

# SPECIFICATIONS

## AUTO CUTTING LAMINATOR

### ***MACH610iS***

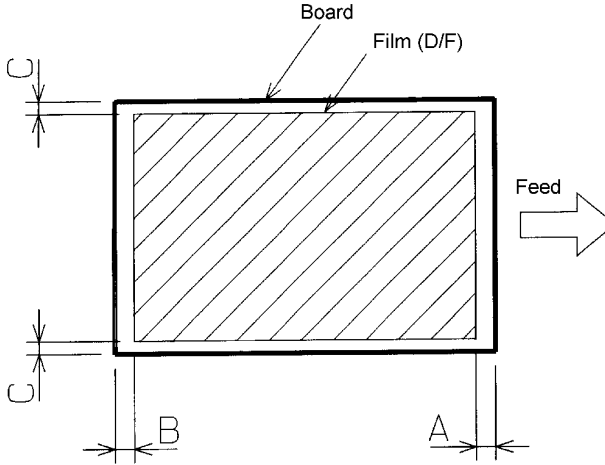
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**Hakuto Co., Ltd.**

# 1. PROCESSING CAPABILITY

1	Board Size	Max. 640 mm wide × 610 mm long Min. 250 mm wide × 250 mm long
2	Board Thickness (Incl. copper foil)	0.15 mm to 5.0 mm (Its both sides are copper foiled.) (0.10 mm to 2.00 mm: an option in the specifications for thin boards.)
3	Processing Speed (when 1.3 sec is required for tacking)	230 boards/hr (board length: 24 inches) 287 boards/hr (board length: 18 inches) 379 boards/hr (board length: 12 inches)
4	Conveyor Speed	1.0 mm to 4.0 mm/min (variable) Maximum speed for lamination: 3.0 m/min
5	Dry Film Photoresist (D/F)	Width: 250 mm to 610 mm Max. roll outside diameter: 160 mm Bobbin diameter: 76.2 mm (3") Film thickness: Max. 50 μ Weight: Max. 20 Kg
6	Method and Precision of Film Lamination	 <p>A : 2 mm to 60 mm ± 1.0 mm B : 0 mm to 25 mm ± 1.0 mm Board width - Film width C : _____ mm ± 1.0 mm 2</p> <p><u>Note:</u> The above value is a mechanical precision when the external dimensions error of the board, film winding error, and film properties are not considered.</p>
7	D/F Tacking	Tacking temperature: Max. 65 degrees C Tacking stop duration: Approx. 3.5 sec (for 2 sec tacking)
8	Surface Temperature of Laminating Rolls	Room temperature to 130 degrees C ± 5 degrees C

## 2. FRONT CONVEYOR

1	Total Length	1,015 mm (1,065 mm when the thin board device operates)
2	Effective Width	330 mm to 640 mm (If the hand valve is mounted, 250 mm wide (optional) is also possible.)
3	Conveyor Wheels and Conveyor Feeding Rolls:	<p>Axis pitch: 90 mm (70 mm for front row)</p> <p>Wheel diameter: <math>\phi</math> 50 mm (one (1) row) <math>\phi</math> 30 mm for front two (2) rows</p> <p>Materials of wheels: Urethane rubbers and electric conductivity resins</p> <p>Cylinder roll diameter: <math>\phi</math> 50 mm</p> <p>Materials of cylinder rolls: Five (5) urethane rubbers and four (4) electric conductivity resins.</p>
4	Driving	<p>40 W 100 V Geared motor (variable speed)</p> <p>One (1) clutch for front three (3) rows</p> <p>One (1) brake for front three (3) rows</p> <p>Four (4) units of clutches and brakes combined</p>
5	Board Centering Stroke	40 mm for both ends of the board (two (2) $\phi$ 32 air cylinders for each end)
6	Thin Board Feeding Stroke (Optional)	50 mm (two (2) $\phi$ 20 air cylinders)
7	Tacking Positioning Detection Sensor (For front space)	<p>Rotary encoder (resolution 1,000 P/R)</p> <p>24 V DC (OMRON)</p> <p>Mounting position: Rear frame for and entrance of the front conveyor</p>

# 3. LAMINATING BLOCK

1	DF Mounting Block	Specifications of D/F rolls Film width: Max. 610 mm D/F roll outside diameter: Max. 250 mm Core inside diameter: 76.2 mm (3") and 152.4 mm (6") [Option]
2.1	Tacking Block	Tacking rubber: W4 mm × L635 mm (× 2) Surface temperature: Max. 65 degrees C Pressure applied: Max. 40 Kg (air pressure: 2.5 Kg/cm <sup>2</sup> ) Heater: 100W, 27.5 V, φ 3.2 × L645 mm (effective) Sheathed heater (× 2) Pressure applied: φ 32 air cylinder (× 4)
2.2	Tacking Block Up/Down Device	Stroke: 70 mm (variable in the range of 60 mm through 80 mm) Driving: Going up: air cylinders Going down: linked with laminating rolls Knocking pin: for receiving reaction force of tacking (× 4) (φ 32 air cylinders) Up/down guide: linear bearing (× 4)
3	Film Cutter	Round cutter: φ 64 mm × 0.8 t (× 2) Rotation, traveling: DC geared motor (× 2) 24 V DC, 3 W
4	Thermal Laminating Rolls	Dimension: φ 77.5 <sup>+1</sup> <sub>-0.1</sub> ±0, 0.1 mm × L680 mm (× 2) Mandrel materials: SUS304 + SS41 Surface temperature: Max. 270 Kg (air pressure: 4 Kg/cm <sup>2</sup> ) Heater: 1.0 Kw cartridge heater (× 2) φ 15.7 mm × L780 mm Pressure applied: φ 50 mm air cylinder (× 2) Driving: 90 W geared motor (variable speed, with a brake) (× 1)
5	Film cutting detection sensor (For rear spacing)	Rotary encoder (resolution: 1000 P/R) 24 V DC Mounting position: Main unit driving motor bracket block
6	Others	Rear conveyor wheel diameter: φ 50 mm × 9 t Rear conveyor wheel materials: two (2) urethane rubbers and two (2) electric conductivity MC nylons (for each row) Pull-out block: Accuride × 3 Exhaust hood: lower part of the rear of the block (no fan) Film tension block: φ 25 mm air cylinder (× 2) (The sensors to detect the film cutting and the bad film tacking are provided.)
7	Temperature control	Temperature control: film tacking × 2, laminating roll × 2 Thermoregulator: digital setting, digital display, upper/lower limit alarm

## 4. REAR CONVEYOR

1	Total Length	Frame length: 770 mm
2	Effective Width	700 mm
3	Conveyors and Wheels	<p>Roll axis pitch: 90 mm</p> <p>Roll diameter, materials: <math>\phi</math> 50 electric conductivity resin rolls (four (4) rows)</p> <p>Wheel diameter, materials: <math>\phi</math> 50 <math>\times</math> 9 t urethane rubbers (five (5) rows)</p> <p>The four (4) rolls and five (5) rubbers are arranged alternately.</p>
4	Driving	40 W geared motor (variable speed) ( $\times$ 1)

# 5. ELECTRIC CONTROL

## Specifications of the Control Board and the Panels

1	Control Board	<p>Mounting position: Rear of the front conveyor</p> <p>Size: Main board: W 600 × D 265 × H 915 mm Auxiliary board: W 300 × D 205 × H 535 mm</p>
2	Sequencer	<p>For main control C500 For control of laminating position: C28H (Mounted into the main control board)</p>
3	Display Panel	<p>Mounting position: Upper part of the front conveyor</p> <p>Thermoregulator: Four (4) units (× 2 for tacking, × 2 for the laminating rolls)</p> <p>Alarm indicating lamp (LED) (Alarms are indicated in red.)</p> <p>Power receiving, home position, and display lamp (× 1 each)</p> <p>Counter (number of boards processed) (× 1)</p> <p>Timer (for setting the tacking time) (× 1)</p> <p>Conveyor speed indicator, change-over switch, D/F front, rear spacing setting devices</p>
4	Operator Panel	<p>Mounting position: On the front conveyor (cover)</p> <p>Switches Power</p> <p>Automatic/manual change-over switch, automatic operation/stop switch, alarm buzzer stop./reset switch, D/F width set switch, vacuum/blower switch, cutter linked switch (upper and lower), emergency stop push-button switch (with a guard)</p>
5	Main Braker	<p>Mounting position: main control board (operable from outside)</p>
6	Interlock	<p>Locks each unit when you pull out the laminating block (main unit) (except the cutter and laminating rolls).</p>
7	Manual Operator Panel	<p>Portable. Mounted to the lower part of the front conveyor within the frame.</p>

# 6. ALARMS AND STOP

	Alarm Indicator (LED)	Explanation	Alarm (For stop)
1	Air pressure lowered ('A' is indicated)	Primary pressure is 3.5 Kg/cm <sup>2</sup> .	The lamp comes on and the operation stops.
2	Bad tacking ('K' is indicated)	The films are fed to the laminating rolls without being tacked (this is detected by the tension roll sensors).	The lamp comes on, the buzzer sounds, and the operation stops.
3	Tacking block overrun ('D' is indicated)	The tacking block overruns the upper or lower limit sensor.	The lamp comes on, the buzzer sounds, and the operation stops.
4	Bad film cutting ('I' is indicated)	The cutting of both the upper and lower films is bad (this is detected by the tension roll sensors).	The lamp comes on, the buzzer sounds, and the operation stops.
5	Cutter run time over ('H' is indicated)	The allowed cutter run time (2.5 sec) is exceed.	The lamp comes on, the buzzer sounds, and the operation stops.
6	Cutter overrun ('G' is indicated)	The cutter overruns the right or left sensor (the operation stops when the next time cycle is started).	The lamp comes on, the buzzer sounds, and the operation stops.
7	Roll temperature range over ('F' is indicated)	The surface temperature of the laminating rolls exceeds the allowed temperature range (this is detected by the temperature sensor).	The lamp comes on and the buzzer sounds, and the operation stops.
8	Tacking temperature range over ('E' is indicated)	The temperature of the tacking block exceeds the allowed temperature range (this is detected by the temperature sensor).	The lamp comes on and the buzzer sounds, and the operation stops.
9	Lamination time over ('J' is indicated)	The allowed time (40 sec) from the sensing of the leading edge of the board by the front conveyor sensor till the completion of the actuator operation is exceed.	The lamp comes on, the buzzer sounds, and the operation stops.
10	Bad pull-in of main unit ('B' is indicated)	The main unit is not completely pulled in.	The lamp comes on, the buzzer sounds, and the operation stops.
11	Lock pin does not work ('C' is indicated)	The tacking block is not back in place, causing the lock pin not to work.	The lamp comes on, the buzzer sounds, and the operation stops.
12	Overload ('L' is indicated)	Over-loading of the vacuum pump and turbo blower.	The lamp comes on, the buzzer sounds, and the operation stops.
13	Boards counter ('M' is indicated)	Up to the preset production.	The lamp comes on and the buzzer sounds.
<b>Stops. Return</b>		Turn on the reset switch and buzzer stop switch, and then return it (the main unit or the tacking block) to the home position manually. (Check that "P.L" which stands for home position is indicated.)	

## 7. GENERAL UTILITIES

1	Power	220/220 V, 50/60 Hz, 9 Kw
2	Main Air Valve	5 Kg/cm <sup>2</sup> , 15 L/min
3	Exhaust Duct	9.5 m <sup>3</sup> /min, φ 150 mm (To be forced exhaust)
4	Weight	Approx. 1,200 Kg

## 8. OTHERS

1.	Frame	Square pipe welding structure, black coating
2.	Cover	SPC sheet metal working, cream-colored backing finish (Munsell 7.5Y9/1) The cover is used to prevent dust from entering the laminating block.
3.	See-Through Window	Main unit: Static electricity prevention polyvinyl chloride (three (3) places) Electrode of the main unit: Acryl (smoked)



# 9. DIMENSIONS

Electric Power Supply	φ 3, 200/220 V, 9Kw
Air Supply	5 Kg/cm <sup>2</sup> 15 L/min.
Exhaust	φ 150 mm 9.5 m <sup>3</sup> /min.

