



TERAPRESS TP-7500S

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: <https://www.metallographic.com>



Equipment Type: Automated Compression Mounting Press

Model: **TERAPRESS TP-7500S 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.



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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.

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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.



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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.



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 7500S** mounting press.



Proper operator training is required for operation of the **TERAPRESS TP 7500S** 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.



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.

(Safety Precautions continued on next page)



1.2 Safety Precautions (continued)



Always completely tighten the bayonet cover. 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 7500S** 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

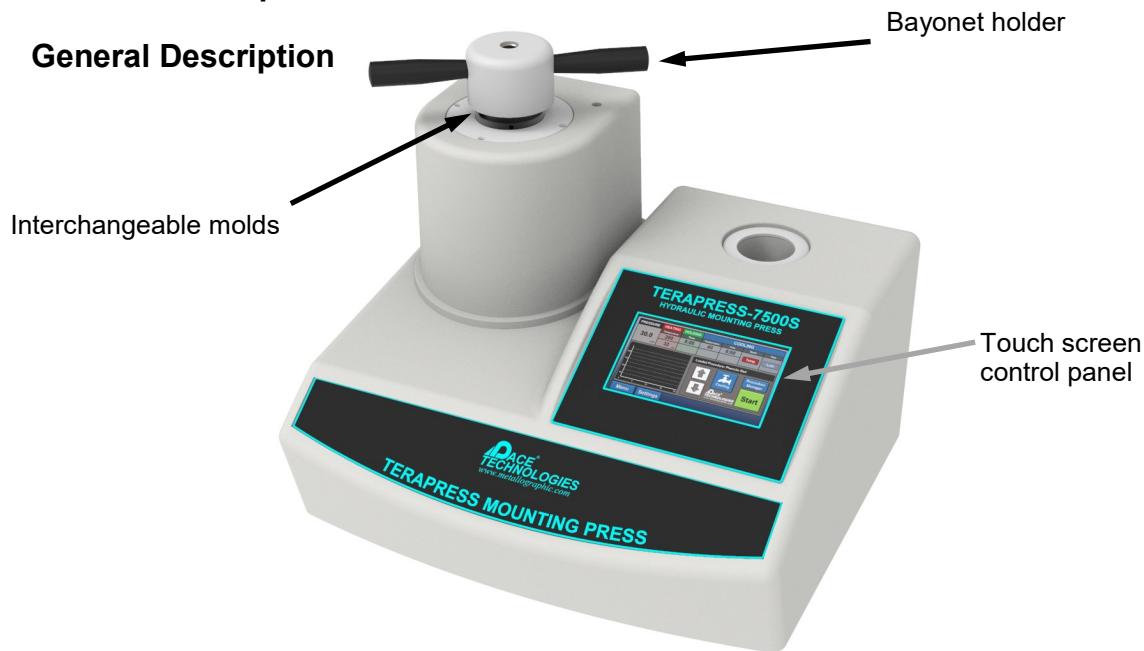
The **TERAPRESS TP 7500S** mounting press has been designed for mounting non-flammable metallographic specimens up to 2-inch diameter. Always follow proper operational guidelines and avoid contact with moving parts and hot assemblies. Seek appropriate medical care for burn injuries.



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2.0 Product Description

2.1 General Description



The **TERAPRESS TP 7500S** compression mounting press is designed for ease-of-use and reliability. It utilizes an electrohydraulic system that maintains 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 7500S** 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 7500S** can produce two mounts simultaneously. This can substantially increase the productivity of your metallographic laboratory.



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2.2 Technical Specifications

Electrical specifications:	110 or 220 Volts (set at factory)
Heating specifications:	1000 Watt (110V / 15 amp) 2000 Watt (110V / 20 amp) 2000 Watt (220V / 10 amp)
Thermostat range:	Room temperature to 392°F (200°C)
Hydraulic pressure range:	Max. 6460 psi
Timer:	0 - 99 minutes
Mold sizes:	1, 1.25, 1.5 and 2-inch 25, 30, and 40-mm
Weight:	102 lbs (46 kg)
Dimensions (WxHxD):	31 x 19 x 19-inches (534 x 485 x 485 mm)
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 (<40 psi recommended)
Water drain connection:	1/4" heater hose
Fuse:	10 amp fast blow

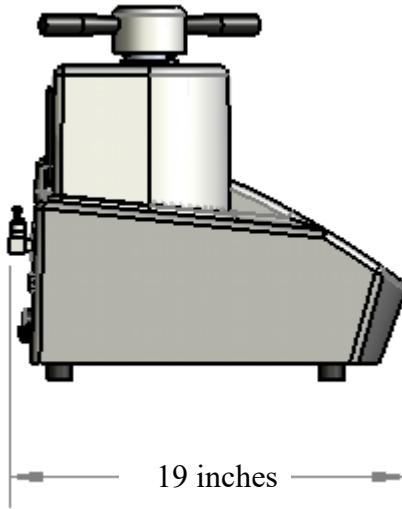
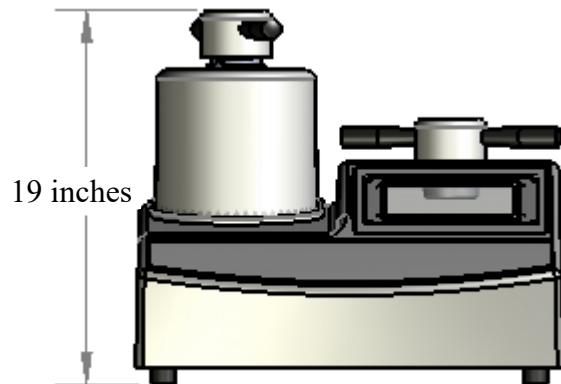
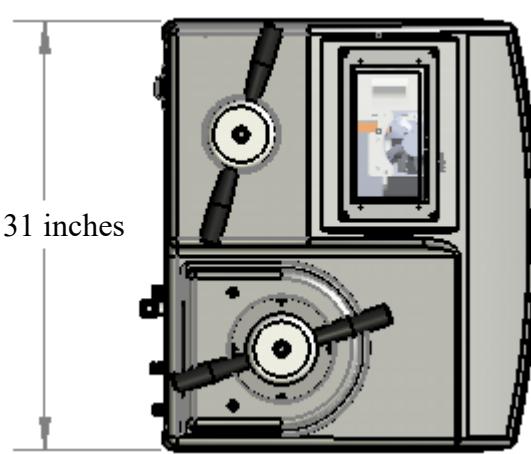


EU Directives:	Machinery directive 2006/42/EC Low Voltage Directive 2006/95/EC Electromagnetic Compatibility directive 2004/108/EC
EU Harmonized Standards:	EN ISO 1200:2010 EN 61010-1:2010 EN 61326-1:2006



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2.3 Mechanical Schematic



Note: Installation of the **TERAPRESS TP 7500S** should be on a flat sturdy surface, with easy access to electrical, water, and drain connections



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2.4 Features

Mounting Force

The **TERAPRESS TP 7500S** applies force through a robust electrohydraulic system. Pressure is precisely controlled via microprocessors.

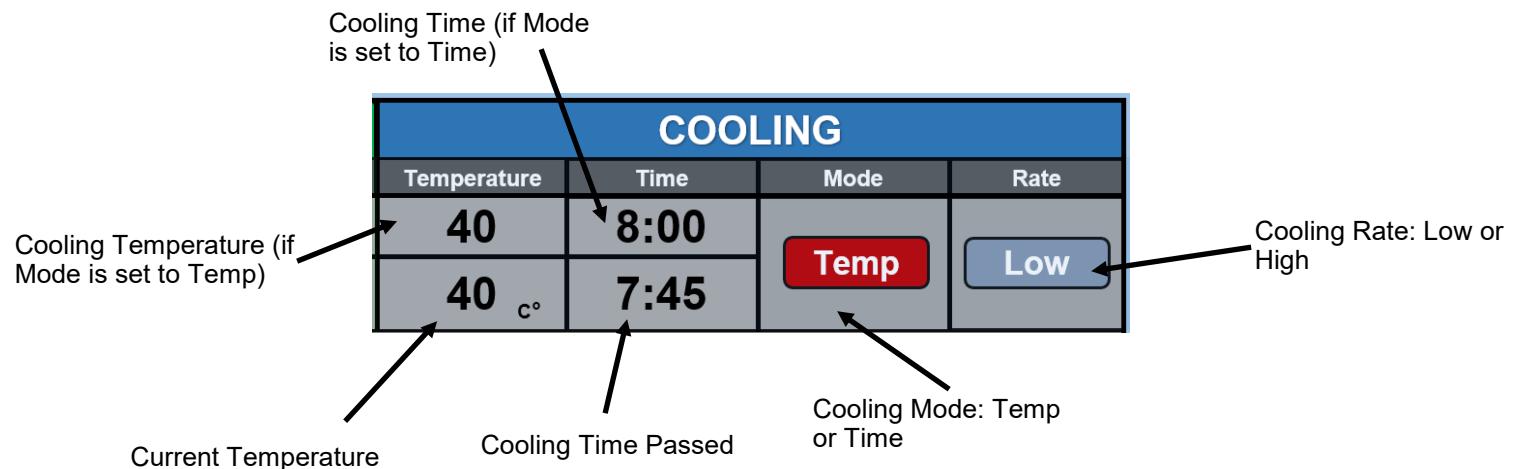
Heating / cooling system efficiency

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 15 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 7500S** compression mounting press offers the user an abundance of control for both the heating and cooling cycle allowing the **TP 7500S** the ability to mount any mounting compound or sample composition.





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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 485 mm)

Weight: Approx. 102 lbs (46 kg)

3.2 Shipping

When moving box, lift from bottom.

The **TERAPRESS TP 7500S** 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 7500S** compression mounting press should be placed on a flat stable surface. Connect to water supply, drain, and electrical connections.

Replace the Plastic Plug with the Hydraulic Breather Cap BEFORE turning on the equipment



Push in plastic cover to access pump



Remove plastic cap and replace with breather cap./ dip stick



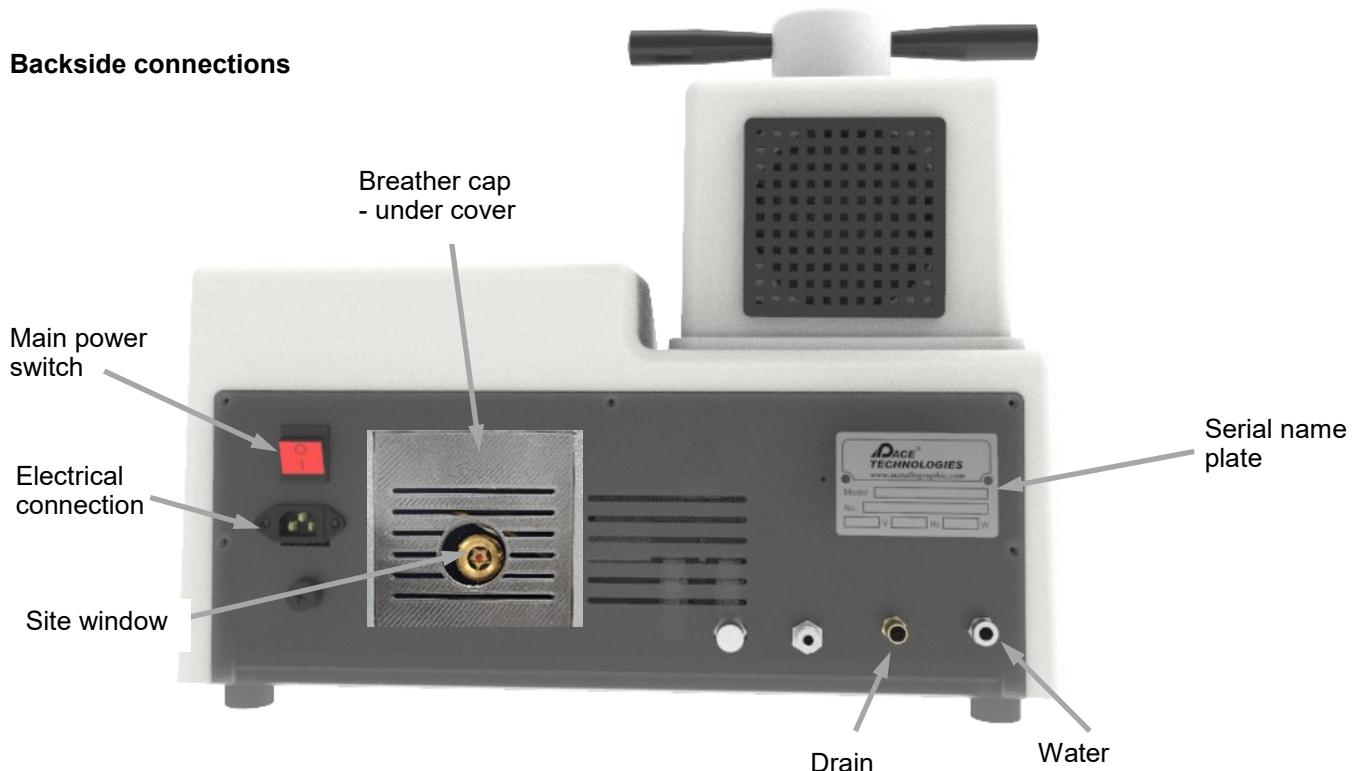
After breather cap, water, drain, and electrical connections are completed, the system is ready for operation by activating the main power switch.

Installation continued on next page



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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. IT IS ALSO RECOMMENDED THAT NO EXTENSION CORDS OR MULTIPLE OUTLET CONNECTORS BE USED AS THIS MAY CAUSE THE FUSE TO OVERHEAT BUT NOT BLOW DURING OPERATION!

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.

Site window: Hydraulic pump fluid level site

Breather cap: Unit is shipped with a plug, this must be changed to the dipstick/breather cap before use



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External Coolant Tank

As an optional attachment, an external recirculating coolant tank can be connected to the back of the **TERAPRESS TP 7500S** 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.





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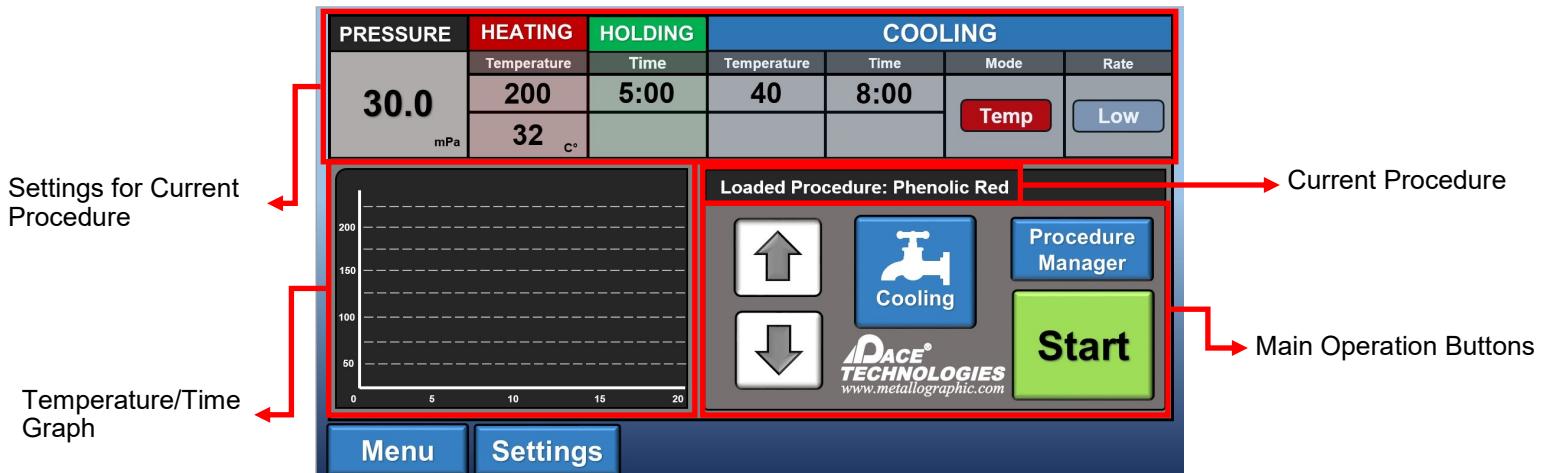
4.0 Start-up and Operation

4.1 General

The **TERAPRESS TP 7500S** 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 7500S** 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.



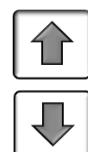
Opens the Procedure Manager for editing and loading various procedures.



Opens the settings.



Begins cooling manually. This turns on the water pump.

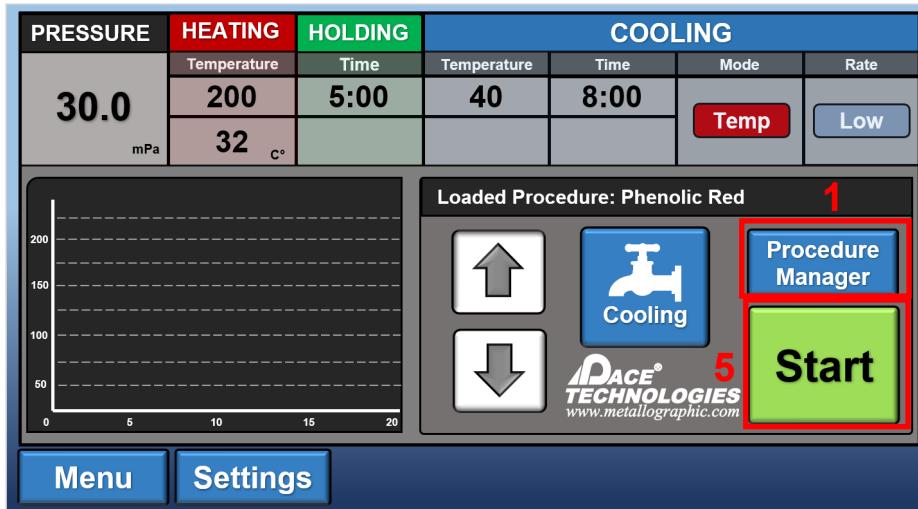


Moves the ram down and up.

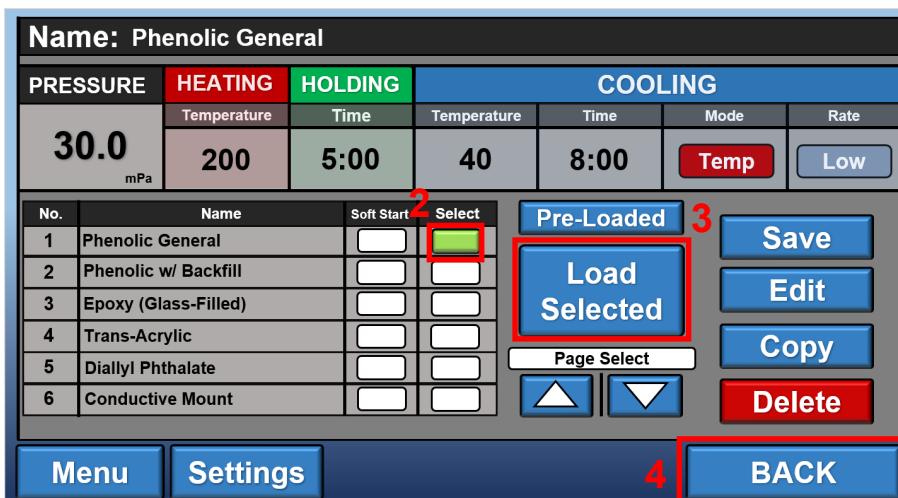


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4.3 Loading a Saved Procedure



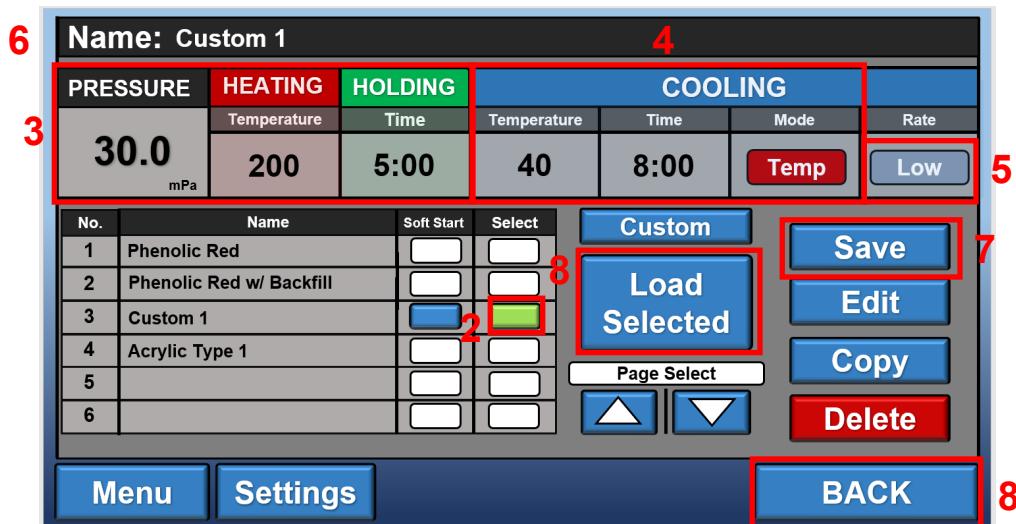
1. From the home screen, touch the Procedure Manager button.
2. Find the desired procedure and touch Select. The Select button will appear green for the selected procedure.
3. Touch the Load Selected button.
4. Touch the BACK button to return to the home screen. The selected procedure specifications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



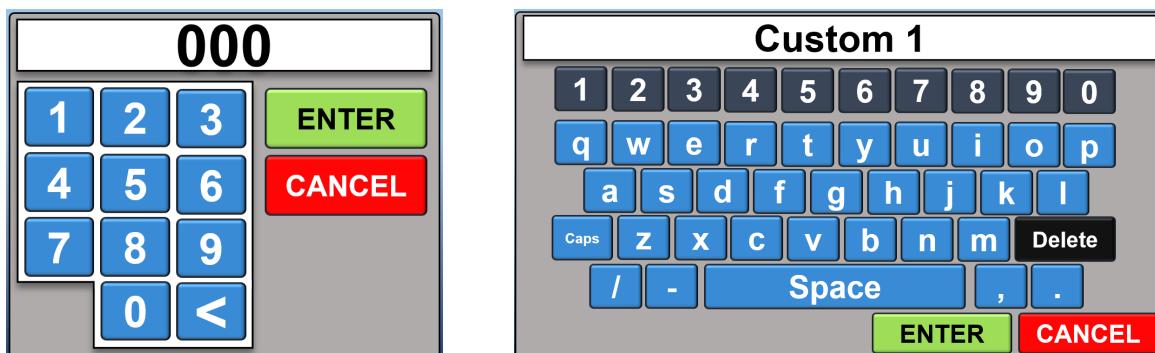


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4.4 Creating and Loading Custom Procedures

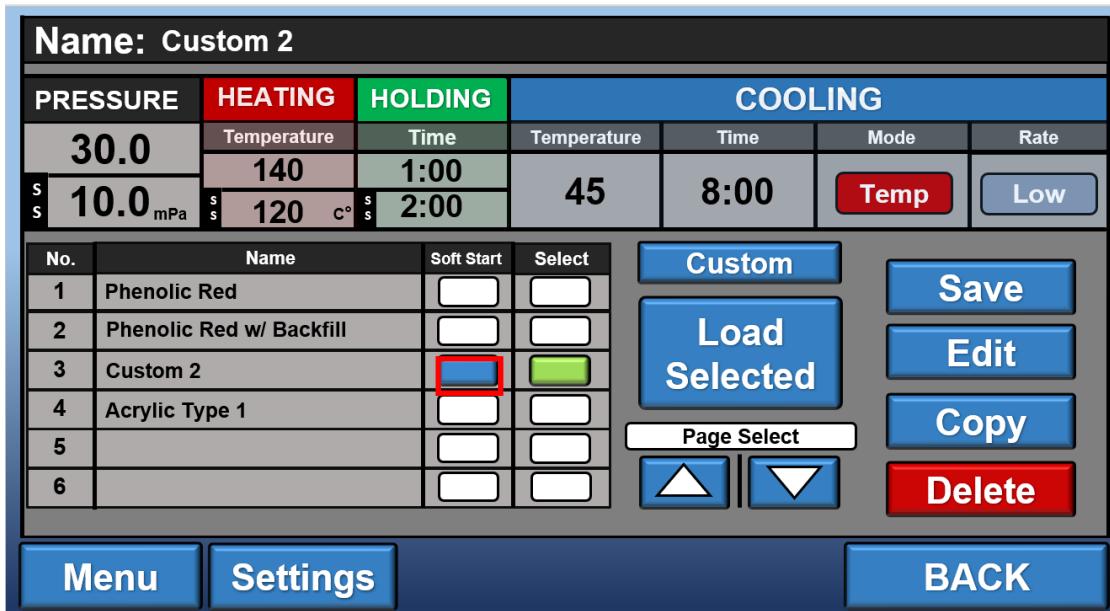


1. From the home screen, touch the Procedure Manager button.
2. Touch Select on an empty slot.
3. Touch numerical value for pressure, heating temperature, and holding time. Use keypad to change to desired values.
4. Set Cooling Mode to either Temp or Time. Then touch either cooling temperature or cooling 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.





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.

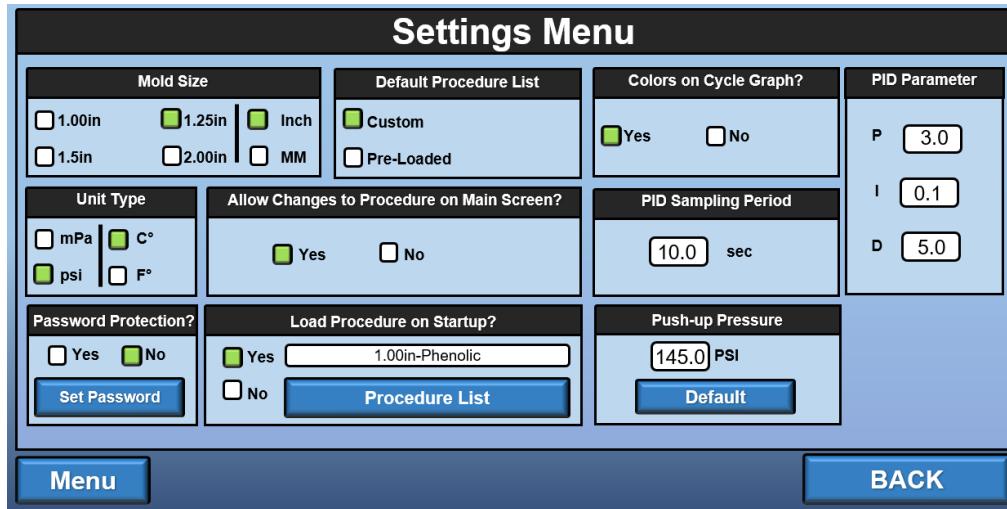
To add Soft Start to a procedure, select Soft Start next to the desired procedure. Empty boxes will now appear under Pressure, Heating, and Holding, and can be set using the same method as described in section 4.4. For the example above, Custom 2 will now complete the following procedure:

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.



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4.6 Settings Menu



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

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.



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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 7500S** 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.



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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



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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, holding 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.



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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





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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)	10-15	10-15	10-15	10-15
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)	10-15	10-15	10-15	10-15
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)	10-15	10-15	10-15	10-15
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

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



TERAPRESS TP-7500S

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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)	10-15	10-15	15-20	15-20
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)	25	25	25	25
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.



5.0 Maintenance

5.1 Introduction

The **TERAPRESS TP 7500S** 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 7500S** mounting press be cleaned with a vacuum 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).



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6.0 Troubleshooting

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



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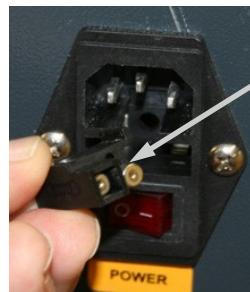
6.0 Troubleshooting (continued)

Problem	Cause	Solution
Mold cylinder cannot be removed	Temperature difference.	Completely cool down system.
	Contamination or corrosion between the cylinder and heating/cooling block.	After cooling, slowly 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.
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.
Lower ram does not move down	Ram is dirty.	Remove and clean.
	Air cylinder is defective.	Check air cylinder and replace if necessary.

Pry open fuse holder with small flat head screwdriver



Replace fuse (10 amp fast blow)





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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.



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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 160-200°C (225-450°F). For faster turn around time, water cooling is essential (see Figure 7-2).



Figure 7-2 Automated heating and water cooled compression mounting press

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.



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Diallyl Phthalate

Figure 7-4 Glass-filled diallyl phthalate resin, 100X.



Epoxy

Figure 7-5 Glass-filled epoxy resin, 100X.

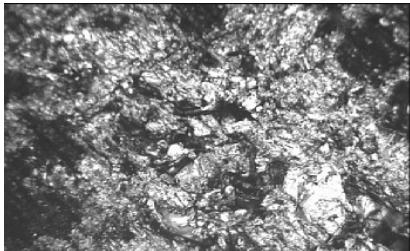


Figure 7-6 Conductive graphite mount, 100X.

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.



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

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



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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 (284°F)	120°C (248°F)	140°C (284°F)	140°C (284°F)
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



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.



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

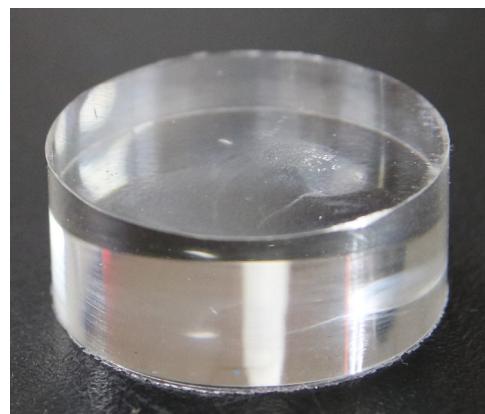


Figure 7-10b Utilizing the soft start at 120°F for 10 minutes and holding at 150°C for 5 minutes eliminated the “cotton ball” effect observed in acrylics.



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)



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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.

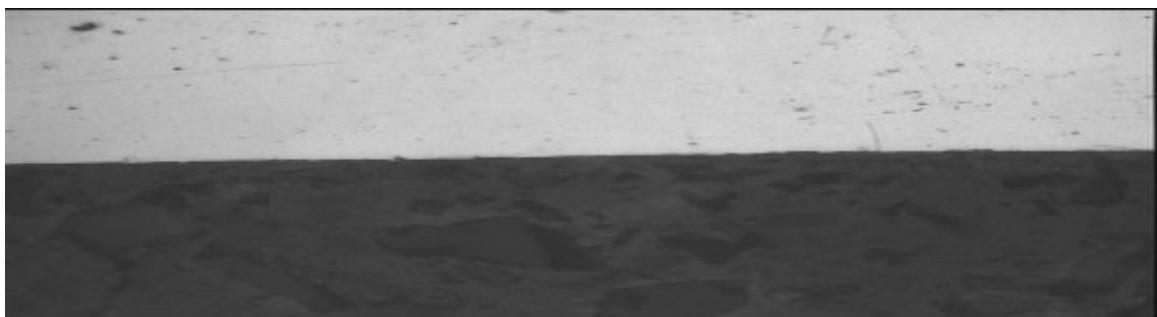


Figure 7-12. Polished edge for tungsten carbide mounted in glass-filled epoxy.



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.



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).



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8.0 List of Spare Parts

Part no.	Description	Image
	Electrical	
HR-8-80-250W	Heater rod Ø8*80, 250W, 110V	
TC-200C-C	Temperature Controller 200C, closed	
TPS-E-003	Thermocouple M8 Pressure reed, K type	
120MM-FAN	Fan 120*120*25, 24V	
POW-30A-SWITCH	Socket with lamp 20A	
FH-20A	Fuse holder 20A	



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Part no.	Description	Image
	Electrical	
FUSE-6-30-15A	Fuse Φ6*30, 15A	
TPS-E-001	Solid-state Rely DC Control AC Da40A	
TPS-E-002	Heat sink	
PS-24V-LRS15024	Power Supply LRS-150-24	
TPS-H-E-001	Pressure Sensor 4-20 mA, 0-30MPA, 2 lines, 24V	



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Part no.	Description	Image
	Electrical	
SRN-T-7IN	Capacitive touch screen 7in, with 485 communication	
TPS-E-010	Cylinder magnetic induction 6*5*8.5	
RELAY-HF105F-4-024D-1HS	Relay HF105F-4-024D-1HS	
TB-T3	Terminal blocks UK2.5B	
TB-RAIL	Slide	
TB-T2	Two side fixed block	
TB-DAM-BOARD	Dam-board	



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Part no.	Description	Image
	Electrical	
WIRE-RT-2020	Trunking 20*20	
PCB-TPS	PCB	
TPS-H-E-002	Oil tank	
TPS-H-E-003	Hydraulic device	
MOT-SVO-750	750W Servo Motor	
MD-110220-SVO	110/220V Servo Motor Driver	
TPS-T	Screen Template	



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Part no.	Description	Image
	Electrical	
TPS75-T	TP-7500S Template	

Part no.	Description	Image
	Mechanical components	
TPS-M-001	Bottom plate	
TPS-001	Top cover plate	
TPS-002	Fixed connect block	
TPS-M-002	Fixed board	
TPS-M-003	Oil cylinder board	
TPS-M-004	Sleeve cap	



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Part no.	Description	Image
	Mechanical components	
TPS-003	Sleeve cap cover	
TPS-M-005	Heat Block	
TPS-0100-1	1.00in top ram	
TPS-0100	1.00in spacer	
TPS-0100-3	1.00in bottom ram	
TPS-0100-4	1.00in sleeve	



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Part no.	Description	Image
	Mechanical components	
TPS-0125-1	1.25in top ram	
TPS-0125	1.25in spacer	
TPS-0125-3	1.25in bottom ram	
TPS-0125-4	1.25in sleeve	
TPS-150-1	1.50in top ram	
TPS-150	1.50in spacer	



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Part no.	Description	Image
	Mechanical components	
TPS-0150-3	1.50in bottom ram	
TPS-0150-4	1.50in sleeve	
TPS-0200-1	2in top ram	
TPS-0200	2in spacer	
TPS-0200-3	2in bottom ram	
TPS-M-006	Ram rod	



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Part no.	Description	Image
	Sheet Metal Parts	
TPS-F-001	Back plate	
TPS-F-002	Front metal template	
TPS-F-003	Solenoid valve holder	
TPS-F-004	Circuit board fixture	
TPS-F-005	Bottom frame	
TPS-F-006	Protection cover (1)	
TPS-F-007	Protection cover (2)	

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

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Part no.	Description	Image
	Standard Parts	
P-1/4-YF-FF	Filter 1/4, Y type, brass, female	
P-1/4-F-12BARB	Pagoda joint 304, G 1/4, Φ12	
HOSE-HT	High temperature hose 13*21	
6MM-TUBE-T	Teflon tube 4*6	
SS-6MM-FTE-018	Fast twist joint ZG 1/8-Φ6, SS304	
TP-TH-P	Choke plug G1/8	
SS-8MM	Quick connector 1/4 Φ8, SUS	
SS-6MM-YT	Y Quick connector 1/4, Φ6, SUS	



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Part no.	Description	Image
	Standard Parts	
TPS-SOL	Solenoid DC24V	
SS-6MM-TJ	Fast twist joint 1/4, Φ6	
SS-FC-E	Flow control valve, 90 degree, needle type	
SS-FTC-014	Female Threaded Coupler 1/4, SUS	
SS-6MM-Y	Y Quick Connector Φ6, SUS	
SS-6MM-FTE-014	Fast twist elbow 1/4, Φ6	
PTC-3/8-E-M-8MM	Quick connector 3/8 Φ8, 90 degree	
PTC-1/4-M-8MM	Quick connector 1/4 Φ8	



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Part no.	Description	Image
	Standard Parts	
TPS-P-001	Adjustable exhaust valve 1/4	
SS-FTCE-014	Female Threaded Coupler 1/4, SUS	
1CH9-16-14OG	Adjustable elbow hydraulic joint 1CH9-16-14OG	
1CM-16-14WD	Hydraulic joint 1CM-16-14WD	
NL-16/JS-RL-10	M16*1.5CAP , ¢ 10 tube NL-16/JS-RL-10	
10MM-PC	¢ 10 pipe clamp	
TPS-H-IP1	Iron pipe-1	
TPS-H-IP2	Iron pipe-2	
TPS-H-CG-14402002	Combination gasket, 14.4*20*2	



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Part no.	Description	Image
	Standard Parts	
TPS-H-CG-20402802	Combination gasket, 20.4*28*2	
TPS-H-HP-14015	Hydraulic plug M14*1.5	
TPS-H-AC-20015014015	Adapter connector inside 20*1.5 outside 14*1.5	
TPS-H-AC-14015	Adapter connector inside 14*1.5 outside 14*1.5	
TPS-H-AC-14015	Adapter connector inside M14*1.5	
TPS-H-FBPJS8	Flanged ball head column SS304 FBPJS8	
TPS-004	Bakelite handle M12*100, black, rotated	
TPS-005	Hexagon inverted thread screw M10*50	
TPS-006	PTFE washer DN65 (76*122*3)	



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Part no.	Description	Image
	Standard Parts	
TPS-007	PTFE washer 3in (62*82*2)	
TPS-008	Rubber feet M8*10 OD: 30, H:29	

	SMC	
TPS-C1	SMC cover-1	
TPS-C2	SMC cover-2	

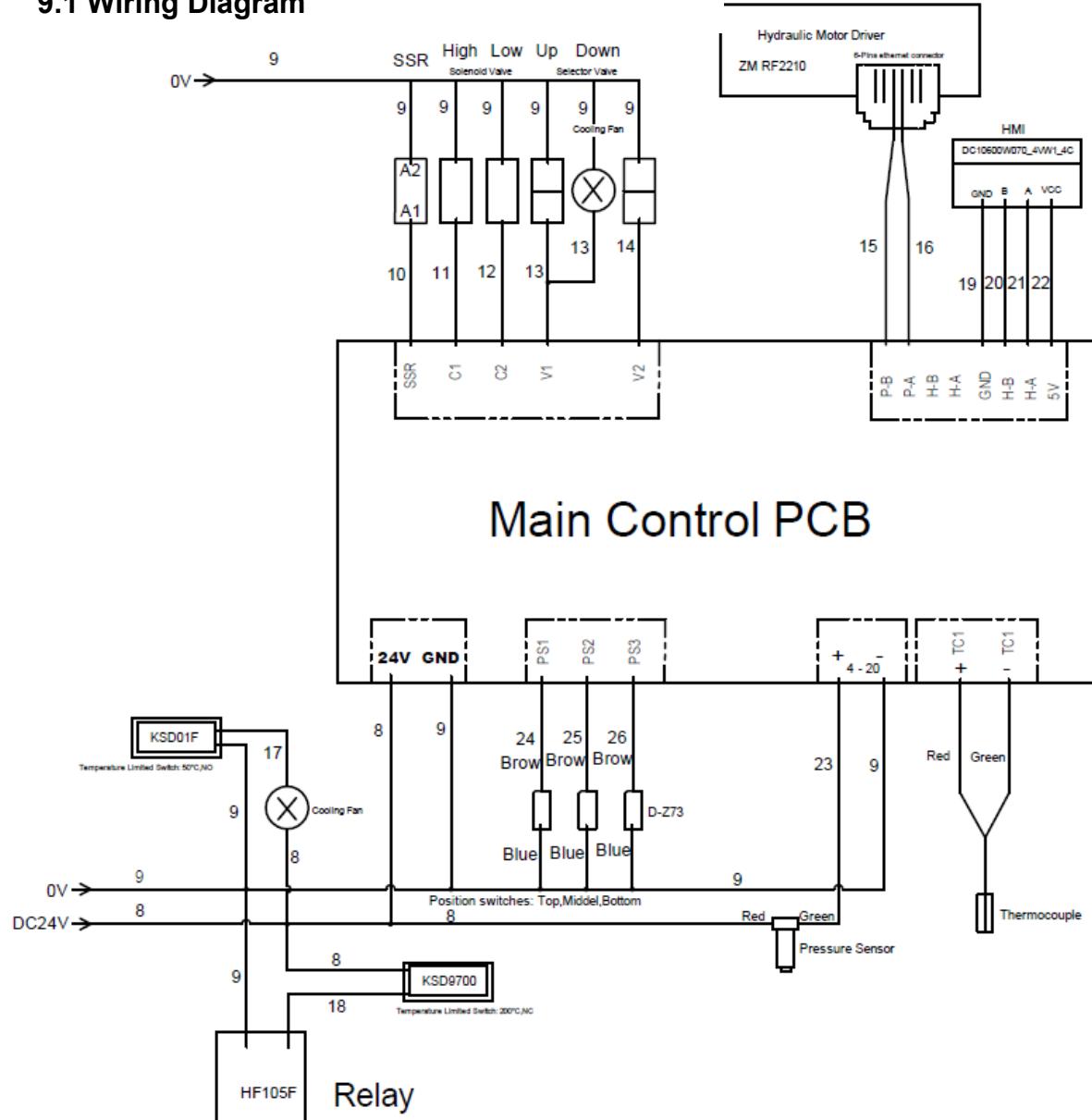
Please read this instruction manual carefully and follow all installation, operating and safety guidelines.



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9.0 Electrical and Mechanical Drawings

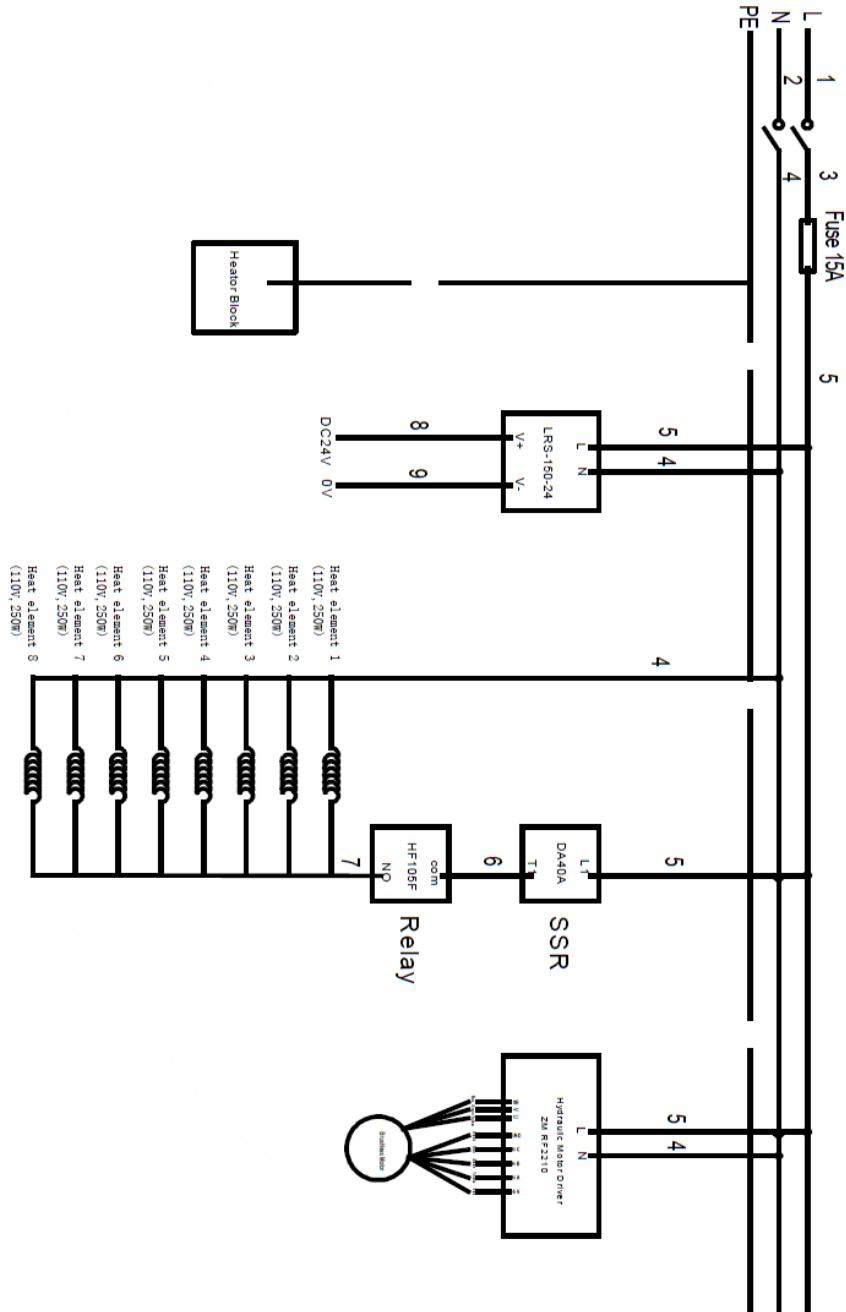
9.1 Wiring Diagram





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9.2 Heater Wiring Diagram for 110V

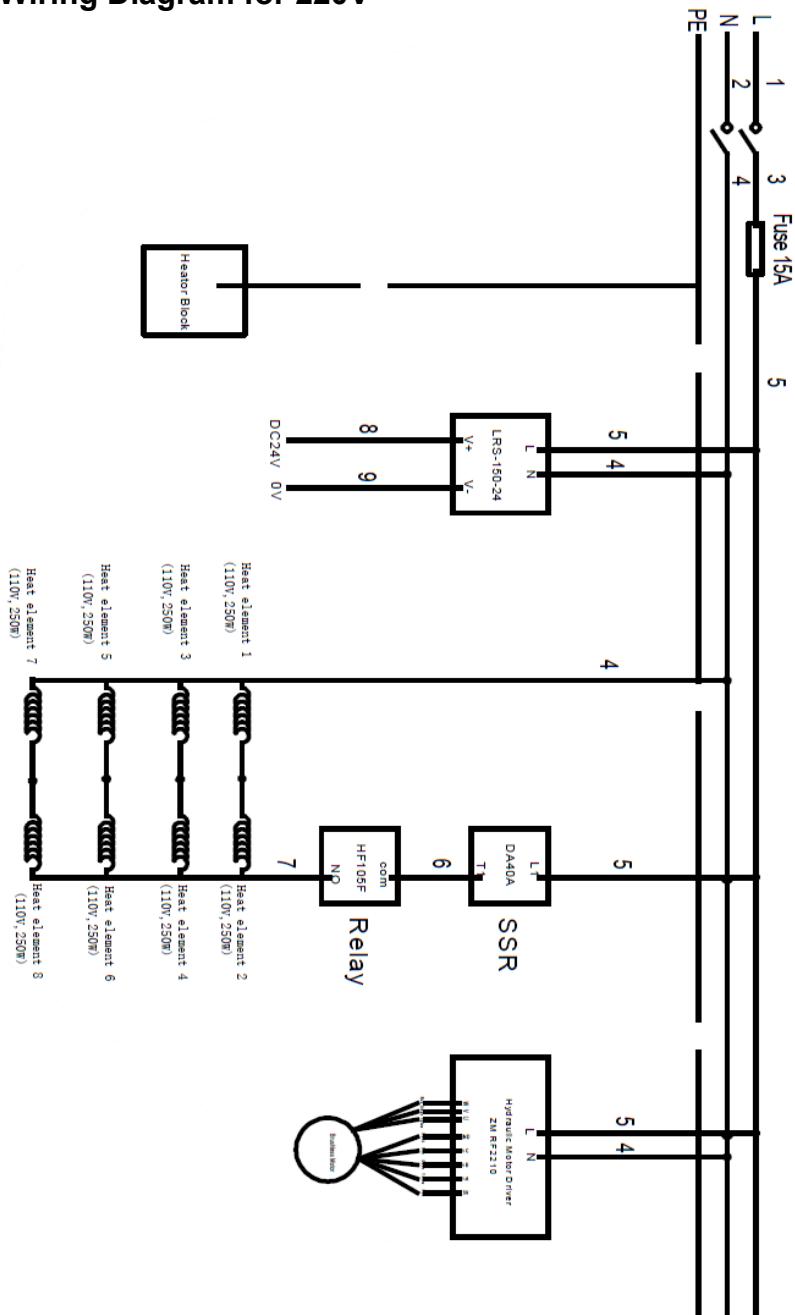


Please read this instruction manual carefully and follow all installation, operating and safety guidelines.



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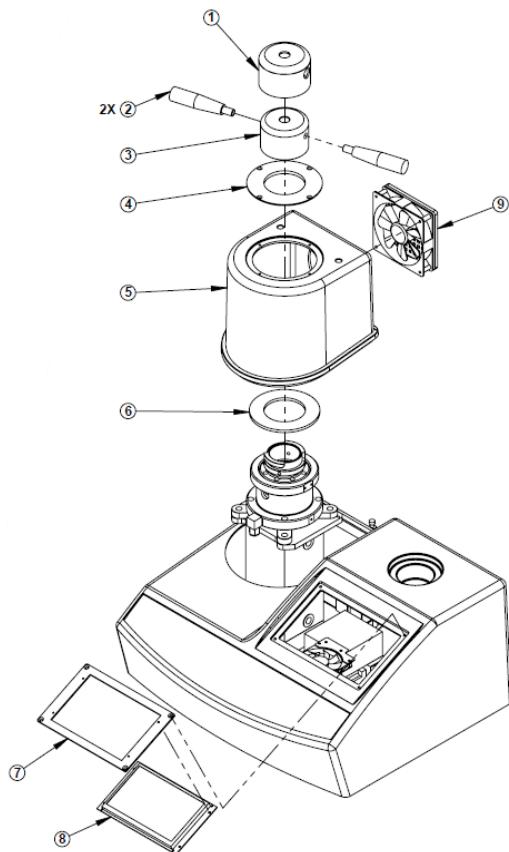
9.3 Heater Wiring Diagram for 220V





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9.2 Mechanical Drawings



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TPS-003	Heat Resistant Cap	1
2	TPS-004	TP-S Handle	2
3	TPS-M-004	TP-S Bayonet Cover	1
4	TPS-001	Top insulating Ring	1
5	TPS-C2	TP-S Top Cover	1
6	TPS-006	PTFE Insulating Ring	1
7	TPS-F-002	TP-S 7in Screen Bracket	1
8	SRN-T-7IN	7in Touch Screen	1
9	120MM-FAN	120mm Fan	1



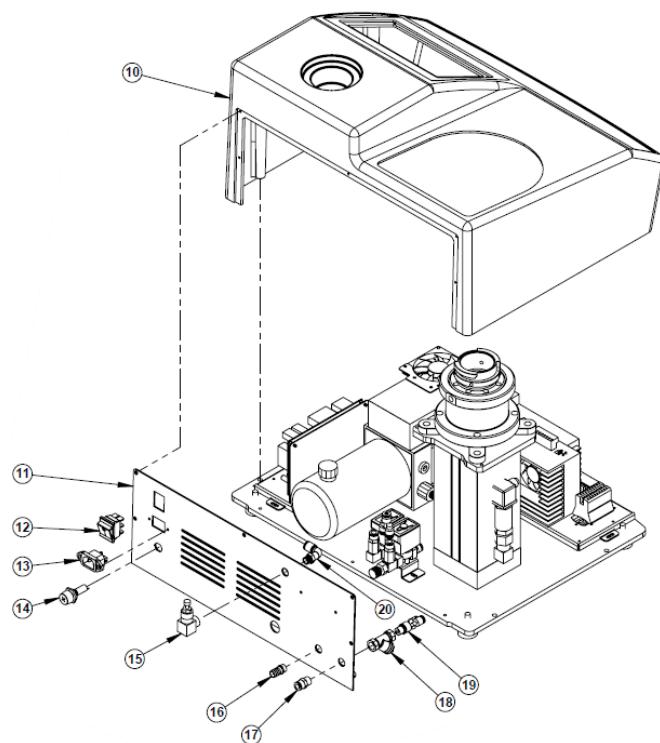
TERAPRESS TP-7500S

Mounting Press



INSTRUCTION MANUAL

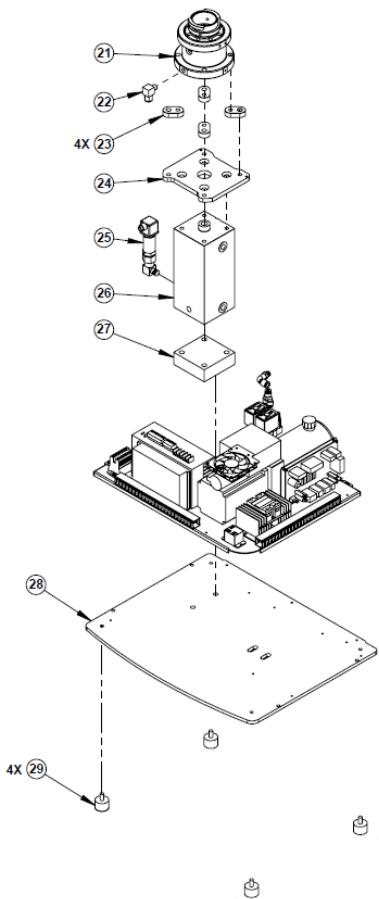
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
10	TPS-C1	TP-S Main Cover	1
11	TPS-F-001	TP-S Back Cover	1
12	POW-SWITCH	ON/OFF Switch	1
13	POW-LC	Large Current Power Switch	1
14	TPS-20A	Fuse Holder	1
15	SS-FTCE-014	Female to Female Coupler	1
16	P-1/4-F-12BARB	Drain Barb Fitting	1
17	PTC-1/4-M-8MM	8mm water supply hose connector	5
18	P-1/4-YF-FF	1/4in Y Filter	1
19	SS-6MM-YT	Threaded 6mm Y Push to Connect	1
20	PTC-3/8-E-M-8MM	90 Degree 8mm Threaded Push to Connect	1



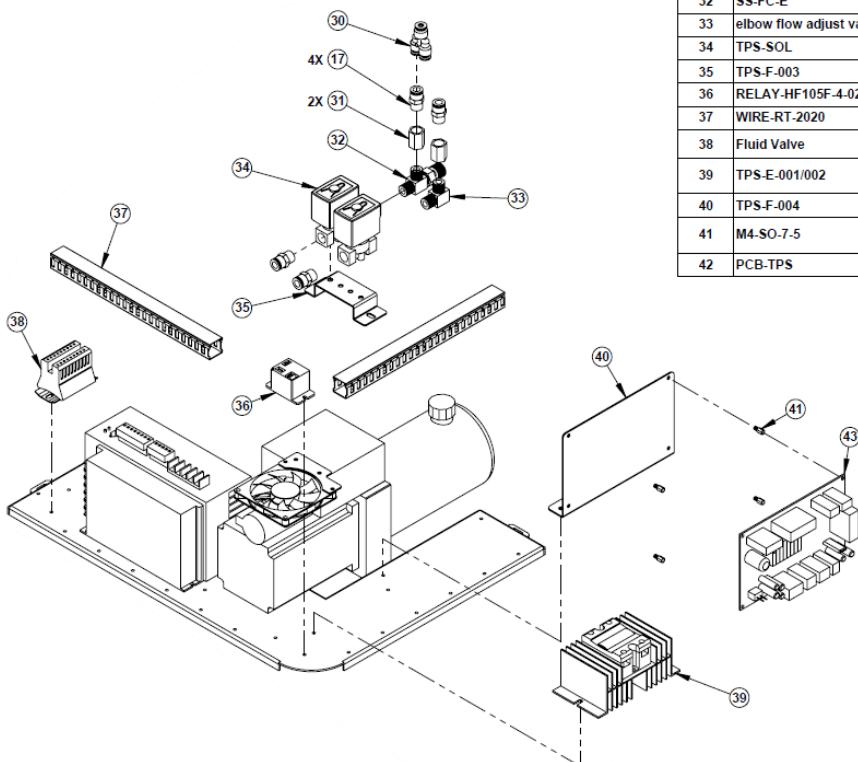
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
21	TPS-M-005	TP-S Heater Block	1
22	SS-6MM-FTE-018	Male Threaded Elbow Compression Fitting	1
23	TPS-002	Heater Spacer Block	4
24	TPS-M-002	Heater Mounting Plate	1
25	TPS-H-E-001	Pressure Sensor	1
26	TPS-H-E-003	Hydraulic Cylinder Block	1
27	TPS-M-003	Hydraulic Cylinder Mounting Block	1
28	TPS-M-001	TP-S Base Plate	1
29	M8-FEET	Machine Rubber Foot	4



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
30	SS-6MM-Y	6mm Female Three Way Y Push to Connect	1
31	SS-FTC-014	Female 1/4 Straight Threaded Connector	2
32	SS-FC-E	Water Adjustment Valve	1
33	elbow flow adjust valve2		1
34	TPS-SOL	Square 24V Solinoid	2
35	TPS-F-003	Solenoid Bracket	1
36	RELAY-HF105F-4-024D-1HS	Relay Block	1
37	WIRE-RT-2020	Wire Trunkng 20x20mm	2
38	Fluid Valve	Fluid Valve	1
39	TPS-E-001/002	Solid State Relay w/Heat Exchanger	1
40	TPS-F-004	TP-S PCB Bracket	1
41	M4-SO-7-5	Brass 4mm Standoff, 7mm Length, 5 Hex	4
42	PCB-TPS	TP-S PCB	1



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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
43	PCB-TPS	TP-S PCB	1
44	MD-110220-SVO		1
45	TPS-F-008	Fan Mounting Plate	1
46	80MM-FAN	80mm Thin Cooling Fan	1
47	TPS-H-E-002	TP-7500S Hydraulic Pump Unit	1
48	TPS-F-005	Electronics Mounting Plate	1
49	PS-24V-LRS15024	TP-S Power Supply	1

