

# *Scientific*

## LABORATORY HYDRAULIC PRESSES

**Hydraulic Presses  
Standard Version**



**Fully Electric and  
Automatic Presses**



**ASTM PRESSES with high  
precision chilled  
water cooling system**



**Benchtop Laboratory  
Hydraulic Presses**



# *Labtech Engineering*

**TECHLABSYSTEMS**



## LABORATORY HYDRAULIC PRESSES

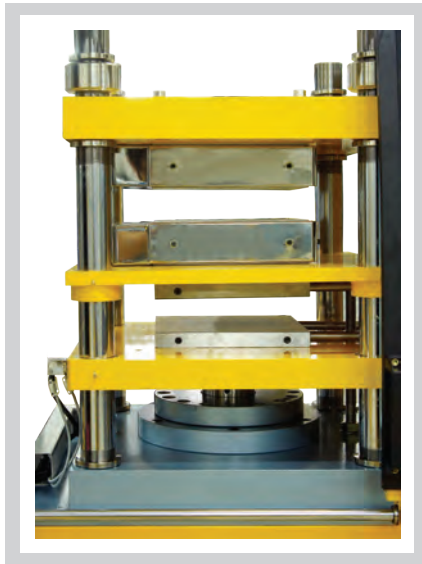
THE PRESSES ARE BUILT UP  
ON STURDY WELDED  
TUBULAR STEEL FRAMES,  
WHICH ARE TOTALLY  
SELF-SUPPORTING.



The **Scientific** presses are equipped with an interlocked sliding door at the front. The upper sides and back part surrounding the press platen assemblies are enclosed with heavy-duty stainless steel nets and frames. All internal parts of the press are easily accessible through removable steel panels.

The control cabinet is placed to the right side of the platen assembly and will be covered by the sliding door when opened so that none of the control buttons can be touched when the door is opened.

All external and internal cabinet parts have been painted with heavy-duty primers and multiple layers of Epoxy lacquers with high surface finish and hardness for optimum protection.



## Platen Construction

The press platens are mounted on heavy-duty machined steel base platens, which are mounted on four oversized precision ground and hardened steel pillars. The top base platen is secured to the pillars with heavy duty locked nuts and the moving base platen is connected to the pillars with self lubricating bronze sliding bearings. The pillars as well as the hydraulic cylinder, are mounted on a thick milled steel plate, which covers the entire lower cabinet for maximum rigidity. The base platens on the press holds the pressing platens, which are built up as described below.

## Heating Platens

The heating platen is built in a sandwich construction where the top part consists of a hardened and precision ground steel plate, which has been hard-chromed and polished to give an absolutely flat and smooth surface. The thermocouple is placed in the center near the surface. The top steel part is bolted to a thick milled heat conductive plate, which contains the bank of special cylindrical heater cartridges. These cartridges have been made with a variable watt density to ensure minimum temperature deviation over the entire platen surface. Below the heat conductive platen is a thick ceramic mounted plate, made from a special formula of Alumina and Silica with optimum hardness.

## Cooling Platens

The cooling platens are made from cored steel platens where the cooling water is lead through the platen in a zigzag pattern for optimum cooling capacity. The hardened steel platen has been precision ground and hard chromed and it is further insulated to the base platen.

## Heating and cooling platens

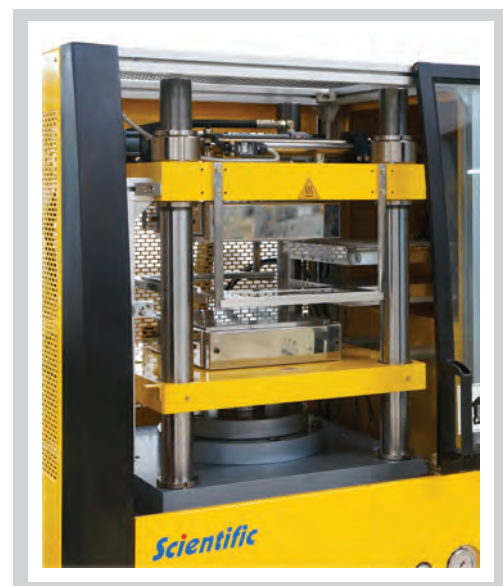
With the optional system of electric heating and water cooling on the same platens, the build up is the same as described earlier for heating platens. Except here, the middle heat conductive plate with the electric cartridges has also been cored with a zigzag pattern to give optimum cooling efficiency.

## Automatic Insert cooling System

The optional Automatic Insert Cooling System enables a fully "hands free" operation of all the press cycles. The system, shown here to the left, comprises of a separate set of cooling platens, which are inserted automatically in between the heating platens and the mould. The mould is resting on a free hanging stainless steel plate.

During the hot pressing cycle, the heating platens are closed over the mould lying on the stainless steel plate. When the hot pressing cycle is completed, the press opens and the cooling platens are automatically moved in between the mould. The press will then close again and bring the cooling platens with the mould upward to start the cooling cycle. After the cooling time has lapsed, the press opens automatically and the mould can be removed. Due to the thick ceramic insulation on the cooling platens, the heating platens will not be cooled when the press is closed and thus immediately ready for the next press job.

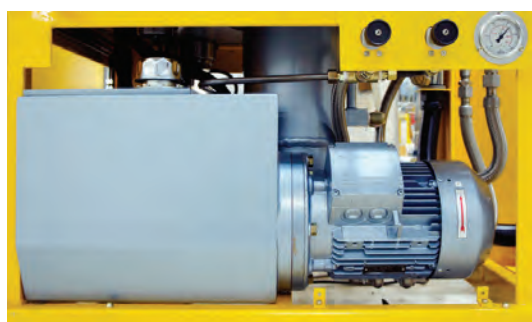
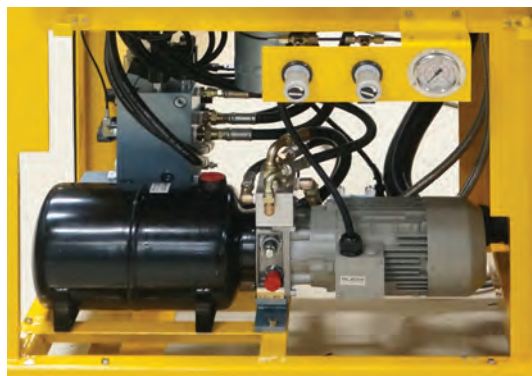
A two speed hydraulic cylinder drives the Insert Cooling platens and non-touching proximity switches regulate its positions. The system is also equipped with sensors to ensure trouble free operation.



## Hydraulic Description

The **Scientific** presses are made with the following main hydraulic components :

- **Double submerged pumps** with one vane pump for high flow, low pressure and one gear pump for low flow, high pressure. Both pumps are driven by a heavy duty AC motor.
- **A Large tank unit** with the pump assembly mounted submerged inside the cabinet. The tank has a large volume to ensure that the hydraulic oil will not overheat and to give maximum lifetime to both oil and hydraulic components. The main hydraulic control block with pressure release valve, main pressure regulator and the solenoid valves is mounted on the top of the tank and connected to the pumps with steel pipes.
- **A Double acting hydraulic press cylinder**, which is flange mounted to the steel base plate of the press, and connected to the hydraulic system with steel pipes. The heavy-duty hard chromed and polished piston rod is connected to the center of the lower base platen and, due to the double action of the cylinder, the press platen will move both up and down under pressure. This ensures that the press will open up at all time.



- **Optional for Insert Cooling system**, the presses are equipped with an hydraulic cylinder mounted on the top of the platen assembly. This cylinder is driven step wise by both the vane and gear pumps in order to give a very smooth movement. It is connected with steel pipes to the solenoid valves on the main hydraulic block situated on top of the tank.

**The piston closing pressure** is regulated with an infinitely variable electric pressure switch coupled to a pressure gauge. The regulator and gauge is placed on the lower front panel of the press cabinet. Optionally, the Scientific presses can be equipped with several pressure regulators to allow for multiple high - pressure settings with automatic switch over from one pressure to the other(s). Further, the pressure can optionally be regulated and set with a digital instrument on the control panel and a pressure transducer.

The standard **Scientific** press version is equipped with a custom made **Automatic Timer Control Panel** containing **four adjustable timers** which will **automatically control all the functions**, ie. **preheating, pressing, venting and cooling**.



Optionally, these functions can be controlled on a **LCD touch screen** at the control panel (shown to the right), coupled to a **Programmable Logic Controller (PLC)** situated in the main electric cabinet.

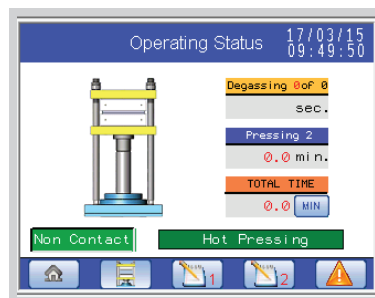


Temperature control (heating and optional watercooling) of the heating platens are regulated with two individual programmable electronic PID controller, via Electronic Proportional Relays, and thermocouples positioned near the steel surface of the platens. Each bank of heater cartridges can be individually turned on and off with switches on the control panel.

The heater cartridges used on our **Scientific** presses are custom made for Labtech Engineering where a special differential wattage is used, which combined with the design of the conductive platen, gives a very even temperature distribution over the entire surface.

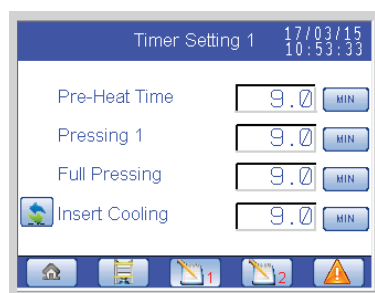
The Sliding Door to the press platens is interlocked with a key-type safety micro switch so that the press can not operate if the door is not fully closed. The Sliding Door will also cover the control cabinet entirely when fully opened so that the control functions can not be touched.

The Emergency button on the control panel will, when activated, immediately open up the press platens and stop all function, as well as close the electric heaters. The button is of the self-locking type and must be turned in order to be reset again.



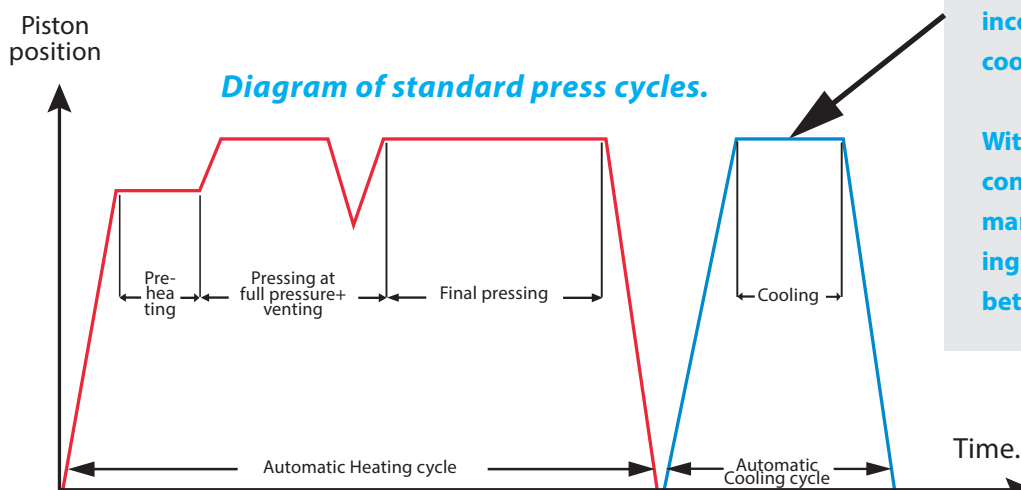
The picture to the left shows the micrometric sliding knobs for the platens, which allows for easy and precise adjustment of the platen daylight for the pre-heating and venting cycles.

The optional LCD Touch Screen control contains all the press cycles on a very user friendly screen set up. The press cycle time can easily be keyed in on the screen shown here above to the right.



The cooling of the mould is carried out either automatically with the Insert Cooling system or with single platen system where the platens incorporate both heating and cooling.

With the standard double platen configuration the mould has to be manually removed from the heating platens and inserted in between the cooling platens.



## SUMMARY OF STANDARD AND OPTINAL EQUIPMENT

### STANDARD VERSIONS

- Modern designed steel cabinet with curved sliding front door and control cabinet. The front door is equipped with a large Plexiglas window and the control cabinet is recessed so that it is covered by the front door when opened.
- The press platens are guided on the pillars with self-lubricating bronze bearings. The top side and rear part of the press is surrounded by a heavy duty stainless steel netting which gives total safety to the operator.
- Dual precision grounded and hard chromed press platens with electric heating of the upper two platens and cooling on the lower platens through machined zigzag water channels. The heating platens are built up with a sandwich construction comprising of :

**The top steel plate with a thermocouple inserted into the center part near the surface.**

**The intermediate thick heat conductive plate with special heating cartridges ensures a very even temperature over the platen surface.**

**The bottom thick high-density ceramic insulation plate, ensures that minimum heat is conducted to the base plate.**

**Further, the heating platens are surrounded along the sides with insulation sheets, which are covered by stainless steel frames.**

- Large fully motorized hydraulic system with a fully immersed two-stage vane and gear pump system for very quiet operations. The pumps enables two-speed operations of the press with high closing speed at low pressure and low pressing speed at high pressure.

The hydraulic tank has a large volume to ensure long lifetime to oil and all the hydraulic components. The press piston is double acting to ensure that it will open in the event that the pressing compound get stuck in-between the platens.

- Two Programmable Digital Electronic PID temperature controllers, one for each heating platen, is driving each a Proportional Electronic Relay connected to the bank of the heater cartridges. This system ensures a smooth and even heating of the platens.

- A bank of Digital Set and Readout Timers on the control panel regulates the automatic press function which are as following :

1. Preheating with the press platens near the closing position.
2. Hot Pressing at full preset pressure.
3. Venting = short opening followed by immediate closing of the platens.
4. Pressing at full pressure until set time has elapsed.
5. Opening - at this stage the mould should be removed manually from the heating platens and be inserted on top of the lower cooling platen.
6. The start button has to be pressed to activate the cooling cycle and the press will close then open automatically when the cooling time has elapsed.

- Sliding knobs at the left side of the press with steel scale in mm. This will set the opening distance of the platens during pre-heating and venting.
- Pressure regulating knob is located on the lower front panel with pressure gauge showing the platen pressure in MT. The platens pressing pressure can be regulated infinitely from 20 to 100% of its maximum rated pressure.

## OPTIONAL EQUIPMENT

### Press Platen Configurations

- **Single set of pressing platens** with both heating and cooling on the same platens. The two platens are built up with the same sandwich configuration as described for the standard heating platens, but with additional machined zigzag channels in the middle layer for water-cooling. The press will automatically switch over to cooling when the heating cycle is completed by means of a solenoid valve, which opens the water flow when the heating time has elapsed.

Thus, the press has fully automatic pressing cycles as following :

1. Pre-heating with press platens near closed position.
2. Hot Pressing at full present pressure.
3. Venting = short opening followed by immediate closing of the platens.
4. Pressing at full pressure until set time has elapsed.

Cooling at full pressure immediately after the heat

5. pressing cycle has elapsed.

Opening of press platens after cooling time has

6. elapsed.

- **Automatic Insert Cooling Platens system** with one set of heating platens and a stainless steel support plate in between the heating platens. This system enables a fully automatic operation of the press, similar to the above single set of heating platens with both heating and cooling on the same platens. But the advantage with this Insert Cooling system is that the water will not cool down the heating platens. The press will thus have a shorter total operating time, as well as being immediately ready for the next job since the heating platens remains all the time at set temperature.

**The Automatic Insert Cooling System is always supplied with Electronic LCD Touch Screen Control and Display.**

- **Other platen dimensions** can be supplied on request for each press type.
- **Multiple set of platens**, with electric heating or with electric heating and water cooling for simultaneously pressing of several moulds etc.
- **Vacuum chamber surrounding the press platens** for pressing of thermosetting resins, or polymers where evacuation of gases is needed etc. These press versions are supplied with a swing open door to the press platen to ensure good sealing for the vacuum chamber.

## OPTIONAL EQUIPMENT

- **Electronic LCD Touch Screen Control and Display** on the Control Panel. The Touch Screen, which replaces all the timers in the standard press version, is coupled to a Programmable Logic Controller (PLC), and it controls all the cycles of the press. The LCD screen has a multitude of displays and, by touching the screen, various press parameters can easily be set. The screen will also show the various press stages during operation.
- **Multiple venting programs** controlled by the above LCD touch screen.
- **Multiple set of manually adjustable Pressure Regulators with dial Pressure Gauges.** This enables infinite settings of two, or more different platen pressures at requested stages of the press cycles. With this, the pressing during the heating cycle can be done at several different pre-set pressures.
- **Electronically regulated pressure and venting stages**, enabling fully automatic multi stage press cycle programs controlled by a colour LCD touch screen. Here the hot pressing cycle can be set on the touch screen at, for instance, five different pressures against time, with or without venting between each stage.



## FULLY ELECTRIC AND AUTOMATIC PRESSES

### THE WORLD'S FIRST FULLY ELECTRIC & FULLY AUTOMATIC **Scientific** LABORATORY PRESS



#### The automatic insert cooling

Fully automatic insert cooling system with ceramic insulated cooling platens which does not affect the temperature of the heating platens. The insert platens are electrically driven and will swing 90° in-between the hot pressing platens when the cooling cycle is called for

#### Heating / Cooling

Platens made in a sandwich construction consisting of an insulating base, a conductive copper layer with the cartridge heaters and a top layer of a hardened precision ground and chromed steel plate.

#### Electric System

This unique laboratory press has no hydraulics and the up stroke pressure is achieved by a heavy duty and high precision ball screw, driven by a geared AC variable speed motor

The press was developed by our engineers for more than a year and it is the first fully electric version in the world which features electric driven insert platens as well as computerized touch screen control with easy to understand graphics





## The press has the following features :

- Fully electric where the pressure is achieved by a heavy duty and high precision ball screw, driven by a geared AC variable speed motor
- Almost completely quiet. All you hear is the motor humming
- Fully automatic and computerized with large touch screen control and with clear graphic illustrations of the pressing cycles. All parameters can be set and controlled on the touch screen.
- 5 to 200 KN clamping force which is fully adjustable and is set numerically on the touch screen
- 200 x 200 mm (8 x 8 inch) fully guided heating platens, mounted on four steel pillars and guided with self lubricating bronze bearings.

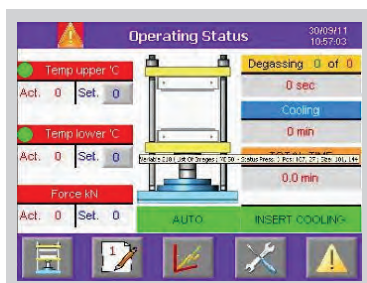
- Platens made in a sandwich construction consisting of an insulating base, a conductive copper layer with the cartridge heaters and a top layer of a hardened precision ground and chromed steel plate.
- 300 °C (570 °F) max platen temperature.
- Full conformity to CE and all other word safety norms.

## OPTIONAL EQUIPMENT

- High Temperature versions up to 400 °C
- Single set of pressing platens with both heating and cooling on the same platens
- Automatic Insert Cooling Platens system
- Change Platen size to 400 x 400 mm
- Electronic full colours 6-inch LCD Touch Screen Control
- Dual set of Pressure Regulators
- Triple sets of Pressure Regulators
- Electronic Digital Readout of pressure in KN.

## CONTROL AND PROGRAM

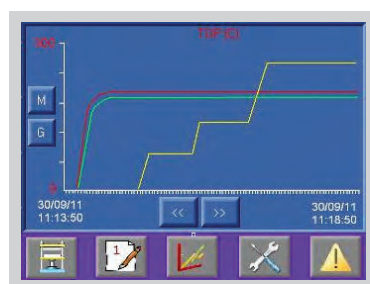
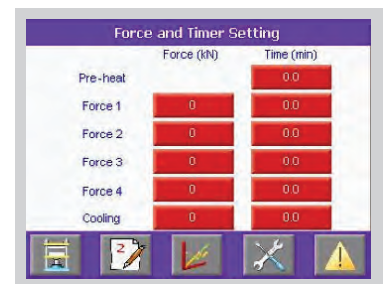
### Many control and programming possibilities on the touch screen as following :



### Main screen showing all major set and read out data such as :

- Temperatures of top and bottom platens
- Platen force in kN
- Venting (degassing)
- Cooling time
- Cooling system

Screen for setting preheating of the mould and platen force as well as cooling and duration of each step. With this it is possible to set up one step for preheating, another 4 steps for different forces, one after the other and finally the required cooling time



Another screen is for setting up the Degassing or venting which can be made to take place in many steps during the heating cycle of the press and where each the duration of each venting can be set in seconds. This screen also have selector buttons for Automatic Cooling with the insert cooling platens or Manual Cooling as well as no cooling.



A real time graph screen will show the press cycles with actual temperatures of both platens as well as the force steps

## ASTM HYDRAULIC PRESSES



**Designated High efficiency  
water cooling system  
with large Chiller unit  
and a large twin chamber  
stainless steel water  
reservoir**

### The New Standard ASTM Press

is also equipped with newly designed press platen which each has a dual channel cooling system and it also has a new design of the heating system with a larger number of high wattage heating cartridges, placed in a special pattern which, together with the new cooling channel system, enables an extremely precise temperature control and ramping of the platens.

The New ASTM computerized press is supplied with a complete designated water cooling system which ensures a very precise supply of water at a temperature of  $24 \pm 1^\circ\text{C}$  and with a constant pressure of 2.5-3 bars. The system comprises of a large air cooled water chilling unit which is connected to a dual chamber stainless steel water tank. A closed loop water pump will supply the cooling water to the press platens and the returning hot water is lead to one of the chambers of the cooling tank where the water will be cooled by the chiller and returned to the closed loop system. This system does not require a large supply of

external water. Only a minute amount is needed from time to time in order to replace water which has evaporated in the tank.

### Control for Standard ASTM

Electronic full colours 6-inch LCD Touch Screen Control and Display on the Control Panel. The Touch Screen is coupled to a Programmable Logic Controller (PLC) and it controls all the cycles of the press. The LCD screen has a multitude of displays and, by touching the screen, various press parameters can easily be set. The screen will also show the various press stages during operation. The press cycles are as following :

- Preheating with press platens near closed position
- Pressing at full preset pressure and heat.
- Venting = short opening followed by immediate closing of the platens.
- Pressing at full pressure until set time has elapsed.
- ASTM Cooling at full pressure immediately after the heat pressing cycle has elapsed.
- Opening of press platens after cooling time has elapsed

## The Platen heating is regulate by

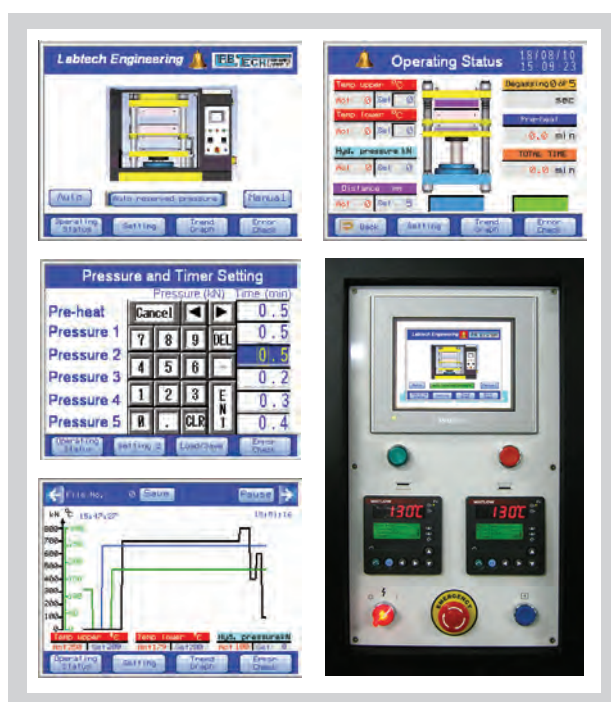
two Programmable Digital Electronic PID temperature controllers, one for each platen. These controllers are sending signals to designated Proportional Electronic Relays which gives a proportional current to the bank of heating cartridges inside the press platen. This system ensures a smooth and very even heating of the entire platen surface.

Two individual ramping instruments to control the exact cooling rate in accordance to the ASTM standard, where the cooling rate has to be controlled at  $15^{\circ}\text{C} \pm 2^{\circ}\text{C}$  per minute. This controlled cooling rate is required for making test sheets in type I, II, III and IV polyethylene and other thermoplastic resins. The ramping controllers can also be set to any cooling rate between  $1^{\circ}\text{C}$  to  $20^{\circ}\text{C}$  in the event that another standard is required

## Electronic Digital Readout

of pressure in KN. The pressure is here sensed by a high precision transducer and indicated digitally on the control panel. The pressure is set by turning a knob to a pressure regulator below the control panel. With this digital readout, it is also possible to set a much more precise pressure on the regulator. Also dual and triple regulators and digital readouts can be supplied in this version.

## Control and Program for ASTM



### Control for Computer ASTM

Electronic full colours LCD Touch Screen Control and Display on the Control Panel. The screen will also show the various press stages during operation. The following graph will be shown on the touch screen and illustrates the ASTM moulding cycles using 4 pressures. (Optionally up to 10 pressure stages can be supplied).

### The LCD touch screen

also has a trend graph facility which will show graphs in real time of the hydraulic pressures as well as the set and the actual temperatures. This Trend Graph can be called upon any time during the press cycles and the data values can be saved in the memory of the PLC as well as transferred through an Ethernet connection to an external PC

## Technical Data

PRESS TYPE		LPE-S-20 (Computer)	LP-S-20	LP-S-50	LP-S-80
<b>Mechanical data</b>					
Maximum platen pressure	MT	20	20	50	80
Platen sizes (Others on request)	mm	200 x 200	200 x 200	300 x 300	400 x 400
Daylight (max. opening)	mm	150	150	180	180
Press size (L x W x H)	cm	110 x 88 x 177	130 x 90 x 200	165 x 110 x 220	165 x 110 x 220
Net weight	kg	460	460	1,350	1,550
<b>Electrical Data</b>					
Platen heating power	kW	2 x 4	2 x 4	2 x 6	2 x 7.2
Hydraulic Motor power	kW	-	2,2	4,0	4,0
Main Motor power for ball screw piston	kW	4,0	-	-	-
Max platen temperature	C	300	300	300	300
Approx. heating time to $150^{\circ}\text{C}$	min	10	10	15	20

## BENCH TOP LABORATORY HYDRAULIC PRESS

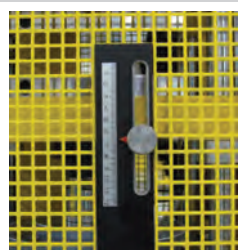


### Bench top laboratory hydraulic presses Types LP20-B & LP30-B With 20 MT respectively 30 MT max platen pressures

Compact fully motorized hydraulic laboratory press with modern and pleasing design. The standard press has two separate sets of platens. The upper set of platens is for heating and the lower set of platens is for cooling. Optionally the press can be equipped with a Single set of platens with both electric heating and water cooling on the same platens. Press platens are built in completely in a safety chamber with an interlocked swing open front door.

Dual precision grounded and hard chromed press platens with electric heating of the upper two platens and water cooling on the lower platens through machined zigzag water channels. The platen sizes are 200 x 200 mm for the LP20-B press and 300 x 300 mm for LP30-B.

The standard control panel comprises of two digital temperature controllers as well as one digital timer, controlling both the heating and the cooling cycle. Optionally, as shown on the right picture, a second timer can be added so that the heating and the cooling cycles are controlled individually by one timer each.



A micrometric sliding knob, shown to the left, allows for precise adjustment of the platen opening distance, which can be set to open from 0 to 100 mm.

Picture to the right show the very compact custom built high power hydraulic system, utilizing medium pressure hydraulics for optimum durability.

### Technical Data

Description	Press type LP20-B	Press type LP30-B
Press platen size	200 x 200 mm.	300 x 300 mm.
Max stroke	100 mm.	100 mm.
Max daylight, standard (Others on request)	50 mm. between each heating and cooling platens	50 mm. between each heating and cooling platens
Max daylight with heating and cooling on same platens	100 mm.	100 mm.
Max platen pressure	200 KN	300 KN
Platen pressure range	20 to 200 KN	20 to 300 KN
Hydraulic pressure	160 bar	160 bar
Hydraulic motor power	1 HP	1 HP
Heating power	2 x 4000 W	2 x 6000 W
Max temperature	300°C	300°C