



TERAPRESS TP-7100S

Mounting Press



INSTRUCTION MANUAL

3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com



Equipment Type: Automated Compression Mounting Press

Model: **TERAPRESS TP-7100S Compression Mounting Press**

Electrical Requirements: 110/220 Volts

Frequency: 50/60 Hz

Manual Revision Date: May 1, 2024

Please read this instruction manual carefully and follow all installation, operating and safety guidelines.



Contents

	PAGE
Warranty	i
1.0 Safety Guidelines	1
2.0 Product Description	3
3.0 Unpacking, Shipping, and Installation	7
4.0 Start-Up and Operation	10
5.0 Maintenance	22
6.0 Troubleshooting	23
7.0 Compression Mounting Guide	25
8.0 Electrical and Mechanical Drawings	35



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

WARRANTY

Terms and Conditions applying to all PACE Technologies Products

1. LIMITED WARRANTY AND DISCLAIMER:

PACE Technologies Products are warranted for two years from the purchase date to be free from defects in material and workmanship under correct use, normal operating conditions, and proper application. PACE Technologies obligation under this warranty shall be limited to the repair or exchange, at PACE Technologies option, of any PACE Technologies Product or part which proves to be defective as provided herein. PACE Technologies reserves the right to either inspect the product at Buyer's location or require it to be returned to the factory for inspection. Buyer is responsible for freight to and from factory on all warranty claims. The above warranty does not extend to goods damaged or subjected to accident, abuse or misuse after release from PACE Technologies warehouse, nor goods altered or repaired by anyone other than specifically authorized PACE Technologies representatives. PACE Technologies shall not in any way be responsible for the consequences of any alteration, modification or misuse unless previously approved in writing by an officer of PACE Technologies. Note: Corrosion is considered a maintenance issue and not a warranty issue.

PACE TECHNOLOGIES MAKES NO EXPRESS WARRANTIES OTHER THAN THOSE WHICH ARE SPECIFICALLY DESCRIBED HEREIN. Any description of the goods sold hereunder, including any reference to Buyer's specifications and any description in catalogs, circulars and other written material published by PACE Technologies, is the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. THIS WARRANTY STATES PACE TECHNOLOGIES ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM FOR DAMAGES IN CONNECTIONS WITH PACE TECHNOLOGIES PRODUCTS. PACE TECHNOLOGIES WILL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, NOR FOR ANY SUM IN EXCESS OF THE PURCHASE PRICE.

2. LIABILITY CAP:

PACE Technologies maximum aggregate liability for loss and damage arising under, resulting from or in connection with the supply or use of the Equipment and Consumables provided under this purchase, or from the performance or breach of any obligation (s) imposed hereunder, whether such liability arises from any one or more claims or actions for breach of contract, tort, (including negligence), delayed completion, warranty, indemnity, strict liability or otherwise, unless otherwise limited by the terms hereof, shall be limited to one hundred percent (100%) of the purchase price.

3. DELIVERY:

Customer assumes and shall bear the risk of all loss or damage to the Products from every cause whatsoever, whether or not insured, and title to such Products shall pass to Customer upon PACE Technologies delivery of the Products to the common carrier of Pace Technologies choice, or the carrier specified in writing by Customer, for shipment to Customer. Any claims for breakage, loss, delay, or damage shall be made to the carrier by the Customer and Pace Technologies will render customer reasonable assistance in prosecuting such claims.



TERAPRESS TP-7100S

Mounting Press



INSTRUCTION MANUAL

3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

4. ACCEPTANCE:

Customer shall inspect the Products promptly upon receipt of delivery. Unless customer objects in writing within thirty (30) business days thereafter, customer shall be deemed to have accepted the Products. All claims for damages, errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

5. PAYMENT:

Customer agrees to provide timely payment for the Products in accordance with the terms of payment set forth on the reverse side hereof or in any proposal submitted herewith. If any payment is not paid on or before its due date, Customer shall pay interest on such late payment from the due date until paid at the lesser of 12% per annum or the maximum rate allowed by law.

6. DEFAULT:

If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to Seller) under the work or purchase order or any other agreement between Buyer and Seller, Buyer's rights under the warranty shall be suspended during any period of such default and the original warranty period will not be extended beyond its original expiration date despite such suspension of warranty rights.

7. MISCELLANEOUS PROVISIONS:

This agreement has been made in and shall be governed by the laws of the State of Arizona. All disputes arising under or relating to the purchase of the equipment shall be brought and resolved solely and exclusively in the State of Arizona, Pima County. These terms and conditions and the description of the Products on the reverse side hereof or in any proposal submitted herewith constitute the entire agreement and understanding of the parties with respect to this sale and supersede all prior and contemporaneous agreements or understandings, inducements or representations, expressed or implied, written or oral, between the parties with respect hereto. Any term or provision of this Agreement may be amended, and any observance of any term of this Agreement may be waived, only by a writing signed by the party to be bounds. The waiver by a party of any breach shall not be deemed to constitute a waiver of any other breach. Should suit be brought on this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs of suit including costs and attorneys' fees incurred on appeal or in collection of any judgment., errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

8. RESTOCKING FEE:

All Returns are subject to a restocking charge equal to 15% (fifteen percent) of the Invoice, unless the Goods are proved to be non-conformed by PACE Technologies.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

1.0 Safety Guidelines

1.1 Warning Sign

- ! This sign points to special safety features on the machine.

1.2 Safety Precautions

- ! Careful attention to this instruction manual and the recommended safety guidelines is essential for the safe operation of the **TERAPRESS TP-7100S** mounting press.
- ! Proper operator training is required for operation of the **TERAPRESS TP-7100S** mounting press. Unauthorized mechanical and electrical changes, as well as improper operation, voids all warranty claims. All service issues need to be reported to the manufacturer / supplier.
- ! Supplying incorrect voltage will cause severe damage to the electrical system. Verify the operating voltage listed on the serial plate on back of machine (indicated in section 3.3).
- ! It is recommended that no extension cords or multiple outlet connectors be used as this may cause the fuse to overheat but not blow during operation.

(Safety Precautions continued on next page)



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

1.2 Safety Precautions (continued)

- !** Caution: DO NOT POSITION HEAD OR OTHER BODY PARTS OVER THE MOLD WHEN RAISING THE RAM TO REMOVE THE SPECIMEN MOUNT
- !** During operation, the closure and upper parts of the heating and cooling block can get very hot. For safety, do not touch the closure unit. Use protective gloves if required.
- !** Always completely screw tighten the bayonet cover and back off a fraction so it is not too tight. Improper installation can result in hot molten mounting material leaking (**danger of burning**).
- !** Initial cooling water coming into contact with mold will produce an initial burst of steam. To avoid **danger of burning**, secure the drain line and use caution when the **TERAPRESS TP-7100S** compression mounting press is in use.
- !** Mold cylinder and ram get very hot during the mounting process. Take care before changing (**danger of burning**).
- !** Mounting samples must be chemically compatible with the mounting material. **Do not mount flammable samples.**
- !** Before opening the unit, disconnect main power plug. Replacement parts should be installed only by qualified personnel.
- !** Follow proper operating instructions (Section 4.0) and obtain proper training before operation.
- !** Do not leave press unattended during operation.
- !** Turn off external water supply when press is not in operation.

1.3 Emergency Statement

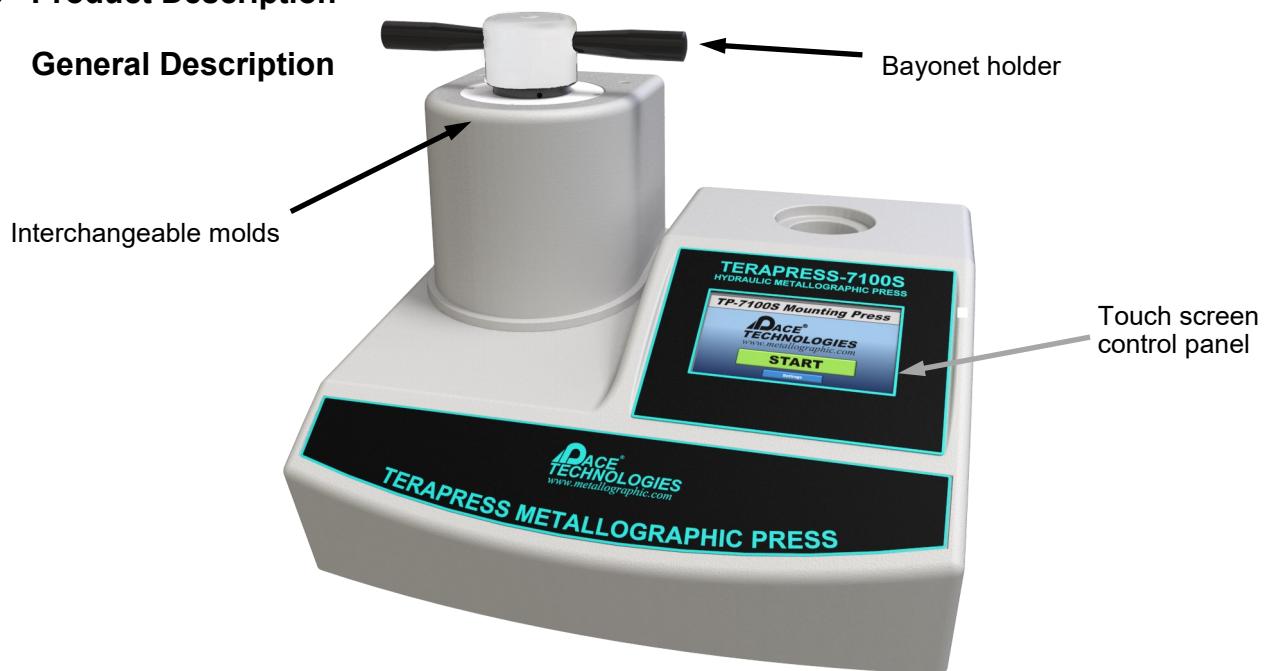
The **TERAPRESS TP-7100S** mounting press has been designed for mounting non-flammable metallographic specimens up to 2-inch diameter. Always follow proper operational guidelines and avoid contact with moving parts and hot assemblies. Seek appropriate medical care for injuries.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

2.0 Product Description

2.1 General Description



The **TERAPRESS TP-7100S** compression mounting press is designed for ease-of-use and reliability. It utilizes air pressure to maintain a constant force on the specimen, thus eliminating the requirement to continually monitor and increase the force as the resin begins to melt.

Rapid heating is achieved by a heater that completely surrounds the mold assembly and is precisely controlled via microprocessors. Cooling is also accelerated by a water-cooling jacket, and can be accomplished by cooling for a set amount of time or to a specific temperature. This ensures that curing can be achieved for both thermoset and thermoplastic compression mounting resins.

Depending on your needs, the **TP-7100S** is sold with either interchangeable or fixed mold assemblies. Interchangeable molds allow the user to quickly swap mold sizes from 1 to 2 inch mounts. Fixed molds offer superior heat retention resulting in shorter cycle times and are best for labs that work with the same mold size the majority of the time.

With the use of a spacer, the **TERAPRESS TP-7100S** can produce two mounts simultaneously. This can substantially increase the productivity of your metallographic laboratory.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

2.2 Technical Specifications

Electrical specifications:	110 or 220 Volts (set at factory)
Heater specifications:	2000 Watts (110V / 20 amp)
Thermostat range:	Room temperature to 392°F (200°C)
Incoming pressure range:	Max. 120 psi
Timer:	0 - 99 minutes
Interchangeable mold sizes:	1, 1.25, 1.5 and 2-inch (25, 30, 40 and 50-mm)
Weight:	68 lbs (31 kg)
Dimensions (WxHxD):	31 x 19 x 19-inches (534 x 485 x 485mm)
Working temperature:	32° - 100°F (0 - 40°C)
Shipping temperature:	32° - 100°F (0 - 40°C)
Storage temperature:	32° - 100°F (0 - 40°C)
Water supply connection:	8 mm quick connect
Water drain connection:	1/4 inch heater hose
Air supply connection:	6 mm quick connect
Fuse:	10 amp fast blow

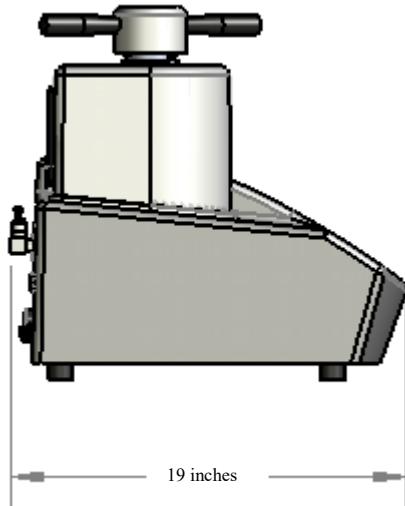
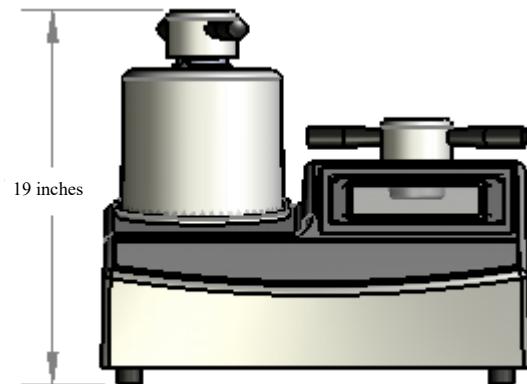
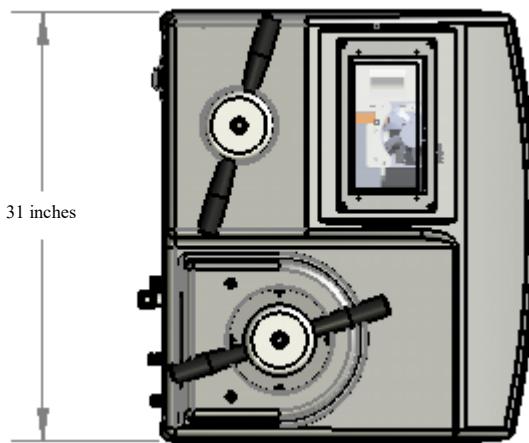


EU Directives:	Machinery directive 2006/42/EC RoHS Directive 2011/65/EU
EU Harmonized Standards:	EN ISO 1200:2010 EN 61010-1:2010 EN 61326-1:2006



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

2.3 Mechanical Schematic



Note: Installation of the **TERAPRESS TP-7100S** should be on a flat sturdy surface, with easy access to electrical, water, air, and drain connections



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

2.4 Features

Mounting Force

The **TERAPRESS TP-7100S** applies force through a robust pneumatic system. Pressure is precisely controlled via microprocessors.

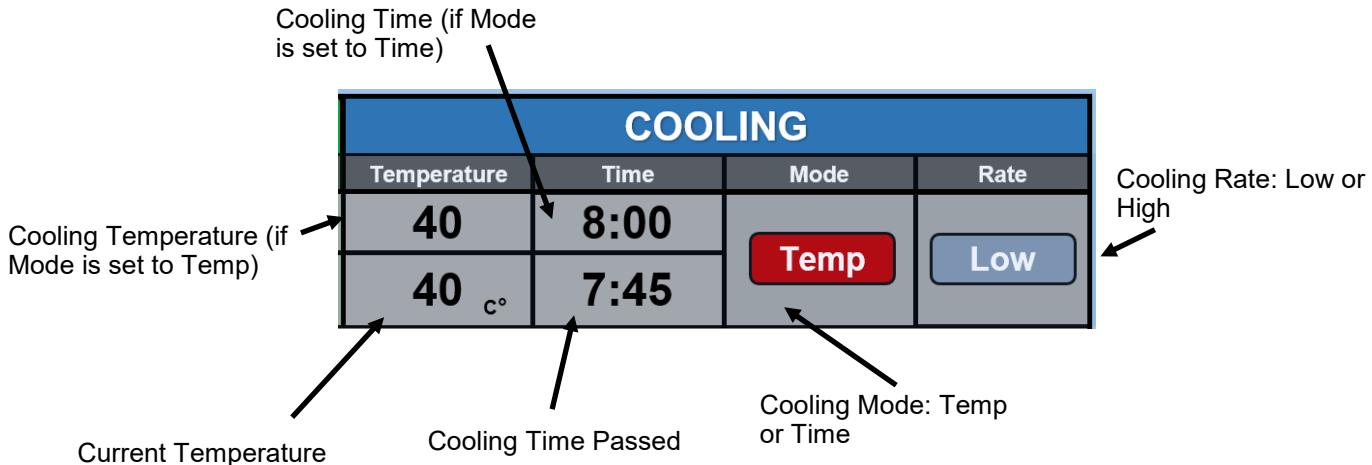
Heating / cooling system efficiency

The heating elements and water-cooling jacket have been integrated into the upper part of the mold cylinder for efficiency. Heating is controlled by a thermostat, with the heating times being variable up to 30 minutes.

The cooling cycle begins automatically after the designated hold time at temperature has passed. Cooling can be completed one of two ways:

1. Cooling to a preset temperature
2. Cooling for a specific amount of time

The **TERAPRESS TP-7100S** compression mounting press offers the user an abundance of control for both the heating and cooling cycle allowing the **TP-7100S** the ability to mount any mounting compound or sample composition.





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

3.0 Unpacking, Shipping and Installation

3.1 Unpacking

Unit is delivered in a box. Unpack and check for completeness of parts.



Measures WxHxD: 31 x 19 x 19-inches (534 x 485 x 485mm)

Weight: Approx. 68 lbs. (31 kg)

3.2 Shipping

When moving box, lift from bottom.

The **TERAPRESS TP-7100S** compression mounting press is constructed of sensitive electronic and mechanical components. **Do not drop.**



! Use caution when unloading to prevent injury.

3.3 Installation



Install unit carefully! Improper installation voids warranty.

The **TERAPRESS TP-7100S compression mounting press** should be placed on a flat stable surface. Connect to air supply, water supply, drain and electrical connections.

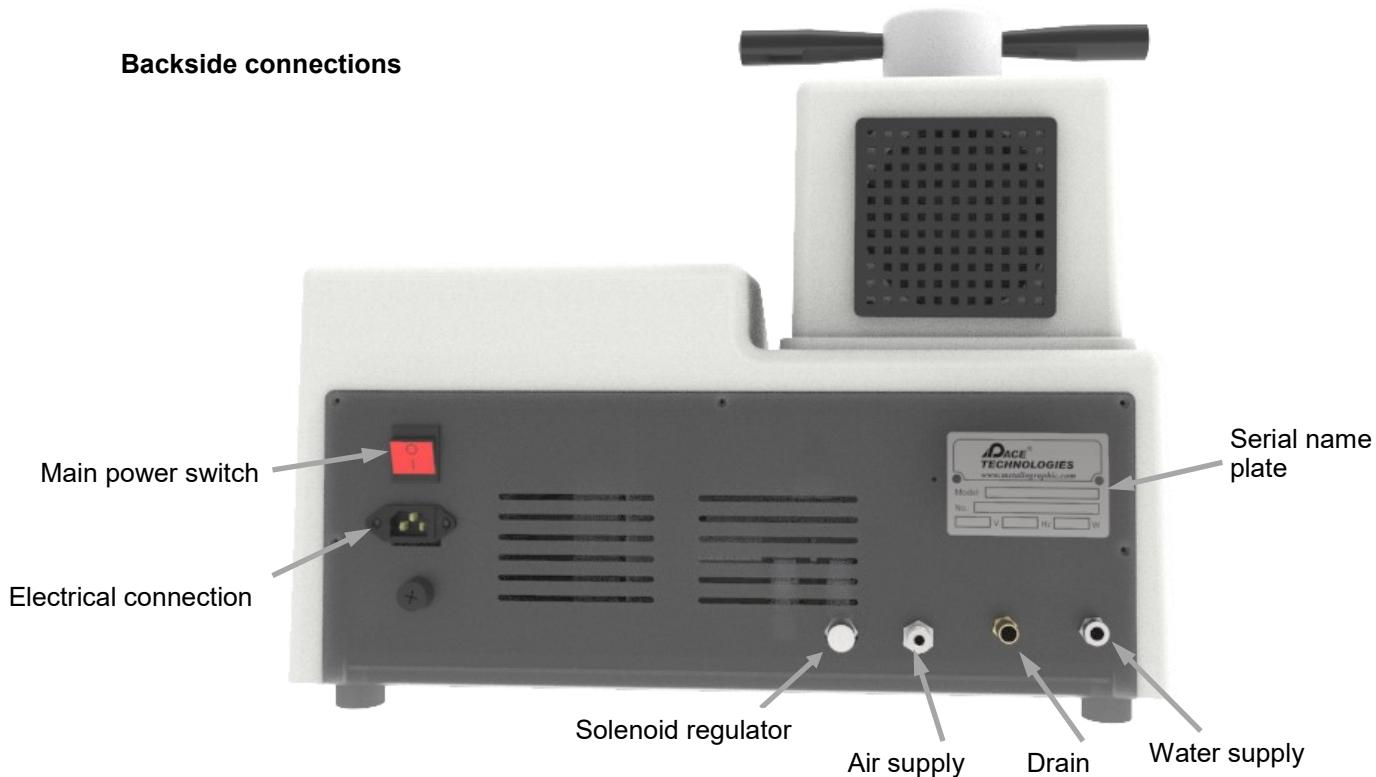
After water, air, drain and electrical connections are completed, the system is ready for operation by activating the main power switch.

Installation continued on next page



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Backside connections



Electrical connection: Verify the operating voltage which is printed on the name plate. The standard voltage is 110V; however, the system is also available in 220V.

Coolant drain: The coolant drain line requires a 1/4-inch hose. **CAUTION:** The mold temperature is very hot and the initial contact of the cooling water turns to steam, which exits the drain hose at a very high temperature.

Coolant supply: The coolant supply line requires an 8 mm hose. It is recommended that the water supply be turned off when the unit is not in use. Inlet water should be clean and contamination-free to extend the life and cooling performance of the system.

Air supply: Air supply line requires a 6 mm pressure hose. Clean dry air is recommended (a filter lubricator is recommended)

Solenoid regulator: To adjust cooling times, adjust this regulator to open the auxiliary solenoid.

TERAPRESS TP-7100S

Mounting Press



INSTRUCTION MANUAL

3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

External Coolant Tank

As an optional attachment, an external recirculating coolant tank can be connected to the back of the **TERAPRESS TP-7100S** compression mounting press. The advantages of using this tank include significant reduction in water usage as well as shorter cooling times due to the heat exchanger built into the tank. The reduction in cycle times can be very advantageous to high throughput metallographic labs.





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

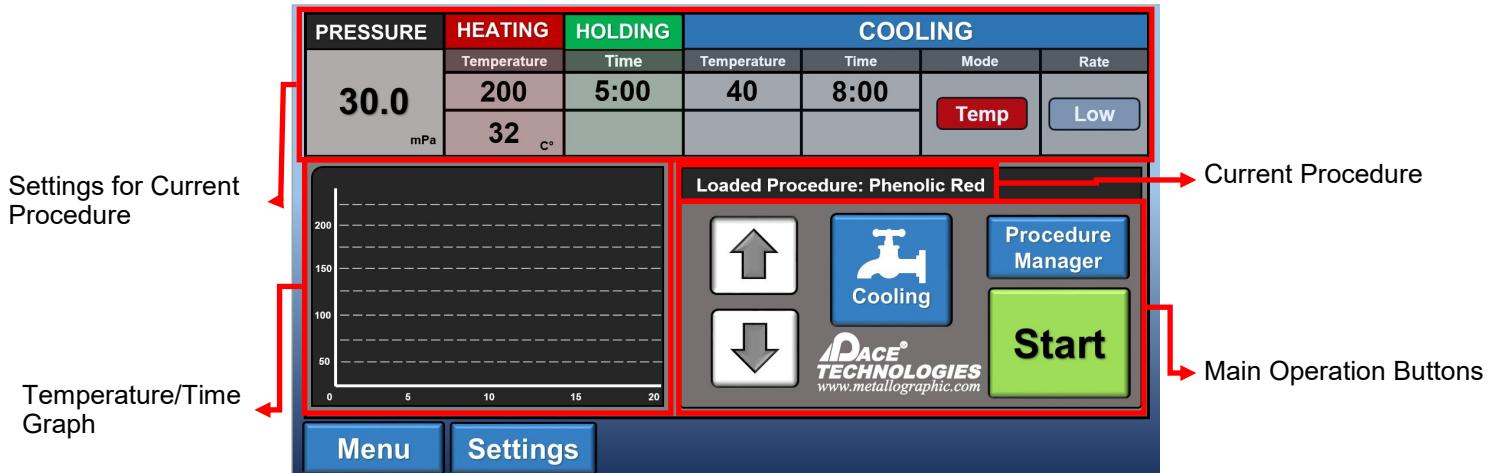
4.0 Start-up and Operation

4.1 General

The **TERAPRESS TP-7100S** mounting press has been designed for ease-of-use in producing high quality metallographic mounts using materials such as phenolics, diallyl phthalates, hard glass-filled epoxies, and conductive thermosets.

The **TERAPRESS TP-7100S** comes with preloaded procedures to make initial startup as fast as possible. Custom procedures can also be created and saved for maximum versatility. Section 4.2 gives an overview of all relevant functions on the main screen, and sections 4.3-4.4 describe how to load procedures as well as how to create custom ones. Section 4.7 gives a general procedure for compression mounting along with recommended mounting guidelines.

4.2 Touch Screen Overview and Functions



Main Operation Buttons



Begins mounting cycle with currently displayed parameters.



Returns to the startup screen.



Opens the Procedure Manager for editing and loading various procedures.



Opens the settings.



Begins cooling manually. This turns on the water pump.

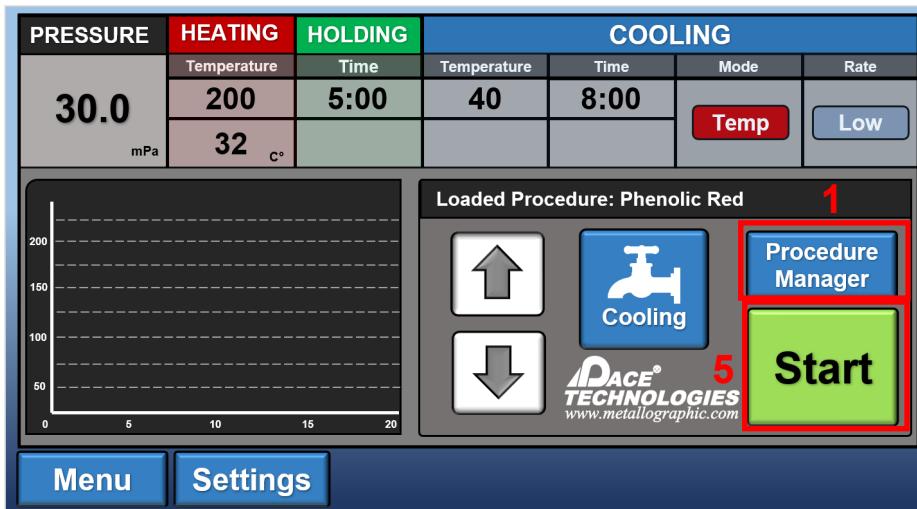


Moves the ram down and up.

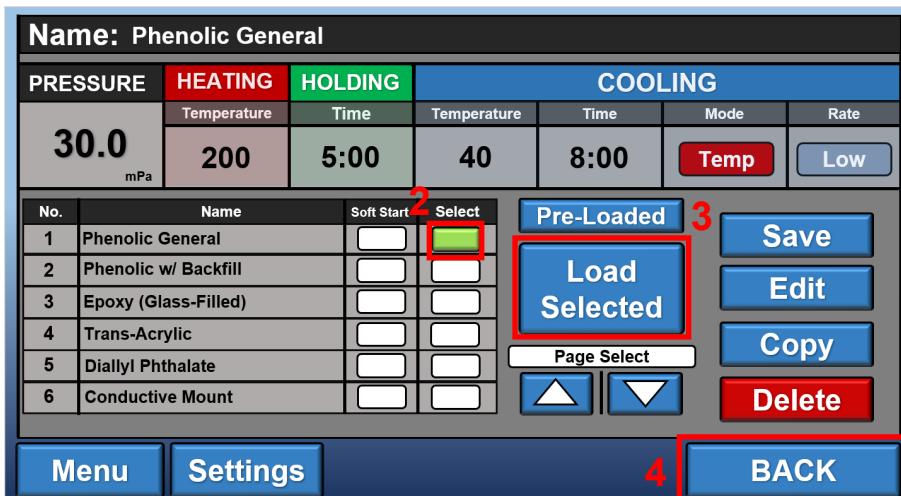


3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

4.3 Loading a Saved Procedure



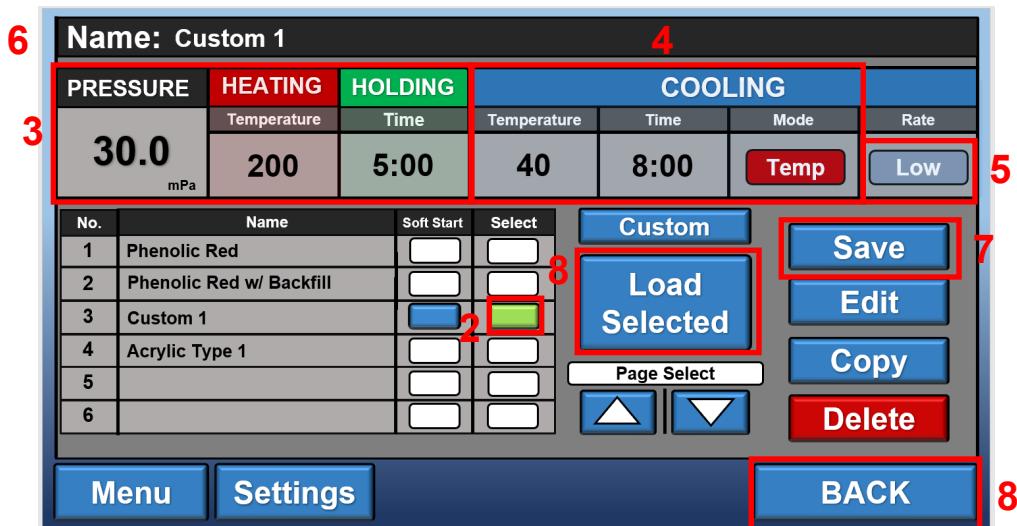
- From the home screen, touch the Procedure Manager button.
- Find the desired procedure and touch Select. The Select button will appear green for the selected procedure.
- Touch the Load Selected button.
- Touch the BACK button to return to the home screen. The selected procedure specifications will now appear at the top.
- Touch Start button.
- The system will now begin mounting the sample to the specifications of the loaded procedure.



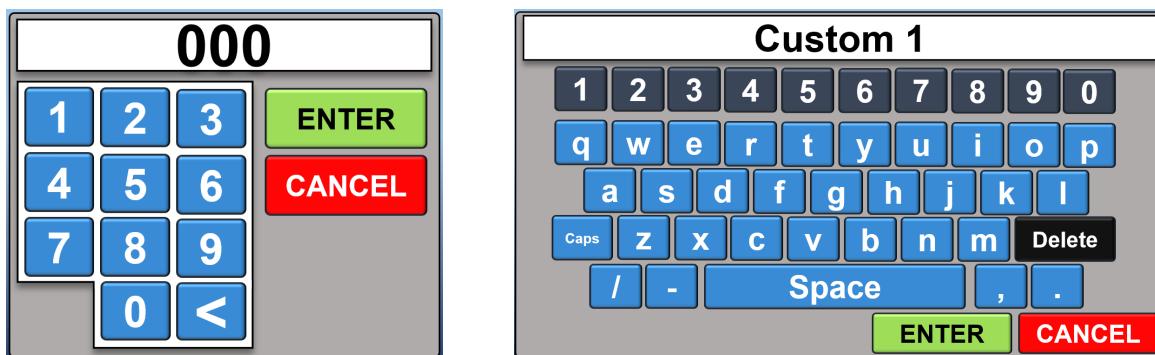


3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

4.4 Creating and Loading Custom Procedures



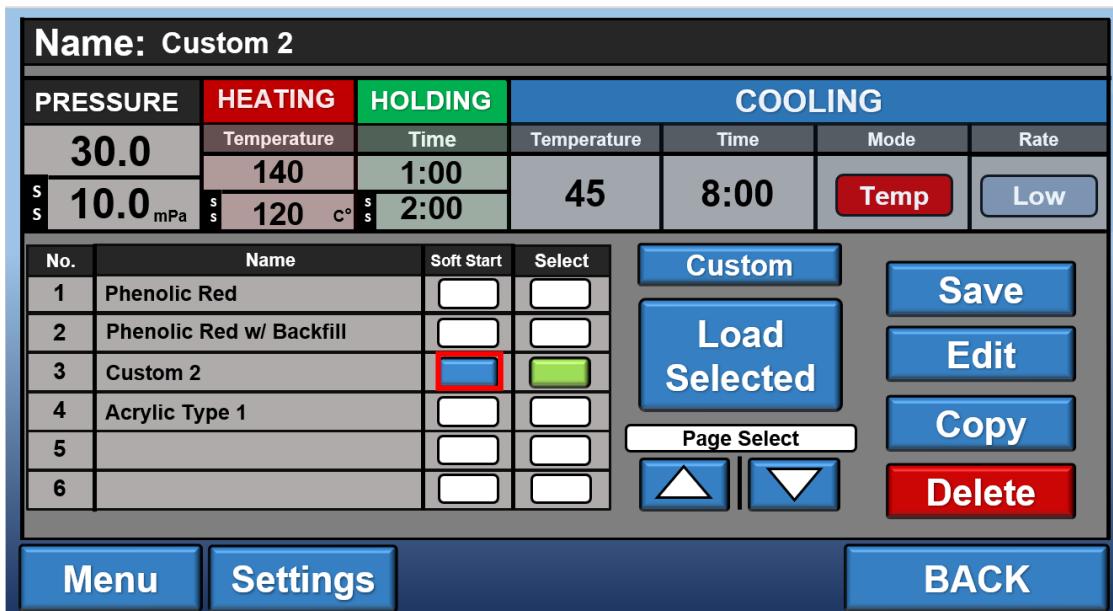
1. From the home screen, touch the Procedure Manager button.
2. Touch Select on an empty slot.
3. Touch numerical value for pressure, heating temperature, and holding time. Use keypad to change to desired values.
4. Set Cooling Mode to either Temp or Time. Then touch either cooling temperature or cooling time and use keypad to change to desired values.
5. To set cooling rate, touch button to toggle between Low and High.
6. Touch the field labeled Name to input a name for the custom procedure using onscreen keyboard.
7. Touch Save button to save procedure to specified slot.
8. To load a custom procedure, touch Select on desired procedure, then touch Load Selected, and then BACK to return to home screen.





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

4.5 Soft Start Function



Soft Start is a new feature to the **TERAPRESS** line of mounting presses. It allows the user to prep the mounting press to a specific temperature and pressure before continuing with the remainder of the procedure. This is helpful for situations such as where heating the mounting compound or sample needs to be done at a slower rate to ensure proper curing, or if the sample is brittle and needs to be pressurized before temperature should be applied for structural integrity of the sample.

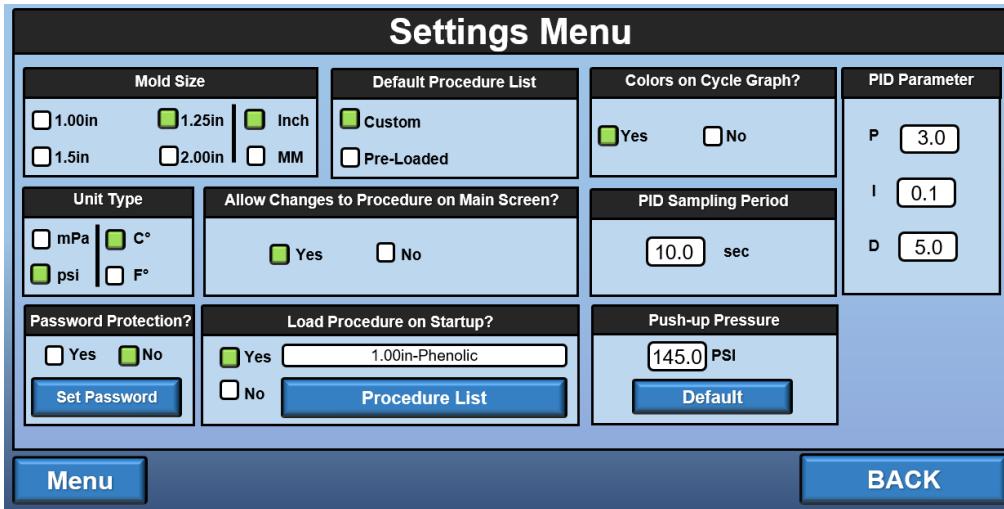
To add Soft Start to a procedure, select Soft Start next to the desired procedure. Empty boxes will now appear under Pressure, Heating, and Holding, and can be set using the same method as described in section 4.4. For the example above, Custom 2 will now complete the following procedure:

1. Heat to 120C while under 10 MPa of pressure.
2. Hold for 2 minutes.
3. Heat to 140C while under 30 MPa of pressure.
4. Hold for 1 minute.
5. Cool to 45C.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

4.6 Settings Menu



Mold Size: This sets the size of the installed mold. Available options in inches are 1.00, 1.25, 1.5, and 2.00. In millimeters, the options are 25, 30, 40, and 50.

Default Procedure List: This setting determines which procedures list will appear as default when Procedure Manager is selected from the home screen when the machine first starts up.

Colors on Cycle Graph?: This setting allows for toggling between grayscale and color for the time/temperature cycle graph.

Unit Type: This sets the default units of the temperature and pressure values.

Allow Changes to Procedure on Main Screen?: This allows the user to change parameters of the procedure after it has been loaded.

PID Sampling Period: This sets the frequency of sampling for the PID controller.

PID Parameters: This setting allows for fine tuning of the PID controller loop.

Password Protection: This allows the user to set a password that must be input before allowing access to procedures.

Load Procedure on Startup?: This allows the user to set a default procedure to be loaded on startup for maximum convenience.

Push-up Pressure: This sets the pressure of the ram as it drives up. This setting is important for situations such as when a mold is stuck to the side walls.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

PID Controller Loop

- The term PID stands for proportional integral derivative and it is one kind of device used to control different process variables like pressure, flow, temperature, and speed in industrial applications. In this controller, a control loop feedback device is used to regulate all the process variables.
 - P-Controller
 - ◊ Proportional, or P-controller gives an output that is proportional to the current error. It compares the desired or set point value with the actual or feedback process value.
 - I-Controller
 - ◊ Integral, or I-controller integrates the “steady-state” error, or expected margin of error between the desired or set point value with the actual or feedback process value. Increasing the I value decreases the feedback system response time while decreasing the I value increases the feedback system response time.
 - D-Controller
 - ◊ Derivative, or D-controller anticipates the future behavior of the margin of error based on the rate of change of the error with respect to time. It acts as a damper on the control system to reduce feedback system over-response. Increasing this value will decrease the sensitivity of the feedback response and decreasing, will increase the response.
- The default values for these controllers are:

P=3.0
I =0.1
D=5.0



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

4.7 Preparing a Mount

1. Lower ram to release force.
2. Turn bayonet closure handle counterclockwise to remove.
3. Lift bayonet closure and place on holder to move out of the way.
4. Raise lower ram to highest position by double tapping UP arrow and place sample on the ram.
5. Lower the ram.
6. Add molding resin and tighten bayonet closure.
7. Load procedure as described in section 4.3.
8. Press START.
9. After cycle is complete, lower ram to release force and remove bayonet closure.
10. Raise ram to push out specimen mount. **DO NOT POSITION HEAD OVER MOLDING CHAMBER AS THE MOUNTS MAY STICK AND BE EJECTED IF NOT COMPLETELY COOLED OR IF THERE IS DAMAGE TO THE MOLD ASSEMBLY.** If mold does not easily move, refer to troubleshooting guidelines.



Unlocked position



Locked position



Completed mount

Note: The **TERAPRESS TP-7100S** compression mounting press is capable of single and double mounts by adding a spacer on top of the first sample and molding resin.

RECOMMENDATION: After inserting spacer, it is recommended that the ram be moved up and down to ensure that the spacer is moving freely. This will make the mounts easier to remove after the molding cycle has been completed.

! **Caution:** DO NOT POSITION HEAD OR OTHER BODY PARTS OVER THE MOLD WHEN RAISING THE RAM TO REMOVE THE SPECIMEN MOUNT

! **Caution:** Mold and ram assemblies can remain hot even after cooling cycle is completed. Use caution to avoid burning.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Sample placement

To position sample, raise the lower ram for easy access by double tapping UP arrow. Position sample on ram and lower ram into mold.



Caution: Do not mount flammable materials.



Mounting material

Lower ram and add mounting material. It is recommended that a funnel be used to minimize spilling and to keep the top of the mold clean (easier installation and removal of upper ram).



Add resin
with funnel

Locking bayonet closure

Upper ram and bayonet closure must be lowered into position for bayonet closure to lock properly. After properly positioning upper ram and bayonet, turn to tighten.



Caution: Improper closure can result in hot mounting material being extruded out of the mold. If such a case arises, turn off mounting press and let it cool before cleaning.



Caution: If you need to handle the top mold assembly while the mold is hot, it is recommended that you use proper heat resistant gloves to prevent burning



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Setting temperature

Set temperature according to mounting material recommendations (see Tables 4-1 to 4-5 on the following pages).

Setting heating time

Set heating time according to mounting material recommendations (see Tables 4-1 to 4-5 on the following pages).

Setting force

Set force according to mounting material recommendations (see Tables 4-1 to 4-5 on the following pages).

Summary

1. Select and install required mold assembly.
2. Insert sample and add mounting material.
3. Select temperature, heating time, and force.
4. Activate mounting operation by pushing start button.

Sample removal

Upon completion, the display will state "Cycle Completed". Turn bayonet cover clockwise to open position and raise ram to remove completed mount.



Caution: Bayonet closure and upper ram may still be very hot.

Recommendation: Clean ram before producing next mount and remove and clean mold assembly after every 40 hours of operation.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

4.8 Changing Mold and Ram Assembly

1. Lower ram.
2. Unscrew bayonet closure.
3. Raise lower ram up and slide off of base to remove.
4. Unscrew (reverse-threaded) the upper ram to remove.
5. Loosen the four hex screws by the top of mold assembly to remove mold.



Unscrew bayonet closure



Remove by loosening the four hex screws and lifting mold



Ram slides off →
Raise lower ram up and slide off of base to remove



Unscrew the upper ram to remove



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

4.9 Recommended Mounting Guidelines (actual conditions may vary)

Table 4-1 Phenolic Mounting Powders

Parameters	1-inch mounts	1.25-inch mounts	1.5-inch mounts	2-inch mounts
Temperature (°C)	140°C	140°C	140°C	140°C
Machine gage pressure (MPa)	10	10	10	10
Time (minutes) - minimum	5-10	5-10	5-10	5-10
Volume of Powder (ml) (*)	11.5	18	26	46
Weight of powder (grams)(*)	9	14	20	35
Thickness of mount (mm)	12	12	12	12

Table 4-2 Diallyl Phthalate Mounting Powders

Parameters	1-inch mounts	1.25-inch mounts	1.5-inch mounts	2-inch mounts
Temperature (°C)	140°C	140°C	140°C	140°C
Machine gage pressure (MPa)	10	10	10	10
Time (minutes) - minimum	5-10	5-10	5-10	5-10
Volume of Powder (ml) (*)	11.5	18	26	46
Weight of powder (grams)(*)	11.5	18	26	46
Thickness of mount (mm)	12.5	12.5	12.5	12.5

Table 4-3 Epoxy Mounting Powders

Parameters	1-inch mounts	1.25-inch mounts	1.5-inch mounts	2-inch mounts
Temperature (°C)	140°C	140°C	140°C	140°C
Machine gage pressure (MPa)	10	10	10	10
Time (minutes) - minimum	8-10	10-12	12-15	12-15
Volume of Powder (ml) (*)	11.5	18	26	46
Weight of powder (grams)(*)	11.5	18	26	46
Thickness of mount (mm)	12.5	12.5	12.5	12.5

* Grams of powder to produce a 9/16 inch mount without any sample



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Table 4-4 Conductive Mounting Powders

Parameters	1-inch mounts	1.25-inch mounts	1.5-inch mounts	2-inch mounts
Temperature (°C)	140°C (284°F)	140°C (284°F)	140°C (284°F)	140°C (284°F)
Machine gage pressure (MPa)	10	10	15	15
Time (minutes) - minimum	10	10	10	10
Volume of Powder (ml) (*)	11.5	18	26	46
Weight of powder (grams)(*)	10.5	16.3	23.5	41
Thickness of mount (mm)	12	12	12	12

Table 4-5 Acrylic Mounting Powders**

Parameters	1-inch mounts	1.25-inch mounts	1.5-inch mounts	2-inch mounts
Soft Start Temperature (°C)				77°C (171°F)
Soft Start Pressure				15
Soft Start Time (minutes)				4-6 minutes
Temperature (°C)	90-120°C (195-250°F)	90-120°C (195-250°F)	90-120°C (195-250°F)	110-120°C (230-250°F)
Machine gage pressure (MPa)	Max	Max	Max	Max
Heating Time (minutes) - minimum	5	5	5	5
Volume of Powder (ml) (*)	11.5	18	26	46
Weight of powder (grams)(*)	8	12.5	18	36
Thickness of mount (mm)	13.5	13.5	13.5	13.5

* Grams of powder to produce a 9/16-inch mount without any sample

** Note: Acrylic compression mounting powders should be heated to just around the softening temperature of the resin to avoid entrapped air or what is commonly known as the “cotton ball effect”. The cotton ball effect occurs when the air is trapped in the mount by the liquid layer and is exacerbated when heating is too fast or too high. Ideally for acrylics the lowest temperature possible should be used, which for the high efficiency TERAPRESS heating is approximately 90-120°C . For thicker acrylic mounts, preheat the resin in the mounting press to 77°C (171°F) using the soft start feature for 4-6 minutes.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

5.0 Maintenance

5.1 Introduction

The **TERAPRESS TP-7100S** mounting press requires very minimal maintenance. However, it is recommended that the mold and assembly be removed after every 40 hours of operation to remove any mounting material buildup. This will extend the life of the mold assemblies.

5.2 Cleaning outside cabinet

Cabinet and front shield should be cleaned occasionally with a moist cloth. Do not use any chemicals or cleaning medium containing abrasive particles.

5.3 Cleaning inside cabinet

Over time, small quantities of mounting residual can build up inside the cabinet. It is recommended that once a year the **TERAPRESS TP-7100S** mounting press be cleaned with a shop cleaner (be sure to disconnect the power before opening the panel).

5.4 Filter

It is recommended that a filter be used on the incoming water line and cleaned as required.

5.5 Cleaning and Storing mold assemblies

Over time, it is possible for residue to build up inside the mold cylinder. It is recommended that the mold cylinder be periodically removed and cleaned. Scraping with a blade such as scissors is one effective method.

When changing and storing the molds, it is recommended that a light oil such as WD-40 be sprayed onto the rams and cylinder to prevent corrosion (especially in high humidity environments).



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

6.0 Troubleshooting

More extensive troubleshooting, repair guides, videos, & parts list are provided online at www.metallographic.com.

Problem	Cause	Solution
Upper ram hard to remove	Temperature of top ram is too hot.	Allow to cool or wrap with a moist cloth
Difficult to remove bayonet cover	Temperature of top ram is too hot.	Allow to cool or wrap with a moist cloth
	Ram in up position.	Lower ram.
No function or power	Unit is disconnected from main electrical power supply.	Connect main cable.
	Main switch off.	Turn on main switch.
	Blown fuse.	Replace fuse (10 amp fast blow).
Heating temperature is not reached	Defective heating element.	Replace.
	Leaking water solenoid.	Replace.
Bayonet closure and upper ram do not fit into mold	Mold cylinder is too hot (thermal expansion).	Let system cool.
	Ram or mold cylinder is defective.	Replace.
	Closure is tilted.	Reposition closure.
	Ram is dirty.	Clean ram.
Lower ram is not pushing out the specimen mount	Mount is not cool enough, leading to sticking.	Cool for longer.
	Mold cylinder and/or lower ram are damaged.	Remove lower ram and cylinder by unscrewing assembly. Press out with hydraulic press or tap out with hammer. Replace mold assembly.
	Mold has buildup of mounting compound.	Remove mold cylinder and clean.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

6.0 Troubleshooting (continued)

Problem	Cause	Solution
Mold cylinder cannot be removed	Temperature difference	Completely cool down.
	Contamination or corrosion between the cylinder and heating/cooling block	After cooling, slowly heat up and disassemble immediately.
Cooling water flow is weak or none at all	Water supply is off	Open valve.
	Solenoid is damaged	Clean and/or replace.
	Solenoid regulator is closed	Adjust solenoid regulator on back of machine.
ON/OFF power switch getting too hot	Fuse overheating	Replace fuse, 10 amp fast blow
	Too many amps being pulled from the incoming power outlet	Plug directly into wall outlet. Do not use any extension cords or multiple outlet connections.
Water leaking	Cooling water supply tube leaks	Check and seal.
	Screw coupling is loose	Tighten or replace.
	Cooling water return line leaks	Replace.
Spacer is getting stuck in a ram	Spacer has flash buildup	After inserting spacer, move ram up and down to make sure it is moving freely
Sample Burning (Discoloration)	Temperature set too high	Reduce Temp.
	Thermoplastic resin melting too fast	Lower Temp. and decrease time.
Lower ram does not move down	Ram is dirty	Remove and clean.
	Air cylinder defect	Check cylinder and replace if necessary.

Use screwdriver to open fuse container



Replace fuse
(10 amp fast blow)



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

7.0 Compression Mounting Guide

Compression mounting is a very useful mounting technique which can provide better specimen edge retention compared to castable mounting resins.

Compression mounting resins are available in different colors and with various fillers to improve hardness or conductivity (Figure 7-1). Several compression mounting characteristics include:

- Convenient means to hold the specimen
- Provides a standard format to mount multiple specimens
- Protects edges
- Provides proper specimen orientation
- Provides the ability to label and store the specimens



Figure 7-1 Wide variety of compression mounting resins.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Compression mounts are quick and easy to produce, only requiring several minutes to cure at the appropriate mounting temperature. Most of the time required in compression mounting occurs during the heating and cooling cycles. When choosing a compression mounting machine, the most important features include its maximum heating temperature and how intimately the heater and water cooler are connected to the mold assembly. The better compression mounting machines have heaters which can reach temperatures of at least 200°C (450°F). For faster turn around time, water cooling is essential.

The primary compression mounting resins are listed below along with standard colors:

- Phenolic Resins: black, red, and green (Figure 7-3)
- Acrylic Resins: clear
- Diallyl Phthalate Resins: blue and black (Figure 7-4)
- Glass-filled Epoxy Resins: various (Figure 7-5)
- Conductive Resins (phenolics with copper or graphite filler): various (Figure 7-6)



Figure 7-3 Red phenolic resin, 100X.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

Figure 7-4 Glass-filled diallyl



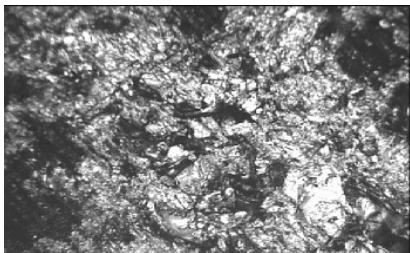
phthalate resin, 100X.

Figure 7-5 Glass-filled epoxy



resin, 100X.

Figure 7-6 Conductive



7.1 Compression Mounting Resin Properties

There are a variety of compression mounting materials. The two main classes of compression mounting materials are thermosets and thermoplastics. Thermoset resins require heat and pressure to crosslink the polymer and the reaction is irreversible. Thermoplastics, on the other hand, can theoretically be remelted. Table Ia provides a relative comparison of the most common compression mounting resins, whereas Table Ib provides more specific information for the various compression mounting resins.

TIP: Compression mounting at higher than the recommended minimum temperature generally improves the properties of the mount.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

TIP: A useful tip for marking or identifying a specimen is to mold the label inside of the mount (Figure 7-7). If the entire mount is an acrylic, just place the label on top the mount and cover it with a little acrylic powder. To label other compression mounting resins, add a thin layer of acrylic over the other mounting material and then position the label on this layer. Finish off the mount with another layer of acrylic.



Figure 7-7. Example of labeling mounts using acrylic resin on top of a phenolic base.

TABLE Ia. Compression Mounting Resin Characteristics

	PHENOLICS	ACRYLICS	EPOXY (Glass-filled)	DIALYL PHTHALATES
Type	Thermoset	Thermoplastic	Thermoset	Thermoset
Cost	Low	Moderate	Moderate	Moderate
Ease of Use	Excellent	Moderate	Good	Good
Availability of Colors	Yes	No	No	Yes
Cycle Times	Excellent	Moderate	Good	Good
Edge Retention	Fair	Good	Excellent	Excellent
Clarity	None	Excellent	None	None
Hardness	Low	Medium	High	High



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

TABLE IIb. Compression Mounting Resin Characteristics

	PHENOLICS	ACRYLICS	EPOXY (Glass filled)	DIALYL PHTHALATES
Form	Granular	Powder	Granular or Powder	Granular
Specific gravity (gm/cm³)	1.4	0.95	1.75-2.05	1.7-1.9
Colors	Black, Red, Green	Clear	Black to gray	Blue, Black
Shrinkage (compression) (in/in)	0.006	N/A	0.001-0.003	0.001-0.003
Coefficient of Linear Thermal Expansion (in/in °C 10E-6)	50	N/A	28	19
Chemical resistance	Glycol, petrochemicals, solvents, some acids and bases	Alcohol, dilute acids & alkalis, and oxidizers	Solvents, acids, alkalis	Solvent, acids, alkalis
Molding temperature (recommended)	140°C	120-130°C	140°C	140°C
Hardness	N/A	Rockwell M63	Barcol 72	N/A
Min. curing time (1/2 mounts at temp. and pressure	5-10 minutes	5-10 minutes	5-10 minutes	5-10 minutes



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

7.1.1 Phenolics

In general, phenolics are used because of their relatively low cost. In addition, phenolics are available in a variety of colors (Figure 7-8).



Figure 7-8 Phenolic resins are available in a variety of colors.

TIP: Use different color phenolics to color code jobs, specimens types, or for different testing dates. For example, changing the phenolic color each month will show which samples or jobs are getting old.

TIP: If the color dye in the mount bleeds out when rinsing with an alcohol, this is an indication that the mount was not cured either at a high enough temperature or for the proper length of time (see Figure 7-9).



Figure 7-9 Insufficient curing of phenolic resin causes alcohol to dissolve the dye.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

7.1.2 Acrylics

The main application for compression mounting acrylics is based on their excellent clarity. This is particularly important for locating a specific feature within the specimen mount. Additionally, the edge retention is increased with acrylics over phenolics due to its superior hardness.



Figure 7-10a The “cotton ball” effect observed in acrylics. Mount produced at 170°C with a holding time of 15 minutes

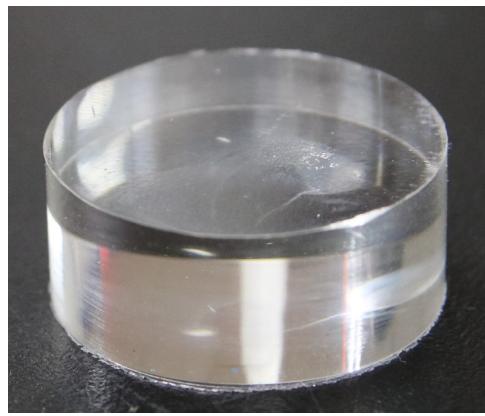


Figure 7-10b Utilizing the soft start at 120°F for 10 minutes and holding at 150°C for 5 minutes eliminated the “cotton ball” effect observed in acrylics.



Figure 7-10c Mounting with a sample also helps to more uniformly heat the acrylic reducing the “cotton ball” effect observed in acrylics.

TIP: A common problem, known as the “cotton ball” effect, can occur with thermoplastic resins if they are heated to too high a temperature too quickly. This causes a liquid layer to form around the unmelted resin giving it the appearance of a cotton ball in the middle of the mount (see figure 7-10). To avoid this problem, it is recommended to mount at the lowest possible temperature (approx. 120-130°C)



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>



Figure 7-11 Glass-filled epoxies and diallyl phthalates have a glass filler added to provide better edge retention during grinding and polishing.

7.1.3 Epoxies / Diallyl Phthalates

Glass-filled epoxies and diallyl phthalates compression mounting resins provide a harder mounting support edge next to the specimen (see Figure 7-11). These resins are commonly used to support the edges of coatings, heat-treated samples, and other specimens requiring better flatness. Figure 7-12 shows the polished interface between a glass-filled epoxy and tungsten carbide specimen. Note that there is no noticeable gap between the specimen and the mounting material showing that glass-filled epoxies provide excellent support to the specimen edge even for extremely hard specimens.

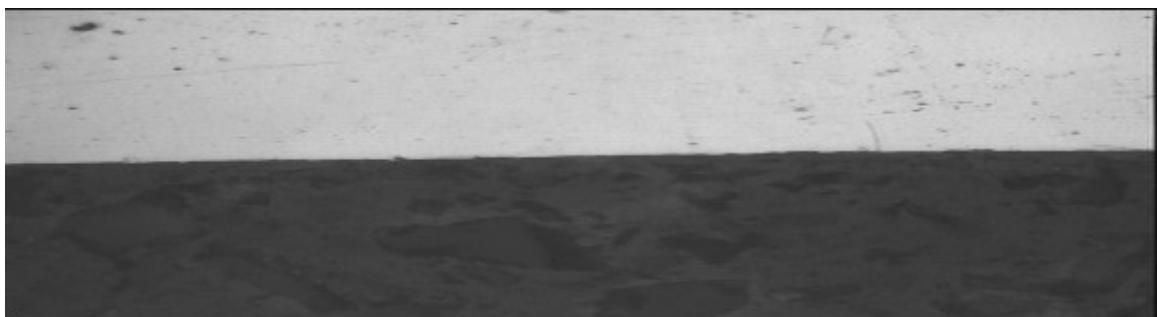


Figure 7-12. Polished edge for tungsten carbide mounted in glass-filled epoxy.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

TIP: Glass-filled epoxies and diallyl phthalates are significantly more expensive than phenolic and acrylics. In order to reduce the cost of these mounts, they can be laminated with a lower cost mounting compound such as a phenolic. The technique is to place a sufficiently thick enough layer of the glass-filled epoxy or diallyl phthalate around the specimen in order to compensate for any grinding loss. The rest of the mount can then be supported with a lower cost compression mounting compound such as a phenolic. Red phenolics are used frequently for this technique (Figure 7-13).



Figure 7-13 Glass-filled epoxy laminated with phenolic to reduce the cost of the mount.

7.1.4 Specialized Compression Mounting Resins

With the addition of fillers such as graphite or copper, the compression mounting compounds can be made conductive (Figure 7-14). Conductive mounts are used in Scanning Electron Microscopes (SEM) to prevent the specimen from building up a charge. Conductive mounts are also used for specimens requiring electrolytic etching or polishing.



Figure 7-14 Graphite and copper are common fillers used to increase the conductivity of compression mounting resins.



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: http://www.metallographic.com

7.2 Compression Mounting Procedures

1. Clean specimens to remove cutting and handling residues.
2. Remove debris from mold assembly.
3. Apply thin coat of mold release compound to mold assembly.
4. Raise mold ram to up position.
5. Center specimen on ram.
6. Lower ram assembly.
7. Pour predetermined amount of resin into mold.
8. Clean and remove any excess resin from around the mold assembly threads.
9. Lock mold assembly cover.
10. Slowly raise ram into up position.
11. Apply recommended heat and maintain pressure for specified period of time.
12. Cool to near room temperature.
13. Remove mounted specimen.
14. Clean mold and ram assembly.

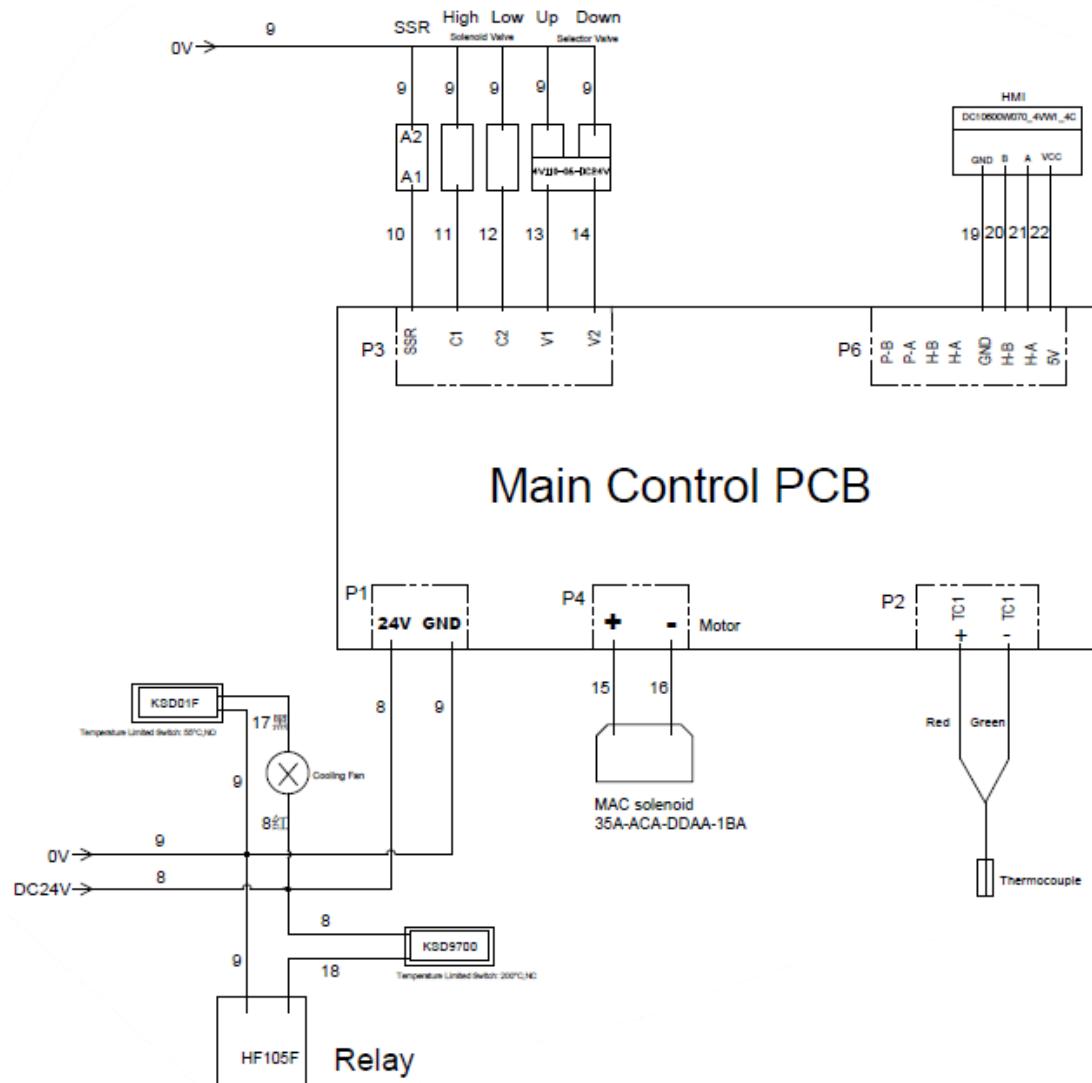
TIP: Preheat resin and sample to 35°C (95°F) to expedite the initial heating process and for increasing throughput. This can be done by adding Soft Start to your procedure (see section 4.5).



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

8.0 Electrical and Mechanical Drawings

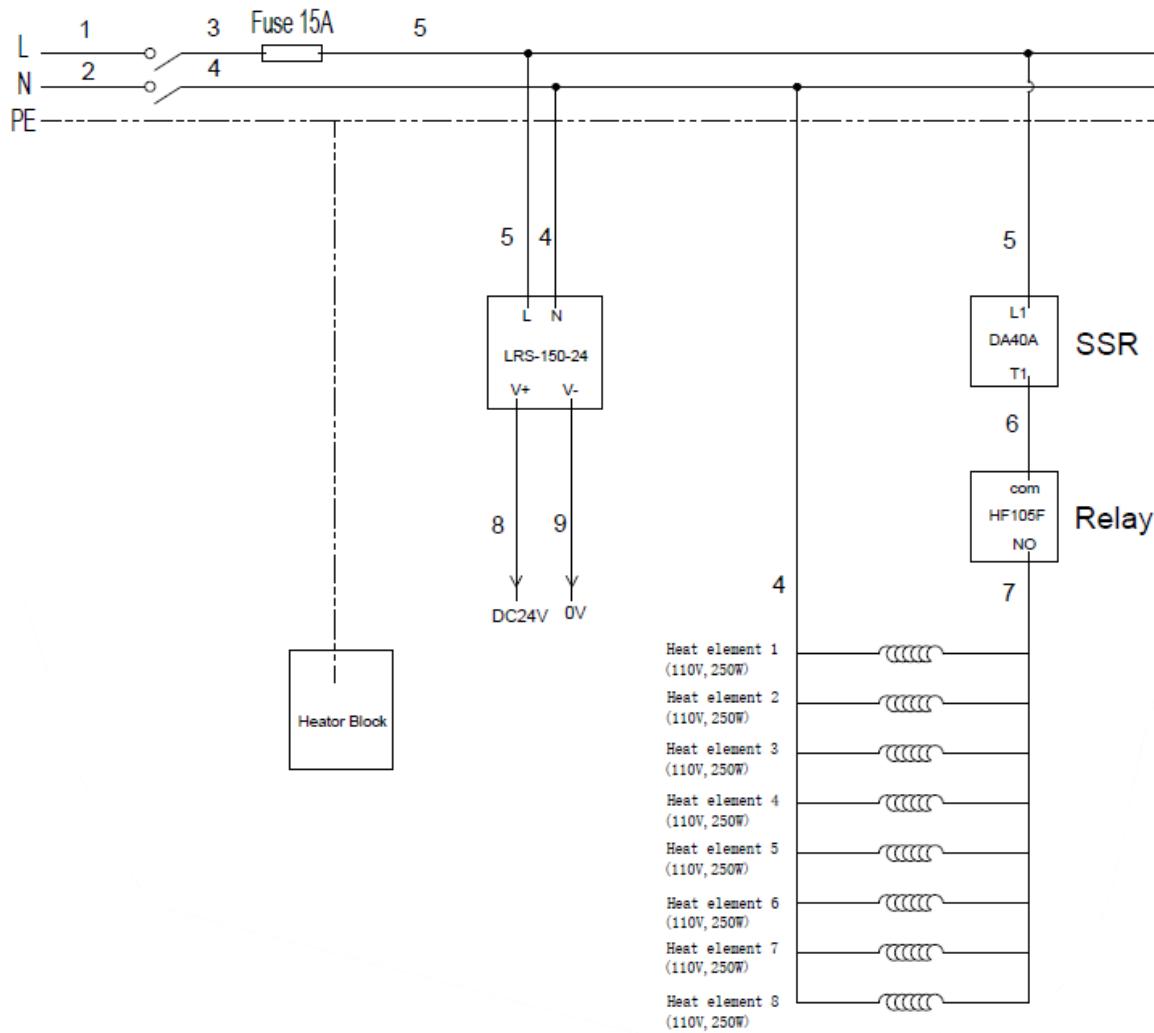
8.1 Wiring Diagram





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

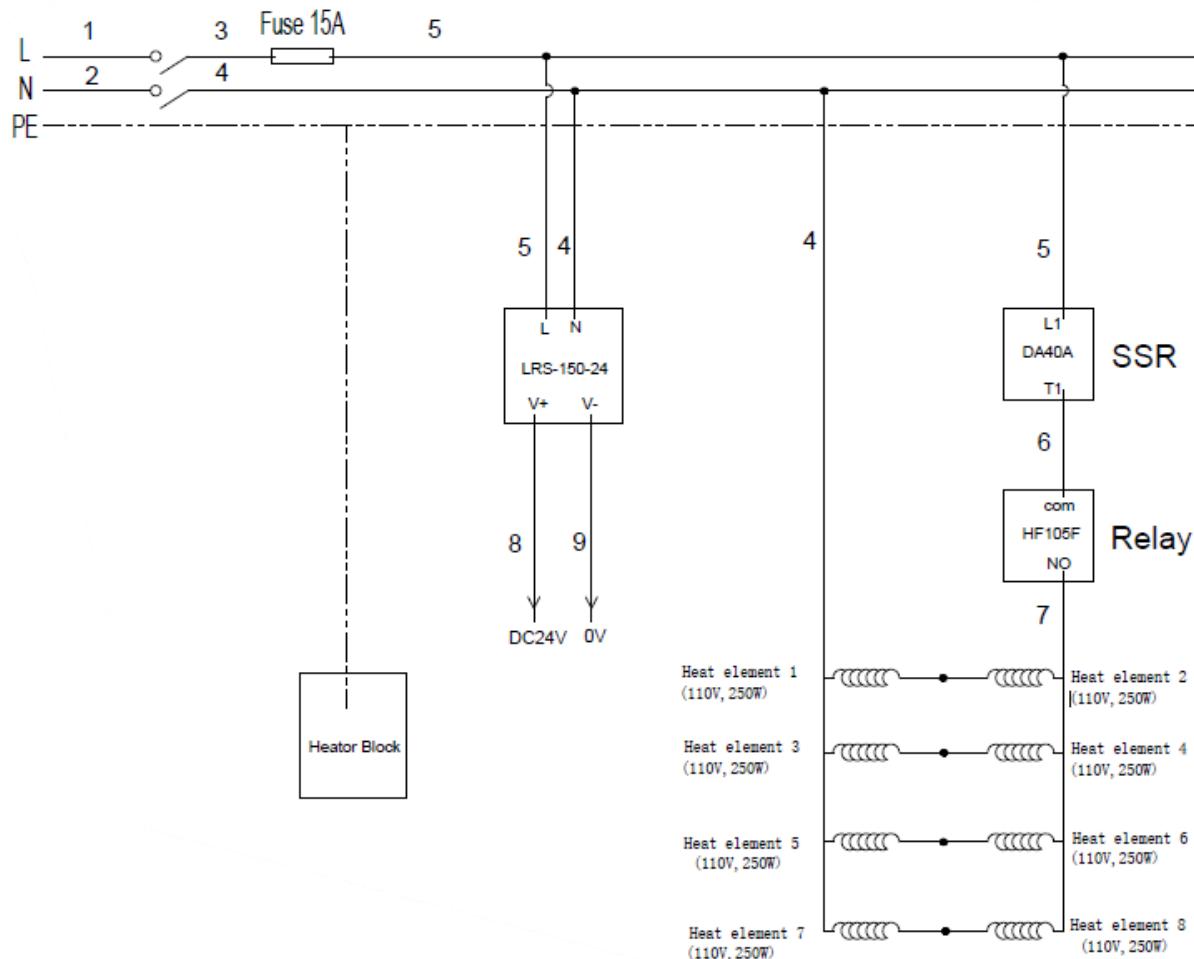
8.2 Heater Wiring Diagram (110 V)





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

8.3 Heater Wiring Diagram (220 V)

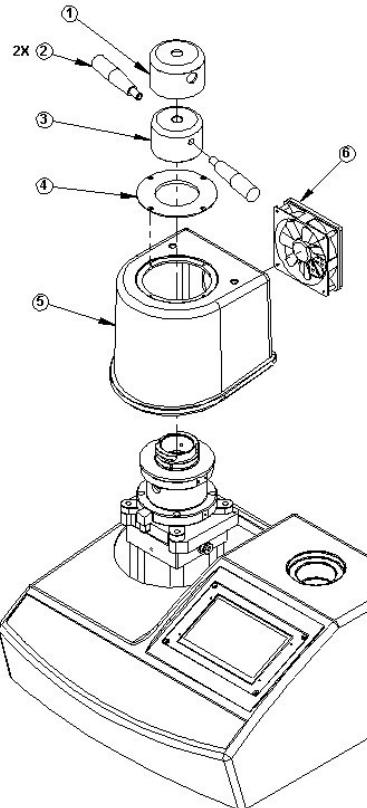




3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

8.4 Mechanical Drawings

BAYONET ASSEMBLY

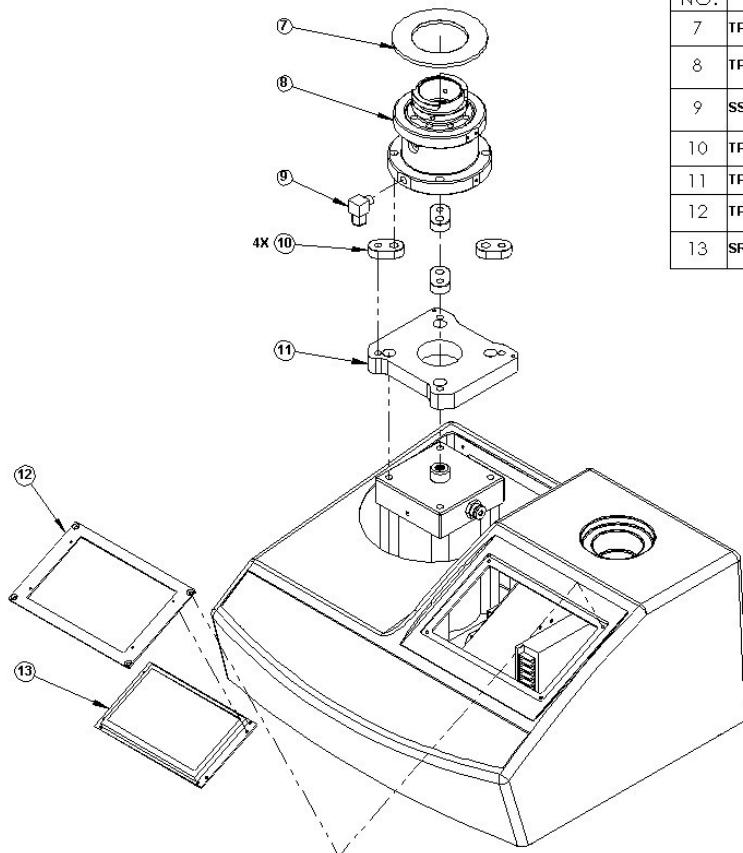


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TPS-003	TERAPRESS-S mold sleeve cap cover	1
2	TPS-004	Bakelite handle M12*100, black, rotated	2
3	TPS-M-004	TERAPRESS-S mold sleeve cap	1
4	TPS-001	TERAPRESS-S Top cover plate	1
5	TPS-C2	TERAPRESS-S SMC cover-2	1
6	120MM-FAN	Fan 120*120*25, 24V	1



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

HEATER ASSEMBLY

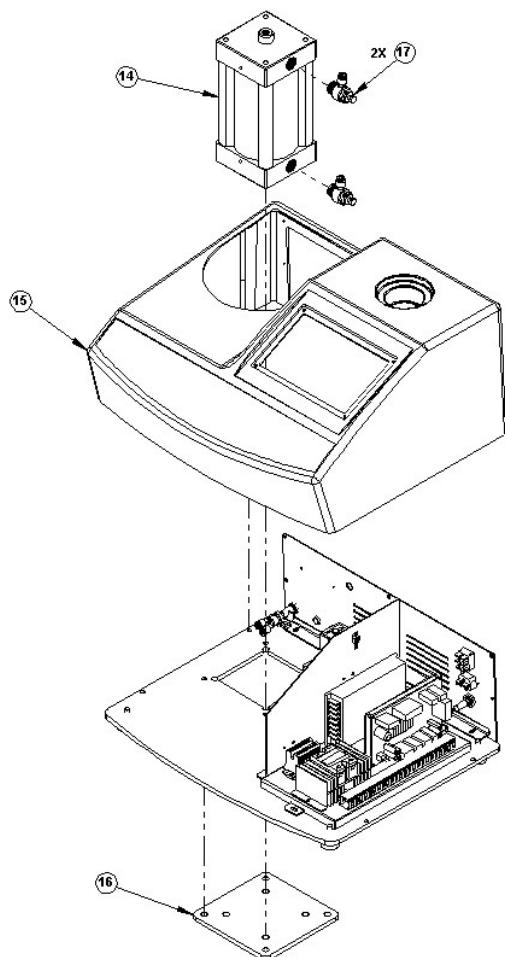


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
7	TPS-006	PTFE washer DN65 (76*122*3)	1
8	TP-0100H	Terapress 1-inch fixed heater/cooler block	1
9	SS-6MM-FTE-018	Fast twist joint ZG 1/8-06, SS304	1
10	TPS-002	TERAPRESS-S Fixed connect block	4
11	TPS-M-002	TERAPRESS-S Fixed board	1
12	TPS-F-002	TERAPRESS-S Front metal template	1
13	SRN-T-7IN	Capacitive touch screen 7in, with 485 communication	1



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

AIR CYLINDER ASSEMBLY



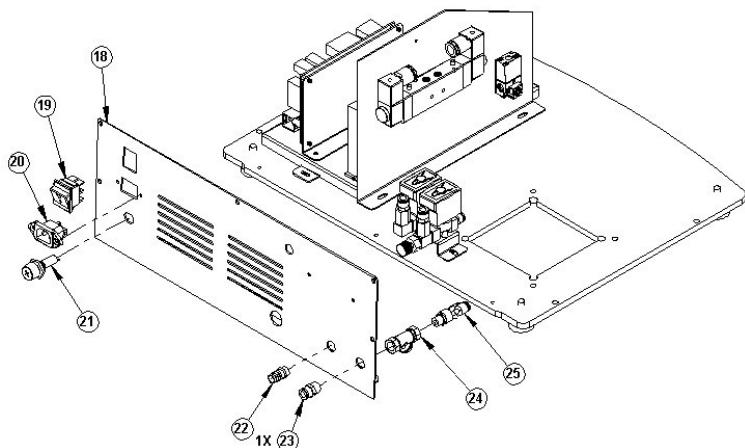
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
14	TPS71-001	Pneumatic air cylinder	1
15	TPS-C1	TERAPRESS-S SMC cover-1	1
16	TPS-M-003	TERAPRESS-S Oil cylinder board	1
17	PTC-AV-1/2-M-6MM	Flow Control Valve 6-04 R1/2	2



3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

BACK PANEL ASSEMBLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
18	TPS-F-001	TERAPRESS-S Back plate	1
19	POW-30A-SWITCH	Switch,30A red	1
20	POW-LC	Large current Switch socket	1
21	FH-20A	Fuse holder 20A	1
22	P-1/4-F-12BARB	Pagoda joint 304, G 1/4, Ø12	1
23	PTC-1/4-M-8MM	Quick connector 1/4 Ø8	5
24	P-1/4-YF-FF	Filter 1/4, Y type, brass, female	1
25	SS-6MM-YT	Y Quick connector 1/4, Ø6, SUS	1

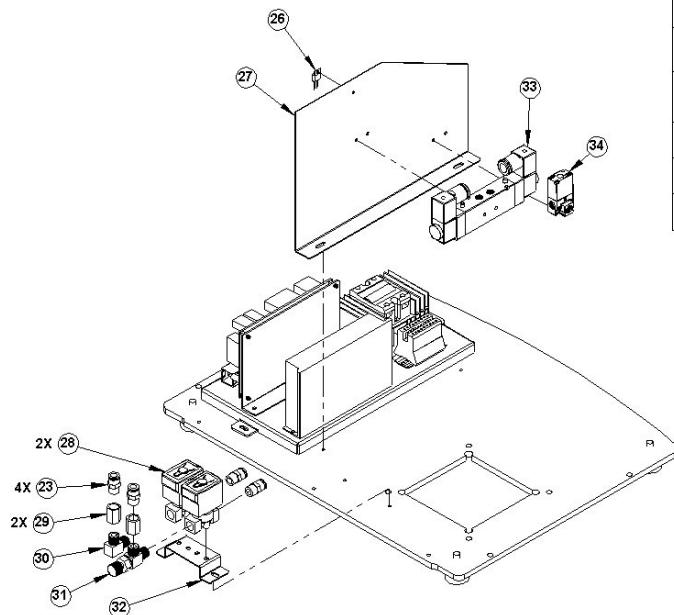




3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

BASE PLATE ASSEMBLY

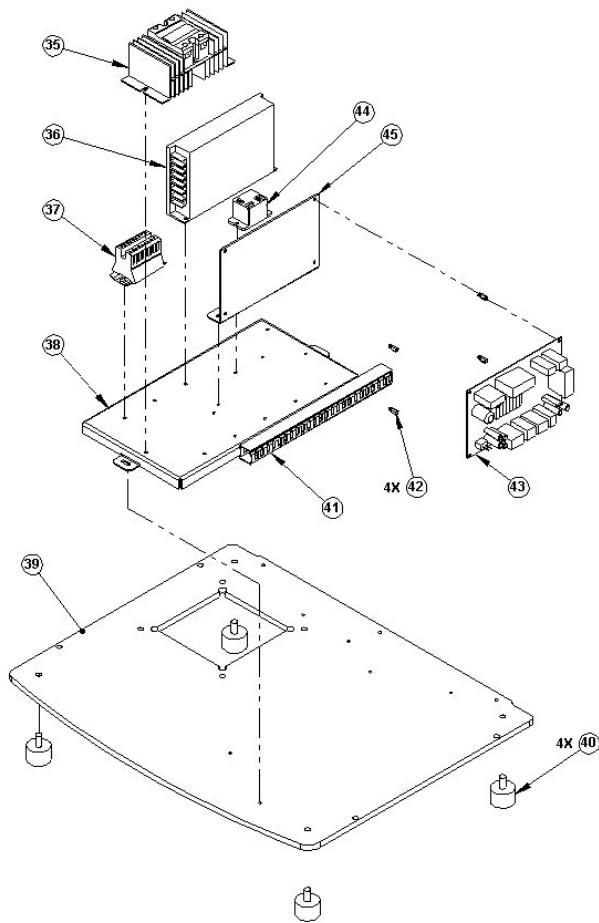
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
26	TS-55C	Temperature switch for fan controlled	1
27	TPS71-F-002	Inner Cap	1
28	TPS-SOL	Solenoid DC24V	2
29	SS-FTC-014	Female Threaded Coupler 1/4, SUS	2
30	SS-FTCE-014	Female Threaded Coupler 1/4, SUS	1
31	SS-FC-E	Flow control valve 1/4, 90 degree, needle type	1
32	TPS-F-003	TERAPRESS-S Solenoid valve holder	1
33	SV-4V230C-24V	Solenoid valve 4V230C-08 DC24V	1
34	SV-HF-24V	High frequency solenoid valve 35A-ACA-DDAA-1BA(DC24V 5.4W)	1





3601 E. 34th St. Tucson, AZ 85713 USA Tel. +1 520-882-6598 Fax +1 520-882-6599 email: pace@metallographic.com Web: <http://www.metallographic.com>

POWER SUPPLY ASSEMBLY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
35	TPS-E-002	Heat sink	1
36	PS-24V-LRS15024	Power Supply LRS-150-24	1
37	TPS-E-003	Terminal blocks UK2.5B	1
38	TPS71-F-001	Dead plate	1
39	TPS-M-001	TERAPRESS-S Bottom plate	1
40	M8-FEET	RUBBER FEET	4
41	WIRE-RT-2020	Trunking 20'20	1
42	Stock	Brass 4mm Standoff, 7mm Length, 5 Hex	4
43	PCB-TPS	PCB	1
44	RELAY-HF105F-4-024D-1HS	Relay HF105F-4-024D-1HS	1
45	TPS-F-004	TERAPRESS-S Circuit board fixture	1