



USER GUIDE for 6390.1

ULTRAPOL

END & EDGE Polishing System



ULTRAPOL END & EDGE Polishing System

A Precision Lapping and Polishing System

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THE BASE

- 1.0 Setup.** The Base is set on a workbench surface. It should be set reasonably level (precise leveling is not required).
- 1.1 Electrical.** The Base requires a standard 110V 60Hz / or 220-240V / 50 Hz 3-wire electrical outlet, dependent on configuration purchased. The power cord plugs into the Base, at the rear.
- 1.2 Coolant.** Lubrication is an important part of the polishing process. One method is to use a plastic spray bottle to apply water to the lap surface. A light mist or several drops of water applied to the polishing film surface is adequate, or the Solenoid Water Actuation system can be used. Simply feed your water source into the back of the polisher and switch the Coolant Switch to the on position on the front panel. Water will begin to pump onto the polishing surface. Adjust the water pressure with the valve on the side of the faucet.



- 1.2.2 Drain.** The Base needs to be placed for convenient drainage. The drain exits from the rear panel, though a fitting onto which the supplied drain hose is pressed. This drain can be fed into a container (a gallon plastic container is usually convenient). Alternatively, the feed may be directed into the facility drain, if faucets are used.

Back Panel Layout



CONTROL FEATURES FOR OPERATION -- BASE.

Looking at the Control Panel from right to left, are the following control features: **Main Power Switch**, **Accessory Power Switch**, **Timer Control** section (made up of Timer Mode Selection Switch, Timer Dial, Timer Reset pushbutton), **Lap control** section (made up of On/Off/Directional switch, Lap Speed selection knob and Tachometer readout), and Solenoid **Coolant control**.

Front Panel Layout



- 2.1 **Main Power Switch.** This switch controls power for all of the functions, with the exception of the rear socket (located on the back panel) which is for the lamp. The Main Power Switch is used to power-up the system after a shutdown period, and should be moved to the OFF position during shutdown. The Main Power Switch is available as an emergency shut-off.
- 2.2 **Accessory Power Switch.** On the right-side panel of the Base, there are two sockets that supply 110VAC power. The Accessory Power Switch controls these switched. These accessory power outlets are used for accessories (for example, rotating or oscillating devices).

Side Panel Layout



- 2.3 **Timer**
 - 2.3.1 **Timer-OFF Mode.** There is a rocker switch for "Timer Mode", with an ON position and an OFF position. In the OFF position, the Platen controls allow for Platen rotation, with no limit on the time period, the actual running time being controlled by the operator.
 - 2.3.2 **Timer-ON Mode.** With the rocker switch in this position, operation of the Platen can only be done under the set-time condition.
 - 2.3.3 **Setting the Timer.** The digital timer reads in seconds, with settings possible from 0 to 9999 seconds (167 minutes). The settings are made by pressing the buttons for each position on the Timer (units, 10's, 100's 1000's), each position settable from 0 to 9—the digits on the Timer can be seen to change when the buttons are pressed. The upper row

will be at 0000, set to read out when the Platen is in operation. (NOTE: The Timer setting can not be modified while in operation—the Timer will run for the originally set time).

- 2.3.4** Operation of Timer. The Timer Reset pushbutton will activate the Timer and Platen operation—the Timer can be observed counting the set number of seconds at the end of which the operation turns off. The previously set time is retained, and rerunning for that time can be done by again pushing the Timer Reset pushbutton.

2.4 Coolant Control Switch

- 2.4.1** When engaged the Coolant Control Switch will pump water (from an existing source) through the faucet on the top-side of the base. The flow of water can be adjusted with the valve on the faucet.

- 3.0 Operation of the Base—Controlling the Platen and the Lap Plate.** The Base provides a Platen to support and drive the Lapping/polishing Plate. The Lapping/polishing Plate is set onto the Platen, locating onto a central aligning plug. Two Drive Pins positioned on opposite sides of the central plug, equidistant from the platen center, drive the Plate during operation.

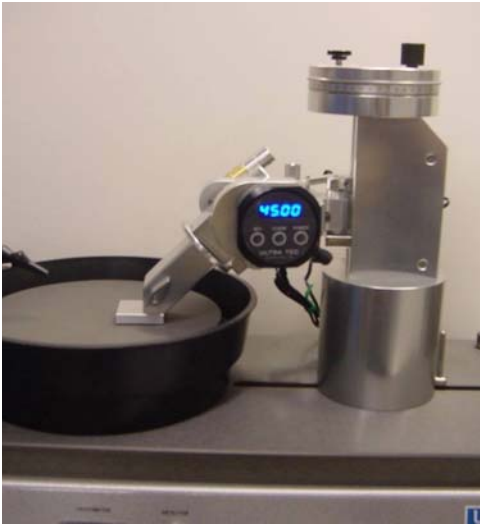
Top View



- 3.1 On/Off/On Directional Switch.** This three-way switch, located to the right of the Timer, has a central OFF position, and two ON positions—Clockwise (CW) and Counter-clockwise (CCW), for selecting direction of the Lap.
- 3.2 Lap Speed selection knob.** This knob is used for selecting speed of the Lap. It can be left in any particular position
- 3.3 Tachometer Readout.** The Tachometer Readout reads directly, in RPM, the maximum speed will be approx. 600 RPM.

4.0 UT.1610.1 MICROSPOSITIONED POLISHING HEAD CONTROLS

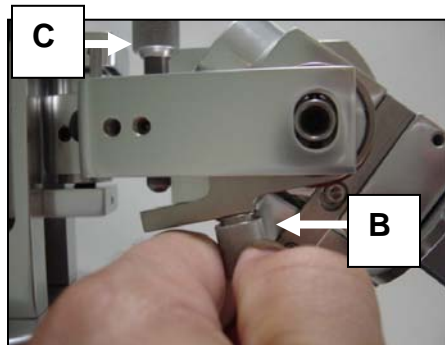
4.1 AXIAL ANGLE CONTROL



The Micropositioned Head provides variable control of the axial angle, the angle setting being shown on the digital display. The nominal setting is at 45°—that is, the measured angle between the upright post of the Mast and the Spindle that extends from it. On that Spindle, the rectangular Interface that grips the workholder, grips it at 45° so that the bottom of the workholder, when the readout is at 45° is parallel to the lap surface—0°.

To make a small adjustment in the angle setting, while watching the digital display, turn the Fine Adjustment Knob (the upward-extending knurled knob at the rear of the Yoke—“C” in the photo below).

The angle is set by use of the Angle Stop and the Angle Fine Adjustment Knob (the photo shows these Knobs with the Pressure-setting mechanism removed—for visibility of the action. To make a small adjustment in the angle setting, while watching the digital display, turn the Fine Adjustment Knob (C). To make a large adjustment, of a number of degrees, loosen the knob B until pressure on the spindle allows a slipping movement. While watching digital display, set the angle coarsely and tighten knob B. Knob C, the Fine Adjustment Knob allows setting the exact angle.



4.1.1 DIGITAL ANGLE DISPLAY OPERATION.

The Digital Angle Display reads the angle directly. It has been calibrated at the factory before shipment, and for your setup only requires being plugged in—the Power Cord, with its AC/DC Adapter has been supplied. (If, for any reason, the calibration is lost—an unexpected event—there is a re-calibration instruction

The “POWER” button is a push-on/push-off toggle switch. When the power is initially supplied, the display will blink 99.99 (the display will blink 99.99 after the power has been shut OFF and then turned ON again – whether it was done purposely, by using the POWER button, or interrupted for any accidental reason). When the 99.99 blinking occurs, swing the Spindle so that it points up (vertically), and then lower it down to and past the 90 degree (horizontal) position. You will see on the display that the Angle Dial “finds itself”—the calibration is maintained.

There is a “BEEPER” that signals reaching the STOP position. It is optionally ON. The SET button turns it ON. The “CLEAR” button turns it OFF.

4.2 PRESSURE

Pressure of the workpiece against the lap surface can be set through use of the Weight Kit. It is pre-assembled to the Mast (it consists of a Hub, an Arm, and Weights-- two aluminum and two brass --it is shown disassembled, for explanatory purposes, in Fig. 1).

The Weight Kit can provide additional pressure, and alternatively, act as a counterbalance to lighten downward pressure on the workpiece. It mounts as shown in figure 2, --held in rotary position by tightening the set screw. When the weight is set toward the rear, as shown in figure 4, it functions to **add pressure**; if it's set toward the front (fig 5) it functions as a **counterbalance**. It operates with a significant mechanical advantage and some experimentation is the best way to determine and set a desired pressure effect. (Note: in some cases, particularly in the counterbalance position, with no weight added to the pin, just the pin alone may provide enough force.



Fig 1 The Weight Kit, disassembled



Fig 2 How the Kit mounts



Fig 3 Adjust position



Fig 4 Weight rearward – add pressure

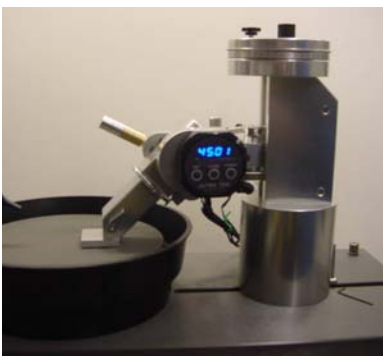


Fig 5 Weight forward – counterbalance pressure

4.3 HEIGHT CONTROL – Z Direction

The vertical height Z position is controlled by a leadscrew that is adjusted by turning the Vertical Knob. The readout is metric, reading like a micrometer. The lower flat knob, turned CCW, allows the Scale to be rotated—convenient for setting and saving a 0 position. CW rotation relocks the Scale so that it rotates with rotation of the entire Vertical Knob.



4.4 RADIAL position – adjustment

A fine adjustment for radial parallelism is provided. It is accessed by raising the Spindle to a pointing-up position. The numbered dial—the numbers representing 0.1°--can be rotated. CW rotation of the dial rotates the workholder position CCW—and vice versa. The workholder position, if it needs any adjustment, usually needs a very small amount.

For major positioning of the Spindle/Interface, there is a four-position index plate--90° increments. The Index Plate is rotated by, applying pressure at the rear of the block, thus lifting the pin out of the notch, then rotating the spindle to a desired position, and re-engaging the pin.



4.5 OSCILLATOR

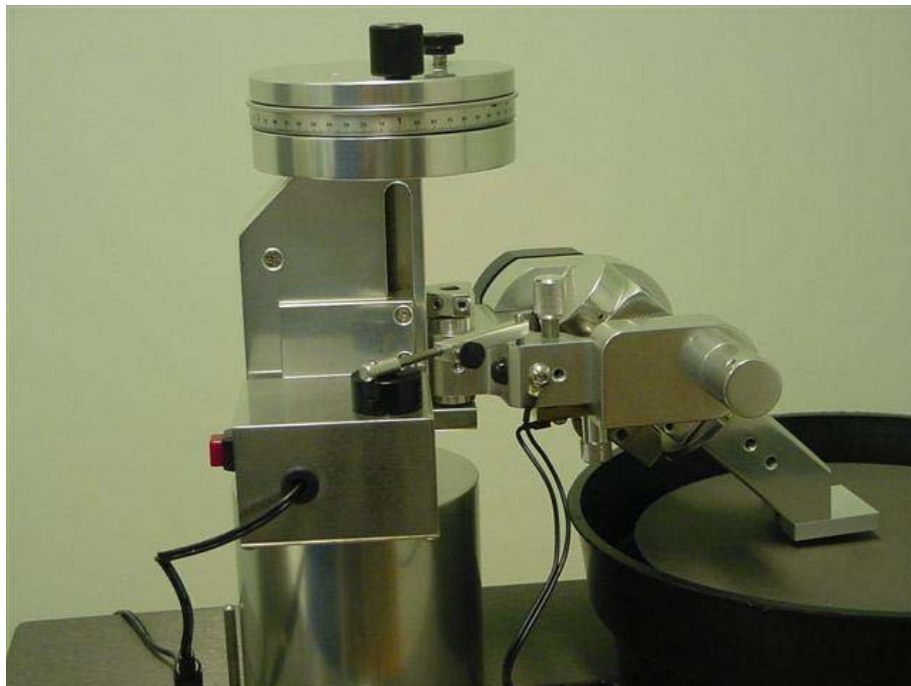
The oscillator provides a mechanized method of oscillating the sample/workpiece on the rotating lap surface. .

4.5.1 Set the Linkage Bar into place--one hole onto the "Driver" (rotating) pin on the Oscillator, and a hole at the other end onto the driven pin that extends from the Yoke.

4.5.2 Adjusting the swing: The Driver Block can be moved, moving the position of the pin relative to the center of rotation, thus controlling the amount of sweep. To set the pin position, loosen the setscrew in the side of the Rotor (it is the upper of two holes--the lower set screw holds the Rotor to its shaft); slide the Pin to its new position at the far side of the rotor, and retighten the setscrew. The closer to the center of the rotor that the post is, the less is the extent of the swing.

In general, the sweep of the oscillation should be kept in the front right quadrant of the lap, with a narrow oscillation--typically a centimeter or two, allowing particles to be washed away. For most operations, wide oscillations are not helpful, and for delicate work oscillations may introduce undesired lateral forces.

4.5.3 Operation of Oscillator. Press the red button to turn the motor on (the power source is also controlled by the Accessory switch on the front panel of the Base--which is tied into the Timer. Unless a correct depth position has been preset, it is a good idea to let the workpiece hover over the surface as the swing is observed and then gradually lower the vertical setting until contact with the lap occurs.



APPENDIX A - LAPPING AND POLISHING FILMS FOR THE ULTRAPOL 1200 Series

Diamond Polishing Film, 8" diameter

8" PSA Backed Discs

Order No.	Micron Size	Quantity
M-8230-1	0.1	5
M-8231-1	0.5	5
M-8232-1	1	5
M-8233-1	3	5
M-8234-1	5	5
M-8237-1	6	5
M-8235-1	9	5
M-8236-1	15	5
M-8238-1	30	5

8" Plain Backed Discs

Order No.	Micron Size	Quantity
M-8430-1	0.1	5
M-8431-1	0.5	5
M-8432-1	1	5
M-8433-1	3	5
M-8434-1	5	5
M-8437-1	6	5
M-8435-1	9	5
M-8436-1	15	5
M-8438-1	30	5

Silicon Carbide Polishing Film 8" diameter

8" PSA Backed Discs

Order No.	Micron Size	Quantity
M-8203-1	0.5	100
M-8221-1	1	100
M-8202-1	2	100
M-8222-1	3	100
M-8223-1	5	100
M-8224-1	9	100
M-8225-1	12	100
M-8226-1	15	100
M-8227-1	20	100
M-8228-1	30	100

8" Plain Backed Discs

Order No.	Micron Size	Quantity
M-8403-1	0.5	100
M-8421-1	1	100
M-8402-1	2	100
M-8422-1	3	100
M-8423-1	5	100
M-8424-1	9	100
M-8425-1	12	100
M-8426-1	15	100
M-8427-1	20	100
M-8428-1	30	100

Aluminum Oxide Polishing Film 8" diameter

8" PSA Backed Discs

Order No.	Micron Size	Quantity
M-8210-1	0.05	100
M-8221-1	0.3	100
M-8229-1	0.5	100
M-8212-1	1	100
M-8213-1	2	100
M-8214-1	3	100
M-8215-1	5	100
M-8216-1	9	100
M-8217-1	12	100
M-8218-1	15	100
M-8219-1	25	100
M-8220-1	30	100
M-8240-1	40	100
M-8260-1	60	100

8" Plain Backed Discs

Order No.	Micron Size	Quantity
M-8410-1	0.05	100
M-8421-1	0.3	100
M-8429-1	0.5	100
M-8412-1	1	100
M-8413-1	2	100
M-8414-1	3	100
M-8415-1	5	100
M-8416-1	9	100
M-8417-1	12	100
M-8418-1	15	100
M-8419-1	25	100
M-8420-1	30	100
M-8440-1	40	100
M-8460-1	60	100

ULTRAFILM Polishing Film 8" (203mm) Plain & PSA backed

8" PSA Backed Discs

Order No.	Micron Size	Quantity
M-8250-1	ULTRAFILM B	100
M-8251-1	ULTRAFILM 1	100
M-8252-1	ULTRAFILM 2	5
M-8253-1	ULTRAFILM 3	5
M-8254-1	ULTRAFILM 4	5

8" Plain Backed Discs

Order No.	Micron Size	Quantity
M-8450-1	ULTRAFILM B	100
M-8451-1	ULTRAFILM 1	100
M-8452-1	ULTRAFILM 2	5
M-8453-1	ULTRAFILM 3	5
M-8454-1	ULTRAFILM 4	5

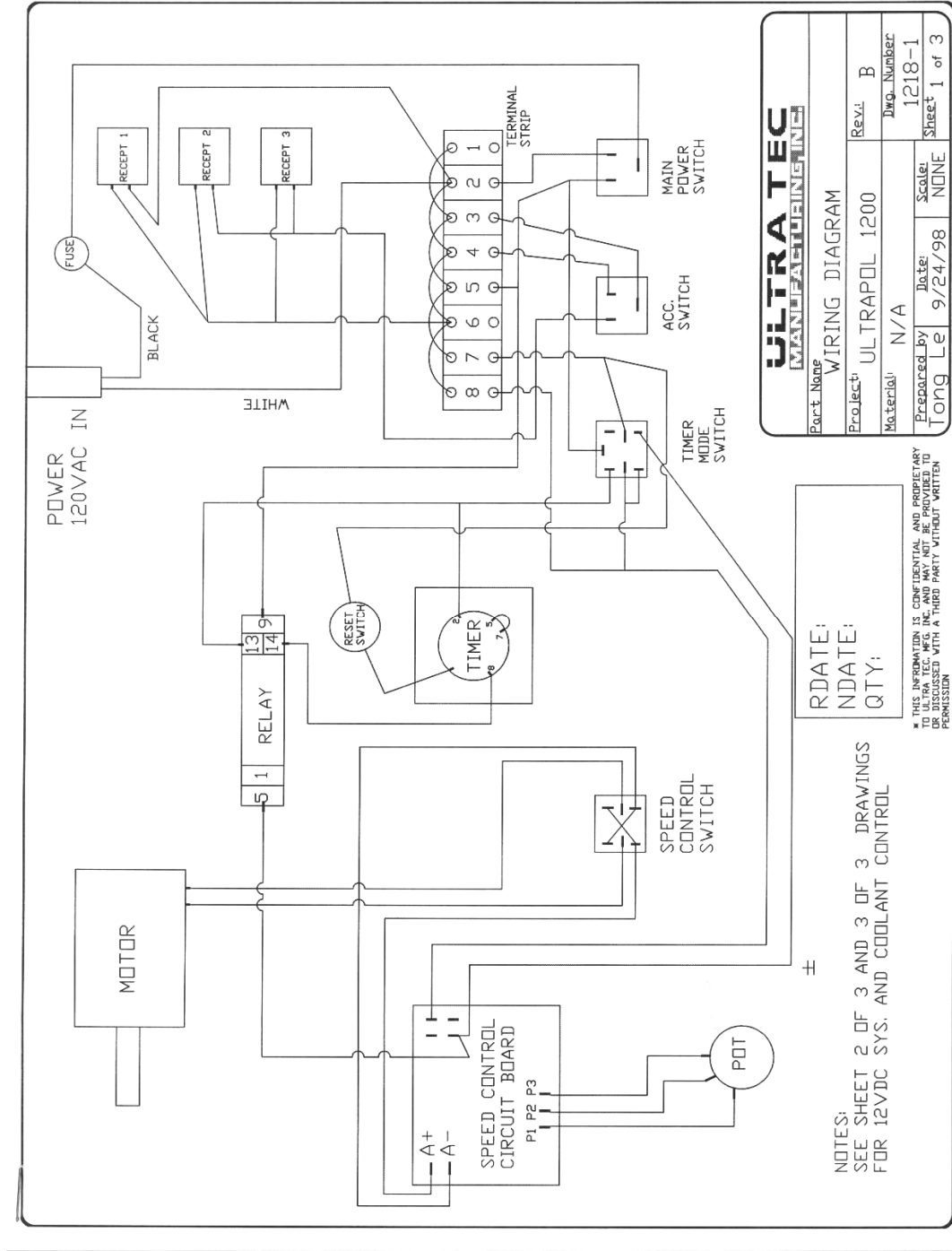
Appendix B : LAPPING AND POLISHING PLATES AND PADS FOR ULTRAPOL

Part No.	Description
Electrometallic (Plated) Diamond 8" Plates	
6-2218-1	100 Mesh
6-2219-1	180 Mesh
6-2220-1	54 micron, 260 Mesh
6-2217-1	42 micron, 360 Mesh
6-2221-1	30 micron, 600 Mesh
6-2222-1	15 micron, 1200 Mesh
6-2223-1	6 micron, 3000 Mesh
Sintered Diamond 8" Plates	
6-2271-1	120 Mesh
6-2272-1	42 micron, 360 Mesh
6-2273-1	15 micron, 1200 Mesh
8" Polishing Plates	
6-2231-1	Phenolic Surface
6-2237-1	Ceramic Surface
6-2238-1	Tin Surface
6-2234-1	Steel Surface
6-2254-1	Tin-Lead Surface
6-2239-1	Aluminum, lapped and anodized (spare item for plate supplied with system)
Resilient Surface Pads	
5-2390-1	Resilient Surface Pad, 8 inch diameter (Each)
5-2390-5	Resilient Surface Pad, 8 inch Diameter (Pack of 3)
	NOTE: The resilient surface pad is used to achieve a PC polish on fiber optic connectors. It is placed onto an anodized aluminum plate (6-2239-1), and then covered by the mylar film to be used.
Fiber Pads	
5-2210-1	Fiber Pad, 8 inch diameter, continuous surface (each)
5-2210-5	Fiber Pad, 8 inch diameter, continuous surface (pack of 5)
	NOTE: These are synthetic soft surface pads for slurry polishing of fiber optic, optic and electro-optic components. They are backed with PSA

Appendix C: Standard Workholders for the ULTRAPOL

Part No.	Description
MATERIALS RESEARCH WORKHOLDERS	
6-2024-11	Encapsulated Mount Workholder (variable 1/2 to 1 1/2" dia mounts)- Quick Release
6-4065-1	SEM Workholder (for wedge polishing)
6-2723-1	Encapsulated Mount Workholder (for 1" diameter samples)
6-2724-1	Encapsulated Mount Workholder (for 1 1/4" dia. samples)
6-2729-1	Encapsulated Mount Workholder (for 1 3/8" dia. samples)
6-2730-1	Encapsulated Mount Workholder (for 1 1/2" dia. samples)
6-4060-1	I.C. Microsectioning Workholder (for small, thin samples)
6-2747-1	1.45" I.C. 90 Degree Microsectioning Workholder
6-2748-1	1.76" I.C. 90 Degree Microsectioning Workholder
6-2751-1	1.45" I.C. 45 Degree Microsectioning Workholder
6-2749-1	1.95" I.C. 90 Degree Microsectioning Workholder
6-2753-1	1.45" I.C. 45 Degree Microsectioning Workholder
OPTICS/ELECTRO-OPTICS WORKHOLDERS	
6-4079-1	Thin Plate Holder (up to 2.5cm length)
6-4079-2	Thin Plate Holder (up to 5cm length)
6-2020-1	Parallel Clamp (specify workpiece size)
6-2021-1	V-clamp Vertical (specify work diameter)
6-4080-1	Block Holder (adjusts 0.5 to 1.0 inch)
6-4080-2	Block Holder (adjusts 2.5 to 6.5 mm)
6-4099-1	Small Block Holder (any direction approx. 15x15x2mm)
HOLLOW SPINDLE WORKHOLDERS (Used with 6-1820-1)	
6-3002-1	Bare Fiber Adapters <330 micron dia. (specify dia.)
6-3002-3	Bare Fiber Adapters >330 micron dia. (specify dia.)
6-3006-1	Parallel Clamp (specify diameter) <=1mm
6-3006-2	Parallel Clamp (specify diameter) 1mm to 2.3mm
6-3006-3	Parallel Clamp (specify diameter) >2.3mm
6-3007-1	Cylindrical Clamp (specify dia. & depth) <=0.7mm dia.
6-3007-2	Cylindrical Clamp (specify dia.& depth) 0.7 to 2.0mm dia.
6-3007-3	Cylindrical Clamp (specify dia. and depth) >2.0mm dia.
6-1806-2	In-line Cylindrical holder for Hollow Spindle
SPARE WORKHOLDERS	
6-2770-1	Quick Release, Plate type holder for Positioning heads
6-2770-2	Quick Release, Block type holder for Positioning heads

APPENDIX D: Wiring Diagram for 110V Machines



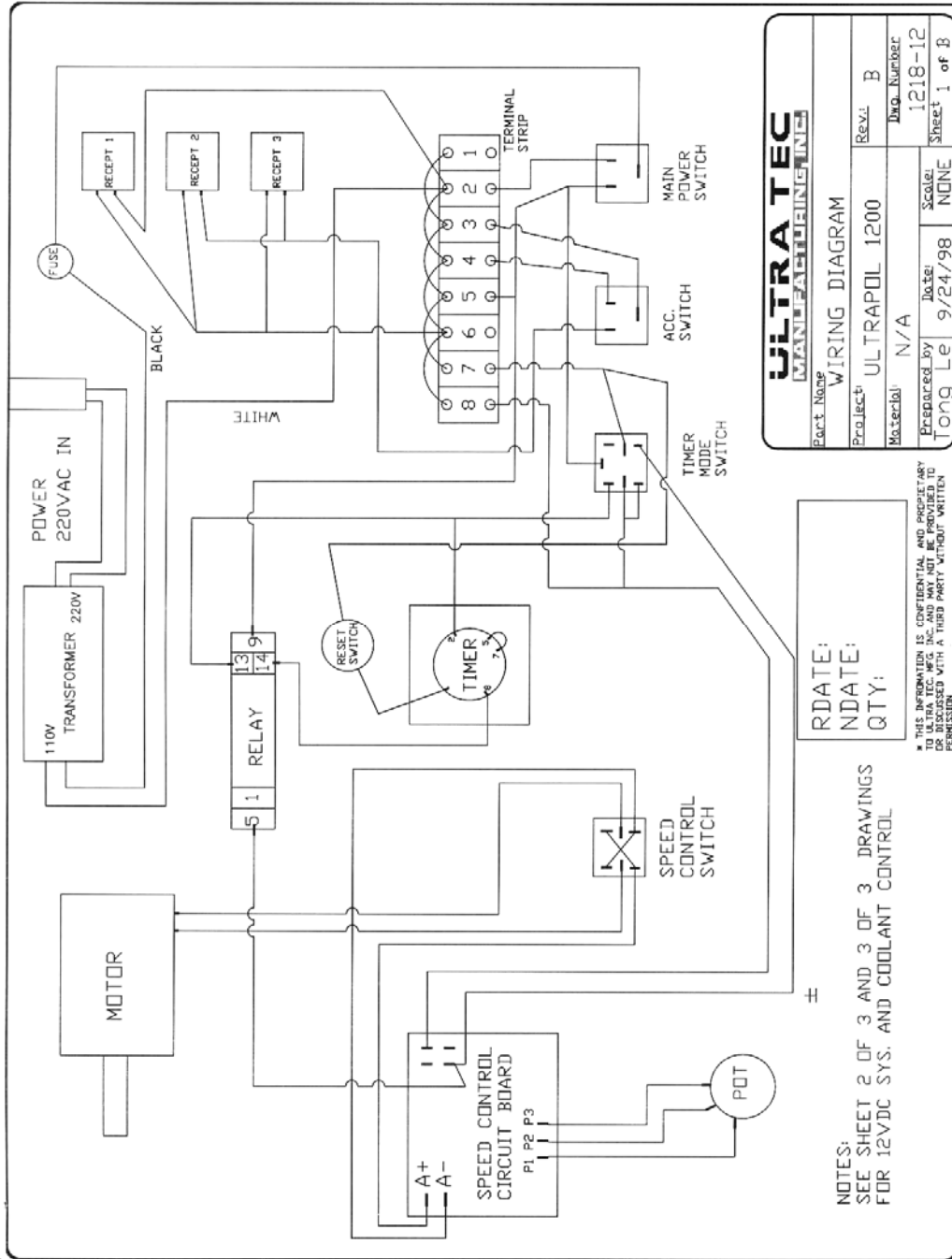
ULTRA TEC MANUFACTURING	
Part Name	WIRING DIAGRAM
Project	ULTRAPOL 1200
Material	N/A
Prepared by	Tong Le
Date	9/24/98
Scale	NONE
Dwg. Number	1218-1
Sheet	1 of 3

RDATE:
NDATE:
QTY:

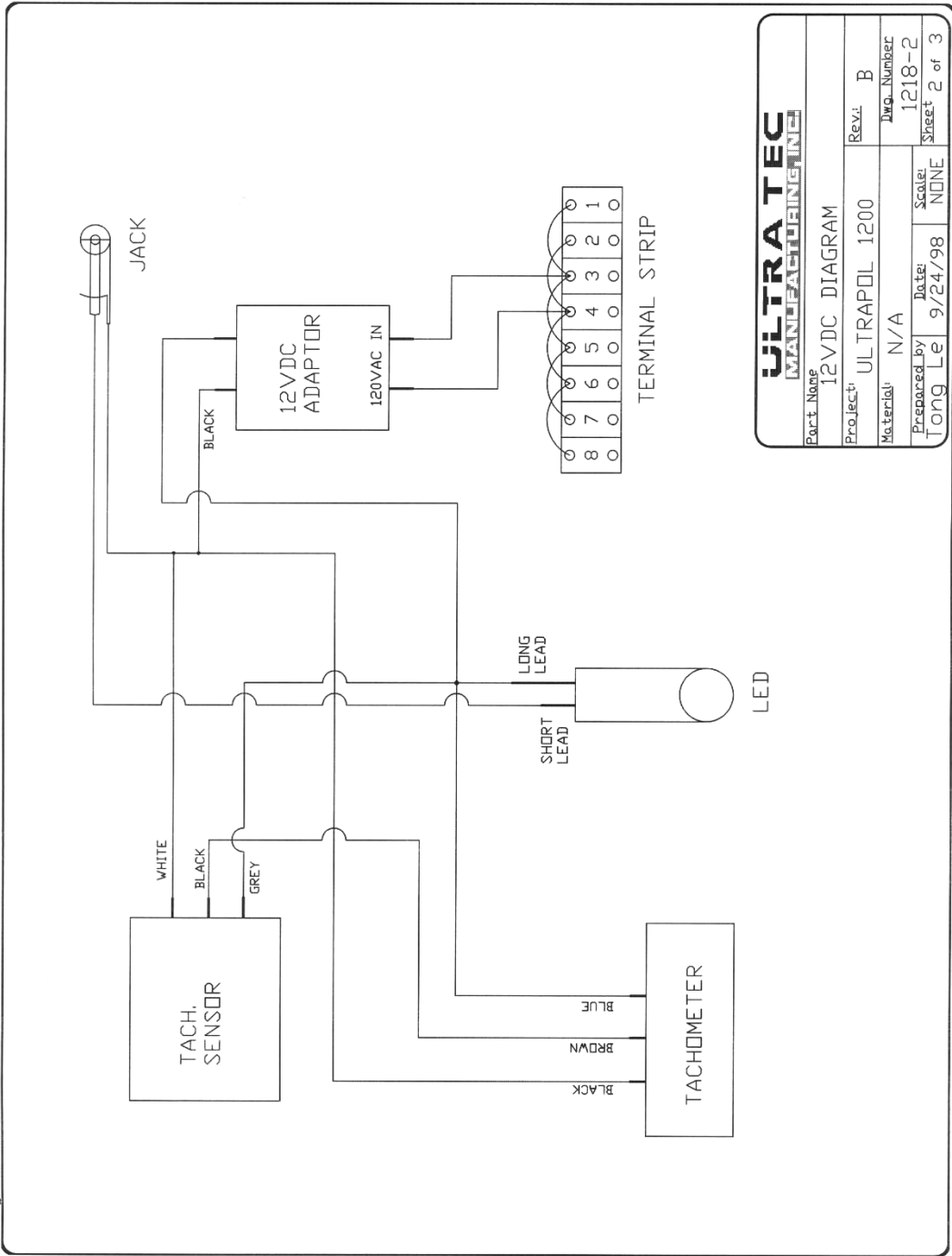
NOTES:
SEE SHEET 2 OF 3 AND 3 OF 3 DRAWINGS
FOR 12VDC SYS. AND COOLANT CONTROL

THIS INFORMATION IS CONFIDENTIAL AND PROPRIETARY
TO ULTRA TEC. IT IS NOT TO BE REPRODUCED OR
DISCUSSED WITH A THIRD PARTY WITHOUT WRITTEN
PERMISSION

APPENDIX E: Wiring Diagram for 220V - 240V Diagrams



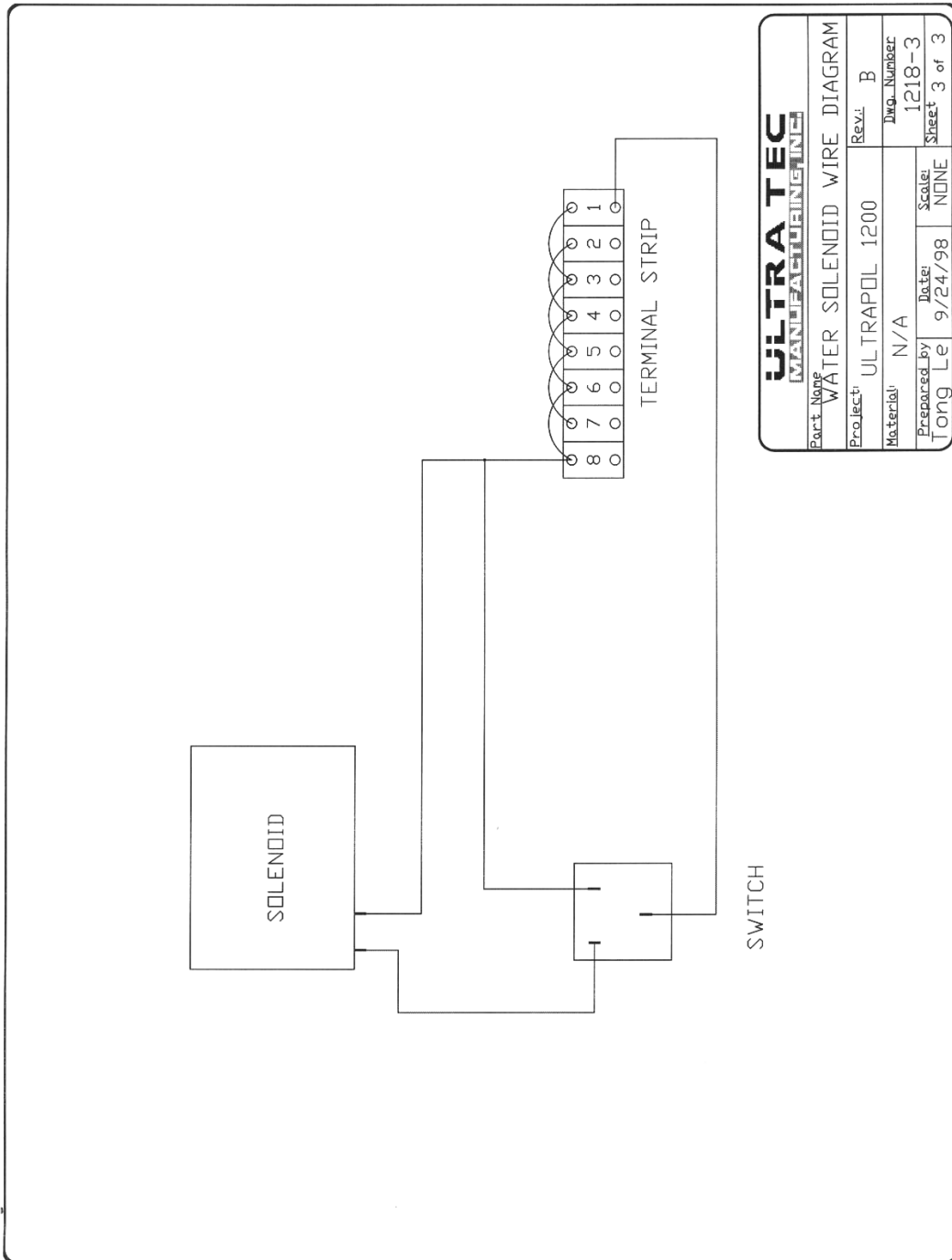
APPENDIX F: Wiring Diagram for 12V Circuit



ULTRA TEC
MANUFACTURING, INC.

Part Name		Rev:	
12VDC DIAGRAM		B	
Project:		Dwg. Number	
ULTRAPOL 1200		1218-2	
Material:		Scale:	
N/A		NONE	
Prepared by	Date:	Sheet	
Tong Le	9/24/98	2 of 3	

APPENDIX G: Wiring Diagram for Coolant Control Circuit



ULTRA TEC MANUFACTURING INC.	
Part Name	WATER SOLENOID WIRE DIAGRAM
Project	ULTRAPOL 1200
Material	N/A
Prepared by	Tong Le
Date	9/24/98
Rev.	B
Dwg. Number	1218-3
Scale	NONE
Sheet	3 of 3