



# **PENTA 7500 Belt Grinder**

## **INSTRUCTION MANUAL**

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



Equipment Type:	Belt Grinder
Model:	<b>PENTA 7500</b>
Electrical Requirements:	110V or 220V
Frequency:	50/60 Hz
Motor Horsepower:	0.75 hp (550W)
Manual Revision Date:	November 15, 2014

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 one year 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.

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.

**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:**

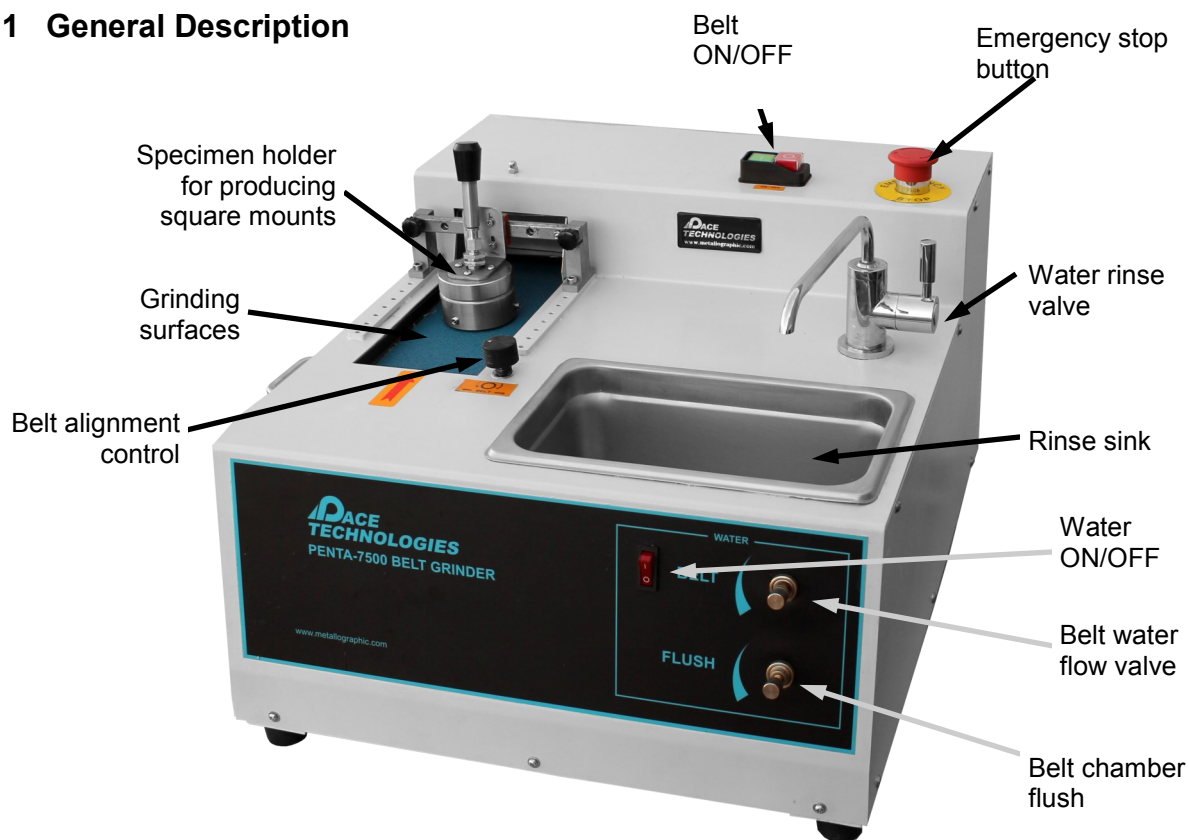
If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to Seller) under the work or purchase order or any other agreement between Buyer and Seller, Buyer's rights under the warranty shall be suspended during any period of such default and the original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

## 1.0 Product Description

### 1.1 General Description



The PENTA 7500 is a single belt hand grinder for coarse grit specimen planarization. A unique benefit of the PENTA-7500 belt grinder is the fixture for planarizing specimen mounts. This is very important for maintaining a square mount for automated polishing machines.

Another benefit is a high 0.75 horsepower motor and the ability to connect the unit to either 110V or 220V for more torque.

A rinse station also allows for the sample to be easily cleaned after grinding.

## 1.2 Technical Specifications

Electrical specifications:	110V or 220V
Roll sizes:	4" width x 36" length
Motor power:	0.75 hp (550 W)
Weight:	Approx. 120 lbs (55 kg)
Dimensions (WxDXH):	Approx. 18.5" x 23" x 15" (470 mm x 580 mm x 370 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)
Belt speed:	43 ft/second (13 m/s)
Construction:	Fabricated steel with stainless steel components to reduce corrosion



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

## 2.0 Unpacking, Shipping and Installation

### 2.1 Unpacking

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

Measures WxDxH: 21" x 29" x 22" (535 x 740 x 560 mm)

Weight:                      Weight with crate  
(approximately 140 lbs).

### 2.2 Shipping

When moving box, lift from bottom.



**Caution:** Heavy equipment. Take care to avoid bodily injury.

## 2.3 Installation



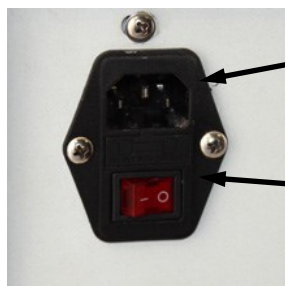
Install unit carefully! Improper installation voids warranty.

The **PENTA 7500** should be placed on a flat stable surface.

Connect to water supply, drain and electrical outlet (110V or 220V, note voltage as been prewired at the factory).

After water and drain are completed, the system is ready for operation.

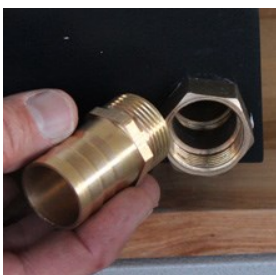
### Backside connections



Electrical plug  
connector

10 amp slow  
blow fuse

### Water drain



Attach water drain connections depending on drain location.



Attach drain hose

### External water supply:

The water supply line requires a 8 mm quick connect fitting. 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 performance of the systems.



### 3.0 Safety Guidelines

#### 3.1 Warning Sign

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

#### 3.2 Safety Precautions

**!** Careful attention to this instruction manual and the recommended safety guidelines is essential for the safe operation of the **PENTA 7500**.

**!** Proper operator training is required for operation of the **PENTA 7500**. Any unauthorized mechanical and electrical change, as well as improper operation, voids all warranty claims. All service issues need to be reported to the manufacturer / supplier.

**!** Operate unit as specified in this manual.

**!** Do not leave any specimen or other parts on the working wheel.

**!** When unit is not in use turn off water.

**!** Securely hold the sample, preferably with two hands when not using the specimen fixture.

## 4.0 Start-up and Operation

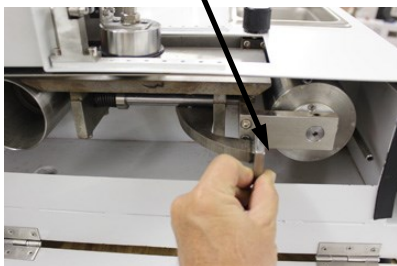
### 4.1 General

The **PENTA 7500** is a belt grinder.

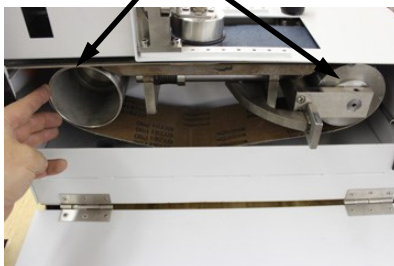


### 4.2 Loading Belts

Release belt tension by pulling lever



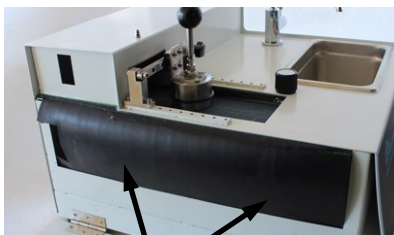
Position belt over rollers



Turn on motor and adjust position of the belt with the belt adjustment knob



Tighten belt with lever



Tuck in rubber splash guard



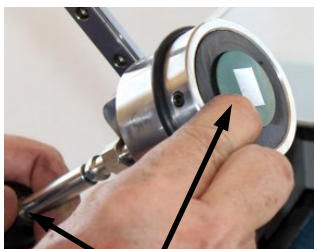
### 4.3 Mounted Specimens Fixture

The PENTA 7500 is the only belt grinder which has a fixturing device for producing square metallographic. mounts during planar. This is very important for maintaining square mount sfor automated polishing machines.

Interchangeable sleeves for holding various mount sizes



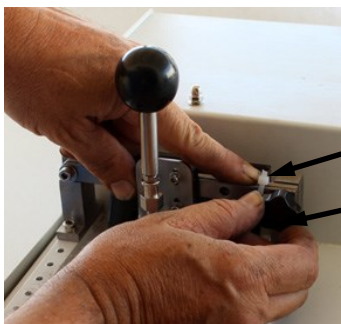
Tighten set screws to hold sleeve in place



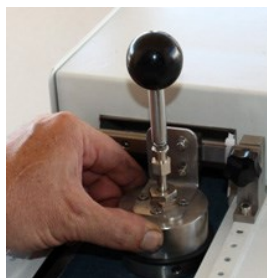
While pulling spring arm insert sample into sleeve



Rotate sample mount onto belt (easier if the holder is positioned more to the right side)



Hold down arm and lock into place



Position holder to desired location on belt



Apply force to planarize (note it is not recommended to move the sample during this operation)

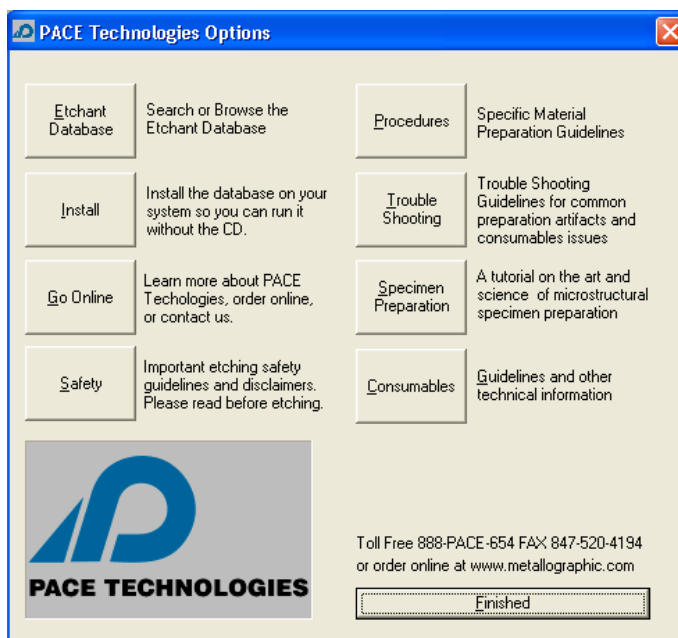
## 4.4 Metallographic Specimen Preparation Basics

A typical metallographic specimen preparation consists of the following basic steps:

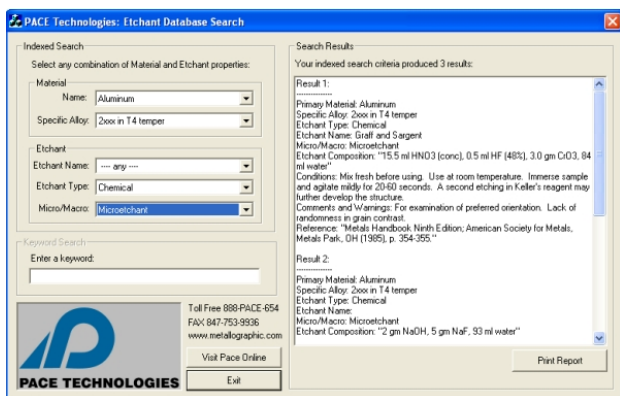
<b><u>Preparation Stage</u></b>	<b><u>Purpose</u></b>
Initial documentation:	<ul style="list-style-type: none"><li>• To document the initial condition of the sample,</li><li>• To map the sample surface,</li><li>• To highlight the area of interest.</li></ul>
Sectioning / cutting:	<ul style="list-style-type: none"><li>• To reduce the size of large samples and to sample the specimens close to the area of interest.</li></ul>
Rough, or planar grinding (refer to Section 4.4.1):	<ul style="list-style-type: none"><li>• To obtain a planar surface,</li><li>• To remove sectioning damage,</li><li>• To approach the area of interest.</li></ul>
Rough polishing (refer to Section 4.4.2):	<ul style="list-style-type: none"><li>• Ideally to remove all the subsurface damage and microstructural damage produced during cutting and rough grinding (Superficial scratches may still be present after this step).</li></ul>
Final polishing (refer to Section 4.4.1)::	<ul style="list-style-type: none"><li>• Generally, more for cosmetic purposes than for removing microstructural damage. In most cases, this stage should be minimized to avoid overpolishing and distorting the microstructural features.</li></ul>
Etching:	<ul style="list-style-type: none"><li>• To enhance microstructural features such as grain boundaries, grain size, phase differences, etc.</li></ul>
Examination:	<ul style="list-style-type: none"><li>• A variety of examination techniques are used in metallography, including: optical microscopy, electron microscopy and hardness testing.</li></ul>

## Educational Etchant and Procedure Database CD

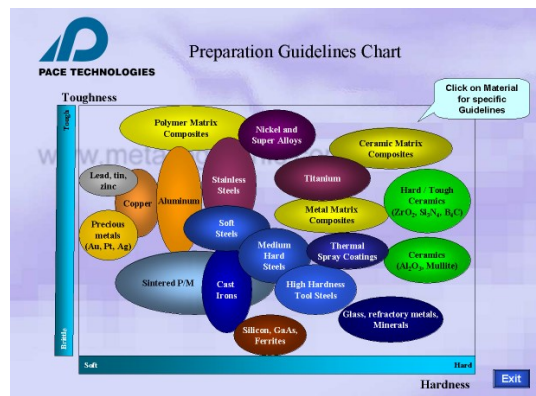
- **Etchant Database - OVER 2200 ETCHANTS**
- **Search Fields**
  - Material or metal type
  - Specific alloys
  - Etchant name
  - Micro vs. Macro etchant
  - Keyword
- **MSDS for Etchant Chemicals**
- **Preparation Guidelines**
- **Preparation Basics**
- **Preparation Trouble Shooting**



Etchant Database



Preparation Guidelines



## **5.0 Maintenance**

### **5.1 Introduction**

The **PENTA 7500** requires very minimal maintenance. However, to increase the life of the grinder, it is suggested that the unit be rinsed after use.

### **5.2 Cleaning inside cabinet**

The inside of cabinet where the belt mechanism is located should be cleaned and dried to avoid possible corrosion. Do not use any chemicals or cleaning abrasives.

### **5.2 Cleaning outside cabinet**

The outside cabinet should be cleaned occasionally with a moistened cloth. Do not use any chemicals or cleaning abrasives.

## 6.0 Trouble Shooting

More extensive trouble shooting, repair guides, video's, parts list are provided online at [www.metallographic.com](http://www.metallographic.com) or

<http://www.metallographic.com/PACE-service/PENTA-7500-service.html>

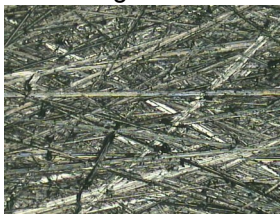
Problem	Cause	Solution
No water supply	a. Water valve closed b. Water tube is extremely bent	a. Open valve b. Straighten out water tube.
Water leaking	a. Rubber boat not positioned properly b. Drain hose plugged c. Unit not tilted properly d. Water flow is too high	a. Ensure rubber boat is inside the lip of the cabinet b. Clean drain hose c. Adjust front feet for proper draining d. Reduce water flow to allow system to drain properly, also check for blockage in drain



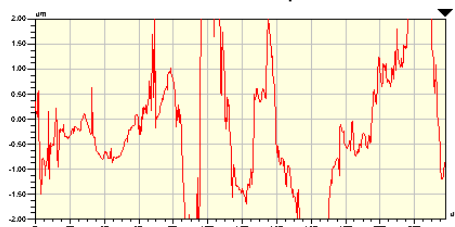
## **7.0 Metallographic Consumables**

### **7.1 SiC Abrasive Paper, Surface Roughness**

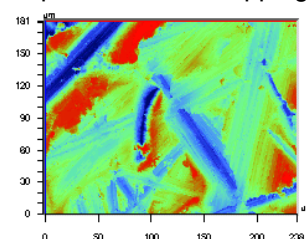
**60-grit SiC**



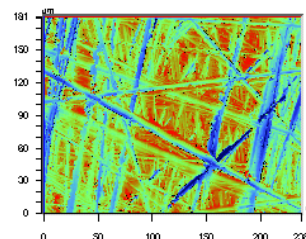
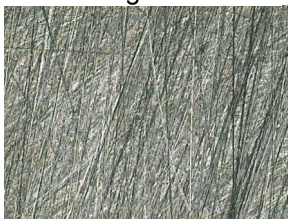
**2-dimensional line profile**



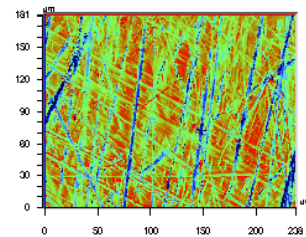
**3-D optical contour mapping**



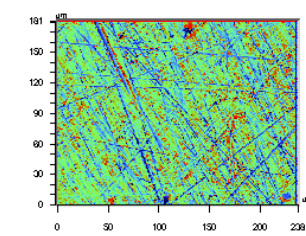
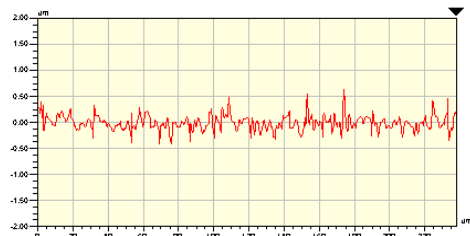
**240-grit SiC**



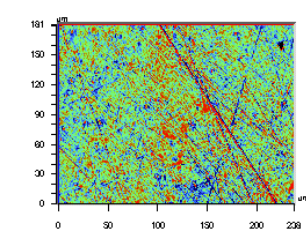
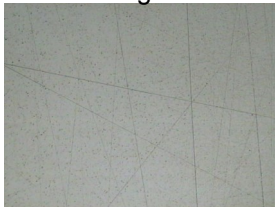
**400-grit SiC**



**600-grit SiC**



**1200-grit SiC**





## 8.0 Replacement Belts

Part No.	Quantity	Description
ZrO2-B060	5/box	Long lasting durable 60 grit zirconia grinding belt, recommended for coarse grinding (4" x 36")
ZrO2-B120	5/box	Long lasting durable 120 grit zirconia grinding belt, recommended for coarse grinding (4" x 36")
ALO-B120	5/box	120 grit, moderate life alumina belt (4" wide, 36" length)
SIC-B60	10/box	60-grit SiC belt (4" wide, 36" length)
SIC-B80	10/box	80-grit SiC belt (4" wide, 36" length)
SIC-B120	10/box	120-grit SiC belt (4" wide, 36" length)
SIC-B180	10/box	180-grit SiC belt (4" wide, 36" length)
SIC-B240	10/box	240-grit SiC belt (4" wide, 36" length)
SIC-B320	10/box	320-grit SiC belt (4" wide, 36" length)
SIC-B400	10/box	400-grit SiC belt (4" wide, 36" length)
SIC-B600	10/box	600-grit SiC belt (4" wide, 36" length)

## **9.0 Spare Parts**

Part no.	Description	Images
	<b>Electrical</b>	
<b>P75-switch-110V</b>	Water proof ON/OFF switch (110V)	
<b>P75-switch-220V</b>	Water proof ON/OFF switch (220V-original)	
<b>Fuse-10A-S</b>	10 amp slow blowing fuse for PENTA-7500 (5/pkg)	
<b>P75-S</b>	Water ON/OFF Switch	
<b>SOL-24V</b> <b>SOL-110V</b> <b>SOL-220V</b>	Water Solenoid 24V Water Solenoid 110V Water Solenoid 220V	
<b>P75-TRANS</b>	PENTA 7500 original motor transformer	
<b>P75-EMERG</b>	PENTA 7500 emergency stop	

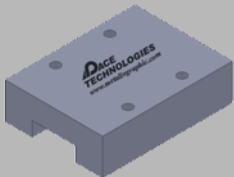

Part no.	Description	Images
	<b>Electrical</b>	
<b>P75-220V-M</b>	220V original PENTA 7500 single phase motor	
<b>P75-110V-M</b>	110-220V PENTA 7500 0.75 hp single phase motor	
<b>CORD-110</b>	110V USA power cord	
<b>CORD-220R</b>	220V round prong power cord	
<b>CORD-220F</b>	220V flat prong power cord	

Part no.	Description	Images
	<b>Mechanical</b>	
<b>PEN7-T</b>	PENTA 7500 Template	
<b>P75-100</b>	PENTA 7500 belt adjustment mechanism	
<b>P75-M-101</b>	PENTA 7500 belt adjustment support brackets	
<b>P75-100K</b>	PENTA 7500 adjustment knob	
<b>P75-101</b>	PENTA 7500 plate tension spring	
<b>P75-102</b>	PENTA 7500 belt tension spring	
<b>P75-103</b>	PENTA 7500 spring tension shaft	
<b>P75-104</b>	PENTA 7500 tension lever	

Part no.	Description	Images
<b>Mechanical</b>		
<b>P75-201</b>	PENTA 7500 adjustment roller	
<b>P75-202</b>	PENTA 7500 motor drive wheel for 5/8-inch motor arbor	
<b>P75-203</b>	PENTA 7500 wear plate	
<b>P75-200</b>	PENTA 7500 plate assembly	
<b>P75-M-001</b>	Adjustment wheel bracket	
<b>P75-M-002</b>	Adjustment wheel rod	
<b>P75-M-003</b>	Side panel hinge	

Part no.	Description	Images
	<b>Mechanical</b>	
<b>FT-004</b>	Feet (4/pkg)	
<b>P75-M-004</b>	Belt cover	
<b>P75-M-005</b>	Back panel	
<b>P75-M-006</b>	Top cover	
<b>P75-M-007</b>	Water splash guard	
<b>P75-M-008</b>		
<b>P75-M-009</b>	Side panel	

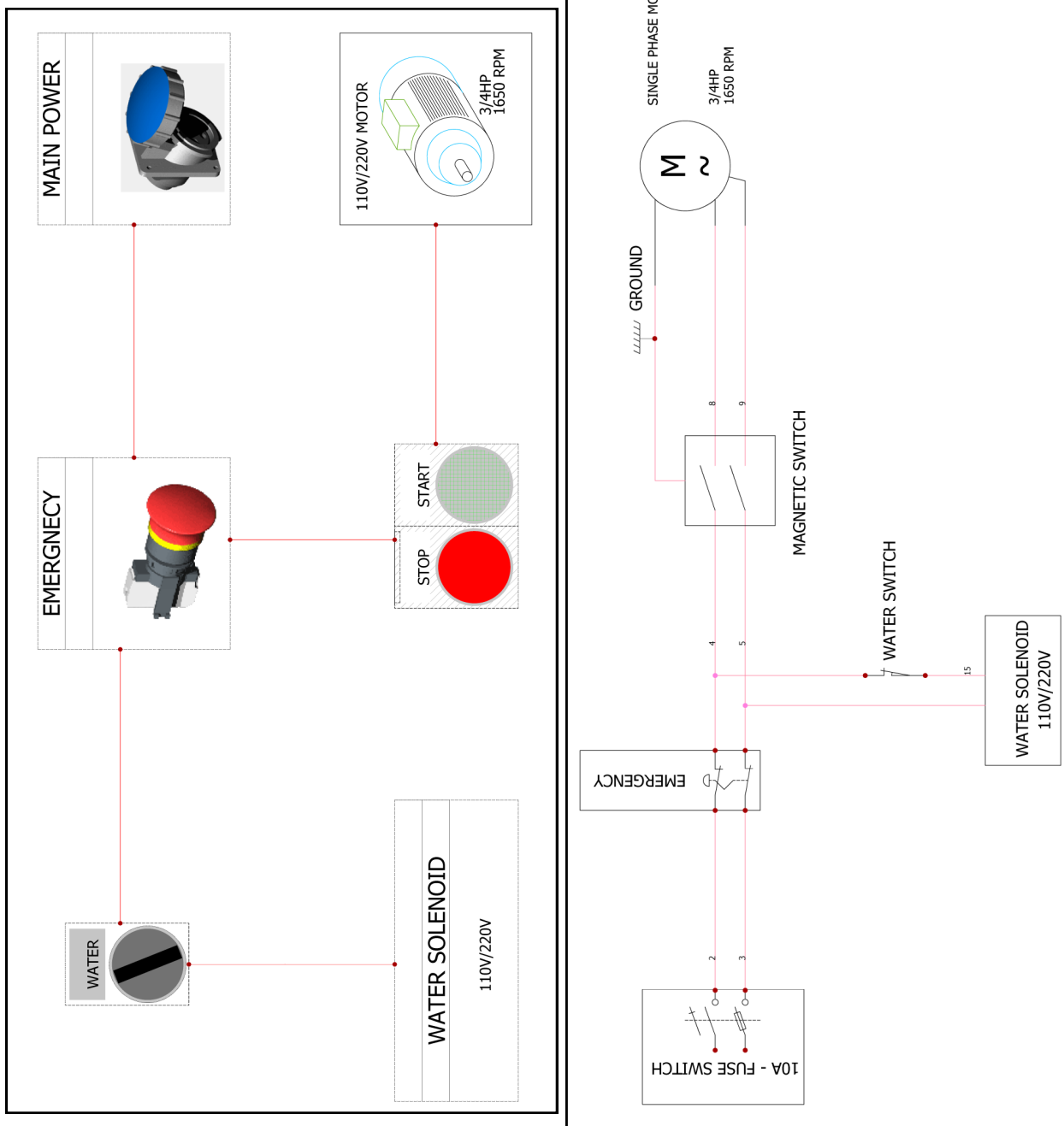
Part no.	Description	Images
	<b>Plumbing</b>	
<b>P75-301</b>	PENTA 7500 rinse tank cover	
<b>P75-302</b>	PENTA 7500 rinse tank	
<b>P75-303</b>	PENTA 7500 water distribution rod (top or bottom)	
<b>P75-304</b>	PENTA 7500 stainless steel water valve and spigot	
<b>P75-305</b>	PENTA 7500 water flow control valve	
<b>N1-010</b>	Drain connector set (elbow, nipple, hose barb)	

Part no.	Description	Images
	<b>Square grinding attachment</b>	
<b>P75-M-010</b>	Sliding block	
<b>P75-M-011</b>	Cross slide guide	
<b>P75-M-012</b>	Shaft	
<b>P75-M-013</b>	Grinding attachment	
<b>P75-M-014</b>	M8-tension-screw	
<b>P75-M-015</b>	Sample holder block left	

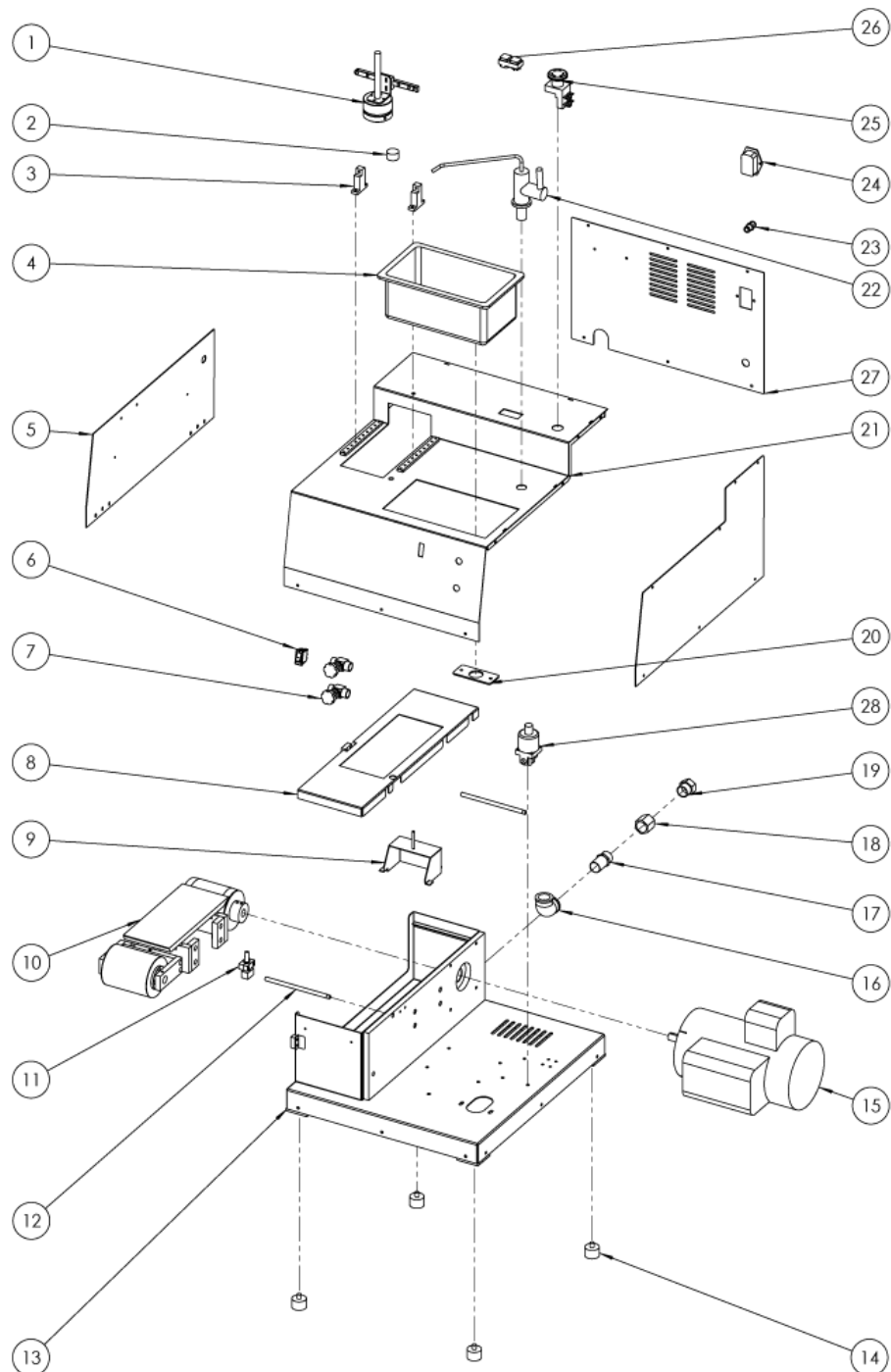


Part no.	Description	Images
	<b>Square grinding attachment</b>	
<b>P75-M-016</b>	Sample holder block right	
<b>P75-M-017</b>	Attachment angle bracket	
<b>P75-M-018</b>	Attachment sliding rail	
<b>P75-M-019</b>	PENTA 7500 attachment spring	
<b>P75-000</b>	PENTA 7500 square grinding attachment	
<b>P75-100H</b>	PENTA-7500 1-inch holder for square holder fixture	
<b>P75-125H</b>	PENTA-7500 1.25-inch holder for square holder fixture	
<b>P75-150H</b>	PENTA-7500 1.5-inch holder for square holder fixture	
<b>P75-25H</b>	PENTA-7500 25 mm holder for square holder fixture	
<b>P75-30H</b>	PENTA-7500 30 mm holder for square holder fixture	
<b>P75-40H</b>	PENTA-7500 40 mm holder for square holder fixture	

## **10.0 Electrical Drawing**



### **11.0 Assembly Drawing**



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

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P75-000	Square grinding attachment	1
2	P75-100-3	Adjustment knob	1
3	P75-M-016	Sample holder block	1
4	P75-302	Rise tank	1
5	P75-M-021	Left cover	1
6	P75-S	Water ON/OFF switch	1
7	PEN-001	Water flow control valve	2
8	P75-M-004	Belt cover	1
9	P75-M-007	Water splash guard	1
10	P75-200	Plate assembly	1
11	P75-100	Belt adjustment mechanism	1
12	P75-303	Water distributed Rods	2
13	P75-M-B	Base	1
14	FT-004	Feet	4
15	P75-110V-220V-M	Motor	1
16	D-ELBOW	Drain elbow	1
17	D-BARB	Drain hose barb	1
18	D-REDUCER	Drain-Reducer	1
19	P75-M-022	Rise tank bracket	1
20	P75-M-009	Side panel	1
21	P75-M-006	Top cover	1
22	PVR	Water valve	1
23	DW-8MM	Water supply hose connector	1
24	PS-001	ON/OFF Switch	1
25	P150-210	Emergency switch	1
26	P75-switch	Water proof ON/OFF switch	1
27	P75-M-005	Back cover	1
28	SOL	110V/220V Water solenoid	1