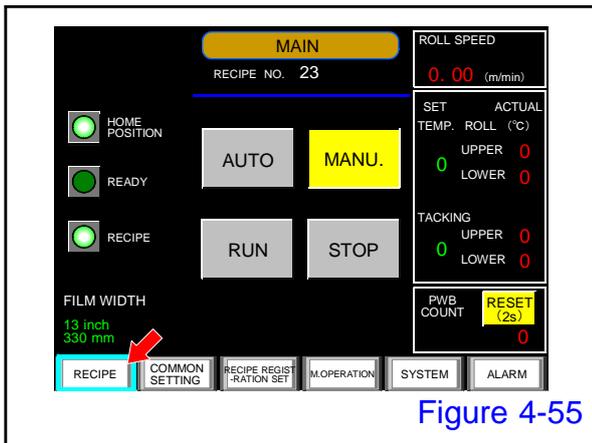


Figure 4-55

1. Push the "RECIPE" button on the MAIN screen.

- Display the RECIPE REGISTRATION screen.

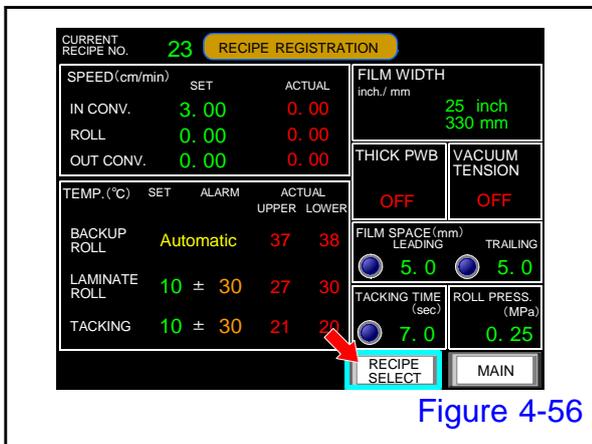


Figure 4-56

2. Push the "RECIPE SELECT" button on the RECIPE REGISTRATION screen.

- Display the COMMENT LIST 1 screen.

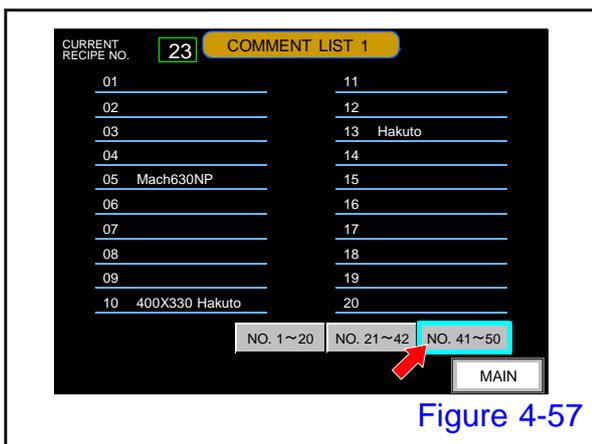


Figure 4-57

3. Push the "No. 41-50" button on the COMMENT LIST 1 screen.

- Recipe NO. 41 - 50 is displayed on the COMMENT LIST 1 screen.

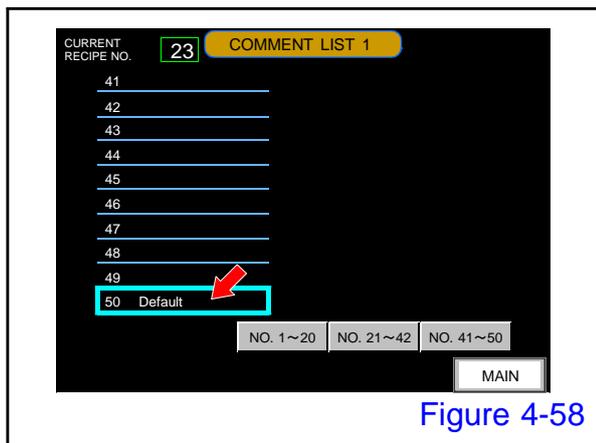


Figure 4-58

4. Push the "50 Default" part of the COMMENT LIST 1 screen.

- The RECIPE SELECT 1 screen with data of Registration Recipe number 50 is displayed.

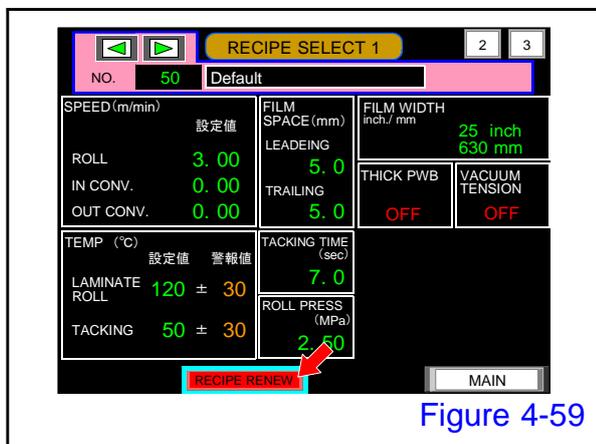


Figure 4-59

5. Push the "RECIPRE RENEW" button on the RECIPE SELECT 1 screen.

- The data of Registration Recipe 50 becomes the Operation Recipe.

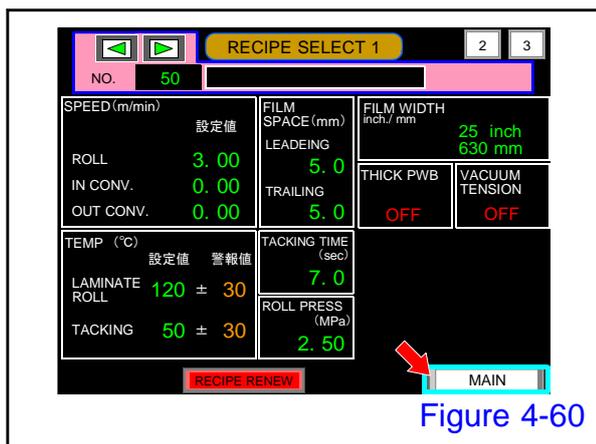


Figure 4-60

6. Push the "MAIN" button on the registration RECIPE SELECT 1 screen.

- The MAIN screen is displayed.

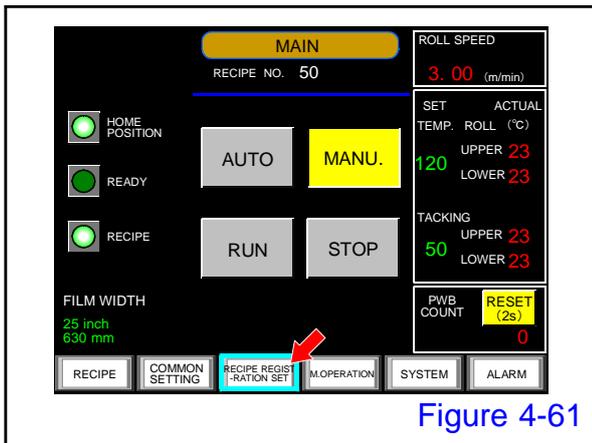


Figure 4-61

7. Push the "RECIPE REGISTRATION SET" button on the MAIN screen

- The password input screen is displayed.

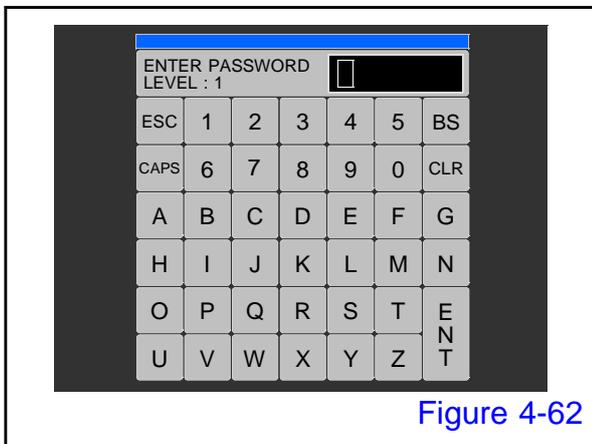


Figure 4-62

8. Enter the password on the password screen. When the password is accepted, the COMMENT LIST 2 screen will be displayed.

- Please check with your machine administrator for the password.

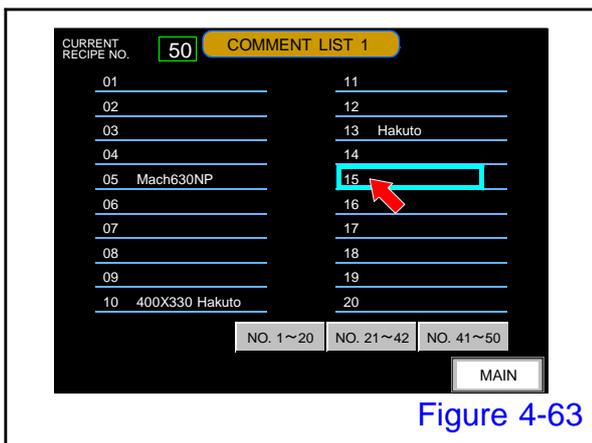


Figure 4-63

9. On the Comment List 2 screen, push the part of the recipe number that is going to set.

- 押された登録レシピ番号のデータを登録レシピ設定画面 1 に表示します。
今回は 15 を押したことにします。

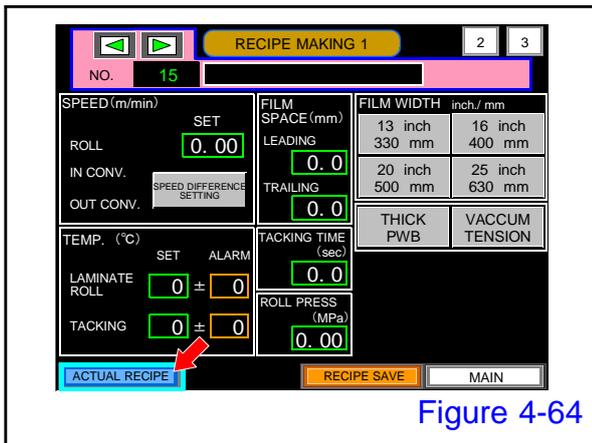


Figure 4-64

10.

Push the "ACTUAL RECIPE" button on the RECIPE MAKING 1 screen.

- Displays the current Operation Recipe data (data saved in Registered Recipe 50) on the screen.

Recipe numbers and comments do not change.



Even if push the "ACTUAL RECIPE" button and copy the Operation Recipe parameters to the screen, the Registration Recipe number and

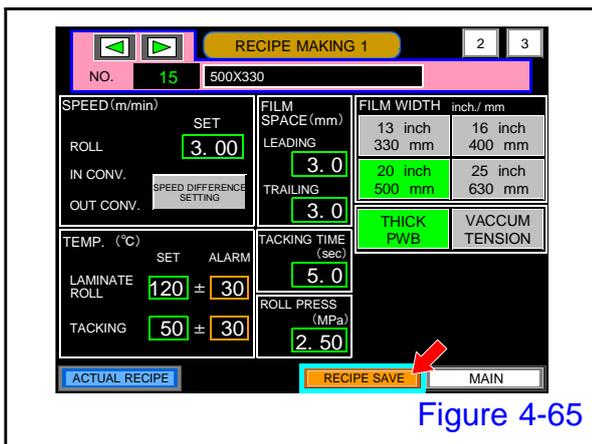


Figure 4-65

11.

Change the required parameters. Change the parameters of RECIPE MAKING 2 screen and RECIPE MAKING 3 screen, if necessary.

After all changes are completed, push the "RECIPE SAVE" button.

- The data on the current screen is saved in Registration Recipe 15.

12.

Push the "MAIN" button on the RECIPE MAKING screen.

- The MAIN screen is displayed.

This concludes the procedure for making a Registered Recipe.

4.2.3. How to enter parameters

There are four kinds of parameters input method, A, B, C, D below.

A : Input by Numeric keypad

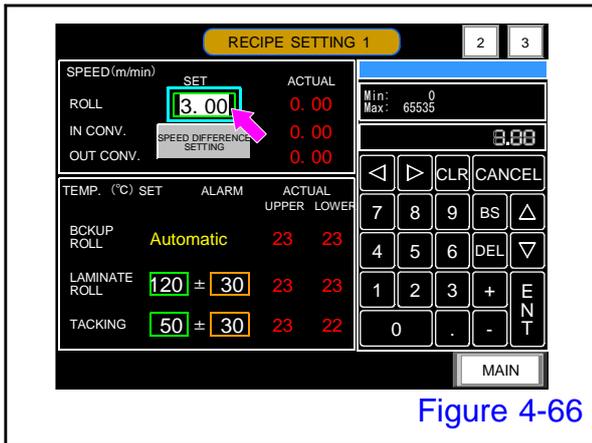


Figure 4-66

When push inside the input frame, the numeric keypad appears next to the frame. The cursor within the frame flashes, and the input becomes ready.

Enter the number and push the "ENT" key to decide.



NOTE

At the top of the number pad, the minimum(MIN.) and maximum(Max) values that can be entered in the current frame are displayed.

B : Input by Keyboard

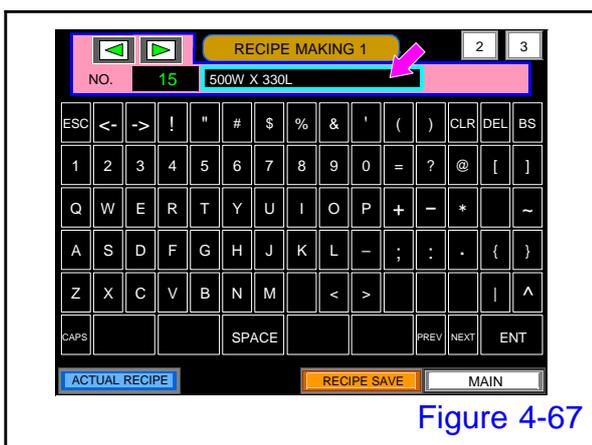


Figure 4-67

Push inside the input frame to display the keyboard.

The cursor within the frame flashes, and the input becomes ready.

Enter the letters and decide with "ENT" key.

C : Input by selection button

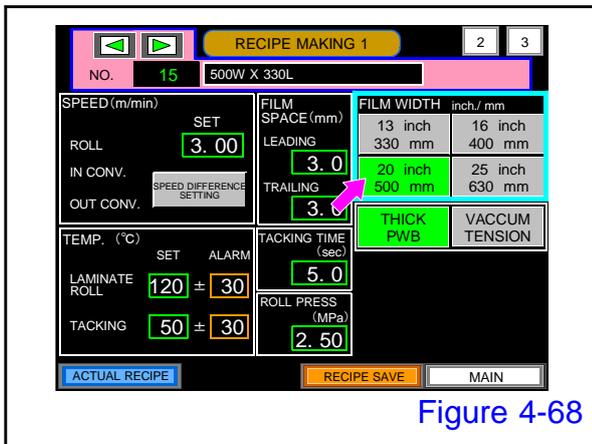


Figure 4-68

In advance, selectable buttons are displayed. When push the button, only the pushed button lights up in green.

The setting of the lit button is valid.

D : Input by ON / OFF button

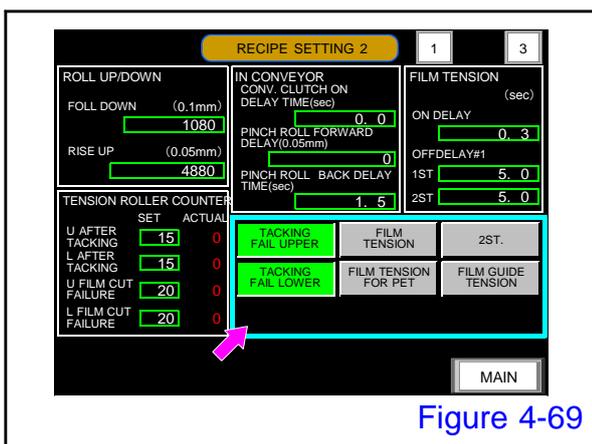


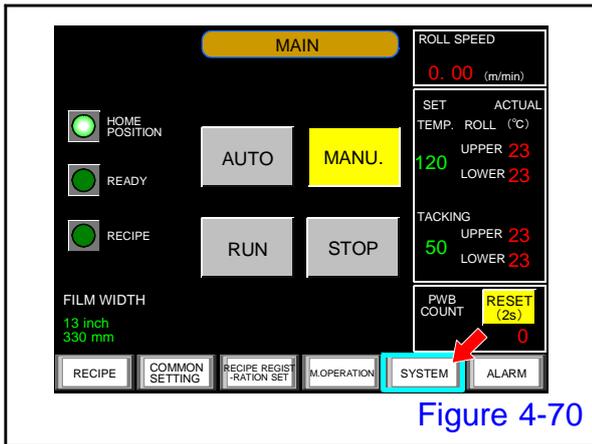
Figure 4-69

It is an input method of type that turns ON / OFF each time the button is pushed.

In the ON state, the button lights up green, and in the OFF state, the button is lit off.

4.3. Setting on the system screen

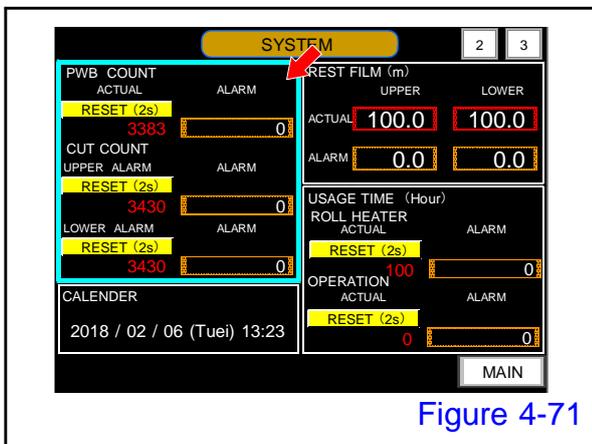
Set the number of PWB processed, number of cutter processed sheets, film remaining counter, total operation time, time setting of the internal clock of the machine on the system screen.



Push the "SYSTEM" button on the main screen to switch to the system screen.

Figure 4-70

4.3.1. Setting of alarm value of COUNT



Here, set the alarm value of PWB and cutter processed number.

When the ACTUAL value (Integrated value until reset) reaches ALARM value, the following alarm will be generated.

- 56 CUTTER CUT COUNTS
- 57 PRODUCTION BOARD COUNTS

If 0 (zero) is input as the alarm value, no alarm will be generated.

Figure 4-71

To reset "PWB COUNT" or "CUT COUNT", it can reset the current value to zero (0) by pushing each reset button for more than 2 seconds.



Please use as a guide for cleaning and replacing the cutter blade, and cleaning the laminate roll.

4.3.2. Setting of Film counter

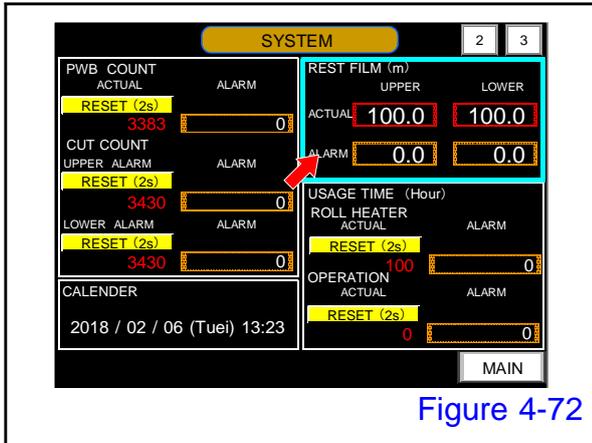


Figure 4-72

Film counters are available in the following three types depending on the specifications of the machine.

Please refer to the screen and check the specification of customer's machine.

REST FILM "Remaining length" (Unit : m)

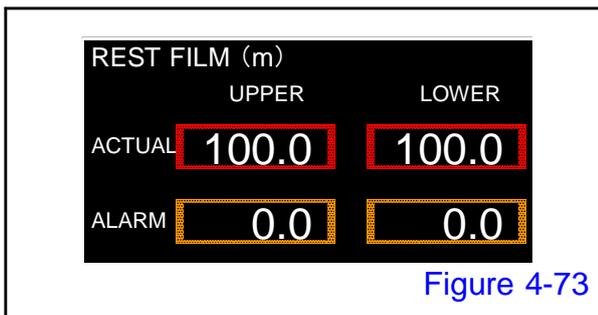


Figure 4-73

It is a function that is standardly installed in the machine.

When dry film is installed, enter the current value of film remaining amount and alarm value.

When the ACTUAL value falls below the ALARM value, an alarm is output.



Enter the current film length in the ACTUAL frame and enter a value that will remain a little in the ALARM frame. (5 m recommended)

REST FILM "Remaining thickness" (Unit : mm)

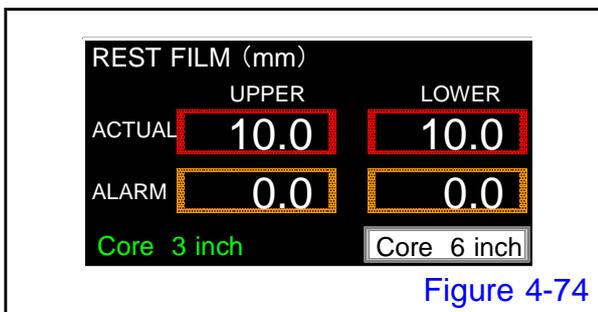


Figure 4-74

This is a screen for the machine equipped with an optional ultrasonic sensor.

The thickness of the film from the core is displayed on the ACTUAL frame.

The maximum value to display is 50 mm and it is a subtractive formula.

When the ACTUAL value becomes an ALARM value, an alarm is issued.

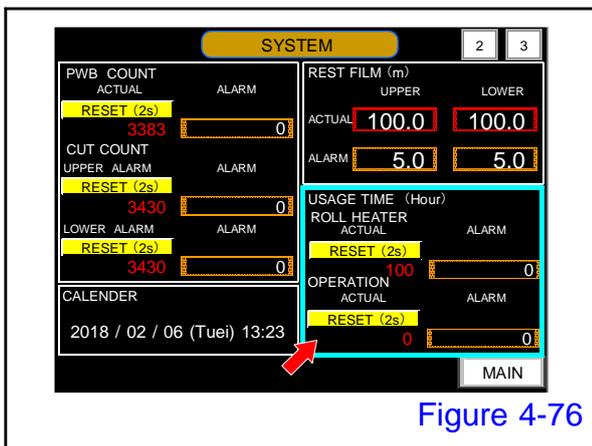
USED FILM "Usage length" (Unit : m)



This is a screen for a machine equipped with an optional photoelectric sensor. It monitoring the presence / absence of film at the sensor position. From the point when the sensor judges that there is no film, the amount of film used (addition formula) is displayed in the frame of ACTUAL.

When the amount of film used reaches the ALARM value, an alarm is issued.

4.3.3. Alarm value setting of usage time



Here, set the alarm of energization time of the roll heater and alarm value of the automatic operation time. When the ACTUAL value (integrated value until reset) reaches the ALARM value, the following alarm will be generated.
 93 ROLL HEATER USE TIME
 94 AUTO RUN TIME

If 0 (zero) is input as the alarm value, no alarm will be generated.

It can reset the current value to zero (0) by pressing the reset button for 2 seconds or longer.



NOTE

Please use it as a guide for replacing the heater and the timing of machine maintenance.

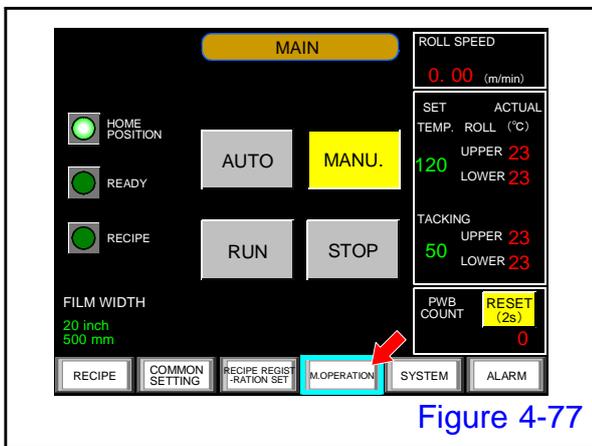
4.4. Heating of laminating roll and Tacking plate

When heating the laminating roll of this machine, it is necessary to rotate and pressurize the backup roll.

Here, explain the procedure for heating the laminate roll by rotating and pressing the backup roll.

1.

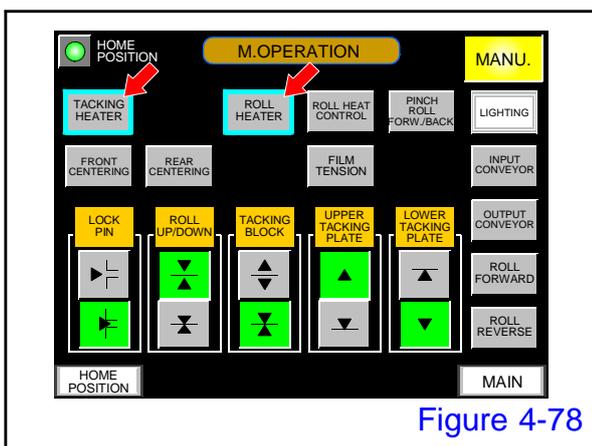
Turn on the machine and wait until the main screen is displayed on the touch panel.



2.

Push the "M. OPERATION" button on the main screen.

- Display the manual operation screen.



3.

Push the "TACKING HEATER" and "ROLL HEATER" button on the manual operation screen.

- Energize the tacking heater and roll heater to start temperature control.

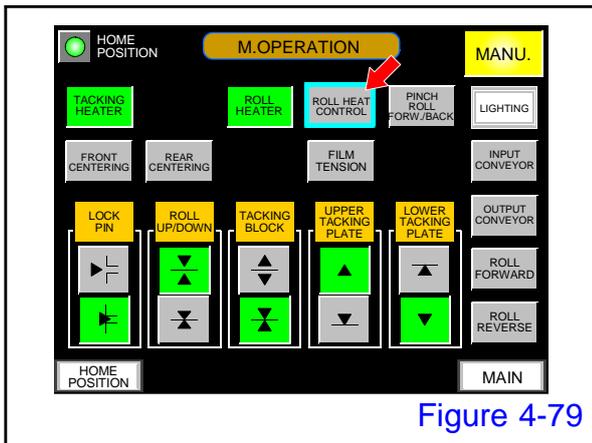


Figure 4-79

4. Push the "ROLL HEAT CONTROL" button on the manual operation screen to turn it ON.
 - The laminating roll starts rotating.
The laminating roll is down.



If the heater is heated for long without rotating the laminating roll, the part of laminating roll is heated too much and may melt.

When the roll heater is ON, the laminating roll must be rotated and be down.

The alarm "45 ROLL NOT ROTATING" is occurred, if the roll heater is ON for a certain period without rotating the laminating roll.

5. Automatic Operation



This section explains the procedure for starting and stopping automatic operation.

5.1. Start procedure of automatic operation

There are settings to use the Registration Recipe and settings not to use the Registration Recipe, and the operation start method is different for this machine.

It confirm that all pre-start inspection and preparation are in order and start automatic operation.

Start automatic operation according to the following procedure.

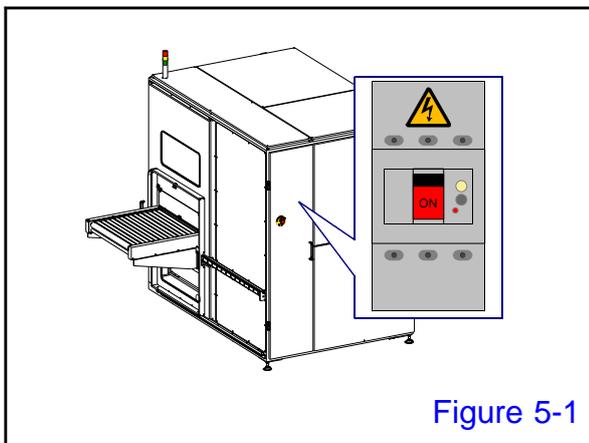
5.1.1. Machine that do not use Registration Recipe

1. Pre-Start inspection

Confirm the proper power supply, the supply of primary air, exhaust condition, and no abnormality in each part of the equipment.

Leave the laminate roll module, input and output conveyor in home position.

2. Main breaker ON



Turn on the main breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

3. Power ON

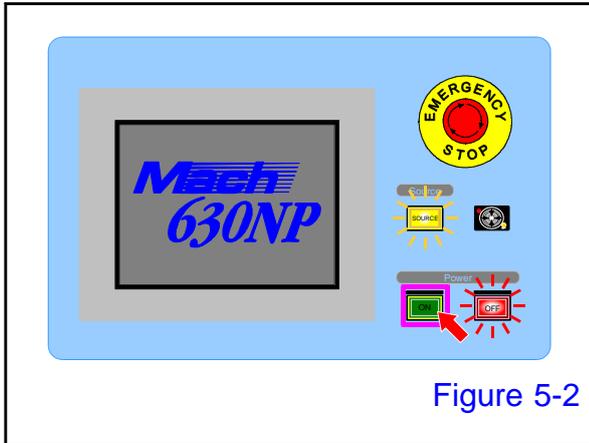


Figure 5-2

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

4. Confirm and change Operation Recipe

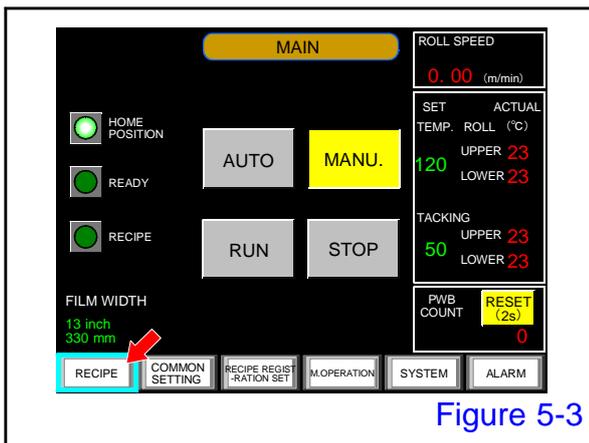


Figure 5-3

①. Push the "RECIPE" button on the MAIN screen.

- Display the RECIPE SETTING 1 screen.

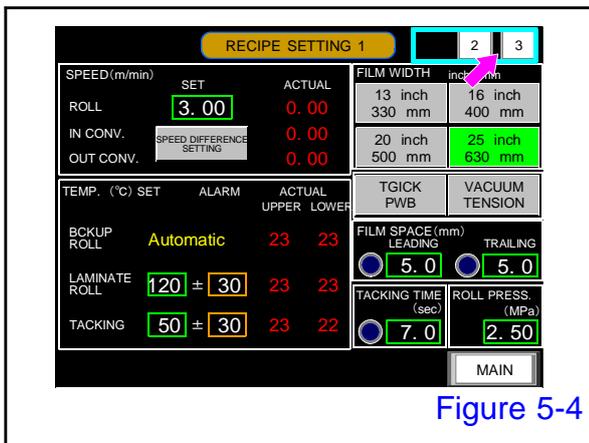
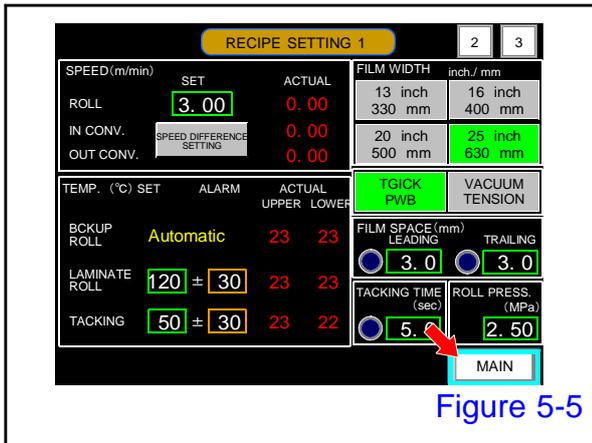


Figure 5-4

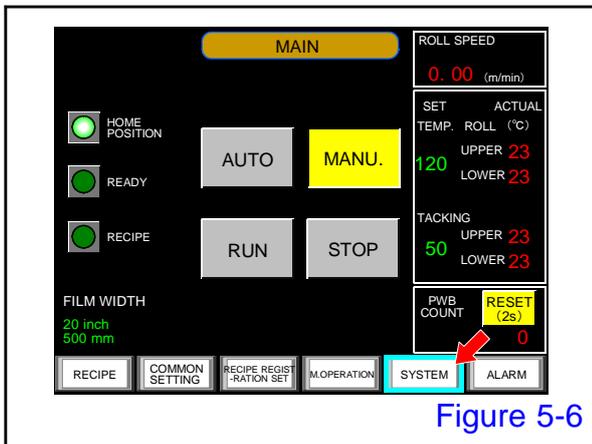
②. Confirm that the contents of recipe setting screen 1 are the same as the recipe of the product to be produced in the next lot. If it is necessary to change the parameters, Please change on this screen. As with recipe setting screen 1, also check and change recipe setting 2, 3 screens.



③. After confirming and changing the Operation Recipe, push the "MAIN" button.

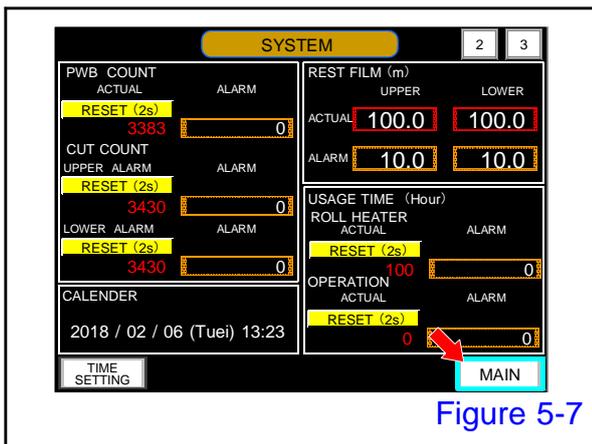
- The MAIN screen is displayed.

5. System screen setting



①. Push the "SYSTEM" button on the MAIN screen.

- Display the SYSTEM screen



②. Set the parameters on the SYSTEM screen. Please reset the current value if necessary. When setting is end, Push the "MAIN" button.

- Display the MAIN SCREEN.

6. Increase roll temperature

This step is unnecessary if the operation of "4. Preparation for operation" has been performed and the roll temperature raising operation has already been performed.

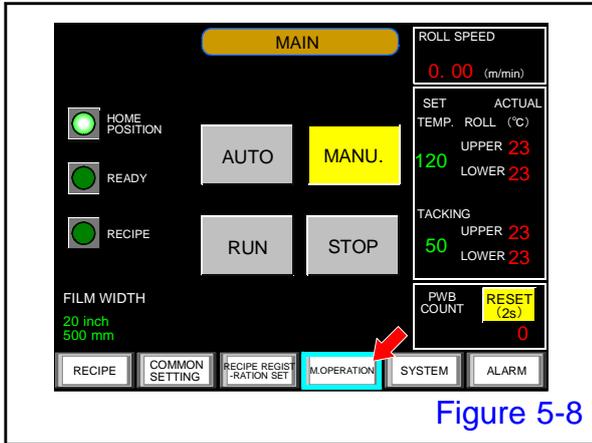


Figure 5-8

①.

Push the "M. OPERATION " button on the MAIN screen.

- Display the M. OPERATION screen.

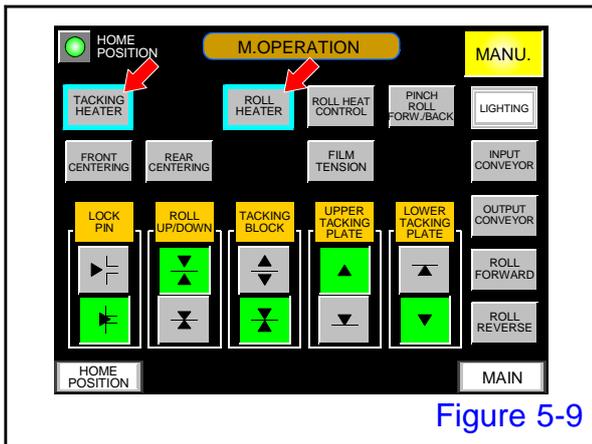


Figure 5-9

②.

Push the "TACKING HEATER" and "ROLL HEATER" button on the M.OPERATION screen to turn it ON.

- TACKING HEATER, ROLL HEATER button lights up.

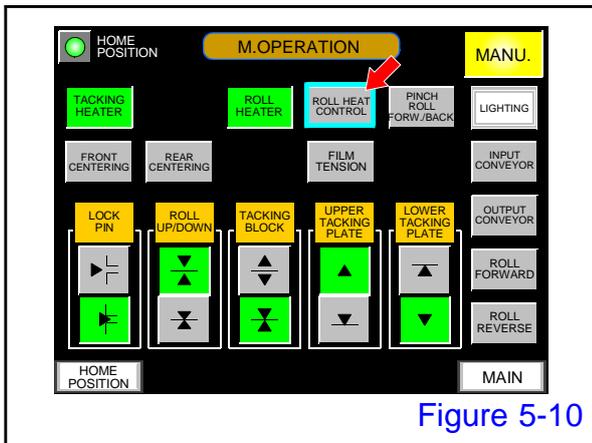


Figure 5-10

③.

Push the "ROLL HEAT CONTROL" button on the M. OPERATION screen.

- "ROLL HEAT CONTROL" button will light up.
- "Roll forward rotation" and Roll up and down "Lower" are turned ON.

7. Adjustment of centering bar

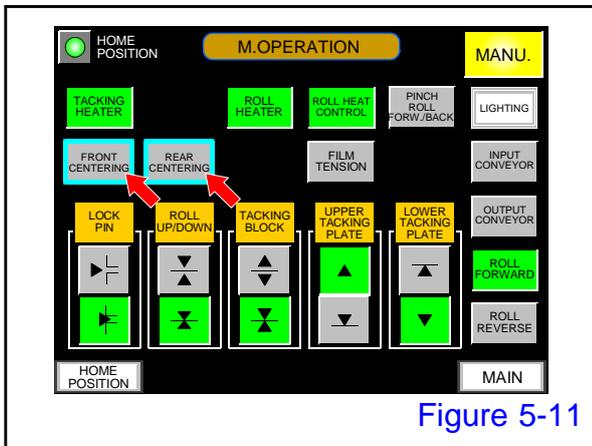


Figure 5-11

①. Push the "FRONT CENTERING" button and "REAR CENTERING" button on the M.OPERATION screen

- The two centering bars approach.

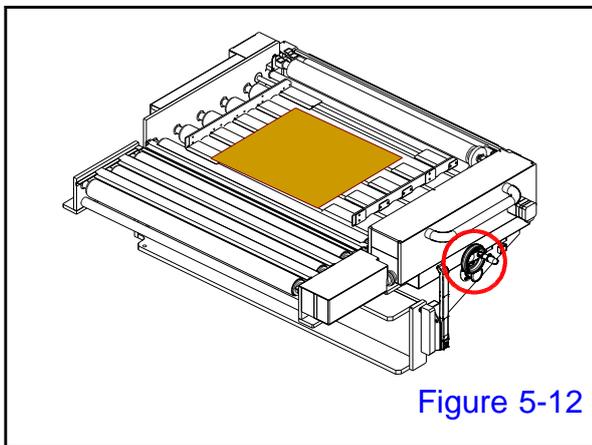


Figure 5-12

②. In this state, place the PWB on the input conveyor, and turn the adjustment handle to align the centering plate with the width of the PWB.



Make clearance of thickness of copy paper between PWB and centering bar so as not to sandwich the PWB.

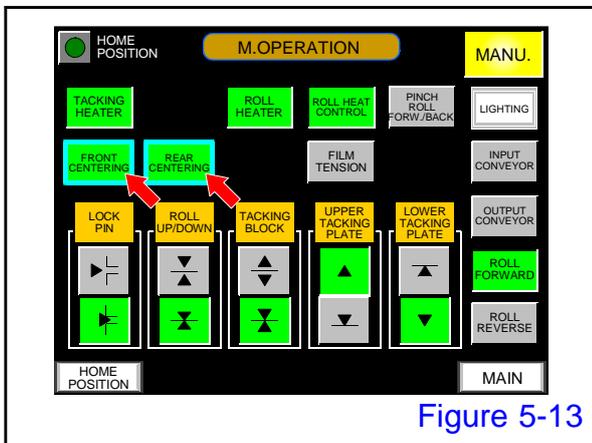
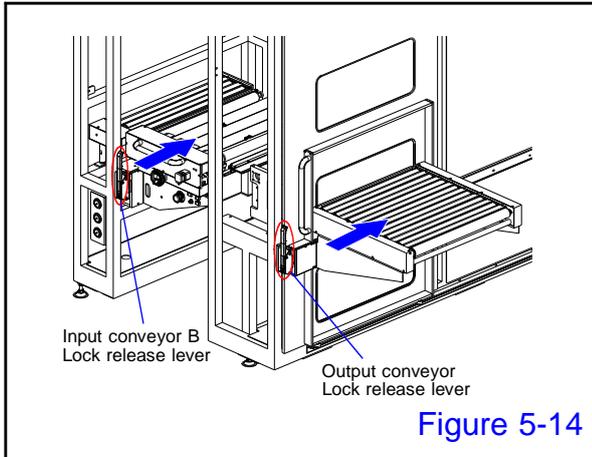


Figure 5-13

③. When adjustment of the centering bar is finished, push the "FRONT CENTERING" button and "REAR CENTERING" button on the M.OPERATION screen

- The centering bar moves away and returns to its original position.

8. Move input and output conveyor



Operate the lock release lever on the input and output conveyor to release the lock, then move the conveyor unit to the film change position.

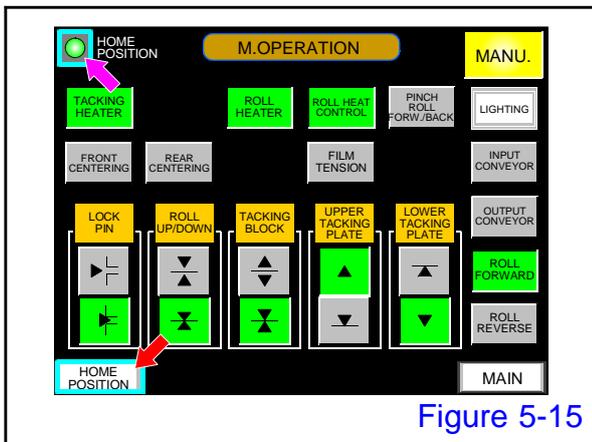
9. Set of dry film unit

Attach the DF unit with the dry film set to the laminate unit.
 Press the vacuum button on the Input Conveyor control panel, pull out the dry film by hand, and thread it through the Tacking Plate, Cutter Backup, Film Guide.
 After adsorbing the dry film, cut with the cutter running button.
 Remove unnecessary dry film after cutting.
 (Refer to "4. Preparation for operation")

10. Move input and output conveyor

Return the input and output conveyor to their original position (home position).

11. Confirmation of HOME POSITION lamp



①. Make sure the HOME POSITION lamp is lit. If the Home Position lamp is not lit, push the "HOME POSITION" button to move to the Home Position screen and check the red lighting part. (green lit is the home position). Go back to the manual operation screen and move each unit to the home position again.

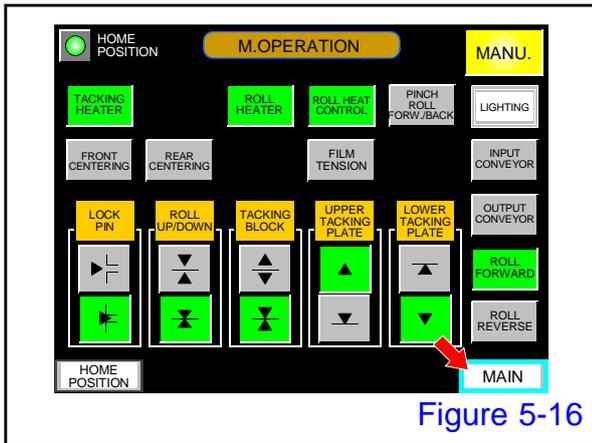


Figure 5-16

②. When confirm that the HOME POSITION lamp is lit, push the "MAIN" button.

- Display the MAIN screen.

12. Move to AUTO mode

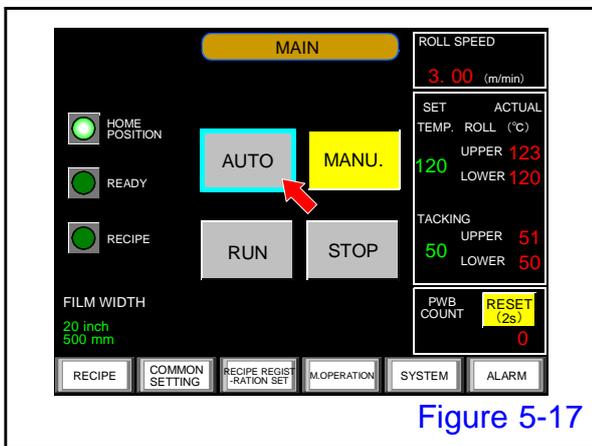


Figure 5-17

Push the "MAIN" button on the MAIN screen

- The AUTO button and the STOP button light up, and the machine enters the automatic mode.

13. Confirmation of READY lamp lighting

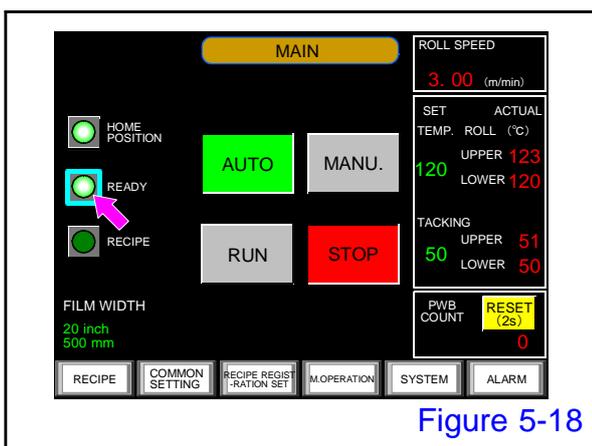


Figure 5-18

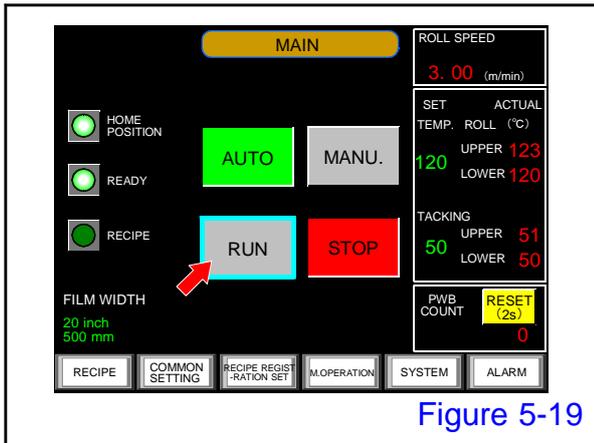
Confirm that the "READY" lamp is lit.

- If the warming up of each heater is completed and it will be in the condition which can start automatic operation, the "READY" lamp will light up.



When press the AUTO button, the READY lamp blinks.
When preparation for operation is completed, the READY lamp goes on.

14. Operation start



Push the "RUN" button on the MAIN screen to start automatic operation.

- The conveyor rotates and operation starts.

15. PWB input

Laminate operation is performed automatically when PWB is inputed.

This completes the procedure for starting automatic operation.

5.1.2. Machine with setting to use Registration Recipe

1. Pre-Start inspection

Confirm the proper power supply, the supply of primary air, exhaust condition, and no abnormality in each part of the equipment.

Leave the laminate roll module, input and output conveyor in home position.

2. Main breaker ON

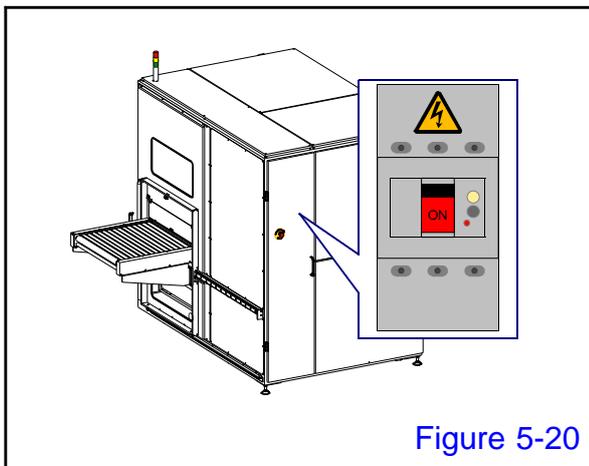


Figure 5-20

Turn on the main breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

3. Power ON

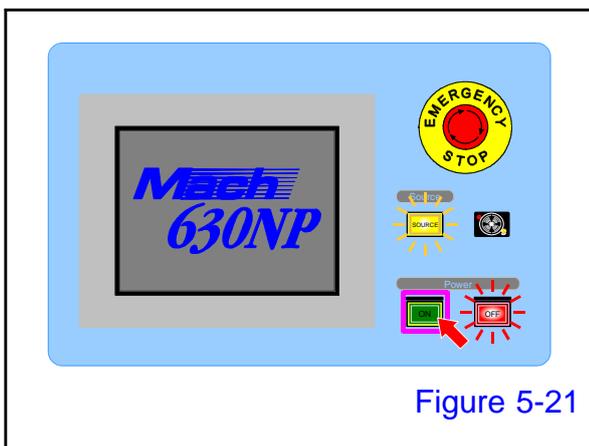


Figure 5-21

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

4. Recipe selection



If the product to be produced is a recipe number displayed on the main screen, a recipe selection step is unnecessary.

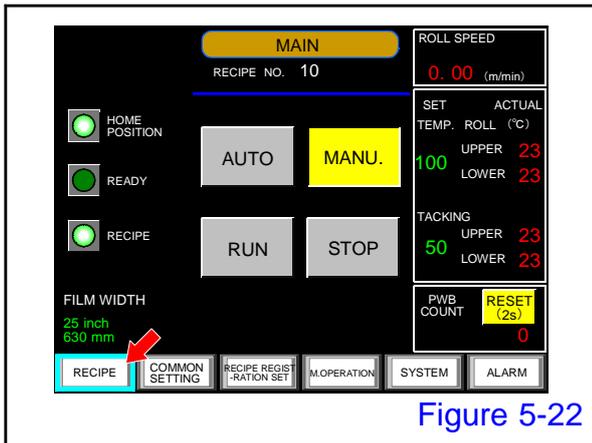


Figure 5-22

1. Push the "RECIPE" button on the MAIN screen.
 - Display the RECIPE SETTING 1 screen.

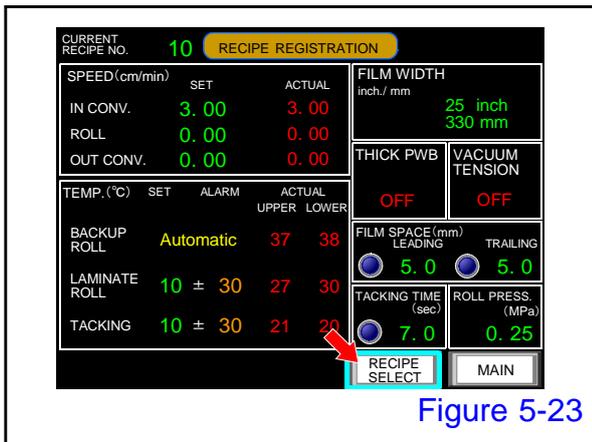


Figure 5-23

2. Push the "RECIPE SELECT" button on the RECIPE REGISTRATION screen.
 - The COMMENT LIST 1 screen will be displayed.

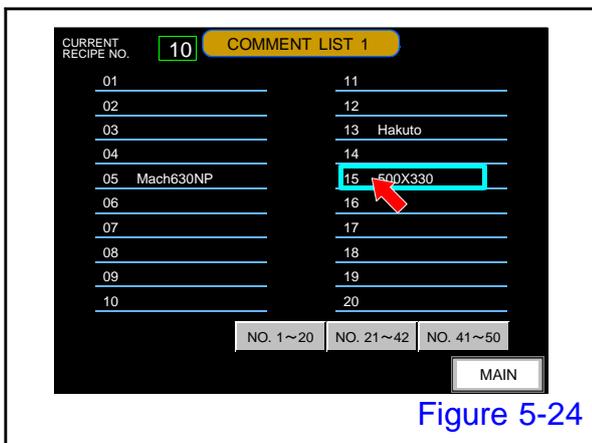


Figure 5-24

3. Push the Registration Recipe number column of the product to be produced.
 - Displays the Registration Recipe contents of the pushed number on the RECIPE SELECT 1 screen.

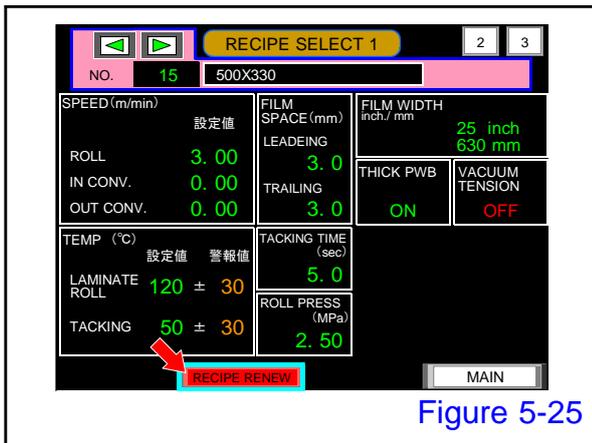


Figure 5-25

④.

If there is no mistake in the displayed recipe, press the "RECIPE RENEW" button.

- Please also check RECIPE SELECT 2, 3 screen.
- The Operation Recipe becomes the recipe of the contents currently displayed.



NOTE

If the recipe currently being displayed differs from the product produced, push the recipe number frame to return to the comment list 1 screen.

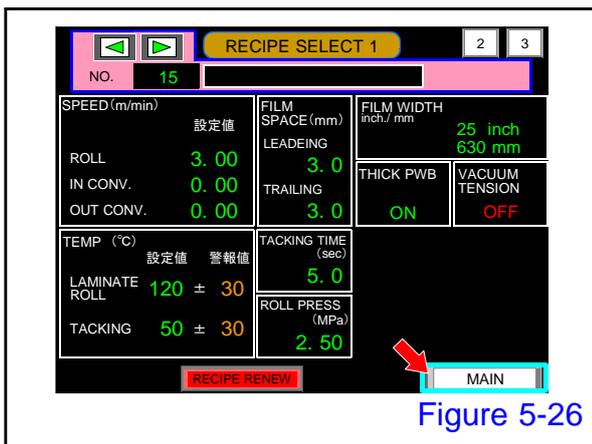


Figure 5-26

⑤.

This concludes the recipe selection. Please push "Main" button.

- The MAIN screen is displayed.

5. System screen setting

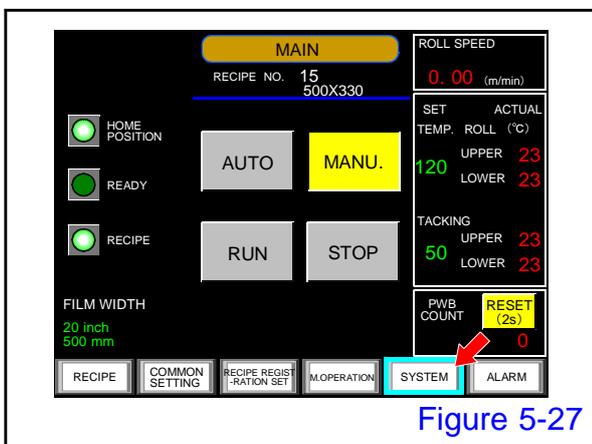


Figure 5-27

①.

Push the "SYSTEM" button on the MAIN screen.

- Displays the SYSTEM screen

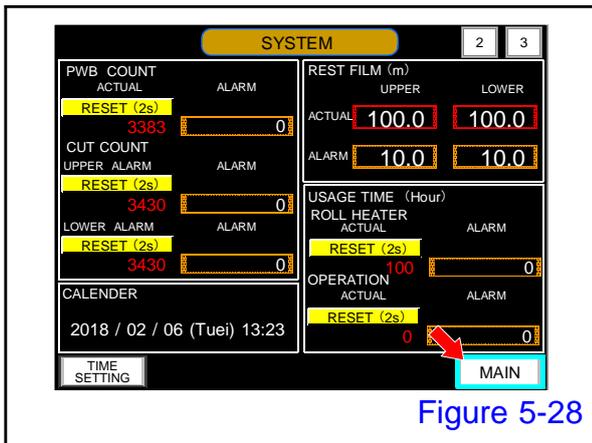


Figure 5-28

②. Set the parameters on the SYSTEM screen. Please reset the current value if necessary. When setting is end, Push the "MAIN" button.

- Display the MAIN SCREEN.

6. Increase roll temperature

This step is unnecessary if the operation of "4. Preparation for operation" has been performed and the roll temperature raising operation has already been performed.

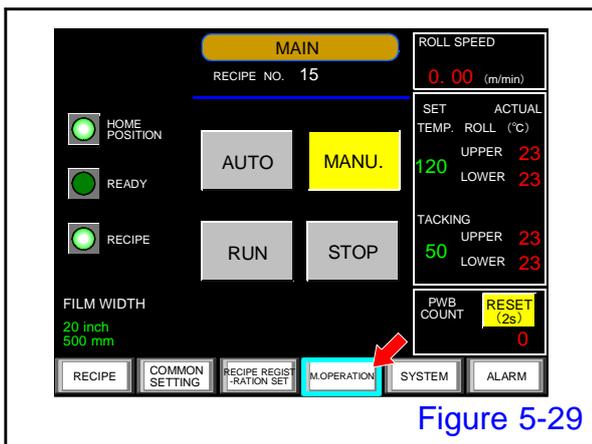


Figure 5-29

①. Push the "M. OPERATION " button on the MAIN screen.

- Display the M. OPERATION screen.

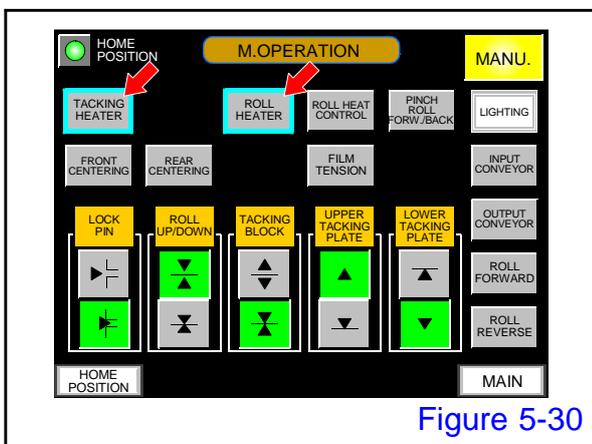


Figure 5-30

②. Push the "TACKING HEATER" and "ROLL HEATER" button on the M.OPERATION screen to turn it ON.

- TACKING HEATER, ROLL HEATER button lights up.

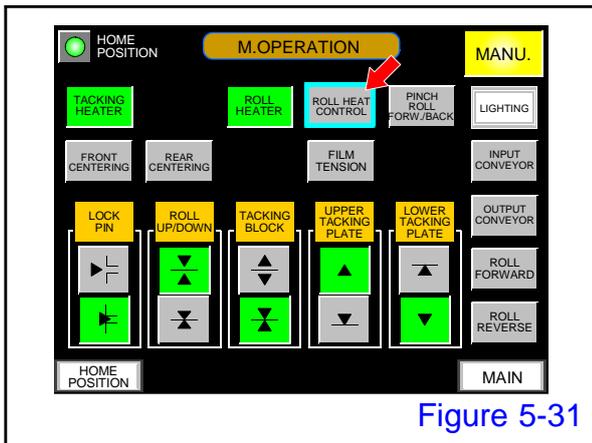


Figure 5-31

③.

Push the "ROLL HEAT CONTROL" button on the M. OPERATION screen.

- "ROLL HEAT CONTROL" button will light up.
- "Roll forward rotation" and Roll up and down "Lower" are turned ON.

7. Adjustment of centering bar

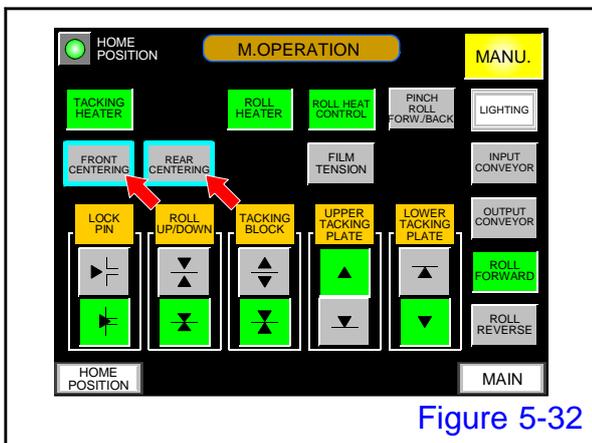


Figure 5-32

①.

Push the "FRONT CENTERING" button and "REAR CENTERING" button on the M.OPERATION screen

- The two centering bars approach.

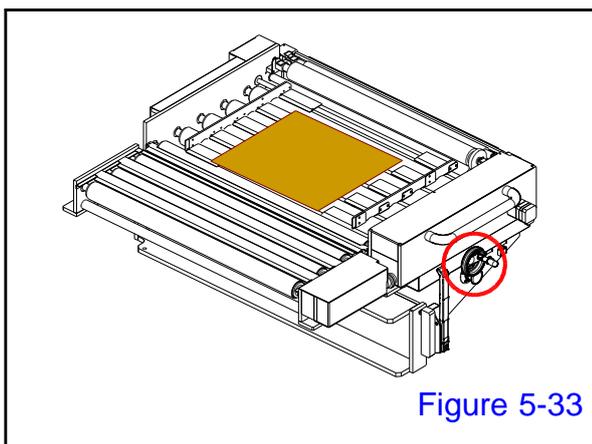


Figure 5-33

②.

In this state, place the PWB on the input conveyor, and turn the adjustment handle to align the centering plate with the width of the PWB.



Make clearance of thickness of copy paper between PWB and centering bar so as not to sandwich the PWB.

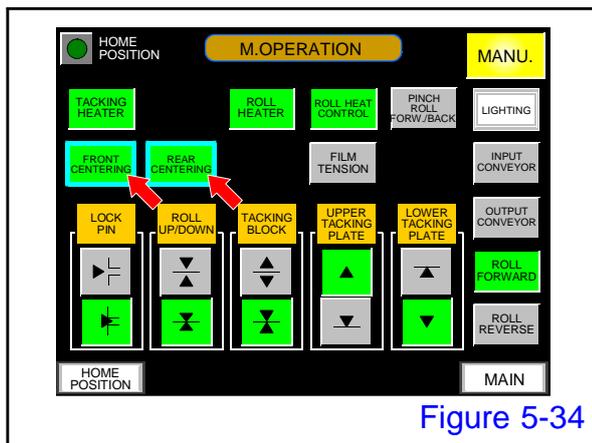


Figure 5-34

③.

When adjustment of the centering bar is finished, push the "FRONT CENTERING" button and "REAR CENTERING" button on the M.OPERATION screen

- The centering bar moves away and returns to its original position.

8. Move input and output conveyor

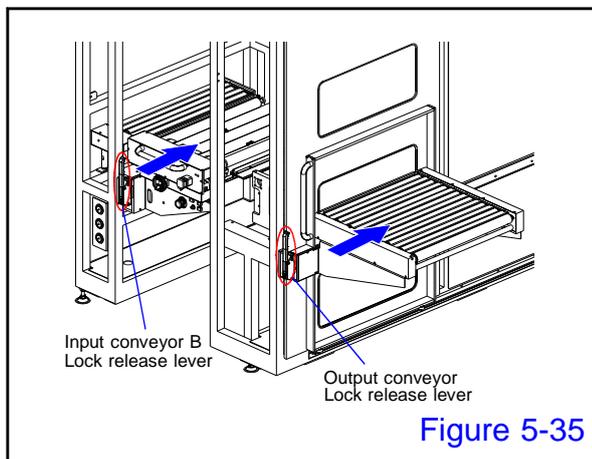


Figure 5-35

Operate the lock release lever on the input and output conveyor to release the lock, then move the conveyor unit to the film change position.

9. Set of dry film unit

Attach the DF unit with the dry film set to the laminate unit.
 Press the vacuum button on the Input Conveyor control panel, pull out the dry film by hand, and thread it through the Tacking Plate, Cutter Backup, Film Guide.
 After adsorbing the dry film, cut with the cutter running button.
 Remove unnecessary dry film after cutting.
 (Refer to "4. Preparation for operation")

10. Move input and output conveyor

Return the input and output conveyor to their original position (home position).

11. Confirmation of HOME POSITION lamp

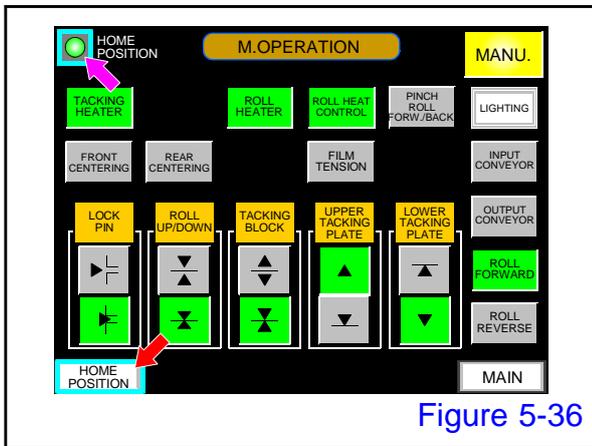


Figure 5-36

①. Make sure the HOME POSITION lamp is lit. If the Home Position lamp is not lit, push the "HOME POSITION" button to move to the Home Position screen and check the red lighting part. (green lit is the home position). Go back to the manual operation screen and move each unit to the home position again.

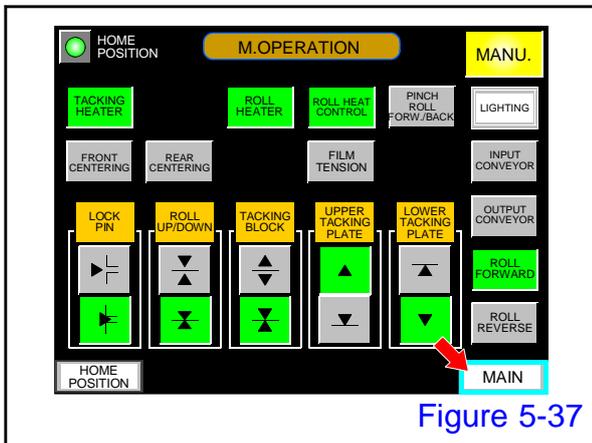


Figure 5-37

②. When confirm that the HOME POSITION lamp is lit, push the "MAIN" button.

- Display the MAIN screen.

12. Move to AUTO mode

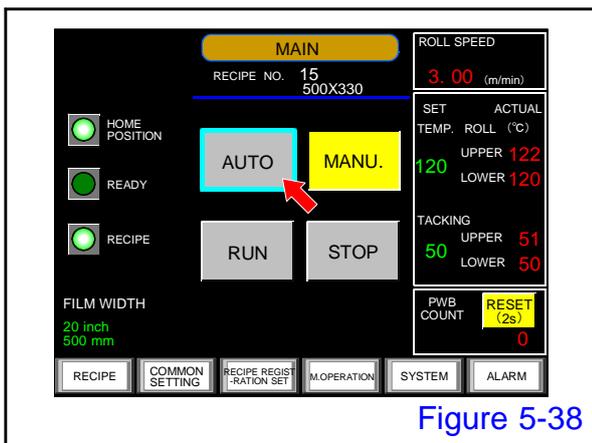


Figure 5-38

Push the "MAIN" button on the MAIN screen

- The AUTO button and the STOP button light up, and the machine enters the automatic mode.

13. Confirmation of READY lamp lighting

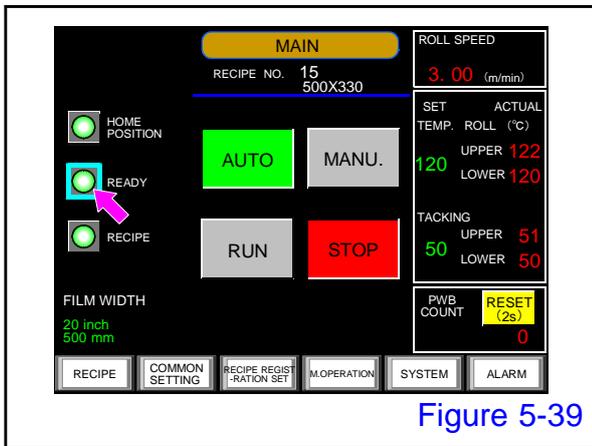


Figure 5-39

Confirm that the "READY" lamp is lit.

- If the warming up of each heater is completed and it will be in the condition which can start automatic operation, the "READY" lamp will light up.



NOTE

When press the AUTO button, the READY lamp blinks.
When preparation for operation is completed, the READY lamp goes on.

14. Operation start

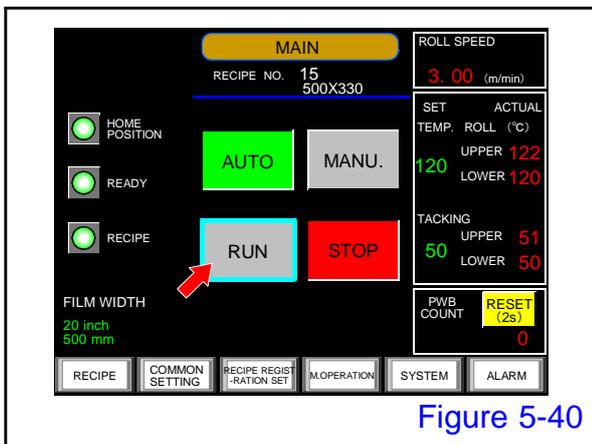


Figure 5-40

Push the "RUN" button on the MAIN screen to start automatic operation.

- The conveyor rotates and operation starts.

15. PWB input

Laminate operation is performed automatically when PWB is inputed.

This completes the procedure for starting automatic operation.

5.2. Stop procedure of automatic operation

Here, it is an explanation using setting that does not use Registration Recipe as an example, but automatic stopping procedure is the same even for setting using Registration Recipe.

Please stop the automatic operation according to the following procedure.

1. Confirm completion of operation cycle

Confirm that the product PWB is not left in the machine.

2. STOP button

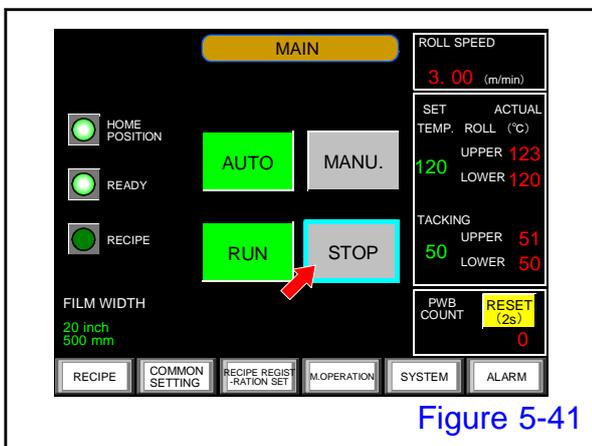


Figure 5-41

Push the "STOP" button on the MAIN screen to end automatic operation.

3. MANUAL button

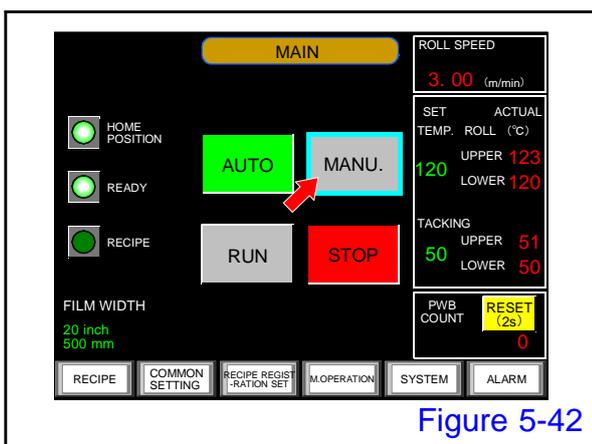


Figure 5-42

Confirm that the stop button lights up, then push the "MANU." button on the MAIN screen to enter manual mode.

- With this operation, It can operate each button in the M.OPERATION screen.

4. M. OPERATION button

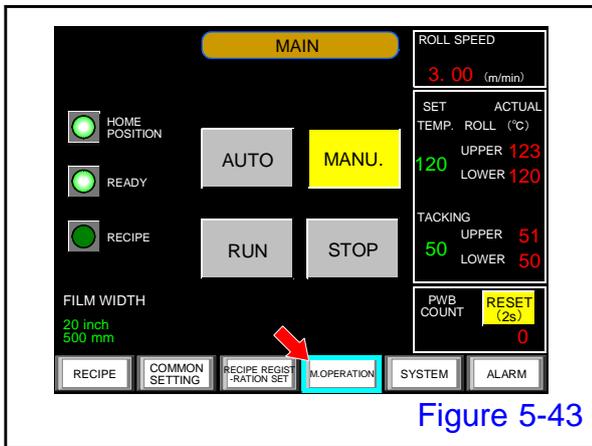


Figure 5-43

Push the "M.OPERATION" button at the bottom of the MAIN screen to switch to the manual operation screen

5. Heater OFF

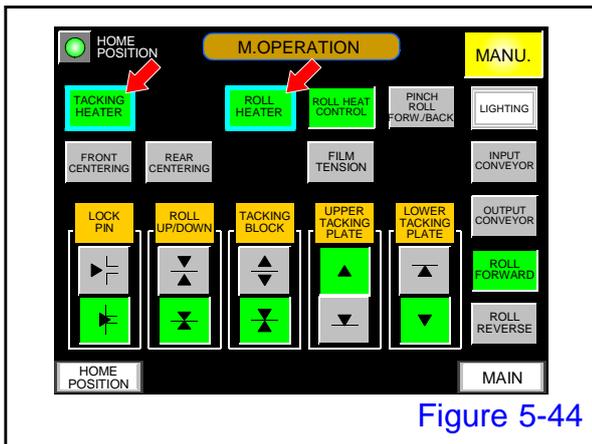


Figure 5-44

Turn off tacking heater and roll heater.

- The roll heat control button also turns off.

6. Move input and output conveyor

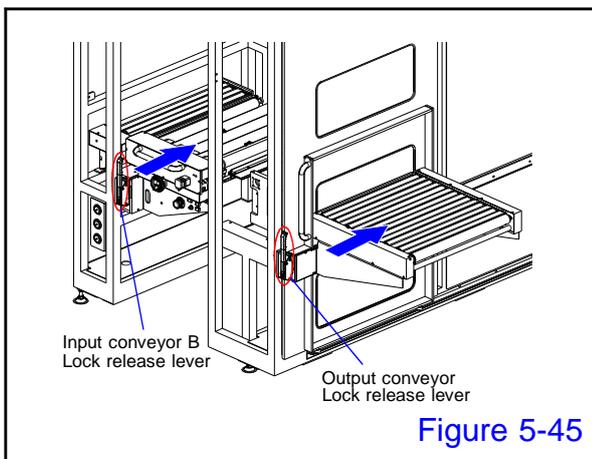
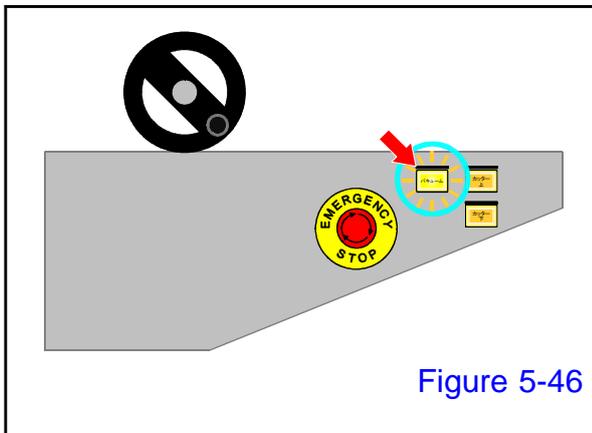


Figure 5-45

Operate the lock release lever on the input and output conveyor to release the lock, and then move the conveyor unit to the film change position.

7. Vacuum OFF



Press the "Vacuum" button on the conveyor control panel to stop the vacuum operation.

- Vacuum turns off and the light of vacuum button turns off.

8. Rewind of dry film

Turn the film roll of the upper and lower DF units by hand to rewind the dry film drawn out to the tacking plate.

9. Removing the DF unit

Remove the upper and lower DF units from the laminate unit.
Removal should be done in the reverse order of mounting.
(Refer to "4. Preparation for operation")

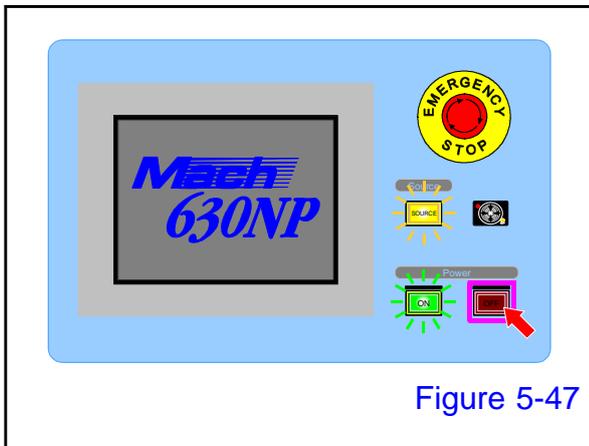
10. Removal of laminate roll

To prevent deterioration of the laminate roll surface, pull out the laminate roll module and remove the laminate roll.
Return the laminate roll module.
(See Chapter 2 Maintenance, 2.2.1. Replacement of the laminating rolls)

11. Move input and output conveyor

Return the input and output conveyor to their original position (home position).

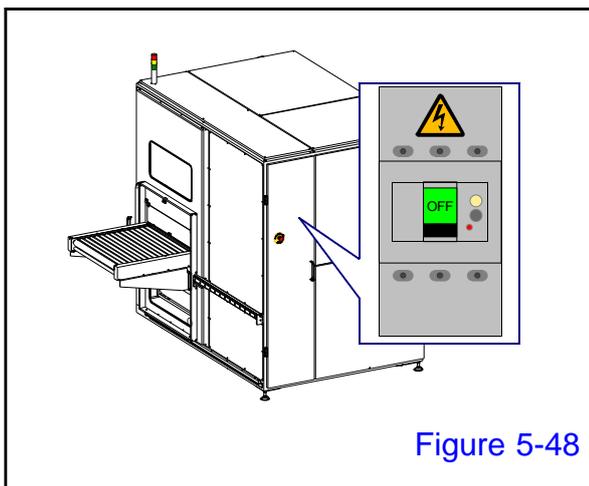
12. Power OFF



Press the power OFF button on the operation panel to turn off the power.

- The power OFF lamp lights and the touch panel display disappears.

13. Main breaker OFF



Open the back door of this machine and turn off the main breaker on the control panel unit.

14. Primary side air supply valve "closed"

Close the primary air supply valve on the factory side and stop supplying air to this machine.

This completes the procedure to stop automatic operation.

6. Manual Operation

If automatic operation has been stopped to load dry film, inspect the unit, or for other reasons, follow the steps specified below to return each part to its home position using manual operation.

6.1. Procedures for Manual Operation

In order to perform manual operation, the operation mode must be "Manual".

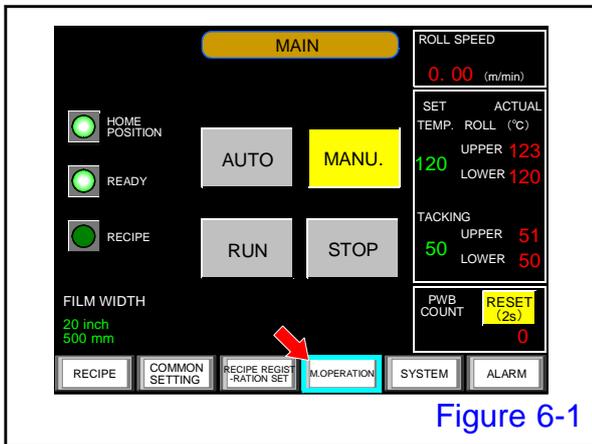


Figure 6-1

1. Push the "M.OPERATION" button on the MAIN screen.

- Display the M. OPERATION screen.

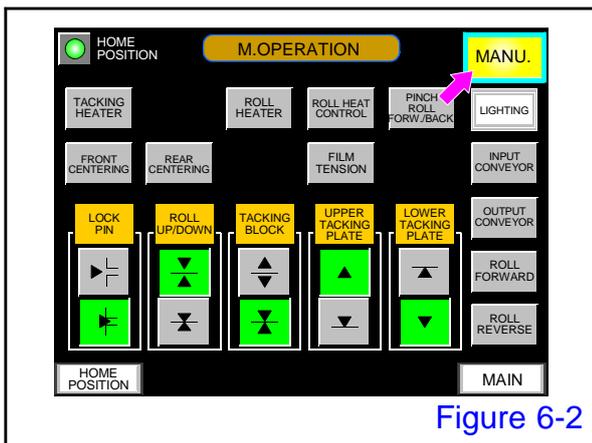


Figure 6-2

2. Confirm that the manual button on the manual operation screen is lit. If it is not lit, please push the button to put it on.

Preparation for manual operation is now complete.



NOTE

- If the "MANU" button is not lit (not in manual mode), operation on the manual operation screen will not be accepted.
- The "Cutter" button and "Vacuum" button of the hard button (not the touch panel) can be operated even in a mode other than manual mode.

6.1.1. Setup control

The "Vacuum" button and "Cutter" button are located on the input conveyor unit to load film onto the laminate unit.

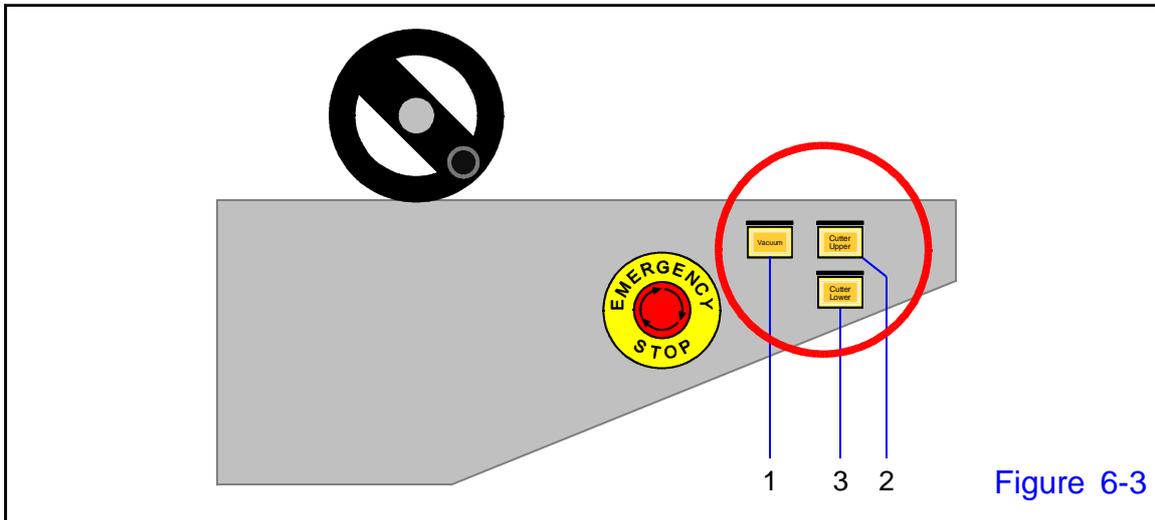


Figure 6-3

1. Vacuum button

Vacuum blower and turbo blower are activated to perform the vacuum operation of the laminating unit's tacking plate, cutter backup and film guide.

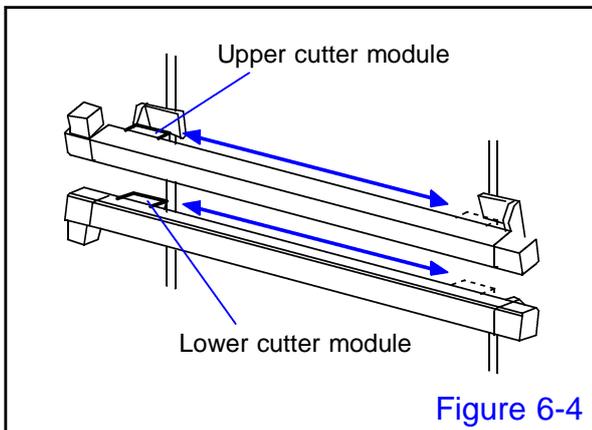


Figure 6-4

2. Cutter Upper button

Runs the upper cutter module only while the button is pressed and held.

3. Cutter Lower button

Runs the lower cutter module only while the button is pressed and held.

CAUTION



- Be careful when running the cutter to cut the film with the lamination module pulled out.
- Keep the cutter cover closed (even when the cutter is not in operation).

6.2. Control by Manual Operation

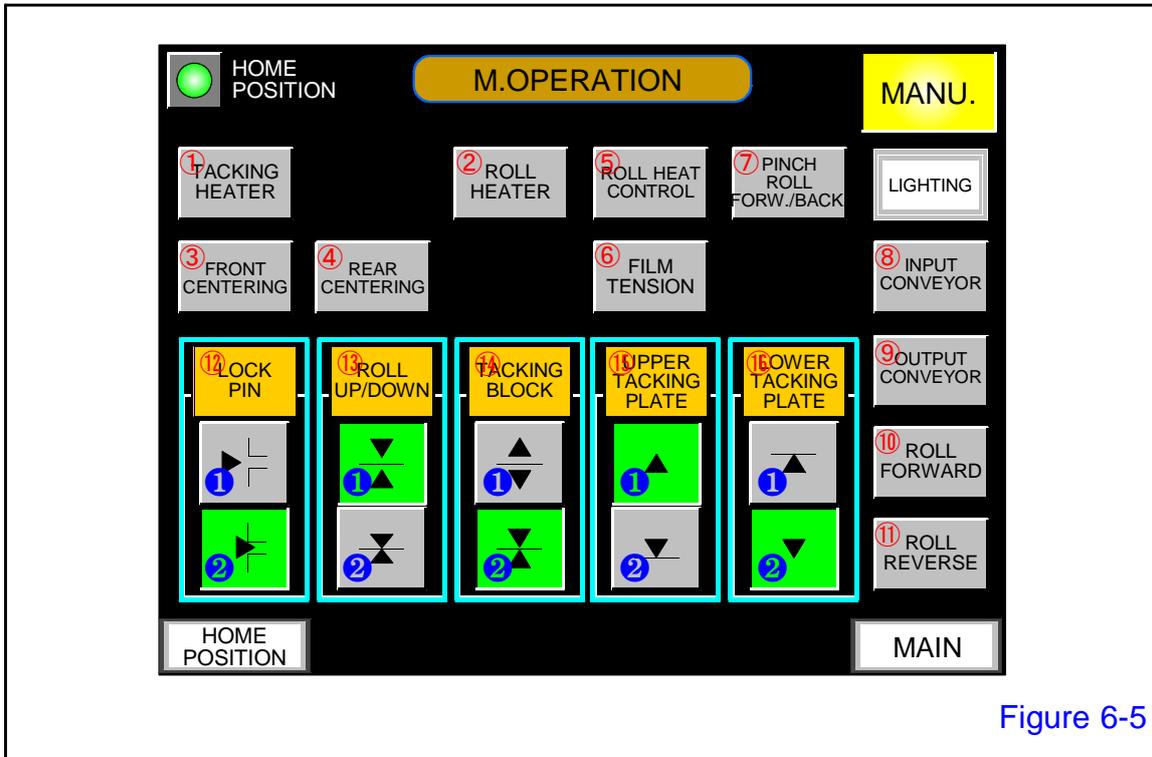


Figure 6-5

①. TACKING HEATER

Turns "ON"/"OFF" the tacking heater built into the tacking rubber at the tip of the upper and lower tacking plates.

②. ROLL HEATER

Turns "ON"/"OFF" the roll heater built into the upper and lower backup rolls.

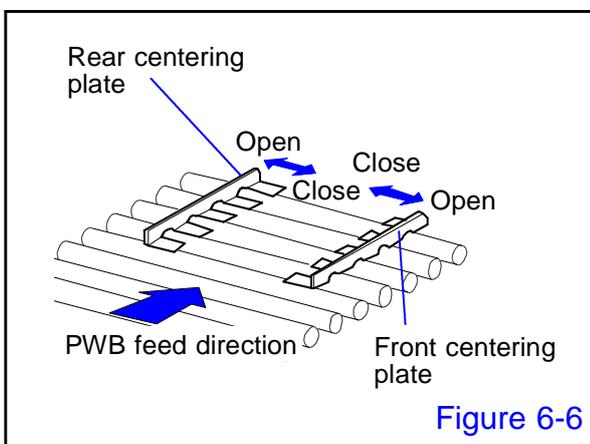


Figure 6-6

③. FRONT CENTERRING

Activates the input-conveyor front centering plate to perform centering.

④. REAR CENTERRING

Activates the input-conveyor rear centering plate to perform centering

- Open : button is lit
- Close : lit

WARNING



Do not open the front door of the machine when it is in operation.

CAUTION



Do not set the centering width smaller than the width of PWB, or the input conveyor will be damaged.

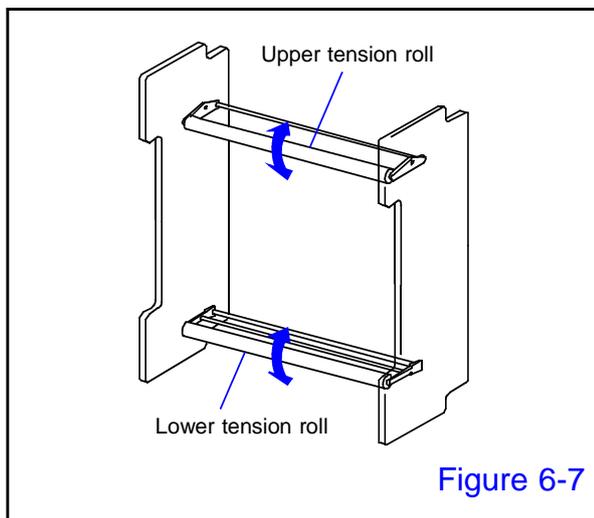
⑤. ROLL HEAT CONTROLL

It is a button to raise the temperature of the lamination roll.

It is available when "ROLL HEATER" button is ON (lit in green).

When the button that is not lit is pushed, the roll rotates in the forward direction, and the roll is moved downward (pressurized).

When the lit button is pushed, all of the above will be OFF and the button will go out.



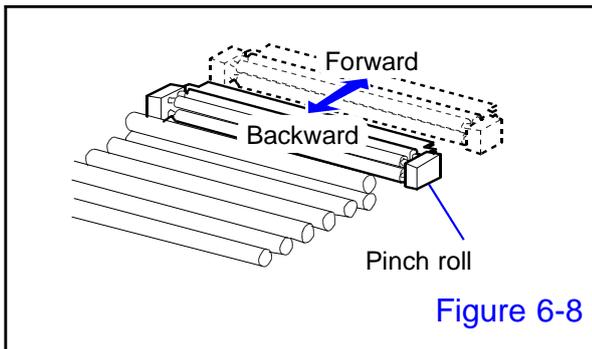
⑥. FILM TENSION

Activates the upper and lower tension rolls.

When ON (button lit), the upper roll rises and the lower roll goes down.



It turns ON only while pushing the "FILM TENSION" button, and turns OFF when it is released.



⑦. PINCH ROLL FORW. / BACK.

Moves the pinch roll forward when turned "ON" and backward when turned "OFF."

⑧. INPUT CONVEYOR

Runs the input conveyor.

Turn ON / OFF the rotation of the input conveyor.

⑨. OUTPUT CONVEYOR

Turn ON / OFF the rotation of the output conveyor.

⑩. ROLL FORWARD

The backup roll and the laminate roll (up / down) move in the forward direction (rotating from the entrance side to the exit side) operation.

⑪. ROLL REVERSE

The backup roll and the laminate roll (up / down) perform the reverse rotation (the rotation is sent from the exit side to the entrance side).



- Roll Forward rotation and reverse rotation turn ON / OFF rotation of the lower backup roll.

The roll operates at the descending (pressurizing) position.

- Roll reverse rotation is different from normal operation, so it works only while pushing the roll "reverse" button.

WARNING



Do not touch the rolls even when they are not in operation. It will cause finger scissors.

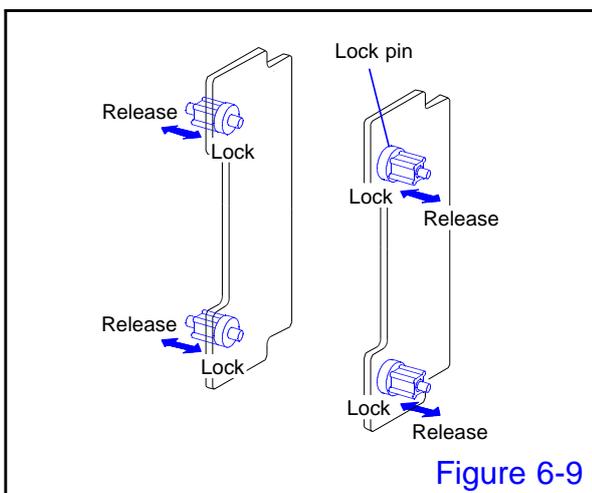
CAUTION



Do not pinch objects other than the PWB. The backup roll and laminate roll may be damaged.

⑫. LOCK PIN

Locks or releases the tacking block. The tacking block will not move to the open position if it is locked.



①. LOCK PIN "RELEASE" button

Releases the lock pin to activate the tacking block.

②. LOCK PIN "LOCK" button

Fixes the lock pin to immobilize the tacking block.

⑬. ROLL UP/DOWN

Raises and lowers the upper backup roll and upper laminating roll in the vertical direction. During lamination, the upper roll moves and the lower roll remains fixed.

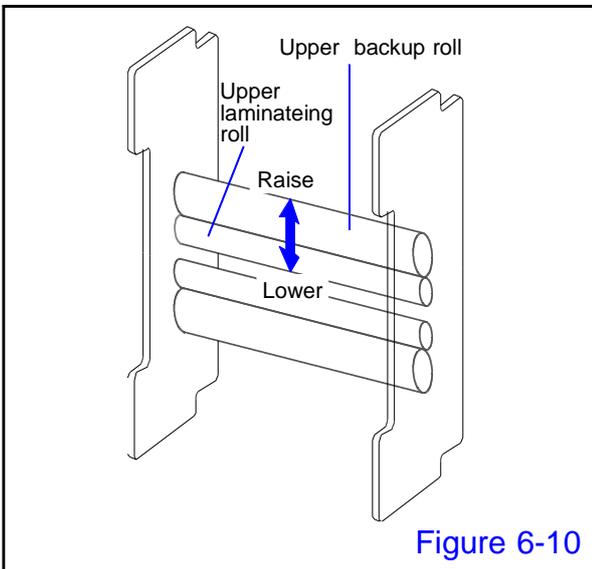


Figure 6-10

①. ROLL UP/DOWN "RAISE" button

Raises the upper backup roll.

②. ROLL UP/DOWN "LOWER" button

Lowers the upper backup roll.

⑭. TACKING BLOCK

Moves the tacking blocks to the closed and opened positions.

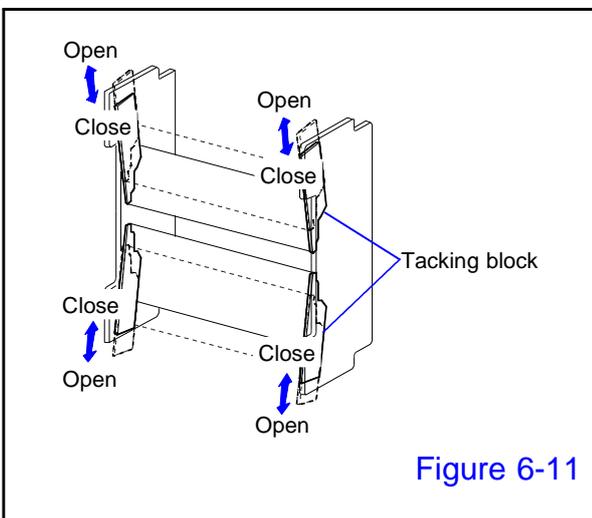


Figure 6-11

①. TACK BLOCK "OPEN" button

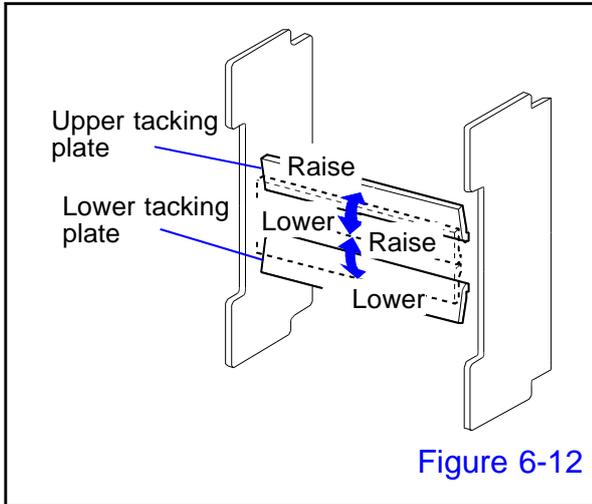
Moves the tacking blocks to the opened position.

②. TACK BLOCK "CLOSE" button

Moves the tacking blocks to the closed position.

15. UPPER TACKING PLATE

Moves the upper tacking plate to the raise and lower positions.



1. UPPER TACK PLATE "Raise" button

Moves the upper tacking plate to the raise position.

2. UPPER TACK PLATE "Lower" button

Moves the upper tacking plate to the lower position.

16. LOWER TACKING PLATE

Moves the lower tacking plate to the raise and lower positions.

1. LOWER TACK PLATE "Raise" button

Moves the lower tacking plate to the raise position.

2. LOWER TACK PLATE "Lower" button

Moves the lower tacking plate to the lower position.



Do not touch the tacking plates, even when they are not in operation, or your fingers may be caught and / or burned.

CAUTION



Do not put foreign objects onto tacking plate, or the tacking plates may be damaged.



NOTE

When moves the upper tacking plate to the lower position, the lower tacking plate also be moved to the raise position first. The alarm is activated if only the upper tacking plate is moved to the lower position.

Part II

Maintenance

This instruction manual is based on the standard specification and the flow direction of the board is left to right.

The contents of the operation panel and touch panel may differ from the your machine.

Also, there may be differences in mechanism part depending on the presence or absence of options etc.

1. Regular maintenance

This chapter describes maintenance schedule which should be executed daily, monthly, semi-annual, or annually.

To ensure its safe and proper use, be sure to perform regular maintenance work as instructed.

1.1. Purpose of Regular Maintenance

The unit has adjustable parts that need to be adjusted periodically during continuous operation, and consumable parts that are subject to wear and tear.

Do not use the unit without adjusting the adjustable parts or replacing worn consumable parts. Otherwise, the unit may fail and the product quality may be degraded.

Clean and inspect the unit in accordance with the daily, monthly, quarterly, and semi-annual inspection methods explained below, and immediately replace parts that have become worn or do not meet machine specifications. Only use genuine Hakuto parts, as others may damage the machine, cause it to fail, or degrade its performance.

1.2. Regular Maintenance Schedule

1.2.1. Daily Inspection

Inspection before power-on

Inspection item	Inspection method	Section for reference
Compressed air connection port	Pressure confirmation	1.3.1.
Inside of the machine	Cleaning	1.3.2.
Cutter blade	Cleaning	1.3.3.

Inspection after power-on

Inspection item	Inspection method	Section for reference
Alarm buzzer and alarm display	Check of function	1.3.4.
Tacking rubber	Cleaning. Check of surface conditions.	1.3.5.
Laminating roll	Cleaning. Check of surface conditions.	1.3.6.
Backup roll	Cleaning. Check of surface conditions.	1.3.7.

1.2.2. Monthly Inspection

Inspection item	Inspection method	Section for reference
Inside of the machine	Cleaning	1.3.2.
Inside of the machine	Lubrication	1.3.8.
Laminating roll	Measurement of temperature distribution	1.3.9.
Tacking rubber	Measurement of temperature distribution	1.3.10.

1.2.3. Semi-annual Inspection (twice a year)

Inspection item	Inspection method	Section for reference
Inside the machine	Cleaning	1.3.2.
Front and rear conveyor	Check fixing mechanism	—
Line filter for releasing adsorption	Cleaning	1.3.11.
Exhaust duct	Check there is no air leak.	—
Air piping	Check connection status, air leak	—
Electric wire	Check for damage	—
Loosen screw	Retightening	—
Alert label	Check pasteing position and peeling	1.3.12.
Turbo blower	Check there is no abnormal noise	—
High-pressure blower	Check there is no abnormal noise	—
Vacuum piping	Check connection status, air leak	—
Air cylinder	Check there is no air leak.	—
Solenoid valve	Check there is no air leak.	—
Drive chain	Check of the tension, adjustment	1.3.15.
Helical gears	Check , adjustment	1.3.16.
Drive belt	Check of the tension, adjustment	1.3.17.
Toothless gear wheel	Check , adjustment	1.3.18.

1.2.4. Annual Inspection

Inspection item	Inspection method	Section for reference
Cutter backup	Disassemble/assemble, cleaning	1.3.13.
Film-guide	Disassemble/assemble, cleaning	1.3.14.

1.3. Regular Maintenance Procedure

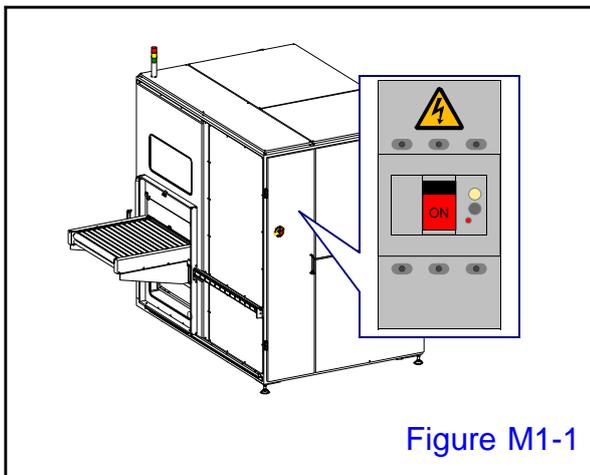
1.3.1. Drain the compressed air connection port, checking the pressure

Check the air pressure of the compressed air connection port and water in the filter bowl every day before the power is turned on to operate each actuator properly.

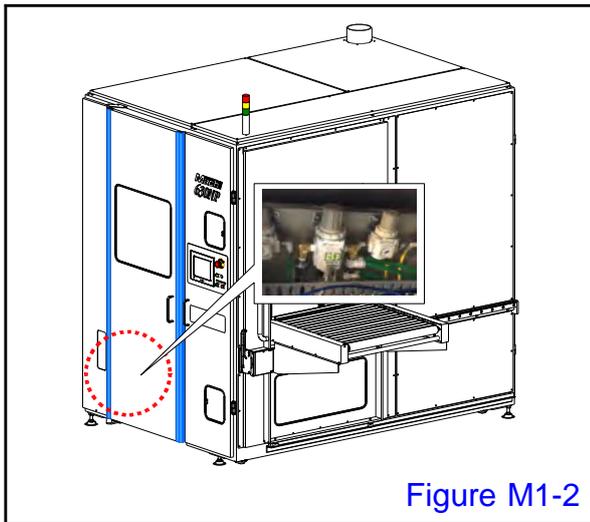


Before draining water and checking the pressure of the compressed air connection port, make sure that the primary compressed air (compressed air supplied from the factory) is supplied.

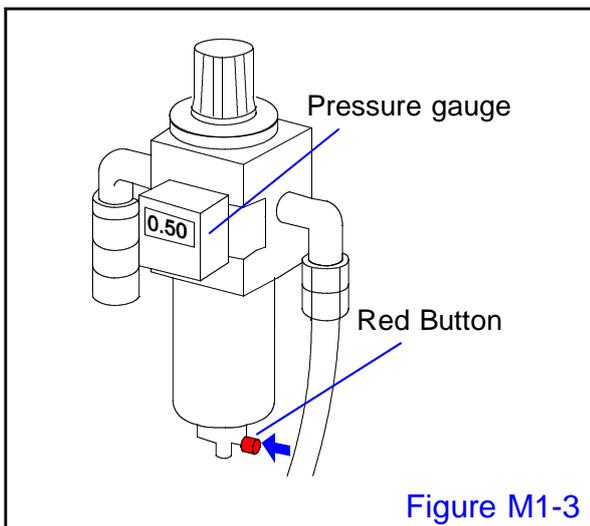
Checking procedure



1. Turn ON the main breaker to turn on the machine power.
 - Please paste the "inspecting" tag in a place easy to check so that nobody else will do the operation.



The pressure gauge of the compressed air connection port is in the round mark of Figure M 1-2.

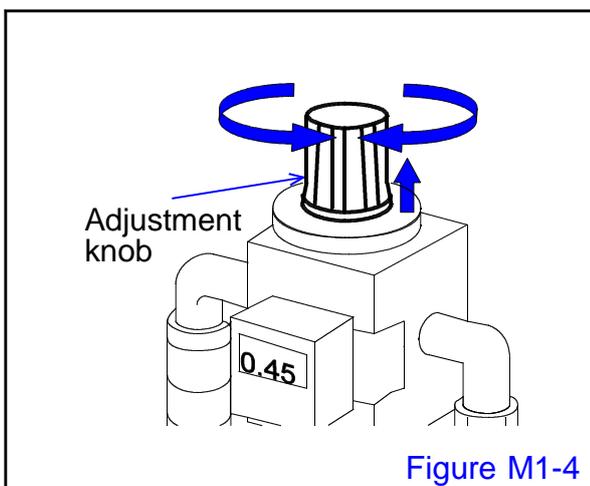


2. Make sure that the pressure gauge of the compressed air connection port indicates regular numerical value.

Make sure that the range of pressure fluctuation is within the following numerical values during automatic operation.

(Unit : MPa)

	Preset value	Minimum scale	Maximum scale
Gauge	0.50	0.45	0.55



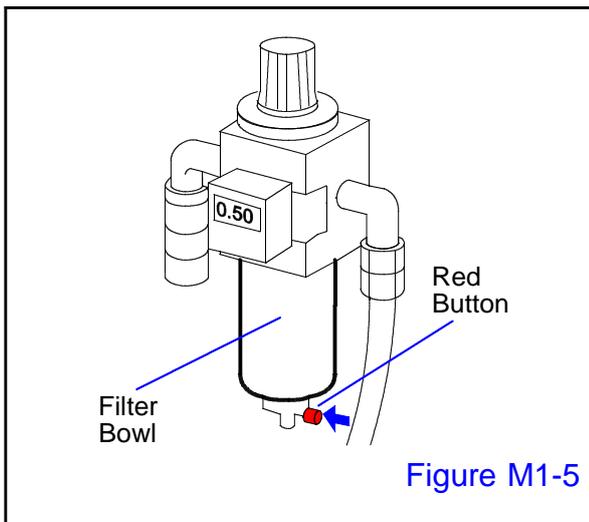
3. If the indicated value of the pressure gauge comes off the regulation value. Pull up the adjustment knob of the regulator, and dodge a lock, and turn a knob, and adjust it so that the mark of the pressure gauge become regulation value.

4.

Even if it adjusts, when the scale of a pressure gauge is below a rated value, it is factory supply compression air pressure, And please check that flux is more than the amount of regulations. (0.5 MPa 、 100 ℓ/min)

5.

After adjustment is finished, a knob is lowered, and it locks.



6.

Make sure that no water drops are seen on the filter bowl.

- If water is accumulated in the filter bowl, remove the filter bowl and remove the water.

If a small amount, press the red button at the bottom of the filter bowl, it can also be pulled out along with the air from the bottom.

In this case, care must be taken so that water does not splash to the floor and peripheral equipment.

CAUTION



In case water droplets are attached, the factory supplied compressed air contains moisture.

If moisture is contained, it will cause malfunction of air equipment such as solenoid valve, cylinder, speed controller, so please check and improve the facility supplied compressed air equipment.

1.3.2. Cleaning the inside of the machine

To prevent product defects due to dust adhesion to the PWB and dry film, please clean the inside of the machine for a fixed period.

Refer to the cleaning part table for a cleaning period.

Cleaning Part table

Cleaning point	Cleaning method	Periodicity	Cleaner
Conveyor roll	Cleaning by the dust-free cloth in which the cleaner was included.	Daily	Ethanol
Laminating roll	Cleaning by the dust-free cloth in which the cleaner was included.	Daily	Ethanol
Backup roll	Cleaning with dry clean cloth	Daily	Not use
Film-running section	Cleaning by the dust-free cloth in which the cleaner was included.	Daily	Ethanol
Cutter	Cleaning by the dust-free cloth in which the cleaner was included.	Daily	Ethanol
Tacking rubber	Cleaning by the dust-free cloth in which the cleaner was included.	Weekly	Ethanol
Each part in the machine	Cleaning by the dust-free cloth in which the cleaner was included after cleaning with the cleaner of clean room specification.	Monthly	Neutral detergent
Sensors	Cleaning by the dust-free cloth in which the cleaner was included.	Quarterly	Neutral detergent
Line filter for releasing adsorption	Air gun	Quarterly	Air

Please prepare the following tools when cleaning inside the machine.

- Clean room specification vacuum cleaner
- Dust-free cloth
- Neutraldetergent
- Ethanol
- Phillips screwdriver

Cleaning procedure

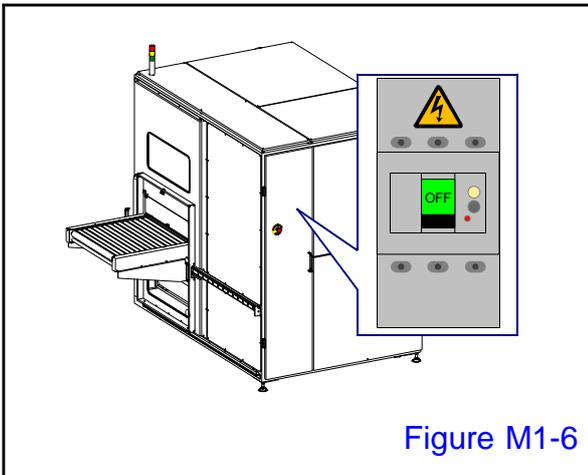


Figure M1-6

1.

Turn OFF the main breaker to turn off the machine power.

- Place the "DO NOT TURN ON POWER" tag on the main breaker so that any other person does not turn on the power.



Before cleaning the interior of the unit, be sure to turn the main breaker OFF.

As some parts may be at extremely high temperatures, wait more than 20 minutes after turning the main breaker OFF, and confirm that the interior of the unit has cooled down before starting cleaning.

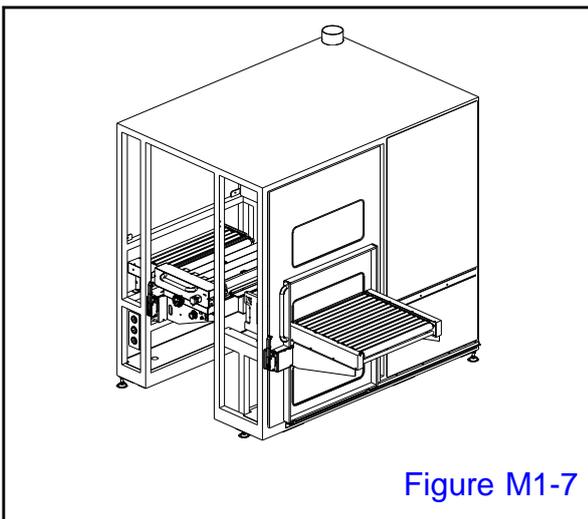


Figure M1-7

2.

Open the doors and fixed covers of the machine, and wipe away the dirt and dust from the inner and outer surfaces using a cleaner of clean room specification and a dust-free cloth moistened with a neutral detergent.

CAUTION



Do not use alcohol to clean painted surfaces or plastic parts. Otherwise, the paint will peel off or the material will be damaged. Be sure to use a neutral detergent to clean the inner and outer surfaces.



NOTE

Input conveyor roll, Output conveyor roll, Pinch roll, Holding guide, laminate roll, Tacking plate, Cutter backup, Film-Guide are the parts through which the board and dry film pass.

Include ethanol in the dust-free cloth and clean the surface thoroughly.

Also, suck suction holes of Tacking plate, Cutter backup, Film-Guide well with a clean room specification vacuum cleaner.

WARNING



Do not clean the unit while turning on the unit, even when cleaning can not be performed unless the unit is moved to the operating position.

Please do under the customer's responsibility when cleaning the machine while turning on the machine for unavoidable reasons.

3.

Upon completion of cleaning, close the doors and the covers of the machine.

1.3.3. Cleaning of the Cutter Blade

WARNING

The circumference of the circle of the cutter blade is a sharp knife. Please handle with care.

Also, when handling the cutter blade, be sure to hold the part other than the periphery of the circle.

Also, please wear gloves and other protective equipment.



This section explains how to clean the cutter blade of the upper cutter module.

The procedure of cleaning the cutter blade of the lower cutter module is the same as the procedure of the upper cutter module.

When cleaning the cutter blade, prepare the following tools.

- Dust-free cloth
- Ethanol
- 2.5mm hexagonal wrench ×2

Cleaning procedure

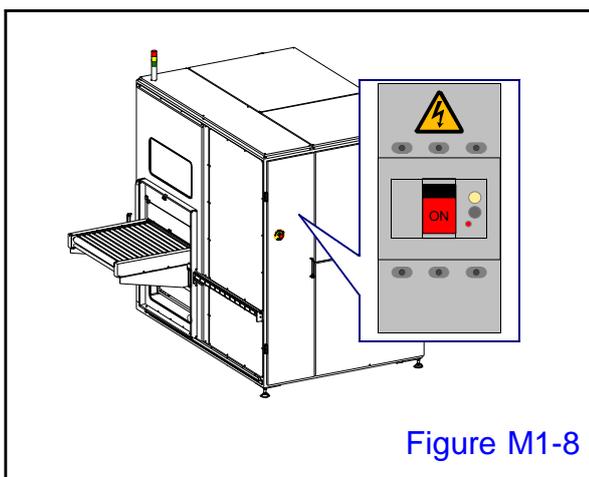


Figure M1-8

1.

Turn ON the main breaker to turn on the machine power.

- Please paste the "inspecting" tag in a place easy to check so that nobody else will do the operation.

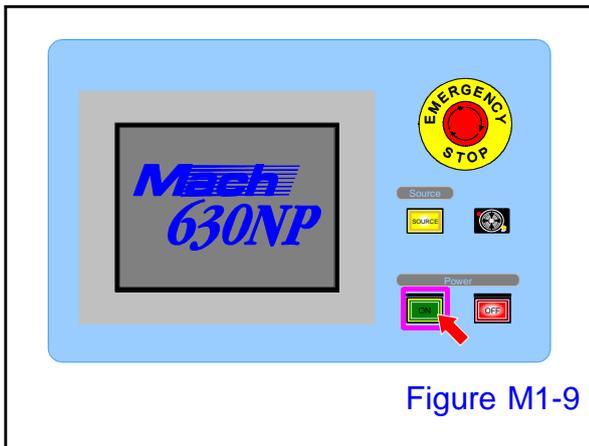


Figure M1-9

2.

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

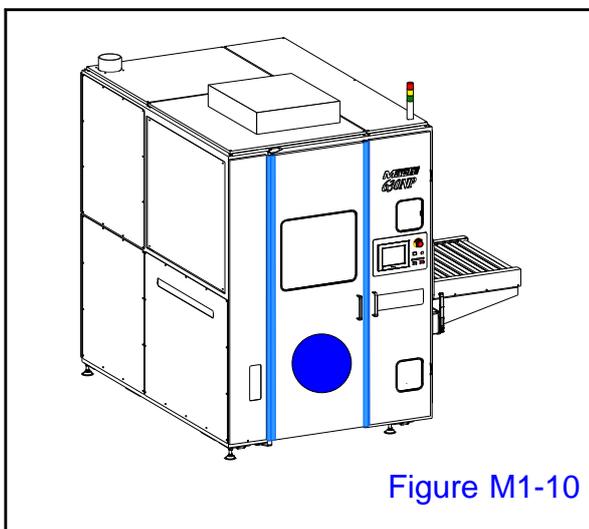


Figure M1-10

3.

Open the front door.

- There is an Input conveyor B in front.

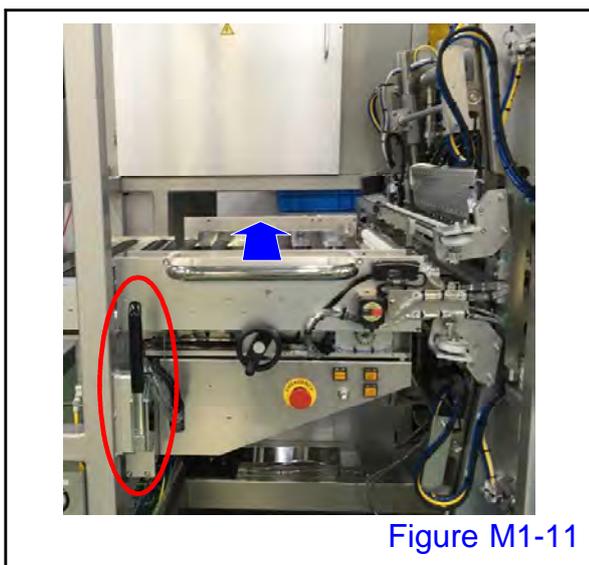


Figure M1-11

4.

Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the Input conveyor B until it hits the far side and move to the film setting position.

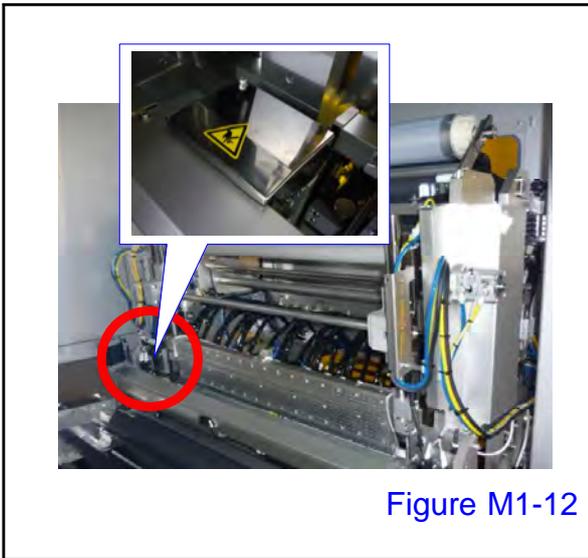


Figure M1-12

- There is an upper cutter module at the circle position.
Since the cutter module moves back and forth between the front side and the back side, it may be sometime on the front side.

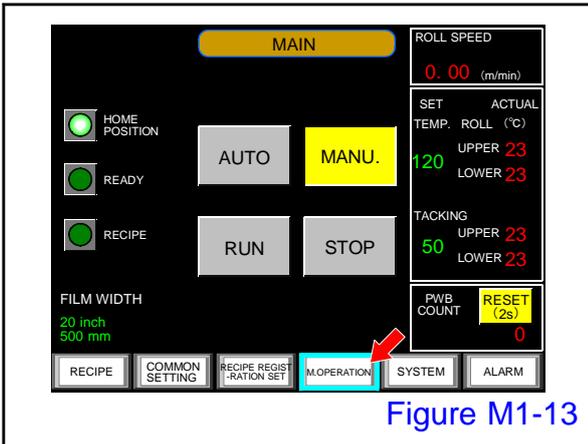


Figure M1-13

5. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

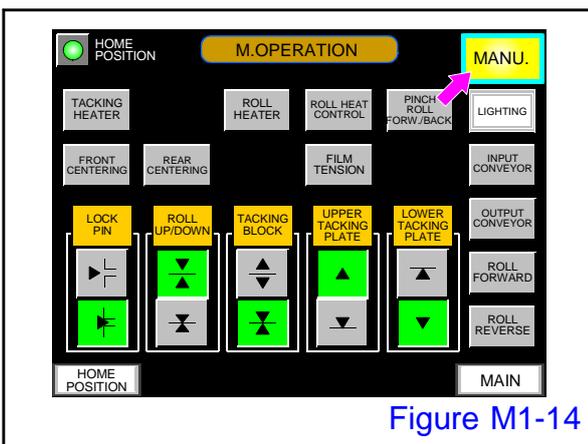
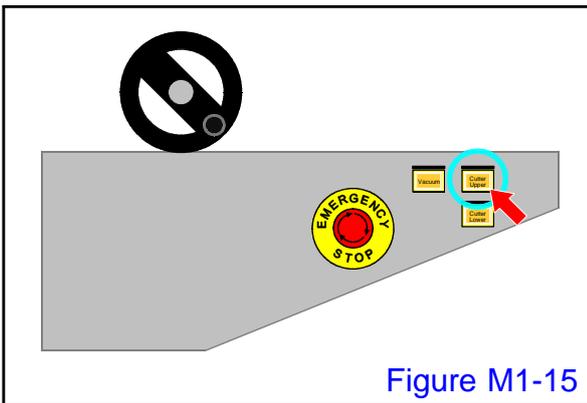


Figure M1-14

6. Confirm that the "MANU." button on the M.OPERATION screen is lit.
If it is not lit, please push the button to light it



7. Push the "Cutter Upper" button on the input conveyor control panel.

- Upper cutter module will move to the front (the front side of the apparatus).



NOTE

- "Cutter upper / lower" When the travel button is blinking, the homing operation of the cutter has not been completed. Make sure the input conveyor B is in the home position.
- This operation is to make it easier to disassemble the upper cutter module and clean the cutter blade.
- If the cutter module is on the front side, this operation is not necessary.

WARNING



Please work carefully when moving the cutter while the input conveyor B remains in the film set position.

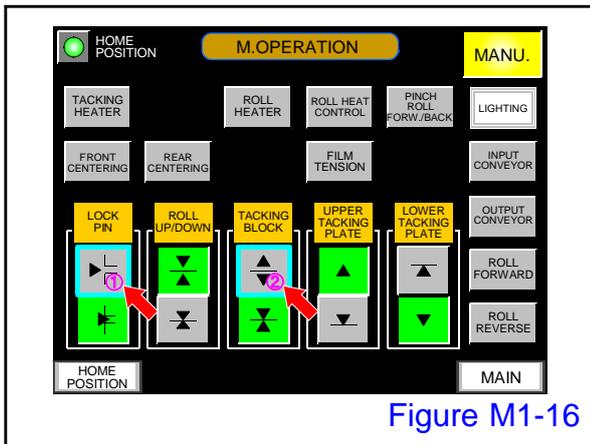


Figure M1-16

8.

On the M.OPERATION screen, push the "LOCK PIN-release" button, then the "Tacking block-open" button to open the Tacking block.

Perform the operation so far in the state of a power ON.



NOTE

- This operation is to make it easier to disassemble the upper cutter module and clean the cutter blade.
- If do not release the lock pin by pressing the "lock pin - release" button, it will not open even if you press the "Tacking block - open" button.

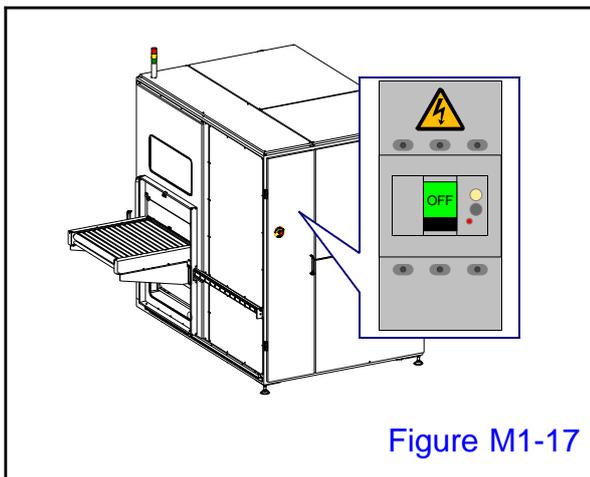


Figure M1-17

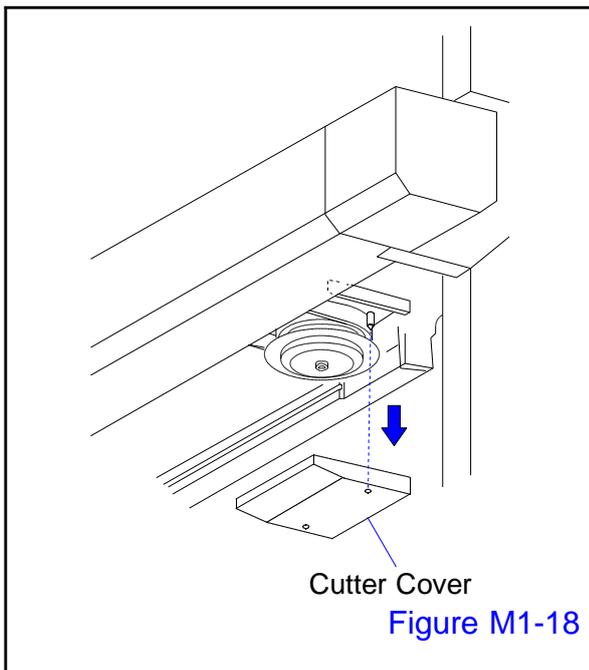
9.

Turn OFF the main breaker to turn off the machine power.

- Place the "DO NOT TURN ON POWER" tag on the main breaker so that any other person does not turn on the power.

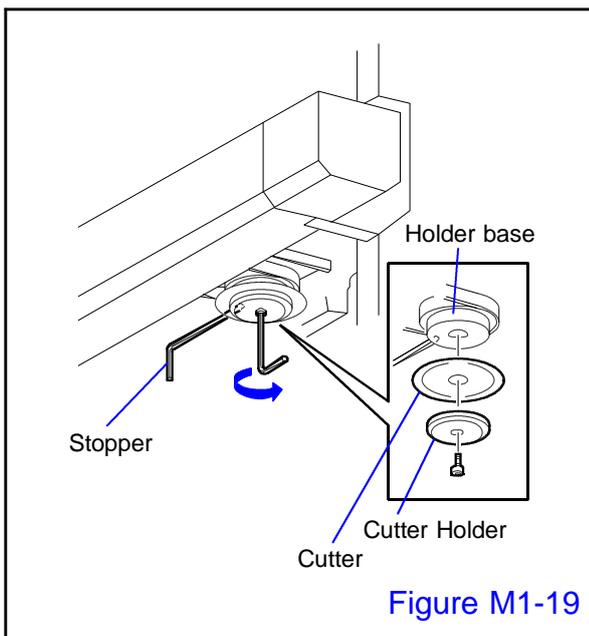
**NOTE**

With the main breaker OFF (power OFF), the cutter module is free and can be moved by hand. However, the circumference of the circle of the cutter blade is a sharp knife. Please handle with care.

**10.**

Remove the cover of the cutter module.

- Move the cutter module by hand with the position where the Allen wrench can easily insert.
- Remove 2 M3 cap bolts with 2.5 mm Allen wrench.

**11.**

Remove the cutter blade and cutter holder.

- Insert a 2.5 mm Allen wrench into the hole that is open on the side of the holder base and fix the cutter module so that it does not rotate. Remove the M3 cap bolt at the center of the cutter holder with another 2.5 mm Allen wrench.



When removing the cutter blade, confirm that the cutter blade is in a position not interfering with the cutter backup groove.

If the outer periphery of the cutter blade is in the groove of the cutter backup, the cutter will not come off or nicked edge will occur due to interference.

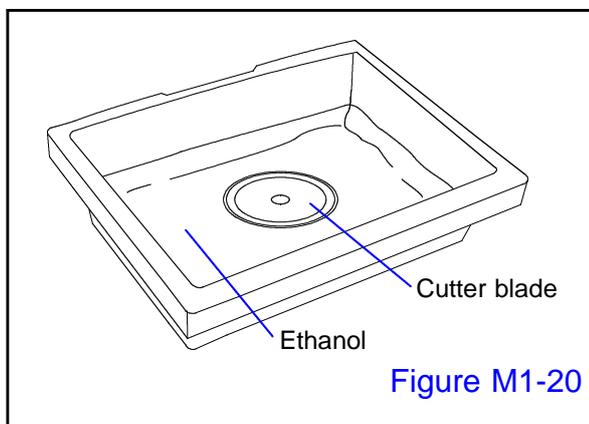
CAUTION

When the cutter holder is removed, the cutter blade falls and it is extremely dangerous.

Please keep removing the cutter blade on the cutter holder and carefully remove it.

Please remove the cutter blade after removing the cutter holder on the lower side.

Cutter holders are different up and down, so caution is required when installing.

**12.**

Wipe off the cutter blade with a clean cloth containing ethanol.

Also prepare tray containing ethanol and soak the entire cutter blade. If you wipe it off with a clean cloth in a few hours, it is safer and dirt can be easily dropped.



When deterioration such as wear, blade chipping, rust etc. is seen in the cutter blade, please exchange it with a new cutter blade.

**NOTE**

Cutter blade can not be re-grind.

When grinding, the diameter of the cutter blade changes.

When the cutter blade is attached, the positional relationship with the groove of the cutter backup changes and it will not cut.

WARNING

The circumference of the circle of the cutter blade is a sharp knife. Please handle with care.

Also, when handling the cutter blade, be sure to hold the part other than the periphery of the circle.

Also, please wear gloves and other protective equipment.

13.

Assemble in the reverse procedure which decomposed the cutter module.カッター

CAUTION

- Fasten the cap bolt of M3 securely so that the cutter holder is not loose.
- Be careful not to touch the cutter module cover etc with the cutter blade. It will cause the blade to be chipped.

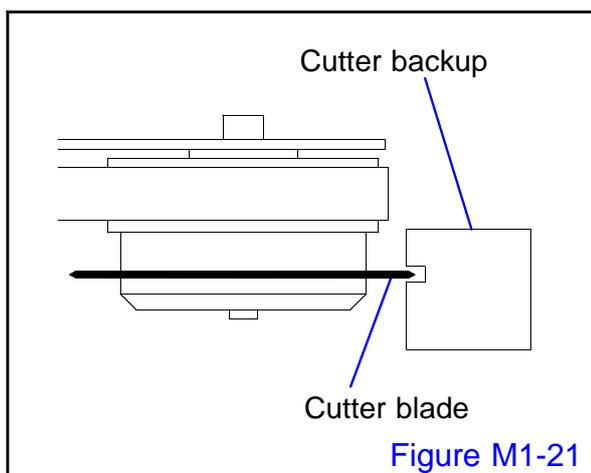


Figure M1-21

14.

Move the cutter module by hand, slowly reciprocate in the groove of the cutter backup and confirm that it doesn't interfere with the cutter backup groove.

- If it interferes with the cutter backup groove, for example when the cutter blade is mounted obliquely, please disassemble the cutter module and reassemble the cutter module once again.

Normally, adjustment is unnecessary.

CAUTION



Make sure to run the cutter module slowly with your hands. If the cutter blade is not properly installed, it may come in contact with the cutter backup groove and the cutter blade may be damaged. Be sure to turn off the power before making this check.

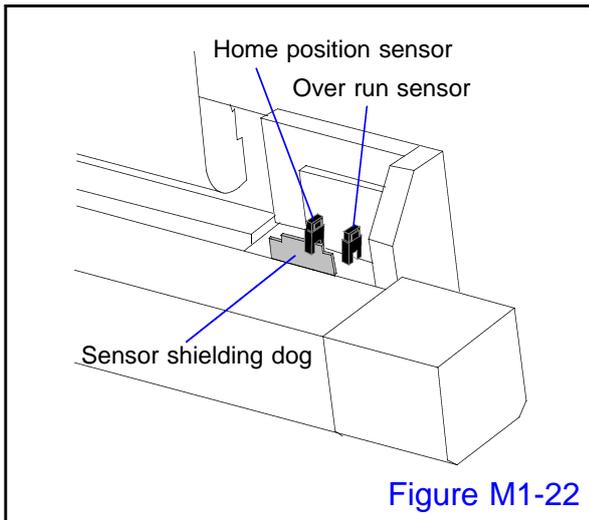


Figure M1-22

15.

Move the cutter module by hand and move to the home position sensor detection position.

- Make sure the sensor shielding dog is at the position of the home position sensor.

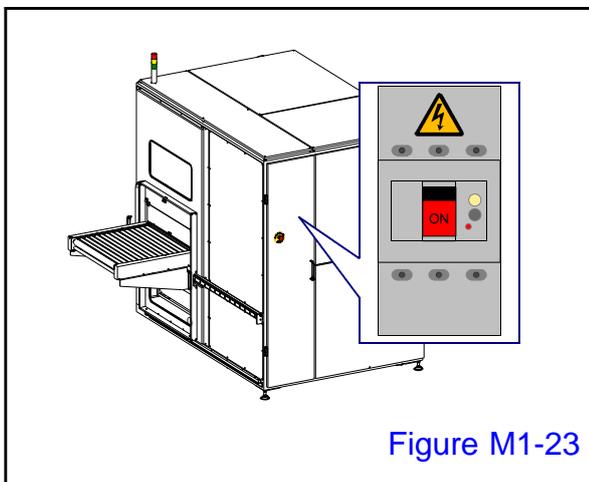
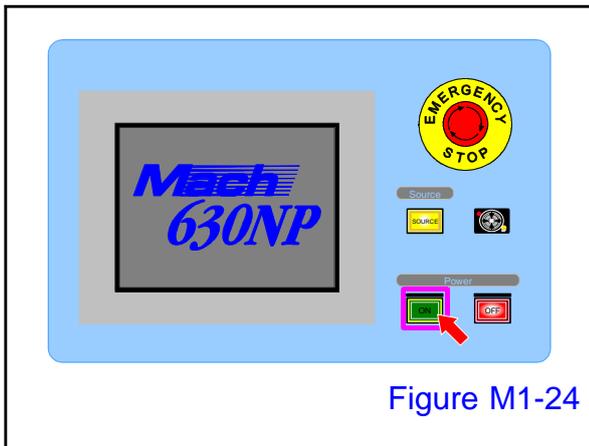


Figure M1-23

16.

Turn ON the main breaker and turn on the system.

- The Source lamp lights up.



17.

Open and press the cover of the power ON button of an operation panel, and start a machine.

- When input conveyor B is in home position, machine will automatically perform homing operation. When homing operation is completed, "Cutter Upper / Lower" traveling button will change from blinking to dark.



- When turning on the power supply, it performs the homing operation together with the Tacking block and the pinch roll.
- When the cutter alarm occurs, if the upper and lower cutter module does not detect the home position sensor (not in the home position), the "Cutter up / down" running button flashes slowly. In this case, homing operation is not performed even if press the "cutter up / down" traveling button. Also, the home position lamp does not light up. Check once again that the cutter module is in the home position sensor detection position.

The procedure for cleaning the cutter blade is finished above.

1.3.4. Checking the alarm buzzer and alarm display

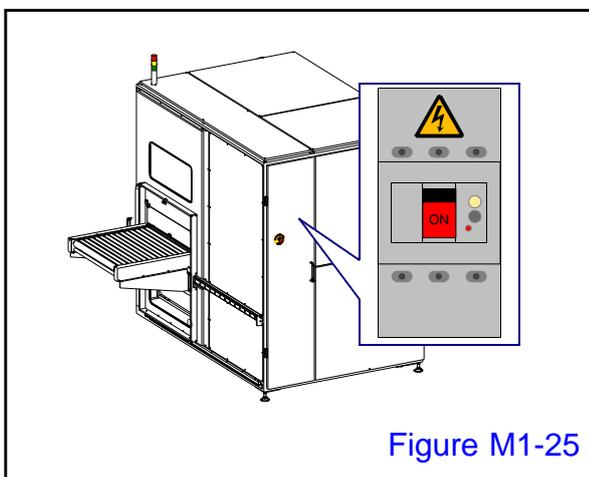
Generate alarm in a pseudo manner to check buzzer, touch panel display, signal tower operation.

Checking procedure

1.

Make sure the input and output conveyors are in the home position.

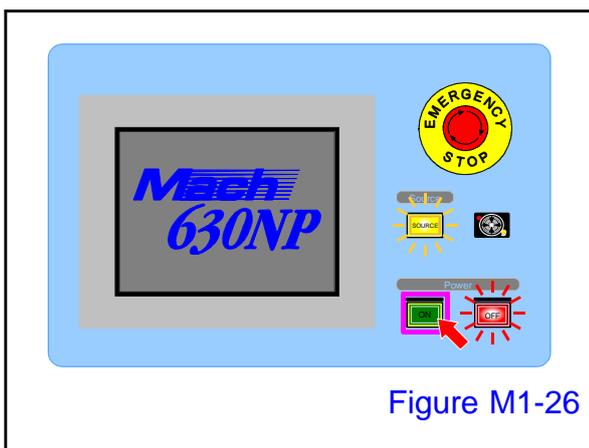
If it is not in the home position, slide the conveyor to the front side and move to the home position.



2.

Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.



3.

Open the cover of the power ON button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

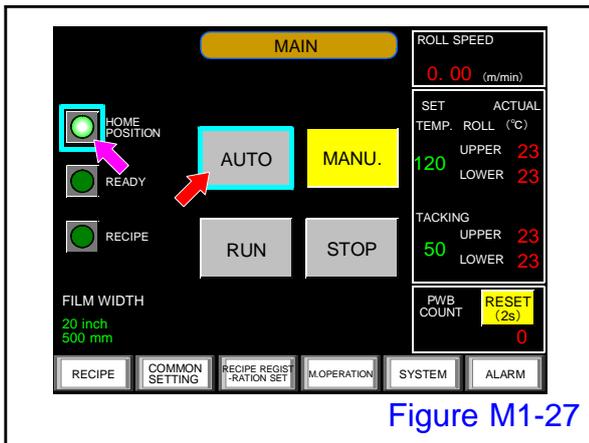


Figure M1-27

4.

On the MAIN screen, make sure that the home position button is lit and push the "AUTO" button.

- The AUTO button will light and the READY lamp will light.

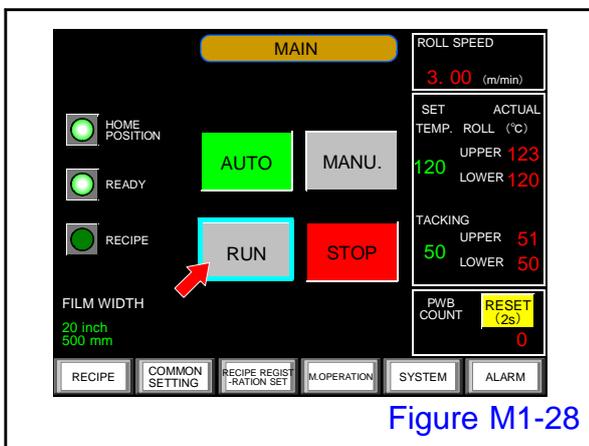


Figure M1-28

5.

Push the "RUN" button.

- The RUN button lights up.



NOTE

If the "READY" lamp does not light up, operation can not be performed.
 When the "READY" lamp is blinking and the RUN button is pushed, the RUN button also flashes.
 Tacking and lamination roll temperature reaches the set value and lights up in the absence of board on the conveyor.

6.

Release the lock of the output conveyor and slide it to the back side during automatic operation and move to the film setting position.

- An alarm occurs and the buzzer beeps.
 The signal tower's red lights up.
 The screen automatically changes to the ALARM screen, and date, time, alarm number, and comment are displayed.

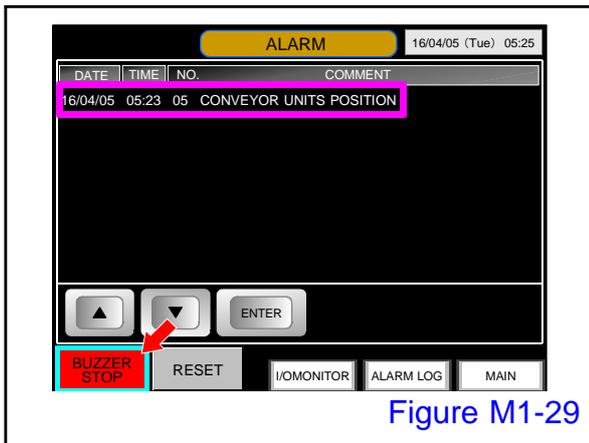


Figure M1-29

7. Confirm that "05 CONVEYOR UNIT POSITION" is displayed on the ALARM screen and press the "BUZZER STOP" button.

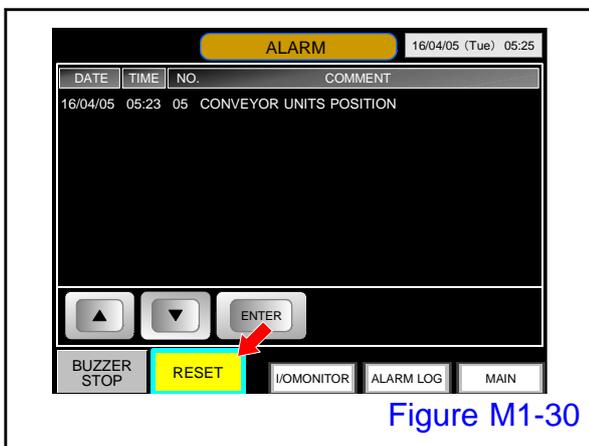


Figure M1-30

8. Return the conveyor unit sliding backward to the original position and press the "RESET" button.

- The alarm comment disappears and the RESET button goes out. Also the lighting of the red light on the signal tower will go out.

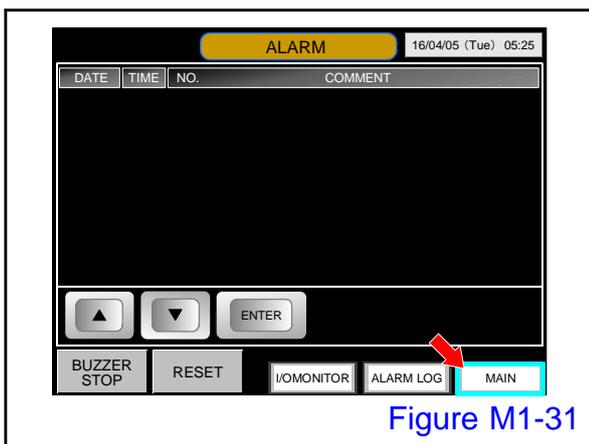


Figure M1-31

9. Finally pushed the "MAIN" button to return to the MAIN screen and confirm that the HOME POSITION button is lit.

Checking the alarm buzzer and alarm display is an end avobe.

1.3.5. Cleaning of the Tacking rubber

If the tacking rubber gets dirty, it may cause tacking failure and air bubbles. It is recommended to clean every day.

Please prepare the following tools to clean the tacking rubber.

- Ethanol
- Clean cloth

Cleaning procedure



This section explains the procedure for cleaning the tacking rubber of the upper tacking plate. The tacking rubber cleaning procedure for the lower tacking plate is similar to the procedure on

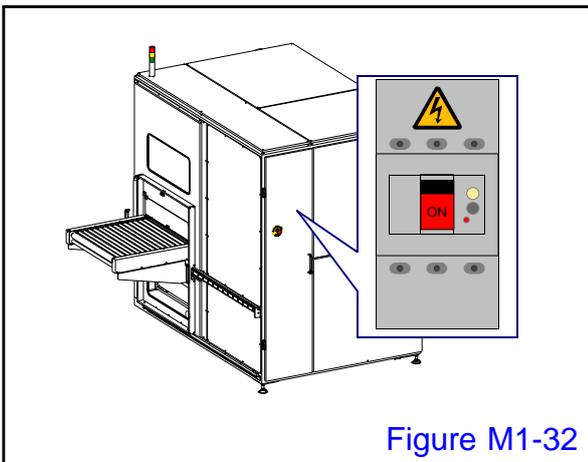


Figure M1-32

1. Turn ON the main circuit breaker and supply power to the machine.

- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.

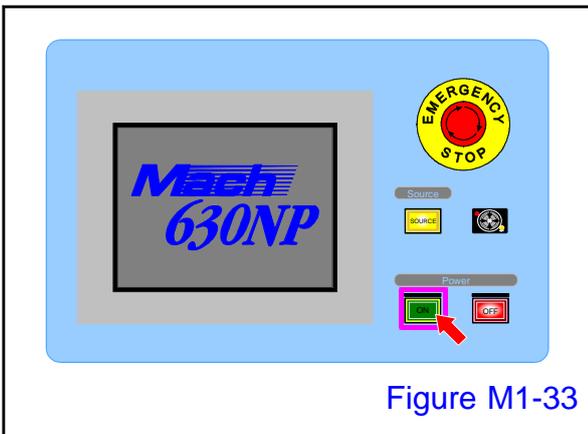


Figure M1-33

2. Open the cover of the power ON button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.



- Cleaning of tacking rubber is done while power supply and air are supplied.
Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.
- When cleaning after automatic operation, the tacking rubber is hot. After turning off the tacking heater, cool it well before starting work.

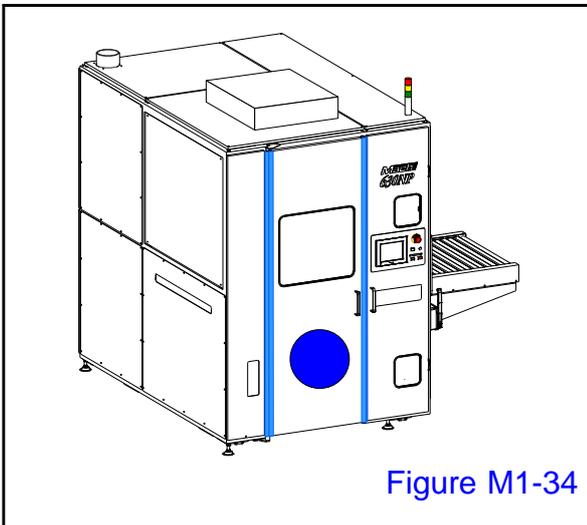


Figure M1-34

3. Open the front door.

- There is an input conveyor B in the front.

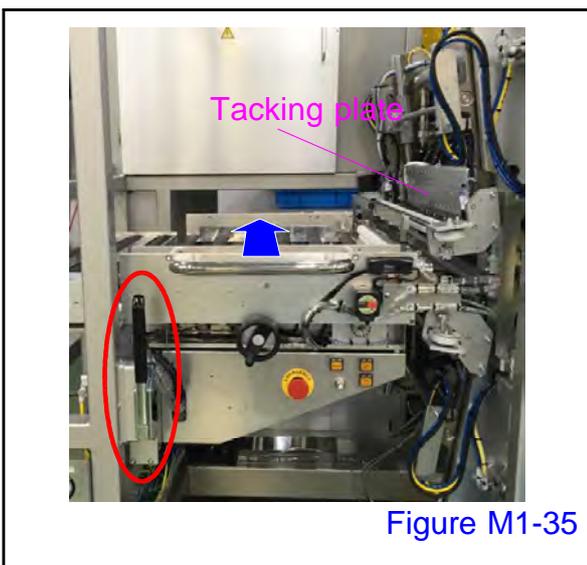


Figure M1-35

4. Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the input conveyor B until it hits the far side and move to the film setting position.

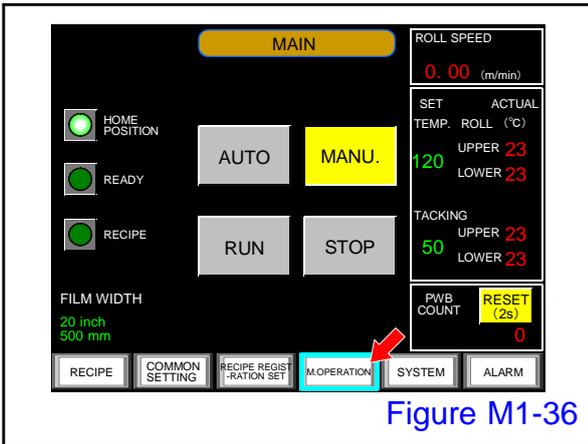


Figure M1-36

5. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

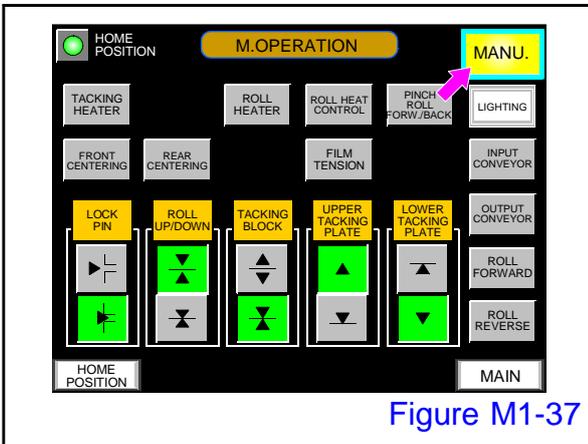


Figure M1-37

6. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it

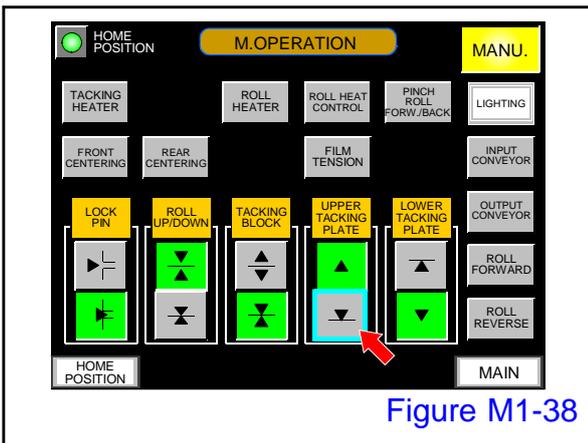
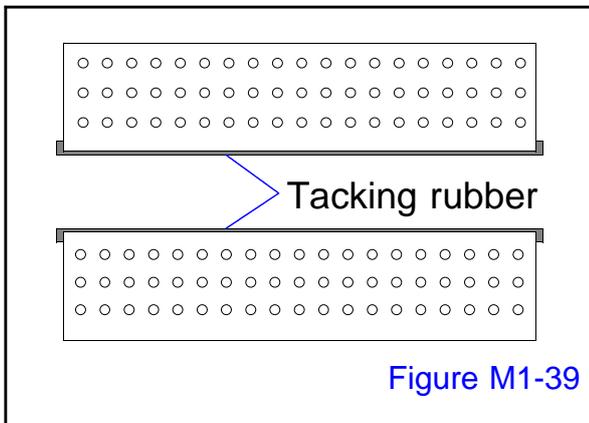


Figure M1-38

7. On the "M. OPERATION" screen, push the "UPPER TACKING PLATE - descent" button to move the upper tacking plate to the lowered position.



This operation is intended to facilitate cleaning work of tacking rubber.
If the tacking plate can not be lowered, there is a possibility that the input conveyor B is not at the film setting position, or the cutter module is not in the home position.
Please also check input conveyor B, cutter module position, sensor.



8.

Wipe the tacking rubber sideways with a clean cloth containing ethanol.
If scratch or deterioration is found in the tacking rubber, please refer to "2.2.3. Tacking rubber exchange" and replace with new tacking rubber.

9.

On the M. OPERATION screen, push the "Upper tacking plate - Raise" button to raise the upper tacking plate.

Please clean the lower tacking rubber as well.

1.3.6. Cleaning of the Laminating roll

Cleaning of the laminate roll is recommended when changing the product PWB or replacing the dry film.

Also, if the dry film adheres to the laminate roll for some reasons please also clean it.

Please prepare the following tools to clean the laminating roll.

- Clean cloth
- Ethanol
- Heat-resistant glove for clean room

Cleaning procedure



- The cleaning work of the laminate roll can be done even when the power supply of the machine is ON or OFF.
- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.

Explanation of cleaning when the power of the system is ON

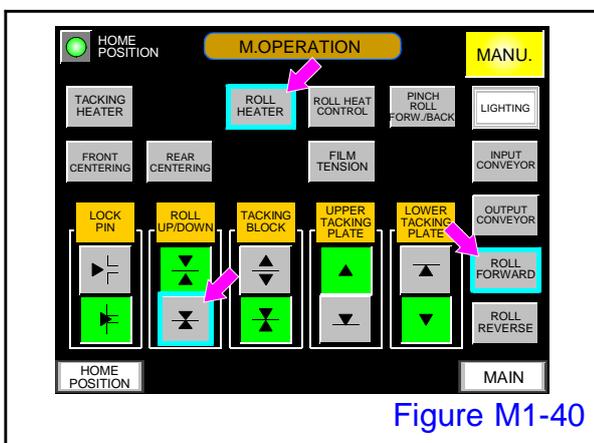


Figure M1-40

1. Make sure that "Roll HEATER", "Roll FORWARD" button is OFF, and "Roll UP / DOWN - Lower" button is OFF in M.OPERATION screen. If it is not OFF, operate the button and turn off the above button.



When the "ROLL HEAT CONTROL" button is ON, pulling out the laminate roll module will stop the roll and raise the roll, and the temperature of the backup roll will be controlled with the set value.

WARNING



Since the temperature of the laminate roll is high, please do cleaning work after confirming that it has cooled enough. Working at high temperatures may cause burns. For safety, please attach heat-resistant gloves for clean room.

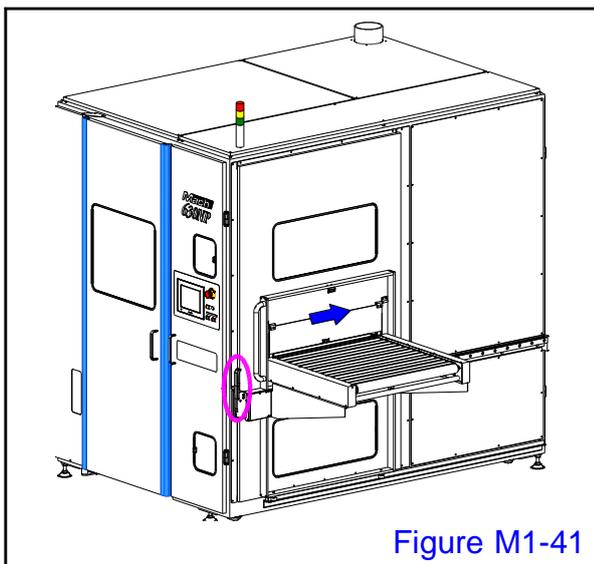


Figure M1-41

2. Unlock the output conveyor, slide it to the far side, and move to the film setting position.

- Push the output conveyor completely to the moving end.
- At the place where the output conveyor was located, it can see the laminate roll from behind the laminate unit.

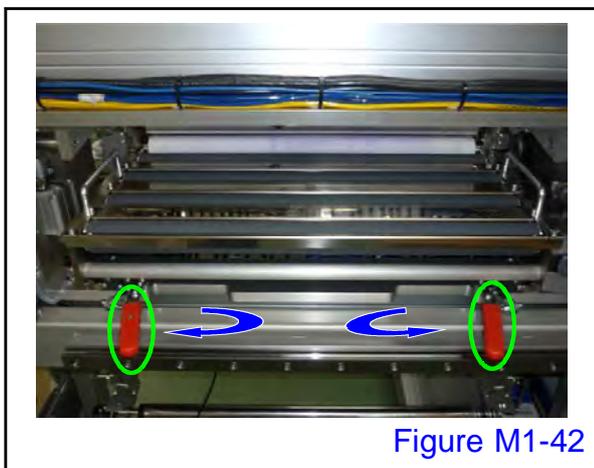


Figure M1-42

3. Unlocking the laminate roll module Turn the handle to release the fixing.

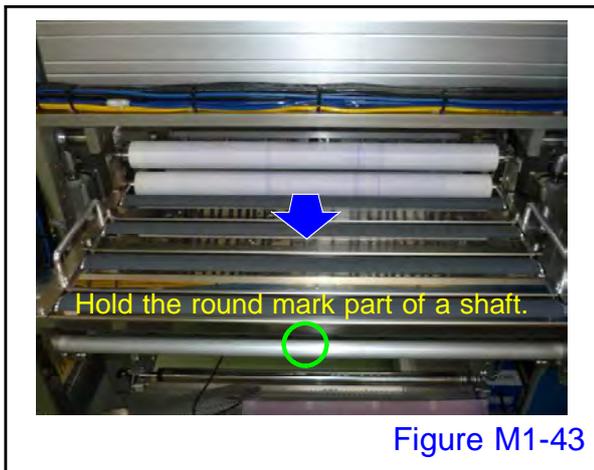


Figure M1-43

4. Hold the center (circle) of the shaft of the laminate roll module and pull it out toward you.
 - As the laminate roll module also has a stopper at the pulling end, pull it out until it hits the stopper.

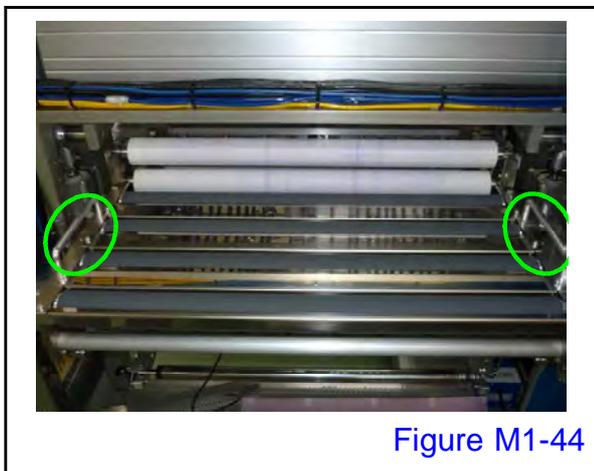


Figure M1-44

5. Remove the PWB drop prevention plate.

In the thin panel specification device, a PWB fall prevention plate is provided between the rollers.

Grip the handle (circle) and raise it upwards, pull it out in front to remove it.



This work is not necessary for machine not equipped with PWB fall prevention plate for thin plate specifications.

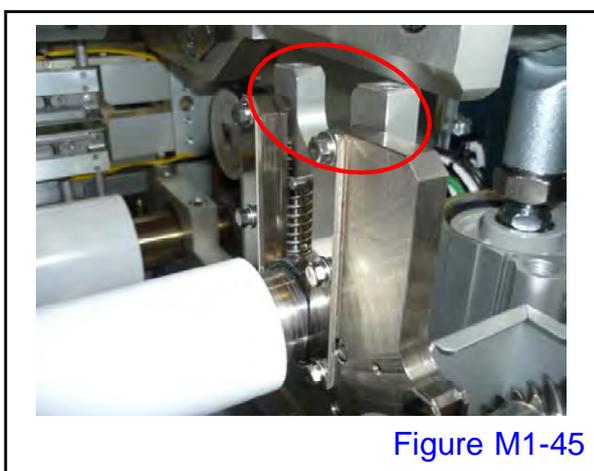
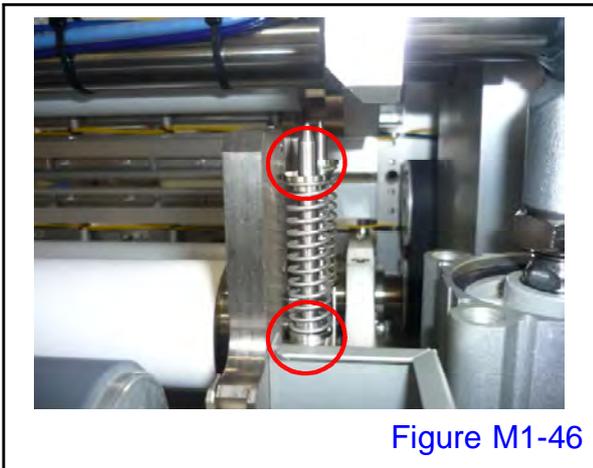


Figure M1-45

6. Remove the laminate roll.

To remove the lower laminate roll, remove the upper laminate roll and then pull out the upper bearing (circle) at both ends upward to remove it.

After that, it can remove the lower laminate roll.



Spacers are on both sides of the spring, so please be careful not to lose it.

WARNING

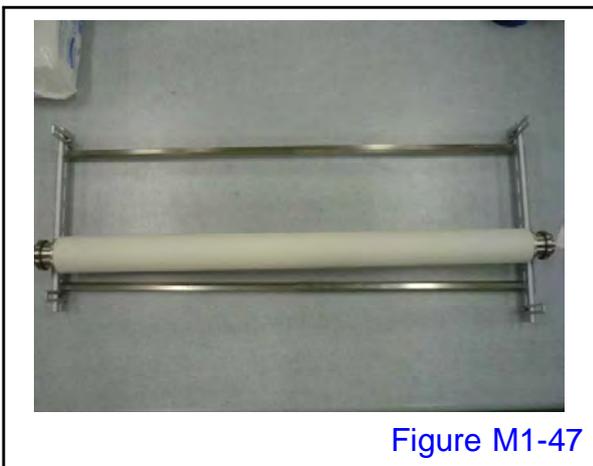


Since the temperature of the laminate roll is high, please do cleaning work after confirming that it has cooled enough. Working at high temperatures may cause burns. For safety, please attach heat-resistant gloves for clean room.

CAUTION



When removing the laminate roll, in particular so as not to contact the rubber portion to the other parts, etc., please be careful to remove so as not to scratch the rubber surface.



7. Wipe off the dirt on the surface with a clean cloth containing ethanol.
- Please do the work after placing it on a table like a photograph, or a clean cloth so as not to scratch the laminate roll.

8.

After cleaning the laminate roll, please install it in reverse order of removal. There are no places where adjustment is necessary.



When returning the laminate roll module to the equipment, please firmly push it until it hits the home position stopper. Also, please lock the released lock lever completely.

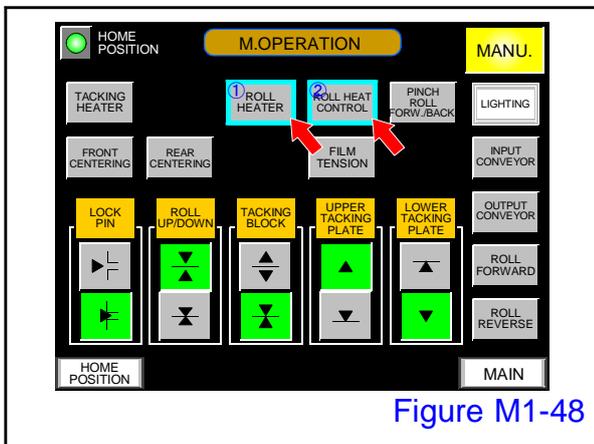


Figure M1-48

9.

On the M. OPERATION screen, push the "ROLL HEATER" and "ROLL HAT CONTROL" button to raise the temperature of the laminate roll.

Cleaning of the laminate roll is completed with the above.

1.3.7. Cleaning the backup roll

Dry film etc. adhering to the laminate roll are transferred and adhere to the surface of the backup roll as well.

Please clean the surface regularly like the laminate roll.

If leave it for a long time without cleaning, things may not be perfect even if you clean it.

Please prepare the following tools to clean backup roll

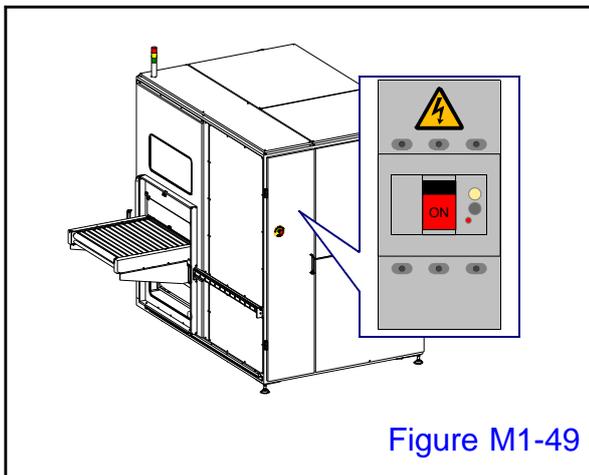
- Clean cloth
- Nylon scourer (without abrasive particles)
- Heat-resistant glove for clean room

Cleaning procedure

1.

Make sure the input and output conveyors are in the home position.

If it is not in the home position, slide the conveyor to the front side and move to the home position.



2.

Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

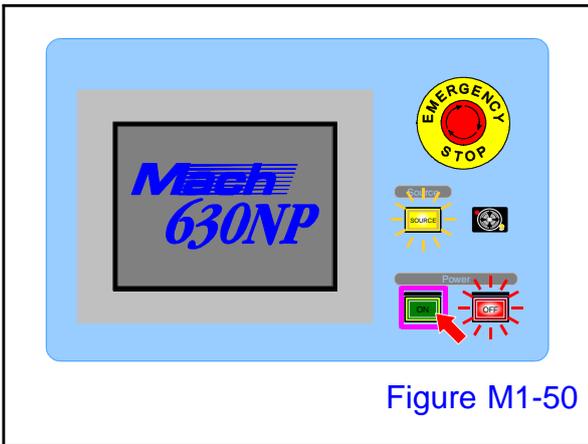


Figure M1-50

3. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

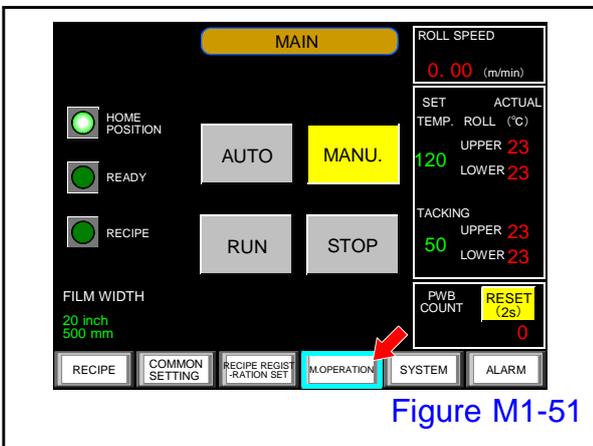


Figure M1-51

4. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

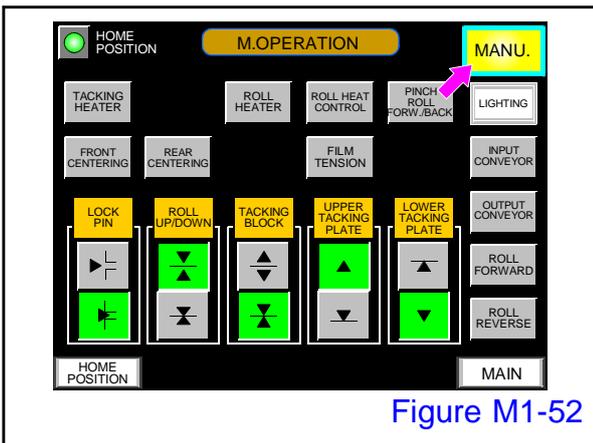


Figure M1-52

5. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it

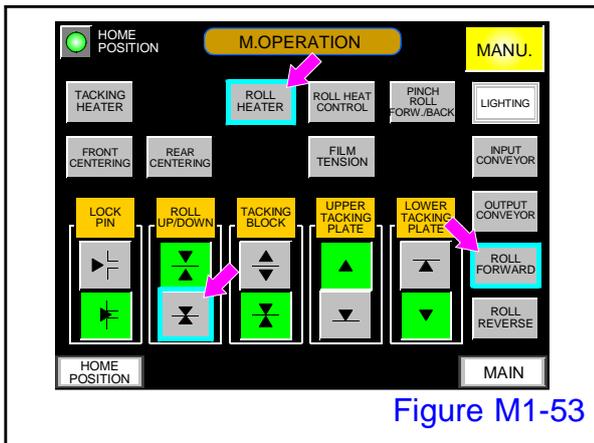


Figure M1-53

6.

Make sure that "ROLL HEATER", "ROLL FORWARD" is OFF, and "ROLL UP / DOWN - Lower button is OFF in M.OPERATION screen.

If the "ROLL HEATER" button is ON, push the button to turn it OFF.



The backup rolls are very hot when cleaning is done after automatic operation or after the roll temperature rising state. Please do cleaning work after confirming that it has cooled enough.

Working at high temperature may cause burns.

For safety, please attach heat-resistant gloves for clean room.



Do not use nylon scourer at high temperature. It melts and adheres to the roll.

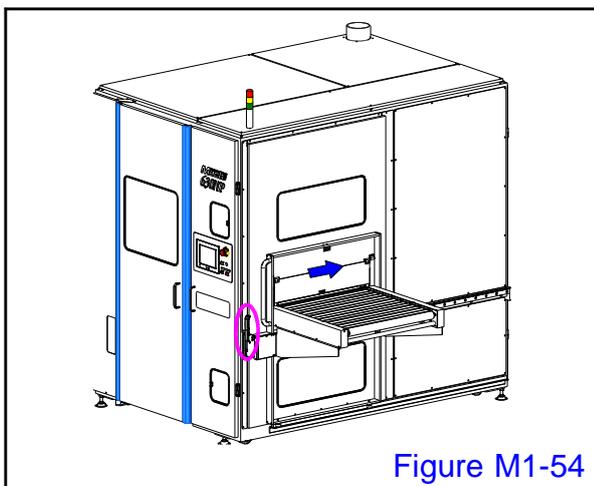


Figure M1-54

7.

Unlock the output conveyor, slide it to the far side, and move to the film setting position.

- Push the output conveyor completely to the moving end.
- When moving the output conveyor to the film set position, it can see the backup roll from the back side of the main unit.

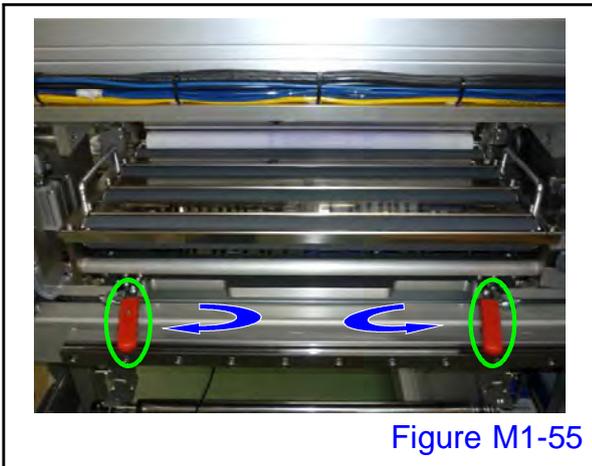


Figure M1-55

8. Turn the fixing lever handle of the laminate roll module to the release position to release it.

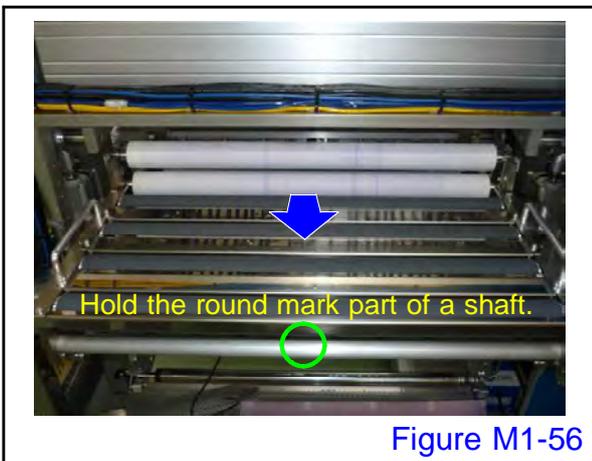


Figure M1-56

9. Hold the center (circle) of the shaft of the laminate roll module and pull out the laminate roll unit.

- Since the stopper is also attached to the drawer end of the laminate roll module, please pull it out until it hits the stopper.

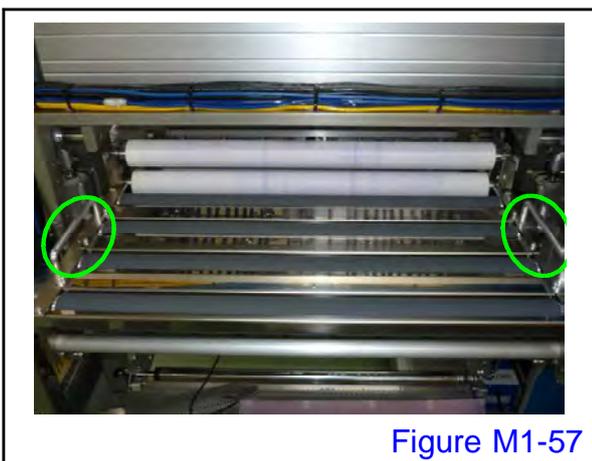


Figure M1-57

10. Remove the PWB fall prevention plate.
In the thin plate specification machine, a PWB fall prevention plate is provided between the rollers.
Grip the handle (circle) and raise it upwards, pull it out in front to remove it.



NOTE

This work is not necessary for machine not equipped with PWB fall prevention plate for thin plate specifications.

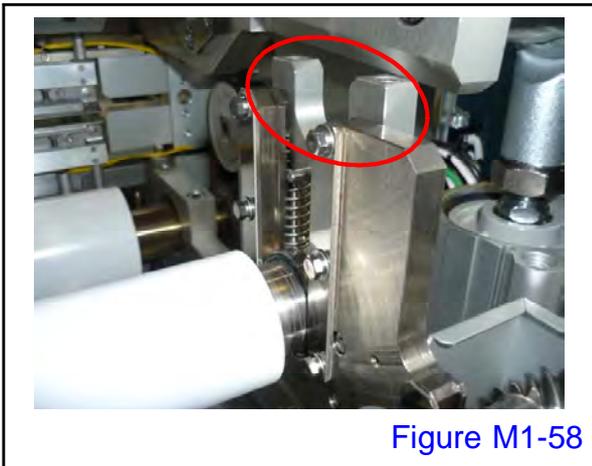


Figure M1-58

11.

Remove the laminate roll.

To remove the lower laminate roll, remove the upper laminate roll and then pull out the upper bearing (circle) at both ends upward to remove it.

After that, it can remove the lower laminate roll.

- For the laminate roll, refer to "2.2.1. Replacing the laminate roll".

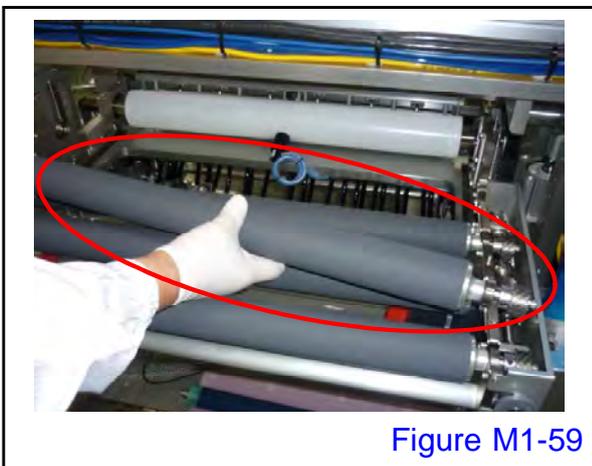


Figure M1-59

12.

Remove the conveyor roll.

- Lift the conveyor roll upward and remove it.

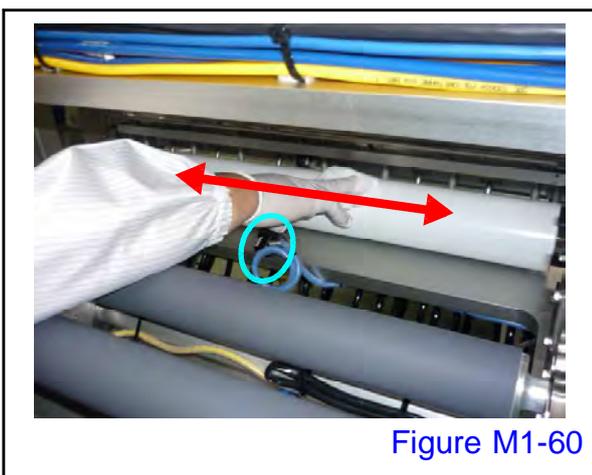


Figure M1-60

13.

Fold the dry clean cloth thickly, scrub the backup roll surface (red arrow) of the part to which the dry film adheres, and clean it.

In particular, the edge of the dry film and the area near the edge of the board are dirty.

- Be careful that there is a temperature sensor in the center part (circle) of the backup roll.

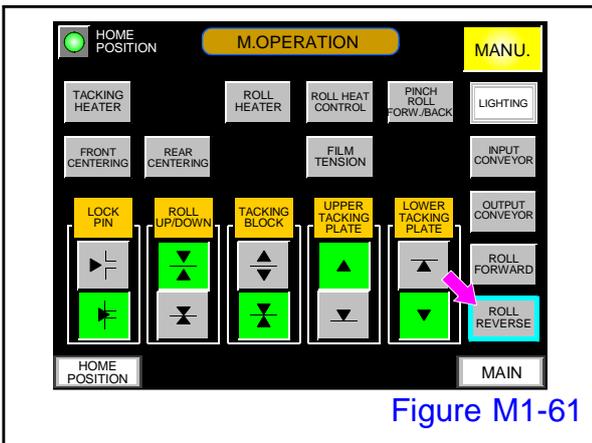


Figure M1-61

- There is no driving of the upper backup roll, please clean while turning by hand.
- To rotate the lower backup roll, press the "ROLL REVERSE" button on the M.OPERATION screen.
This button rotates only while it is pushed.



As dry film adhered to the backup roll falls down, please underlay clean cloth etc under the backup roll.

WARNING



- At our company we recommend cleaning after waiting for the temperature of the backup roll to drop.
When cleaning while looking at intervals during production protect the hand with a heat-resistant glove for clean room and wipe it with a clean cloth superposed thickly, because the backup roll is hot.
Please be careful not to burn yourself carefully.
- If you want to rotate the roll during cleaning, the "ROLL FORWARD" button is very dangerous because the roll may continuously rotate and you may get caught in a clean cloth or hands.
Use the "ROLL REVERSE" button to repeat rotation and stop, with the roll stopped.

14.

For things that can not be removed by rubbing, please lower the temperature completely, then scrub with nylon scrub to clean.



Nylon scourer (Scotch bright) etc. may contain abrasives. Please choose what does not contain abrasive. Coating peels off with abrasive.

15.

After cleaning the backup roll, please install it in reverse order of removal. There are no places where adjustment is necessary.



When returning the laminate roll module to the machine, please firmly push it until it hits the home position stopper. Also, please lock the unlocked lock lever completely.

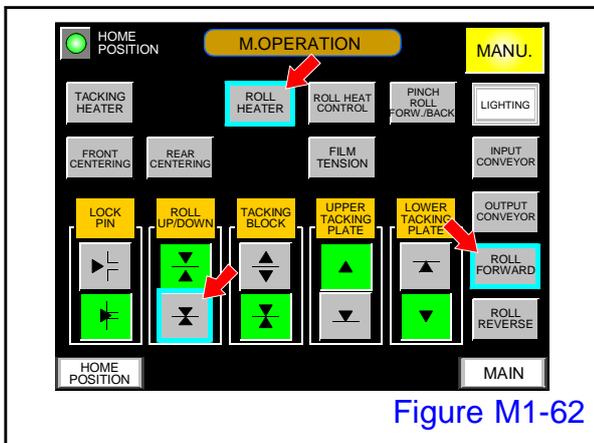


Figure M1-62

16.

Push the "ROLL HEATER", "ROLL FORWARD" and "ROLL UP / DOWN-Lower" buttons on the M.OPERATION screen to raise the temperature of the laminate roll.

- Pushing the "ROLL HEAT CONTROL" button turns on "ROLL UP / DOWN - Lower" and "ROLL FORWARD" ON.

Cleaning of a backup roll is an end above.

1.3.8. Lubrication in the machine

In order to maintain smooth operation of a machine, please lubricate in the specified period.

Refer to the lubrication point table for lubrication period.

Table of Lubrication Points

Lubrication point	Lubrication method	Periodicity	Lubricant
Input / Output conveyor slide section	Brush on the lubricant grease.	Semi-annual	Grease A
Cam groove of tacking plate part	Brush on the lubricant grease.	Semi-annual	Grease A
Centering-adjustment handle	Brush on the lubricant grease.	Semi-annual	Grease A
Rotary-encoder module gear	Brush on the lubricant grease.	Semi-annual	Grease A
Air-cylinder fixing pin	Inject the lubricant using an oiler.	Quartely	Grease A
Air-cylinder knuckle pin	Inject the lubricant using an oiler.	Quartely	Machine oil
Cutter-shuttle-module spline shaft	Coated with a dust-free cloth containing lubricating oil	Monthly	Machine oil
Tacking block rail	Brush on the lubricant grease.	Semi-annual	Grease B
Input conveyor pinch roll chain	Brush on the lubricant grease.	Semi-annual	Grease A
Input / Output conveyor crossed helical gears	Brush on the lubricant grease.	Semi-annual	Grease A
Lock pin insert bush section (tacking block part)	Brush on the lubricant grease.	Semi-annual	Grease A



- Before lubricating the oil or applying grease, Wipe off oil, dust, dirt, etc. with a dust-free cloth and clean it.
- After lubricating and coating, extra lubricant must be wiped off with a dust-free cloth. Especially, please pay attention to near the running line of substrate and film.
- Grease, machine oil please use the one specified by our company below.
Grease A : Grease WR-500 055017
Grease B : JG80/CG2
Machine oil : Terrace Oil Shell 32 manufactured by Showa Shell

WARNING



Be sure to turn off the main breaker and turn off the power before cleaning inside the machine.
Also, since there is a high temperature section inside the machine, after turning off the power supply, confirm that it is sufficiently cooled before proceeding.

WARNING



Do not clean the system while turning on the machine, even when cleaning can not be performed unless the mechanical parts is moved to the operating position.
Please do under the customer's responsibility when cleaning the machine while turning on the machine for unavoidable reasons.

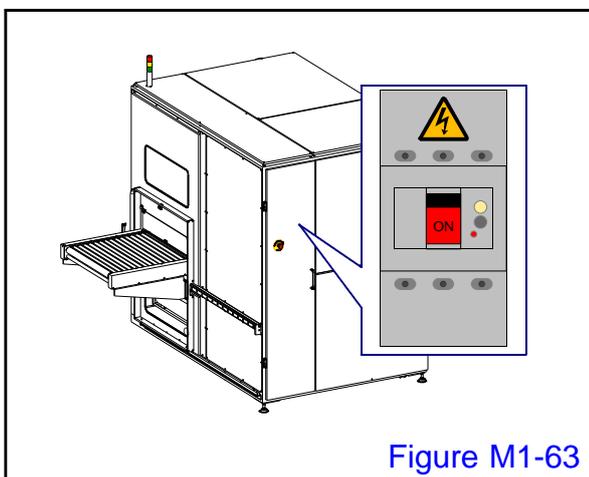
1.3.9. Measurement of the Laminating Roll Temperature Distribution

Measure the temperature of the roll surface at least once a month for the laminate roll and check that the temperature distribution state is uniform.

To check the laminate roll temperature distribution, prepare the following tools.

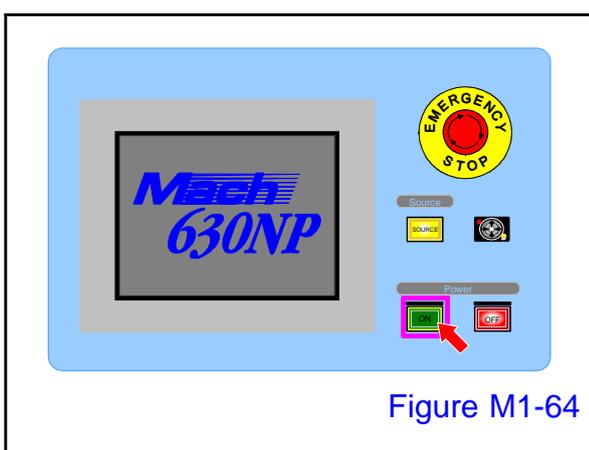
- Surface thermometer (non-contact type)

Checking procedure



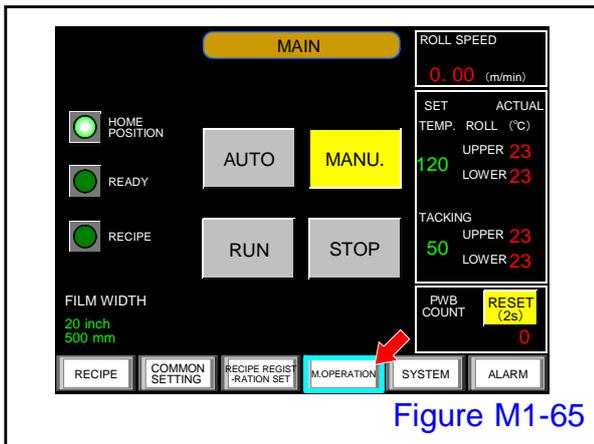
1. Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.



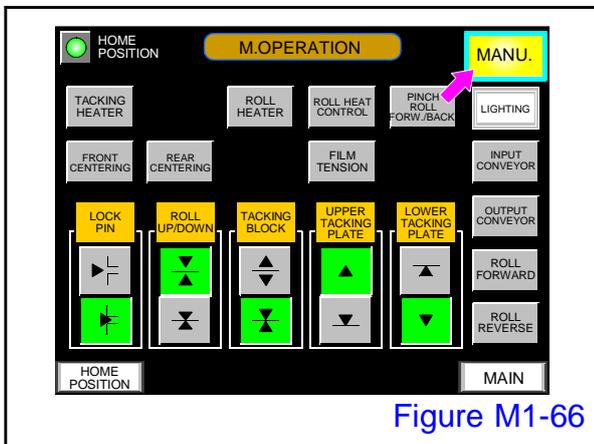
2. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

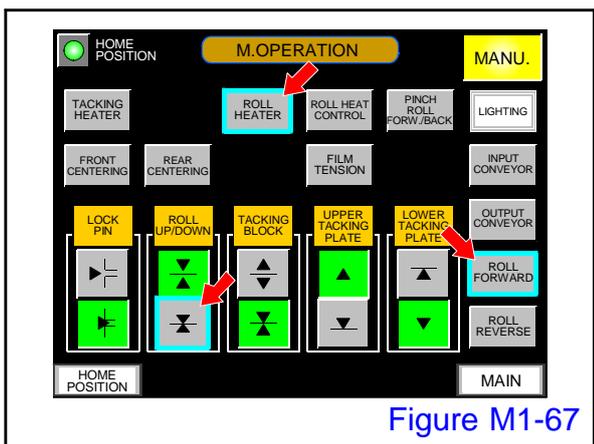


3. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.



4. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it



5. On the M.OPERATION screen, push the "ROLL HEATER", "ROLL FORWARD", "ROLL UP / DOWN-Lower" buttons.

- Pushing the "ROLL HEAT CONTROL" button turns on "ROLL UP / DOWN - Lower" and "ROLL FORWARD" ON.
- In the case of an optional electro-pneumatic regulator specification, the laminating roll pressure is a slight pressure.

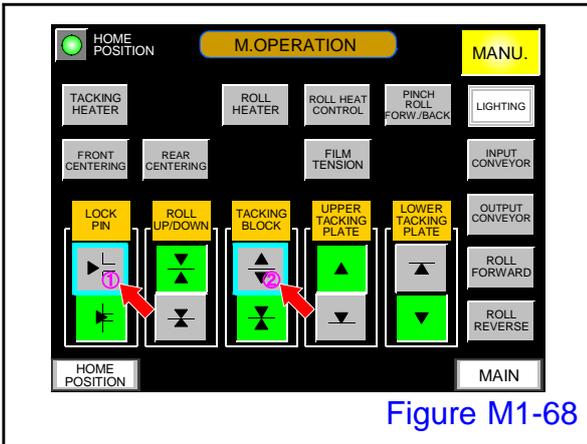


Figure M1-68

6. On the M.OPERATION screen, push the "LOCK PIN - Release" button and the "TACKING BLOCK -Open" button in this order to open the tacking block.

- If the lock pin is not in the release position, the Tacking block will not open even if press the "TACKING BLOCK - Open" button.

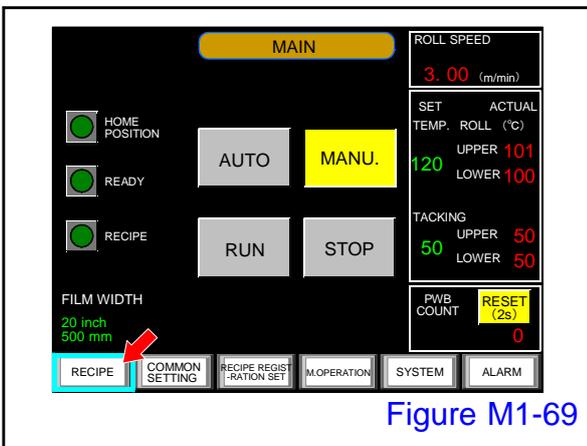


Figure M1-69

7. Push the "RECIPE" button on the MAIN screen.

- Move to the RECIPE screen.

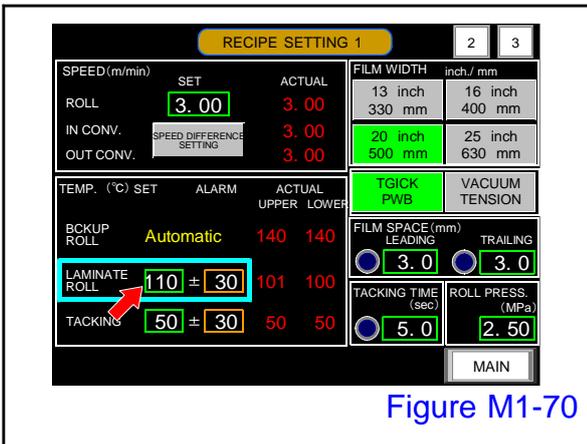


Figure M1-70

8. Check the laminate roll temperature setting. Here is the explanation with the case of 110°C setting.

If it is not set to 110°C, push the "RECIPE MANAGER" button to enter the recipe manager screen.



If the laminate roll temperature setting is not 110°C, please refer to "4.4. Creating a storage recipe" in Operation section and set it to 110°C.

9.

Wait until the laminate roll temperature stabilizes at 110°C (it takes about 20 to 30 minutes) and perform measurement.

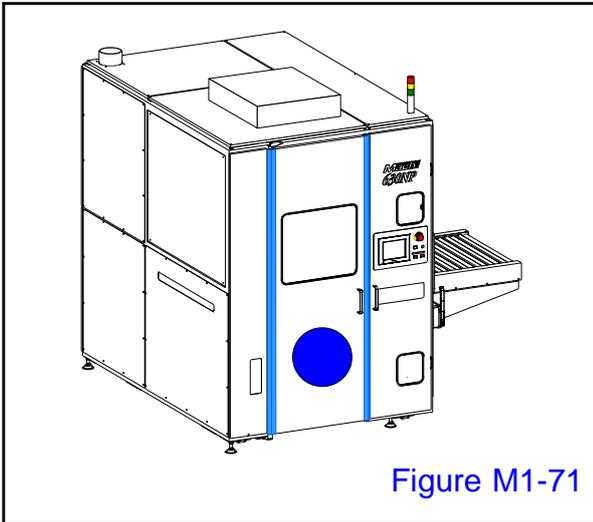


Figure M1-71

10.

Open the front door.

- There is an input conveyor B in front.

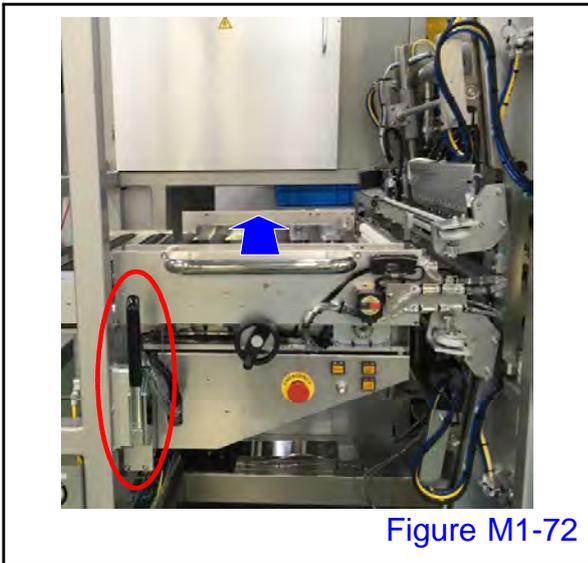


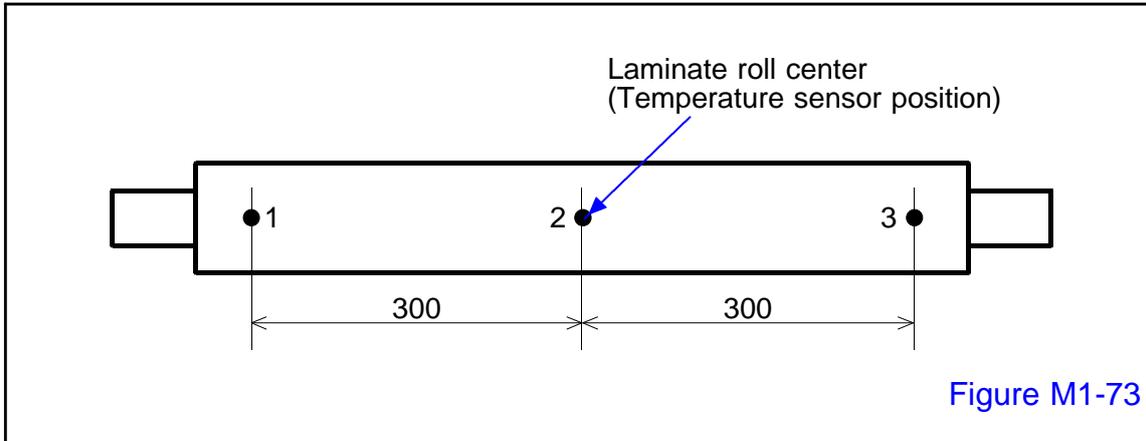
Figure M1-72

11.

Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the input conveyor B until it hits the far side and move to the film setting position.

12.

Using a non-contact surface thermometer, measure three places in Figure M1-.



Measurement is carried out with the laminate roll pressurized and rotated, so make sure the surface thermometer is a non-contact type.

13.

Check that the distribution of surface temperature and the difference between measured value and displayed value are within the following ranges.

Measured value	Contents	Allowable value
A	Surface temperature distribution (The difference between the maximum temperature and the minimum temperature of the three measurement points)	Within 10°C
B	The difference between the measured value (the average value of the three measured points) and the displayed value (the displayed value of the laminate roll on the recipe screen)	Within 5°C



If the measurement result is not within the above range, please consult with Hakuto Co., Ltd.

1.3.10. Measurement of the Tacking-Rubber Temperature Distribution

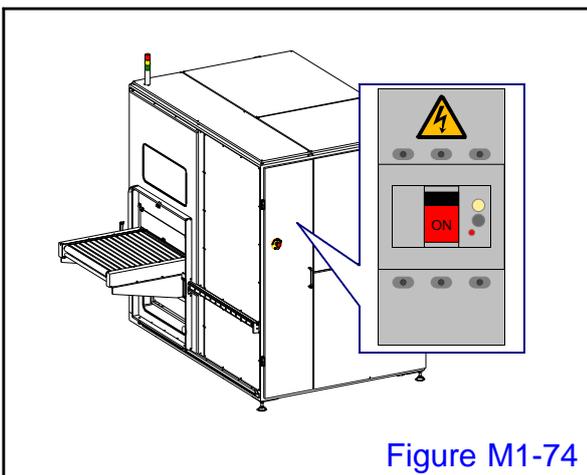
The Tacking rubber is built in the tip of tacking plate.

Check the surface temperature at least once a month and check that the temperature distribution state is uniform.

Please prepare the following tools to checking the tacking rubber temperature distribution.

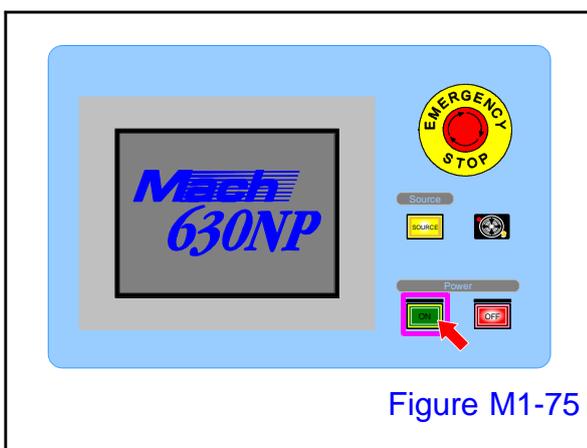
- Surface thermometer (contact type)

Checking procedure



1. Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.



2. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.



- Temperature distribution measurement of tacking rubber is performed while power supply and air are supplied. Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.
- Tacking rubber is high temperature (maximum temperature: about 70°C, heater is 100°C or more). Be fully careful of measurement of surface temperature, and perform it.

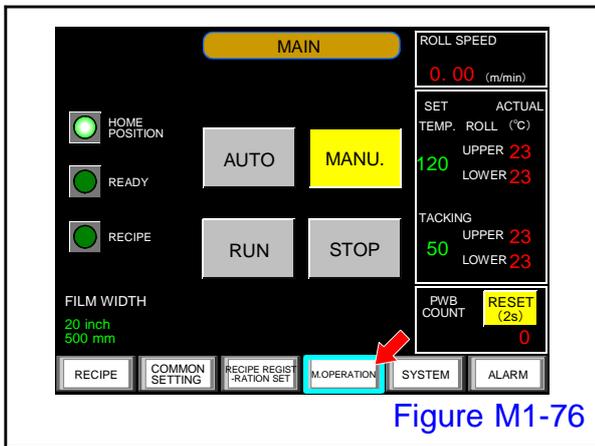


Figure M1-76

3. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

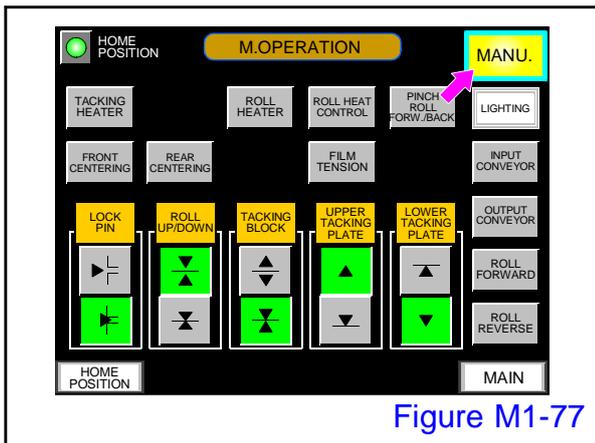


Figure M1-77

4. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it

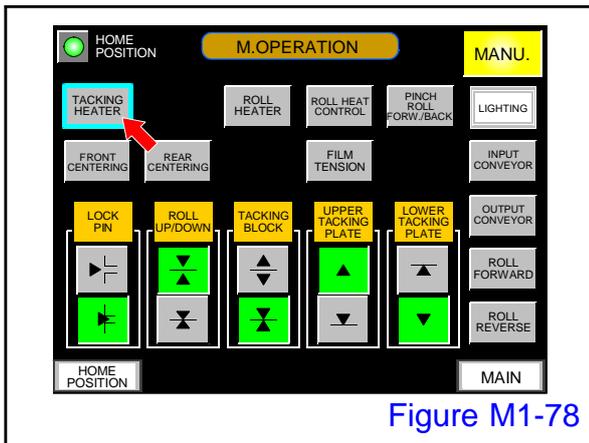


Figure M1-78

5. On the M.OPERATION screen, push the "TACKING HEATER" button to turn it ON.

- Perform warm up for about 20 minutes in this condition.



NOTE

- If the tacking heater is not sufficiently warmed up, accurate measurement results can not be obtained.

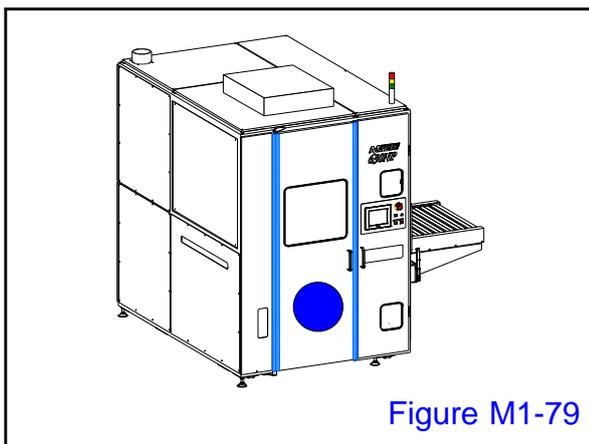


Figure M1-79

6. Open the front door.

- There is an input conveyor B in front.

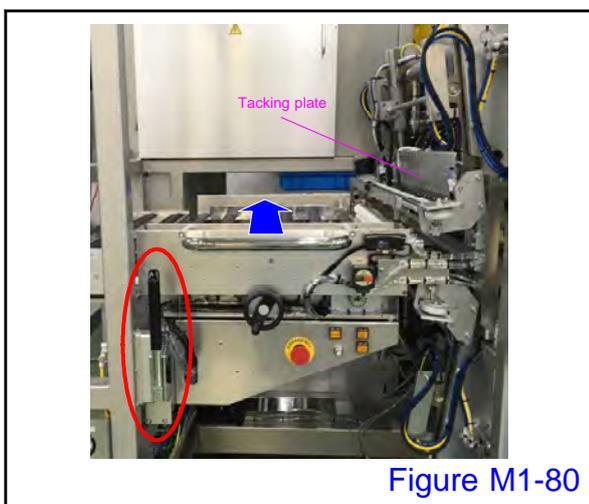


Figure M1-80

5. Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the input conveyor B until it hits the far side and move to the film setting position.

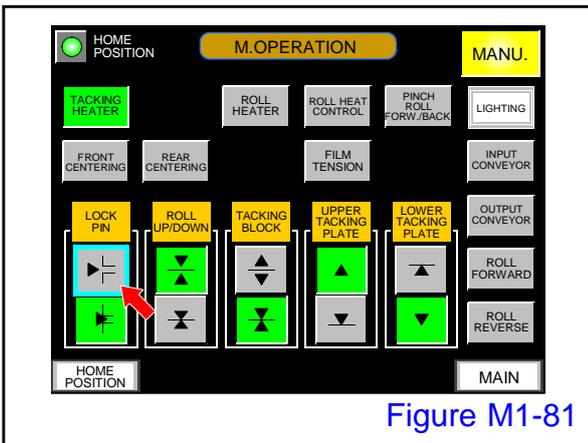


Figure M1-81

8. On the M.OPERATION screen, push the "LOCK PIN - Release" button.

- The lock pin moves to the release position and lock of the tacking block is released.

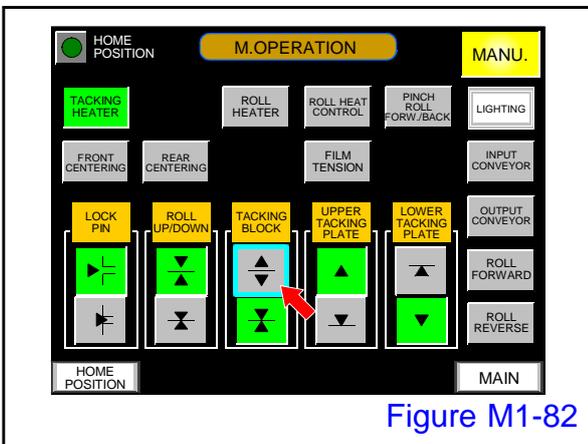


Figure M1-82

9. On the M.OPERATION screen, push the "TACKING BLOCK -Open" button.

- The upper and lower tacking blocks move to the open position.

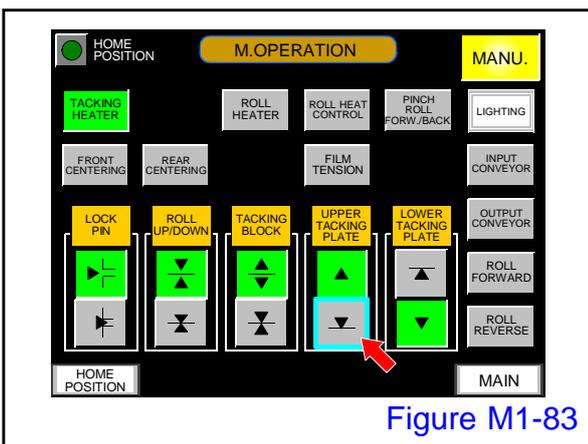


Figure M1-83

10. On the M.OPERATION screen, push the "UPPER TACKING PLATE - Lower" button.

- The upper tacking plate descends.

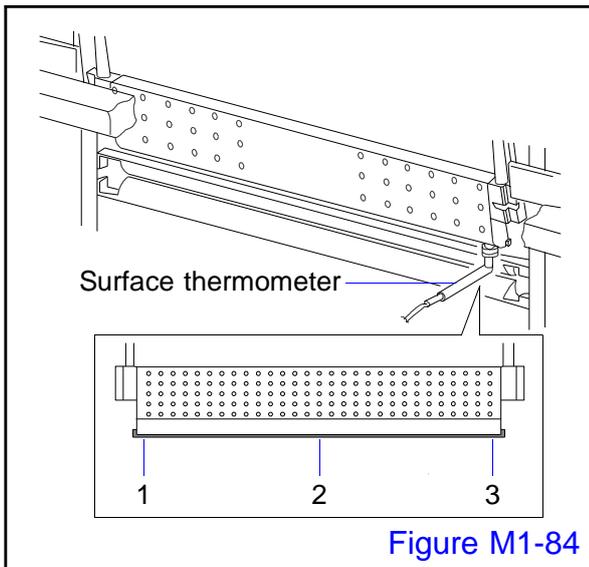


Figure M1-84

11.

Push the surface thermometer (contact type) against the rubber part at the tip of the tacking plate and measure the surface temperature of each point.

- Measure the surface temperature at the front side, the back side and the center side within the effective width 630 mm of the tacking plate.

12.

Check that the distribution of surface temperature and the difference between measured value and displayed value are within the following ranges.

Measured value	Contents	Allowable value
A	Surface temperature distribution (The difference between the maximum temperature and the minimum temperature of the three measurement points)	Within 10°C
B	The difference between the measured value (the average value of the three measured points) and the displayed value (the displayed value of the laminate roll on the recipe screen)	Within 5°C



If the temperature distribution is not uniform, please refer to "2.2.3. Replacing the Tacking Rubber, Replacing the Tacking Heater" and replace the tacking heater or tacking rubber.

13.

On the M. OPERATION screen, press the "UPPER TACKING PLATE - Raise" button to raise the upper tacking plate.

Next, push the "TACKING BLOC - Close" button and move the tacking block closer and push the "LOCK PIN - Lock" button to lock the Tacking Block.

14.

Upper part Tacking rubber temperature distribution confirmation is an end above. Please check the lower Tacking Rubber in the same way.

1.3.11. Cleaning the line filter for tacking plate adsorption destruction

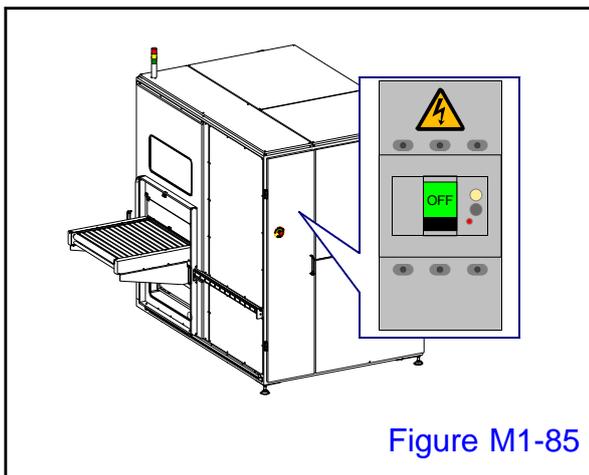
A line filter is used for the air outlet for the solenoid valve for adsorption destruction of the tacking plate.

To maintain the performance of the machine, please clean the line filter element more than once every 6 months.

Please prepare the following tools for line filter cleaning work.

- Air gun

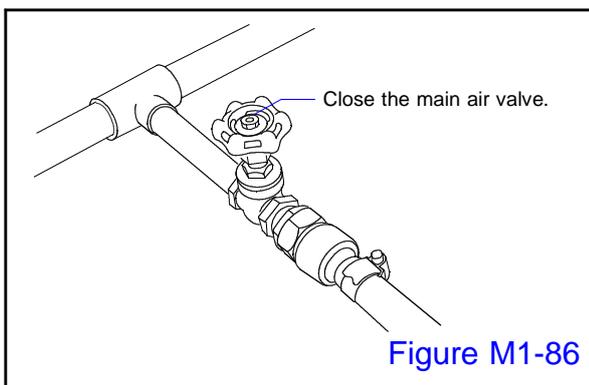
Cleaning procedure



1.

Turn OFF the main circuit breaker and turn off the machine.

- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.



2.

Close the main valve of the air supplied to the machine.

- Paste the "Air Supply Prohibited" tag in a place where it is easy to check so that nobody do not supply air.

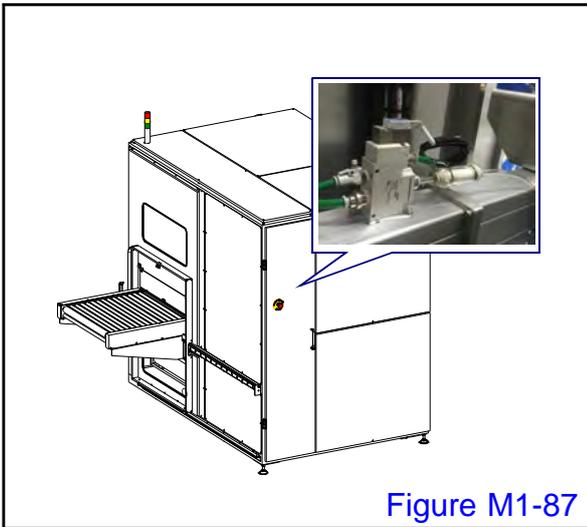


Figure M1-87

3.
Open the back door.

- There is a solenoid valve for adsorption breakdown on the vacuum header. The line filter module is connected to the air outlet port of the solenoid valve.

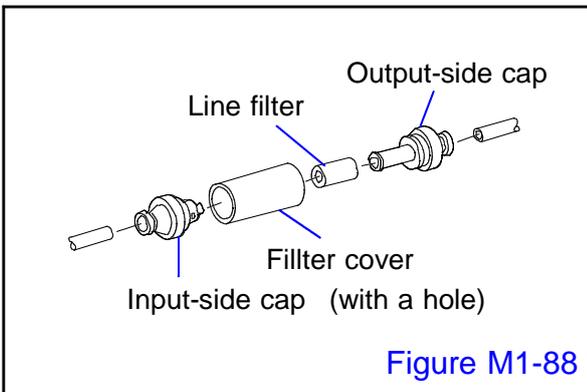


Figure M1-88

4.
Remove the inlet side and outlet side tubes and remove the adsorption destruction filter module.

Disassemble the filter module for adsorption destruction by turning the inlet side and outlet side caps.

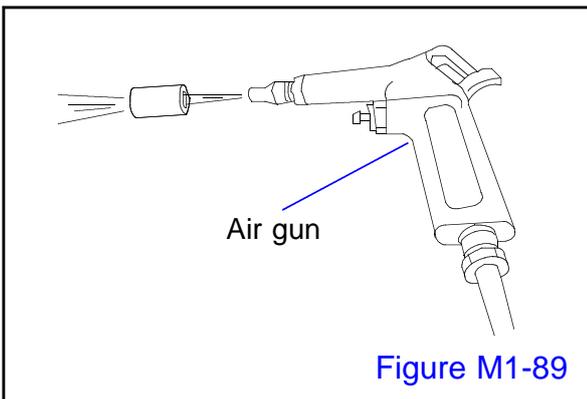


Figure M1-89

5.
Air is blown from the inside of the line filter with an air gun to remove dust and others adhering to the filter.



If the dirt does not fall even after cleaning, please refer to "2.2.5. Replacement of the Adsorption breakdown Line filter" and replace with a new filter.

6.

After cleaning, attach the line filter for adsorption destruction in reverse order of removal.



The line filter has inlet side and outlet side, so be careful when returning to the original piping. There is a Δ mark on the exit side.

1.3.12. Checking the alert labels

Please refer to "1.3. Alert Label" in Chapter 1 Operation section and confirm that appropriate alert label is affixed to the designated place once every 6 months.

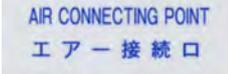
Checking procedure

Make sure that all Alert labels are affixed in the specified positions as the position of the warning label stated in "1.3.2. Paste place" in Operation section.

- If any alert message is hard to read due to peeling or dirt, replace the label with the same one or equivalent one.

The types of warning labels are as follows

No.	Type of label	Description	No.	Type of label	Description
1		Caution: Electric Shock	2		Caution: High temperature
3		Caution: Keep fingers away to prevent them from being caught.	4		Caution: Keep fingers away to prevent from being caught.
5		Caution: Keep away from the cutter.	6		Warning for the danger inside the unit
7		Close the cover.	8		Power-supply connection

No.	Type of label	Description	No.	Type of label	Description
9		Exhaust-duct connection	10		Air connection
11		Caution: Be careful to prevent injury by the electrode.			

1.3.13. Cleaning the cutter backup

Cutter backup has the important role of the film cut.

If there is dirt or clogging in the cutter running groove or suction hole, it can cause film cutting and wrinkles etc.

Please add to the cleaning every day and remove it from the laminate unit once a year and clean it.

Please prepare the following tools for cleaning by removing the cutter backup.

- 7 mm spanner
- Clean cloth
- Ethanol
- 150 mm ruler
- Vacuum cleaner for clean room
- Needle (Paper clip etc.)

Cleaning procedure



Here explain the procedure of removing the upper cutter backup and cleaning it.

The cleaning procedure with removing the lower cutter backup is similar to the procedure with upper cutter backup in vertical symmetry.

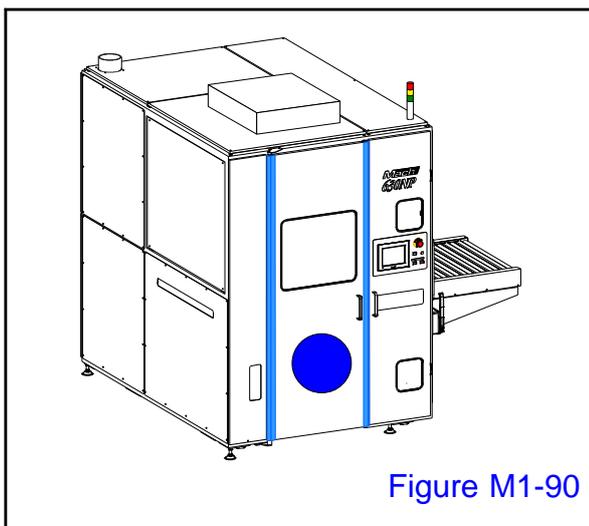


Figure M1-90

1. Open the front door.
 - There is an input conveyor B in front.

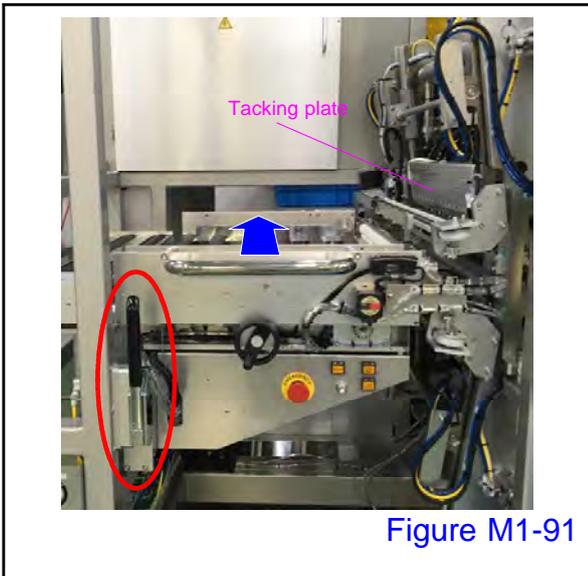


Figure M1-91

2. Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the input conveyor B until it hits the far side and move to the film setting position.

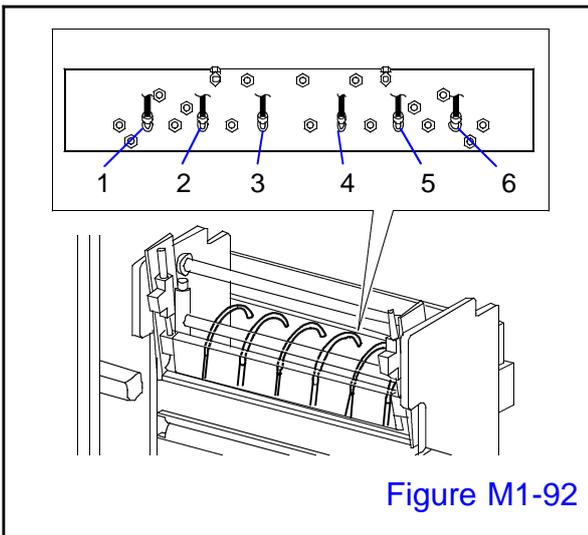


Figure M1-92

3. Remove the six vacuum tubes extending from the cutter backup from the tube fitting of the back vacuum headers.



Be careful not to mistake the tube mounting position when undoing.

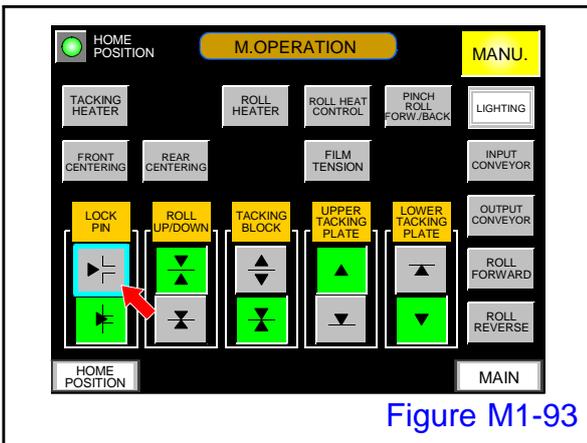


Figure M1-93

4. On the M.OPERATION screen, push the "LOCK PIN - Release" button.

- The lock pin moves to the release position and lock of the tacking block is released.

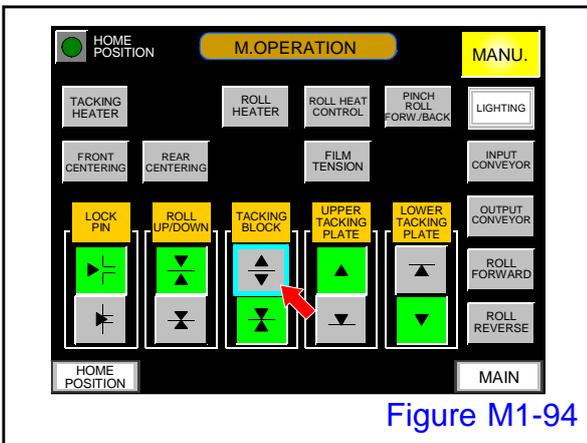


Figure M1-94

5. On the M.OPERATION screen, push the "TACKING BLOCK -Open" button.

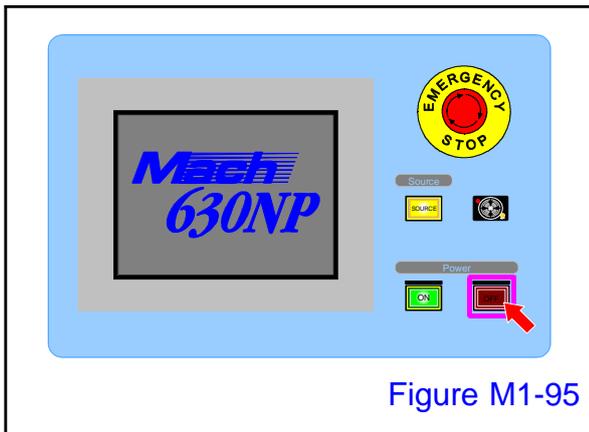
- The upper and lower tacking blocks move to the open position.



NOTE

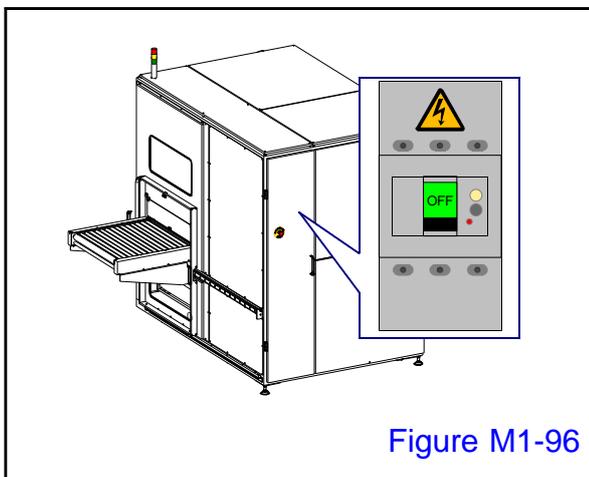
- If not in manual mode by pressing the "MANU" button on the MAIN screen, it will not accept operations on the manual operation screen.
- To open the tacking block, the lock pin must be released. Please release the lock pin by pushing the "LOCK PIN - release" button.

The operation so far is done with the power on.



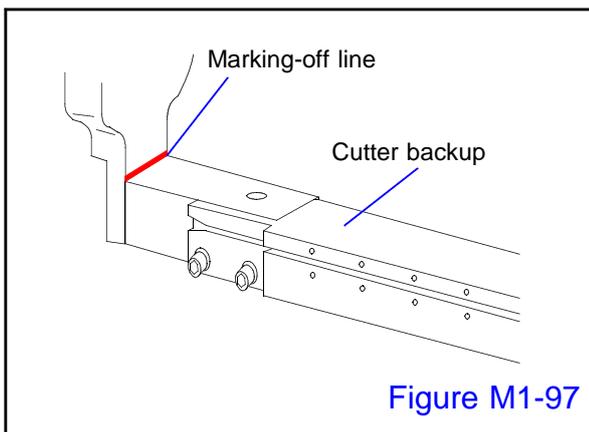
6. Push the power "OFF" button on the operation panel.

- The power ON button goes out and the power OFF button lights up.

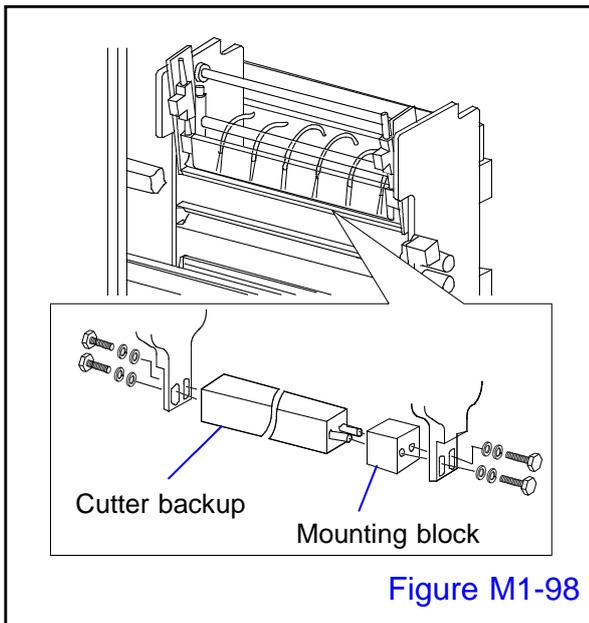


7. Turn OFF the main circuit breaker and turn off the machine.

- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.



8. Before removing the cutter backup, put the marking-off line in the chassis part, please as a guide at the time of reassembly.

**9.**

Remove the cutter backup.

- If remove the fixing bolt of the cutter backup, it can be divided into cutter backup and mounting block (front side only).

Fixing bolt

- M4 Hexagon bolt, washer, spring washer (4 each)

10.

With needle (Paper clip etc.), remove dirt and film garbage adhering to the cutter backup vacuum hole.

Wipe off with a clean cloth containing ethanol after sucking with a vacuum cleaner for clean room, and cleaning the surface and groove.

Also, if ethanol is put in a container and soaked with cutter backup, dry film ingredients are easy to remove and cleaning becomes easy.

Especially inside the pipes, it is effective when immersed.

Finally wipe it off with a clean cloth and let it dry and it's done.

CAUTION

Be careful not to scratch the surface when cleaning the hole with a paper clip etc. If it gets scratched, please polish the surface with fine sandpaper etc.

However, in the case of special products such as coating, polishing is not possible.

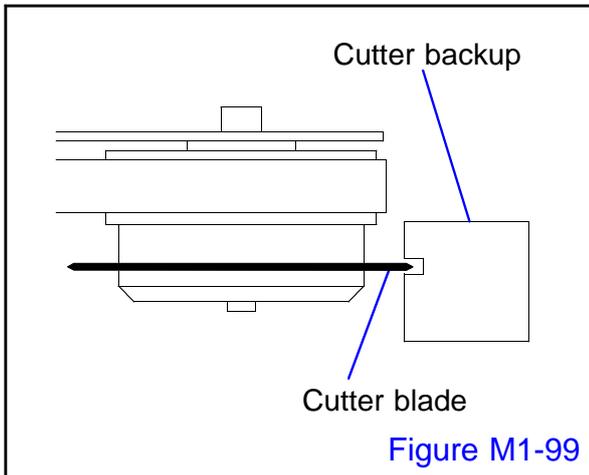
**NOTE**

If the inside of the pipe is dirty, the inside of the tube for vacuum is also dirty, so please replace it.

11.

Attach the cutter backup in accordance with the marking-off line.

- Attach to the chassis part with the mounting block in alignment with the two protrusions of the cutter backup.



12.

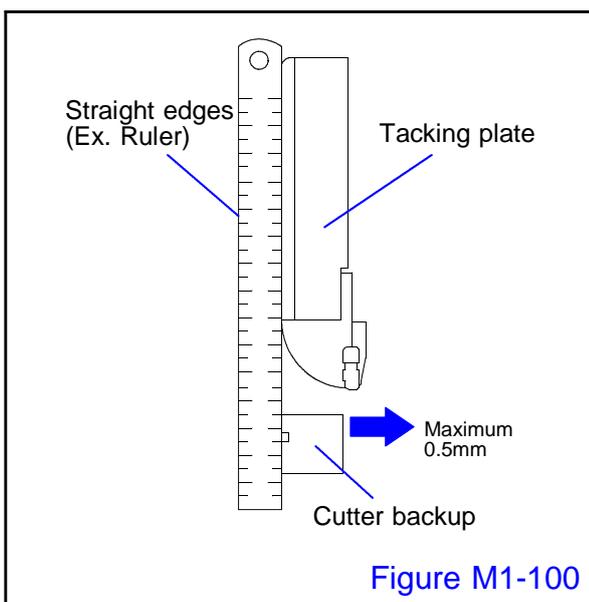
Make sure the cutter backup and the cutter module are not interfering with each other. Make the cutter module reciprocate slowly by hand, and see from the side whether the cutter backup groove and the cutter blade are not in contact.

- If the cutter backup is not installed in the proper position, it may interfere with the cutter. In that case, please reset the cutter backup to the appropriate position.

CAUTION



Make sure to run the cutter module slowly with your hands. If the cutter blade is not properly installed, it may come in contact with the cutter backup groove and the cutter blade may be damaged. Be sure to turn off the power before making this check.



13.

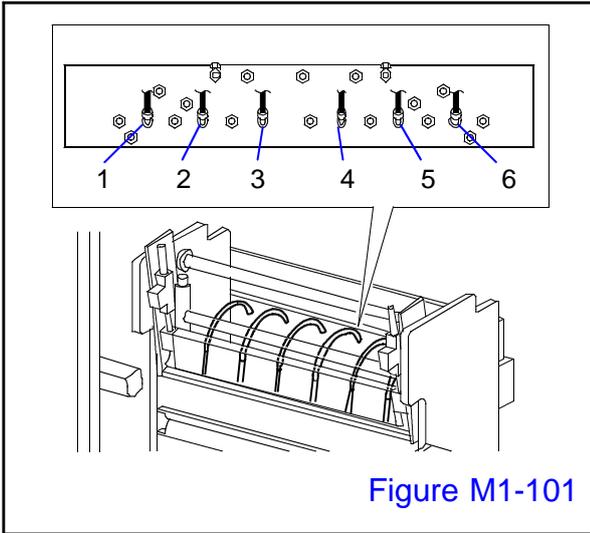
Place a straight edge on the tacking plate and cutter backup and check that it is within the range that is maximally 0.5 mm retracted in the direction of the arrow from the straight line.

- If the cutter backup is not installed in the proper position, please install it in the proper position.

CAUTION



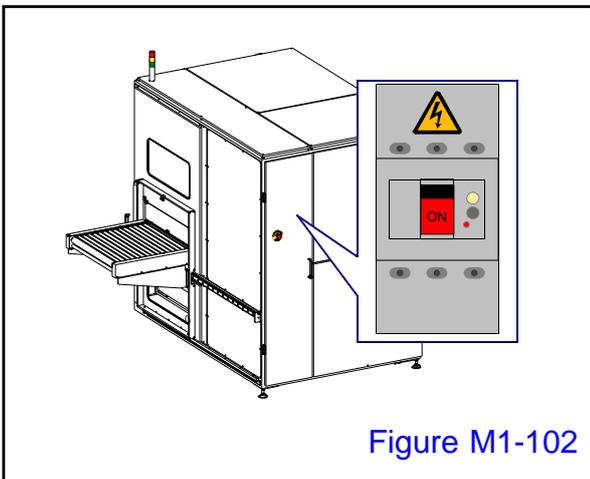
Be careful not to damage the surface of the tacking plate and cutter backup and the running surface of the dry film such as the film guide with a tool (straight edge etc.) at the time of confirmation.



- 14.**
Attach six vacuum tubes to the tube fitting of the back vacuum headers.

 **NOTE**

Install cutter backup and position adjustment before installing the tube.
The position can be easily adjusted without being pulled by the tube.
Be careful not to mistake the tube mounting position when undoing.



- 15.**
Turn ON the main circuit breaker and supply power to the machine.
- The SOURCE lamp on the control panel will light up.

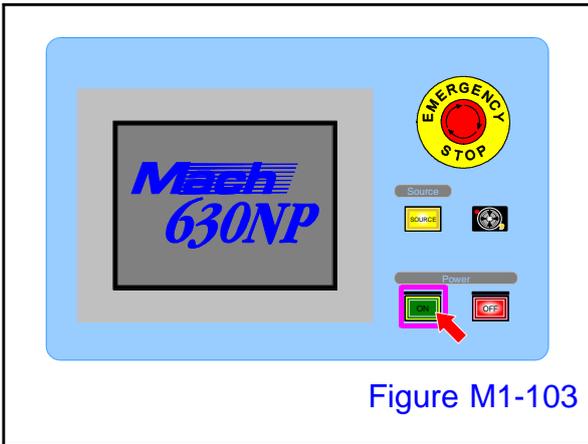


Figure M1-103

16.

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

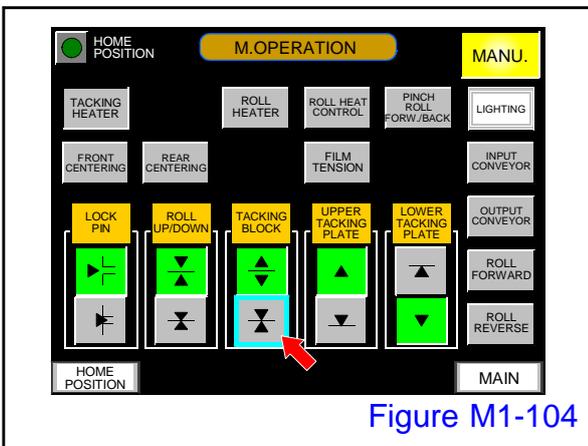


Figure M1-104

17.

On the M.OPERATION screen, push the "TACKING BLOCK -Close" button.

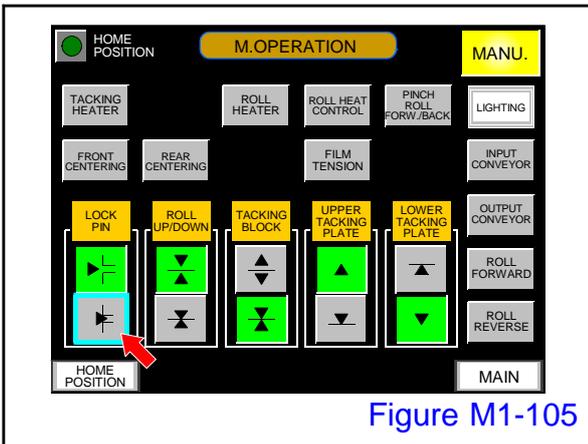


Figure M1-105

18.

On the M.OPERATION screen, push the "LOCK PIN - Lock" button.

NOTE

If not in manual mode by pressing the "MANU" button on the MAIN screen, it will not accept operations on the manual operation screen

Cleaning of the cutter backup is over with the above.

1.3.14. Cleaning the film guide

If the film guide is dirty or if the suction hole is clogged, it may cause wrinkles. Please add to the cleaning every day and remove it from the laminate unit once a year and clean it.

Please prepare the following tools for removing the film guide and cleaning it.

- 7 mm spanner
- 5.5 mm spanner
- Nippers
- Needle (Paper clip etc.)
- Ethanol
- Clean cloth
- 150 mm ruler
- Vacuum cleaner for clean room

Cleaning procedure



NOTE

Here explain the procedure of removing the upper film guide and cleaning it.

The cleaning procedure with removing the lower film guide is similar to the procedure with upper cutter backup in vertical symmetry.

1.

Open the front door, then input conveyor B until it hits the far side and move to the film setting position.

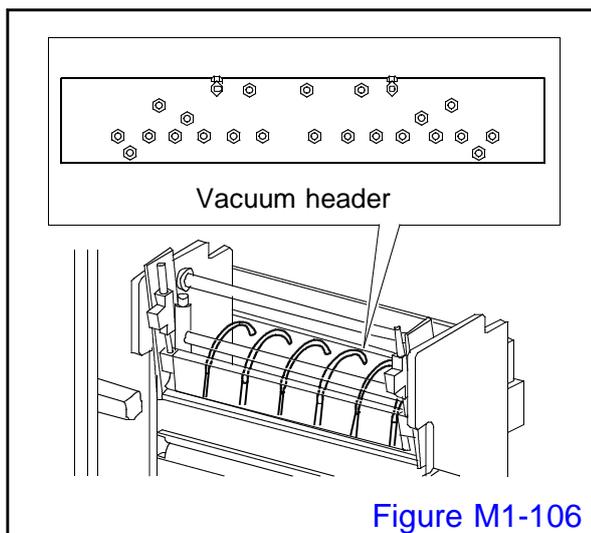


Figure M1-106

2.

Remove the nine vacuum tubes extending from the film guide from the tube fitting of the vacuum header at the back.



Be careful not to mistake the tube mounting position when undoing.

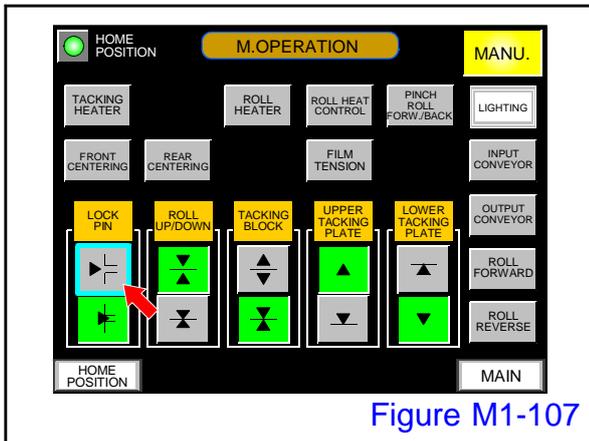


Figure M1-107

3.

On the M.OPERATION screen, push the "LOCK PIN - Release" button.

- The lock pin moves to the release position and lock of the tacking block is released.

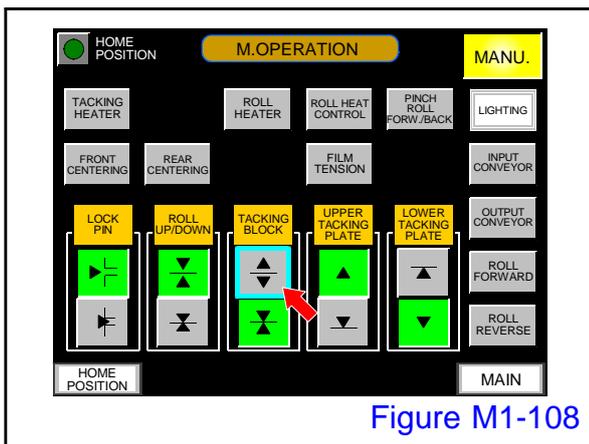


Figure M1-108

4.

On the M.OPERATION screen, push the "TACKING BLOCK -Open" button.

- The upper and lower tacking blocks move to the open position.



● If not in manual mode by pressing the "MANU" button on the MAIN screen, it will not accept operations on the manual operation screen.

● To open the tacking block, the lock pin must be released. Please release the lock pin by pushing the "LOCK PIN - release" button.

The operation so far is done with the power on.

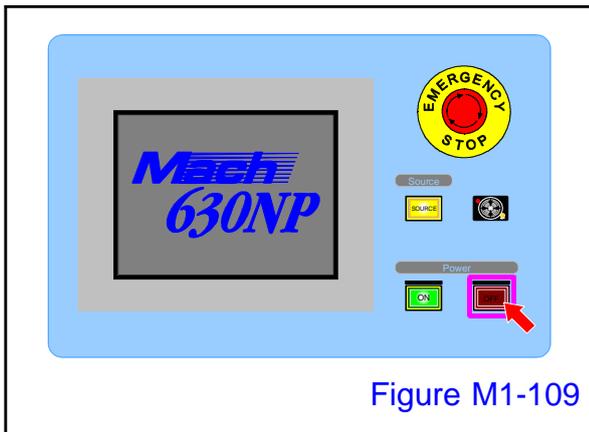


Figure M1-109

5. Push the power "OFF" button on the operation panel.

- The power ON button goes out and the power OFF button lights up.

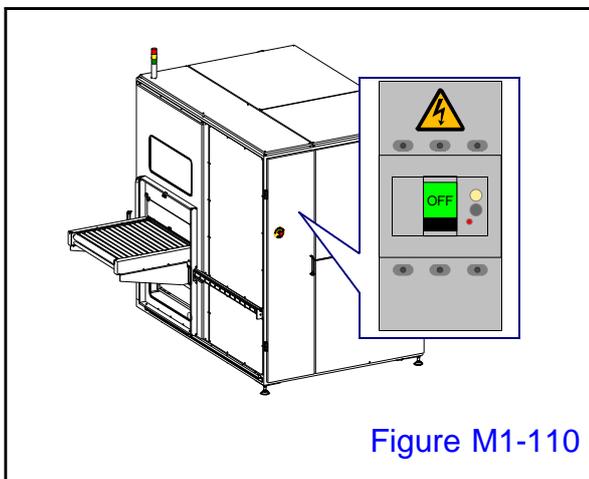


Figure M1-110

6. Turn off the main circuit breaker and turn off the machine.

- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

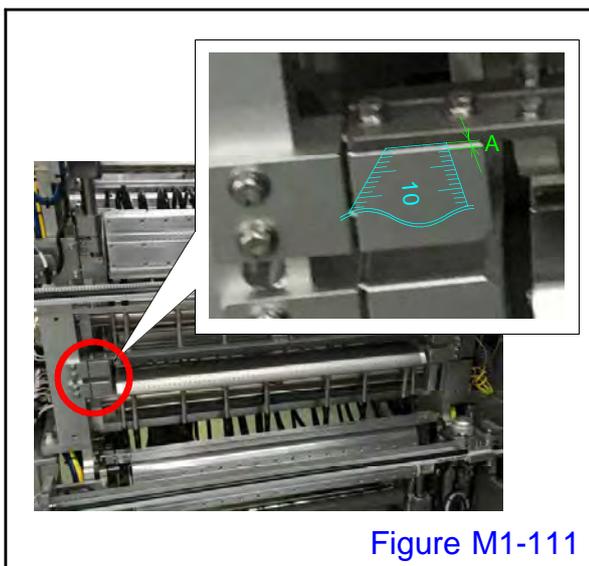


Figure M1-111

7. Measure the mounting position dimension "A" of the film guide, and install it with the same dimensions when installing.

- Measure the left and right sides for mounting dimensions.

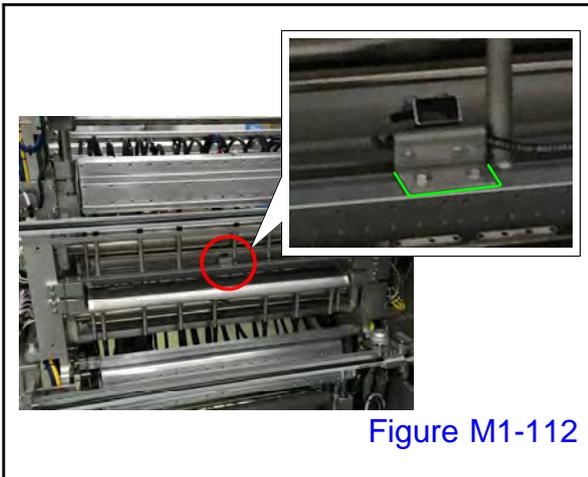


Figure M1-112

8.

Writing the marking line of the mounting position on the bracket of the laminate roll temperature sensor.

Remove the bracket fixing screw and remove the sensor together with the bracket.

- Since the wiring of the sensor is fixed to the pipe of the film guide with the cable tie, please cut the cable tie with the nipper.

- Since sensor bracket is glued with silicon, please apply silicone when installing.



Leave the removed laminate temperature sensor at a position that does not become an obstacle to the work.
Also, be careful not to damage the wiring.

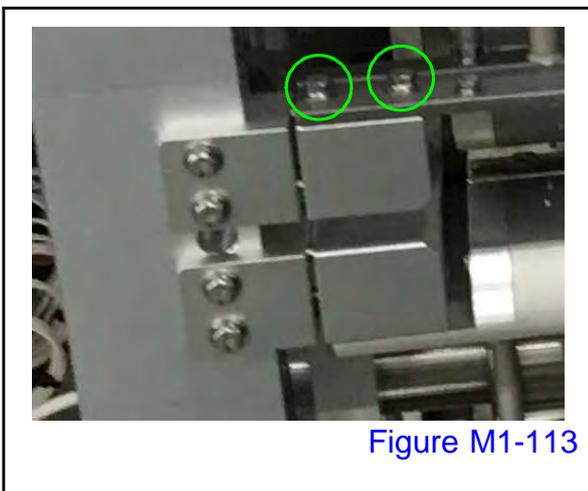


Figure M1-113

9.

Remove the film guide fixing screw (circle mark), the total of 4 places in 2 places on one side, and remove the film guide.



Be careful not to damage the surface of the laminate roll.
It is safe to pull out the laminate roll module beforehand before removing the film guide.

10.

With needle (Paper clip etc.), please remove dust and others adhering to the adsorption hole of the film guide and suck it with a vacuum cleaner for clean room.

Then wipe the entire film guide with a clean cloth containing ethanol.

Also, if ethanol is put in a container and soaked with cutter backup, dry film ingredients are easy to remove and cleaning becomes easy.

Especially inside the pipes, it is effective when immersed.

Finally wipe it off with a clean cloth and let it dry and it's done.

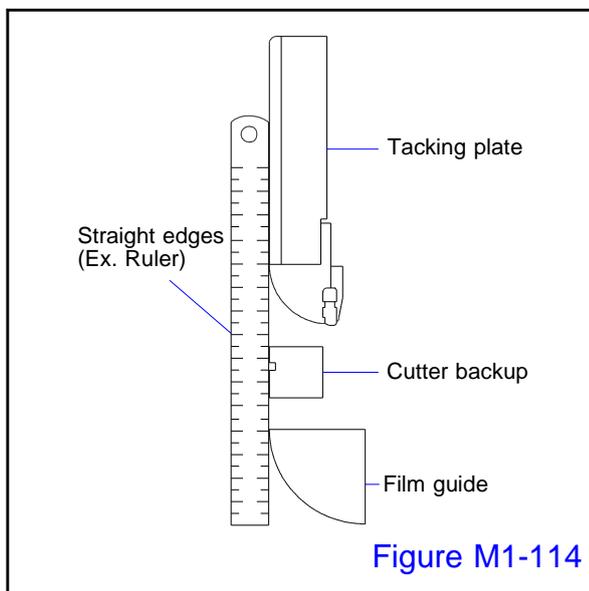
CAUTION

Be careful not to scratch the surface when cleaning the hole with a paper clip etc. If it gets scratched, please polish the surface with fine sandpaper etc.

However, in the case of special products such as coating, polishing is not possible.

11.

Attach the film guide according to the numerical value measured in step 8.

**12.**

Place the straight edge on the tacking plate and film guide and check if it is on a straight line.

- If the film guide is not installed in the proper position, it may not be in alignment with the tacking plate. In that case, please install it in the proper position.

CAUTION



Be careful not to damage the surface of the tacking plate and cutter backup and the running surface of the dry film such as the film guide with a tool (straight edge etc.) at the time of confirmation.

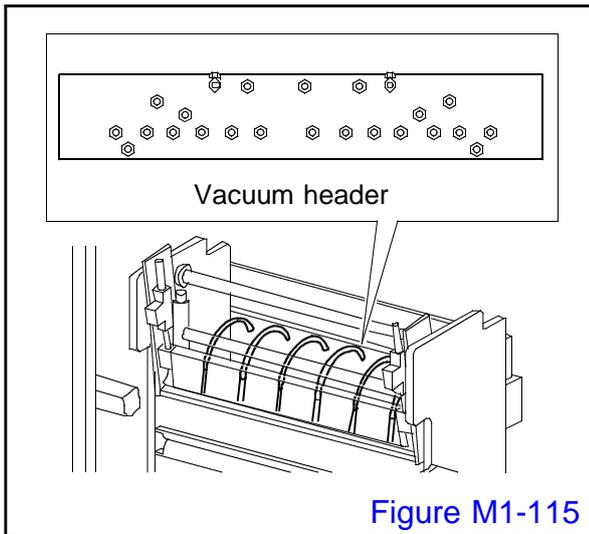


Figure M1-115

13.

Attach the nine vacuum tubes to the tube fitting of the back vacuum headers.



NOTE

Be careful not to mistake the installation position of the tube.

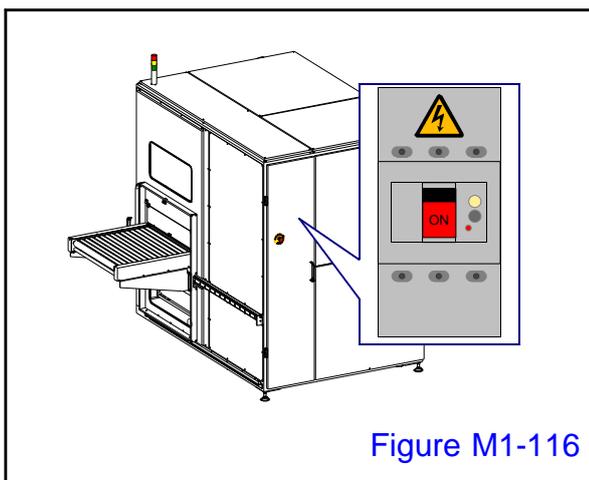


Figure M1-116

14.

Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

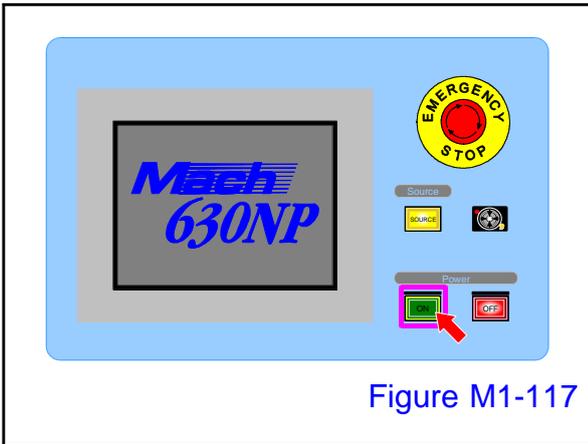


Figure M1-117

15.

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

The cleaning work by removing the film guide from the machine is over with the above.

1.3.15. Checking and adjustment the tension of the pinch roll drive chain.

A chain is used as a means to transmit the driving force from the drive source to drive the pinch roll portion of the present machine input conveyor.

Measure the amount of slack in the drive chain at least once every 6 months and if not appropriate, adjust the tension.

Please prepare the following tools for checking and adjustment the tension of the pinch roll drive chain.

● Allen key set

● Spanner set

Checking and adjustment procedure

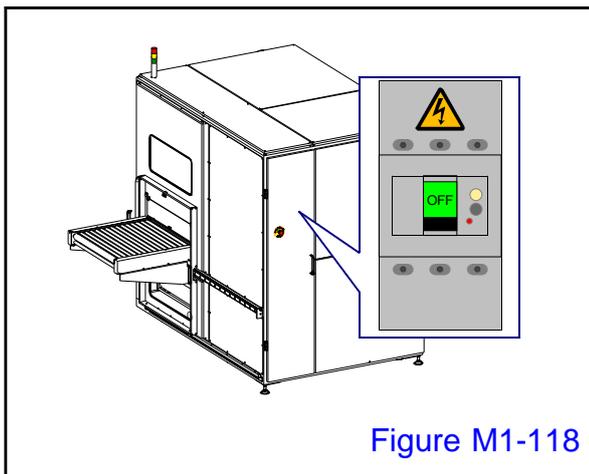


Figure M1-118

1.

Turn OFF the main circuit breaker and turn off the machine.

● Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

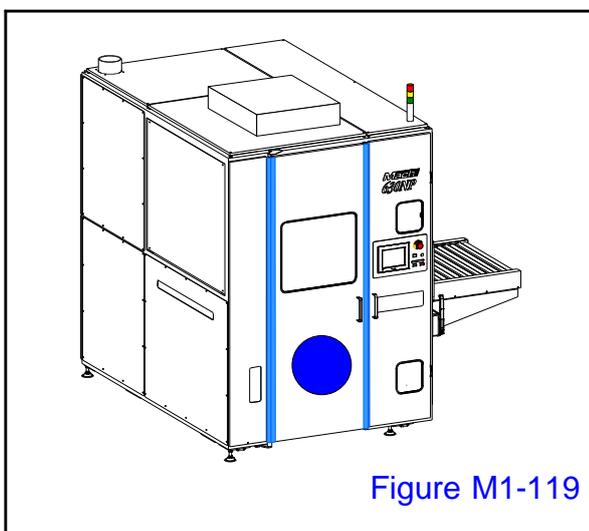


Figure M1-119

2.

Open the front door.

● There is an input conveyor B in front.

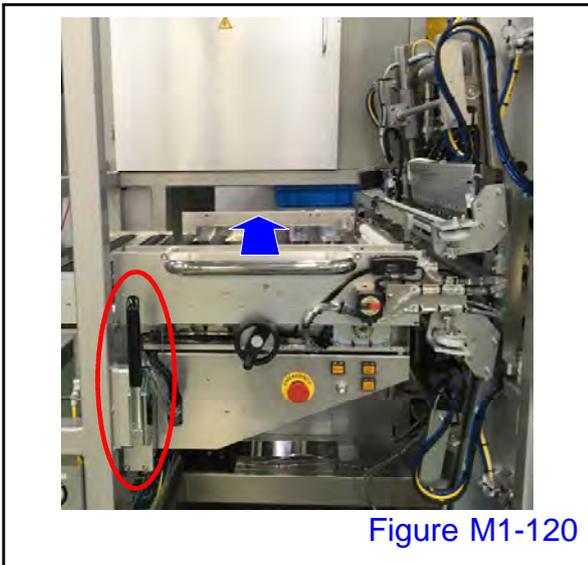


Figure M1-120

3. Operate the conveyor fixing release lever (red circle) to unlock the conveyor, then slide the input conveyor B until it hits the far side and move to the film setting position.

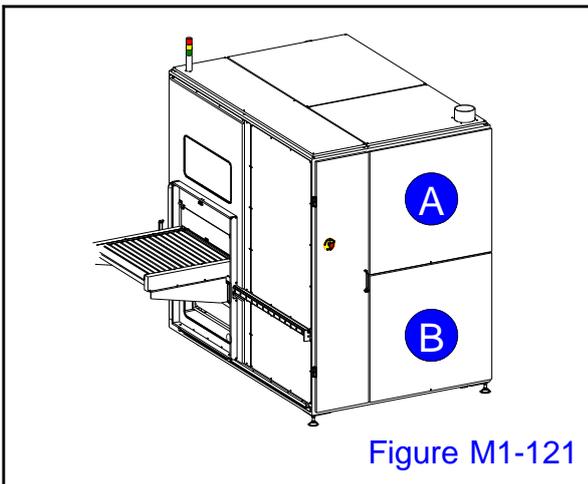


Figure M1-121

4.
 - Remove the covers A, B on the back of the machine.

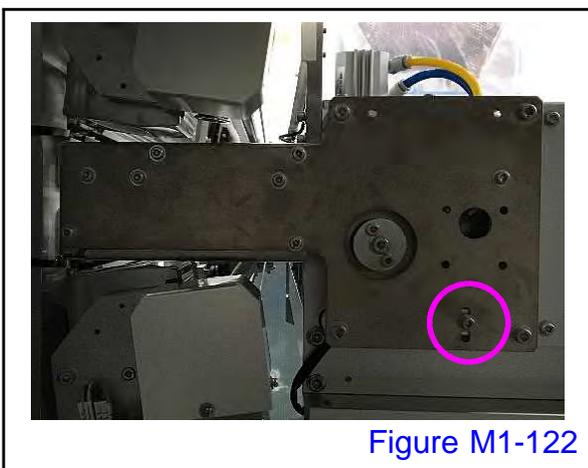
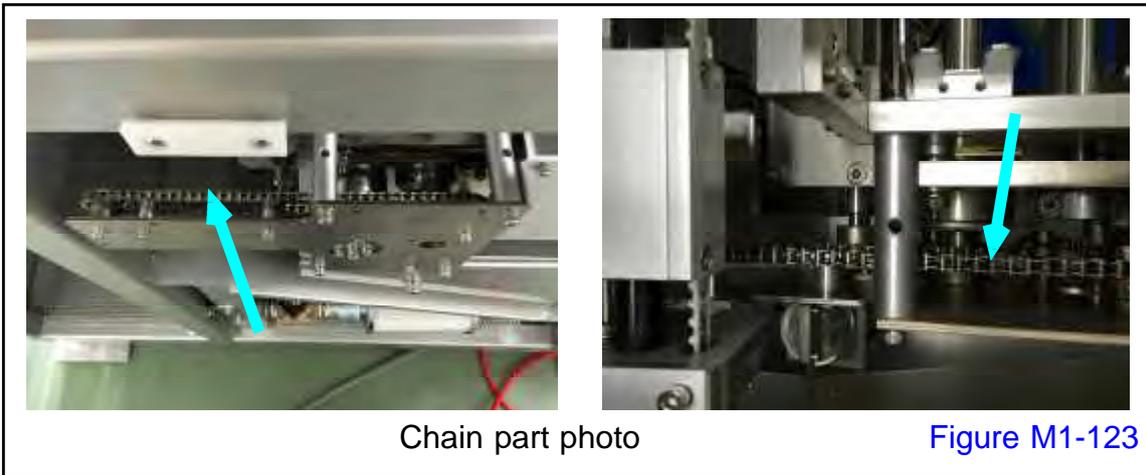


Figure M1-122

5. Loosen the bolt fixing the tension sprocket (the position of the circle), move the sprocket within the slot range, and adjust the tension of the drive chain.

- When loosening or fixing the cap bolt (circle), please turn the bolt with a allen key while holding the nut of the sprocket part on the back side of the plate with a spanner.



Chain part photo

Figure M1-123

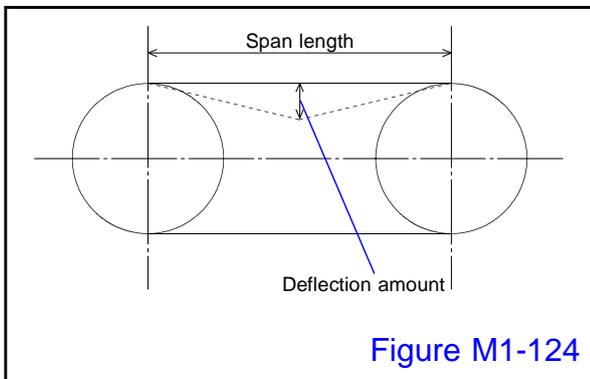


Figure M1-124

6. Adjust so that it becomes the proper amount of deflection shown below.

Span length : 83.0mm

Deflection amount : 1.7mm

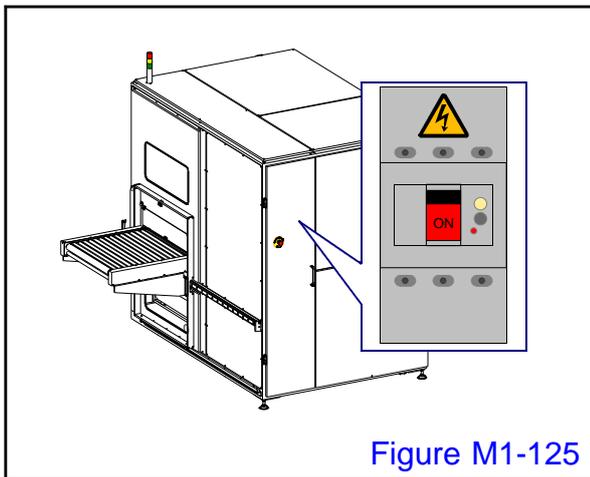


Figure M1-125

7. Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

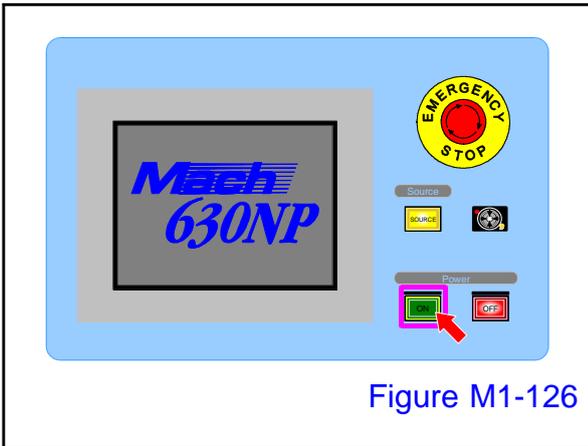


Figure M1-126

8. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

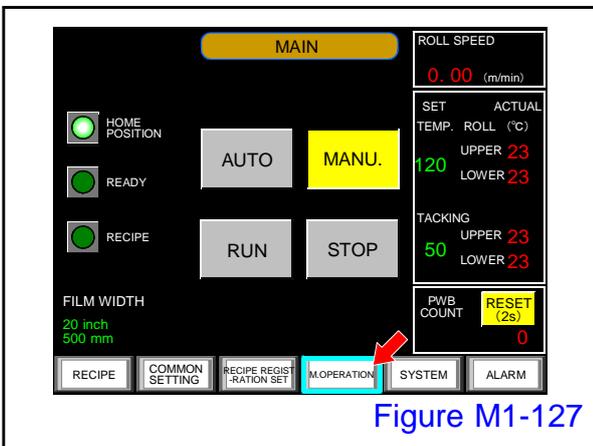


Figure M1-127

9. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

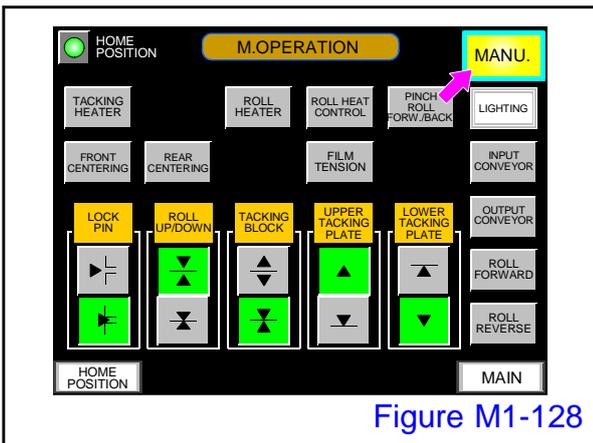
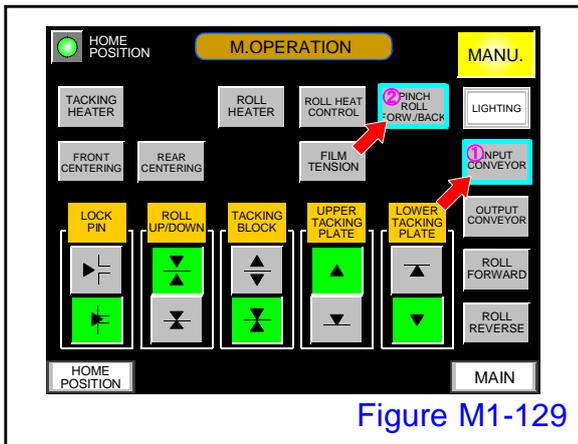


Figure M1-128

10. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it



11.

Turn on the "INPUT CONVEYOR" button on the M.OPERATION screen, then push the "PINCH ROLL FORW./BACK" button to make sure it rotate smoothly and it goes back and forward smoothly.

Although adjustment of the drive chain tension is completed with the above, it is recommended to perform grease up regularly.
For grease-up, refer to "1.3.8. Lubrication in the machine".

1.3.16. Checking and adjustment the crossed helical gears

A crossed helical gear is used as a method of transmitting the driving force from the drive source to drive the input conveyor and output conveyor of this machine. Check the crossed helical gear more than once every 6 months and if it is not appropriate, please adjust and tighten again.

Please prepare the following tools for checking and adjusting crossed helical gear for driving.

- Allen key set
- Screw lock agent TL43J (moderate intensity 3M Scotch-Weld)

Checking and adjustment procedure

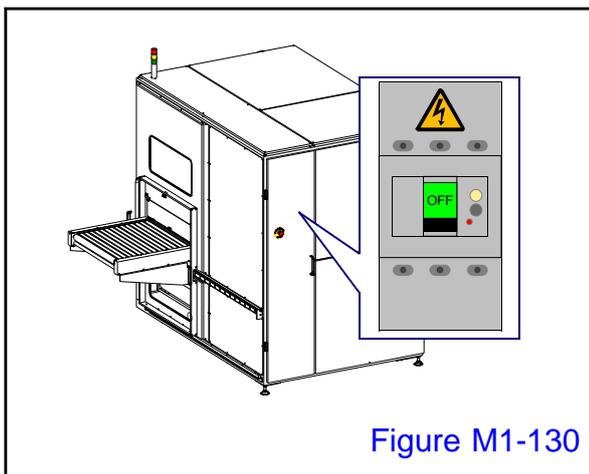


Figure M1-130

1. Turn OFF the main circuit breaker and turn off the machine.

- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

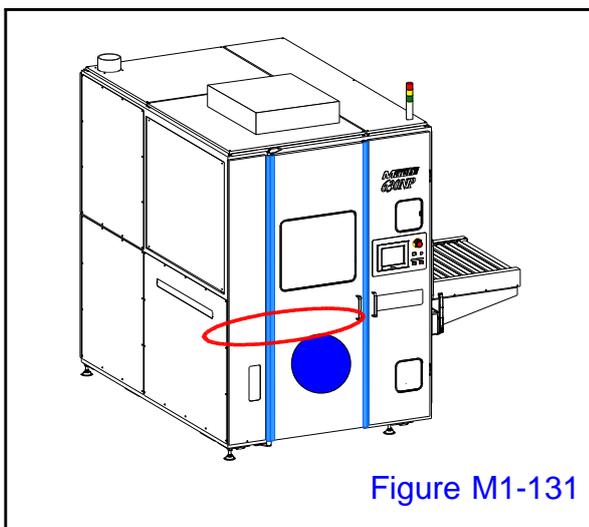
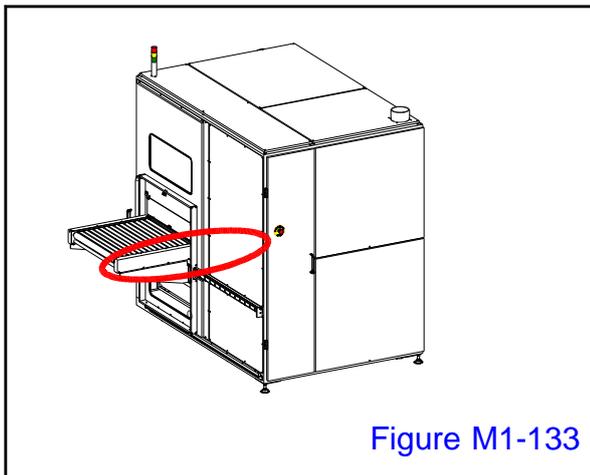
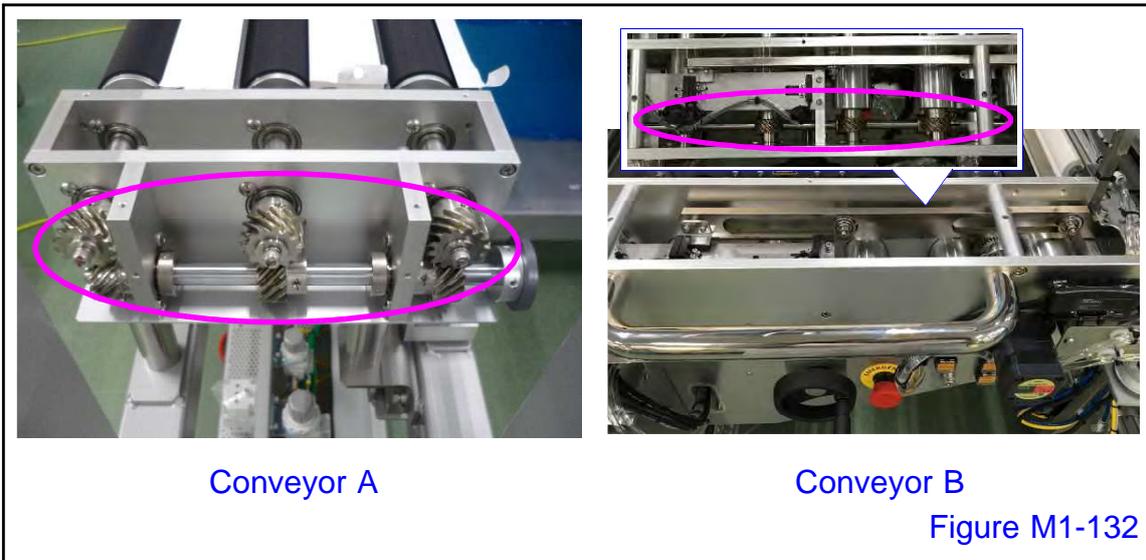
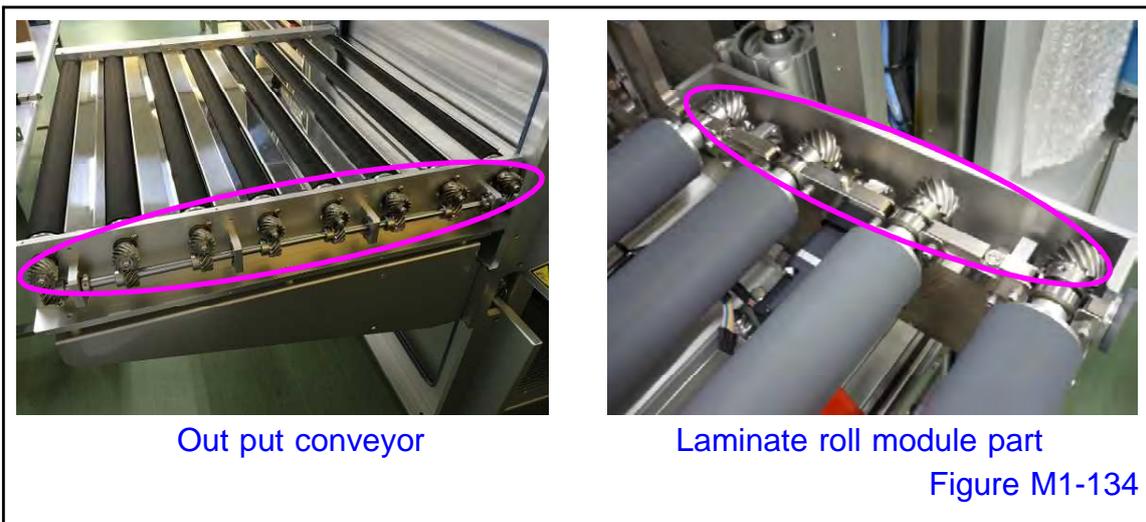


Figure M1-131

2. The crossed helical gear of the input conveyor section opens the front door and is located on the front side.



- 3.
- The crossed helical gear of the output conveyor section is arranged on the back side of the output conveyor. Please remove the cover.



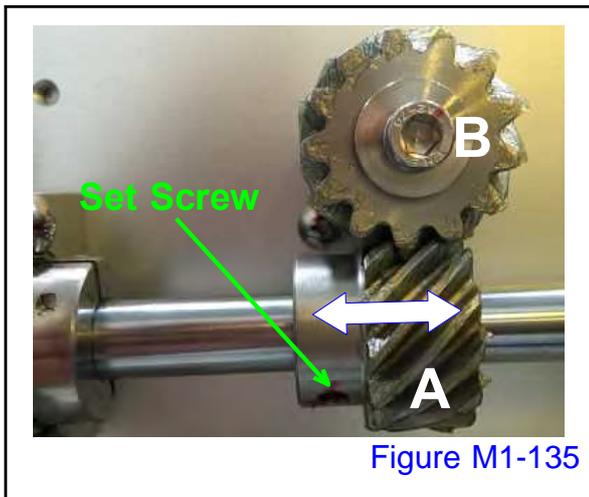


Figure M1-135

4. Loosen the set screw of gear A (there are two places).
Move gear A in the axial direction while turning gear B by hand, and fix it where there is backlash.

- Please fix the set screw by applying screw lock agent.

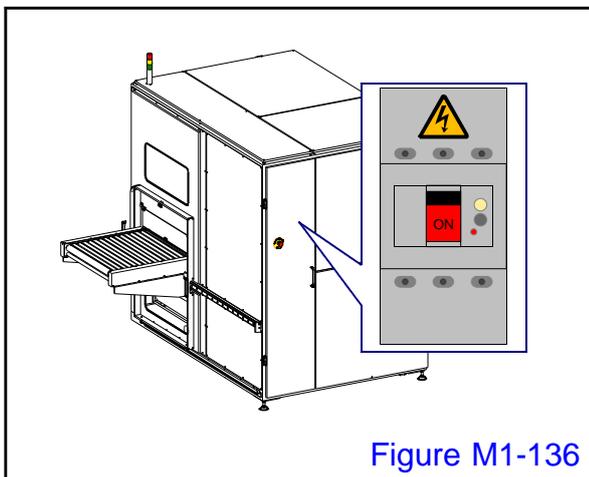


Figure M1-136

5. Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

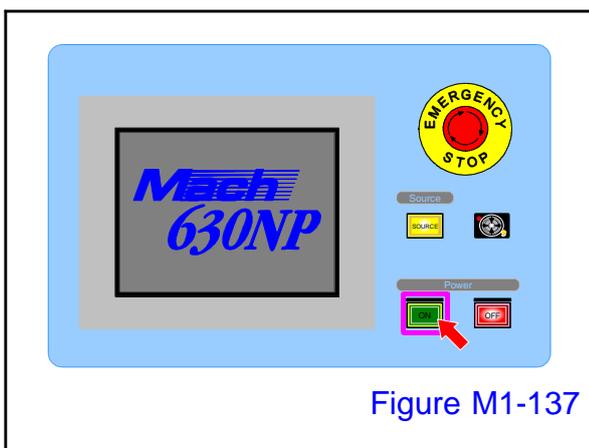


Figure M1-137

6. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation.
When the homing operation ends, the MAIN screen is displayed on the touch panel.

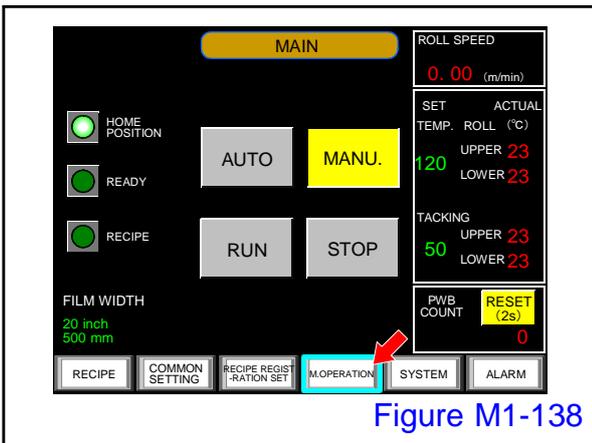


Figure M1-138

7. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

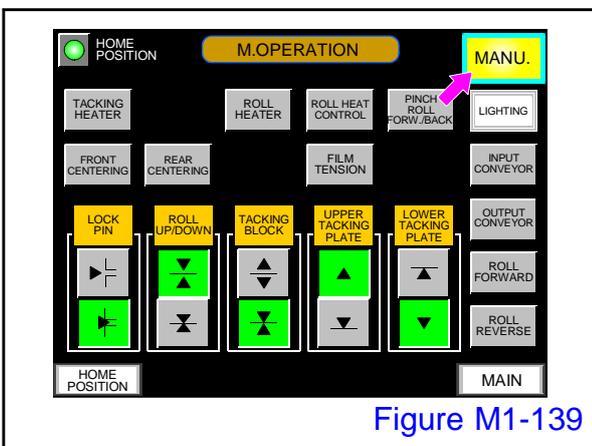


Figure M1-139

8. Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it

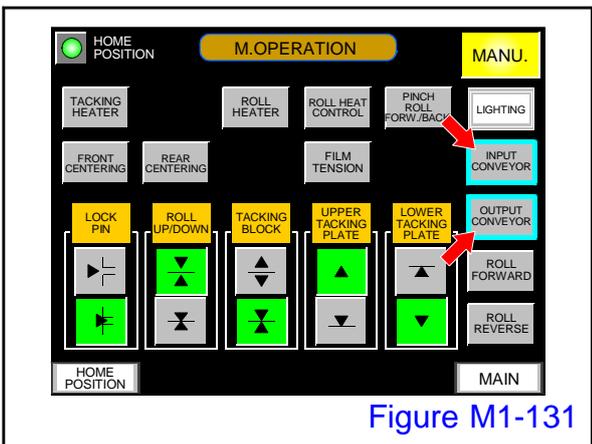


Figure M1-131

9. On the M.OPERATION screen, turn on the "INPUT CONVEYOR" and "OUTPUT CONVEYOR" buttons and confirm that the conveyor turns smoothly.

With the above, adjustment of the crossed helical gear is completed, but we recommend that you perform grease up as necessary. For grease-up, refer to "1.3.8. Lubrication in the machine".

1.3.17. Checking and adjustment the drive belt tension

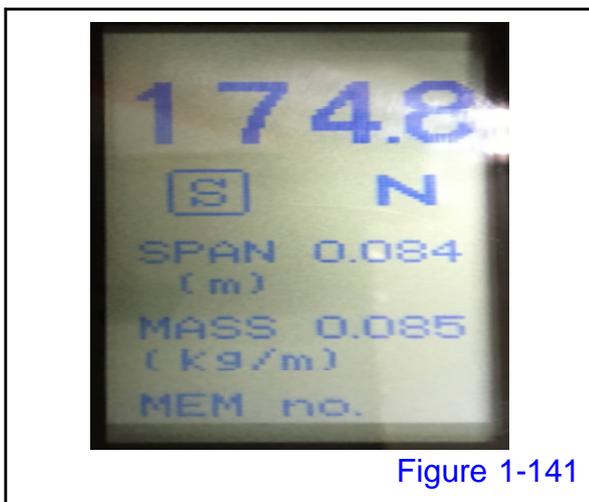
In this device, there are several places where the drive belt is used as a method of transmitting the driving force from the drive source.

Measure the amount of slack in the drive belt at least once every 6 months and if not appropriate, adjust the tension.

Please prepare the following tools for checking and adjustment the tension of the drive belt.

- Allen key set
- Spanner set
- Belt Tension Meter (TSUTUKI BDTM101)

In this machine, the following measuring instruments are used as a tool for measuring belt tension.



For SPAN and MASS settings, set the numerical value of the "Belt proper tension table" below.

Belt proper tension table

No.	Driving point	Use	SPAN (m)	MASS	Proper value
1	Tacking block Open / Clorse	4	0.261	0.085*	170 ~ 190
2	Lower backup roll rotation	1	0.081	0.085*	170 ~ 190
3	Cutter module running	2	1.050	0.017	20 ~ 40
4	Cutter rotation	2	1.000	0.03	30 ~ 50

*For serial number # 508 and later, the MASS value is 0.088.

Checking and adjustment procedure

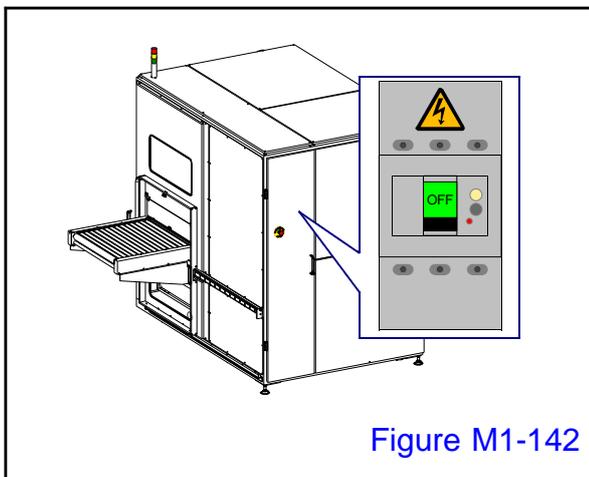


Figure M1-142

1. Turn OFF the main circuit breaker and turn off the machine.
 - Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.



Figure M1-143

2. As for the measurement method, play the belt with your fingers and measure the frequency with the belt tension meter. Compare the measurement result with the belt proper tension table.

If the measured value is lower than the table, increase the tension.

If the measured value is higher than the table, weaken the tension.

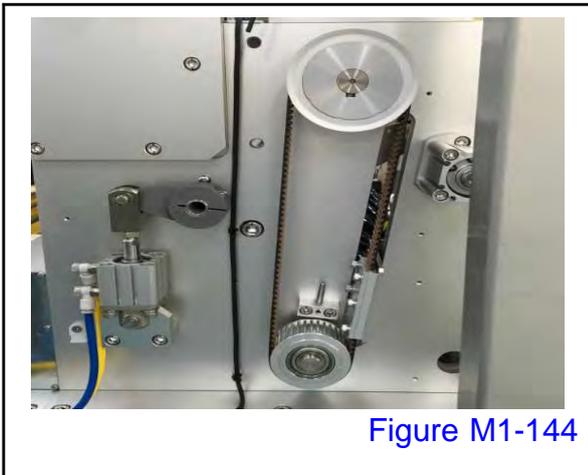


Figure M1-144

Adjustment of tackin block driving belt

①

Remove the aluminum cover to see the drive pulley and belt.

- The same thing is on the outside of the main body side plate, there are a total of 4 places on the front side upper and lower and the back side upper and lower. (On the back side, the drive motor is mounted with a coupling.)

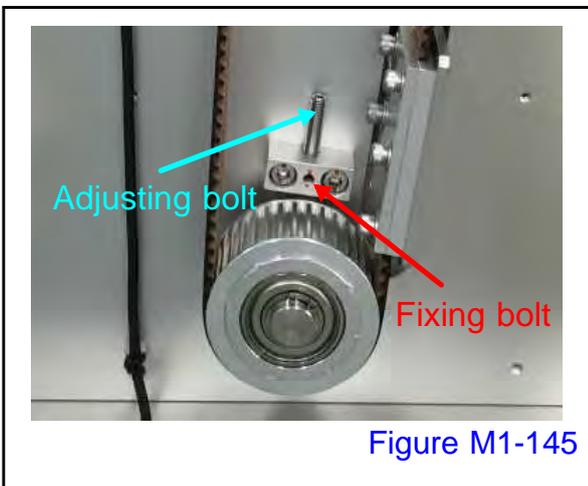


Figure M1-145

②

Loosen the set screw for fixing (red arrow) and adjust the tension pulley with the adjustment screw.

- Before adjustment, it is necessary to loosen the fixing bolt of the tension pulley. The fixing bolt is stopped from the inside of the main body side plate.

After adjustment, tighten the loosened set screw, pulley fixing bolt and fix it.

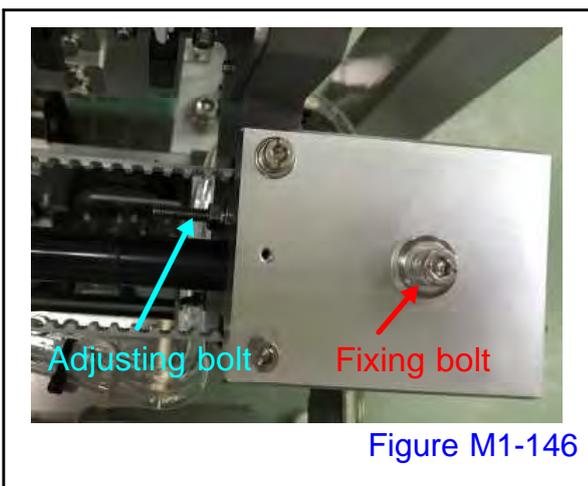


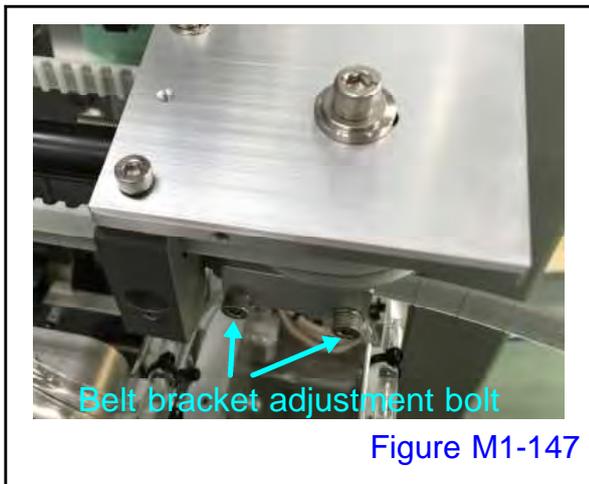
Figure M1-146

Adjustment of Cutter module running belt

Remove the cover of the cutter part and loosen the adjusting bolt (blue arrow).

Loosen the lock nut of the fixing bolt (red arrow) and adjust with the adjustment bolt.

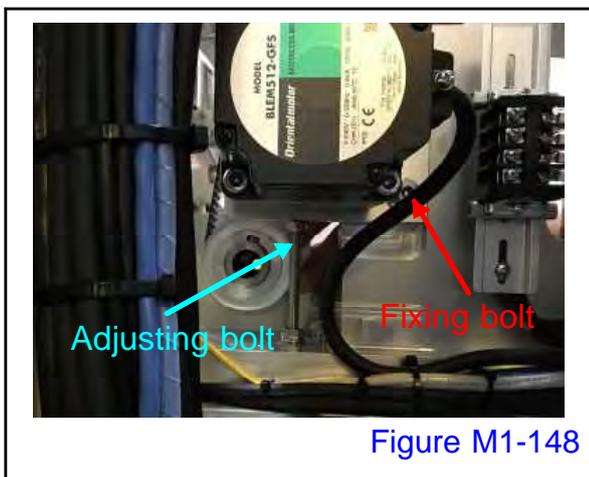
After adjustment, tighten the loosened bolts and nuts.



Adjustment of cutter rotating belt

Loosen the cap bolt of the bracket that sandwiches the cutter rotating belt.

Adjust the tension of the belt and tighten the bolts again to fix.



Adjustment of lower backup roll rotating belt

Loosen the two fixing cap bolts (red arrows) of the motor section and turn the adjustment nut (blue arrow) to adjust.

After adjustment, fix the two fixing bolts (red arrow) of the motor section.

After tension adjustment, be sure to rotate manually before reconfirming.
The adjustment of the drive belt is over with the above.

1.3.18. Checking and adjustment the gap of toothless gear wheel

Toothless gear wheel is used as a means to transmit the driving of the PWB feed roller between the input conveyors A and B and between the laminate roll module and the output conveyor.

Please check once or more every 6 months whether there is no gap or breakage, and if it is not appropriate, please adjust and exchange.

Please prepare the following tools for Checking and adjustment the gap of toothless gear wheel

- Allen key set
- 1mmBlock gauge

Checking and adjustment procedure

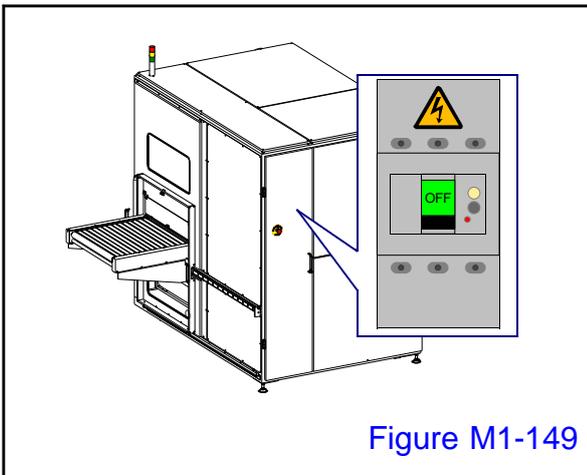


Figure M1-149

1. Turn OFF the main circuit breaker and turn off the machine.
 - Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

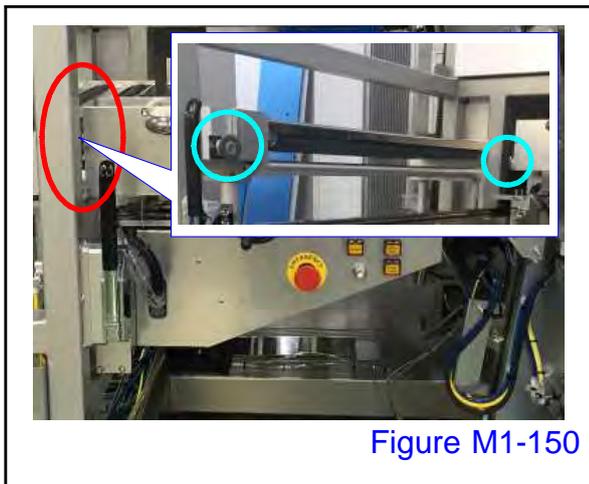


Figure M1-150

2.

Indicates the position (circle) of the input conveyor driven Toothless gear wheel.

The input conveyor is divided into a fixed part A and a movable part B, and it is used for the drive transmission part of A and B.

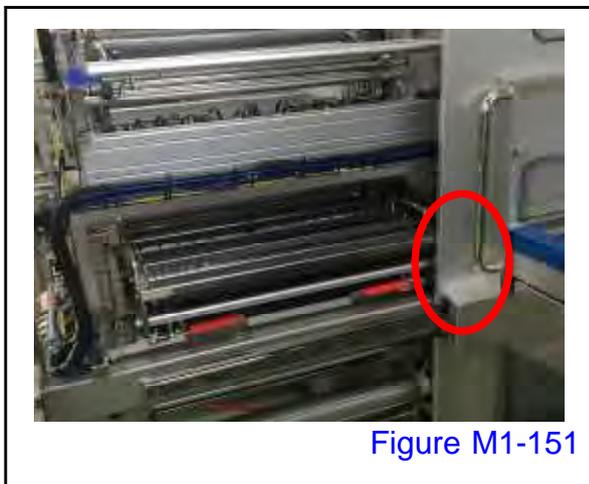


Figure M1-151

3.

Indicates the position (circle) of the output conveyor Toothless gear wheel.

The output conveyor receives the driving force from the laminate module. It is used for the drive transmission of laminate roll module and output conveyor.

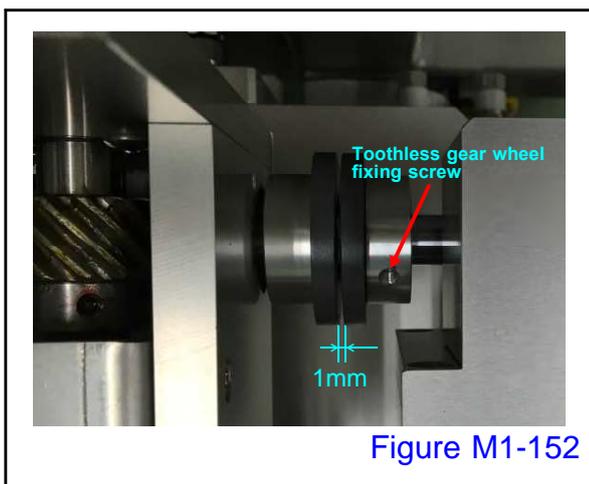


Figure M1-152

4.

It explain about the Toothless gear wheel of the inlet conveyor section here.

Loosen the 2 set screws (red arrow) of the Toothless gear wheel and fix the set screw again by setting the gap with the Toothless gear wheel on the opposite side to 1 mm.

- It is easy to adjust by sandwiching 1 mm block gauge.

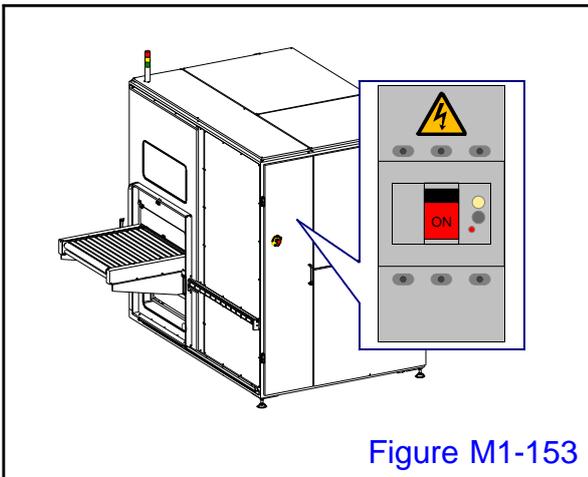


Figure M1-153

5. Turn ON the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.

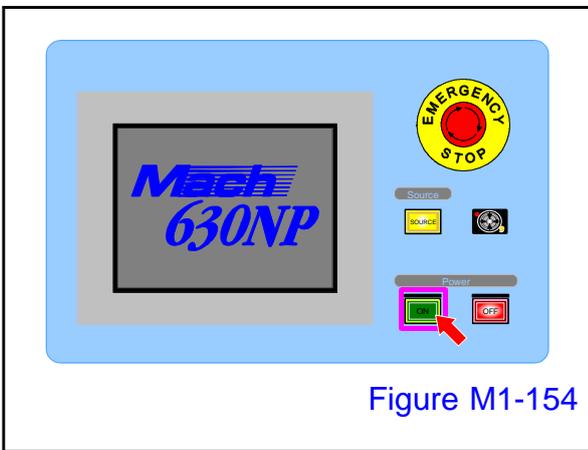


Figure M1-154

6. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

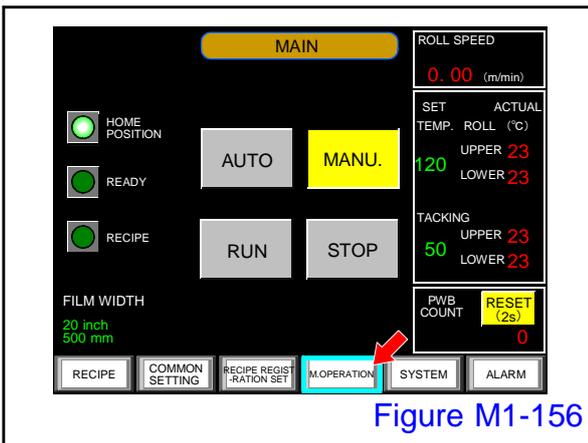


Figure M1-156

7. Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

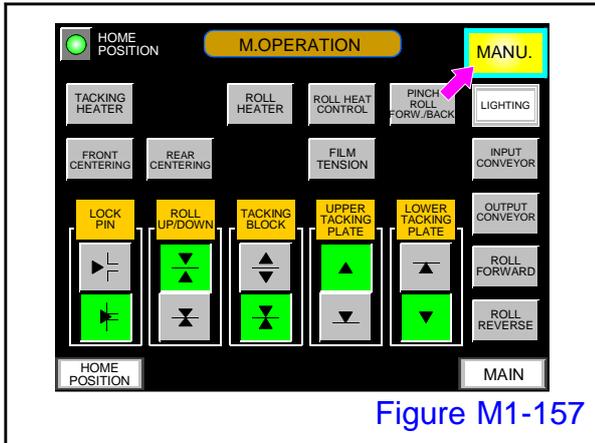


Figure M1-157

8.

Confirm that the "MANU." button on the M.OPERATION screen is lit. If it is not lit, please push the button to light it

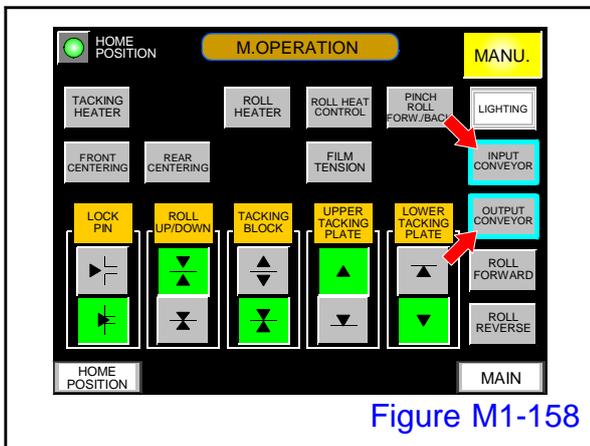


Figure M1-158

9.

On the M.OPERATION screen, turn on the "INPUT CONVEYOR" and "OUTPUT CONVEYOR" buttons and confirm that the conveyor turns smoothly.

Adjustment of Toothless gear wheel is an end above.

2. Inspection and replacement of consumables parts

This section explains the inspection and replacement procedures of consumables parts that require periodic replacement. Follow the procedures in this chapter to perform safe and reliable replacement work.

2.1. Consumable parts table

It is a list of consumable parts that require confirmation by periodic replacement or periodic inspection.

Consumable parts are those parts that are expected to be consumed within a year when operating the equipment for 48 hours a week (8 hours a day).

【 Consumable parts table 】

	Name	Parts number.	Reference	
1	Laminate roll	M1B0411A1	2.2.1.	
2	Backup roll heater	Upper Lower	M1B2252A1 M1B2251A1	2.2.2.
3	Tacking rubberr	11503535	2.2.3.	
4	Tacking heater	142024	2.2.3.	
7	Cutter blade	044022	2.2.4.	
8	Line filter for adsorption destruction	Body Element	4400253A1 4400253A3	2.2.5.
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				



The part number of consumable parts table will be changed according to customer's specification. Please contact Hakuto Co., Ltd. or a distributor along with the serial number of the machine.

2.2. Replacement of Consumable Parts

2.2.1. Replacement of the Laminating Roll

Damage such as scratches on the surface of the laminate roll will lead to deterioration of the product PWBs quality.

Regularly check the cleaning, surface condition, pressurization condition of the laminate roll and change it if any deterioration is observed.

The timing of replacement can not be unequivocally determined depending on the material, width, thickness, and application of the PWBs being produced, but please change it approximately once every 1 to 3 months as a guide.

It is also recommended to dedicate the laminate rolls according to the width and thickness of the board, and always prepare several kinds of laminate rolls at all times.

Please prepare the following tools to replace the laminate roll.

- Clean cloth
- Ethanol
- Heat-resistant glove for clean room



If replacing the laminate roll from immediately after use (the device is ready for automatic operation), steps 1 and 2 are not necessary.

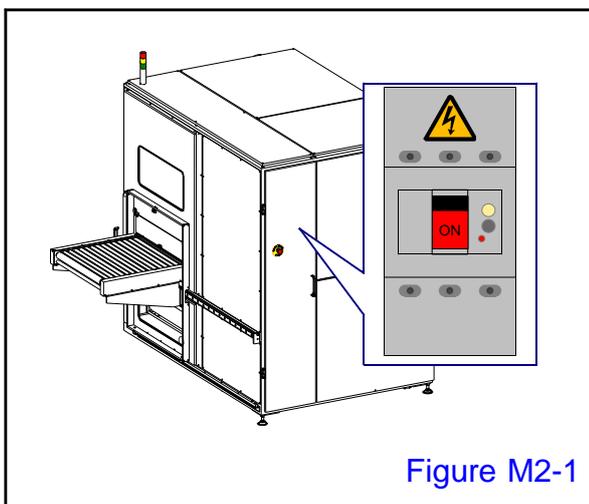


Figure M2-1

1.
Turn on the main circuit breaker and supply power to the machine.

- The SOURCE lamp on the control panel will light up.
- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.

Maintenance

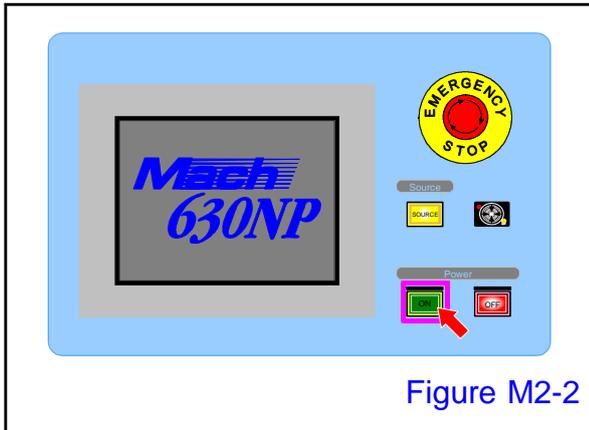


Figure M2-2

2.

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

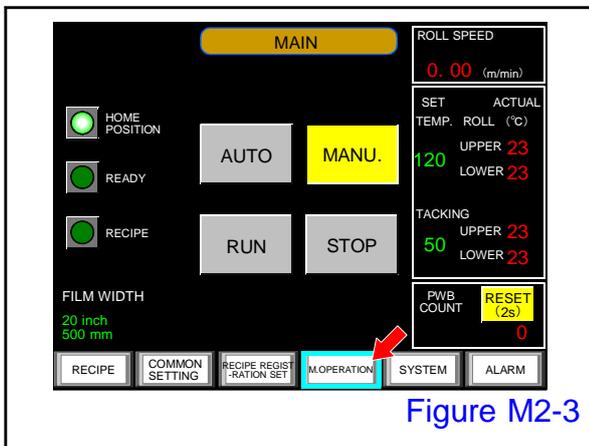


Figure M2-3

3.

Push the "M. OPERATION" button on the MAIN screen.

- Display the M.OPERATION screen.

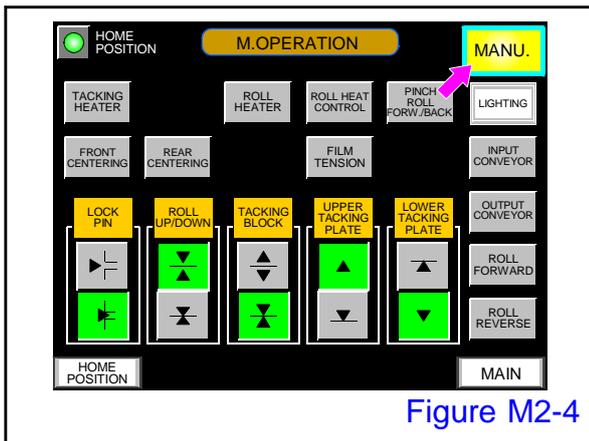


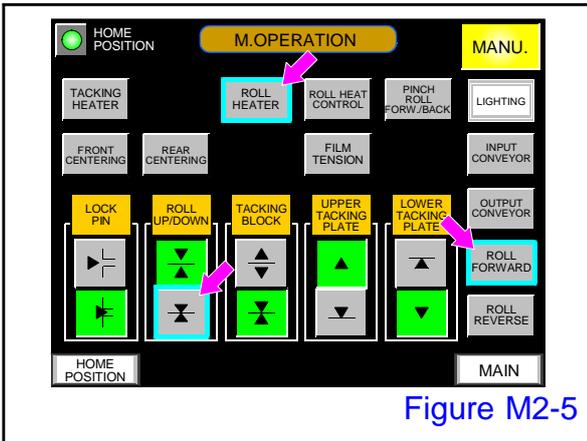
Figure M2-4

4.

Confirm that the "MANU." button on the M.OPERATION screen is lit.

If it is not lit, please push the button to light it

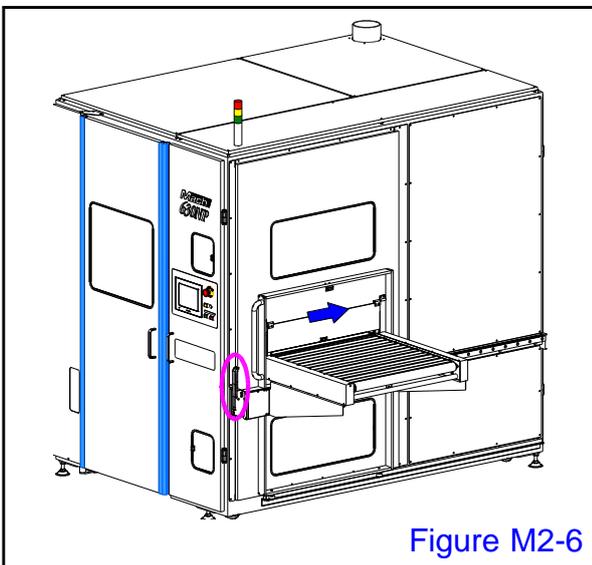
Maintenance



5.

Make sure that "ROLL HEAT CONTROL", "ROLL HEATER", "ROLL FORWARD" and "ROLL UP/DOWN" buttons are OFF.

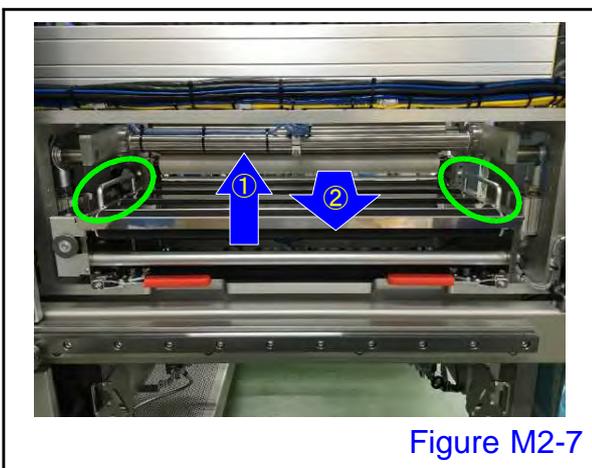
If it is not OFF, turn it OFF.



6.

Unlock the output conveyor and move to the film set position.

- Move the output conveyor until it hit the magnet catch.
- It can see the laminate roll from the back side of the laminate unit in the place where the exit conveyor was located.



7.

Remove the Auxiliary plate

In the thin plate specification apparatus, there is an auxiliary plate between the rollers.

Grasp the handle (circle) and lift it upward, pull it out to remove it.



NOTE

For equipment not equipped with Auxiliary plate for thin plate specification, this work is not necessary.

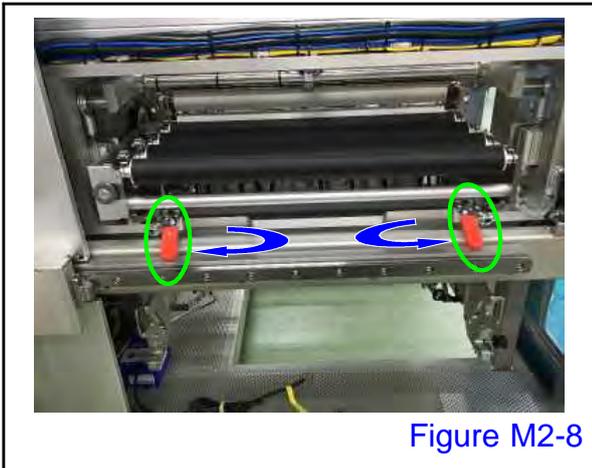


Figure M2-8

8.

Rotate the release handle lever of the laminate roll module to release it.

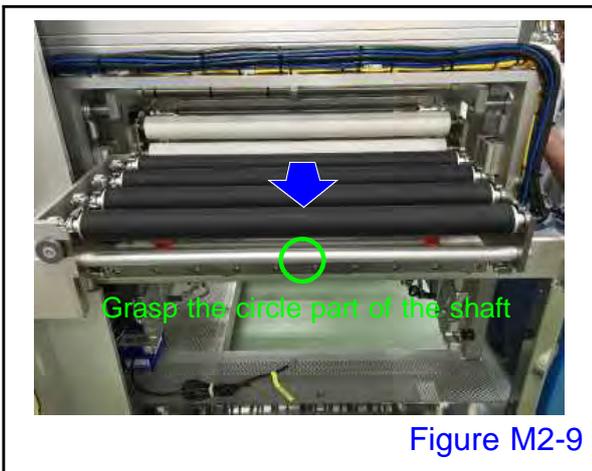


Figure M2-9

9.

Hold the center (circle) of the shaft of the laminate roll module and pull out the laminate roll module.

- Since the stopper is attached to the drawer end of the laminate roll module, pull it out until it hits the stopper.
- The laminate roll module never falls.

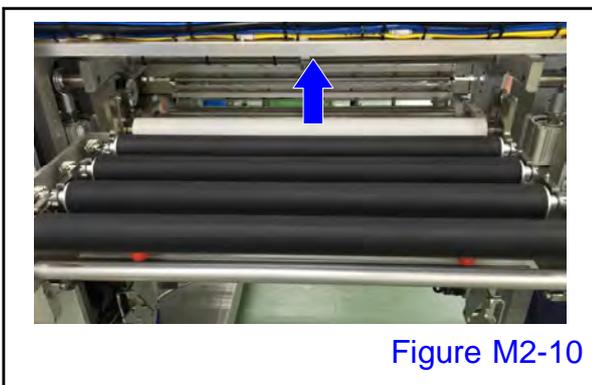


Figure M2-10

10.

Lift the upper side of the laminate roll up and remove it.

- Laminating rolls may not be completely cold yet.
Protect your hands with gloves etc.

Maintenance

WARNING



The laminate roll is hot.

Clean up work after checking that it has cooled enough.
Also, please wear Heat-resistant glove for clean room for safety.

CAUTION



When removing the laminate roll, remove the rubber part especially with care so as not to come in contact with other parts etc, so as not to scratch the rubber surface.



Figure M2-11

11.

Remove the bearings supporting the upper laminate roll upwards on both left and right sides. (Red circle)

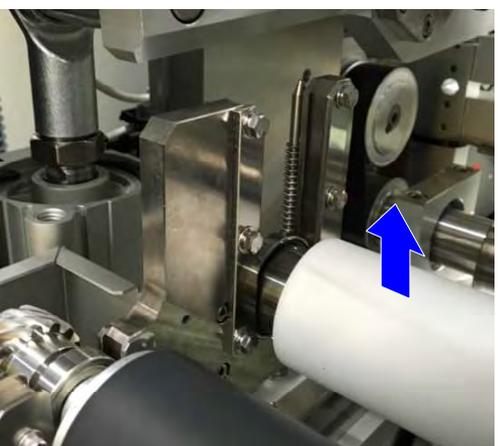


Figure M2-12

12.

Remove the lower laminate roll upward.

Maintenance

13.

Assemble is done in reverse order of removal.

There is no place where adjustment is necessary.

After assemble, clean the laminate roll surface by moistening the ethanol with the clean cloth.

CAUTION



When setting the laminate roll module in the machine, push firmly until it hits the rail stopper.

Also, lock the released lock lever completely.

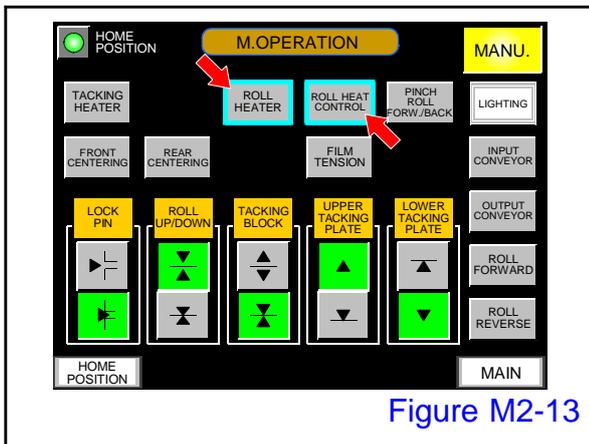


Figure M2-13

14.

Turn on the "ROLL HEATER" and "ROLL HEAT CONTROL" buttons on the M.OPERATION screen and heat up the laminate roll.

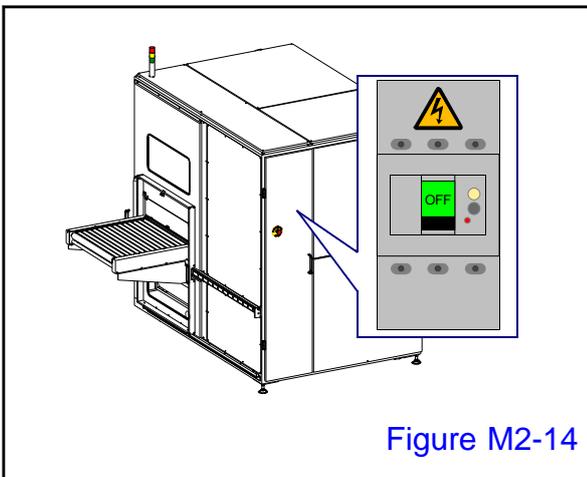
The replacement of the laminating roll is end above.

2.2.2. Replacement of the Backup Roll Heater

To replace the roll heater, prepare the following tools.

- Phillips screwdriver
- Nippers
- Allen wrench set
- permanent marker
- Curing tape
- Cable tie

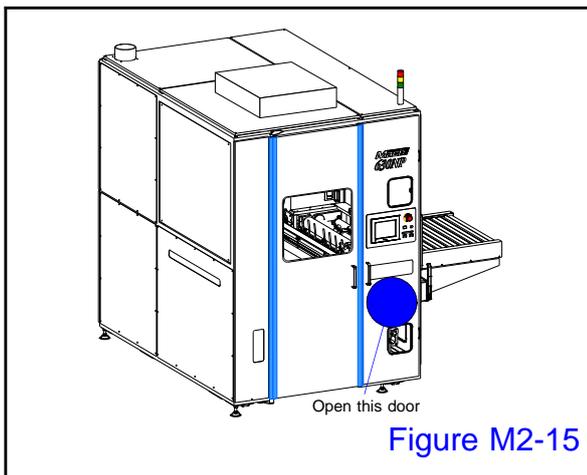
Replacement procedure



1.

Turn off the main circuit breaker and turn off the machine.

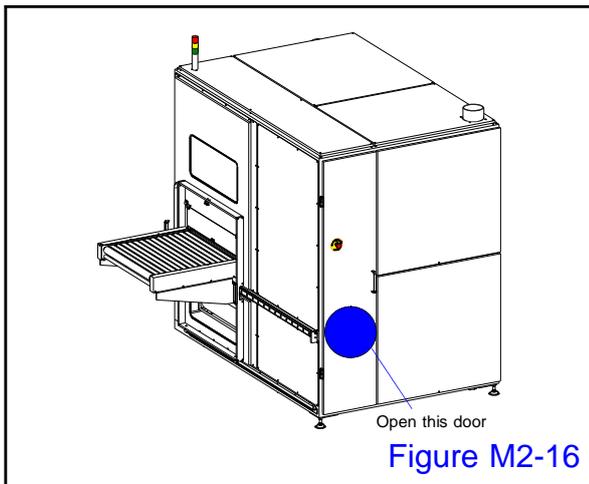
- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.



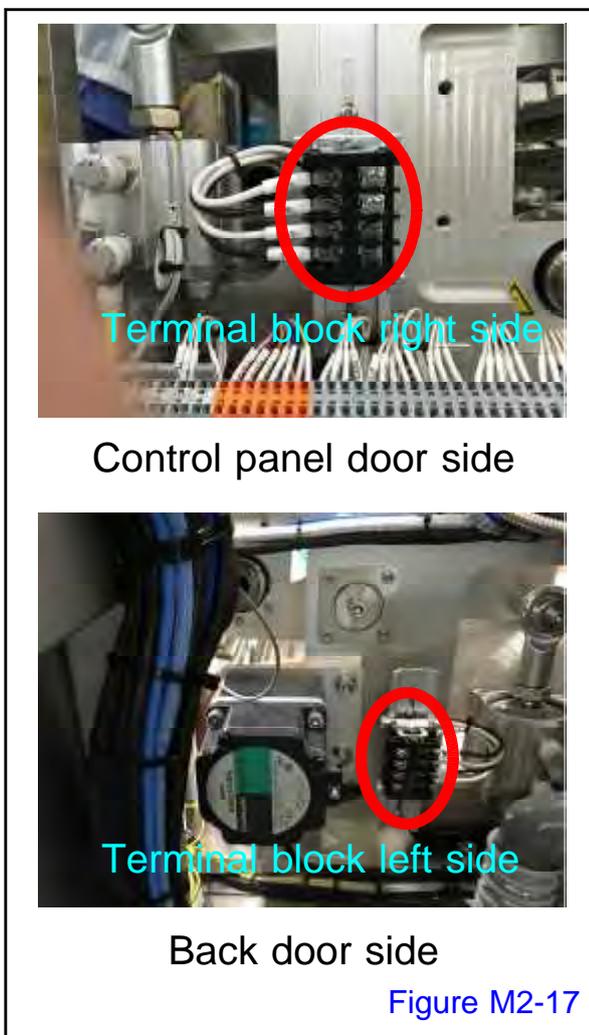
2.

Open the control panel door (circle).

Maintenance



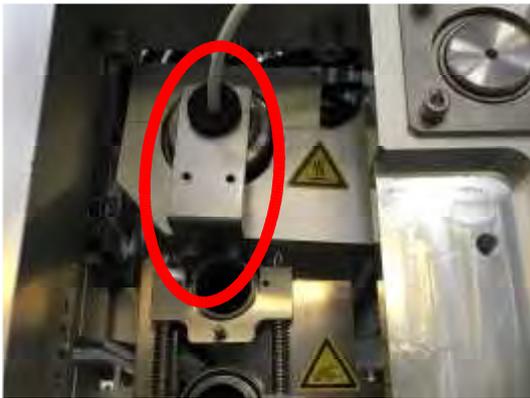
3. Open the back door



4. Remove the wiring from the roll heater from the terminal block with a Phillips screwdriver. (Inside red circle)

- The roll heater wiring is fixed with a cable tie. Cut the cable tie with a nipper. Also, when assembling, fix with cable tie in the same way.

Maintenance



Upper side



Lower side

Figure M2-18

5.

Using a allen wrench, remove the roll heater fixing bracket.

- Before removing the bracket, mark the position of the bracket attachment with an permanent marker etc.

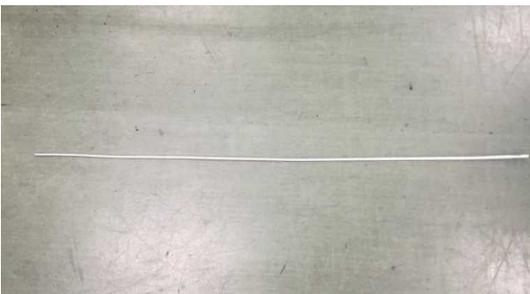


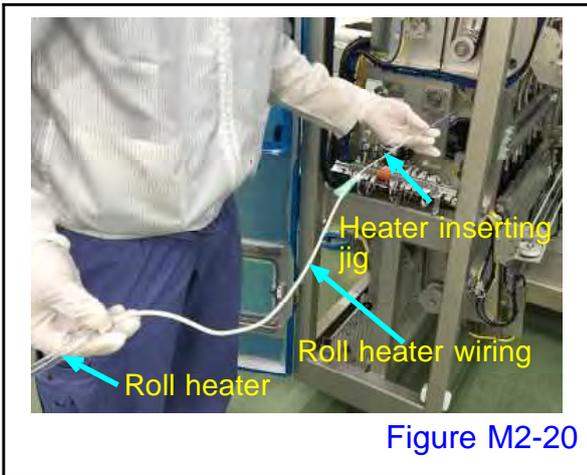
Figure M2-19

6.

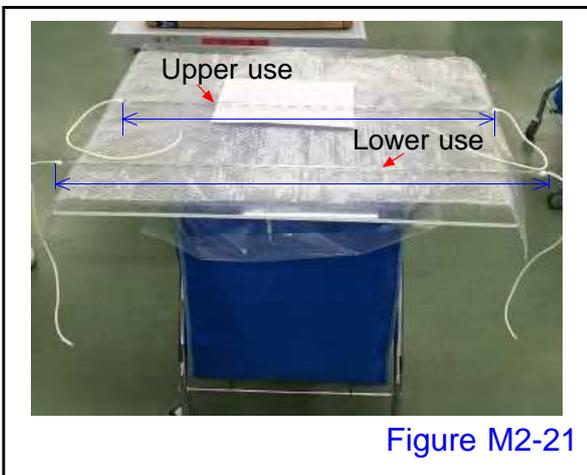
To the wiring of the roll heater removed on the back door side, fix and attach the Heater inserting jig(4 Φ x 1000 mm aluminum pipe) with adhesive tape etc.

- The Heater inserting jig is to minimize the contact of the heater with the backup roll hole when inserting / removing the heater.

Maintenance



7. Pull out the roll heater from the backup roll.



There are differences in the length of the roll heater for upper and lower use. (The upper side is shorter than the lower side.)

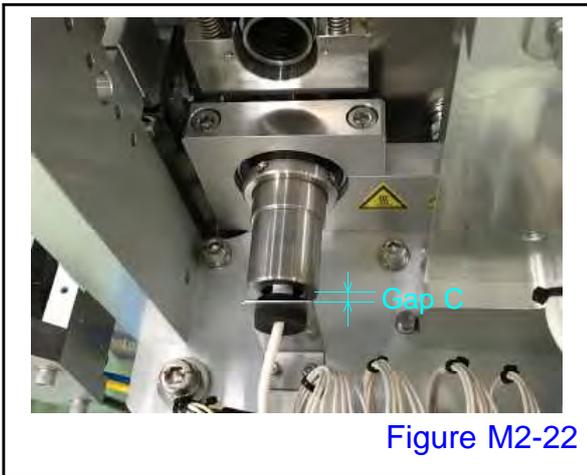
CAUTION



The roll heater is an infrared heater made of glass tube. Please handle with great care.

8. When assembling the roll heater, insert it in the hole of the backup roll in the reverse order to 5.6.

Maintenance



9.

Assemble so that there is a gap between the backup roll shaft and the heater stopper (black part).

Gap C = 8 mm

Replacement of a roll heater is an end above.

2.2.3. Replacement of the Tacking Rubber and Tacking Heater

Degradation such as scratches on the surface of tacking rubber leads to deteriorated product PWB quality.

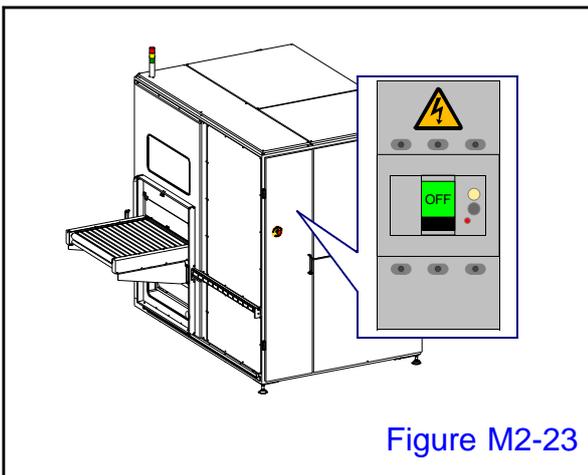
Check the surface condition of tacking rubber every day and change it if any deterioration is seen.

Also, measure the temperature distribution monthly for tacking heater and tacking rubber, replace it if there is temperature unevenness.

Prepare the following tools for replacing tacking rubber, tacking heater, temperature sensor.

- Phillips screwdriver
- 4 mm Allen wrench
- Nippers
- Silicon grease YG6111
- M5 socket head
(Stem length 20 mm or more)
- Clean cloth
- Gloves
- Ethanol
- Cable tie

Removal procedure



1. Turn off the main circuit breaker and turn off the machine.

- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

WARNING



Near the tacking heater is high temperature.
After turning off the power supply, wait at least 20 minutes and check that it is enough cooled before proceeding.
In particular, care must be taken on the heater section exposed from the tacking rubber.

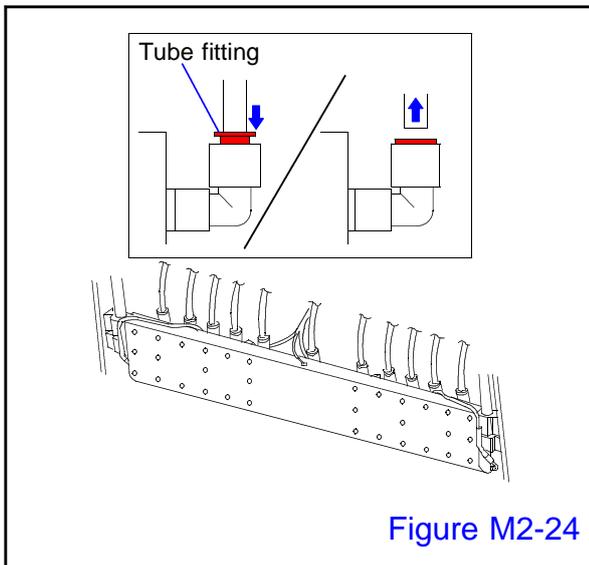


NOTE

Here, explain the procedure for replacing the upper tacking plate.
Refer to the procedure on the upper tacking plate for the replacement procedure for the lower tacking

2.

Open the front door and move the input conveyor B to the film setting position.
Also, output conveyor move to the film set position in the same way.
Remove the DF unit.



3.

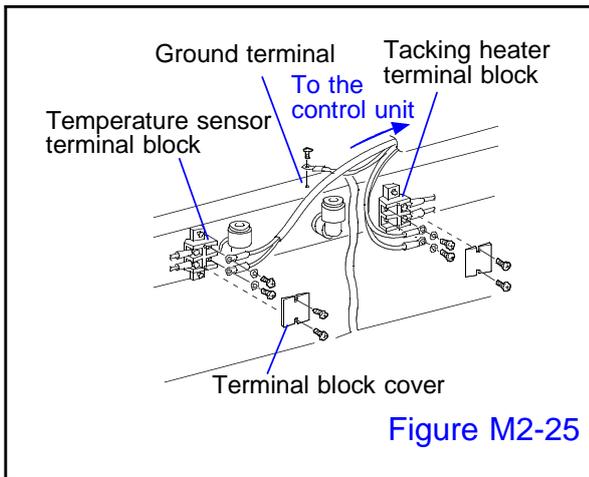
Remove the air tube (11 pieces) of the tacking plate from the tube fitting.
Push down on the red part of the tube fitting in Figure M2-24 and pull out the air tube.



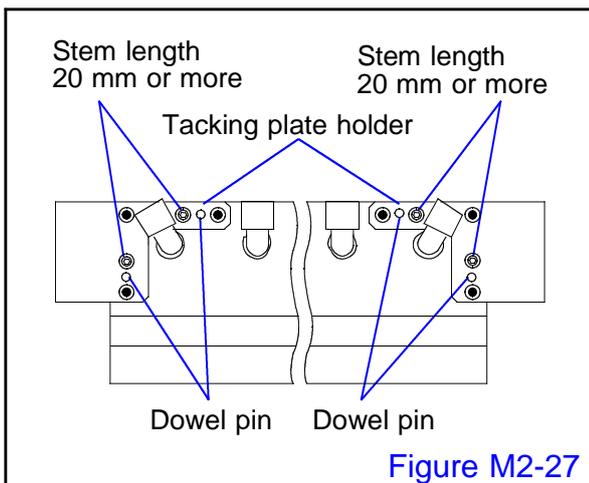
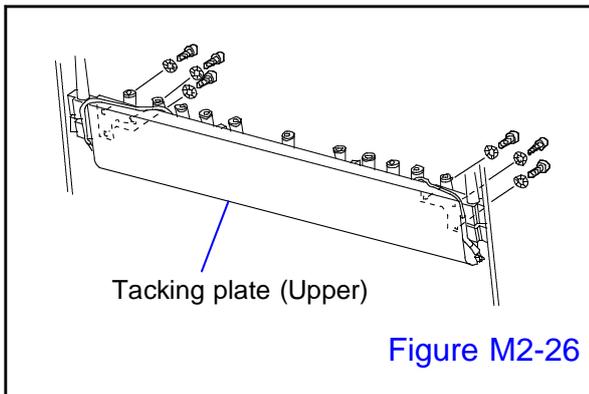
NOTE

Be careful not to mistake the tube mounting position during assembly.
Adsorption area of each tube is fixed.

Maintenance



- Cut the cable ties that gather wiring and tubes with nipper
When assembling, fix with the cable ties in the same way.



4. Remove the primary side terminals (wiring from the control panel) of the tacking heater and temperature sensor from the terminal block.
Remove the GND terminal from the tacking plate too.

- Be careful not to mistake the polarity of the tacking heater and temperature sensor during assembly.

5. Remove the tacking plate fixing bolt using the allen wrench.

- There are three fixing bolts on each side, and there are six in total on both sides.

6. Remove the tacking plate.

- Since the tacking plate is secured at the left and right two spots at the dowel pin, the tacking plate will not fall even if the fixing bolt is removed.
- Place the bolt in the place of the arrow marked "Stem length 20 mm or more" and tighten it with a allen wrench, the tacking plate disengages from the dowel pin, making removal of the tacking plate easier.

Maintenance

CAUTION



In case, There are some shim for adjustment between the Tacking plate and the Tacking holder.

When removing the tacking plate, record which side and how many shims are inserted.

Also, be careful not to forget to insert the shims when assembling.



NOTE

The film contact surface of a tacking plate should be careful not to make scratch etc.

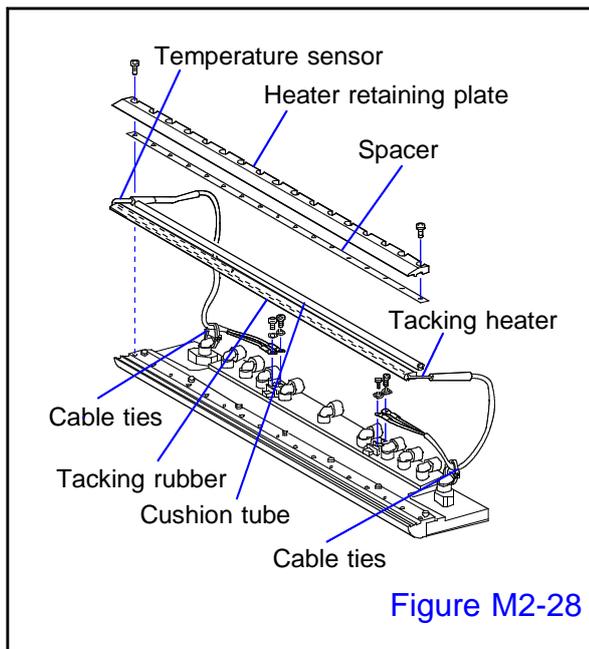


Figure M2-28

7.

Cut the cable tie fixing the cable for the tacking heater and temperature sensor.

Remove the screws of the heater retaining plate, the tacking heater terminal, and the temperature sensor terminal, and remove the tacking rubber, tacking heater, temperature sensor, spacer, cushion rubber.

- Pull out the tacking heater and temperature sensor from the tack rubber and replace it.
- When assembling, fix with the new cable tie in the same place as the removing cable tie.

- The tacking heater and the temperature sensor are coated with silicone grease.

Wet ethanol with a clean cloth and clean the surface.



NOTE

Pay attention to breakage and loss of the spacer.

Assembling procedure

Parts number	Tacking rubber	#11503535
	Tacking heater	#142024
	Temperature sensor	#106008

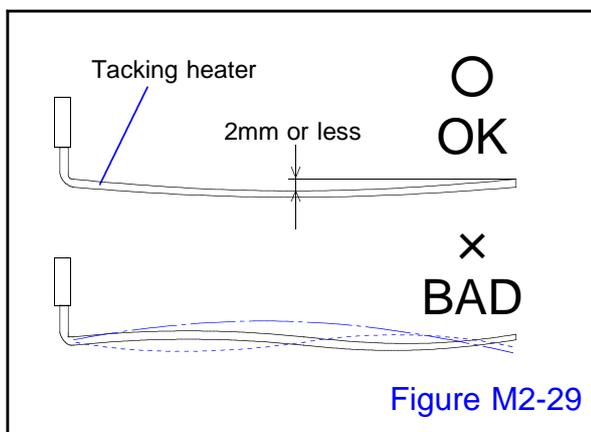
1.

When assembling the tacking heater and the temperature sensor, apply silicone grease uniformly to both the tacking heater and the temperature sensor to increase the thermal conductivity.



NOTE

- Silicone grease applied to the tacking heater and the temperature sensor makes hands dirty. Wear gloves is recommended.
- Apply heat conductive material sufficiently evenly. There is a risk of adversely affecting the temperature distribution.
- After inserting the heater into the tacking rubber, please be sure to wipe off extra conductive material with a clean cloth etc.
- Silicon grease :
Momentive Performance Materials Inc. YG6111
Part number of Hakuto P/N 055002

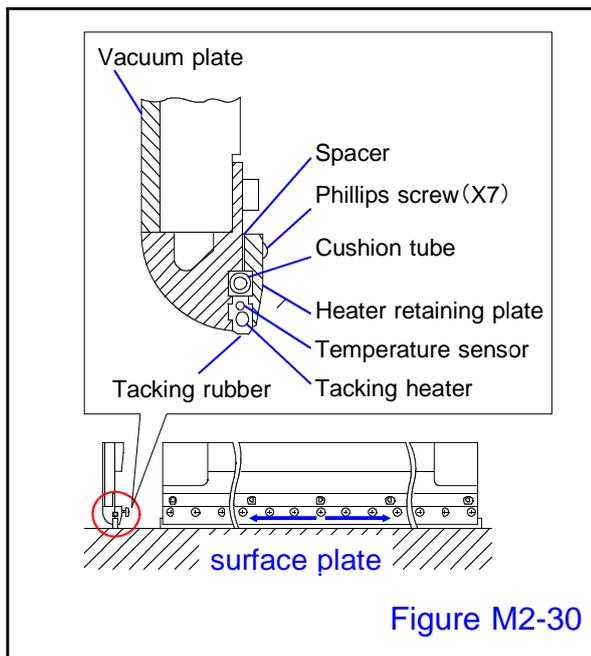


2.

Pay attention to bending of the tacking heater and temperature sensor.

- Fix the tacking heater and temperature sensor so that the bending is within 2 mm and insert it in tacking rubber without bending.

Maintenance



3.

When assembling the tacking plate, refer to the Figure M2-30 on the left, stand up vertically on the surface plate after temporary assembly of each part, tighten the Phillips screws of the heater retaining plate in order from the center to the outside and fix.

- In order to prevent distortion of tacking rubber, be sure to tighten the screw by the above procedure.

Attach so that the tacking surface of the tacking rubber hits the surface plate uniformly.

4.

Assemble the tacking plate in reverse order as when removing the tacking plate.

- Be careful not to mistake the connection of the terminal and the air tube.

2.2.4. Replacement of the Cutter Brade

The cutter blade is a consumable item.

In the Inspection item "1.3.3. Cleaning of the Cutter Blade", replace when it seems necessary to replace the cutter blade.

WARNING



The cutter blade is a sharp knife.

Be fully careful of the handling of a cutter brade.

When handling the cutter blade, be sure to hold the part other than around the circle.

Also, wear something that protects your hands such as gloves.

Prepare the following tools to replace the cutter blade.

- 2.5mm Allen wrench x2
- Glove

Replacement procedure

- The part number is # 044022.

1.

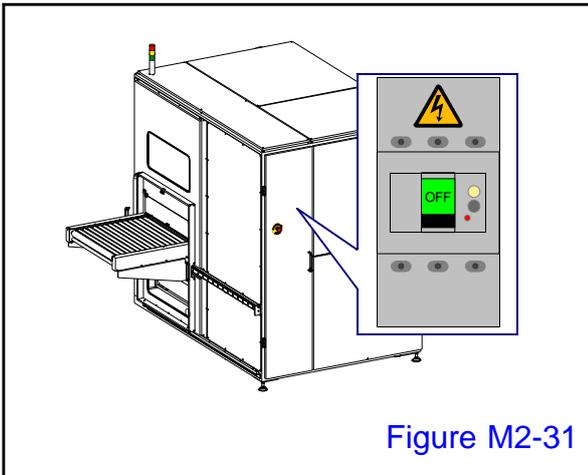
Move the tacking block to the open position by manual operation.



NOTE

For the manual operation method, refer to "6. Manual operation" in Chapter 1 Operation.

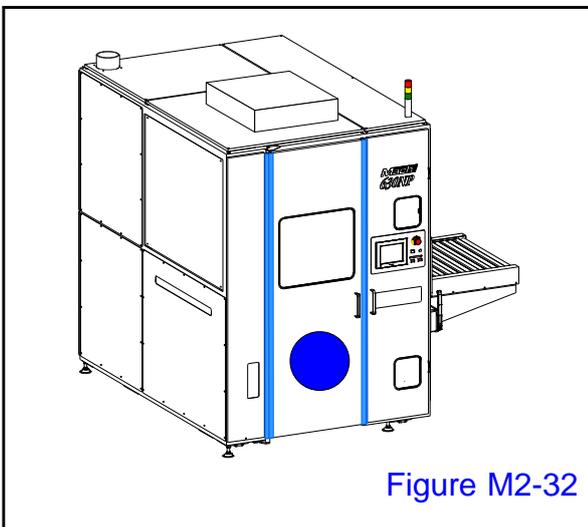
Maintenance



2.

Turn off the main circuit breaker and turn off the machine.

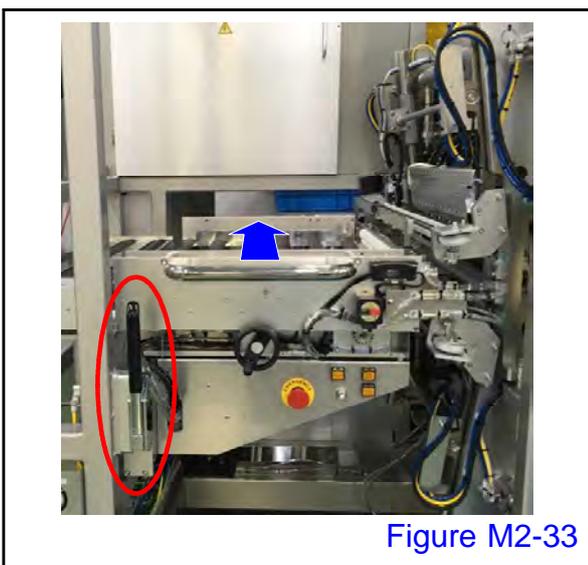
- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.



3.

Open the front door.

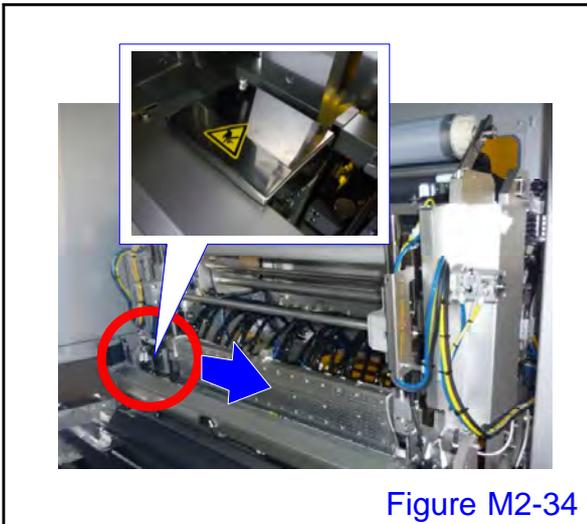
- There is an input conveyor B in front.



4.

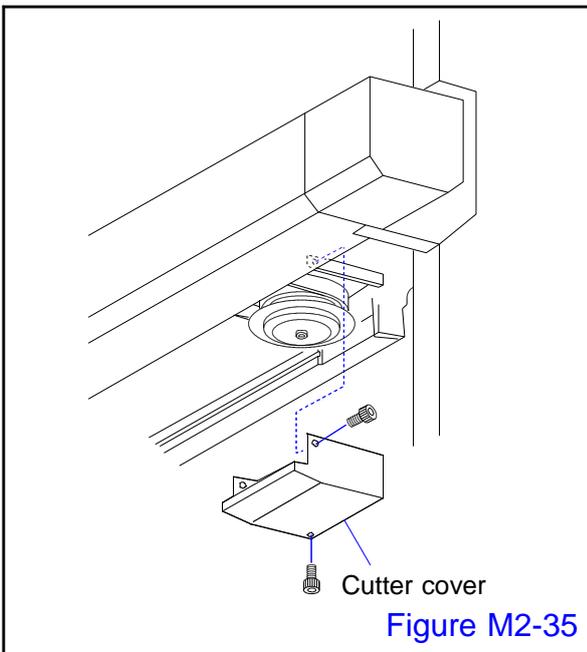
Operate the fixing release lever (red circle) of the input conveyor B to release the conveyor fixing, and then move the input conveyor B to the film setting position.

Maintenance



5.

If the cutter module is on the far side, move it by hand to operation side.

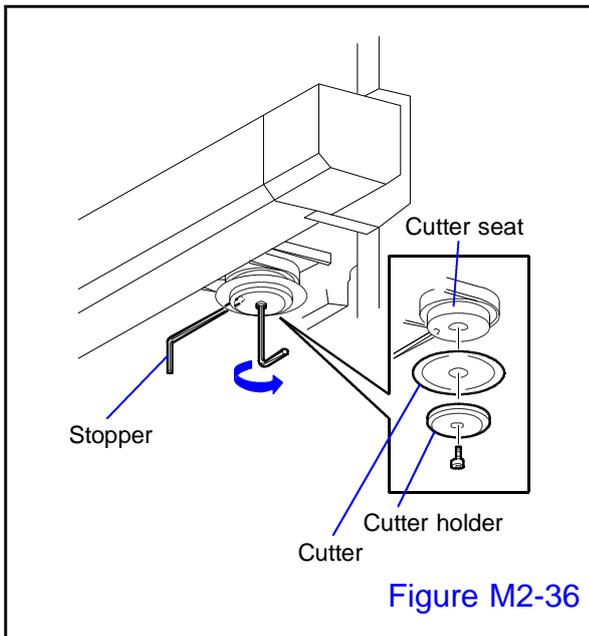


6.

Remove the cover of the cutter module.

- Move the cutter module by hand to the position where the allen wrench is easy to insert.
- Remove 2 M3 cap bolts with 2.5 mm allen wrench.

Maintenance



7.

Remove the cutter blade and cutter holder.

- Insert a 2.5 mm Allen wrench into the hole beside the Cutter seat, fix the cutter module so that it does not rotate, and remove the M3 cap bolt at the center of the cutter holder with another 2.5 mm Allen wrench .



When removing the cutter blade, confirm that the cutter blade is in a position not interfering with the cutter backup groove.

If the circumference part of the cutter blade is in the groove of the cutter backup, the cutter will not come off or the blade will spill due to interference.

CAUTION



Removing the cutter holder makes the cutter blade fall and it is very dangerous.

Keep removing the cutter blade on the cutter holder and carefully remove it.



The cutter blade can not be regrind.

When grinding, the diameter of the cutter blade changes, the positional relationship with the groove of the cutter backup changes when the cutter blade is attached, it will not be cut.

Maintenance

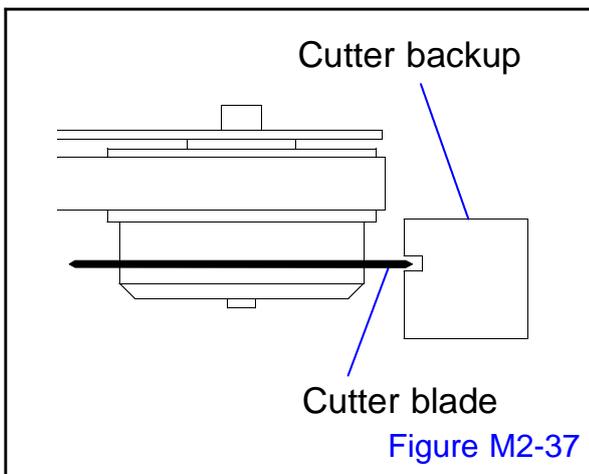
WARNING



The exchanged cutter blade is still a sharp knife. Handle with great care and dispose according to local disposal rules.

8.

Prepare a new cutter blade and assemble in reverse order of removal.



9.

Move the cutter module by hand, slowly reciprocate inside of the groove of the cutter backup, and confirm that it doesn't interfere with the cutter backup groove.

- If the cutter blade interferes with the cutter backup groove, for example when it is mounted obliquely, please disassemble the cutter module again and reassemble it. Normally, adjustment is unnecessary.

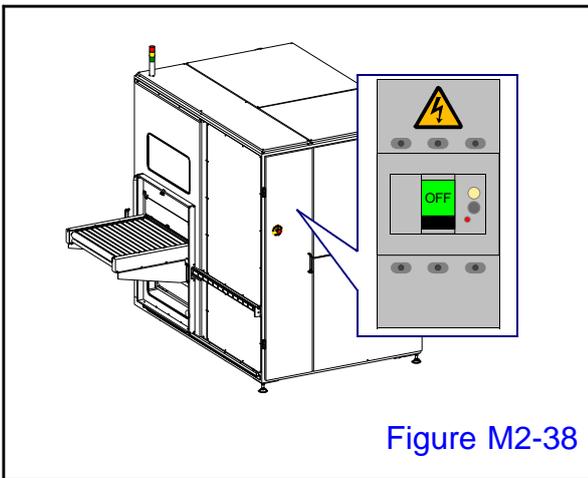
Replacement of the cutter blade is over with the above.

2.2.5. Replacement of the Adsorption breakdown Line filter

A line filter is used for the air outlet of the solenoid valve for adsorption destruction.

To maintain the performance of the machine, replace the line filter element at least once a year.

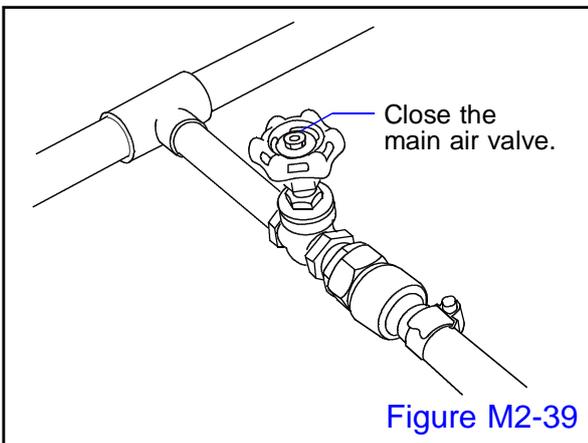
Removal procedure



1.

Turn off the main circuit breaker and turn off the machine.

- Paste the "power-on prohibited" tag on the main breaker so that nobody except the worker will turn on the power.

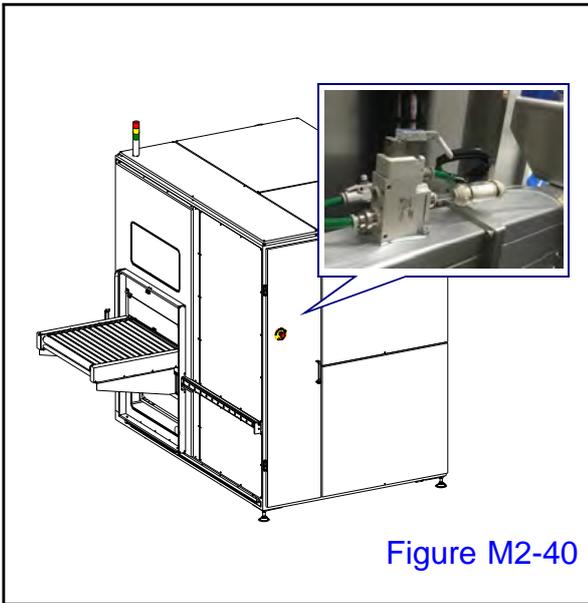


2.

Close the main valve of the air supplied to the equipment.

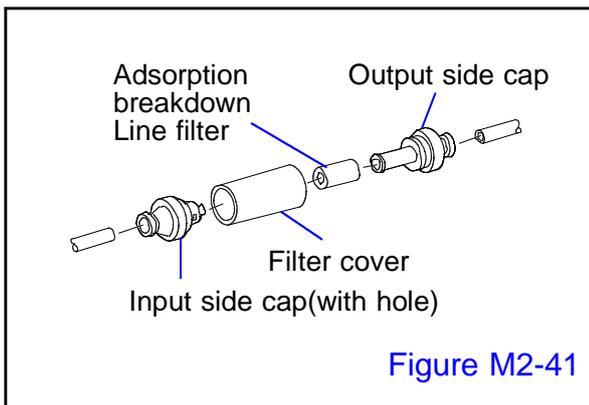
- Paste the "Air Supply Prohibited" tag in a place where it is easy to check so that nobody do not supply air.

Maintenance

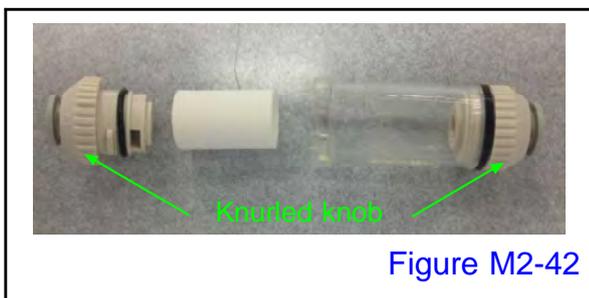


3.
Open the back door.

- There is a solenoid valve for vacuum leak on the vacuum header.
The line filter is connected to the air blowout port of the solenoid valve.



4.
Vacuum adsorption destruction Disconnect the tube on the input side and output side of the line filter unit and disassemble the filter unit.



Hold the left and right knurled knob of the line filter and turn it counterclockwise to disassemble it.

Assembling procedure

● Parts number

For 6mm tube Body #4400253A1 element #4400253A3

For 8mm tube Body #4400508A1 element #4400508A2

1.

Prepare and replace a new filter element.

After assembling the line filter, return it to the original piping.



The line filter has input side and output side, so please be careful when returning to the original piping.

There is a Δ mark on the output side.

3. Trouble shooting

Here, explain the contents of the alarm issued from this machine and how to deal with it.

Also, explain typical trouble of this machine and how to deal with them.

3.1. Processing when an alarm occurs

This machine has a function to stop the operation automatically when an abnormality occurs in the machine and display the error.

Errors are detected by the programmable logic controller (PLC).

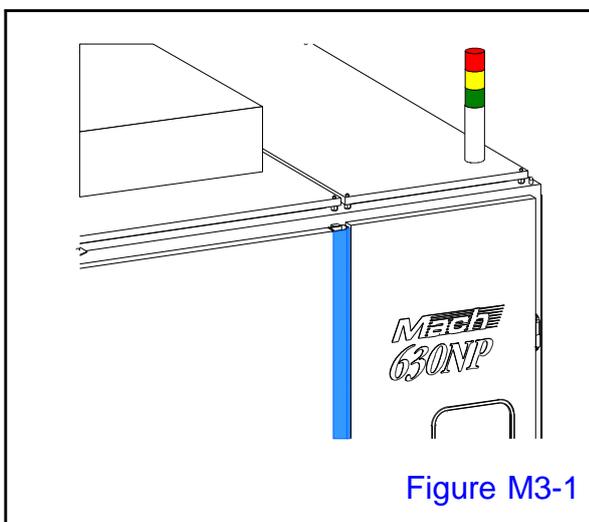
Errors detected by the programmable logic controller are informed to the operator with the "ALARM number" and "comment" on the ALARM screen with "buzzer sound" and "signal tower".

WARNING



If smoke, ignition, abnormal noise, odor occurs from the machine, please do not inadvertently touch the machine, please turn off the power promptly and contact Hakuto Co., Ltd. or your distributor.

3.1.1. Lighting status and contents of signal tower



RED lights

A failure has occurred in the machine. Take necessary actions immediately in accordance with the display on the alarm screen.

YELLOW lights

Manual mode is selected.

GREEN lights

The machine is in the automatic operation now.

GREEN blinking

It is preparing for automatic operation.

"RUN" button was pressed during automatic mode, but the temperature of the roll heater etc. has not reached the operation parameter setting value.

When the set value is reached, it turns green lighting.

3.1.2. Operation on the Alarm Screen

When an abnormality occurs in the machine, an alarm screen is displayed on the touch panel. Please follow the procedure below.

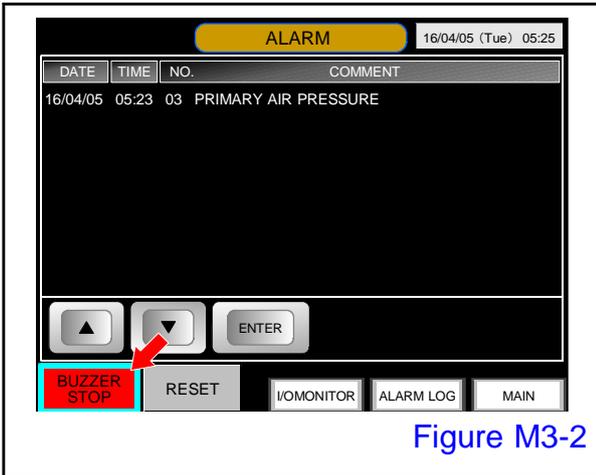


Figure M3-2

1. Display the number, the alarm comment, the date and the time when alarm is occurred. Even if multiple alarms occur simultaneously, everything will be displayed. Push the "buzzer stop" button on the alarm screen to stop the buzzer from ringing.

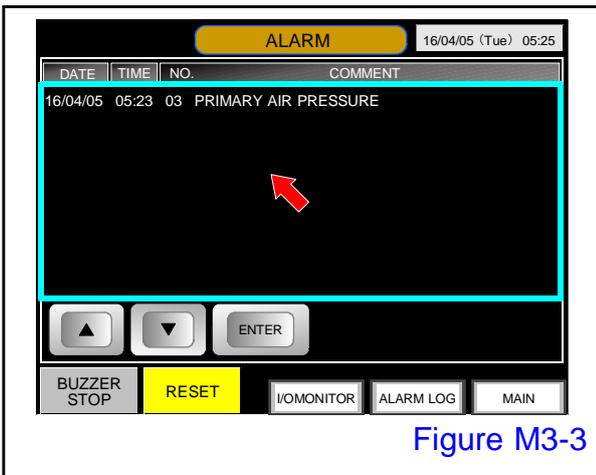


Figure M3-3

2. Push the alarm display area.
 - The alarm is selected and it is surrounded by a white frame.

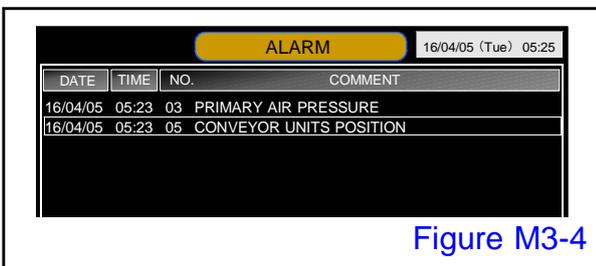


Figure M3-4

3. If more than one alarm has occurred, select it with "▲" "▼" button.

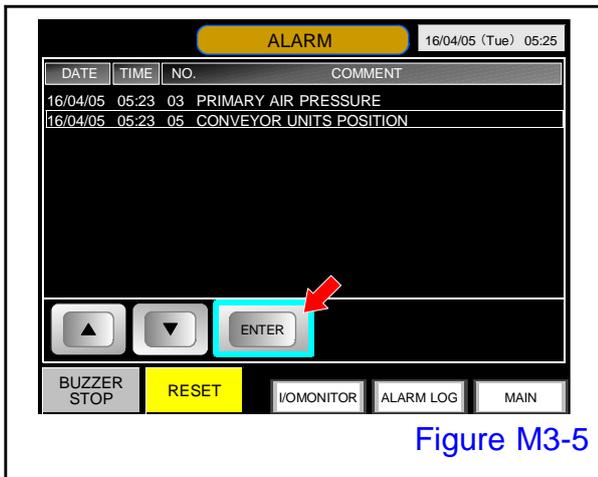


Figure M3-5

4. After selecting the alarm, push the "ENTER" button.

- Displays the remedy of the selected alarm.

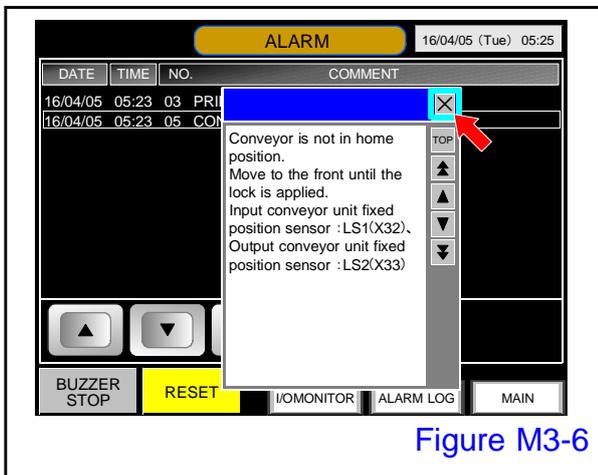


Figure M3-6

5. Check the cause of the alarm and take action.

To erase the remedy method display, push the "X" button at the upper right of the remedy method frame.

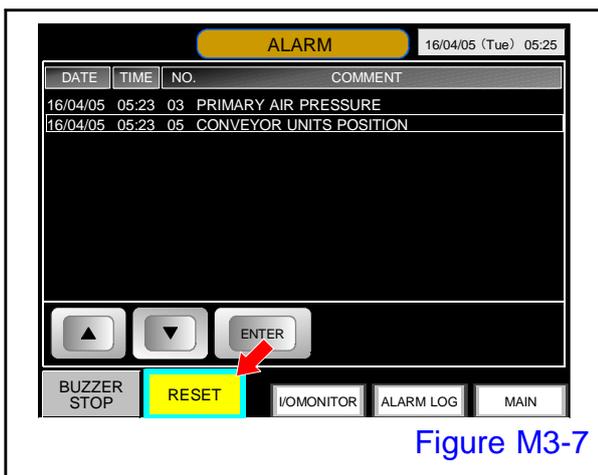


Figure M3-7

6. When alarm handling is completed, push the "RESET" button to reset the alarm.

- The alarm comment on the alarm screen is deleted.
 Be sure to perform alarm handling before resetting.

When referring to the history of previously generated alarms

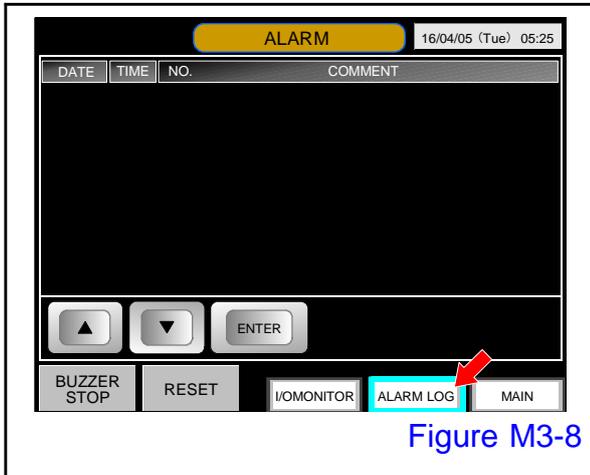


Figure M3-8

To refer to the history of previously generated alarms, press the "ALARM LOG" button on the alarm screen.

- The alarm history screen is displayed.

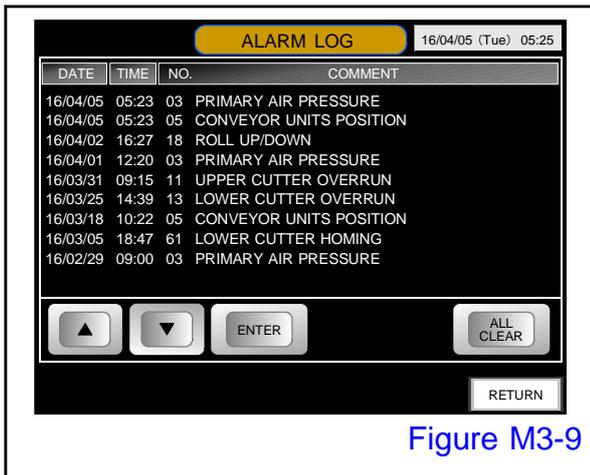


Figure M3-9

To display the ALARM LOG that is not displayed on the display section, press inside the alarm frame, display the cursor line, and then display it with the "▲" or "▼" button.



NOTE

On the ALARM LOG screen, you can display the remedy of alarms that occurred in the past. Select the alarm like the alarm screen and push "ENTER" button.

3.2. Alarm comments and Actions

When an abnormality occurs in the machine, an alarm comment and a remedy are displayed on the ALARM screen of the touch panel. Follow the instruction contents to dealwith the trouble.



3.2.1. Machine Reaction

There are 4 types, A~D, of machine reactions show below.

Machine Reaction table

Reactions		Contents
A	Power OFF	Turn off the power. It is in the same state as pushing the Power OFF button on the control panel or the Emergency Stop button.
B	Operation stop	Automatic operation will stop even when a PWB is being processed.

Machine Reaction table (Continued)

Reactions		Contents
C	Operation-cycle stop	Cycle stop of automatic operation. It is in the same state as the operation "STOP" button was pushed, Stop the operation after completing the processing of the PWB.
D	Operation continuation	Automatic operation is continued and the alarm indicator informs the operator of the abnormality.

3.2.2. Alarm Comments List

Please refer to the attached alarm comments list.

Alarm Comments List

No.	Alarm Comment	Machine Reactions	Possible Remedies
01	EMERGENCY STOP	A	The emergency switch has been pushed. ① Turn clockwise button to release E.STOP. ② Check the breakdown of the button itself, disconnection. E.STOP SW : EMG1,EMG2,EMG3 CR2 Relay contact , PLC Input : X31
02	CONTROL BOX DOOR	B	The control panel door is open. ① Close the door. ② Check the position of the door switch (DS1, DS2) and the breakdown of the switch itself.
03	PRIMARY AIR PRESSURE	B	Primary air pressure is dropped. ① Check the air hose and factory compressed air. ② Check the air pressure switch (PS1: X34).
04	—	—	Not used.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
05	CONVEYOR UNITS POSITION	B	Conveyor is not in home position. Move to the front until the lock is applied. Input conveyor unit fixed position sensor : LS1(X32)、 Output conveyor unit fixed position sensor : LS2(X33)
06	TACKING 1	B	The film was not tacked to the PWB or an alarm occurred incorrectly despite normal operation. Dry film may slip during tacking operation. ① Make sure there is no problem with the adsorption of the tacking plate ② Check the tension roller sensor and sensor position. . Upper PHOTO 7: X 49 lower PHOTO 8: X 4 A ③ If an alarm fault occurs, check the pulse count during operation and set it so that it operates normally. ④ Check the setting condition of dry film.
07	FILM CUT	B	The film cut failed. ① Check the positional relationship between the cutter blade and the cutter backup. ② There is a possibility that the cutter blade is in contact with the cutter backup during traveling. Check whether a cutter blade does not have a nicked part of an edge. ③ Make sure that there is no dry fill on the cutter blade. ④ Check the sensor and sensor position of the tension roller. Top PHOTO 7: X 49, Bottom PHOTO 8: X 4 A

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
08	PUMP / BLOWER	B	<p>It is an overload of a vacuum blower or turbo blower.(VB1.BR0.X2D.CR2)</p> <p>① Check if the adsorption system piping and solenoid valve are blocked.</p> <p>② Check there is any abnormal noise or smell from the vacuum blower or turbo blower.</p> <p>③ Check whether the vacuum blower or turbo blower is broken.</p> <p>④ Check the inverter of the vacuum blower.</p> <p>Magnet SW for vacuum blower : MS1 Inverter : INV Magnet SW for turbo blower : MS2</p>
09	BACKUP ROLL MOTOR	B	<p>It is an alarm for the backup roll motor.(X58)</p> <p>① Check the driver. (BLU)</p> <p>② Make sure that the motor is not overheating with overload condition. (M1) (Drive belt, backup roll, bearing, etc.)</p> <p>③ Check the wiring for short circuit, disconnection.</p> <p>Roll motor PLC output REV (Lamination roll forward rotation): Y78 FWD (Lamination roll reverse rotation): Y79 Alarm : Y7A</p>
10	—	—	Not used
11	UPPER CUTTER OVERRUN	B	<p>The upper cutter overrun sensor turned ON.</p> <p>① Check the motor setting (M6), motor driver (CMD1), positioning unit (AX3) setting, wiring, or wiring of sensor.</p> <p>② Check overrun sensor.</p> <p>Back side LS 15: X 039 Front side LS 4: X 044 AX 3 wiring DOG : Y088. FLS : Y089. RLS : Y08A</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
12	UPPER CUTTER OVERTIME	B	<p>Running of the upper cutter was not completed within the set time.</p> <p>During homing operation : 15 sec. (T1434) Automatic operation : 3 sec. (T1435)</p> <p>① Make sure that the cutter blade is not in contact with the cutter backup.</p> <p>② Make sure that the cutter traveling section is not in contact with the other.</p> <p>③ Check the position sensor. Back side LS 14: X 038 Front side LS 3: X 043</p> <p>④ It may have been cut without dry film adsorption. In this case, check piping of adsorption system and solenoid valve.</p> <p>⑤ Check the looseness of the cutter belt and the tension.</p> <p>AX 3 wiring DOG : Y088. FLS : Y089. RLS : Y08A</p>
13	LOWER CUTTER OVERRUN	B	<p>The lower cutter overrun sensor turned ON.</p> <p>① Check the motor setting (M7), motor driver (CMD12), positioning unit (AX4) setting and wiring, or wiring of sensor.</p> <p>② Check overrun sensor. Back side LS 17: X 03B Front side LS 6: X 046</p> <p>AX 4 wiring DOG : Y08B. FLS : Y08C. RLS : Y08D</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
14	LOWER CUTTER OVERTIME	B	<p>Running of the lower cutter was not completed within the set time.</p> <p>During homing operation : 15 sec. (T1444) Automatic operation : 3 sec. (T1445)</p> <p>① Make sure that the cutter blade is not in contact with the cutter backup.</p> <p>② Make sure that the cutter traveling section is not in contact with the other.</p> <p>③ Check the position sensor. Back side LS16 : X03A Front side LS5 : X045</p> <p>④ It may have been cut without dry film adsorption. In this case, check piping of adsorption system and solenoid valve.</p> <p>⑤ Check the looseness of the cutter belt and the tension.</p> <p>AX4wiring DOG : Y08B. FLS : Y08C. RLS : Y08D</p>
15	FRONT CENTERING BAR	B	<p>It is an alarm of front side centering cylinder operation.</p> <p>The open end sensor (FLS 1: X 25) is ON even after 5 seconds (T 106) has passed from the centering ON.</p> <p>The open end sensor (FLS 1: X 25) will not turn ON even after 5 seconds (T 107) from centering OFF.</p> <p>① Check piping, speed controller, solenoid valve, sensor.</p> <p>② Check the cylinder.</p> <p>③ Check the PLC's output card.</p> <p>④ Check whether the centering mechanism is in contact with others.</p> <p>Cylinder closing solenoid valve : SOL4(Y93)</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
16	REAR CENTERING BAR	B	<p>It is an alarm of back side centering cylinder operation.</p> <p>The open end sensor (FLS 2: X 26) is ON even after 5 seconds (T 108) has passed from the centering ON.</p> <p>The open end sensor (FLS 2: X 26) will not turn ON even after 5 seconds (T 109) from the centering OFF.</p> <p>① Check piping, speed controller, solenoid valve, sensor.</p> <p>② Check the cylinder.</p> <p>③ Check the PLC's output card.</p> <p>④ Check whether the centering mechanism is in contact with others.</p> <p>Cylinder closing solenoid valve : SOL5(Y94)</p>
17	PINCH ROLL	B	<p>It is an operation alarm of pinch roll forward and backward mechanism.</p> <p>① Check whether the forward-backward mechanism is in contact with the other.</p> <p>② Check the position of forward (FLS 5: X 00 C), backward (RLS 5: XE), home position (DOG 5: X 00 A) sensor.</p> <p>③ Check the motor (M8).</p> <p>④ Check the motor driver. (CRD 1)</p> <p>⑤ Check the wiring cable.</p> <p>Positioning unit wiring (AX 1) CW : Y4. CCW : Y6</p>
18	ROLL UP/DOWN	B	<p>It is the alarm of backup roll up / down mechanism operation.</p> <p>The upper end sensor (LS24: X42) is ON even after 5 seconds (T112) has elapsed since roll pressurization was turned ON.</p> <p>The upper end sensor (LS24: X42) does not turn ON even after 5 seconds (T113) from rolling pressure OFF.</p>

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
18	(continued) ROLL UP/DOWN	B	<ul style="list-style-type: none"> ① Check piping, speed controller, solenoid valve (pressurized SOL 2: Y 91) and cylinder sensor (roll upper end LS 24: X 42). ② Check the cylinder. ③ Check the PLC's output card. ④ Make sure that the backup roll up / down mechanism is not in contact with the other.
19	UPPER TACKING PLATE	B	<p>It is an alarm for up and down movement of the upper tacking plate.</p> <ul style="list-style-type: none"> ① Check the speed controller, piping, solenoid valve (SOL 6: Y 095), cylinder sensor (upper end LS 18: X 03 C, lower end LS 19: X 03 D). ② Check the air pressure setting. (0.2 ~ 0.3Mpa) ③ Make sure the left and right stroke of the cylinder is even. ④ Check the PLC's output card. ⑤ Make sure there is no contact with the tacking plate vertical movement mechanism.
20	LOWER TACKING PLATE	B	<p>It is an alarm for up and down movement of the lower tacking plate.</p> <ul style="list-style-type: none"> ① Check the speed controller, piping, solenoid valve (SOL7 : Y096), cylinder sensor (upper end LS21 : X03F, lower end LS20 : X03E). ② Check the air pressure setting. (0.4 ~ 0.45Mpa) ③ Make sure the left and right stroke of the cylinder is even. ④ Check the PLC's output card. ⑤ Make sure there is no contact with the tacking plate vertical movement mechanism.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
21	LOCK PIN	B	<p>This is a lock pin mechanism alarm that fixes the tacking block at the home position (close end).</p> <ol style="list-style-type: none"> ① Check piping, speed controller solenoid valve (SO9L: Y98), sensor. ② Make sure that the home position (close end) of the tacking block is correct. ③ Check the cylinder. ④ Check the PLC's output card. <p>Cylinder sensor Unlock position Back upper (LS22 : X40)、lower (LS23 : X41) Front upper (LS7 : X47)、lower (LS8 : X48)</p>
22	CENTERING UNIT (option)	B	<p>This is an automatic centering module alarm.</p> <ol style="list-style-type: none"> ① Check the front side wiring, motor (M9), driver (CVK1, abnormal signal X108), positioning unit (AX1), sensor. ② Check the back side wiring, motor (M 10), driver (CVK 2, abnormal signal X 109), positioning unit (AX 2), sensor. ③ Check the PLC's output card. ④ Check whether the centering mechanism is in contact with others. <p>Sensor : Home position. DOG6 、 Overrun. outside RLS6. inside FLS6</p>
23	CENTERING MOTOR (option)	B	<p>It is the automatic centering motor alarm.</p> <ol style="list-style-type: none"> ① Check the front side wiring, motor (M9), driver (CVK1, abnormal signal X108), positioning unit (AX1). ② Check the back side wiring, motor (M10), driver (VK2, abnormal signal X 109), and positioning unit (AX2). ③ Check the PLC's output card. ④ Check whether the centering mechanism is in contact with others.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
24	LAMINATION OVERTIME	B	<p>It is an alarm which is laminated continuously without lamination operation finishing. Cutter driving was not performed for a certain time (TIM124 D377) after tacking operation.</p> <ol style="list-style-type: none"> ① Check whether the edge sensor (PHOTO 1: X 20) is working properly. ② Check the input conveyor motor (M2) and the screwdriver (BLHD1). ③ Check the motor (M1) of the roll and the screwdriver (BLE). ④ Make sure the board is too long or connected and laminated. ⑤ Check whether speed is set extremely slow. ⑥ Make sure the pinch roll is at the home position.
25	BACKUP ROLL HEATER	C	<p>It is the alarm of the backup roll heater.</p> <ol style="list-style-type: none"> ① Check the temperature controller (EJ1-2, G3ZA), solid state relay (top G3PE1, bottom G3PE2), heater (top H-1, bottom H-2), temperature sensor. ② Check the heater wiring (S51, T5 for upper, S52, T5 for lower) and the temperature sensor wiring (CA1 for upper, CA2 for lower). ③ Check circuit breaker (NFB 4), circuit protector (upper CP 3, lower CP 4). <p>Backup roll heater ON : Y71</p>
26	FILM GUIDE (option)	C	<p>It is the alarm of film guide heater.</p> <ol style="list-style-type: none"> ① Please check the temperature controller (EJ 1-4), solid state relay (top G3PA3, bottom G3PA4), heaters (H-7A & B for top, H-8A & B for bottom) and temperature sensor. ② Check the heater wiring (upper R7C, S7, lower R7E, S7), temperature sensor wiring (upper CA 9, lower CA 10).

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
26	(continued) FILM GUIDE (option)	C	③ Check breaker (NFB 9), fuse (upper FU 3, lower FU 4). Film guide heater ON : Y72
27	TACKING HEATER	C	It is the tacking heater alarm. ① Check the temperature controller (EJ1-3), solid state relay (top G3PA1, bottom G3PA2), heater (top H - 5, bottom H - 6), temperature sensor. ② Check the heater wiring (upper U03V1, lower U05V1), temperature sensor wiring (upper CA5, lower CA6). ③ Check breaker (NFB 3), fuse (upper FU 1, lower FU 2). Tacking heater ON : Y73
28	CENTERING SENSOR (option)	C	An erroneous detection occurred in the second automatic centering. ① Check the front side wiring, motor (M 9), driver (CVK 1, abnormal signal X 108), positioning unit (AX 1), board detection sensor (near side FLS 1: X 025). ② Check the back side wiring, motor (M 10), driver (CVK 2, abnormal signal X 109), positioning unit (AX 2), board position detection sensor (back side FLS 2: X 026). ③ Check the PLC's output card. ④ Check whether the centering mechanism is in contact with others. Sensor: home position DOG 6 、 Overrun outer RLS 6, inner FLS 6
29	INPUT CONVEYOR	C	Encoder pulse (X0) is not output. ① Check the driving of the input conveyor motor, the rotation of the encoder and so on. ② Check coupling and engagement of gears. ③ Check motor (M2), driver (BLHD1), encoder. ④ Check the wiring.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
30	BACKUP ROLL ENCODER	C	Encoder pulse (X0C0, X0C7) is not output. ① Check the driving of the input conveyor motor, the rotation of the encoder and so on. ② Check the pulley, timing belt engagement, belt tension. ③ Check motor (M1), driver (BLE), encoder. ④ Check the wiring.
31	OUTPUT ENCODER	C	Encoder pulse (X2) is not output. ① Check the driving of the input conveyor motor, the rotation of the encoder and so on. ② Check coupling and engagement of gears. ③ Check motor (M3), driver (BLHD2), encoder. ④ Check the wiring.
32	TACKING	B	The film was not tacked to the board or an alarm occurred incorrectly despite normal operation. ① Check the tacking temperature and tacking time. ② Check if the dry film is hanging on the tacking rubber at the time of tacking action. ③ Make sure the upper and lower tacking plate rubber contacts when tacking action. ④ Check the tacking plate air pressure. (Upper 0.2 - 0.3 MPa, lower 0.4 - 0.45 MPa) ⑤ Check the sensor position of tension roller sensor (upper / PHOTO 7: X 49, lower / PHOTO 8: X 4 A). ⑥ If an alarm fault occurs, check the pulse count during operation and set it so that it operates normally. ⑦ Check the setting condition of the dry film.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
33	UPPER TACKING BLOCK OVERTIME	B	<p>It is the open / close overtime of the upper tacking block.</p> <p>It does not complete after 15 seconds in homing operation and 7 seconds in normal operation.</p> <p>① Make sure the open / close mechanism of the Tacking block is not touching the other.</p> <p>② Check the slide bearings.</p> <p>③ Check the pulley, timing belt tension.</p> <p>④ Check motor(M4),driver(AR1 / ARD-C) sensor.</p> <p>⑤ Check the wiring.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p> <p>Slide part sensor : DOG1 、 FLS1 、 RLS1 、 END : X53 、 REDAY : X54</p>
34	UPPER TACKING BLOCK MOTOR	B	<p>It is an alarm of the upper tacking block slide motor driver.</p> <p>① Make sure the open / close mechanism of the Tacking block is not touching the other.</p> <p>② Make sure that the slide motor (M4) and driver (AR1) are overloaded and not at high temperature.</p> <p>③ Check the pulley, timing belt tension.</p> <p>④ Check the wiring.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p> <p>I/O : YA8, YA9, YAA</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
35	INPUT CONVEYOR MOTOR DRIVER	B	<p>It is an alarm of the driver for the input conveyor motor. (X 059)</p> <p>① Make sure that the motor (M2) and driver (BLHD1) are overloaded and not at high temperature.</p> <p>② Check wiring and cable for abnormality.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p>
36	OUTPUT CONVEYOR MOTOR DRIVER	B	<p>It is an alarm of the driver for the output conveyor motor. (X 05 A)</p> <p>① Make sure that the motor (M3) and driver (BLHD2) are overloaded and not at high temperature.</p> <p>② Check wiring and cable for abnormality.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p>
37	LOWER TACKING OVERTIME	B	<p>It is the open / close overtime of the lower tacking block.</p> <p>It does not complete after 15 seconds in homing operation and 7 seconds in normal operation.</p> <p>① Make sure the open / close mechanism of the Tacking block is not touching the other.</p> <p>② Check the slide bearings.</p> <p>③ Check the pulley, timing belt tension.</p> <p>④ Check motor (M5),driver (AR2/ARD-C) sensor.</p> <p>⑤ Check the wiring.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p> <p>Slide part sensor : DOG2 、 FLS2 、 RLS2 、 END : X55 、 REDAY : X56</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
38	LOWER TACKING BLOCK MOTOR	B	<p>It is an alarm of the lower tacking block slide motor driver.</p> <p>① Make sure the open / close mechanism of the Tacking block is not touching the other.</p> <p>② Make sure that the slide motor (M5) and driver (AR2) are overloaded and not at high temperature.</p> <p>③ Check the pulley, timing belt tension.</p> <p>④ Check the wiring.</p> <p>After confirming the above, turn on the machine power supply again.</p> <p>Wait at least 10 seconds before turning on the device again.</p> <p>I/O : YAB,YAC,YAD</p>
39	LAMINATION ROLL UNIT POSITION	B	<p>The laminate roll unit is not installed in the fixed position.</p> <p>① Attach the laminate roll unit to the fixed position and fix the fixed handle.</p> <p>② Check the sensor (LS10: X4E).</p> <p>③ Check the sensor position and dog position.</p>
40	PWB TEMP. SENSOR POSITION	C	<p>The PWB temperature sensor is not in the fixed position.</p> <p>① Please return the temperature sensor (CA7) to the fixed position.</p> <p>② Check the position detection sensor (PHOTO 9: X 5 B) position.</p>
41	REST UPPER FILM	D	<p>The remaining amount of the upper film has decreased.</p> <p>Replace to new film and set new film length and set alarm value.</p>
42	REST LOWER FILM	D	<p>The remaining amount of the lower film has decreased.</p> <p>Replace to new film and set new film length and set alarm value.</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
43	UPPER FILM END DETECTION	B	There is no upper film, or film remains, but an alarm has occurred incorrectly. ① Replace with a new film. ② Check the sensor (PHOTO12: X05E) and the sensor amp.
44	LOWER FILM END DETECTION	B	There is no lower film, or film remains, but an alarm has occurred incorrectly. ① Replace with a new film. ② Check the sensor (PHOTO13: X05F) and the sensor amp.
45	ROLL NOT ROTATING	B	The time when the backup roll heater is heating and the roll has not rotated exceeds the limit time set value of the correction screen. When the backup roll heater is ON, roll forward, roll down (pressurize), and laminate roll unit must be in the fixed position. Rotate and pressurize the backup roll, then turn on the heater of the backup roll.
46	WINDING MOTOR	C	Alarm of upper winding motor occurred. ① Check motor (TM1) and driver (TMP-1). ② Make sure that it is overloaded and not at high temperature. ③ Check gear engagement. ④ Check wiring and cables.
47	WINDING MOTOR	C	Alarm of lower winding motor occurred. ① Check motor (TM2) and driver (TMP-2). ② Make sure that it is overloaded and not at high temperature. ③ Check gear engagement. ④ Check wiring and cables.
48	UPPER FILM BRAKE	C	An alarm occurred in the upper film brake. ① Check the brake (BR1) and the driver(CTA-1). ② Check wiring and cables.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
49	LOWER FILM BRAKE	C	An alarm occurred in the lower film brake. ① Check the brake (BR2) and the driver(CTA-2). ② Check wiring and cables.
50	ROLL HEATER OVERRANGE	D	It is the over range of roll temperature. ① Check the temperature of the backup roll and the laminate roll and the alarm set value. ② Check the heater (H-1 for upper , H-2 for lower). ③ Check the temperature controller (EJ1-2, G3ZA). ④ Check the solid state relay (upper G3PE1, lower G3PE2). ⑤ Check the temperature sensor of the backup roll and laminate roll. ⑥ Check the wiring of the backup roll heater (S51 · T5 for upper, S52 · T5 for lower), sensor (CA1 for upper, CA2 for lower) wiring. ⑦ Check the wiring of Laminate roll sensor (upper CA 3, lower CA 4) . Backup roll heater ON : Y71
51	FILM GUIDE HEATER OVERRANGE (Option)	D	It is the over range of film guide heater. ① Check the set temperature and alarm value. ② Check the heater itself (H-7A & B for upper use, H-8A & B for lower side). ③ Check the temperature controller (EJ 1-4). ③ Check the solid state relay (upper G3PA3, lower G3PA4). ④ Check the temperature sensor. ⑤ Check the heater wiring (upper R7C, S7, lower R7E, S7), temperature sensor wiring (upper CA 9, lower CA 10).

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
52	TACKING HEATER OVERRANGE	D	<p>It is the over range of the tacking heater.</p> <p>① Check the temperature of the tacking and the alarm set value.</p> <p>② Check the heater (H-5 for upper use, H-6 for lower side).</p> <p>③ Check the temperature controller (EJ 13).</p> <p>④ Check the solid state relay (upper G3PA1, lower G3PA2).</p> <p>⑤ Check the temperature sensor.</p> <p>⑥ Check the heater wires (upper U03, V01, lower U05, V1) and temperature sensor wiring (CA5 for upper, CA6 for lower).</p>
53	LOCK PIN UNLOCK	D	<p>Pin for tacking block fixing is not inserted.</p> <p>① Move the tacking block to close end manually and insert the lock pin.</p> <p>② Check the cylinder.</p> <p>③ Check piping, solenoid valve (SO9L: Y98), speed controller.</p> <p>④ When four lock pins are inserted and an alarm has occurred, check the sensor and sensor position.</p> <p>Cylinder sensor Back side upper unlock (LS22 : X40) Back side lower unlock (LS23 : X41) Front side upper unlock (LS7 : X47) Front side lower unlock (LS8 : X48)</p>
54	REST UPPER FILM	D	<p>The remaining amount of the upper film has decreased.</p> <p>Replace to new film and set new film length and set alarm value.</p> <p>Sensor PHOTO10 : X05C</p>
55	REST LOWER FILM	D	<p>The remaining amount of the lower film has decreased.</p> <p>Replace to new film and set new film length and set alarm value.</p> <p>Sensor PHOTO11 : X05D</p>

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
56	CUTTER CUT COUNTS	D	Cutter processing count reached warning value. Exchange the cutter blade and reset the present value.
57	PRODUCTION PWB COUNTS	D	The PWB production number has reached the alarm set value. Reset the current value.
58	PWB FEED	D	The PWB on the input conveyor does not reach the edge sensor even after a certain period of time. It takes more than 30s (T140: K300) until the edge sensor (X20) turns ON after the board detection sensor 4 (X23) turns ON. ① Check whether someone have pulled out the board after starting centering. ② Check whether the PWB is stopped inside the input conveyor. ③ Check edge sensor and PWB detection sensor ④ Check the amp sensitivity of the edge sensor and PWB detection sensor.
59	PLC BATTERY	D	The memory battery voltage of the PLC is decreasing. Replace with a new battery as soon as possible.
60	UPPER CUTTER HOMING	D	The homing action of the upper cutter motor can not be done. ① Make sure that the cutter module is in the position where either the left or right fixed position sensor turns ON. ② Check the cutter fixed position sensor (back side LS14: X038, front side LS3: X043), sensor dog position and sensor position. ③ Make sure the upper tacking plate is in the upper position. ④ Check the sensor position (upper end LS18: X03C lower end LS19: X03D) on the upper tacking plate cylinder sensor.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
61	LOWER CUTTER HOMING	D	<p>The homing action of the lower cutter motor can not be done.</p> <ol style="list-style-type: none"> ① Make sure that the cutter module is in the position where either the left or right fixed position sensor turns ON. ② Check the cutter fixed position sensor (back side LS16: X03A, front side LS5: X045), sensor dog position and sensor position. ③ Make sure the lower tacking plate is in the lower position. ④ Check the sensor position (lower end LS20: X03E upper end LS21: X03F) on the lower tacking plate cylinder sensor.
62	CENTERING OVERTIME	D	<p>It is overtime of centering operation. The centering bar will not open even after 30 s (T 141 K 300) has elapsed since the board detection sensor 4 (X 23) turned ON.</p> <ol style="list-style-type: none"> ① Make sure that the centering mechanism is not in contact with conveyor rolls, PWB, etc. ② Check the cylinder closing solenoid valve (front side SOL 4: Y 93, back side SOL 5: Y 94). ③ Check PWB detection sensor 4 (X23). ④ Check the wiring of the cylinder open end sensor (front FLS 1: X 25, back FLS: 2 X 26).
63	TACKING TEMP.	C	<p>The temperature of tacking exceeds 100°C. Because it is dangerous, please do not touch the tacking rubber and the heater.</p> <ol style="list-style-type: none"> ① Check the solid state relay (upper G3PA1, lower G3PA2). ② Check the heater (upper H-5, lower H-6). ③ Check the temperature controller (EJ1 - 3). ② Check the heater wiring (U03 · V1 for upper use, U05 · V1 for lower side), sensor wiring (CA5 for upper side, CA6 for lower side).

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
64	BACKUP ROLL TEMP. UPPER LIMIT	C	<p>The temperature of the backup roll exceeds 200 °C. Do not touch the backup roll or laminate roll as it is dangerous.</p> <p>① Check the solid state relay (upper G3PE1, lower G3PE2), CA1, CA2.</p> <p>② Check the heater (H-1 for upper use, H-2 for lower side). Backup roll heater ON: Y 71</p> <p>③ Check the temperature controller (EJ1-2, G3ZA).</p> <p>④ Check the backup roll heater wiring (S51 · T5 for upper, S52 · T5 for lower), sensor wiring (CA1 for upper, CA2 for lower).</p>
65	STOP CYCLE OVERTIME	D	<p>During automatic operation, the PWB was not inserted for a certain period of time. There is a possibility that the state of the film is getting worse. Please reset film.</p>
66	FILM GUIDE TEMP. UPPER LIMIT	C	<p>The temperature of the film guide exceeds 100 °C. Do not touch the film guide as it is dangerous.</p> <p>① Check the solid state relay (upper G3PA3, lower G3PA4).</p> <p>② Ceck the heater (upper H7A & B, lower H8A & B). Film guide heater ON: Y 72</p> <p>③ Ceck the temperature controller (EJ 1-4).</p> <p>④ Check the heater wiring (upper R7C, S7, lower R7E, S7), temperature sensor wiring (upper CA 9, lower CA 10).</p>

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
67	PURE HEATER ROLL UP/DOWN	D	It is an alarm of up and down movement of the preheater roll. Even if 3 s (T 205 K 30) elapsed after the solenoid valve was turned ON / OFF, the roll could not be moved to the fixed position. ① Check the cylinder, air piping, speed controller, solenoid valve. ② Check the upper end detection sensor (X 27) and the sensor position. ③ Check the wiring.
68	PANEL INPUT OVERTIME	B	With the state of the REDAY signal to the upstream machine and the board stock signal from the upstream machine, the board will not be input even after a certain time has passed. Check the sensor on the input conveyor and state of the upstream machine.
69	PANEL OUTPUT OVERTIME	B	The PWB is not ejected even after a certain period of time, with the PWB being present on the REDAY signal from the downstream machine and the exit PWB detection sensor. Check the state of the sensor on the output conveyor and the downstream machine.
70	TEMPERATURE CONTROLLER COMMUNICATION	B	It is a communication alarm with the temperature controller. Check the power supply wiring of the temperature controller, the wiring between the temperature controller and the PLC.
71	PANEL JAMING	B	The jamming sensor (PHOTO9, X05B) can not detect the PWB even after a certain time (T319) has passed during lamination. Check near the laminate roll and remove the PWB. Check the surface of the laminate roll for damage such as scratches.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
72 ~ 100	—	—	Not used
101	EJ1N-4A RAM	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
102	EJ1N-4A CALIBRATED VALUE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
103	EJ1N-4A SETTING VALUE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
104	EJ1N-4A CONFIGURATE REGISTER DATE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
105	EJ1N-4A UNIT INFORMATION DATE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
106	EJ1N-4A UNIT INFORMATION MISMATCH	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
107	EJ1N-4A EXPANSION UNIT UNDEFINED	C	Unidentifiable unit is connected. Check the connection condition of the temperature control unit for any abnormality. Turn off the machine and turn it on again to reset the temperature control unit.
108	EJ1N-4A EXPANSION UNIT	C	Communication with multipoint power controller (G3ZA) is abnormal. Check the cable connected to the temperature control unit for any abnormality.
109	EJ1N-4A EXPANSION UNIT UNREACHABLE	C	There is no communication response from the multipoint power controller (G3ZA). Check the cable connected to the temperature control unit for any abnormality.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
110	UPPER BACKUP ROLL HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check wiring connection to temperature sensor, temperature control unit.
111	LOWER BACKUP ROLL HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check wiring connection to temperature sensor, temperature control unit.
112	UPPER LAMINATE ROLL HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check wiring connection to temperature sensor, temperature control unit.
113	LOWER LAMINATE ROLL HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check wiring connection to temperature sensor, temperature control unit.
114	EJ1N-4A RAM1 SAVE	C	Power is exhausted while saving RAM 1, and all data can not be registered. Turn off the machine and turn it on again to reset the temperature control unit.
115	EJ1N-4A RAM2 SAVE	C	Power is exhausted while saving RAM 2, and all data can not be registered. Turn off the machine and turn it on again to reset the temperature control unit.
116	EJ1N-4A CONTROL PARAMETER STORAGE	C	Power is turned off during parameter registration after auto-tuning is finished, and all data can not be registered. Turn off the machine, turn it on again, reset the temperature control unit, then auto tuning again and save the parameters.
117	EJ1N-4A UNIT CONFIGURATION / COMPOSITE READING REGISTERED	C	Power supply shutdown occurred during unit configuration registration or composite readout registration, and all data can not be registered. Turn off the machine and turn it on again to reset the temperature control unit.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
118	UPPER BACKUP ROLL HEATER OVER CURRENT	C	Overcurrent is generated. Check the heater and check wiring and connection for abnormality.
119	LOWER BACKUP ROLL HEATER OVER CURRENT	C	Overcurrent is generated. Check the heater and check wiring and connection for abnormality.
120	UPPER LAMINATE ROLL HEATER OVER CURRENT	C	Overcurrent is generated. Check the heater and check wiring and connection for abnormality.
121	LOWER LAMINATE ROLL HEATER OVER CURRENT	C	Overcurrent is generated. Check the heater and check wiring and connection for abnormality.
122	UPPER BACKUP ROLL HEATER SSR SHORTAGE	C	SSR short circuit has occurred. Check whether there are any abnormalities in a SSR unit, wiring, and connection.
123	LOWER BACKUP ROLL HEATER SSR SHORTAGE	C	SSR short circuit has occurred. Check whether there are any abnormalities in a SSR unit, wiring, and connection.
124	UPPER LAMINATE ROLL HEATER SSR SHORTAGE	C	SSR short circuit has occurred. Check whether there are any abnormalities in a SSR unit, wiring, and connection.
125	LOWER LAMINATE ROLL HEATER SSR SHORTAGE	C	SSR short circuit has occurred. Check whether there are any abnormalities in a SSR unit, wiring, and connection.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
126	UPPER BACKUP ROLL HEATER SSR BREAK	C	The disconnection alarm has occurred. Check if there is abnormality in heater, wiring and connection.
127	LOWER BACKUP ROLL HEATER SSR BREAK	C	The disconnection alarm has occurred. Check if there is abnormality in heater, wiring and connection.
128	UPPER LAMINATE ROLL HEATER SSR BREAK	C	The disconnection alarm has occurred. Check if there is abnormality in heater, wiring and connection.
129	LOWER LAMINATE ROLL HEATER SSR BREAK	C	The disconnection alarm has occurred. Check if there is abnormality in heater, wiring and connection.
130	UPPER BACKUP ROLL TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
131	UPPER BACKUP ROLL TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
132	LOWER BACKUP ROLL TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
133	LOWER BACKUP ROLL TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
134	UPPER LAMINATE ROLL TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
135	UPPER LAMINATE ROLL TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
136	LOWER LAMINATE ROLL TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
137	LOWER LAMINATE ROLL TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
138	EJ1N-2A RAM	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
139	EJ1N-2A CALIBRATED VALUE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
140	EJ1N-2A SETTING VALUE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
141	EJ1N-2A CONFIGURATE REGISTER DATE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
142	EJ1N-2A UNIT INFORMATION DATE	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.
143	EJ1N-2A UNIT INFORMATION MISMATCH	C	Memory error in temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
144	UPPER TACKING HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.
145	LOWER TACKING HEATER SENSOR INPUT	C	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.
146	EJ1N-2A RAM1 SAVE	C	A power shutdown occurred while saving RAM 1 and all data could not be registered. Turn off the machine, turn it on again, reset the temperature control unit and resave it.
147	EJ1N-2A RAM2 SAVE	C	RA power shutdown occurred while saving RAM 2 and all data could not be registered. Turn off the machine, turn it on again, reset the temperature control unit and resave it.
148	EJ1N-2A CONTROL PARAMETER STORAGE	C	Power is turned off during parameter registration after auto-tuning is finished, and all data can not be registered. Turn off the machine, turn it on again, reset the temperature control unit, then auto tuning again and save the parameters.
149	EJ1N-2A UNIT CONFIGURATION /COMPOSITE READING REGISTERED	C	Power supply shutdown occurred during unit configuration registration or composite readout registration, and all data can not be registered. Turn off the machine and turn it on again to reset the temperature control unit.
150	UPPER TACKING TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
151	UPPER TACKING TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.

Alarm Comments List (continued)

No.	Alarm Comment	Machine Reactions	Possible Remedies
152	LOWER TACKING TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
153	LOWER TACKING TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
154	HFU CONFIGURATION	D	There is an abnormality in the equipment configuration. To reset the temperature control software, turn off the machine and turn the power on again.
155	TEMPERATURE CONTROLLER START	D	There is a breakdown of the temperature control unit. Turn off the machine and turn it on again to reset the temperature control unit. Or replace the temperature control unit .
156	PWB UPPER TEMPERATURE SENSOR INPUT	D	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.
157	PWB LOWER TEMPERATURE SENSOR INPUT	D	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.
158	UPPER FILM GUIDE TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
159	UPPER FILM GUIDE TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.

Alarm Comments List (continued)

No.	Alarm Commnet	Machine Reactions	Possible Remedies
160	LOWER FILM GUIDE TEMPERATURE UPPER LIMIT	D	Temperature high limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
161	LOWER FILM GUIDE TEMPERATURE LOWER LIMIT	D	Temperature lower limit alarm is generated. Check the temperature setting value and temperature sensor for abnormality.
162	UPPER FILM GUIDE HEATER SENSOR INPUT	D	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.
163	LOWER FILM GUIDE HEATER SENSOR INPUT	D	There is a problem with the input of the sensor. Check the wiring connection from the temperature sensor to the temperature control unit.

3.3. Troubleshooting

Here are examples of typical troubles and troubleshooting methods.

PWB feed

	Symptom	Reference
1	Conveyor does not turn when automatic operation is ON	3.3.1.
2	Centering operation does not work properly	3.3.2.
3	PWB does not feed after tacking (Pinch roll does not move forward)	3.3.3.
4	PWB does not enter the laminating roll	3.3.4.
5	PWB stops at the output conveyor.	3.3.5.

Tacking action

	Symptom	Reference
1	Film can not be tacked	3.3.6.
2	Tacking faulty alarm comes out although it is being tacked	3.3.7.

Film sticking position is bad

	Symptom	Reference
1	Position at the beginning of sticking of film is bad or not constant.	3.3.8.
2	The position of the rear end of the sticking of the film is bad or not constant.	3.3.9.
3	Film sticking Horizontal position is bad or not constant.	3.3.10.

Wrinkles, bubbles appear.

	Symptom	Reference
1	Wrinkles and air bubbles are generated in the tacking area	3.3.11
2	Wrinkle bubbles are generated at the rear end of the PWB	3.3.12.
3	Wrinkle bubbles are generated in a portion not at the edge of the PWB	3.3.13.

Temperature

	Symptom	Reference
1	Roll temperature does not rise	3.3.14.
2	Tacking temperature does not rise	3.3.15.
3	The temperature of the film guide does not rise (option)	3.3.16.
4	Alarm of temperature abnormality comes out	3.3.17.

Cutter

	Symptom	Reference
1	Film can not be cut	3.3.18.
2	The film is cut obliquely	3.3.19.
3	Cutter overrun alarm comes out	3.3.20
4	Cutter overtime alarm comes out	3.3.21

3.3.1. Conveyor does not turn when automatic operation is ON

Possible cause		Action
1	The motor is out of order.	<p>Motor torque drops and the conveyor can not be driven.</p> <ul style="list-style-type: none"> ● Remove the motor from the device and rotate it with the motor alone. If it seems to rotate, the torque of the motor may be reduced. Please replace the motor. ● If it does not rotate, it is possible that the motor controller is broken. Replace the motor controller.
2	The downstream machine is not in the receivable state.	<p>If the downstream machine and the this machine are connected by signal wires, automatic operation is stopped because the laminated PWB can not be sent to the downstream unit unless the downstream unit is in the automatic operation state or receivable state.</p> <ul style="list-style-type: none"> ● When operating the laminator automatically, the "RUN" button can not be turned ON unless the downstream machine is in the receivable state. ● Check the operation status of downstream machine.

3.3.1. Conveyor does not turn when automatic operation is ON (continued)

	Possible cause	Action
3	The excitation power of the clutch and brake of the conveyor is weak.	<p>When the excitation force of the electromagnetic clutch weakens, the drive of the motor is not transmitted.</p> <ul style="list-style-type: none"> ● Replace clutch, brake if excitation is weak.
4	Gap of toothless gear wheel of conveyor and set of crossed helical gears Looseness of screw, slack of tension of pinch roll chain.	<p>If the gap of the toothless gear wheel or crossed helical gears are loose and the sag of the tension of the chain is large, the conveyor will not turn.</p> <ul style="list-style-type: none"> ● Extend the chain tension. ● Make sure that the chain, timing belt, sprocket is not worn and replace if necessary. <p>Refer to "1.3.15. Checking and adjustment the tension of a pinch roll drive chain" in Maintenance of Part 2.</p> <ul style="list-style-type: none"> ● Check the gap of toothless gear wheel. (1 mm) <p>Refer to "1.3.18. Checking and adjustment the gap of toothless gear wheel" in Part 2 Maintenance.</p> <ul style="list-style-type: none"> ● Check crossed helical gears. <p>Refer to "1.3.16. Checking and adjustment the crossed helical gears" in Maintenance of Part 2.</p>
5	Defective conveyor clutch, brake relay failure, relay terminal, cable disconnection between PLC, fixing of the connector.	<p>If there is a faulty relay, disconnection of the cable between the relay terminal and the PLC, or a fixing failure of the connector, the relay will not turn ON and the clutch and brake will not operate.</p> <ul style="list-style-type: none"> ● Change the relay. ● Make sure that the connector part of the cable is securely fastened. ● Check with a tester etc. for cable disconnection.

3.3.2. Centering operation does not work properly

Possible cause		Action
1	Air leaks from cylinder and tube.	<p>If air is leaking out of the cylinder, the force to move the centering bar weakens and may not move.</p> <ul style="list-style-type: none"> ● Replace the cylinder. ● Replace the tube. ● Check the speed of the air cylinder. <p>Refer to "3.4.1. Speed adjustment method of air cylinder" in Maintenance of Part 2.</p>
2	The centering bar is in contact with conveyor rollers and others.	<p>If the centering bar is in contact with others, it may not move.</p> <ul style="list-style-type: none"> ● Adjust so that the centering bar does not contact with others.
3	Centering start sensor does not turn on.	<p>Centering can not be started unless the centering start sensor is turned on.</p> <ul style="list-style-type: none"> ● Check whether the centering start sensor turns ON. ● Place the board and adjust the height of the sensor. (The sensor has an LED lamp that lights up when detected.) ● Check sensor malfunction, sensor wiring. <p>Refer to "3.4.2. Sensor adjustment method of air cylinder" in Maintenance of Part 2.</p>
4	The solenoid valve for centering cylinder operation does not move.	<p>If the solenoid valve does not operate, the line and ring cylinder will not operate.</p> <ul style="list-style-type: none"> ● Replace the solenoid valve. ● Check whether output of PLC is defective.
5	The width of the substrate and the width of the centering bar are not matched.	<p>If the width of the PWB and the width of the centering bar are not aligned, the centering stops halfway and an alarm may occur or the centering may not be performed correctly.</p> <ul style="list-style-type: none"> ● Make the centering and closing state by manual operation, and match the width with the centering bar adjustment handle.

3.3.3. PWB does not feed after tacking (Pinch roll does not move forward)

	Possible cause	Action
1	The motor is out of order.	<p>Motor torque drops and the conveyor can not be driven.</p> <ul style="list-style-type: none"> ● Remove the motor from the device and rotate it with the motor alone. <p>If it seems to rotate, the torque of the motor may be reduced. Please replace the motor.</p> <ul style="list-style-type: none"> ● If it does not rotate, it is possible that the motor controller is broken. <p>Replace the motor controller.</p>
2	Tacking plate is not in open position.	<p>If the tacking plate is not in the open position, the interlock will not activate the pinch roll advancement operation</p> <ul style="list-style-type: none"> ● The sensor attached to the tacking plate cylinder (for the open end) may not be ON. <p>Check whether there is any abnormality in sensor or wiring.</p> <p>Also check the position of the sensor.</p> <p>Refer to "3.4.2. Sensor adjustment method of air cylinder" in Maintenance of Part 2.</p> <ul style="list-style-type: none"> ● The tacking plate cylinder may not be moving. Check the cylinder solenoid valve, air piping, air leakage. <p>Also, make sure that the tacking plate is not in contact with the other.</p> <p>Refer to "3.4.1. Speed adjustment method of air cylinder" in Maintenance of Part 2.</p>
3	Defective home position sensor of input conveyor or output conveyor.	<p>When the input conveyor and the home position sensor of the output conveyor are turned OFF, the interlock will not activate the pinch roll advancing motion.</p> <ul style="list-style-type: none"> ● Check the location of defective, wiring, dog and sensor of the sensor itself.

3.3.3. PWB does not feed after tacking (continued)

Possible cause		Action
4	The pinch roll advance / retreat mechanism is in	Pinch roll Forward / Backward mechanism does not operate smoothly if it is in contact with the other. ● There is a possibility that the PWB Holding guide is in contact with a film guide.

3.3.4. The PWB does not enter the laminating roll

Possible cause		Action
1	In the case of the Thick PWB function ON, the timing at which the roll changes to pressurization is earlier.	<p>When the thick PWB function is turned on and the timing at which the roll changes to pressure is early, the laminate roll is pressurized before the leading edge of the PWB reaches the laminate roll, and the load may not send the PWB due to the load.</p> <ul style="list-style-type: none"> ● Change the value of LEAD DISTANCE in the "ROLL UP / DOUN" field in the CALIBRATION screen. <p>(Pressurizing timing will be delayed if the number is increased)</p>
2	Pinch roll does not send PWB.	<p>Pinch roll may not send PWB.</p> <ul style="list-style-type: none"> ● The pinch roll is not turning. Check clutch, brake. ● PWB is slipping at the pinch roll section. Make sure that the upper pinch roll is reliably on the PWB. ● The pinch roll shaft is bent, the roller is wear down. please Exchange.
3	The dry film becomes resistive and can not send PWB.	<p>Dry film may become resistive and may not send PWB.</p> <ul style="list-style-type: none"> ● Static electricity is generated on dry film on tacking plate, film guide. ● Tacking plate and film guide adsorption are on. Check the solenoid valve for adsorption and the air operated valve. ● The unwind resistance and tension of the dry film are strong. Adjust the film tension cylinder. Also check the dry film installation condition.

3.3.5. The PWB stops at the output conveyor.

Possible cause		Action
1	The motor is out of order.	<p>The motor torque is reduced and the conveyor can not be driven.</p> <ul style="list-style-type: none"> ● Remove the motor from the device and rotate it with the motor alone . <p>If the rotation is possible, the motor torque is decreasing. Replace the motor.</p> <ul style="list-style-type: none"> ● If it does not rotate, it is also possible that the motor controller is broken. <p>Replace the motor controller.</p>
2	Loosening of the fixing of the drive crossed helical gears.	<p>Drive crossed If there is a fixed looseness of helical gears, it can be idle and can not convey the drive to the conveyor.</p> <ul style="list-style-type: none"> ● Tighten the set screw fixing the drive crossed helical gears. <p>(Please apply screw lock agent to the screw and tighten to prevent looseness.)</p> <p>Refer to "1.3.16. Checking and adjustment the crossed helical gears" in Maintenance of Part 2. .</p>
3	The gap of the toothless gear wheel is too much.	<p>If the gap of the toothless gear wheel is too large, driving can not be transmitted to the conveyor.</p> <ul style="list-style-type: none"> ● Adjust the gap of toothless gear wheel. (1 mm). <p>Refer to "1.3.18. Checking and adjustment the gap of toothless gear wheel" in Maintenance of Part 2.</p>
4	There is no signal input from the downstream machine.	<p>If there is no signal input from the downstream machine, the board can not be discharged to the downstream machine.</p> <ul style="list-style-type: none"> ● Check the condition of downstream machine. ● Check the wiring of the signal line between this machine and the downstream machine.

3.3.6. Film can not be tacked

Possible cause		Action
1	The PWB surface temperature immediately before tacking is low.	Depending on the thickness of the board, tacking can not be done if the PWB surface temperature just before tacking is too low. <ul style="list-style-type: none"> ● If the PWB temperature is low, increase the preheating temperature.
2	Tacking temperature is low	If tacking temperature is low, it can not tack the film. <ul style="list-style-type: none"> ● Set to the proper tacking temperature. ● It is a defect of the tacking heater. Refer to "2.2.3. Replacement of the Tacking Rubber and Tacking Heater" in Maintenance of Part 2.
3	The setting time of the tacking timer is short.	If the tacking time is too short, It can not tack the film. <ul style="list-style-type: none"> ● Please extend tacking time.
4	Tacking pressure is low	If tacking pressure is too low it can not tack the film. <ul style="list-style-type: none"> ● Adjust the tacking air pressure. Upper : 0.2 ~ 0.3Mpa Lower : 0.4 ~ 0.45Mpa
5	Inadequate contact amount of dry film to tacking rubber	If the suction power of the vacuum of the tacking plate is weak, the film can not be moved during the tacking operation and it will come off the tacking rubber. <ul style="list-style-type: none"> ● Check the suction of the blower fan and the connection of the air hose. ● Check the solenoid valve for switching tacking plate suction width.
		If the film cut position is bad, the film will come off the tacking rubber during the tacking operation. <ul style="list-style-type: none"> ● Adjust the position of the cutter blade. Adjust the position of the cutter blade, if the blade contacts the cutter backup, adjust the position of the cutter backup if it is. Refer to "1.3.13. Cleaning the cutter backup" in Maintenance of Part 2.

3.3.6. Film can not be tacked (continued)

Possible cause		Action
6	After tacking, the vacuum of the tacking plate is not OFF.	If the vacuum is not turned off, the film will peel off when the tacking plate returns from the tacking position. ● Check solenoid valve and change it.
7	When the resistance at the time of withdrawing the dry film is strong, or the tension of the film is strong.	If the unwind resistance of the dry film is strong or the tension is strong, the film can not be moved during the tacking operation, and it will come off the tacking rubber. ● Check the set of dry film. ● Adjust the film tension roll.
8	Tacking rubber quality dropped	Tacking It can not be tacked due to deterioration of rubber. ● Replace the tacking rubber. Refer to "2.2.3. Replacement of the Tacking Rubber and Tacking Heater" in Maintenance of Part 2.

3.3.7. Tacking faulty alarm comes out although it is being tacked

Possible cause		Action
1	Film tension roll is not turning.	<p>This alarm is judged by counting the rotation pulse of the film tension roll. Since no pulse is generated unless the tension roll is rotating, a tacking failure alarm will result.</p> <ul style="list-style-type: none"> ● Make sure that the dry film is on the film tension roll. ● Make sure that the film tension roll is not in contact with the other. ● Please change the bearing.
2	The position and sensitivity of the sensor in the film tension roll section are not appropriate.	<p>If the position and sensitivity of the sensor in the film tension roll section are not appropriate, it is impossible to generate a pulse, resulting in a tacking failure alarm.</p> <ul style="list-style-type: none"> ● Adjust the position and sensitivity of the sensor. Adjust the sensor so that the LED display on the sensor flashes when turning the film tension roll. (Detecting dimple in tension roll)
3	Tacking failure alarm pulse counter setting.	<p>It is set as an alarm when the number of pulses is less than the setting value of the alarm counter of Tacking failure.</p> <ul style="list-style-type: none"> ● Check the actual counted value and set a value smaller than this value. U / L AFTER TACKING setting value within the tension roll counter frame on the CALIBRATION screen.

3.3.8. Position at the beginning of sticking of film is bad or not constant.

	Possible cause	Action
1	Crossed helical gears of the input conveyor, toothless gear wheel, pinch roll chain is loose.	<p>Crossed helical gear, toothless gear wheel driving the conveyor roll, if the pinch roll chain is loose, the board stop position at tacking can not be determined and the tacking dimension is not fixed.</p> <ul style="list-style-type: none"> ● Check the crossed helical gears, toothless gear wheel, and pinch roll chain. <p>Refer to "1.3.15. Checking and adjustment the tension of a pinch roll drive chain" in Maintenance of Part 2.</p> <p>Refer to "1.3.16. Checking and adjustment the crossed helical gears" in Maintenance of Part 2.</p> <p>Refer to "1.3.18. Checking and adjustment the gap of toothless gear wheel" in Maintenance of Part 2.</p>
2	After the end of the PWB passes through the edge sensor, the PWB stops for a moment with the pinch	<p>If the tip of the PWB stops momentarily at the pinch roll portion after passing through the edge sensor, the tacking dimensions are not fixed because the PWB stop position at tacking is not fixed.</p> <ul style="list-style-type: none"> ● Check the chain of the pinch roll part. <p>Refer to "1.3.15. Checking and adjustment the tension of a pinch roll drive chain" in Maintenance of Part 2. .</p> <ul style="list-style-type: none"> ● Check the height level of the pinch roll.
3	Dry film drifts from tacking plate during tacking.	<p>When the dry film shifts from the tacking plate during tacking, the film sticking start position is not fixed.</p> <ul style="list-style-type: none"> ● Check tacking plate suction, piping, solenoid valve. ● Check the set of dry film. ● Check the film tension roll.

3.3.8. Position at the beginning of sticking of film is bad or not constant. (continued)

Possible cause		Action
4	The position of the cutter blade is unsuitable.	<p>If the position of the cutter blade is not appropriate, the position will not match on the front and back sides.</p> <ul style="list-style-type: none"> ● Adjust the position of the cutter blade. <p>When tacking, check the amount of dry film on the tacking rubber and decide whether to adjust the upper side or the lower side. (It is normal that the dry film is on 1/2 ~ 2/3 of rubber)</p> <p>Refer to "1.3.13. Cleaning the cutter backup" in Maintenance of Part 2.</p>
5	The setting value does not match the actual pasting position.	<p>The setting value does not match the actual pasting position.</p> <ul style="list-style-type: none"> ● Change the "COMPEN" Of "LEADING FILM SPACE" on the RECIPE SETTING screen. <p>If you want to increase the space, increase the correction value. If you want to reduce the space, reduce the correction value. (Unit : 0.1 mm)</p>
6	Bad input conveyor encoder, loose gear or coupling.	<p>Pulse can not be generated accurately if encoder is defective or there is looseness of gear and coupling fixation.</p> <ul style="list-style-type: none"> ● Replace the encoder. ● Tighten the fixed set screw of the gear and coupling. <p>Use the screw lock agent for set screws.</p>

3.3.9. The position of the rear end of the sticking of the film is bad or not constant.

Possible cause		Action
1	Lamination roll and tacking block driving belt are loose.	When the belt is loose, the position of the end of film sticking will not be constant. <ul style="list-style-type: none"> ● Adjust the tension of the belt. Adjust the tension of the four belt evenly. Refer to "1.3.17. Checking and adjustment the drive belt tension" in Maintenance of Part 2.
2	Tacking block, backup roll gear, pulley, coupling fixation is loose.	When the set screw of the gear, pulley and coupling is loose, the tacking block Open / Close is not stabilized and the end position of film pasting is not fixed. <ul style="list-style-type: none"> ● Check whether the set screw is loose. Use the screw lock agent for set screws.
3	Loose backup roll encoder, gear and coupling.	If there is looseness in the gear or coupling fixing, or there is a defect in the encoder, the pulse can not be generated accurately. <ul style="list-style-type: none"> ● Replace the encoder. ● Tighten the fixed set screw of the gear and coupling. Use the screw lock agent for set screws.
4	The position of the film guide is not appropriate.	If the position of the film guide is not appropriate, the pasting end position does not match on the front and back sides. <ul style="list-style-type: none"> ● Adjust the position of the film guide. Upper side : If it raises upwards or puts into the back, a space will increase. If it lowers downward or take out to front, a space will decrease.

3.3.9. The position of the rear end of the sticking of the film is bad or not constant.

(continued)

Possible cause		Action
4	The position of the film guide is not appropriate.	<p><u>Lower side</u> :</p> <p>If it lowers downward or puts into the back, a space will increase.</p> <p>If it raises upwards or take out to front, a space will decrease.</p> <p>Refer to "1.3.14. Cleaning the film guide" in Maintenance of Part 2.</p>
5	The setting value does not match the actual pasting position.	<p>The setting value does not match the actual pasting position.</p> <ul style="list-style-type: none"> ● Change the "COMPEN" Of "TRAILING FILM SPACE" on the RECIPE SETTING screen. <p>If you want to increase the space, reduce the correction value.</p> <p>If you want to reduce the space, increase the correction value. (Unit : 0.05 mm)</p>
6	There is a difference on the upper / lower side at the open position of the tacking block.	<p>If the open position of the tacking block is different between the upper side and the lower side, a difference occurs at the pasting end position of the front and back sides.</p> <ul style="list-style-type: none"> ● From the CALIBRATION screen, go to the TACKING BLOCK screen and adjust "ADDRESS 2". (μ)

3.3.10. Film sticking Horizontal position is bad or not constant.

Possible cause		Action
1	Dry film centering is not done.	If the dry film setting position is not at the center of the PWB, the left and right sticking dimensions will not be constant. <ul style="list-style-type: none"> ● Set the dry film so that it is at the center position of the PWB. Refer to "4.1.1.3. Loading of DF Unit" in Operation of Part 1.
2	The PWB width setting for centering of the input conveyor is not appropriate.	If the PWB width setting for the centering of the input conveyor is not appropriate, the left and right sticking dimensions will not be constant. <ul style="list-style-type: none"> ● Make sure that the centering width setting is appropriate for the width of the board and the centering bar is installed correctly. Refer to "4.2. Adjustment of centering width" in Operation of Part 1.
3	It is tilted before the PWB enters the pinch roll portion.	When the PWB enters the pinch roll, if it is rotating, it will also rotate into the laminate roll, and the sticking dimension on the left and right will not become constant. <ul style="list-style-type: none"> ● Check whether PWB is entering the pinch roll straight.
4	The attachment of the film guide is inclined with respect to the laminate roll.	The film guide and the laminate roll axis must be mounted in parallel. <ul style="list-style-type: none"> ● If it is not parallel adjust the film guide. Refer to "1.3.14. Cleaning the film guide" in Maintenance of Part 2.
5	The mounting of the centering bar is tilted.	If the mounting of the centering bar is tilted, the PWB is transported diagonally, and the pasting left and right dimensions are not fixed. <ul style="list-style-type: none"> ● Adjust the centering bar installation. Adjust so that the tacking rubber of the tacking plate and the PWB tip after centering become parallel.

3.3.11. Wrinkles and air bubbles are generated in the tacking area

Possible cause		Action
1	Tacking temperature is too high.	If tacking temperature is too high, it will become the cause which air bubbles generate. <ul style="list-style-type: none"> ● Set to the proper tacking temperature. See "4.4. Create registration recipe" in Operation of Part 1.
2	Tacking time is too long.	If tacking time is too long, it will become the cause which air bubbles generate. <ul style="list-style-type: none"> ● Set the appropriate tacking time ● It is necessary to change the set time according to the thickness of the PWB. See "4.4. Create registration recipe" in Operation of Part 1.
3	Tacking rubber is worn out.	If tacking rubber is worn out, tacking pressure will not become uniform but it will become the cause which air bubbles generate. <ul style="list-style-type: none"> ● Replace the tacking rubber. Refer to "2.2.3. Replacement of the Tacking Rubber and Tacking Heater" in Maintenance of Part 2.
4	At the time of Tacking, the tip of the dry film protrudes from the tacking rubber.	If the dry film is too long and the tacking rubber protrudes, bubbles will be generated at the boundary of the part where the dry film protrudes from the rubber. <ul style="list-style-type: none"> ● Adjust the position to cut the dry film (the position of the cutter blade). The position where the dry film rides on the tacking rubber is about 1/2 ~ 2/3. Refer to "1.3.13. Cleaning of Cutter Backup" in Maintenance of Part 2.
5	Dry film flow during lamination is bad.	The flow of the dry film during lamination is bad, wrinkles are left on the tacking plate at the time of cutting, and this wrinkle occurs in the tacking part at the next tacking of the PWB.

3.3.11. Wrinkles and air bubbles are generated in the tacking area (continued)

	Possible cause	Action
5	Dry film flow during lamination is bad.	<ul style="list-style-type: none"> ● Check whether the upper laminating roll and the lower laminating roll are parallel. ● Check if the film guide is parallel to the tacking plate. Refer to "1.3.14. Cleaning the Film Guide" in Part 2 of Maintenance. ● Make sure the film tension roll is parallel to the tacking plate. ● Make sure PWB is extremely diagonal and not sent to the laminate roll ● Make sure that all solenoid valves for tacking plate suction width switching are operating properly. ● Change the laminate roll. Refer to "2.2.1. Replacement of the Laminating Roll" in Maintenance of Part 2.
6	The cutting of the cutter blade is bad.	<p>When the cutting edge of the cutter blade is bad, it becomes wrinkled when tacking.</p> <ul style="list-style-type: none"> ● Change the blade of the cutter. Refer to "2.2.4. Replacement of the Cutter Blade" in Maintenance of Part 2. ● The positional relationship between the cutter blade and cutter backup is not good. The good position of the cutter blade is the position where the vertical direction of the groove of the cutter backup is in the middle and the front and back direction is in the depth of 1/2 to 2/3. Refer to "1.3.13. Cleaning of the Cutter Backup" in Maintenance of Part 2.+ ● Adsorption of the cutter backup is weak, and the dry film can not be sufficiently held and it cuts. Check the cutter backup suction piping and air operated valve. Also check the clogging of the cutter backup hole and clean the hole and clean the surface. (Clean the hole with a thin tip like alcohol or needle)

3.3.12. Wrinkle bubbles are generated at the rear end of the PWB

	Possible cause	Action
1	After the film is cut, it falls onto the PWB.	<p>When the air hose connected to the film guide leaks air or the air operated valve malfunctions, the film does not adhere to the film guide.</p> <ul style="list-style-type: none"> ● Check the connection of the air hose and the operation of the air operated valve.
2	Dry film flow during lamination is bad.	<p>The flow of the dry film during lamination is bad, wrinkles are left on the tacking plate at the time of cutting, and this wrinkle occurs in the tacking part at the next tacking of the PWB.</p> <ul style="list-style-type: none"> ● Check whether the upper and lower laminate rolls are parallel. ● Check if the film guide is parallel to the tacking plate. Refer to "1.3.14. Cleaning of the Film Guide" in Maintenance of Part 2. ● Make sure the film tension roll is parallel to the tacking plate. ● Make sure PWB is extremely diagonal and not sent to the laminate roll ● Make sure that all solenoid valves for tacking plate suction width switching are operating properly. ● Change the laminate roll. Refer to "2.2.1. Replacement of the Laminating Roll" in Maintenance of Part 2.
3	Lamination roll and preheating temperature (PWB surface temperature) are high.	<p>If the laminate roll and preheating temperature (PWB surface temperature) are high, wrinkles and bubbles are likely to occur.</p> <ul style="list-style-type: none"> ● Check the actual surface temperature. Refer to "1.3.9. Measurement of the Laminating Roll Temperature Distribution" in Maintenance of Part 2. ● Try lowering the set temperature.

3.3.12. Wrinkle bubbles are generated at the rear end of the PWB (continued)

Possible cause		Action
4	The up and down movements of the laminate roll and the backup roll are not synchronized on the left and right.	<p>If the up and down movements of the laminate roll and the backup roll are not synchronized on the left and right, the pressure distribution will become worse, causing wrinkles.</p> <ul style="list-style-type: none"> ● Confirm pressure distribution with pressure sensitive paper. ● Check that the speed of the left and right cylinders is the same speed.
5	The speeds of the laminate roll and the input conveyor are different.	<p>If the speeds of the laminate roll and the input conveyor are different, it will become the cause of wrinkles or air bubbles.</p> <ul style="list-style-type: none"> ● Adjust the speed of the laminate roll and the input conveyor to the same speed.
6	Lamination roll speed is faster than tacking block close speed.	<p>It will become the cause of wrinkles if lamination roll speed is faster than a tacking block closing rate.</p> <ul style="list-style-type: none"> ● Enter the TACKING BLOCK screen from the CALIBRATION screen and correct "CLOSING CALIBRATION" No.1 Speed (%). Increasing the number will be faster.

3.3.13. Wrinkle bubbles are generated in a portion not at the edge of the PWB

Possible cause		Action
1	Lamination roll temperature is too high.	If lamination roll temperature is too high, it will become the cause which air bubbles generate. ● Change the set temperature.
		If the detection position and interval of the temperature sensor are incorrect, the temperature display may differ from the actual temperature. ● Measure the temperature of the laminate roll and place the temperature sensor in the proper position.
2	Lamination pressure too high.	If the laminate pressure is too high, excessive force is applied to the roll, which causes wrinkles. ● Set the pressure of the roll to the recommended value.
3	PWB temperature just before lamination is too high.	If the PWB temperature just before lamination is too high, bubbles may be generated. ● Measure the PWB temperature and set the PWB preheat temperature adjustment in the previous process so that the PWB surface temperature becomes appropriate.
4	The motion of the tension roll is too mach.	If the motion of the tension roll increases, the film may slack and cause bubbles to appear. ● Adjust the tension roll and adjust the film so that it does not sag.
5	The tension roll is obliquely attached.	If the tension roll is obliquely attached, the film may be fed obliquely to the laminate roll, causing wrinkles. ● Make sure that the tension roll is attached parallel to the laminate roll.
6	The film guide is obliquely attached.	If the film guide is attached obliquely, the film is fed obliquely to the laminate roll, which causes wrinkles. ● Make sure the film guide is attached parallel to the laminate roll. Refer to "1.3.14. Cleaning of the Film Guide" in Maintenance of Part 2.

3.3.14. Roll temperature does not rise

Possible cause		Action
1	"Roll heater" button on manual operation screen is OFF.	In automatic operation, the roll heater is automatically turned on, but in manual operation the roll temperature will not rise unless the roll heater is on in the manual operation screen. <ul style="list-style-type: none"> ● Set the roll heater to "ON" on the manual operation screen.
2	The roll heater alarm was output.	When the alarm of the roll heater is output, the heater is turned OFF for safety. <ul style="list-style-type: none"> ● Check whether an alarm is output.
3	The wiring is broken.	The wiring between the control box and the terminal block is disconnected. <ul style="list-style-type: none"> ● Measure the voltage with a tester. Or turn off the power supply and check wiring continuity.
4	The heater is broken.	If the heater is disconnected, the temperature will not rise. <ul style="list-style-type: none"> ● Replace the roll heater. Refer to "2.2.2. Replacement of the Backup Roll Heater" in Maintenance of Part 2.
5	The detection part of the temperature sensor is dirty.	If the detection part is dirty, the sensor can not be detected accurately. <ul style="list-style-type: none"> ● Clean it.
6	It is a malfunction of the temperature controller and the solid state relay.	Voltage supply to the heater is impossible if there is a temperature controller or solid state relay fault. <ul style="list-style-type: none"> ● Check the temperature controller and the solid state relay, and if it has failed, replace it.
7	Breaker is tripped.	The heater or wiring are short-circuited and the breaker is tripped. <ul style="list-style-type: none"> ● Check the short circuit area and fix it. Then, turn on the breaker again.

3.3.15. Tacking temperature does not rise

Possible cause		Action
1	"TACKING HEHEATER" button is OFF in manual peration screen.	In automatic operation, the tacking heater is automatically turned on, but in manual operation the tacking temperature does not rise unless the tacking heater is ON in the manual operation screen. <ul style="list-style-type: none"> ● Turn on the tacking heater on the manual operation screen.
2	Tacking heater alarm is output.	When the tacking heater alarm is output, the heater will turn OFF for safety. <ul style="list-style-type: none"> ● Check whether an alarm is output. ● Check the alarm indicator of the tacking temperature controller.
3	The wiring is broken.	The wiring between the control box and the terminal block is disconnected. <ul style="list-style-type: none"> ● Measure the voltage with a tester. Or turn off the power supply and check wiring continuity.
4	The heater is broken.	If the heater is disconnected, the temperature will not rise. <ul style="list-style-type: none"> ● Replace the tacking heater. Refer to "2.2.3. Replacement of the Tacking Rubber and Tacking Heater" in Maintenance of Part 2.
5	It is a malfunction of the temperature controller and the solid state relay.	Voltage supply to the heater is impossible if there is a temperature controller or solid state relay fault. <ul style="list-style-type: none"> ● Check the temperature controller and the solid state relay, and if it has failed, replace it.
6	The fuse is blown or the breaker is tripped	Heater or wiring are short-circuited, blown fuse and breaker are tripped. <ul style="list-style-type: none"> ● Check the short circuit area and fix it. Then replace the fuse and turn on the breaker again.

3.3.16. The temperature of the film guide does not rise (option)

Possible cause		Action
1	The film guide heater is OFF on the manual operation screen.	At the time of automatic operation, the film guide heater turns on automatically, but in manual operation the film guide temperature does not rise unless the film guide heater is turned on on the manual operation screen. ● Turn film guide heater on manual operation screen.
2	Alarm of film guide heater is output.	When an alarm of the film guide heater is output, the heater is turned OFF for safety. ● Check whether an alarm is output. ● Check the alarm indicator of the film guide temperature controller.
3	The wiring is broken.	The wiring between the control box and the terminal block is disconnected. ● Measure the voltage with a tester. Or turn off the power supply and check wiring continuity.
4	The heater is broken.	If the heater is disconnected, the temperature will not rise. ● Replace the film guide heater.
5	It is a temperature controller, solid state relay fault.	Voltage supply to the heater is impossible if there is a temperature controller or solid state relay fault. ● Check the temperature controller and the solid state relay, and if it has failed, replace it.
6	The fuse is blown or the breaker is tripped	Heater or wiring are short-circuited, blown fuse and breaker are tripped. ● Check the short circuit area and fix it. Then replace the fuse and turn on the breaker again.

3.3.17. Alarm of temperature abnormality comes out

Possible cause		Action
1	Temperature does not rise to set value.	If the temperature does not rise to the range of the alarm set value, an alarm is generated. <ul style="list-style-type: none"> ● Refer to 3.3.17., 3.3.18., 3.3.19.
2	The temperature rises above the set value.	If the temperature rises beyond the range of the alarm set value, an alarm is generated. <ul style="list-style-type: none"> ● The temperature sensor is faulty. Replace the temperature sensor. ● The wiring of the sensor is disconnected. Check continuity of wiring with tester. ● Voltage continues to be supplied due to the failure of the solid state relay. Replace the solid state relay. ● The heater ON signal from the temperature controller does not turn OFF. Replace the temperature controller.
3	The temperature alarm setting value is too low.	When the temperature alarm setting range is too narrow, the alarm tends to occur easily. <ul style="list-style-type: none"> ● Adjust the temperature alarm set value. (±15 ~ 20°C) Note) Temperature alarm setting is only for generating an alarm. It is not a range to control the temperature.

3.3.18. The film can not be cut

Possible cause		Action
1	A chip is in a cutter blade.	If the cutter blade is chipped, the film will not be cut. <ul style="list-style-type: none"> ● Change the cutter blade. Refer to "2.2.4. Replacement of the Cutter Blade" in Maintenance of Part 2.
2	It is adhesion of a foreign substance to a cutter blade.	If the resist is adhesion to the cutter blade, it will not only difficult to cut the film, but also causes waste generation. <ul style="list-style-type: none"> ● Clean the cutter blade. Caution) Cutter blade is sharp and dangerous in cutting edge. It will easily be cut your hands. Please handle with great care. Refer to "1.3.3. Cleaning of the Cutter Blade" in Maintenance of Part 2.
3	Position of cutter blade and cutter backup	If the cutter is away from the cutter backup, the cutter will not hit the film and the film will not cut. <ul style="list-style-type: none"> ● Adjust the mounting position of the cutter running rail so that the cutter strikes the film appropriately. The good position of the cutter blade is the position where the vertical direction of the groove of the cutter backup is in the middle and the front and back direction is in the depth of 1/2 to 2/3. Refer to "1.3.13. Cleaning of the Cutter Backup" in Maintenance of Part 2..
4	Dry film adsorption is weak or not working.	If the adsorption of the cutter backup is weak, it can not be cut without being able to hold the dry film sufficiently. Also, it can not be cut unless adsorption is in operation. <ul style="list-style-type: none"> ● Check solenoid valve and air operated valve. Also check the connection of the air hose. ● Clean clogged holes in the cutter backup and dirt on the surface. (Clean the hole with a thin tip like alcohol or needle) Refer to "1.3.13. Cleaning of the Cutter Backup" in Maintenance of Part 2.

3.3.19. The film is cut obliquely

Possible cause		Action
1	Position of cutter module and running rail and cutter backup	<p>Is the cutter traveling rail obliquely attached? When the cutter running rail is obliquely attached, since the cutter runs diagonally with respect to the film, the film is cut diagonally.</p> <ul style="list-style-type: none"> ● Make sure that the mounting of the running rail is not diagonal. <p>Refer to "1.3.13. Cleaning of the Cutter Backup" in Maintenance of Part 2.</p>
2	Lamination roll speed is faster than closing speed of tacking block.	<p>If the laminate roll speed is faster than the tacking block closing speed, the dry film is obliquely cut.</p> <ul style="list-style-type: none"> ● Enter the TACKING BLOCK screen from the CALIBRATION screen and correct "CLOSING CALIBRATION" No.1 Speed (%). <p>Increasing the number will be faster.</p>
3	The traveling speed of the cutter is slow, or the tacking block closing speed is fast.	<p>If the cutter run has not ended before the tacking block finishes close, the film will be cut diagonally.</p> <ul style="list-style-type: none"> ● Reduce the line speed. (1.0 to 5.5 m / min) ● Check the cutter motor, belt, etc.
4	The PWB bends obliquely and is sent to the laminating part.	<p>When the PWB is fed obliquely to the laminating part, the film is cut obliquely.</p> <ul style="list-style-type: none"> ● Make sure centering is set to PWB width. ● Make sure PWB is not oblique at pinch roll part.

3.3.20. Cutter overrun alarm comes out

Possible cause		Action
1	Motor, motor driver and controller may be broken	Due to breakdown of the motor driver or controller, the cutter does not stop at the standby position and runs to the overrun sensor. ● Replace the driver or controller.
2	Cutter Overrun sensor failure, wiring short circuit.	Alarm occurs due to overrun sensor failure, wiring short circuit. ● Replace the sensor. ● Check continuity of wiring with a tester.

3.3.21. Cutter overtime alarm comes out

Possible cause		Action
1	Motor, motor driver and controller may be broken	The cutter does not run to the standby position due to malfunction of the motor, the motor driver or the controller. Or it takes too much time to run. (At homing : 15 seconds, manual/ automatic operation : 3 seconds) ● Replace the motor, driver, controller.
2	Cutter home position sensor defective, wiring disconnection.	An alarm occurs due to a failure of the standby position sensor or disconnection of wiring. ● Replace the sensor. ● Check continuity of wiring with a tester.
3	Loose timing belt.	There was loosening of the timing belt, and it took a long time to travel. ● Adjust the timing belt tension.
4	The cutter blade is in contact with the cutter backup.	If the cutter blade is in contact with the cutter backup it will become resistive and will stop halfway or it will take time. ● Adjust the positional relationship between the cutter blade and cutter backup. Refer to "3.3.18. The film can not be cut" in Maintenance of Part 2.
5	The dry film can not be cut and the cutter stops on the way.	An alarm will be generated if the dry film does not cut and the cutter stops on the way. ● Refer to "3.3.18. The film can not be cut" in Maintenance of Part 2.

3.4. How to adjust

Here, explain how to adjust the equipment performed in "3.3. Troubleshooting "

3.4.1. Speed adjustment method of air cylinder

The speed of the air cylinder is adjusted by adjusting the speed controller.
The meter-out control method is used for the speed controller of this machine.



What is the meter-out control method?

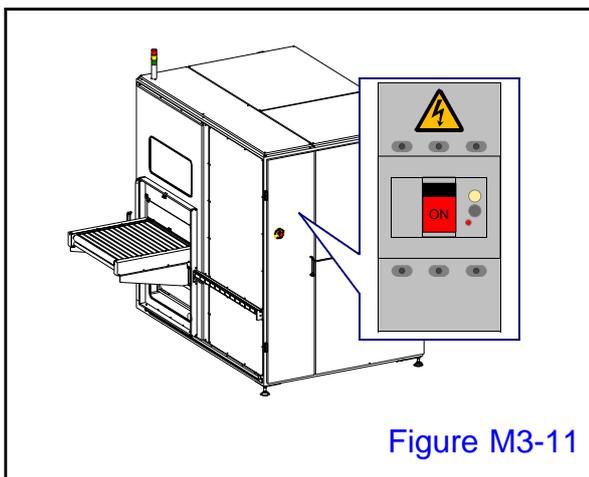
It is a control method that adjusts the speed of the cylinder by controlling the amount of air exhausted from the cylinder.

It is generally used to control double acting cylinders.

For the adjustment of the speed controller prepare the following tools.

- 8mm~10mm spanner
- 4mm Allen wrench

Checking, Adjustment Procedure



1. Turn on the main circuit breaker and supply power to the machine.

- Paste the "DURING INSPECTION : OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.

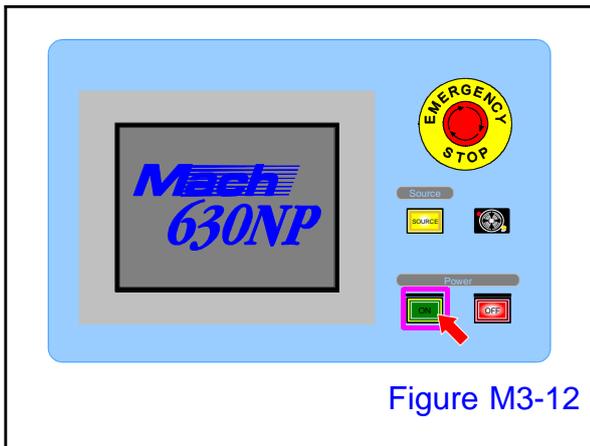


Figure M3-12

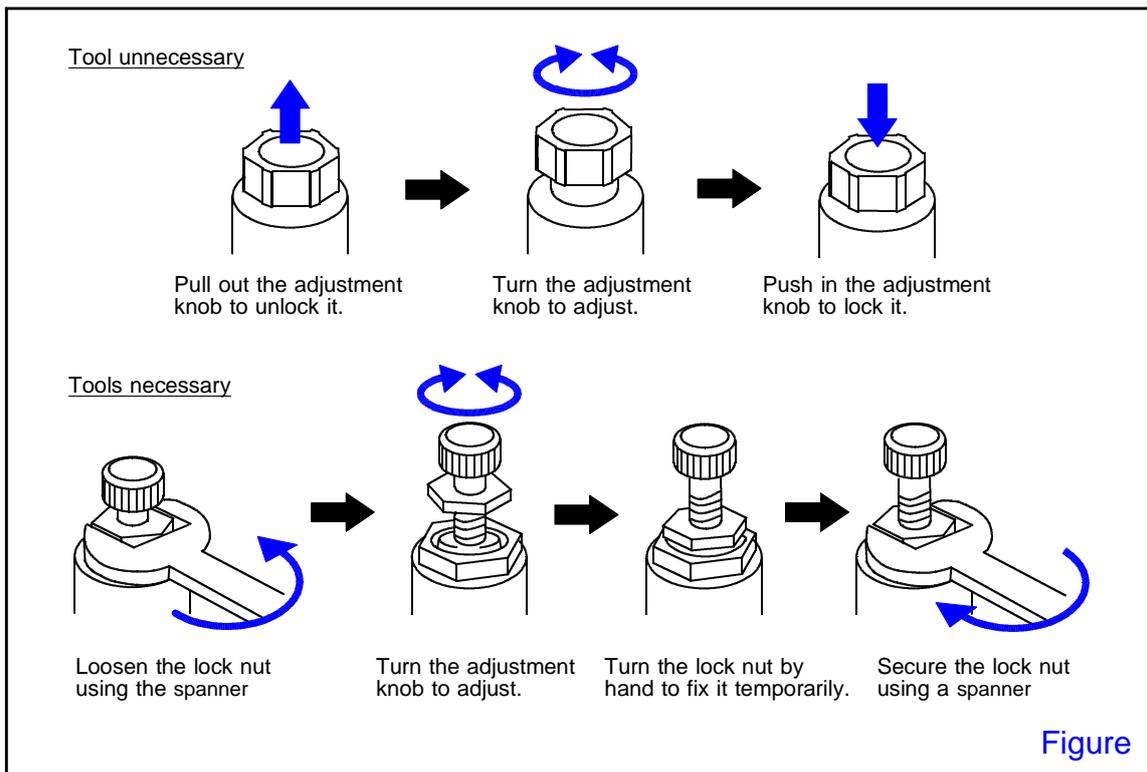
2.

Open the cover of the power "ON" button on the control panel and press it to start up the machine.

● Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

3.

There are two types of speed controllers as follows.



Figure

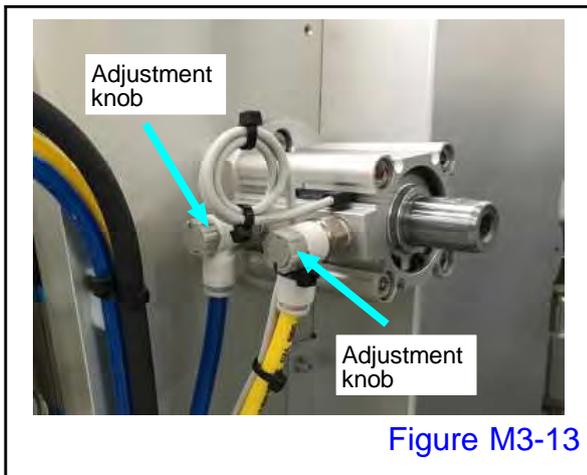


Figure M3-13

The type which does not need a tool

When pull out the adjustment knob of the speed controller, the lock is released.

Turning with pulled out state will change the operating speed of the cylinder.

When locking, push in the adjustment knob to lock it.



Turning the adjustment knob of the speed controller clockwise (closed) slows down the speed, turning counterclockwise (open) increases the speed.

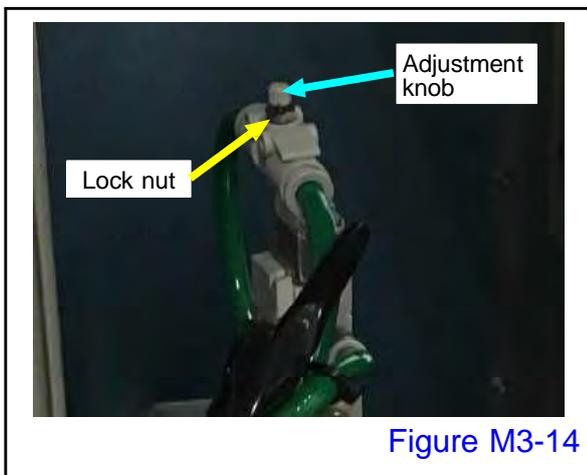


Figure M3-14

The type which needs a tool

Loosening the lock nut of the speed controller releases the lock.

Turn the adjustment knob to change the operating speed of the cylinder.

4.

The setting of the air pressure applied to the air cylinder of the tacking plate is different for the upper and lower tacking plates.

Before adjusting the speed, check that the air pressure is within the following range.

Upper side 0.20 ~ 0.25Mpa

Lower side 0.40 ~ 0.45Mpa

CAUTION

When the pressure of the upper tacking plate reaches the same pressure or higher pressure than the lower tacking plate, the tip of the Tacking plate falls from the level of PWB during tacking and pushes down the PWB. Be careful as it may contact the holding guide of the pinch roll.

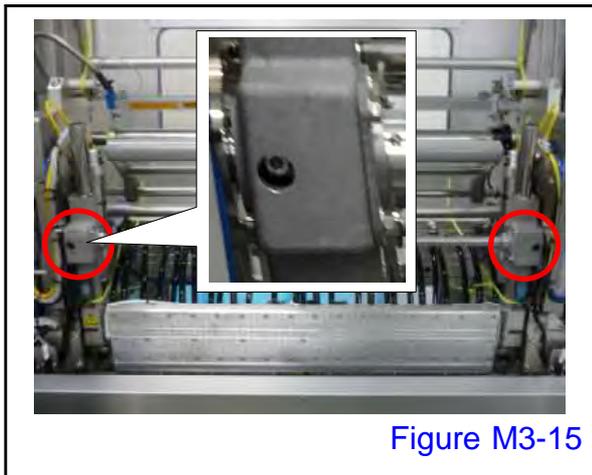


Figure M3-15

5.

Remove the bolt securing the left and right synchronizing shaft of the tacking plate and release the synchronized state.

(The head of a bolt is visible to the hole of a round mark part. Remove only one side.)

Adjust while watching the speed of the left and right cylinders.

CAUTION

When detaching the bolt fixing the synchronous shaft, be careful not to drop the bolt inside the housing.

6.

When the upper and lower tacking plates approach, be sure to adjust the lower side so that it reaches the tacking position earlier than the upper side.

This is the timing when the lower side first reaches the rising edge and the upper side reaches the falling edge.

7.

Be sure to tighten the lock of the speed controller and install the removed bolt.

With the above, the air cylinder speed adjustment method is over.

3.4.2. Sensor adjustment method of air cylinder

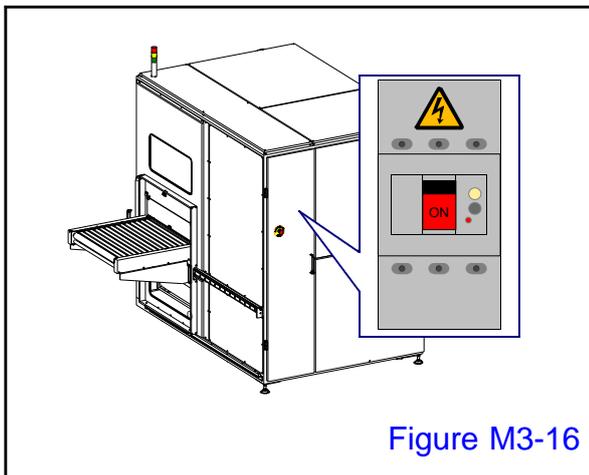
The air cylinder detects the movement of the extended end and the contracted end with a magnet sensor.

- There are two kinds of methods for fixing the magnet sensor of the air cylinder: a type fixed with a band and a type fixed to a groove of a cylinder.

Please prepare the following tools for air cylinder sensor adjustment.

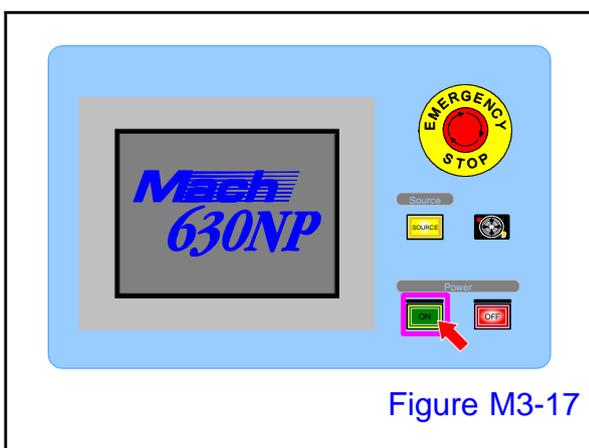
- Phillips screwdriver
- Flathead screwdriver

Checking, Adjustment Procedure



1. Turn on the main circuit breaker and supply power to the machine.

- The Source lamp lights up.
- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate.



2. Open the cover of the power "ON" button on the control panel and press it to start up the machine.

- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

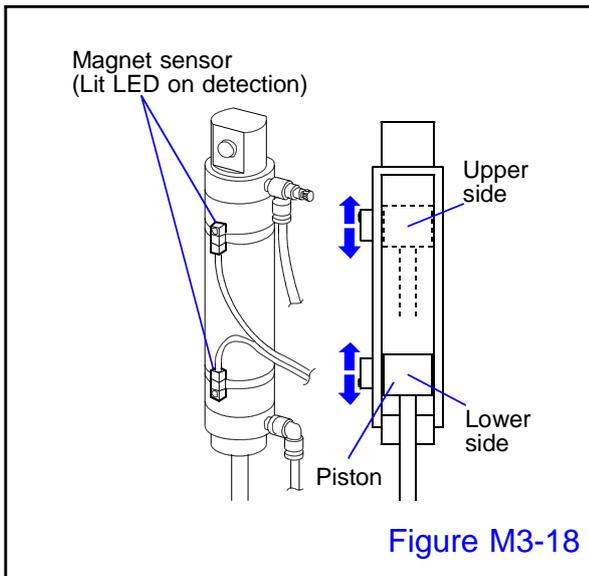


Figure M3-18

3.

Type fixed with band

Loosen the screw of the band that fixes the magnet sensor, fix it according to the detection position (LED lit) when the piston is at the extended and retracted positions respectively.

- The type fixed with band is used for tacking plate vertical movement cylinder.
- Operate "UPPER TACKING PLATE", "LOWER TACKING PLATE" button on manual operation screen.

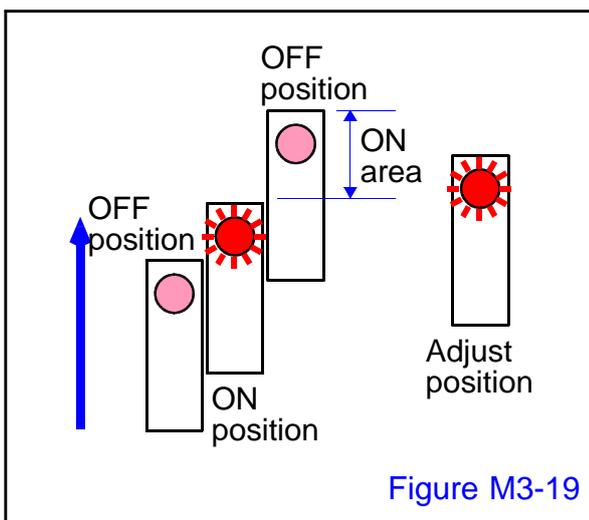


Figure M3-19

Move the sensor outward from the inner OFF position of the cylinder and draw a line at the position when it is ON.

Move the sensor to the outside as it is, and draw a line also at the position when it turned OFF.

Fix the sensor to the center position of the two lines.



- For the lower tacking plate, move the vertical movement with the "Raise", "Lower" buttons to determine the position of the magnet sensor.
- To adjust the position of the cylinder sensor for the upper tacking plate, keep the lower tacking plate in the raised position and position it with the upper tacking plate 'Raise' and 'Lower' buttons.



Prepare the thickest dummy PWB of the PWB to be produced for the extended end magnet sensor position of the upper tacking plate.

The position where the magnet sensor is in the ON state at both positions where the dummy PWB is sandwiched between the tacking plates and not sandwiched is the optimum position.

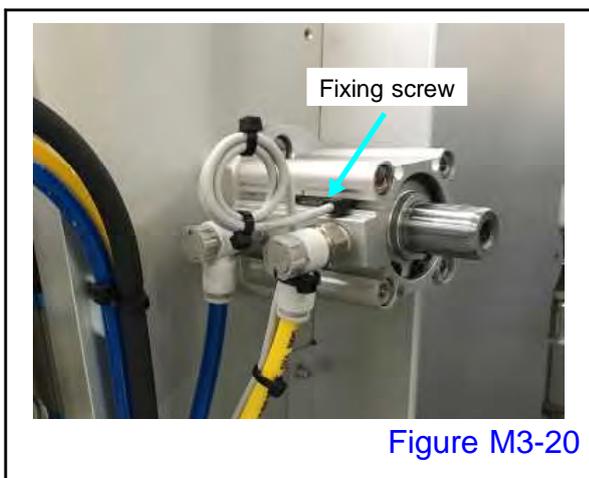


Figure M3-20

Type to fix to cylinder groove

Loosen the screw that fixes the magnet sensor, (attached to the sensor) fix it according to the detection position (LED lit) when the piston is at the extended and retracted position respectively.

Figure

- This groove fixing type is used for the cylinder such as lock pin, centering, tension roll, roll up and down.

Adjust the position of each magnet sensor, "Centering (F), (R)", "Film Tension", "Lock Pin", "Roll Up and Down".

With the above, the method for sensor adjustment of the air cylinder is the end.

3.4.3. Checking and adjustment of edge sensor

The edge sensor is located at the end of the input conveyor (downstream side, close to the laminating unit) and detects the front and rear edges of the PWB. Failure or malfunction of the edge sensor may cause variations in film pasting position, tacking defects, cut defects, etc.

Please prepare the following materials for checking and adjustment of the edge sensor.

- Test PWB

Checking, Adjustment Procedure

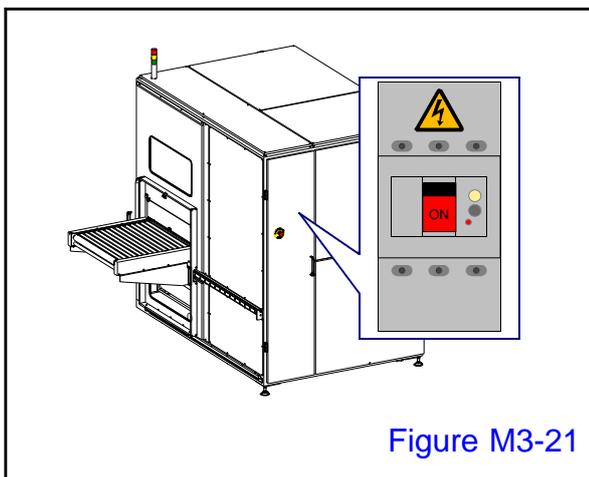


Figure M3-21

1. Turn on the main circuit breaker and supply power to the machine.

- The Source lamp lights up.
- Paste the "DURING INSPECTION: OPERATION IS PROHIBITED" tag in a place that is easy to check so that nobody except the operator will operate

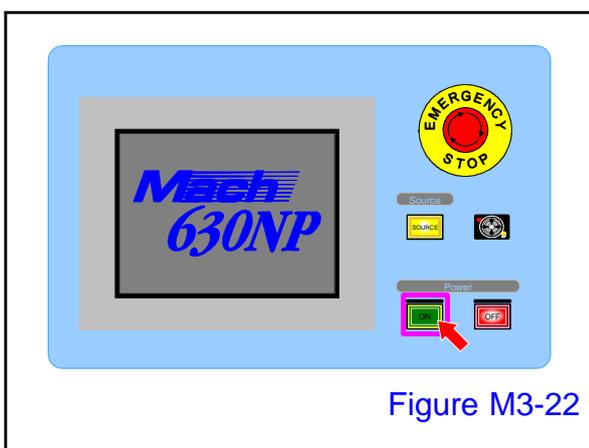


Figure M3-22

2. Open the cover of the power "ON" button on the control panel and press it to start up the machine.
- Tacking block, pinch roll, the cutter module performs homing operation. When the homing operation ends, the MAIN screen is displayed on the touch panel.

WARNING

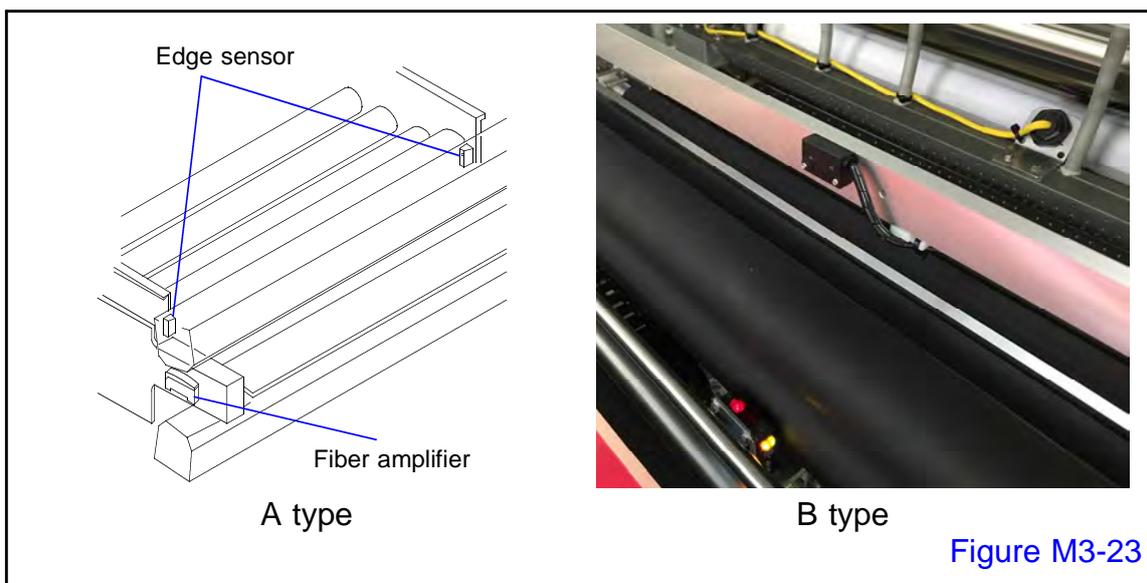


Adjustment of the edge sensor is done with the front door open. When driving the PWB, pay attention to finger pinching and entanglement to the conveyor.

CAUTION



Do not loosen the screw fixing the edge sensor. The optical axis of the light emitting part / light receiving part of the edge sensor may be lost.



There are two types of edge sensor mounting positions, A type and B type.

A type

Sensors for projecting / receiving light are installed on the front side and the back side of the conveyor.

B type

Sensors for projecting / receiving light are attached respectively at the center of the upper side and the lower side.

Here, explain it by taking B type as an example.

**NOTE**

Since the same parts are used for A type and B type, checking and adjustment method are the same.

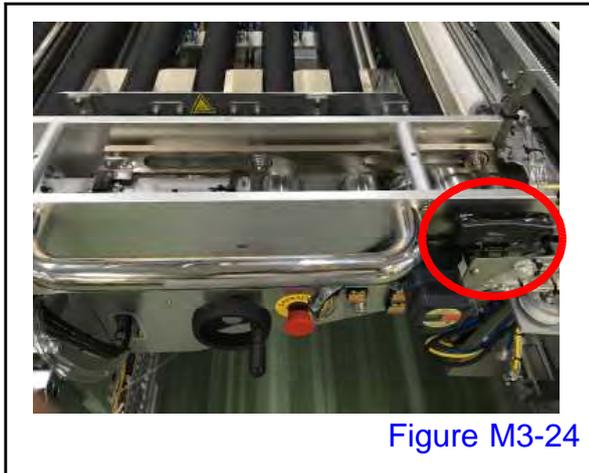


Figure M3-24

1.

Open the front door.

- The fiber amplifier is near the handle at the front end of the input conveyor (circle).

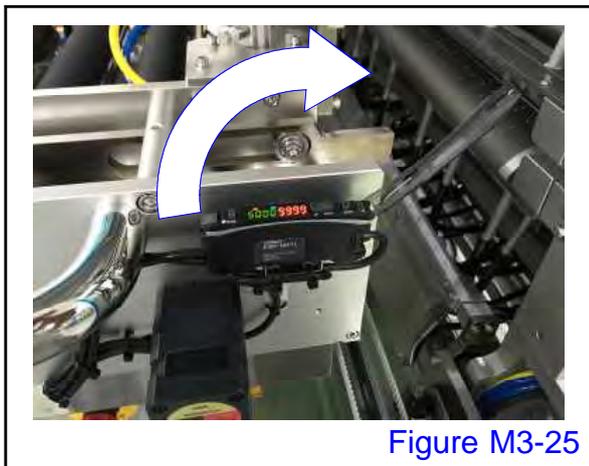


Figure M3-25

2.

Open the cover of the fiber amplifier.

3.

Place the test PWB on the input conveyor and adjust the centering width.

- For details, refer to "3.2. Adjustment of centering width of 3. Preparation for operation".

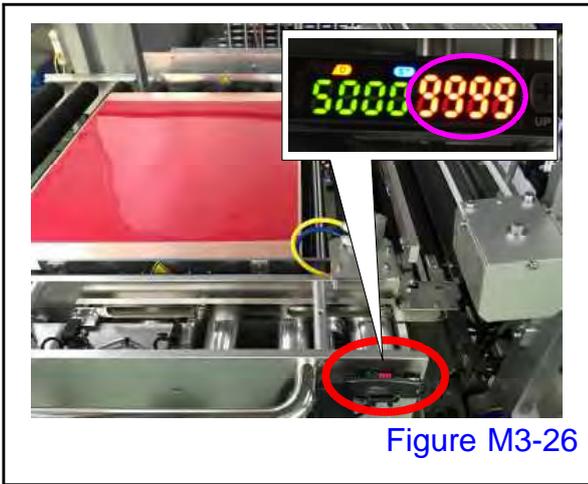


Figure M3-26

4.

Check the current value "9999" of the fiber amplifier while the test PWB is in the centering position.

- The green number is the set value, and the orange color is the current value display.
- Confirm that the PWB has not reached the edge sensor.

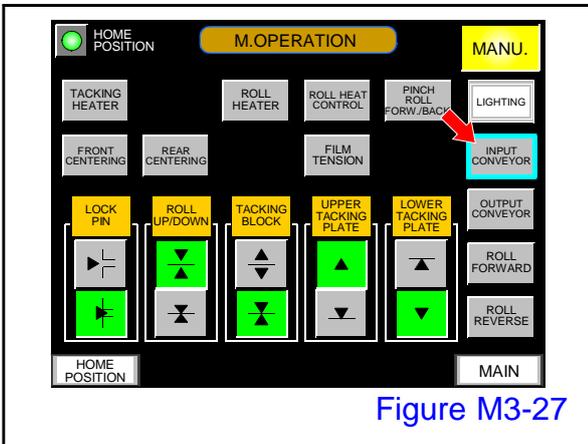


Figure M3-27

5.

In the manual operation screen of the touch panel, push the "INPUT CONVEYOR" button to turn it ON, and transfer the board front edge to the edge sensor position.

As soon as the PWB tip reaches the edge sensor position, press the "INPUT CONVEYOR" button again to turn it OFF and stop the board.

- Operation on the manual operation screen will not be accepted unless you press the "MANUAL" button on the main screen to enter the manual mode.

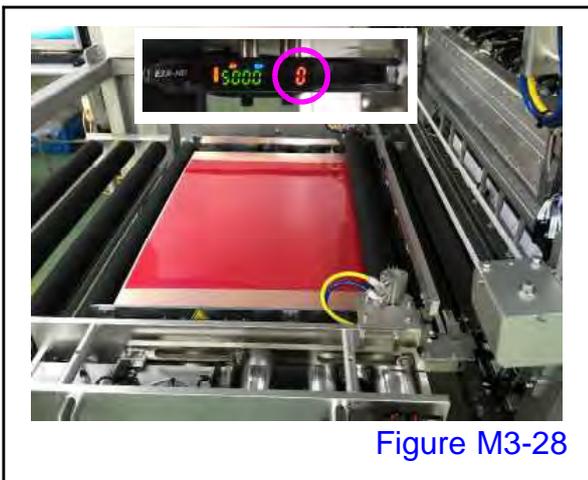


Figure M3-28

6.

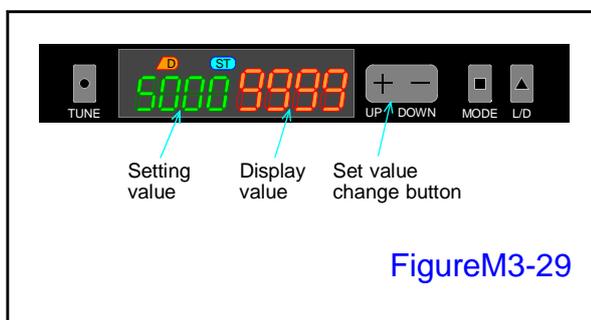
When the test PWB is at the position of the edge sensor, check the current value "0" of the fiber amplifier.

- The green number is the set value, and the orange color is the current value display.

- Although the ideal value of the fiber amplifier's current value is "0", it may not necessarily be "0" due to warping or bending of the end face of the PWB. In that case, please check that number.

**NOTE**

If production PWB has holes, slits, etc., check the current value when hole or slit is at edge sensor position.



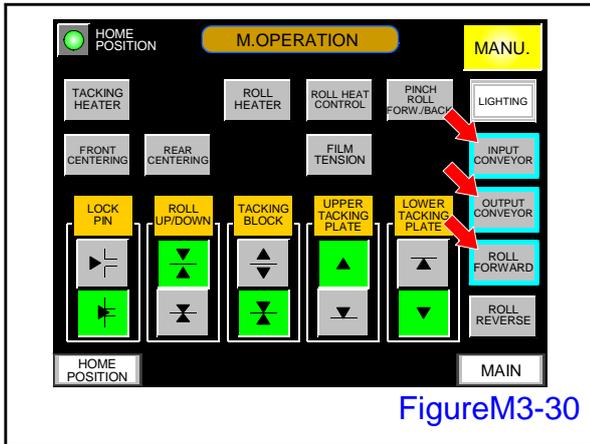
FigureM3-29

7.

Enter the value intermediate between the values checked in steps 4 and 6 to the setting value (green number) of the fiber amplifier with the set value change button. UP(+), DOWN(-)

**NOTE**

- Set the setting value to "5000" when the numerical value in step 4 is "9999" and the numerical value in step 6 is "0".
- If the production PWB has holes or slits, the value confirmed in step 6 will become larger. For example, if the value in step 6 was "5000", set the setting value here to "7500".



FigureM3-30

8.

On the manual operation screen of the touch panel, push the "INPUT CONVEYOR", "ROLL FORWARD" and "OUTPUT CONVEYOR" buttons to turn them ON and discharge the test PWB.

Please pick up the test PWB on the output conveyor.

After that, turn off the buttons again input conveyor, roll forward and output conveyor.

- Operation on the manual operation screen will not be accepted unless you press the "MANUAL" button on the main screen to enter the manual mode.



After adjustment of the edge sensor, in rare cases, deviation may occur between the setting value of the film pasting position and the measured value. In this case, refer to "Part 2 Maintenance - 3.3. Troubleshooting - Film Paste Position is Bad" to adjust.

Checking / adjusting the edge sensor is now complete.