Taping Machine

User Manual

Manual #: **APE-HTM-SS-A0011**

Model #: **APE-HTM-SS-A0011**

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Revision History

Manual #	Revision	Description
APE-HTM-SS-A0011	1.0	First released.

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1. Safety

1.1 Introduction

Operating the system with any portion of the safety systems or procedures bypassed can result in severe system damage and human injury.

Extreme care and consideration were taken during the design and implementation of this system for a safe operation. However, it is mandatory that users are aware of hazards highlighted in this entire section to avoid untoward incidents that may cause equipment damage or even human injury.

1.2 Important Safety Notifications

Electrical Hazard: High voltages exist in this machinery when the electrical power is turned on. Always disconnect power when servicing machine. When operating the system, observe all practical precautions for the use of high voltage machinery, as dictated by applicable electrical codes and regulations. Observe all operating precautions as they are stated throughout this manual.

Mechanical Hazard: Never place your hands, arms, or any body part in the machine when machine is in operation. Power down the system and lockout tag out before carry on maintenance work.

Heat & Hot surface: The bottom heater on taping station and both Lead frame and tape Lamination heater's can generates heat above 200°C. Therefore, parts that have been laminated will be extremely HOT. Do not touch them with bare hands until cooled; or, use protective gloves.

NOTE	Please read through Safety chapter before carrying out installation, operation or maintenance of this machine.

1.3 General Precaution

Several hazards may be present when operating or servicing the system and extreme caution must be exercised at all times.

The hazards that may be encountered include:

- Electrical hazards
- Mechanical hazards
- Heat and Hot Surface Hazard

Existence of hazards on this system is indicated by the use of safety labels that are fixed in a visible manner.

The use of controls, replacement parts, adjustments or procedures other than those specified within this manual may result in exposure to any of these hazards.

The degree of seriousness of the hazards is indicated by the use of the following signal words:

DANGER	Indicates an imminent hazard, which, if not avoided, is extremely likely to result in death or serious injury. (Note that this signal word is limited to the extreme situations.)
WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation, which, if not avoided may result in minor or moderate injury. It is also used to alert the user against unsafe working practices and potential damage to the system.

1.4 Mechanical Hazards

Pinch Point & Mechanical Entanglement Hazards!

Will result in injury to fingers/hand if placed in equipment. Keep fingers/hand out of the equipment.

Turn power off and lock-out / tag-out before servicing.

It is essential to take the following precautions to prevent mechanical hazards:

- Do not wear loose fitting clothing, neckties or jewelry that could become entangled in moving parts.
- Do not try to remove piece parts from a moving handling system.
- Ensure that only trained and qualified personnel are permitted within the working envelope of the system.
- Identify the working envelope of the system with floor marking, signs and barriers.
- Eliminate areas where personnel might be trapped between moving and fixed parts of the system (pinch points).
- Provide sufficient room to permit safe teaching and maintenance procedures.
- Always adhere to local or company safety regulations.
- Report to the appropriate authorities should any unsafe condition is found around the area of the system.

1.5 Heat and Hot Surface

WARNING

The bottom heater on taping station and both Leadframe and tape Lamination heater's temperature generates heat above 200°C. Therefore, parts that have been laminated will be extremely HOT. Do not touch them with bare hands until cooled; or, use protective gloves.

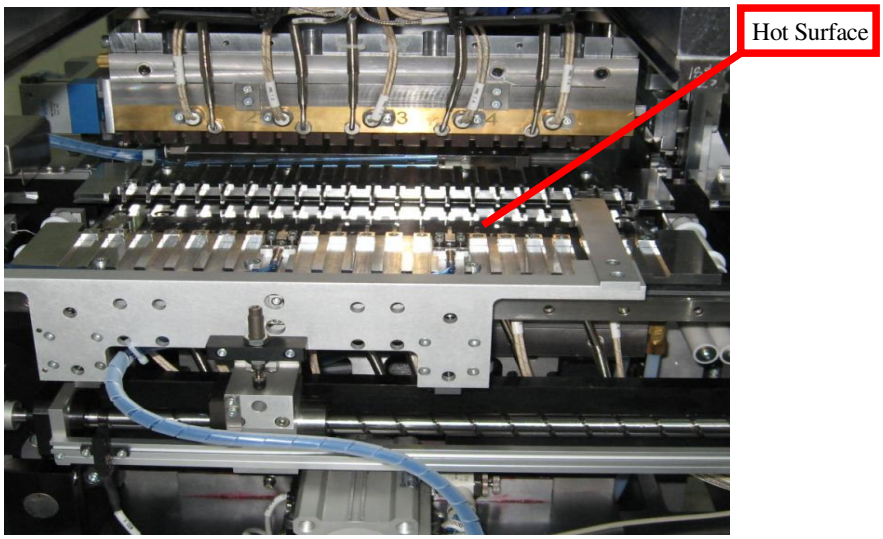


Figure 1-1: Taping Station.

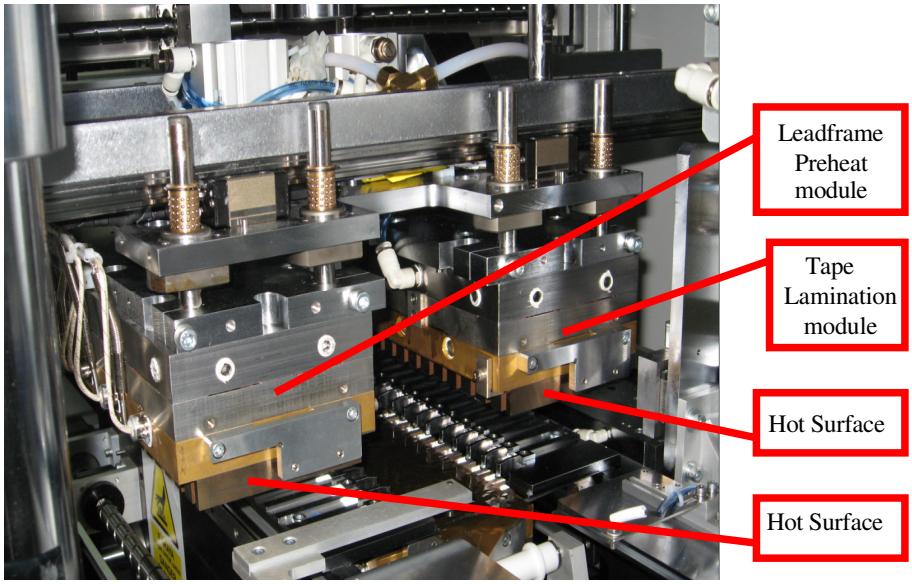


Figure 1-2: Centre Press station.

1.6 Electrical Hazards

Electrical Hazard: Power to this system is provided by **200VAC/3 phase/ 50 or 60Hz / 60A** Disconnect and lock-out tag-out the tool prior to servicing.

General electrical safety practices:

- Only trained and certified personnel should remove covers.
- Ensure that only trained personnel, familiar with electrical hazards, have access to the inside of the system.
- Follow accepted working procedures and code of practice when working on electrical components.
- Follow the requirements of the electrical safety code for the site where the machine is installed.
- Read the operating instructions of the machine before commencing any servicing.
- Never wear rings, bracelets or other jewelry when working around electrical circuits.
- Never work on electrical equipment alone. Always have a colleague nearby.
- Isolate the main power input at the circuit breaker, lock it in the OFF position and attach a notice to the circuit breaker before replacing fuses or exchanging printed circuit boards (PCB).
- Never operate the system if any main power cable is frayed or damaged.
- Never operate the system in production with safety covers removed.
- Never assume the polarities of cabling or replacement components.

1.7 Emergency OFF (EMO) Circuit

WARNING	Maintenance CANNOT be performing with the EMO button press only due to devices like PLC may remain energized from a non-hazardous power source. Perform LOTO (Lock-out & Tag-out) before performing maintenance to the machine.

The EMO Circuit is used to place the system into a safe shutdown condition, without generating any additional hazard to personnel or the facility when the EMO actuator is activated. The EMO button should be clearly labeled and clearly legible from the viewing location.

There are 4 non-lockable, self-latching with red, round mushroom head EMO buttons, 1 located at the control panel together with the touch screen monitor and 3 located on the machine body. Please refer to figure 1-3 below for EMO buttons location.

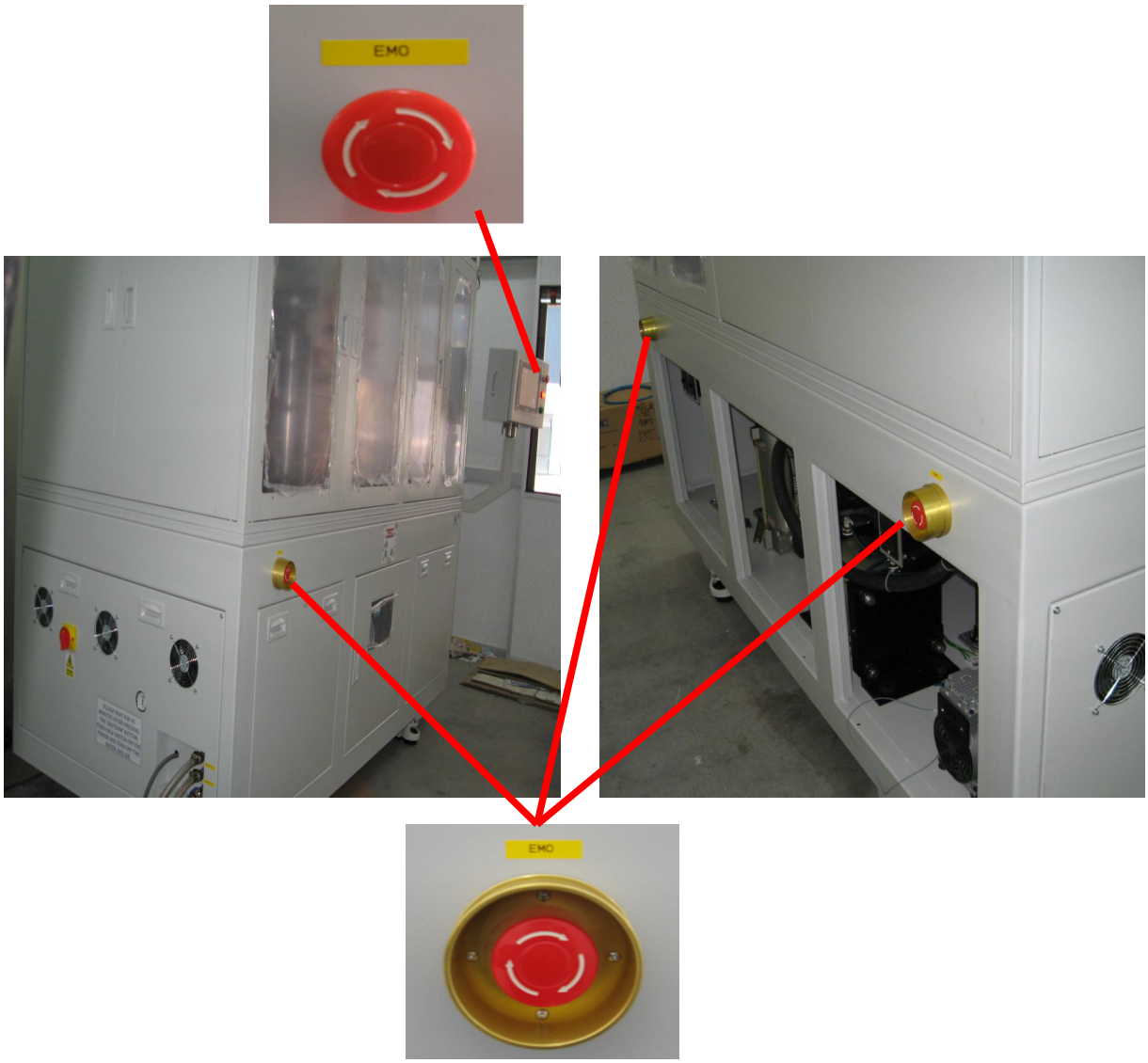


Figure 1-3: The EMO's button location.

1.8 Lockout Tagout (LOTO)

Please read through this Safety section before carrying out installation, operation or maintenance of this system.

In accordance with the OSHA Standard 1910.147, this system must be locked out prior to servicing. Lockout procedures are posted in the operating area and/or by the main energy source of the system.

If you have any questions about the lockout procedures, please see your supervisor or safety director.

1.8.1 Lock-out Tag-out Procedure

Step	Description
1	Inform operator / supervisor about work to be performed. Ensure that approval has been obtained.
2	Press the '**SHUTDOWN**' button on the control panel, then wait for **45 minutes** for the heater block temperature to cool down.
3	Press the EMO to power down the system.
4	Lock-out and tag-out on the facilities power supply switch or removal the power plug.
5	Shut off compressed air at the shut off valve.
6	Shut off the chiller water at the shut off valve.
7	Ensure that system has been de-energized electrically, Pneumatically as well as chiller water. • Pressure gauge shows '0' and pneumatic cylinders can be moved freely. • **Main Power** isolator switched to **OFF**. There should not be any sensors or LEDs illuminations seen within the system. • Chiller water pressure gauge shows '0' and seen no chiller water circulate in the system.
8	Barricade the system surrounding.
9	Remove any media or work units from the system before commencing work.

1.8.2 Restoring Lockout Tagout

Step	Description
1	Remove all tools from system.
2	Clear and clean the area from any resulting waste.
3	Remove padlock and tag.
4	Turn the main disconnect switch to position ‘ON’.
5	Turn the shut off valve to supply compressed air to system.
6	Turn the shut off valve to supply chiller water to system.
7	Inform operator / supervisor about the status of the system.

2. Installation

2.1 Console Uncrating And Placement

The machine should be carefully uncrated and inspected for damage. Follow your facility's standard procedures for making notification if any shipping damage is found.

Locate the machine in an appropriate place that allows adequate flow of cooling air. Level as required with shims if the length of the levelers provided is not enough.

2.2 System Clearance

It is recommended the system to have at least **42** inches of maintenance work space all around for service accessibility as well as personnel safety.

2.3 Facility Requirements

Button	Description
Power Capacity	200VAC/3 phase/ 50Hz or 60Hz / 60A
Compressed Air inlet	Requirement Air Pressure: 5 to 6 bars (80-90psi)
Chilled Water	2.8 bars to 3.2 bars

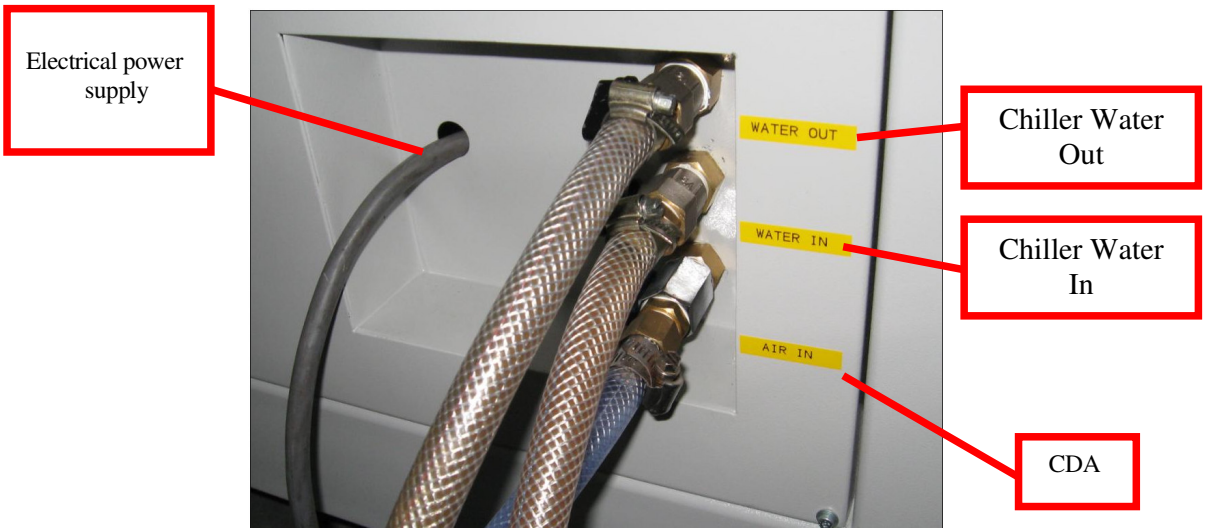


Figure 2-1: On the left bottom of the machine.

3. Machine Overview

3.1 Introduction

The Taping machine is special designed to laminate leadframe with Hitachi tape. The machine is consists of 6 major modules as listed below:

- Onload PNP
- Cleaning Station
- Taping station
- Centre Press Module / Lamination Pick & Place
- Platform Module
- Unloader PNP

The machine is fully enclosed to prevent unauthorized access and also to prevent machine hazard.

3.2 Loader Overview

The function of this module is to pickup leadframe from the leadframe box and place it to the onload conveyor. Besides that, the Onload PNP also will pickup the interleaf and place it to special made interleaf box. A sensor is installed on the Onload PNP to differentiate leadframe and interleaf.

The leadframe will then be transfer to leadframe cleaning station by the motor driven onload conveyor.

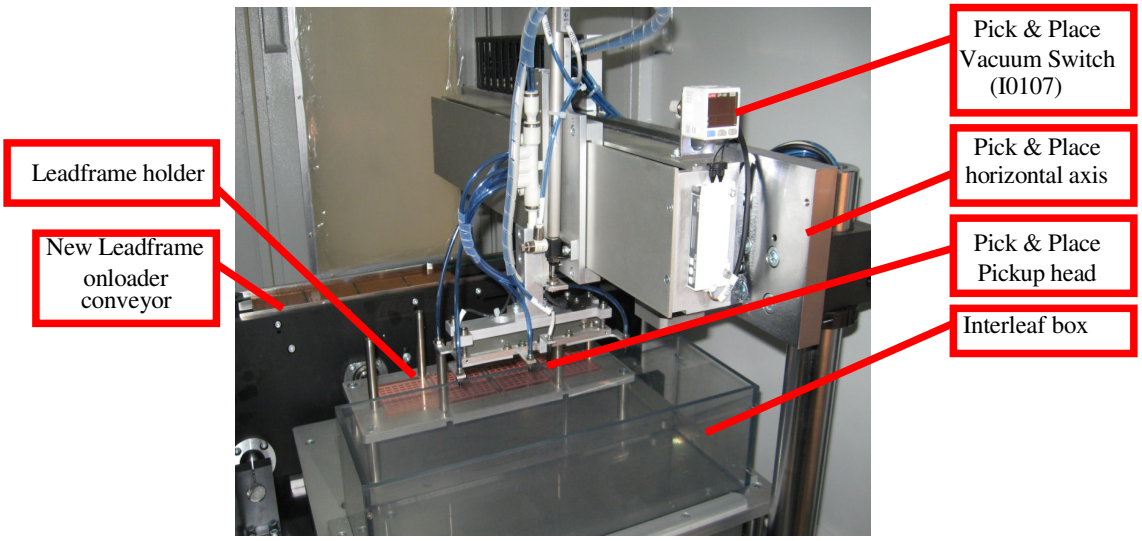


Figure 3-1: Onloader station overview.

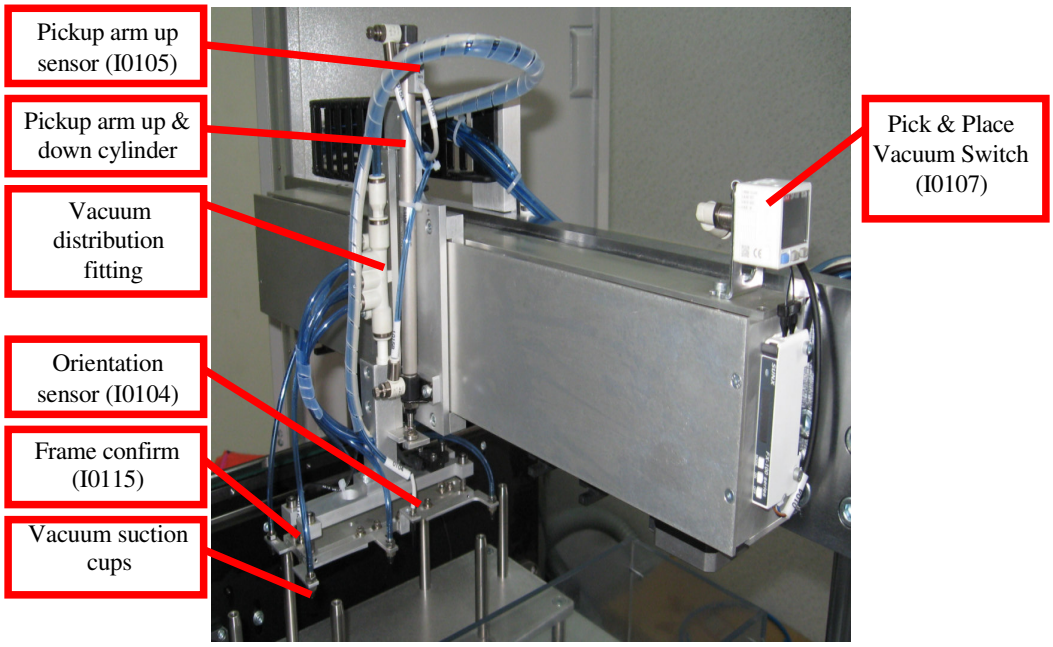


Figure 3-2: Onloader PNP.

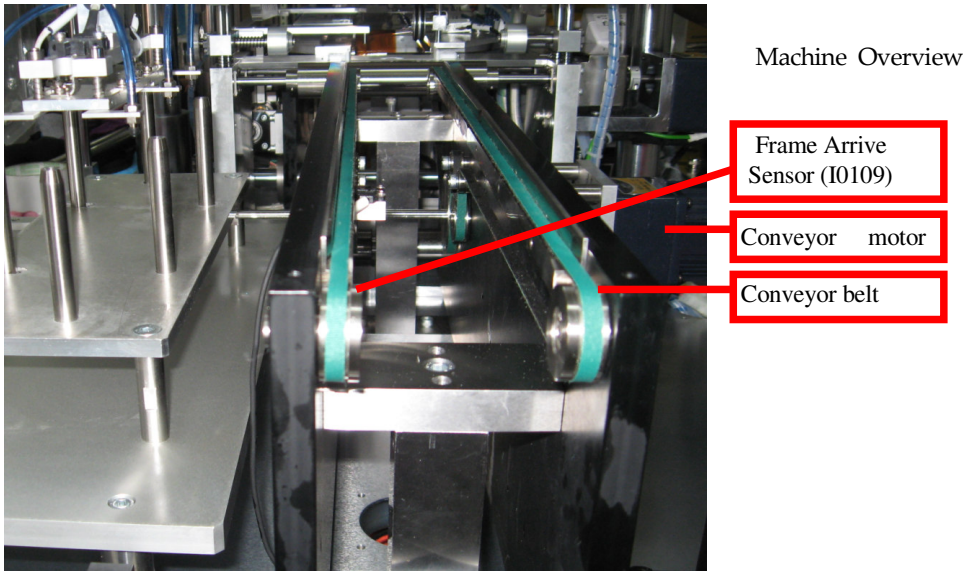


Figure 3-3: New leadframe conveyor.

3.3 Cleaning Station

The cleaning station is used to clean up the leadframe before laminate. The blue roller, with sticky surface, will come down and rolls by the motor driver shaft at the bottom and clean-up the leadframe. The machine will clean-up the blue roller with white tape after a few cycles (configurable). User also can change the blue roller when it's service life reached.

The small roller is used to push the leadframe to the taping station conveyor.

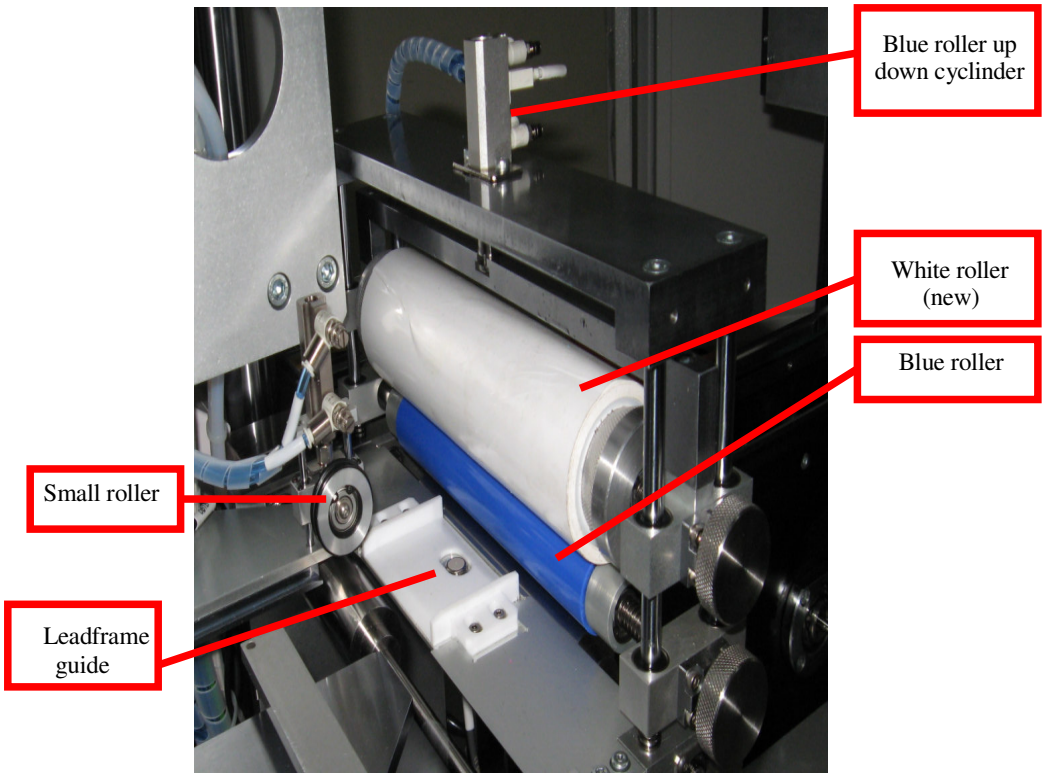


Figure 3-4: Cleaning Station.

3.4 Taping Station

When leadframe is cleaned by the roller and lay on the taping station conveyor, the leadframe Indexer will push the leadframe to taping station and move back to home position.

There is a heater on the bottom of the taping station. The surface of the bottom is cover with a layer of Teflon and Kapton. The heater will be lift up and support the leadframe during lamination process. There are fingers and precisors on the taping table which used to hold and precise the leadframe. The Teflon and Kapton will roll automatically after a few cycles (configurable by user).

The cushion actuator will move up during the lamination process to support the leadframe.

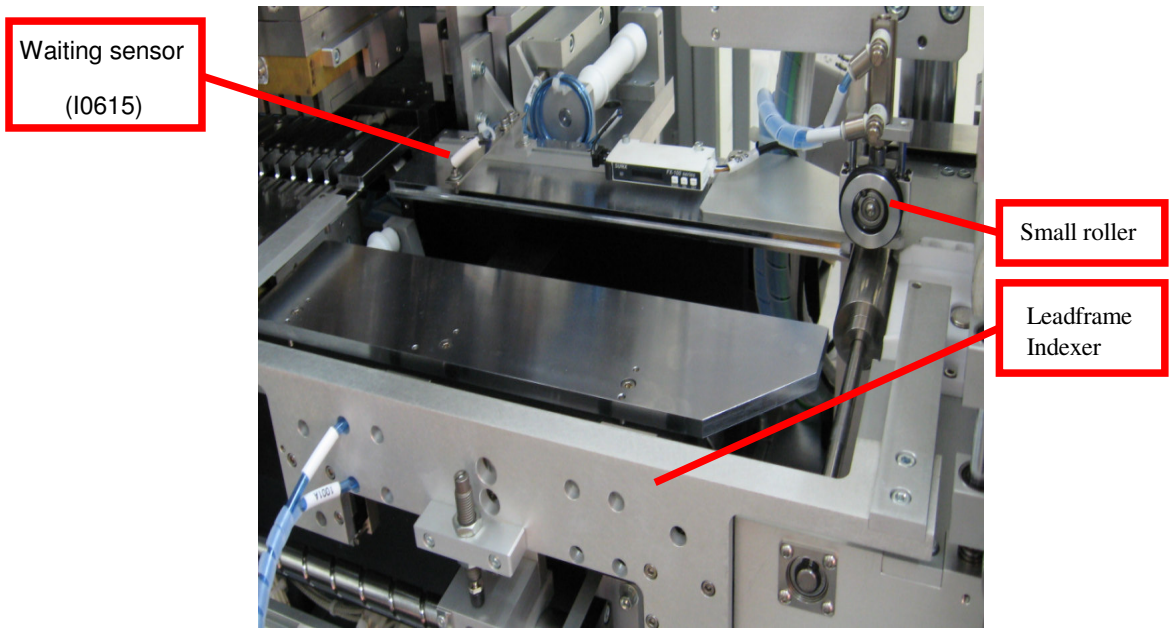


Figure 3-5: Leadframe Indexer module.

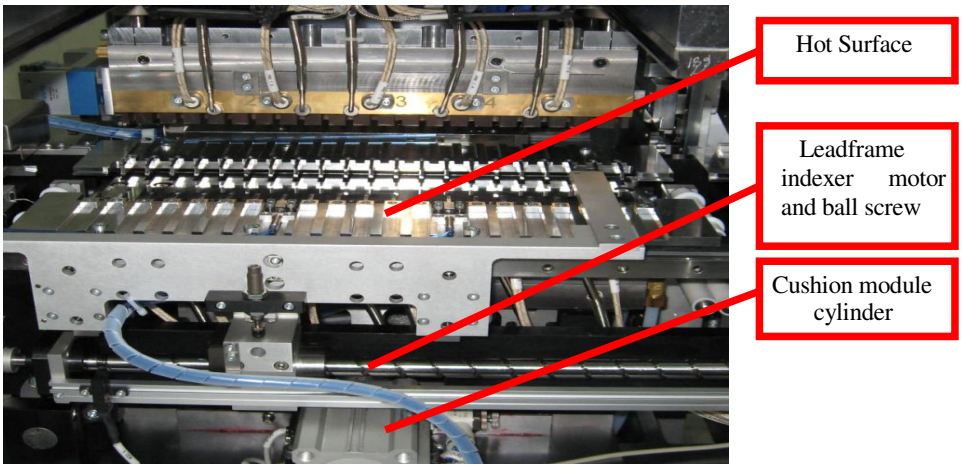


Figure 3-6: Taping Station

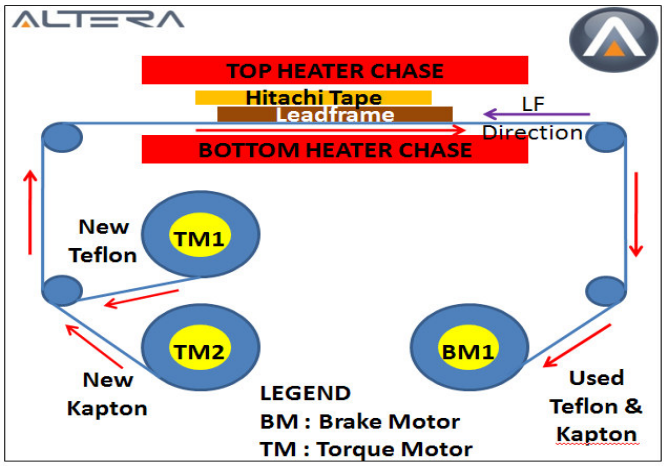


Figure 3-7: Teflon and Kapton tape installation guide.

3.5 Centre Press Station

The centre press module has of 2 head - Pre-heat and lamination. Both head are equipped with heater and cooling system. During auto cycle mode, both heater are ON and maintain at set temperature. There is an air-hydraulic cylinder on top of the taping station.

During auto cycle, when leadframe present at taping station, the pre-heat head will heat up the tape at platform station. After that, the lamination head will come and pickup the tape and move to taping station. The lamination head will then move down with the tape and the air-hydraulic actuator will apply press force on the lamination head. The leadframe will be support by the extended cushion module which also equipped with heater.

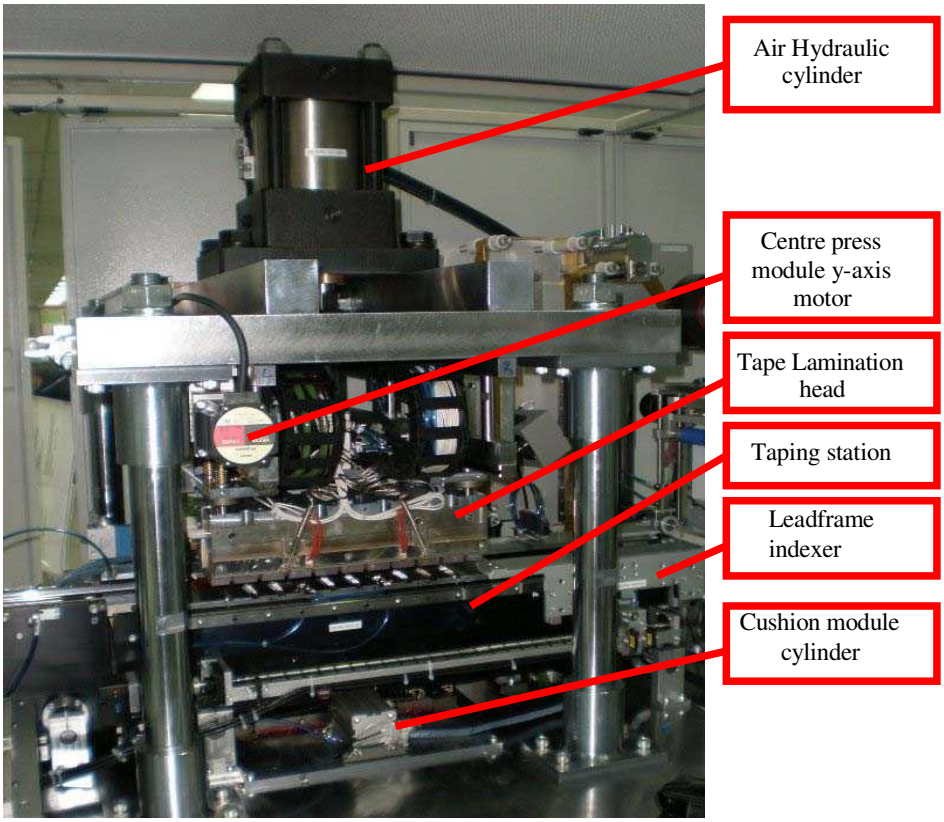


Figure 3-8: Centre Press station.

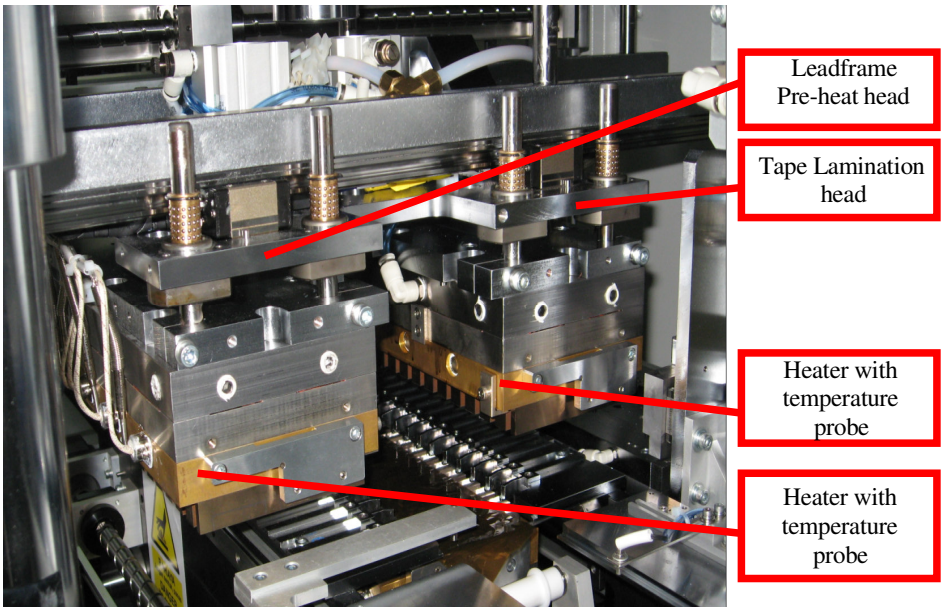


Figure 3-9: leadframe lamination and pre-heat head.

3.6 Platform Module

The platform module is located at the rear side of the machine. It is consists of 4 sub-module as listed below.

- Hitachi tape module - motor driven Hitachi tape loader
- Tape cutter - hold and cut the tape.
- Platform slider - hold the piece of tape after cut. The platform will slide to lamination head pickup position. The lifter will lift up during pre-heat process by pre-heat head.
- Tape clamper - clamp and pull the tape to required length and lay it on platform. The cutter will then cut the tape.

During auto cycle, the clamper will clamper and pull the tape to required length. The tape will lay at the platform slider and shuck by the vacuum cup on slider table. The cutter move forward and cut the tape and hold the other end of the tape. After that, the slider move forward to lamination head pickup position. The lifter will extend and support the tape while pre-heat head move down.

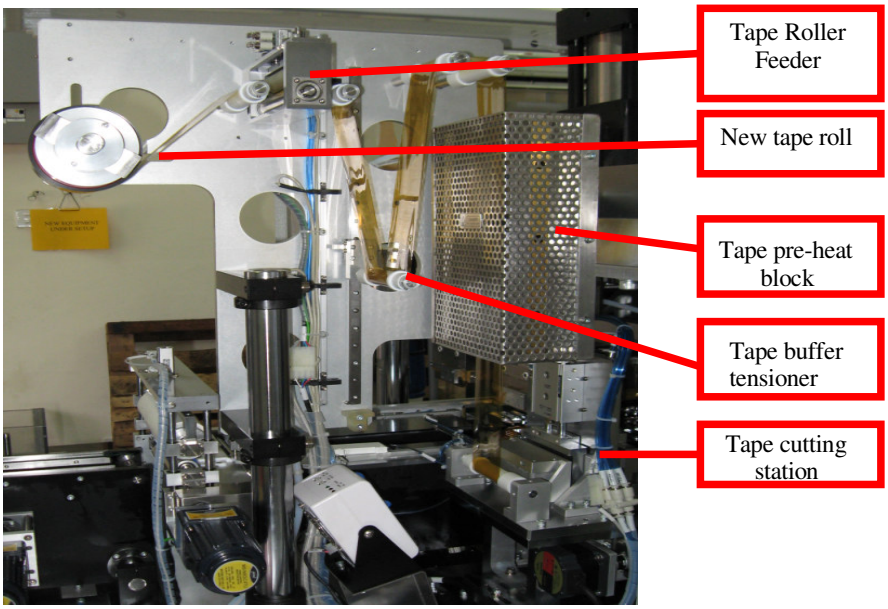


Figure 3-10: Hitachi tape module.

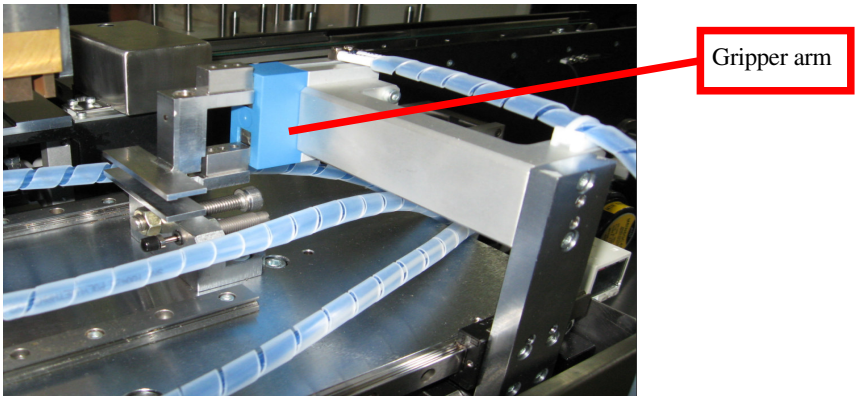


Figure 3-11: Hitachi tape clamper.

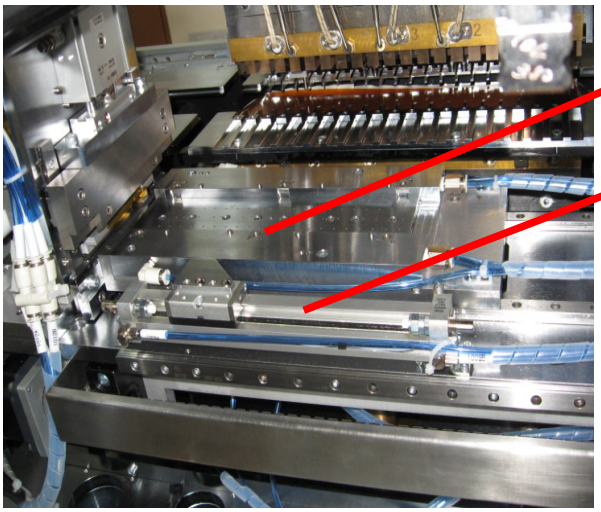


Figure 3-12: platform slider.

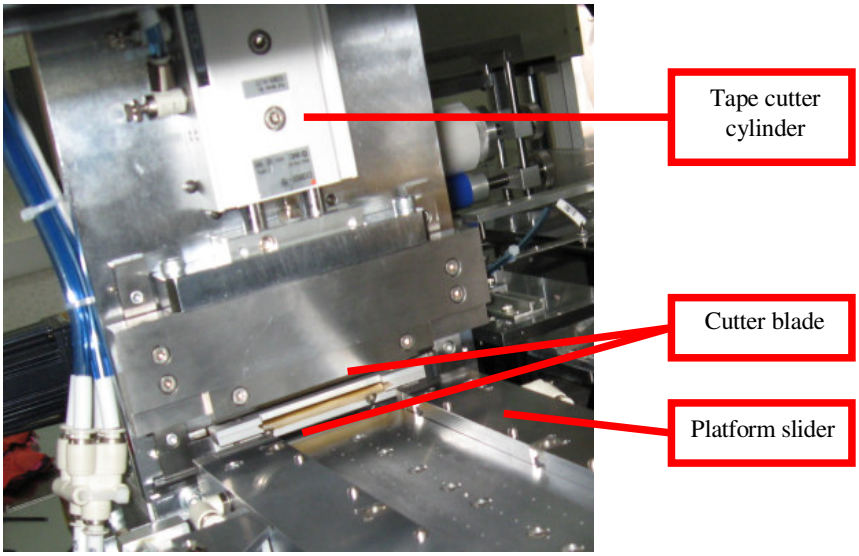


Figure 3-13: Hitachi tape module.

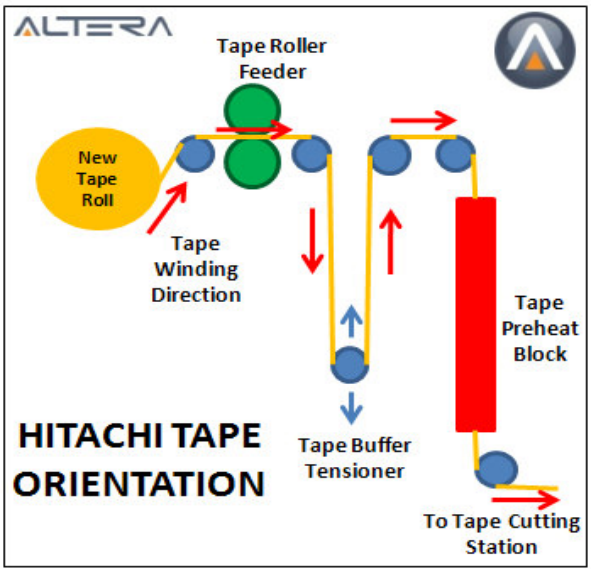


Figure 3-14: Hitachi tape installation guide.

3.7 Unloader/Offloader Overview

The unloader module is user to pick laminated leadframe from offload conveyor to leadframe holder and cover it with interleaf.

When the leadframe is laminated at taping station, the leadframe indexer will push the leadframe to offload conveyor. The leadframe will then be holding on the cooling platform to cool down. The leadframe will then convey to the end of conveyor for Offload PNP head to pickup. The PNP head will then pick leadframe to leadframe holder and cover it with interleaf.

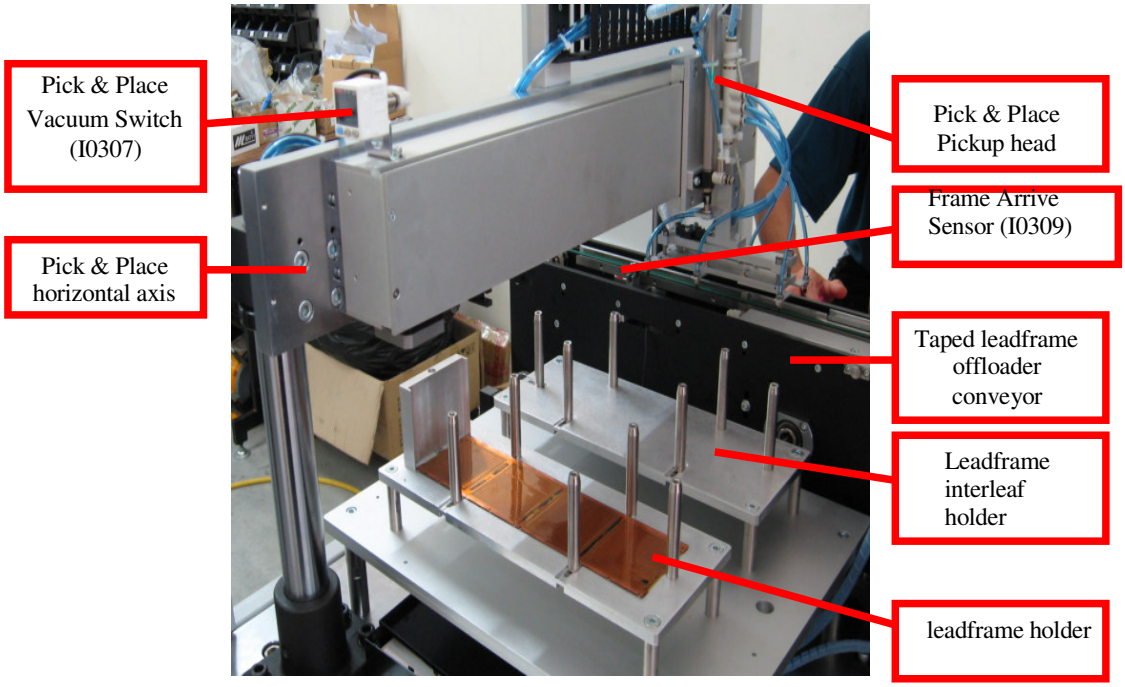


Figure 3-15: Offload Module overview.

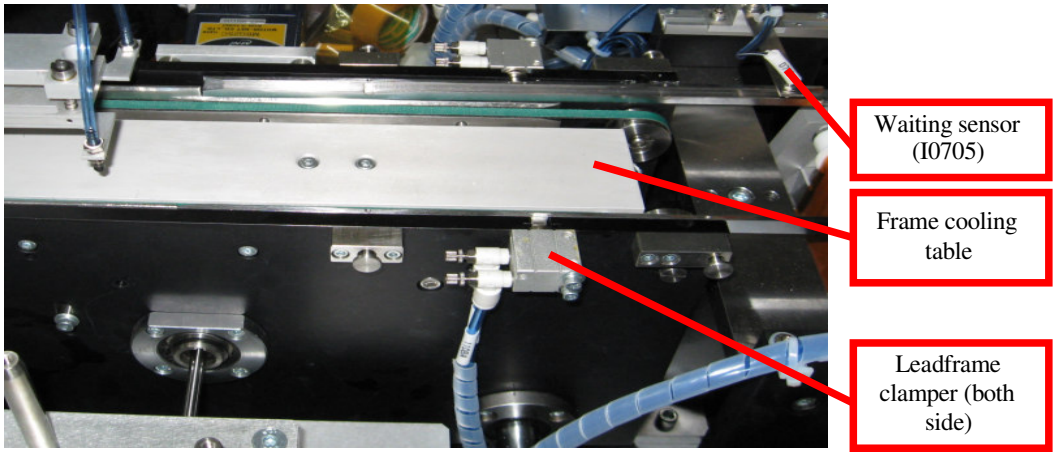


Figure 3-16: Taped Leadframe Offloader.

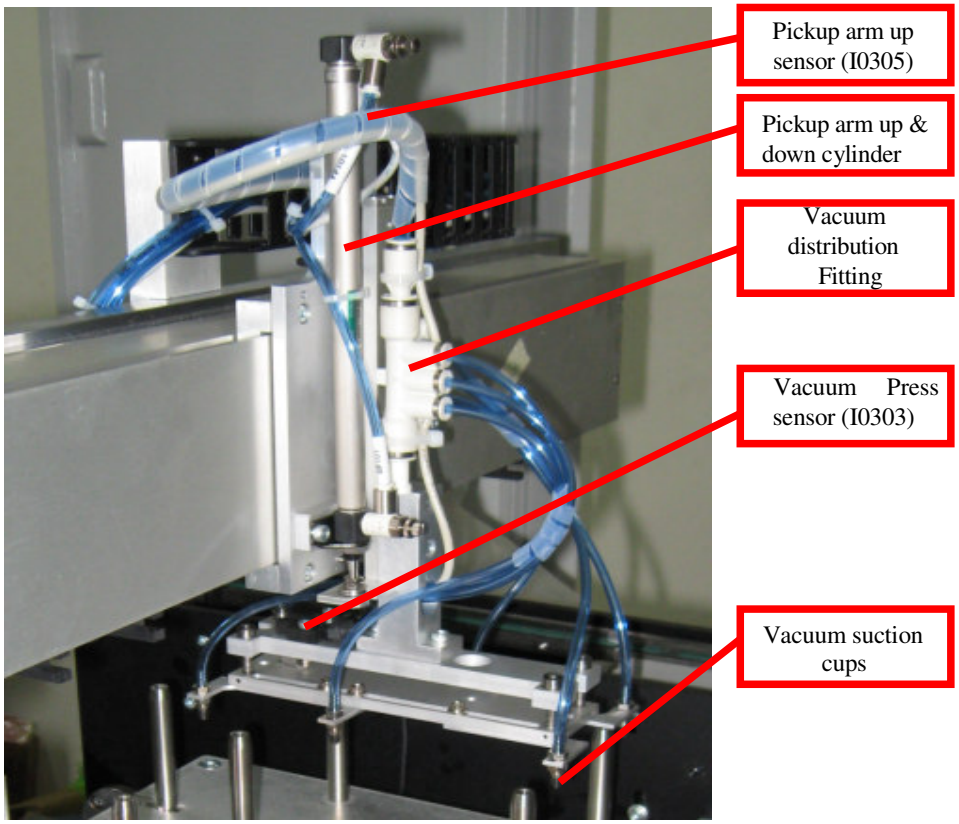
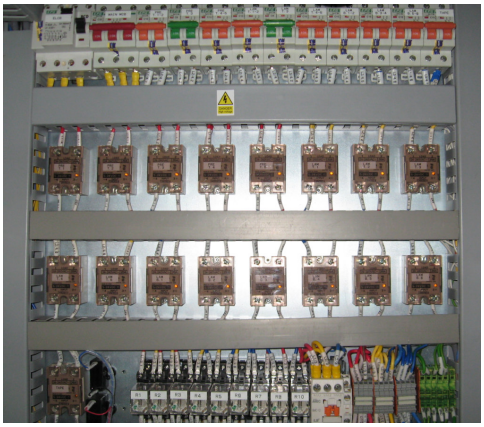


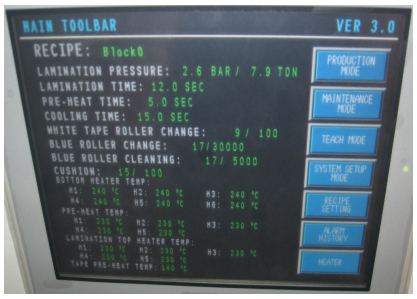
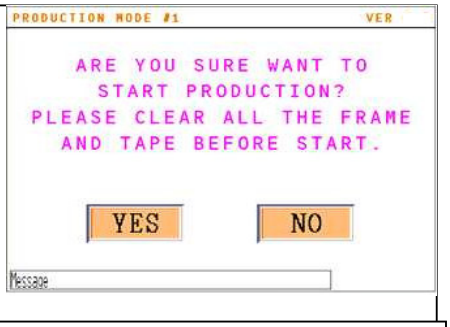
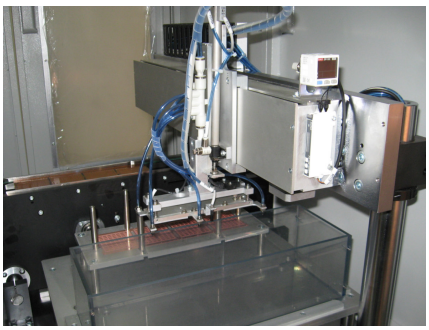
Figure 3-17: Offload PNP.

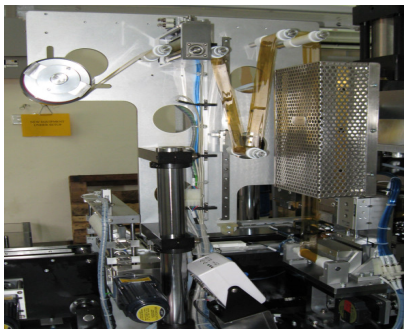
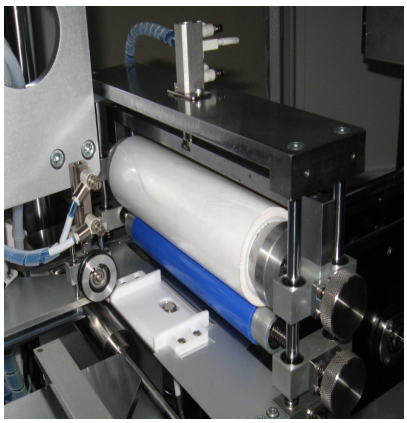
4. Operation

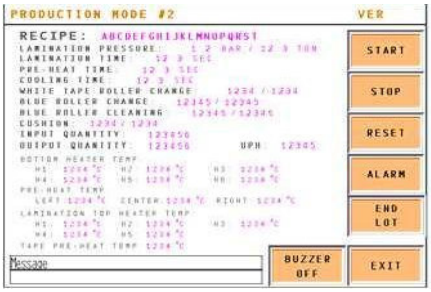
4.1 Power ON

No.	Description
1	Provide correct power supply to the machine (200VAC/ 3 Phase).
2	Provide sufficient pneumatic power. Recommended compressed pressure: 5.5 bar.
3	Access to the electrical panel and switch on machine ELCB, and switch on MCB one-by-one. 
4	Ensure that the vacuum pumps and hydraulic pump are ON.
5	The touch screen monitor will turn ON and Main Toolbar screen as shown below will prompt. 

4.2 Production Mode

No.	Description	Screen
1	At Main Toolbar screen, press on [Production Mode].	
2	Production Mode #1 screen will prompt. Clear all frames, tapes and tools. Press on [Yes] to continue.	
3	The machine will start homing. The homing process will stopped when error found. Refer to message display for error occurred. Attend to the error and press on [Reset] to continue.	
4	Production Mode #2 screen prompt when homing is completed.	
5	Load full loader leadframe box and an empty the interleaf box.	

No.	Description	Screen
6	Place interleafs into the interleaf holder Of the off loader.	
7	Load the Hitachi tape according to instruction card. Ensure that the tape is stretched properly. Ensure that the cutter is holding the tape and the tape clamper is able to clamp the tape.	
8	Ensure the white tape roller and blue roller Is hold in position properly. Refer to instruction card for more detail.	
9	Load the Teflon and Kapton properly according to instruction card. Ensure that the tape is stretched properly.	
10	Ensure that all doors and safety covers is close properly.	

No.	Description	Screen
11	Check on all 3 heaters temperature. Press on [Start] only to begin auto cycle when the temperature is up to setpoint.	

4.3 Interpreting Production Mode Screen

Production Mode screen #1 as shown below prompt when [Production Mode] on Main Toolbar screen is pressed. Clear all frame and tape on the machine and press on [Yes] to continue.

Production Mode screen #2 will prompt. Press on [Exit] to back to Main Toolbar screen.

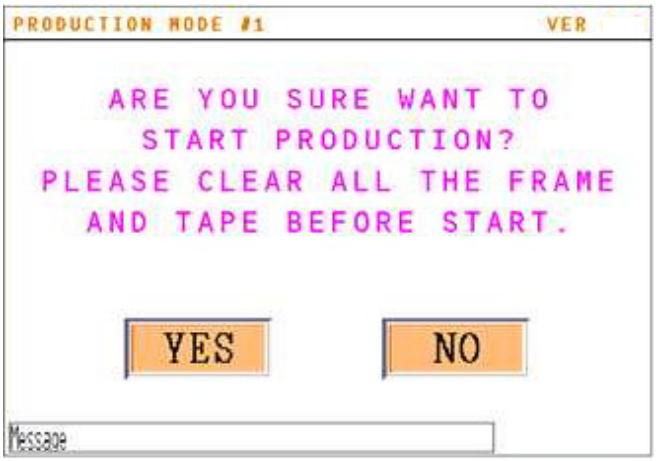


Figure 4-1: Production Mode #1 screen.

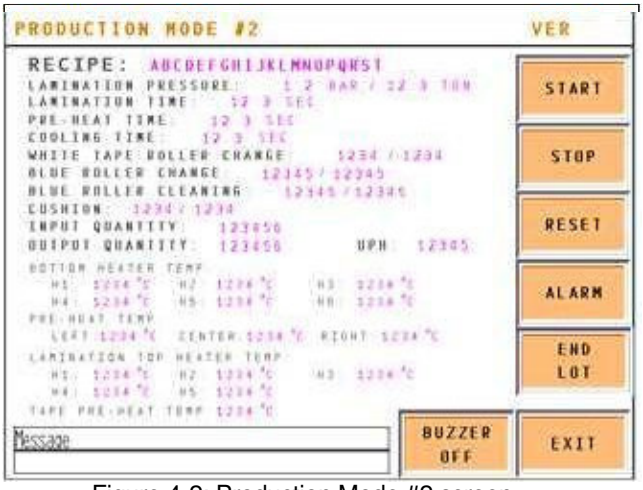
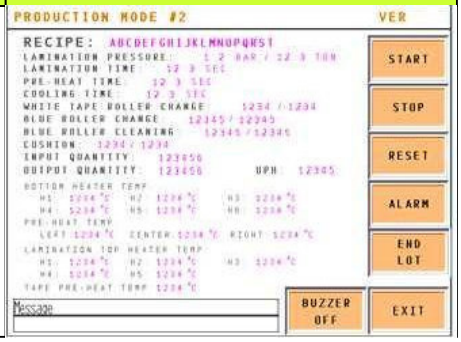


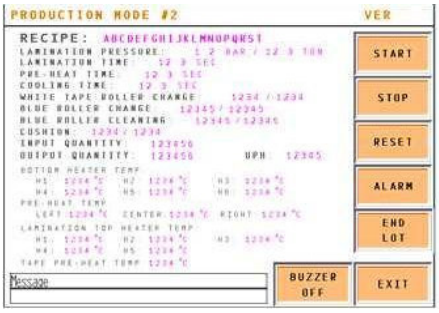
Figure 4-2: Production Mode #2 screen.

Button	Description
Start	Press to begin auto cycle mode.
Stop	Press to stop auto cycle mode.
Reset	Press to reset the activated alarm.
Alarm	Press to go to alarm page.
End Lot	Press to end lot. The machine will process the last leadframe on the onload conveyor and end lot.
Buzzer OFF	Press to silence the buzzer.
Exit	Press to exit production mode.

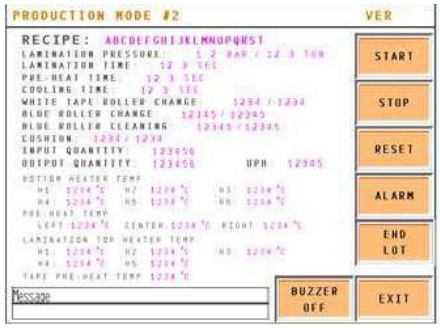
4.4 Stop Production

No.	Description	Screen
1	Wait until the machine complete all leadframe on the leadframe box. Press on [Stop] to stop production.	

4.5 Stop Production - End Lot

No.	Description	Screen
1	Press on [End Lot]. The machine will process the last leadframe on the onloader conveyor. The machine will stop automatically when last leadframe is processed.	

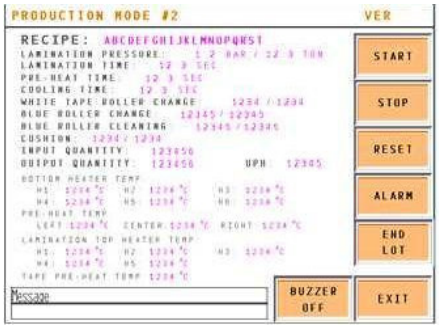
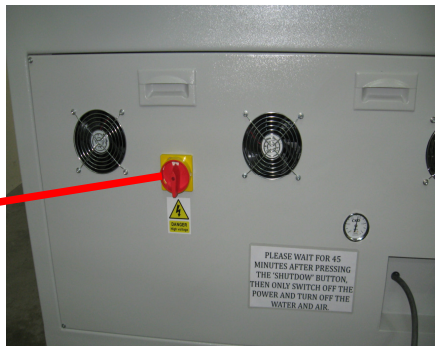
4.6 Reset Activated Alarm

No.	Description	Screen
1	When error occurred, alarm messages will display at message area. To view the alarm history, press on [Alarm] to go to alarm history screen. Attend to the error and press on [Reset] to reactivate the alarm. Press on [Start] to resume.	

4.7 Emergency Stop

No.	Description	Screen
1	For emergency, press on the **EMO** button to stop the machine immediately.	

4.8 Proper Shutdown

No.	Description	Screen
1	Wait until the machine complete all leadframe on the leadframe box. Press on [Stop] to stop production. Or, Press on [End Lot]. The machine will process the last leadframe on the onloader conveyor. The machine will stop automatically when last leadframe is processed.	
2	Press on the **EMO** button to stop the machine immediately.	
3	Go to machine isolator switch, turn the Switch to '0'.	

5. Interpreting Main Toolbar

5.1 Main Toolbar

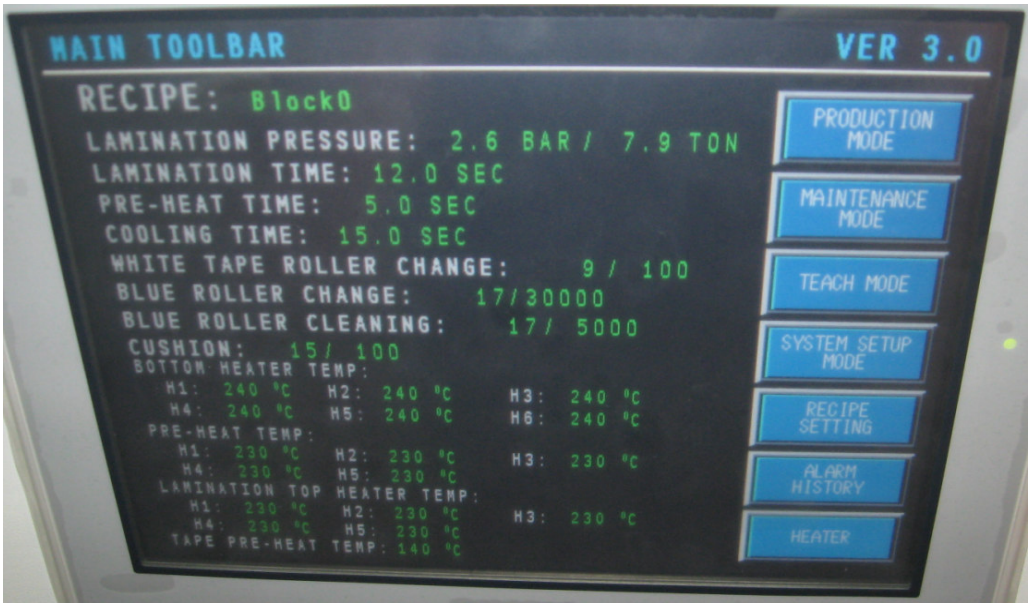


Figure 5-1: Main Toolbar screen.

5.1.1 Buttons

Button	Description
Production Mode	Press to go to production mode screen.
Maintenance Mode	Press to go to Maintenance Mode screen. In maintenance mode, user is able to check sensor functionality and jog the machine manually.
Teach Mode	Press to go to Teach Mode screen. Teach mode is used to check motor position accuracy and perform motor position teaching if necessary.
System Setup Mode	Press to go to PLC setup screen.
Recipe Setting	Press to go to Recipe Setting screen for recipe's parameters setting.

Button	Description
Alarm History	Press to go to Alarm History screen to view the alarm history.
Heater	Press to go to heater screen to perform heater's parameter setting.

5.1.2 Indicators

Indicator	Description
Recipe Parameters	
Lamination Pressure	Lamination pressure in Bar and Ton.
Lamination Time	The length of time for the frame to be laminated.
Pre-heat Time	The length of time for the pre-heat heater (top) to heat up the frame on the taping station.
Cooling Time	Frame cool down time at offload conveyor cooling plate.
White Tape Roller Change	Total of cycle to roll the white tape. The white tape is use to clean up the blue roller that cleans the leadframe.
Blue Roller Change	Blue roller life cycle.
Blue Roller Cleaning	Total of cycle before cleaning the blue roller with white tape.
Cushion	Total of cycle before changing the Teflon and Kapton.
Heater's Temperature	
Bottom Heater Temperature	Real time display bottom heater temperature in degree Celsius. The temperature is measure in 3 places, left end, center and right end.
Pre-Heat Temperature	Real time display Pre-heat module temperature in degree Celsius. The temperature is measure in 3 places, left end, center and right end.
Lamination Top Heater Temp	Real time display lamination module temperature in degree Celsius. The temperature is measure in 3 places, left end, center and right end.
Tape Pre-heat Temp	Display tape pre-heat temperature.

6. Interpreting Maintenance Mode

6.1 Maintenance Mode

Maintenance Mode screen as shown below will prompt when [Maintenance Mode] on Main Toolbar screen is pressed. Press on [Home] to back to Main Toolbar screen.

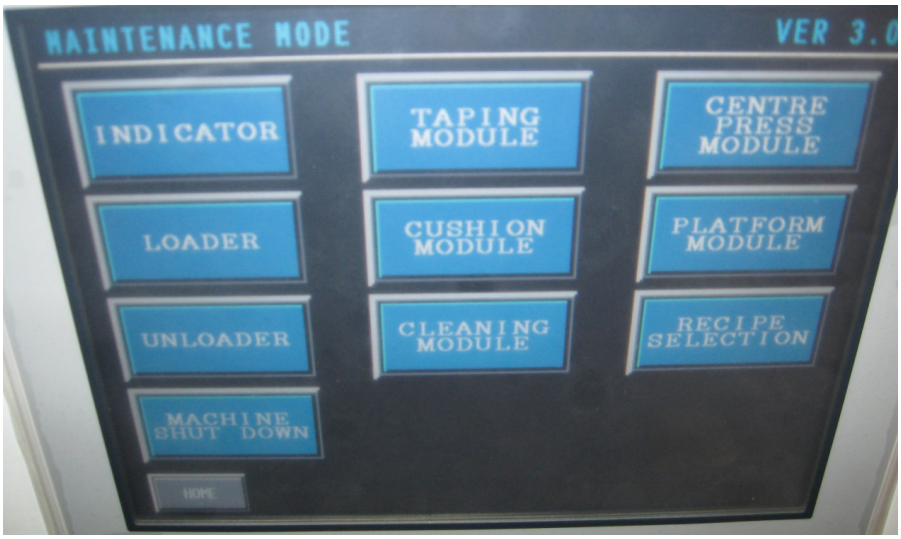


Figure 6-1: Maintenance Mode screen.

6.1.1 Buttons

Button	Description
Indicator	Press to go to Tower Light manual trigger tower screen.
Loader	Press to go to Loader module manual trigger screen.
Unloader	Press to go to Unloader module manual trigger screen.
Taping Module	Press to go to Taping module manual trigger screen.
Cushion Module	Press to go to Cushion module manual trigger screen.
Cleaning Module	Press to go to Cleaning module manual trigger screen.
Machine Shut Down	Press to go to Machine Shut Down screen.

Button	Description
Centre Press Module	Press to go to centre Press module manual trigger screen.
Platform Module	Press to go to platform module manual trigger screen.
Recipe Selection	Press to go to Recipe Selection screen.

6.1.2 Indicator - Tower Light Screen

Indicator screen as shown below will prompt when [Indicator] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

Press on the [Red], [Amber], [Green], [Buzzer], to trigger the tower light and buzzer manually.

Press on the EMO button on the right side of the touch screen. The EMO indicator light on the screen should ON.

Air Pressure sensor (I0200) status will ON, while the incoming air pressure below the setting value.

Water Level High (I0201) status will ON, while the incoming cooler water pressure above the maximum setting value.

Water Level High (I0202) status will ON, while the incoming cooler water pressure below the minimum setting value.

Figure 6-2: Maintenance Mode - Indicator screen.

6.2 Loader

Loader screen as shown below will prompt when [Loader] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

Figure 6-3: Maintenance Mode - Loader screen.

Button	Description
Pickup Arm	Press on [ON] to trigger the loader pickup arm to pickup leadframe from leadframe cassette. Press on [OFF] to release the leadframe.
Vacuum	Press on [ON] to trigger the pickup arm vacuum cup to shuck. Press on [OFF] to stop shucking.
Conveyor Motor	Press to ON/OFF the onload conveyor motor.
Air Blow	Press on [ON] to trigger the pickup arm vacuum cup to purge. Press on [OFF] to trigger the pickup arm to stop purging.

6.3 Unloader

Unloader screen as shown below will prompt when [Unloader] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

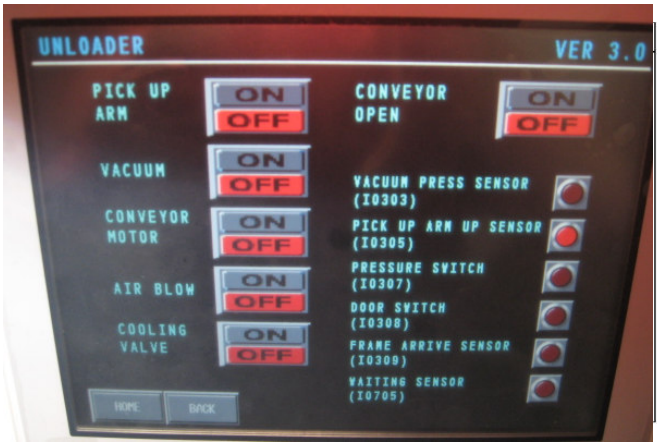


Figure 6-4: Maintenance Mode - Unloader screen.

Button	Description
Pickup Arm	Press on [ON] to trigger the loader pickup arm to pickup leadframe from leadframe cassette. Press on [OFF] to release the leadframe.
Vacuum	Press on [ON] to trigger the pickup arm vacuum cup to shuck. Press on [OFF] to stop shucking.
Conveyor Motor	Press to ON/OFF the onload conveyor motor.
Air Blow	Press on [ON] to trigger the pickup arm vacuum cup to purge. Press on [OFF] to trigger the pickup arm to stop purging.
Cooling Valve	Press on [ON] to open the cooling valve to blow the cooling table on offload conveyor with compressed air. Press on [OFF] to stop blowing.
Conveyor Open	Press on [ON] to trigger the conveyor open wider then leadframe width. Press on [OFF] to trigger the conveyor to close to leadframe width

6.4 Machine Shut Down

Machine Shut Down screen as shown below will prompt when [Machine Shut Down] on Maintenance Mode screen is pressed. Press on [Yes] to go to the Count Down screen. The system will count down 2700 seconds (45 minutes) before it prompts up the note to switch off the electricity and turn off the water and air.

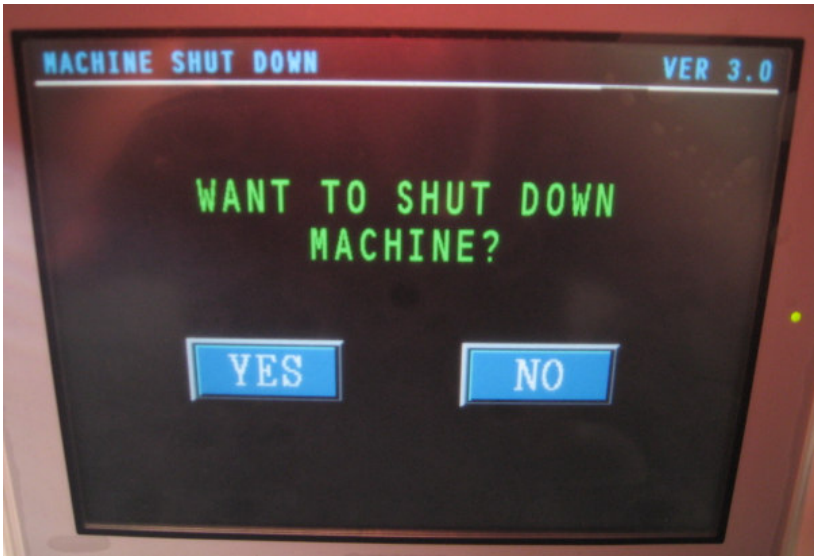


Figure 6-5: Maintenance Mode –Machine Shut Down screen.

Figure 6-6: Maintenance Mode –Machine Shut Down Count Down Screen

6.5 Taping Module

Taping Module screen as shown below will prompt when [Taping Module] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

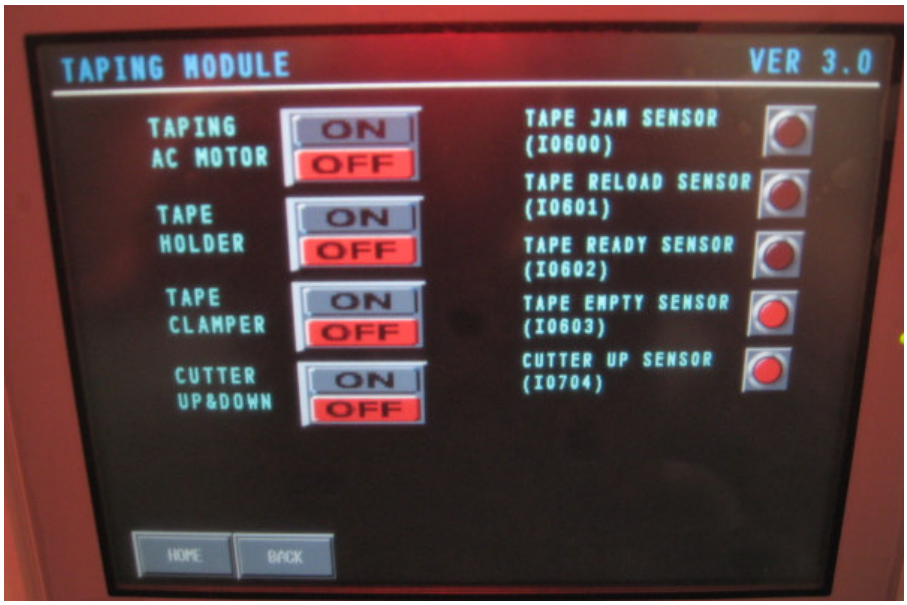


Figure 6-7: Maintenance Mode -Taping Module screen.

Button	Description
Taping AC Motor	Press to trigger the tape's (Hitachi tape) AC motor to rotate to tension the tape.
Tape Holder	Press on [ON] to trigger the holder to move down and hold the tape. Press on [OFF] to trigger the holder to move up or release.
Tape Clamper	Press to trigger the tape clamper to clamp to release tape.
Cutter Up & Down	Press on [ON] to move cutter up. Press on [OFF] to move down cutter or cut the tape.

6.6 Cushion Module

Change Cushion Mode screen as shown below prompt when [Cushion Module] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

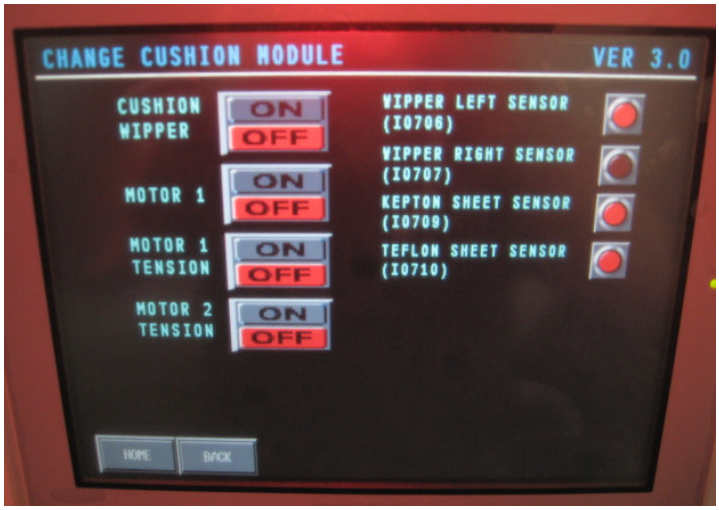


Figure 6-8: Maintenance Mode -Change Cushion Module screen.

Button	Description
Cushion Wiper	Press on [ON] to trigger the wiper to move forward. Press on [OFF] to trigger the wiper to move backward. The wiper finger is in between bottom heater and Teflon tape. The wiping process is to prevent Teflon tape stick on the bottom heater top surface.
Motor 1	Teflon & Kapton tape winding brake motor (or BM1). Press to ON/OFF the brake motor.
Motor 1 Tension	Teflon tape unwinding tension motor (or TM1). Press to ON/OFF the motor.
Motor 2 Tension	Kapton tape unwinding tension motor (or TM2). Press to ON/OFF the motor.

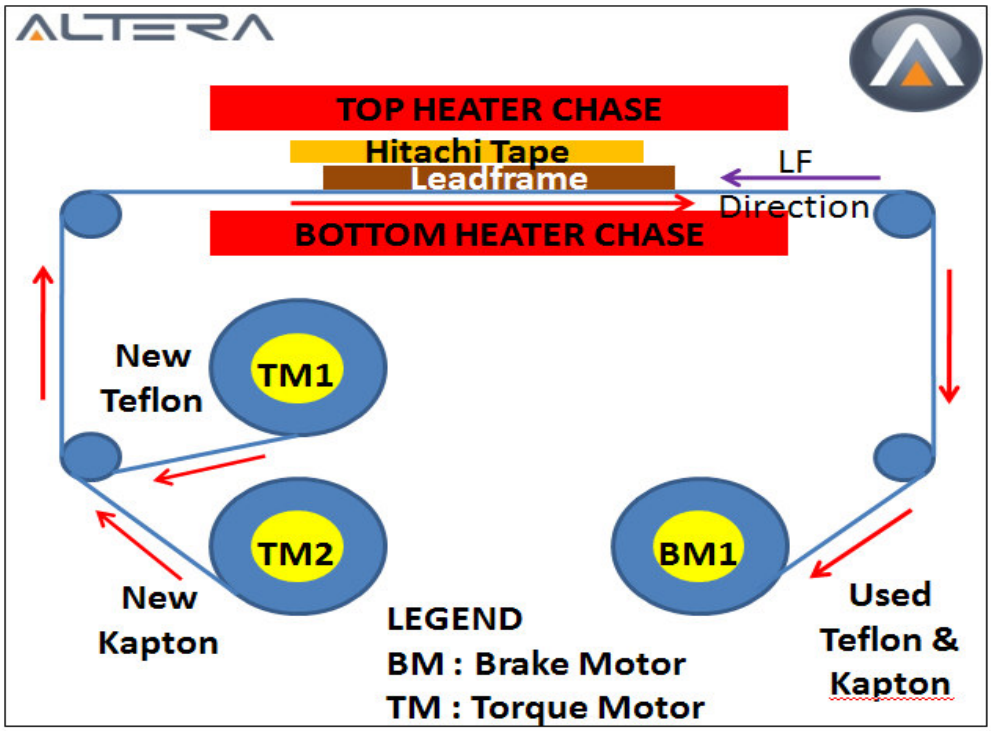


Figure 6-9: Taping station indication card.

6.7 Cleaning Module

Cleaning Module screen as shown below will prompt when [Cleaning Module] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

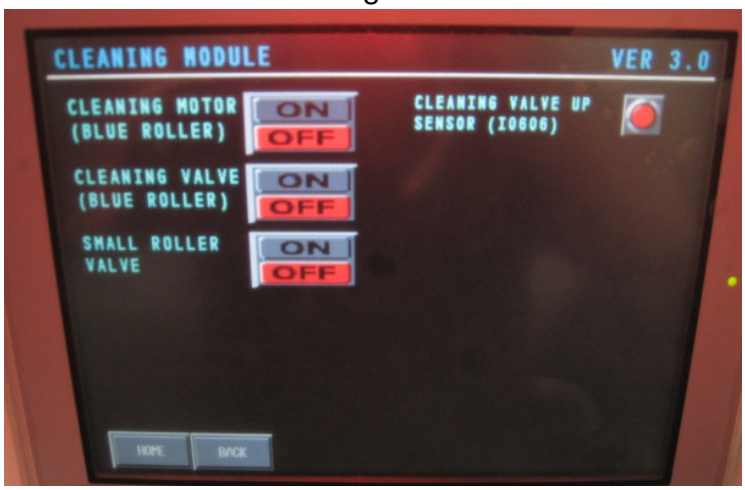


Figure 6-10: Maintenance Mode -Cleaning Module screen.

Button	Description
Cleaning Motor (Blue Tape)	Press on [ON] to trigger the cleaning motor to roll the blue roller. Press on [OFF] to stop.
Cleaning Valve (Blue Roller)	Press on [ON] to trigger the blue roller to move down and touch the cleaning motor shaft. When the cleaning motor is ON, the blue roller will roll to clean the frame. Press on [OFF] to retract or move up.
Small Roller Valve	Press on [ON] to trigger the small roller to move down and touch the cleaning motor shaft. When the cleaning motor is ON, the roller wheel will roll to push the frame toward taping station. Press on [OFF] to retract or move up.

6.8 Centre Press Module

Centre Press Module Page 1 screen as shown below will prompt when [Centre Press Module] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screens. Press on [Next] to go to page 2.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

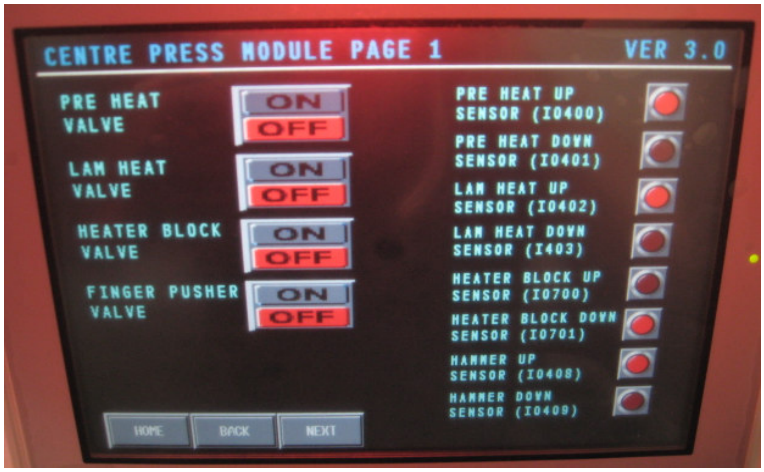


Figure 6-11: Maintenance Mode -Center Press Module Page 1 screen.

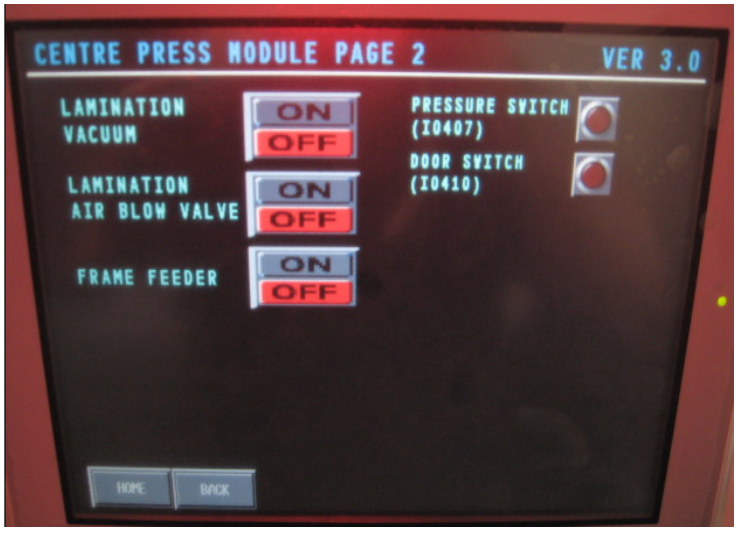


Figure 6-12: Maintenance Mode -Center Press Module Page 2 screen.

Button	Description
Pre Heat Valve	Press on [ON] to trigger the pre heat heater block to move down. Press on [OFF] to retract or move up.
LAM Heat Valve	Press on [ON] to trigger the lamination heater block to move down. Press on [OFF] to retract or move up.
Heater Block Valve	Press on [ON] to trigger the bottom heater (in taping station) block to move up. Press on [OFF] to retract or move down.
Finger pusher valve	Press on [ON] to trigger the finger on taping station to extend and hold the leadframe. Press on [OFF] to retract or release.
Lamination Vacuum	Press on [ON] to trigger the lamination vacuum to ON. Press on [OFF] to turn off vacuum.
Lamination Air Blow Valve	Press on [ON] to trigger the lamination to purge. Press on [OFF] to turn off purging.
Frame Feeder	Press on [ON] to trigger the frame indexer finger to move down. The frame indexer will then move forward to push leadframe to offloader conveyor and at the same time push leadframe from onloader conveyor to taping station. Press on [OFF] to turn retract or move up. The indexer is now safe to move forward & backward.

6.9 Platform Module

Platform Module screen as shown below will prompt when [Platform Module] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

The buttons on the left of the screen is used to manually trigger the sub-modules, and the indicator on the right shows the sensors status.

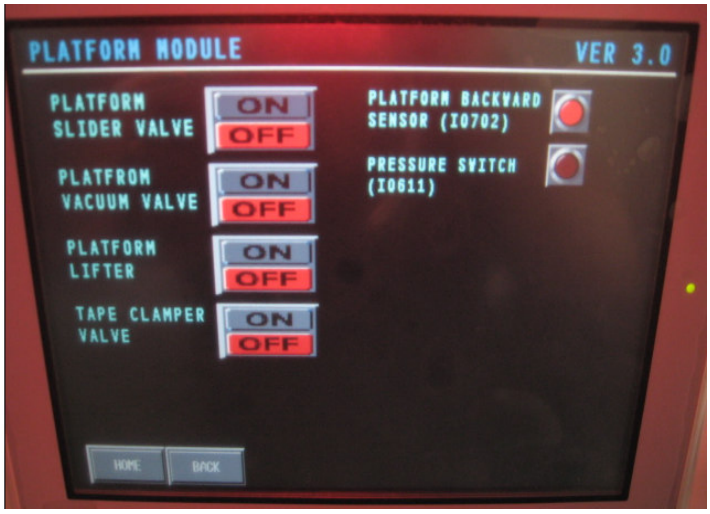


Figure 6-13: Maintenance Mode - Platform Module screen.

Button	Description
Platform Slider Valve	Press on [ON] to move the platform forward. The platform is where the tape lay on after cut by the cutter. Press on [OFF] to retract or go backward.
Platform Vacuum Valve	Press on [ON] to turn on the platform vacuum and shuck the tape. Press on [OFF] to turn off vacuum.
Platform Lifter	Press on [ON] to trigger the platform lifter to move up and hold the tape for pre-heating process. Press on [OFF] to retract or move down.
Tape Clamper Valve	Press on [ON] to trigger the tape clamper to close and clamp the tape. Press on [OFF] to open the clamper or release.

6.10 Recipe Selecting

Recipe Selection screen as shown below will prompt when [Recipe Selection] on Maintenance Mode screen is pressed. Press on [Home] to back to Main Toolbar screen or press on [Back] to back to Maintenance Mode screen.

Press on the recipe selection row to select the desire recipe and press on the [Select] button on right to confirm the selection made.

Figure 6-14: Maintenance Mode – Recipe Selection Screen.

7. Interpreting Teach Mode

7.1 Introduction

WARNING

The position teaching should be performed only by personnel specifically trained for this machine.

Motor position teaching is not a routine task for this system. It only requested when motor is consistently cannot go to correct position. It is strongly recommended to check other aspects like, mechanical alignment before jump into conclusion to re-teach the position.

Besides that, some sensors like home and limit sensors should not be relocated. This will cause the motor position error and may cause serious human and machine hazards.

Motor position verification need to be done manually when sensors like, home or limit sensors is replaced, or mechanical alignment had been done.

In general, there are only 5 motors that required motor position teaching, there are

- Loader
- Unloader
- Lamination Pick & Place
- Frame Indexer
- Tape Singulator

It is always recommended to verify the motor position before perform motor position teaching.

7.2 Teach Mode - Select Module

Select Module screen as shown below will prompt when [Teach Mode] on Main Toolbar screen is pressed. Press on [Home] to back to Main Toolbar screen.

Figure 7-1: Teach Mode - Select Module screen.

Button	Description
Loader	Press to go to Loader module teach mode screen.
Unloader	Press to go to Unloader module teach mode screen.
Lamination Pick & Place	Press to go to Lamination Pick & Place module teach mode screen.
Frame Indexer	Press to go to Frame Indexer module teach mode screen.
Tape Singulator	Press to go to Singulator module teach mode screen.

7.3 Loader

NOTE

It is recommended to move the Onloader PNP Arm to top position before homing and jogging it forward or backward.

NOTE

It is recommended to use **Low speed** for position teaching for high accuracy, and use **High speed** only when jogging the motor for a distance.

Teach Mode: Loader screen as shown below will prompt when [Loader] on Select Module screen is pressed. Press on [Back] to back to Select Module screen.

Before begin position teaching,

- Remove any frames and tools.
- Trigger the PNP arm to top position.
- Place a leadframe box with at least 1 frame and 1 interleaf.

There are total of three positions to teach, there are

- **Pick Frame** - PNP arm to pick frame or paper on leadframe holder.
- **Place Frame** - PNP arm to place frame on onloader conveyor.
- **Place paper** - PNP arm to place paper on interleaf box.

Follow instruction below to perform position teaching.

Figure 7-2: Teach Mode: Loader screen.

7.3.1 Pick Frame Position

No.	Description
1	Press on [Homing] to initialize the onloader.
2	Press on [Pick Frame] to teach pick frame from leadframe box position.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of leadframe box. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Move PNP arm down to get the frame from leadframe box.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on the frame of the leadframe.
8	Trigger the vacuum to ON.
9	Move the PNP arm up.
10	The PNP arm should pickup the frame smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Pick Frame position for PNP arm**.
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.3.2 Place Frame Position

No.	Description
1	Press on [Homing] to initialize the onloader.
2	Press on [Place Frame] to teach place frame to onloader conveyor position.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.

No.	Description
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of conveyor. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Place a frame on the conveyor. Move PNP arm down to get the frame from conveyor.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on the frame of the leadframe.
8	Trigger the vacuum to ON.
9	Move the PNP arm up.
10	The PNP arm should pickup the frame smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Place Frame position for PNP arm**.
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.3.3 Place Paper Position

No.	Description
1	Press on [Homing] to initialize the onloader.
2	Press on [Place paper] to place frame to interleaf box.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of interleaf box. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Place an interleaf on the interleaf box. Move PNP arm down to get the paper from interleaf box.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on edge of the interleaf.
8	Trigger the vacuum to ON.

No.	Description
9	Move the PNP arm up.
10	The PNP arm should pickup an interleaf smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Place paper position for PNP arm**.
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.4 Unloader / Offloader

NOTE

It is recommended to move the Onloader PNP Arm to top position before homing and jogging it forward or backward.

NOTE

It is recommended to use **Low speed** for position teaching for high accuracy, and use **High speed** only when jogging the motor for a distance.

Teach Mode: Unloader screen as shown below will prompt when [Unloader] on Select Module screen is pressed. Press on [Back] to back to Select Module screen.

Before begin position teaching,

- Remove any frames and tools.
- Trigger the PNP arm to top position.
- Place a leadframe box with at least 1 frame and 1 interleaf.

There are total of three positions to teach, there are

- **Pick Frame** - PNP arm to pick frame from conveyor.
- **Pick Paper** - PNP arm to pick paper from interleaf holder.
- **Place** - PNP arm to place leadframe or paper on Leadframe holder.

The teaching instructions for Offloader PNP are similar to Onload PNP.

Figure 7-3: Teach Mode: Unloader screen

7.4.1 Pick Frame Position

No.	Description
1	Press on [Homing] to initialize the offloader.
2	Press on [Pick Frame] to teach pick frame from conveyor position.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of conveyor. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Place a leadframe on the conveyor and move PNP arm down to pick the leadframe from conveyor.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on the frame of the leadframe.
8	Trigger the vacuum to ON.
9	Move the PNP arm up.
10	The PNP arm should pickup the frame smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Pick Frame position for PNP arm**.
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.4.2 Pick Paper Position

No.	Description
1	Press on [Homing] to initialize the onloader.
2	Press on [Pick paper] to teach pick paper from interleaf holder position.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.

No.	Description
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of interleaf holder. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Place an interleaf into the interleaf holder. Move PNP arm down to get the interleaf from holder.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on the edge of the interleaf.
8	Trigger the vacuum to ON.
9	Move the PNP arm up.
10	The PNP arm should pickup the interleaf smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Place Frame position for PNP arm**.
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.4.3 Place Frame Position

No.	Description
1	Press on [Homing] to initialize the onloader.
2	Press on [Place paper] to teach place frame or paper to leadframe holder.
3	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
4	Press on [High] to select high speed.
5	Jog the PNP arm by press on [Forw] or [Rev] to jog the PNP arm until it is on top of leadframe holder. *[FORW] - to jog the PNP head go forward. *[Rev] - to jog the PNP head to go backward.
6	Place a leadframe into the holder. Move PNP arm down to get the frame from box.
7	Change to low speed by press on the [Low] and jog wisely until all vacuum cups are on frame of leadframe.

No.	Description
8	Trigger the vacuum to ON.
9	**Move the PNP arm up.**
10	The PNP arm should pickup the leadframe smoothly. Else, redo step 6 to 9.
11	Press on [Save] to save current position as **Place Frame position for PNP arm**
12	Press on [Disable] to disable teach mode.
13	Press on [Back] to back to Select Mode screen.

7.5 Lamination Pick & Place

Heat & Hot surface: The bottom heater on taping station and both Leadframe and tape Lamination heater's can generates heat above 300°C.

Therefore, it is strongly recommended to turn off heaters, and cool down heaters before performing position teaching for this module.

NOTE

Ensure that Frame Indexer is at origin return position before triggering this module.

Also ensure that the tape clamper is at home position as well.

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NOTE

It is recommended to move the Lamination Pick & Place to top position before homing and jogging it forward or backward.

Teach Mode: Lamination Pick & Place screen as shown below will prompt when [Lamination Pick & Place] on Select Module screen is pressed. Press on [Back] to back to Select Module screen.

There are 2 pick & place head for this module - Leadframe Pre-heat (Pre-heat) and Tape Lamination (Lamination). Both heads are sharing a same vertical axis which required position teaching.

Before begin position teaching,

- Ensure that all 3 heaters are OFF and COOL.
- Remove any frames, tapes and tools.
- Trigger both pick & place head to top position.

There are total of three positions to teach, there are

- **Pick Tape** - Lamination head to pick tape from platform module.
- **Place Tape** - Lamination head to pick tape at taping station.
- **LAM Heat Standby** - a standby position.

Follow the instruction below to perform motor position teaching.

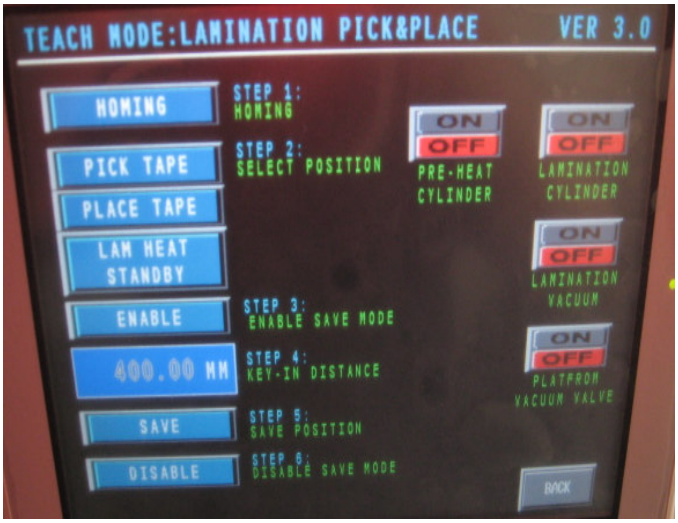


Figure 7-4: Teach Mode: Lamination Pick & Place screen.

7.5.1 Pick Tape Position

No.	Description
1	Press on [Homing] to initialize the lamination pick & place.
2	Press on [Pick Tape] to teach pick tape from platform position.
3	Go to Platform maintenance screen to trigger that module to get a tape ready for pickup (vacuum ON, platform at pickup position, platform lifter move up).
4	Press on [Enable] to enable the position teach mode. The taught position cannot be saved if [Enable] not pressed.
5	By referring to current position, measure how much (in mm) to offset from current position. Key in the offset distance for the lamination Pick & place head to go.
6	Press on [Save] to save current position as **Pick Tape position.**
7	Press on [Pick Tape] again to trigger the Lamination Pick & Place to go to pick tape position.
8	Press on [ON] for lamination cylinder to move down the Lamination Pick & Place head.
9	Turn ON Lamination Pick & Place vacuum valve.
10	Turn OFF the platform vacuum valve.
11	Press on [OFF] to move the Lamination Pick & Place head up.
12	Check on the tape and verify the position.
13	Repeat step 5 to 12 until desire position is get.

7.5.2 Place Tape Position

No.	Description
1	Continue from previous section with Lamination Pick & Place head shucking the tape from platform position.
2	Press on [Place Tape] to teach place tape at taping station position.
3	Press on [Enable] to enable the position teach mode.
4	Place a lead frame on the taping station and trigger the finger to extend and hold the leadframe (go to Centre Press Module Page 1).
5	By referring to current position, measure how much (in mm) to offset from current position. Key in the offset distance for the lamination Pick & place head to go.
6	Press on [Save] to save current position as **Place Tape position.**
7	Press on [Place Tape] again to trigger the Lamination Pick & Place to go to place tape position.
8	Press on [ON] for lamination cylinder to move down the Lamination Pick & Place head.
9	Turn OFF Lamination Pick & Place vacuum valve.
10	Press on [OFF] to move the Lamination Pick & Place head up.
11	Check on the tape and verify the position.
12	Repeat step 5 to 11 until desire position is get.

7.5.3 LAM Heat Standby

LAM heat position is a standby position when the Lamination Pick & Place head is at standby and ready for next process. The Lamination Pick & Place head can be any where as long as it won't interrupt other process and take shortest to go to next process position.

7.6 Frame Indexer

Teach Mode: Frame Indexer screen as shown below will prompt when [Frame Indexer] on Select Module screen is pressed. Press on [Back] to back to Select Module screen.

The indexer is normally standby at origin return position with frame feeder at up position. Target index position is the position where the indexer push leadframe from onload conveyor to taping station and also push leadframe from taping station to offloader conveyor simultaneously. The frame feeder will move down first before indexing.

Before begin position teaching, remove any frames, tapes and tools.

The frame indexer is motor driven and required position teaching. There are total of two positions to teach, there are

- **Target Index** - indexer to push leadframe to taping position or from taping station to offloader conveyor.
- **Origin Return** - the standby position where the conveyor push the leadframe too.

Follow the instruction below to perform motor position teaching.

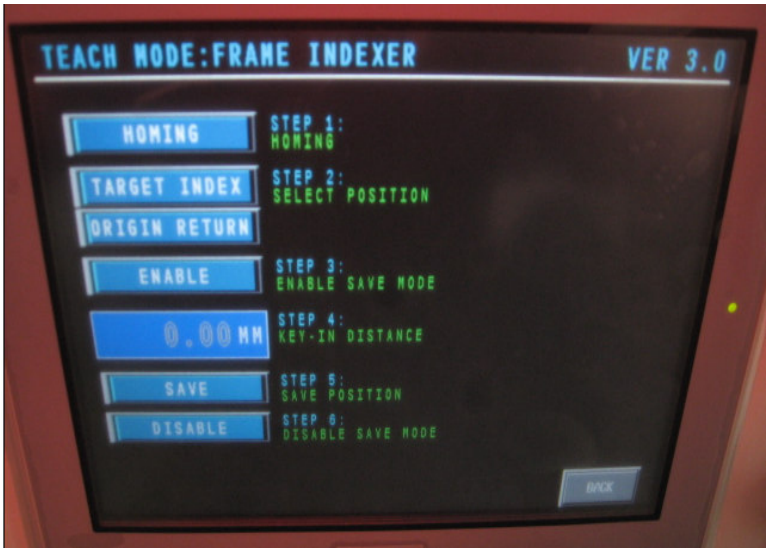


Figure 7-5: Teach Mode: Flame Indexer screen.

7.7 Tape Singulator

Teach Mode: Tape Singulator screen as shown below will prompt when [Tape Singulator] on Select Module screen is pressed. Press on [Back] to back to Select Module screen.

The tape singulator is used to cut tape to leadframe size for leadframe lamination.

Before begin position teaching, remove any frames, tapes and tools.

The clamper of this module is motor driven and required position teaching. There are total of two positions to teach, there are

- **Clamp Tape** -a position for tape clamper to clamper the tape.
- **Target Tape** -the distance for the clamper to pull the tape. The cutters will then move to the tape.

Follow the instruction below to perform motor position teaching.

Figure 7-6: Teach Mode: Tape Singulator screen.

8. Recipe Setting & Heater

8.1 Recipe Setting Screen

Recipe Setting screen as shown below will prompt when [Recipe Setting] on Main Toolbar screen is pressed. Press on [Home] to back to Main Toolbar screen.

Figure 8-1: Recipe Setting screen.

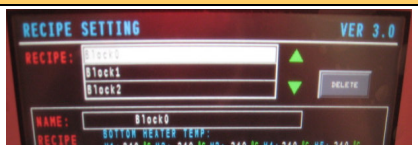
8.1.1 Buttons

Button	Description
Save to USB Storage	Press to save current recipe setting to USB storage device.
Bypass Door Switch	Press to bypass all the door sensors.
LAM & Pre-Heat Simultaneously / Pre-Heat First	Press to choose • LAM & Pre-Heat Simultaneously - Lamination and pre-heat head work simultaneously. • Pre-heat First - pre-heat to work first and follow by Lamination.
Disable Wipper	Press to disable/enable the wiper.
Disable Unload Interleaf	Press to disable/enable unload interleaf process.
Save	Press to save the change.

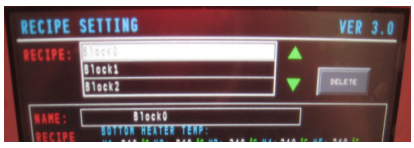
8.1.2 Parameters

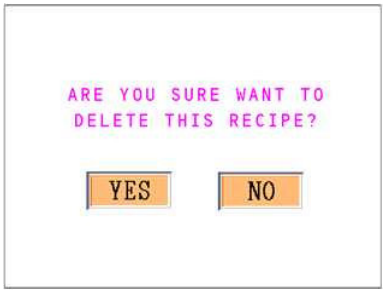
Parameter	Description
Heater's Temperature setting	Temperature setpoint for heaters (Bottom heater,pre-heat heater, lamination heater) at different locations.
Tape Pre-Heat Temperature	The temperature setpoint for tape to be heat up to.
Lamination Time	The length of time for the lamination process by Lamination Pick & place head at taping station.
Pre-heat Time	The length of time to heat up the tape by pre-heat pich & place head.
Lamination Pressure	Pressure in Bar or Ton during lamination process.
Cushion Cycle	Total of cycle before changing Teflon and Kapton tape.
Wipper Cycle	Total of cycle before wiping the Teflon and kapton.
Blue Roller life Cycle	Total of cycle to before change the blue roller.
Blue Roller Cleaning	Total of cycle before cleaning the blue roller with white tape,
Cooling Timer	Cooling laminated frame at unload cooling table.

8.1.3 Select Recipe From List

No.	Description	Screen
1	Scroll and select the recipe from list with [Up] and [Down]. Press on recipe bar to select the recipe.	

8.1.4 Delete Recipe From List

No.	Description	Screen
1	Scroll and select the recipe from list with [Up] and [Down]. Press on [Delete] to delete the selected recipe from the list.	

No.	Description	Screen
2	Screen as shown will prompt. Press on [Yes] to delete the recipe or press on [No] to return to recipe setting screen without any action taken	

8.2 Heater Screen

Heater screen as shown below will prompt when [Heater] on Main Toolbar screen is pressed. Press on [Home] to back to Main Toolbar screen.

The screen display temperature for bottom heater, Pre-heat, lamination heater and tape pre-heat temperature.

For bottom heater has 6 measuring points. For pre-heat and lamination heater, there are 5 measuring points.

Press on [Auto Tuning] to tune the heater according to the user temperature setting at different location (on Recipe Setting screen).

Press on the heater [ON] and [OFF] button to turn ON or turn OFF all heaters.

Press on [SAVE] to save all the setting.

Figure 8-2: Heater Screen.

Parameter	Description
Set value	Temperature measured by the integrated temperature probe at the heater.
Offset	Offset value is the differential temperature on the contact surface (contact with leadframe or tape) compare to temperature measure at heater.
TC Value	The temperature feedback from the TC.
Alarm	Heater temperature high and low limits. For example, alarm will prompt when the measured temperature (after offset) is 5 degree above or below the preset temperature if the value is 5. Please refer to recipe setting screen for heater preset temperature.
Water Limit TC	Water temperature feedback from TC.
Water Limit Set	Water temperature limit set before alarm.

9. Preventive Maintenance

9.1 Introduction

The maintenance and/or engineering personnel should be able to maintain the system, up to component level to ensure consistent and reliable operation of the system. This would prolong the service life of the machine.

Failure to perform preventive maintenance (PM) will cause the system to have a higher probability to malfunction or cause the system to induce unplanned downtimes. This eventually will affect the productivity.

9.2 Safety Precaution

WARNING

Power to this system is provided by **200 VAC**, 3 phases.
Disconnect and lock-out tag-out machine prior any servicing.

NOTE

Users are encouraged to read through the section on safety and hazard awareness before servicing the machine.

Refer to the safety chapter for *Lockout Tagout procedure* as well.

Safety precautions should always be taken when any servicing or maintenance task is done to the machine to avoid any untoward incidents. Ensure that the following precautions are observed at all times.

- The main power switch is OFF.
- Machine has to be disconnected and locked out.
- Avoid touching or holding sharp edges or protrusion and hot surface.
- Wear appropriate personal protection equipment as required.
- Follow standard safety regulation and procedures.

9.3 Preventive Maintenance Schedule

 NOTE	Users are encouraged to read through the section on safety and hazard awareness before servicing the system. Refer to the safety chapter for *Lockout Tagout procedure* as well.

Preventive Maintenance	Module	Freq.	Ref.
Lubrication: • Lead/ball screw • linear bushes • Slider bearing	1. Onloader PNP 2. Blue roller up down 3. Frame indexer 4. Taping station 5. Platform module 6. Lamination & Preheat Pick & Place. 7. Offoader PNP. 8. Both conveyors (shaft that support the conveyor to open wider).	M	9.4
PM for electrical and electronic components • Check all wiring for loosen connection. • Check sensor functionality.	All electrical and electronic components.	HY	9.5
PM for Pneumatic System • FRL units • Pneumatic System	FRL unit all pneumatic system like solenoid valves, cylinder and etc.	W	9.6
Changing blue roller and white tape	Cleaning station	TBD	9.7
Replace Hitachi tape.	Platform module	TBD	9.8
Replacing Teflon and Kapton tape	Taping Module	TBD	9.9

(D-daily; W-weekly; M-monthly;, Q-quarterly; HY-half-yearly; Y-yearly; TBD-to be determine)

9.4 Lubrication

9.4.1 Lead/Ball Screw Nut

No.	Description
1	Clean off any visible dirt build-up using clean room wipes
2	Pump the lubricant via the lead/ball screw nut grease nipples. Or Apply a thin layer of the lubricant directly to lead/ball screw. Avoid over applying lubricant as excess build-up may lead to dirt accumulation.

9.4.2 Linear Bushes

No.	Description
1	Clean off any visible dirt build-up using clean room wipes.
2	Apply a thin layer of the lubricant direst to shaft. Avoid over applying lubricant as excess build-up may lead to dirt accumulation.

9.4.3 Slider Bearings

No.	Description
1	Clean off any visible dirt build-up using clean room wipes.
2	Use a dedicated grease gun to apply the lubricant on the linear guides.
3	Pump the lubricant via the grease nipples. Or Apply a thin layer of the lubricant along the rail. Avoid over applying lubricant as excess build-up may lead to dirt accumulation.

9.5 PM for Electrical & Electronic Components

9.5.1 Electrical Panel

	Power to this system is provided by **200 VAC**, 3 phases. Disconnect and lock-out tag-out machine prior any servicing.

No.	Description
1	De-energize system and perform lockout tagout.
2	With help of the electrical schematic, checking wiring and seeking for loosen connection.

9.5.2 Sensors

No.	Description
1	Locate a sensor on the machine.
2	Trace sensor wiring to connectors and check to ensure connectors are firmly in place.
3	Retighten loose mounting or sensor. Check to ensure that sensor function is maintained. Recalibrate or re-align sensor if necessary.
4	Place a lead frame on the taping station and trigger the finger to extend and hold the leadframe (go to Centre Press Module Page 1).
5	Repeat for all sensors particularly those listed.

9.6 PM for Pneumatic System

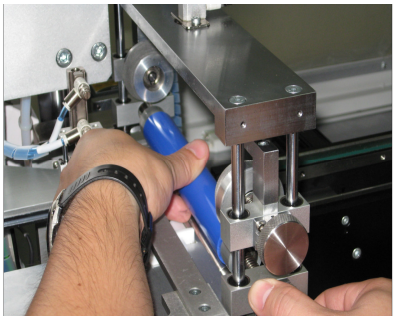
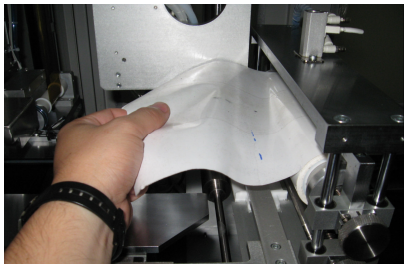
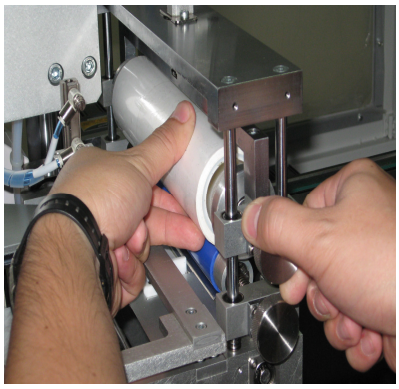
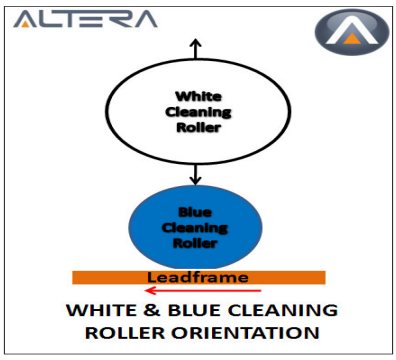
9.6.1 FR Unit

No.	Description
1	Inspect the bowl weekly. If water accumulates, drain the water out from bowl.
2	Supply pneumatic air to filter regulator unit.
3	Place a container under the bowl. Press on the manual petcock to drain water out to container.
4	Clean the area after drained.

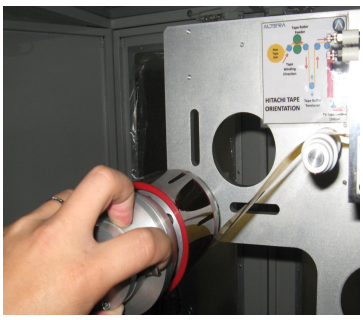
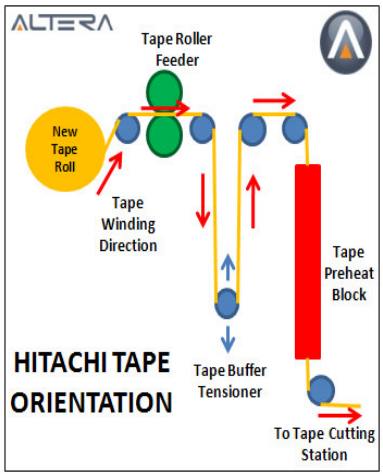
9.6.2 Pneumatic System

No.	Description
1	Locate the solenoid valves, cylinders, and etc. in the machine.
2	Ensure that connectors and tubing are firmly in place.
3	Reconnect any loose connectors or tubing.

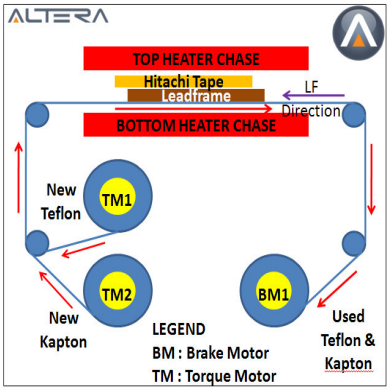
9.7 Changing Blue Roller & White Tape

No.	Description	Screen
1	Pull the knob to release the blue roller. Use the other hand to hold and remove the blue roller. Change the blue roller with the new one. Secure the blue roller properly.	
2	To change the white tape, pull the white tape out until to 1 revolution of length, then cut and remove the used tape.	
	To change the white tape roller, pull the knob to release the white tape roller. Use the other hand to hold and remove the white tape roller. Change the roller with the new one. Secure the white tape roller properly.	
	Follow the instruction on the card to load the white tape.	

9.8 Replace Hitachi Tape

No.	Description	Screen
1	When the Hitachi tape is empty, Pull out the tape roller locker that lock the tape roller to the shaft. Replace the tape by follow the instruction on the card. Insert back the tape roller locker.	 

9.9 Replace Teflon & Kapton Tape

No.	Description	Screen
1	When Teflon and Kapton tape empty, replace it with new Teflon and Kapton tape. Both Teflon and Kapton tape are located at the underneath of the machine. Follow the instruction on the card to replace the tapes. Tension both tapes accordingly.	 

10. Trouble Shooting Guide

10.1 Machine Alarm List & Corrective Action

No	Alarm Error	Corrective Action
1	PRE HEAT CYLINDER UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
2	LAM HEAT CYLINDER UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
3	HAMMER CYLINDER UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
4	HEATER BLOCK DOWN ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving down.
5	TAPE SINGULATOR NOT AT HOME	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder movement.
6	LAMINATION PICK&PLACE NOT AT HOME	1. Check if sensor mounting shifted/malfunction. 2. Reset machine.
7	LOADER CYLINDER UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
8	UNLOADER CYLINDER UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
9	REMOVE FRAME AT LOADER FRAME ARRIVE	1. Remove frame along loader track. 2. Reset alarm.
10	REMOVE FRAME AT UNLOADER FRAME ARRIVE	1. Remove frame along loader track. 2. Reset alarm.
11	REMOVE FRAME AT LOADER MATERIAL SENSOR	1. Remove frame along loader track. 2. Reset alarm.
12	REMOVE FRAME AT LOADER WAITING SENSOR	1. Remove frame along loader track. 2. Reset alarm.
13	FRAME JAM AT UNLOADER CONVEYOR	1. Remove frame after taping station. 2. Reset alarm.
14	CUSHION CYLINDER LEFT ERROR	1. Check if cushion wiper is obstructed. 2. Clear cushion wiper obstruction. 3. Adjust cushion wiper sweeping height.
15	CUSHION CYLINDER RIGHT ERROR	1. Check if cushion wiper is obstructed. 2. Clear cushion wiper obstruction. 3. Adjust cushion wiper sweeping height.
16	TAPE EMPTY.PLEASE RELOAD TAPE	1. Reload tape. 2. Reset alarm.
17	TAPE JAM.PLEASE CHECK TAPING MODULE	1. Check tape buffer at tape feeder station. 2. Release more tape into tape buffer. 2. Clear tape jam at tape feeder roller. 3. Position tape buffer at middle of linear guide before continue operation.

No	Alarm Error	Corrective Action
18	REMOVE FRAME AT LOADER PICK UP ARM	1. Remove leadframe at loader station pick up arm.
19	LOADER PRESS ERROR	1. Check cylinder pick and place loader sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder movement.
20	PLATFORM VACUUM ERROR.PLEASE REMOVE TAPE	1. Check if tape is present at tape platform. 2. Check if tape is sitting flat on tape platform. 3. Check if tape lifter on tape platform is fully up. 4. Check if vacuum leakage along tape platform.
21	CUTTER UP ERROR	1. Check if cutter sensor mounting shifted/malfunction.
22	PLATFORM BACKWARD ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking platform cylinder module from moving front and back.
23	LOADER CONVEYOR CONFIRM ARRIVE ERROR	1. Check if frame jammed at loader station and conveyor. 2. Clear jammed frame. 3. If problem persist, check for misalignment and realign.
24	FRAME JAM AT LOADER CONVEYOR	1. Check if frame jammed at loader station conveyor. 2. Clear jammed frame. 3. If problem persist, check for misalignment and realign.
25	REMOVE PAPER AT LOADER WAITING SENSOR	1. Remove paper at loader pick up head.
26	LAM HEAT VACUUM ERROR	1. Check if tape is covering all top taping tool vacuum hole. 2. Check if tape length is correct. 3. Check if tape protrusion at tape cutting station is correct. 4. Service tape cutting station if tape protrusion is shorter than normal. 5. Adjust tape platform position if tape is not covering all top taping tool vacuum hole.
27	HEATER BLOCK UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up. 3. Check if leadframe support fingers and mounting plate blocking bottom heater block
28	HAMMER CYLINDER DOWN ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving down.
29	UNLOADER PRESS ERROR	1. Check cylinder pick and place loader sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder movement
30	UNLOADER PICK FRAME ERROR.CHECK VACUUM SYSTEM	1. Check if leadframe sitting correctly on conveyor. 2. Correct leadframe sitting position on conveyor. 3. Check vacuum cup condition. 4. If vacuum cup broken, change new vacuum cup. 5. Check vacuum cup position on leadframe rail. 6. If vacuum cup offset on leadframe rail, adjust cup position for better suction.
31	FRAME MISSING AT UNLOADER	1. Check for jammed frame at taping station and unloader conveyor. 2. Clear jammed frame. 3. If problem persist, check for misalignment and realign.

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No	Alarm Error	Corrective Action
32	LAM HEAT DOWN ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving down.
33	UNLOADER CAN'T PICK PAPER OR PAPER EMPTY	1. Check if paper available in paper box at unloader station. 2. Replenish paper in box if finish.
34	LOADER CAN'T PICK FRAME OR FRAME EMPTY	1. Check if frame available in leadframe loader station. 2. Replenish leadframe in loader station.
35	FRAME DROP AT UNLOADER	1. Check leadframe dropped at unloader station. 2. Clear dropped frame. 3. Check vacuum cup condition. 4. If vacuum cup broken, change new vacuum cup. 5. Check vacuum cup position on leadframe rail. 6. If vacuum cup offset on leadframe rail, adjust cup position for better suction.
36	HEATER BLOCK UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up. 3. Check if leadframe support fingers and mounting plate blocking bottom heater block.
37	PRE HEAT DOWN ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving down.
38	PRE HEAT UP ERROR	1. Check cylinder sensor position. Correct if necessary. 2. Check if any obstruction blocking cylinder module from moving up.
39	KAPTON SHEET EMPTY	1. Replenish kapton tape.
40	TEFLON SHEET EMPTY	1. Replenish teflon tape.
41	LOADER FRAME ORIENTATION ERROR	1. Check loader frame orientation. 2. Reposition frame orientation. 3. Adjust loader fiber sensor if necessary.
42	PLEASE RELEASE EMO BUTTON	1. Release EMERGENCY button.
43	PLEASE CHANGE NEW BLUE ROLLER	1. Replenish new blue roller.
44	PLEASE CLEAN BLUE ROLLER	1. Clean blue roller.
45	BOTTOM H1 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and thermocouple malfunction. 4. Replace malfunction heater and thermocouple.
46	BOTTOM H1 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and thermocouple malfunction. 4. Replace malfunction heater and thermocouple.
47	BOTTOM H2 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
48	BOTTOM H2 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple

No	Alarm Error	Corrective Action
49	BOTTOM H3 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
50	BOTTOM H3 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
51	BOTTOM H4 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
52	BOTTOM H4 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
53	BOTTOM H5 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
54	BOTTOM H5 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
55	BOTTOM H6 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
56	BOTTOM H6 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
57	PRE H1 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
58	PRE H1 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.

No	Alarm Error	Corrective Action
59	PRE H2 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
60	PRE H2 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
61	PRE H3 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
62	PRE H3 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
63	PRE H4 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
64	PRE H4 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
65	PRE H5 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
66	PRE H5 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
67	LAM H1 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
68	LAM H1 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
69	LAM H2 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.

No	Alarm Error	Corrective Action
70	LAM H2 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
71	LAM H3 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
72	LAM H3 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
73	LAM H4 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
74	LAM H4 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
75	LAM H5 TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
76	LAM H5 TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
77	TAPE TEMPERATURE LOW	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
78	TAPE TEMPERATURE HIGH	1. Identify affected heater and thermocouple on display screen. 2. Power OFF machine. 3. Check for heater and themocouple malfunction. 4. Replace malfunction heater and thermocouple.
79	CHANGE CUSHION COMPLETE,PRESS RESET TO CONTINUE	1. Auto cushion change cycle completed. 2. Check for cushion condition after change. 3. Reset alarm to continue operation.
80	RIGHT DOOR OPEN ERROR	1. Check right side door open. 2. Check door sensor for malfunction.
81	LEFT DOOR OPEN ERROR	1. Check left side door open. 2. Check door sensor for malfunction.
82	CENTER DOOR OPEN ERROR	1. Check center door open. 2. Check door sensor for malfunction.

No	Alarm Error	Corrective Action
83	END LOT READY PRESS START TO CONTINUE	1. Production lot ended. 2. Press start to resume prodution for next load.
84	LOADER CW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
85	LOADER CCW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
86	UNLOADER CW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
87	UNLOADER CCW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
88	LAMINATION PNP CW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine
89	LAMINATION PNP CCW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
90	FRAME INDEXER CW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine..
91	FRAME INDEXER CCW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
92	TAPE SINGULATOR CW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
93	TAPE SINGULATOR CCW LIMIT SENSOR ERROR	1. Activate EMERGENCY button. 2. Push affected module to center of axis. 3. Release EMERGENCY button. 4. Reset and home machine.
94	HEATER TEMPERATURE OVER 300 DEGREE!	1. Temperature over control limit. 2. Check heater SSR for malfunction and replace if necessary. 3. Check thermocouple for malfunciton and replace if necessary.

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11. Spare Parts & Consumable Parts List

11.1 Spare Parts & Consumable Parts List For Fabrication Part

No.	Part No.	Description	Module	Qty.	Life Span
1	P04-HTB27	Lamination Plate (Bottom)	HTB	1	2kk cycles
2	P04-HTB14	Lamination Plate (Top)	HTB	1	2kk cycles
3	P04-CPF31	Cutter Blade (Top)	CPF	1	1kk cycles
4	TS010305	Cutter Blade (Bottom)	CPF	1	1kk cycles
5	P04-TFD27	Roller (Tape width:64.0)	TFD	1	2kk cycles
6	P04-CLR26	Frame Guide	CLR	1	1kk cycles
7	P04-IND30	Finger (Precisor)	IND	1	800k cycles
8	P04-IND08	Finger Fixed (C type)	IND	4	1kk cycles
9	P04-IND09	Finger Fixed (L Type)	IND	8	1kk cycles
10	P04-CUS30	Guide Roller	CUS	1	2kk cycles
11	P04-CUS29	Locking Plate	CUS	2	2kk cycles

11.2 Spare Parts & Consumable Parts List for Standard Part

No.	Part No.	Description	Module	Qty.	Life Span
1	DHBLT5-1.28	Flat Belt	CVR	2	
2	DBHL-T5-1.315	Flat Belt	CVR	2	
3	O'Ring-ø3-OD30	O-Ring	CLR	2	
4	PFG-3.5A-N	Convum Suction Cup	PNP	24	300k cycles
5	RK564AC	Stepping Motor	CPF	1	
6	Thermocouple type K straight	Thermocouple	HTB	1	
7	Thermocouple type K 'L' shape	Thermocouple	HTB	3	
8	TBN424XL037	Timing Belt	PNP	1	1kk cycles
9	SOH32C-10-14	Coupling - Slit Clamping Type	LMS	1	2kk cycles
10	SOH20C-6-8	Coupling - Slit Clamping Type	CVR	1	2kk cycles
11	Q1/B257 x126mm, B261 lead wire 240v,1000W	Heater	HTB	5	
12	SOH32C-10-12	Coupling - Slit Clamping Type	CUS	2	2kk cycles
13	SOH20C-8-10	Coupling - Slit Clamping Type	IND	1	2kk cycles
14	RCB0806	Shock Absorber	CPF	1	1kk cycles
15	PK246A	Stepper Motor	PNP	1	
16	EE-SX472	Slot Sensor	PNP	3	
17	EE-SX672	Slot Sensor	LMS	1	
18	FD-T40	Fibre Optic Sensor	PNP	1	
19	FX-MR3	Fibre Optic Sensor Len	PNP	1	
20	FX-101	Sensor Amplifier	PNP	1	
21	M6IN6GC4TU	MOTOR	CVR	1	
22	M6G25C	Gear Head+C19	CVR	1	
23	CUJB10-6DM	Pneumatic Cylinder	IND	1	
24	CJ1B4-5SU4	Pneumatic Cylinder	IND	1	
25	SB673ZZ	Bearing	IND	3	
26	MR12MN	Linear Guide Block	TFD	1	2kk cycles
27	OD=3.75mm, W.D=0.5, Pitch=1.6mm,L=18mm	Cushioning Spring	CUS	4	2kk cycles
28	DIA10X100, 220V, 400	Heater	TFD	1	
29	ROCKHILL Lubricants Greases	Bottom Heater Block Lifter Lubricant	HTB	1	PM every 3
30	698zz	Bearing	CLR	4	
31	6804zz	Bearing	CVR	4	
32	695zz	Bearing	CVR	10	

12. Appendix

12.1 Electrical And Phuematics Diagram

12.2 Assembly Drawing