VAKUUM LAMINATING PRESSES

Type RMV 125, 200 and 250 with thermal oil heating and cooling

Type		RMV 125				RMV 200				RMV 250			
plate size	mm x mm	660 x 750				1070 x 750				1 270 x 750			
	inch x inch	26.0 x 29.5				42.1 x 29.5				50.0 x 29.5			
plate thickness	mm	36				42				48			
	inch	1.4				1.7				1.9			
max. laminate size	mm x mm	610 x 700				1020 x 700				1 220 x 700			
	inch x inch	24.0 x 27.6				40.2 x 27.6				48.0 x 27.6			
spec. laminating pressure	N/cm²	293				280				293			
	psi	417				3 98,5				4 17			
closing pressure	kN	1 250				2 000				2 500			
	US ton	138				220				276			
number of openings		4	6	8	10	4	6	8	10	4	6	8	10
daylight per opening	mm	84											
	inch	3.3											
closing stroke	mm	120				126				132			
	inch	4.7				5.0				5.2			
piston diameter	mm	1x250				1x320				2x250			
	inch	1x9.8				1x12.6				2x9.8			
max. system pressure	bar	255				249				255			
	psi	3 630				3 540				3 630			
electric motor power	kW	4,0				5,5				5,5			
hydraulics	HP	5,4				7,4				7,4			
closing speed	mm/s	~27,5											
	inch/min	~65											
pressing speed	mm/s	~1,8											
	inch/min	~4.3											
opening speed	mm/s	~30											
	inch/min	~71											
operating temperature	°C	280											
	°F	536											
heating capacity	kW/h	96	120	160	185	160	225	250	290	225	290	360	360
	BTU/h	328 000	410 000	547 000	631 000	547 000	768 000	854 000	990 000	631 000	768 000	1230000	1230000
*cooling water need	m3/h	4,2	5,4	7,1	8,3	7,6	10,2	12,2	14,3	10,5	13,4	16,6	19,4
	gal/h	1 110	1 430	1 870	2 190	2 010	2 690	3 220	3 780	2 770	3 540	4 380	5 120
**heating rate	°C	9,9	9,5	9,7	9,6	9,1	9,5	8,8	8,7	9,2	9,3	9,3	8,0
without product	°F	17.8	17.1	17.5	17.3	16.4	17.1	15.8	15.7	16.6	16.7	16.7	14.1
max. vacuum	mbar/Hg	≥ 10 / ≥ 29,62											
vacuum pump	m³/h	100	100	160	160	100	160	200	250	160	200	300	300
vacuum power	cu ft/h	3 532	3 532	5 650	5 650	3 532	5 650	7 063	8 829	5 650	7 063	10 595	10 595
electrical motor power	kW	2,2	2,2	4	4	2,2	4	4	5,5	4	4	5,5	5,5
vacuum pump	HP	2.0	2.9	5.4	5.4	2.9	5.4	5.4	7.4	5.4	5.4	7.4	7.4
width x depth	mm x mm	1 220 x 1060		1 300 x 1060		1 850 x 1100		1 950 x 1100		2 100 x 1160		2 200 x 1160	
of the press	inch x inch	48.0 x 41.7		51.2 x 41.7		72.8 x 43.3		76.8 x 43.3		82.7 x 45.7		86.6 x 45.7	
height of the press	mm	1 970	2 360	2 800	3 190	2 250	2 650	3 050	3 450	2 320	2 740	3 150	3 570
without thermal oil piping	inch	77.6	92.9	110.2	125.6	88.6	104.4	120.2	135.9	91.4	107.9	124.1	140.6
1st opening height	mm	1 050	1 200	1 400	1 550	1 150	1 300	1 450	1 600	1 150	1 300	1 450	1 600
from floor	inch	41.3	47.2	55.1	61.0	45.3	51.2	57	63	45.3	51.2	57.1	63
total weight without tool	kg	5 000	5 500	6 000	6 500	9 000	10 000	11 000	12 000	12 600	13 800	15 000	16 200

*with cooling water temperature increase < 20°

**set-up of the thermal oil heating/cooling unit next to press

Operating Voltage

- Country-specific operating voltage based on customer's information.

Electronic Closing Pressure Control

- The electronic closing pressure control is a closed control circuit via servo-valve, ensuring constant laminating pressure during the entire process time.

Product Temperature Measurement

- Plug connections with plugs for customized thermo-couples are installed in the vacuum chamber.
- The product temperature is displayed on the monitor and logged.

Thermal Heating Oil Cooling Aggregate

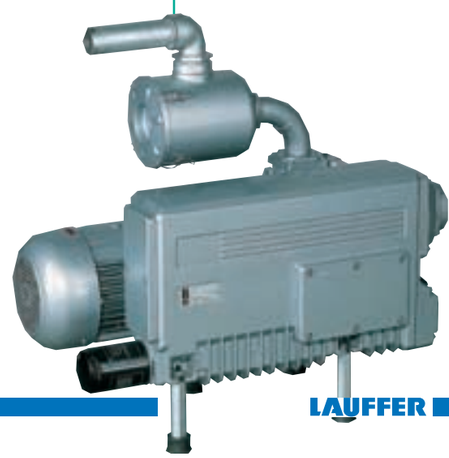
- For heating and cooling the vacuum laminating press with an electrically heated thermal oil heater and an integrated water-operated heat exchanger.
- The thermal oil unit is a separate, compact unit and should be placed near the press.
- The unit has a protective sheathing and heat insulation.
- For greater heating rates, units with greater heating output can be used.
- Alternatively, thermal oil heaters fired with gas or light oil can be used.

Vacuum Chamber

- The heating press consists of a vacuum-tight, welded press frame shaped as a vacuum chamber.
- The front of the vacuum chamber has a pneumatic sliding door.
- The rear of the vacuum chamber has a hinge mounted maintenance door.

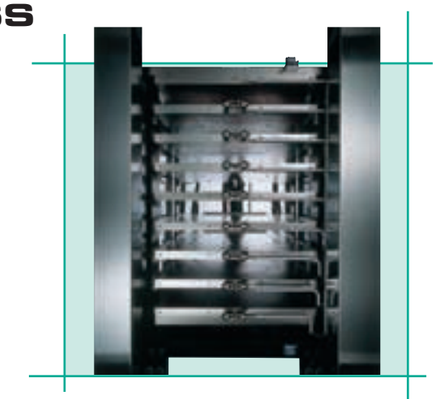
Vacuum Pump Unit

- The vacuum in the vacuum chamber is created by a slide vane rotary vacuum pump with direct drive.
- The vacuum pump can be flexibly placed near the press.
- The pumps are hygric insentive.



HYDRAULIC COOLING PRESS

Type VKE 10, 20 and 50



- Cooling press to cool the press tools with the laminated multi-layer PC boards.
- The cooling plates are equipped with a water channel.
- The cooling plates are coated to prevent rust and corrosion.
- A circulating pump to prevent condensation constantly circulates the coolant.
- The amount of coolant needed is controlled via magnetic valve relative to the temperature.
- The platens are equipped with spring-mounted rollers, spring-mounted stopping bolts, and top mounted ejector pins.
  - The spring-mounted rollers ensure that there is no contact between the tool and the heating plate until the press is closed.
  - The stop bolts prevent the press tools from slipping.
  - The top mounted ejector pins prevent the upper tool plate from sticking to the platen.
- Various openings and platen sizes are available in standard versions, and special sizes can be provided on request.
- The cooling press can be integrated in a fully automatic modular concept if desired.

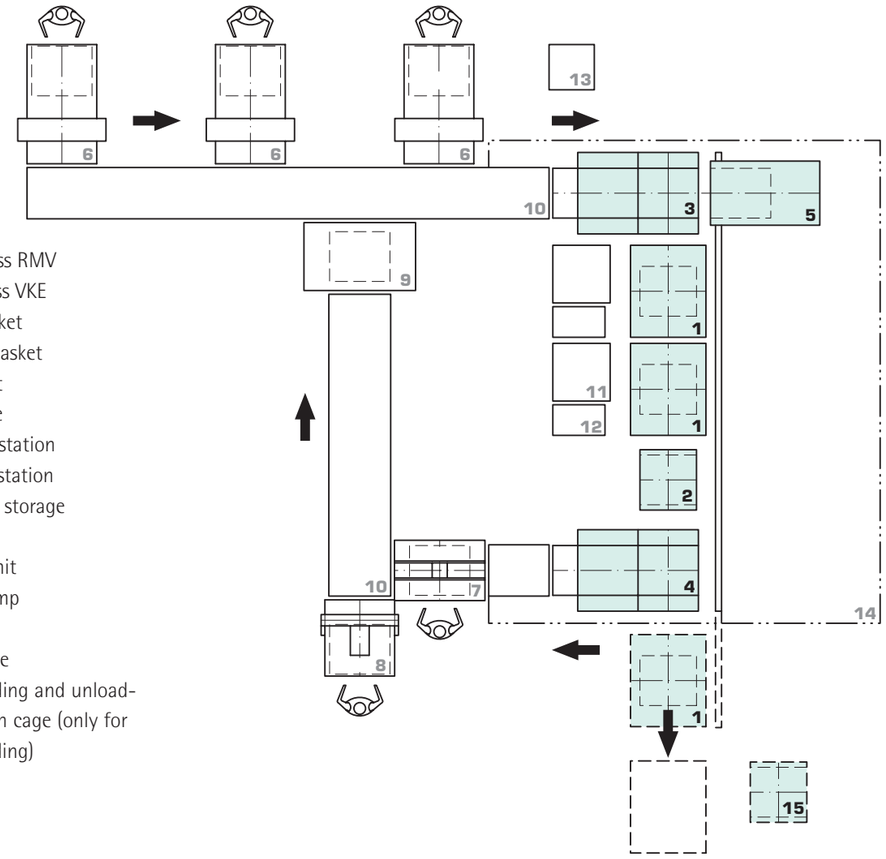
Water-Tempering Device

- The cooling press can be equipped with a (hot) water-tempering device for better performance during the cooling process. The coolant is heated electrically and cooled by an integrated heat exchanger.
- This unit ensures programmable controlled cooling.
- The water-tempering device is a separate, compact unit and should be placed near the press.
- The unit has a protective sheathing and heat insulation.

Type		VKE 10				VKE 20				VKE 50			
plate size	mm x mm	660 x 750				1070 x 750				1270 x 750			
	inch x inch	26.0 x 29.5				42.1 x 29.5				50.0 x 29.5			
closing pressure	kN	100				200				500			
	US ton	11				22				55			
number of openings		4	6	8	10	4	6	8	10	4	6	8	10
daylight per opening	mm	84											
	inch	3.3											
closing stroke	mm	120				126				132			
	inch	4.7				5.0				5.2			
1st opening height	mm	1050	1200	1400	1550	1150	1300	1450	1600	1150	1300	1450	1600
from floor	inch	41.3	47.2	55.1	61.0	45.3	51.2	57.0	63.0	45.3	51.2	57.1	63.0
closing speed	mm/s	27											
	inch/min	64											
electrical motor power	kW	2,2				3,0				3,0			
hydraulics	HP	2,9				4,0				4.0			
opening speed	mm/s	30											
	inch/min	71											
max. system pressure	bar	199				177				204			
	psi	2830				2520				2900			
operating temperature only	°C	130											
for water-tempering device	°F	250											
*cooling water needed	m^3/h	2,8	3,8	5	6,3	4,6	7,0	9,3	11,5	5,5	8,3	11,0	13,8
temperature increase Δ10K	gal/h	700	1000	1320	1600	1200	1800	2400	3100	1500	2200	2700	3600
width x depth	mm x mm	800 x 1000				1240 x 1050				1460 x 1100			
	inch x inch	31.5 x 39.4				48.8 x 41.3				57.5 x 43.3			
height	mm	1624	1954	2394	2834	2024	2024	2024	2024	2084	2084	2448	2448
	inch	63.9	76.9	94.3	111.6	79.7	79.7	79.7	79.7	82.0	82.0	96.4	96.4
total weight without tool	kg	1700	1950	2200	2500	3800	4400	5000	5600	4500	5500	6500	7500

*with cooling water temperature increase < 10°

FIGURE 2 "AUTOMATIC LOADING SYSTEM"



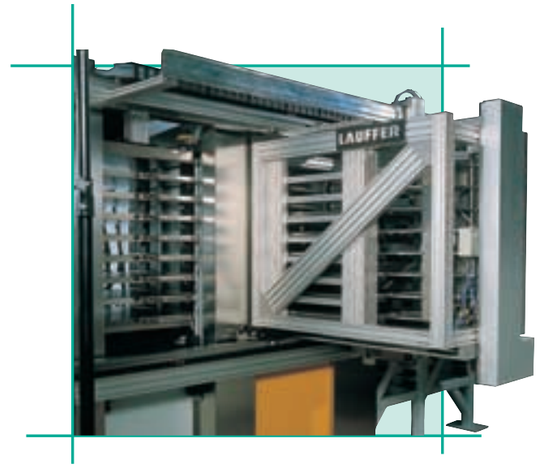
1 Heating press RMV
2 Cooling press VKE
3 Loading basket
4 Unloading basket
5 Transfer cart
6 Lay-up table
7 De-pinning station
8 Breakdown station
9 Empty plate storage
10 Conveyor
11 Hydraulic unit
12 Vacuum pump
13 PC
14 Safety device
15 Manual loading and unloading unit with cage (only for manual loading)

TRANSFER CART

- Automatic loading and unloading of loading cart, heating press, cooling press, and unloading storage.
- Connected to the press line with guide rails.
- Drive: frequency-controlled gear motor with pinion and toothed rack.
- Automatic gripper system to insert and remove the complete charge.

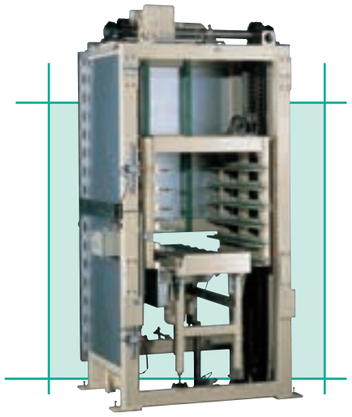
Advantages

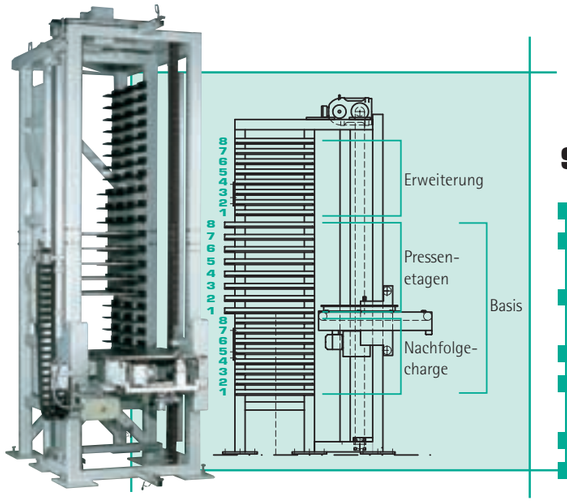
- Automatic feed to press line.
- No rail assembly on the floor.
- No obstacles on the floor i.e. greater freedom of movement and more space.
- No preparations necessary on location.
- Easily moved during power failure.
- Accurate positioning.



LOADING and UNLOADING BASKET

- Pick-up and placement of a lamination charge.
- The number of basket openings is the same as in the lamination press.
- Consists of an elevator cage with interior chain conveyor or roller guide.
- Loading and unloading due to raising and lowering of the basket in jogging mode.





LOADING and UNLOADING STORAGE WITH LIFT

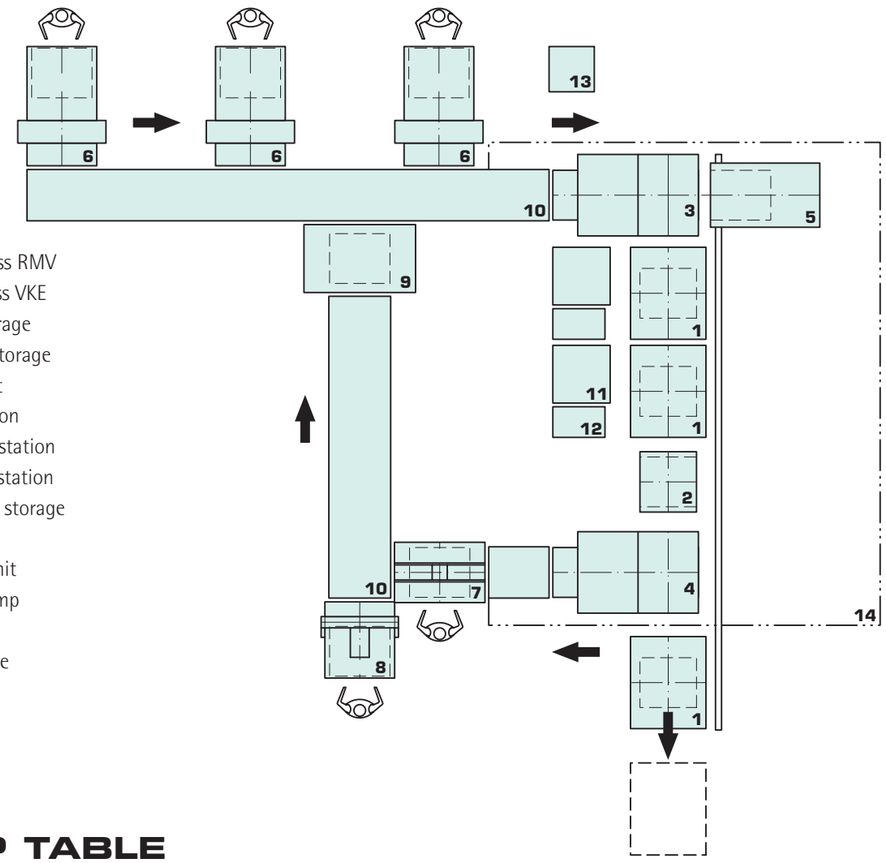
- Storage of several press charges.
- Adjusted storage clearance for press charge preparation.
- Aditional storage clearance with a smaller distance for optimal room utilization.
- Automatic preparation of the subsequent cycle.
- The subsequent charge is located below the press charge placement.
- The storage is loaded and unloaded with a lift.
- The lift is loaded and unloaded via roller conveyor.

TECHNICAL TABLE for Loading and Unloading storage

STORAGE													
plate size	mm x mm	660 x 750				1070 x 750				1270 x 750			
	inch x inch	26.0 x 29.5				42.1 x 29.5				50 x 29.5			
number of openings		4	6	8	10	4	6	8	10	4	6	8	10
daylight per opening	mm	120				126				132			
press area	inch	4.7				5.0				5.2			
closing stroke	mm	100											
storage clearance	inch	3.9											
1st layer from bottom	mm	1050	1200	1400	1550	1150	1300	1450	1600	1150	1300	1450	1600
	inch	41.3	47.2	55.1	61.0	45.3	51.2	57.0	63.0	45.3	51.2	57.1	63.0
width x depth	mm x mm	1200 x 2050				1650 x 2050				1850 x 2050			
	inch x inch	47.3 x 80.7				65.0 x 80.7				72.8 x 80.7			
basic magazine		4 + 4	6 + 6	8 + 8	10 + 10	4 + 4	6 + 6	8 + 8	10 + 10	4 + 4	6 + 6	8 + 8	10 + 10
basic magazine heigth	mm	1 897	2 287	2 727	3 117	2 021	2 423	2 825	3 227	2 045	2 459	2 873	3 287
	inch	74.7	90.0	107.4	122.7	79.6	95.4	111.2	127.0	80.5	96.8	113.1	129.4
basic magazine expansion		We recommend expanding the number of press layers several fold.											
expansion height	mm / inch	x 100 / 3.9											
total height for expansion		basic magazine height + expansion height											

For example: (Basic magazine 8 + 8 = 16 2727 mm) + (expansion of 8 magazine positions = 800 mm) = total height 3527 mm for 24 layers.

3 FIGURE "PERIPHERAL EQUIPMENT"



1 Heating press RMV
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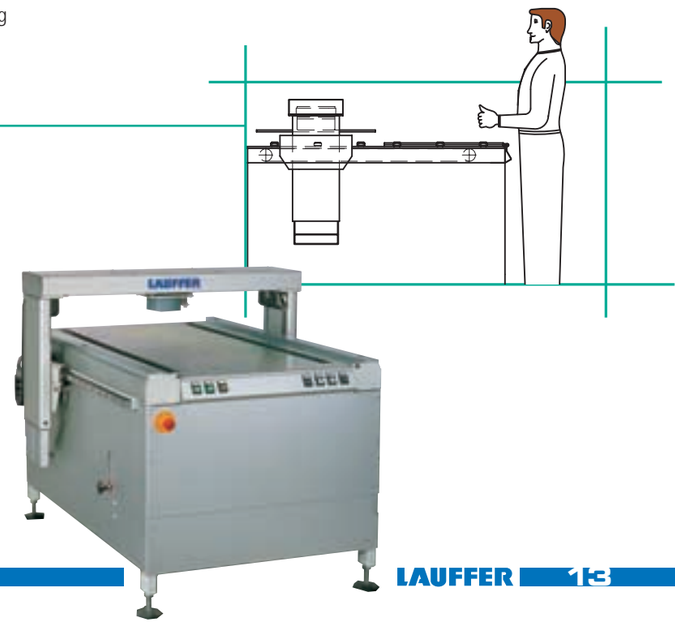
8 Breakdown station
9 Empty plate storage
10 Conveyor
11 Hydraulic unit
12 Vacuum pump
13 PC
14 Safety device

LAY-UP TABLE

- Table with elevator roller guides for manual placement of press cushion, separator, CU sheet, PrePeg and cores.

Possible Enhancements

- Automatic lifting and lowering of the upper tool plate with permanent electromagnet and manual movement of the upper tool plate.
- Vertical chain conveyor for automatic transport.
- Automatic movement of the upper tool plate.
- Ergonomic work height adjustment.
- Motor-driven pin advance (PinLam).
- Pneumatic press-down fixture for pin advance.
- Stainless steel model.
- Optical guide via cross laser.

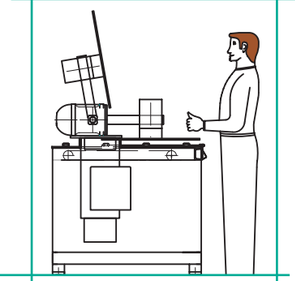


BREAK-DOWN TABLE

- Breakdown table with lifting magnet for top plate removal to allow the removal of the press cushions, separators and PCB boards.

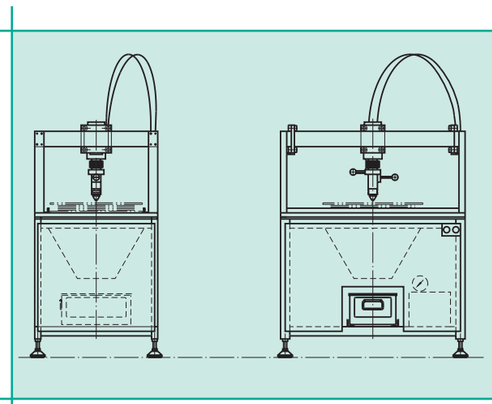
Possible Enhancements

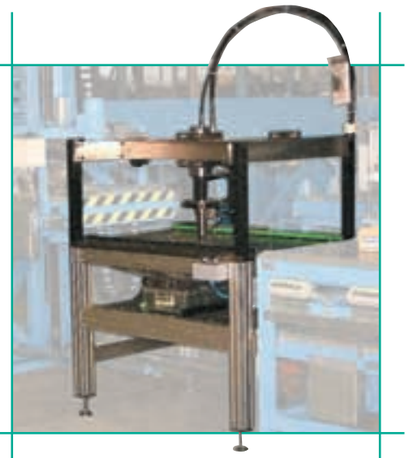
- Automatic lifting and swinging of upper tool plate with permanent electromagnet.
- Vertical chain conveyor for automatic transport.
- Ergonomic work height adjustment.
- Stainless steel model.



DE-PINNING STATION

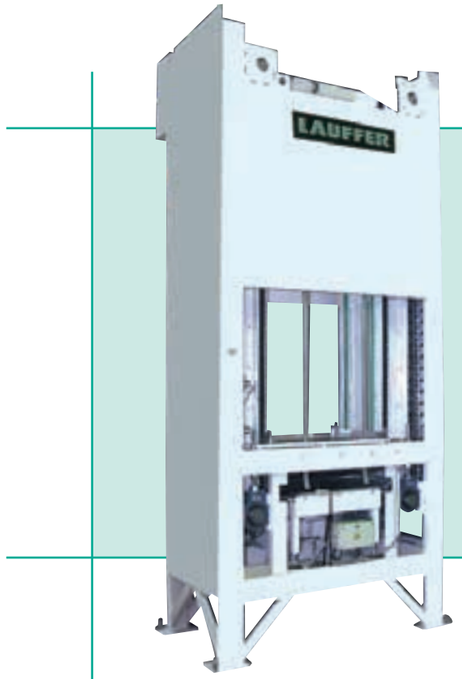
- Pushes pins (PinLam) out of the press tool.
- Hydraulically driven de-pinning head.
- Optical guide for de-pinning position.
- Can be integrated within or without the roller conveyor.

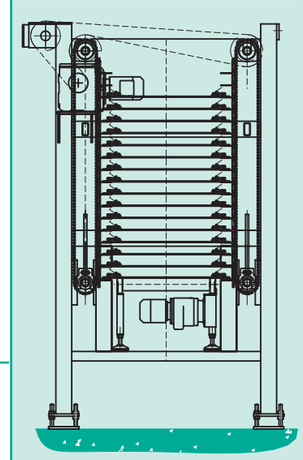




EMPTY PLATE MAGAZINE
(Chain Magazine)

- Reception of several empty press tools.
- Storage principle LI/FO "last in, first out".
- Customized number of magazine positions.





CONVEYING DEVICE
(Roller Conveyor)

- Automatic circulation of the tools.
- Transport via driven roller conveyors.
- Controlled drives via frequency converter.
- Elevator angle transfer.

Possible Enhancements

- Manual hinged section for entrance.
- Stainless steel rollers.
- Rubber-coated rollers.
- Rubber-coated rollers.
- Lifting rake for empty tool placement in front of guide station.
- Rotating station.
- Two-layer roller conveyor.
- Elevator station.

SAFETY DEVICE

- Safety fence with electrically secured access door.
- Design should be adapted to the particular facility and room.