

Multilayerpress Instructions for Use



Preface

The RMP 210 multilayerpress was designed for use in PCB labs. It allows quick prototyping of multilayer PCBs of 4 or more layers according to industry standards. A compact and floor standing aluminium rack contains the pressure supply and heated press plates, covered by a big door with security switch.

The unit is controlled by two digital thermostats, one digital timer and a pressure valve with meter. Two strong air ventilators are activated automatically during cooling cycle.

To produce a multilayer with this machine you have to go through the following steps:

- Fixing and inserting the prepreg batch
- Building up pressure
- Turning on the heater
- Heat up cycle
- Press cycle at set temperature
- cool down cycle

Taking out the multilayer

The whole process lasts about 3 hours. When you insert a batch of 250 x 350 mm, you get a usable multilayer size of approx. 210 x 300mm, depending on the quality of the pcb material you are using (losses in size due to resin flow inside of the stack).

Safety Regulations

This Multilayerpress is designed for use in laboratories and shall be operated by skilled staff.

The general safety rules for operating electrical machines need to be applied.

Before all maintenance work disconnect the machine from power supply.

Children and pets need to be kept away.

The installation location of the machine is of special importance. You should choose a mostly dust free room with a non corrosive atmosphere.

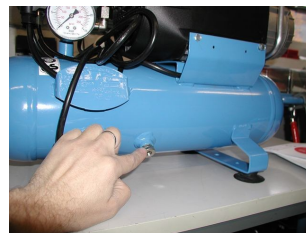
There is a door security switch that will deactivate the pressure bottom when door is opened during operation. THAT MAY DESTROY YOUR MULTILAYER but it is an important security feature of the machine.

Multilayerpress

Instructions for Use

NOTE: while compressor is running, it is not allowed to switch off the machine or open the door of the press-room.

If because of power failure, compressor should be switched off while running, open the rear bottom door (1) and reset the compressor. Discharge the compressed air (2) and reset the motor safety switch (3). Without that procedure, there is a risk of overloading the compressor motor which may lead to severe damage.



When you turn on the main switch, the compressor will start for about one minute. Take care that there is nothing between the upper and the lower press plate, that could damage the machine or even burst and blow out of the machine.

Use only appropriate material to avoid fire and resulting severe economic losses.

Apply suitable temperatures and pressures to avoid burning of the pcb material and development of poisonous or harmful gas.

Cool down machine to a maximum of 50°C (takes about 30-45 min.) to avoid severe burnings to the skin. Or wear suitable protective gloves.

Technical Data

Board Size:	brutto 250 x 350 mm netto 210 x 300 mm
Pressure:	> 12 t
Compressor:	0-15 bar (included)
Temp.:	175 °C (up to 300°C possible as an option with costs)
Max. Heat Up Cycle:	ca 30 min.
Press Cycle:	ca. 60 min.
Cool Down Cycle:	ca 120 min.
Dimensions:	ca 65 x 65 x 130 cm
Weight:	ca. 130 kg
Electrical Connection:	230 V 50 Hz 16 A

Technical details are subject to change without notice.

Set Up

The machine is supplied in a special packing of wood. Check the condition of packing immediately at reception. Goods delivered by a carrier and signed as "Received in good condition" will be impossible to be returned as "Damaged in transit". If you re-

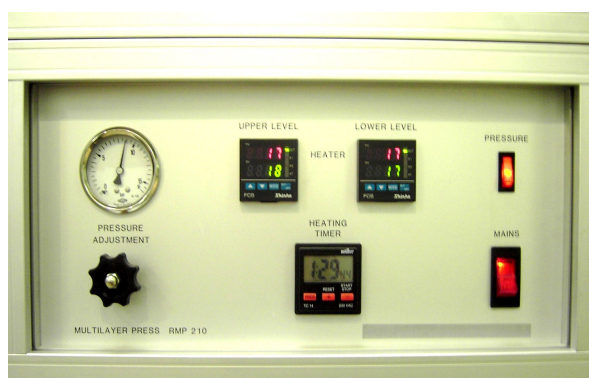
Multilayerpress

Instructions for Use

cognize any damage after unpacking you need to declare this transport damage to the shipping agent immediately in written and verbal. In this case please also notify us.

To unpack, remove the cardboard cover and the lateral carton / wood package. On the pallet you will then see a piece of wood with screws. Remove this piece to get the wheels free that the machine is sitting on. Due to the weight and to avoid tilting the machine do not just roll the unit off the pallet. Use a fork lift and the assistance of skilled staff to take the unit off the pallet and place it on even ground. From then on the machine may be moved on its rollers.

Operating



There is a red mains (and emergency stop) button on the right front. Push this button in case of emergency and to cut the machine of the main supply. Start the machine by pressing that red button.

This will activate the compressor.

The machine is equipped with special high pressure compressor. You get access to the compressor when you open the back door underneath the fans.

Make sure to pull off the plug before opening this door (Mortal danger because of electrical stroke).

Take care that there is nothing between the upper and the lower press plate, that could damage the machine or even burst and blow out of the machine.

Pressure adjustment

Whenever the PRESSURE switch is activated, machine will close the press plates. As that requires compressed air, the compressor will start running again (for about 2 minutes depending on the pressure preset).

ATTENTION:

Never switch off machine or open the front door (safety door switch). If this happens, for example in case of a power failure, you need to reset the compressor. To do so read on chapter 2 safety regulations.

Pressure adjustment is done with the turning valve in the front panel underneath the manometer read out.



Multilayerpress

Instructions for Use

For the correct pressure adjustment please read the instructions of your pcb board supplier. As a thumb rule you can set a pressure of 12 bares = 12 tons for a board of 250 x 350 mm.

Timer

The timer is controlling the heat-up/cool down sequence of RMP 210. The preset time is the total heating time. After that, the cooling ventilation is started and the heaters are switched off while pressure is still adjusted.

To reset the timer to zero press all three buttons at once.

The Button **PROG** (far left) is used to select the digit to be adjusted. Press it once to change hours. Press again to change minutes. Press again to change seconds and once again to come back to timer mode. Note: timer setting can not be varied while timer is controlling a press cycle.

The button **+** is to increase the value of the blinking digit.

The button **-** is to decrease the value of the blinking digit.



The button **Reset** is used to reset the time to adjusted time.

The timer has a auto-reset function at the end of the count-down.

The button **Start/Stop** starts or stops the timer.

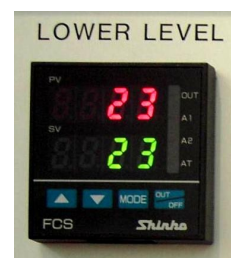
System Reset: to cancel the adjusted process time, press all three bottoms for a second. Count-down time is now at zero.

To reset timer completely, press all three bottoms.

Heater Adjustment

The upper and lower pressure plates have separate heater adjustment facilities. Once the timer has started, the thermostats will turn on. Both heaters are preset to 175°C (which is standard for most application). On request heater adjustment up to 300°C is possible. Both thermostats will operate with 6 °C/min heat-up speed. This standard setting can be adjusted upon request.

The thermostat has two displays and four buttons. The upper display shows the actual temperature, the lower one shows the set value. Press the mode button once and use the up and down arrow keys to set the desired temperature, in this picture 155°C. Finally press the mode button again. This will save the value. The out/off button serves to turn the heaters off and on manually, but is not used in normal operation. The OUT LED right to the upper display shows if the heaters are actually on or off.



Multilayerpress

Instructions for Use

The thermostat has a soft heat-up function that prevents over-temperature. After each initial start the lower display will show increasing temperature values until the set value is reached. Temperature setting proposals are about 175 °C for normal and fresh prepregs. You must determine the best setting for your application. If the temperature is too low or heating time too short, the laminate will have delamination problems or air-bubbles inside. Both will damage the multilayer board.

Work Flow:

Operation details are related to prepregs and inner layers specifications. As a matter of fact, these settings may change depending on the type of prepregs.

- a) If you do not prefer to swim press (this is possible for 3- 4 layer board) fix your layers with reference pins or rivets. We recommend to have the reference pins outside of the press plates and to include the reference marks in your film layouts for all layers
- b) protect your press plates with tedlar foil or something alike to prevent the press plates from sticking to your pcb. Select suitable material to avoid fire and resulting severe economic losses.

- c) Insert PCB stack into press plates
- d) Select appropriate temperature and pressure to avoid burning your pcb and emerging of poisonous gas.
- e) pressure is adjusted according to board specification. For boards 210 x 300mm²: approx. 12 bar
- f) heater temperature is selected (according to condition and type of prepregs normal range: 155 - 175°C)
- g) heater is activated
- h) heating-up procedure and press sequence at preset temperature (normally 60-120 minutes. Time depending on temperature preset and on room temperature according to condition / type of prepregs)
- i) cooling down under pressure to 50° C or lower (about 30 -45min) to avoid skin burns. If you want to take out stack at a higher temperature wear suitable protective gloves.
- j) Never take out stack at a temperature higher than 100°C. Danger of delamination.
- k) PCB stack is taken out of the machine.
- l) boards are depinned.

The sequence will take all at all approx. 3 hours. Gross size of the PCB is 250 x 350 mm which will result in PCB net size of 210 x 300 mm². Depending on the material you use, the rim of your multilayer will show less resin as in the middle and needs to be cut off (normally 1-2 cm on each side. In the meantime board supplier improved their products so this effect may not occur at all)

Process time will decrease down to half an hour if you take out stack at a temperature of about 100°C. But this is made on the operators responsibility and we will deny any liability for this.

Multilayerpress

Instructions for Use

Guaranty

All machines are submitted before distribution to examination on tightness, function and continuous operation firmness. On the machine we grant a work warranty of 12 months to our customers starting from purchase date on accuracy in material and processing. We warrant at our choice by exchange of incorrect parts or by repair of the machine in our house. Old parts change into our possession.

Disclaimer of Warranty

All parts subjected to wear and the heater element are excluded from this warranty. This also applies to defects to the machine caused by non-observance of this manual or of parts of it.

We cannot accept subsequent claims from damage or destruction of workpieces worked on in the machine, because we have no knowledge or control over the operating conditions at your site. This is valid in a general manner also for requirements from damage to articles, buildings and persons as well as the environment.

We do not warrant that the function of the machine will meet the customer's requirements or that the operation of the machine will to this regard be error free.

In no event will we be liable to the customer for any incidental, consequential, or indirect damages of any kind, including loss of profit and prosecution for environmental pollution, even if we could have been aware of the possibility of such damages.

Operating the machine in corrosive, dusty, humid, extremely hot or explosive atmosphere is take place at the operators own and only risk.

The operator has provide suitable precautionary safty and protective measures. We explicitly deny any liability for damage resulting from running the machine in such an atmosphere.

All information was arranged with great care. We reserve ourselves however mistake and technical changes without previous announcement.

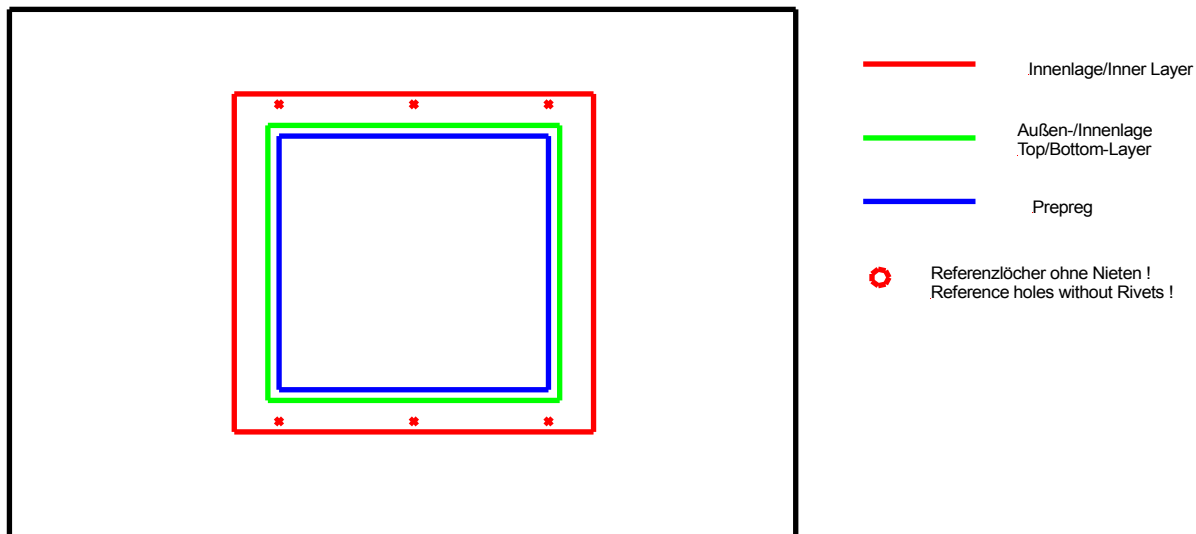
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RMP 210 Multilayerpress Appendix

Composition of Press Stack

Page 1 / 3



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You can press up to 4 Layers in floating technique. Add reference holes into your inner layers and adjust your layouts according to these holes.

Reference holes can be inserted into your layout with the help of IsoCam and can be drilled with the Bungard CCD.

Cut your prepregs and your outer layers smaller (as seen in the upper picture), so the resin of the boards will not flow into the reference holes during the press cycle. You will need these reference holes later on to register your pcb again for drilling on the CCD.

If your pcb is smaller than the press area of the machine (250 x 350 mm), we recommend to adapt the pressure according to this formula:

$$P_A = (P_W \times A_W) / A_A$$

P_A = desired pressure for your pcb in bar

P_W = machine pressure RMP 210) in bar

A_W = press area of machine (250 x 350 mm = 8.75 dm² = constant)

A_A = press area of your pcb in dm²

Example:

If you want to press a pcb with 120 x 120 mm with a pressure of 16 bar, please adjust formula:

$$(P_A \times A_A) / A_W = P_W$$

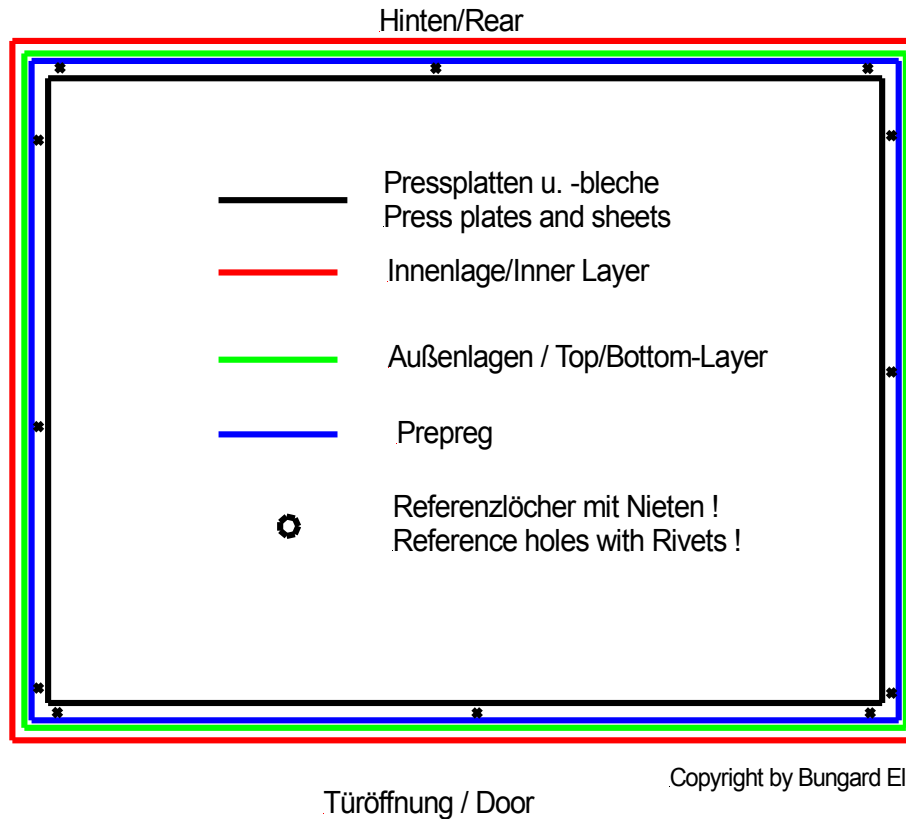
$$(16 \text{ bar} \times 1,44 \text{ dm}^2) / 8,75 \text{ dm}^2 = 2,63 \text{ bar}$$

Set this pressure at the machine. For small pcbs we generally recommend to panelize the pcb and so increase the press area.

RMP 210 Multilayerpress Appendix

Composition of Press Stack

Page 2 / 3



If you want to press more than 4 layers, it is necessary to fix all layers with reference pins to prevent the layers from moving during the press cycle.

Again you can add reference holes into your pcb with IsoCam and drill them with the Bungard CCD.

Reference rivets D3.0 x 5.4 mm can be obtained from Bungards in packages of 100 rivets.

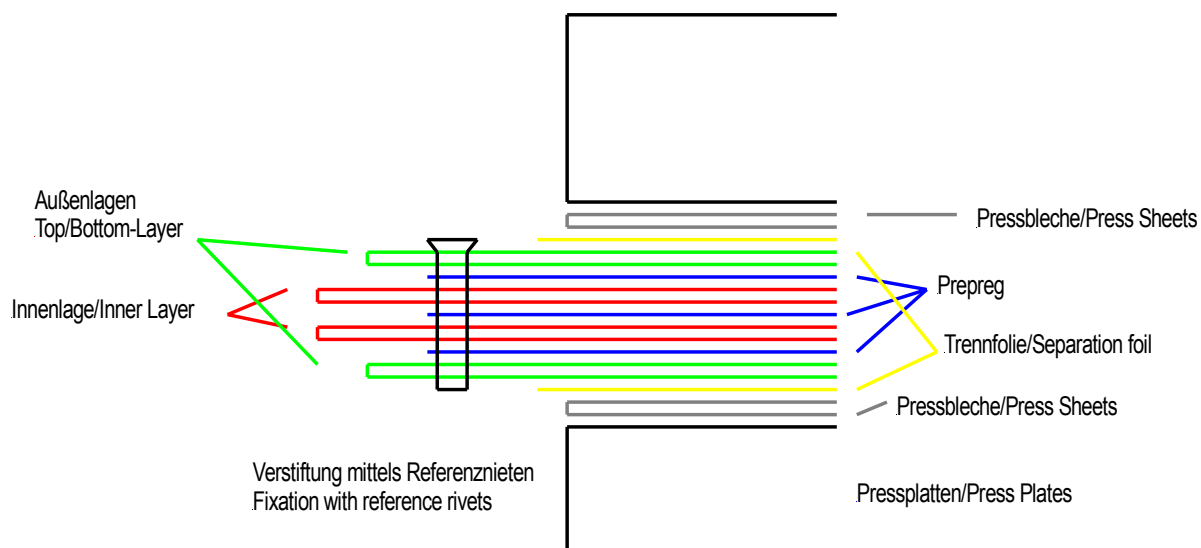
These rivets have to be mounted outside of the press area as in the upper picture, so they can be easily removed after pressing.

See picture 3 for a sectional view on a press stack. The press sheets protect the press plates from mechanical damage and the separation foil protects both press sheet and press plate from contamination with resin

RMP 210 Multilayerpress Appendix

Composition of Press Stack

Page 3 / 3



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This instruction was carefully edited. Nevertheless we cannot give any warranty.
Specifications are subject to change on the part of the manufacturer.

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