



Pro-X



Operator's Manual

**Model Numbers: 600-0100/A
600-0100/PRT/A**

Revision: D

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Scope of Manual:

This manual contains procedures for safety, general unpacking, set-up, and operation of your DEMTECH Services, Inc. Pro-X Extrusion Welder.

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DEMTECH Services, Inc. assumes no responsibility for any errors that may appear in this manual.

Manual Number: **600-OPERATOR'S MANUAL/PRO-X, Revision: D**

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1 Safety Precautions

Safety precautions for operating personnel and equipment:

WARNING 1: Operating personnel should perform only the procedures described and recommended in this manual. Only qualified service personnel familiar with electrical shock hazards and mechanical entanglement hazards present inside the equipment should perform disassembly or corrective maintenance of the equipment.

WARNING 2: To avoid shock hazards, the equipment must be grounded with an adequate earth ground in accordance with local and national electrical codes.

WARNING 3: The locations of potentially dangerous voltages and other hazards are identified and labeled on the equipment. Be careful to observe these warnings when installing, operating, maintaining or servicing the equipment. Observe all warnings in this manual.

WARNING 4: Make sure to turn off the equipment power and remove the ~ (AC) line cord from the power outlet before attempting to service the equipment. Do not perform service unless you are qualified and trained to do so.

WARNING 5: This product is intended for operator attended operation only. This product should never be left unattended at any time while it is plugged in and the power is turned on. Incorrect use of the product such as overheating of the material can present a fire and explosion hazard, especially near combustible materials and explosive gases.

WARNING 6: This product is intended for operation in dry environments only. Higher humidity environments should be kept non-condensing by avoiding large temperature swings.

WARNING 7: Do not touch the main housing, air nozzle and/or output molten material when they are hot as they can cause burns. After use allow sufficient time for the product to cool to room temperature before handling and stowing. Do not point or direct the hot air flow and the output molten material in the direction of personnel.

CAUTION 1: Observe the precautions given on the equipment and within this manual to prevent damage to the equipment.

CAUTION 2: Before connecting the equipment to its electrical power source, check that the ~ (AC) voltage, frequency and current to be supplied to the equipment are correct and match the serial plate affixed to the system.

CAUTION 3: Use proper handling and packaging procedures for Electro-Static Discharge (ESD) sensitive Printed Circuit Boards (PCB's). Assume that all PCB's are sensitive to potential damage from ESD.

CAUTION 4: Unauthorized personnel should not remove from the equipment those panels or covers that are provided for protection and/or require a tool to remove.

2 General Safety & Maintenance Information

The DEMTECH Services, Inc. Pro-X™ Thermoplastic Extrusion Welder, hereinafter referred to as the Pro-X or welder, is a high temperature and voltage piece of equipment. Always disconnect the power source before performing any service and/or maintenance procedures on the welder. Never lift, pull or carry the welder by the power cord or electrical connection. Always maintain slack in any extension cords connected to the welder while in operation to avoid damage to the power connections. At all times while operating the welder keep hands, fingers and other body parts well clear of the heating element and related mounting components. Always use the Pro-X in a well-ventilated area when welding materials such as PVC which can produce toxic fumes. Do not inhale toxic fumes when present. Do not operate near flammable materials of any kind. Do not apply flammable materials, including liquids, to seam area. Allow welder to cool to room temperature, at least 15 minutes, before returning to the shipping/storage case. Protect welder from exposure to rain or standing water. Never attempt to weld in standing water.

2.1 *Intended Use*

The Pro-X is intended as professional use equipment and is not intended for sale to the general public. The total input power of the Pro-X is specified as greater than 1 kW although in lightly loaded conditions the actual power may be less than 1 kW.

The Pro-X has been manufactured utilizing the latest technology and current safety standards and regulations. However, improper use or abuse may lead to hazardous conditions for the user or other personnel or cause damage to the welder.

Always keep this manual with the welder at or near the location where the Pro-X is being used so that it can be referred to quickly and easily.

The technician assigned to operate this welder must have read through and become familiar with this manual, particularly all safety information, before operating the Pro-X.

No changes and/or modifications shall be made to the Pro-X especially as it relates to safety.

2.2 *Maintenance*

Maintenance, inspection and adjustment of the Pro-X shall only be carried out by qualified personnel. Before removing or installing spare parts or performing other repair operations to the welder, consult DEMTECH Services, Inc. or your authorized DEMTECH service center for advice on proper procedures. This will help insure a safe and successful outcome. Always make sure all screw connections are tight before attempting to operate the welder after maintenance and/or repair procedures. Also make sure all covers, guards, and other safety devices have been fully reinstalled before use.

3 General Product Data

The DEMTECH Services, Inc. Pro-X Thermoplastic Extrusion Welder, hereinafter referred to as the Pro-X or welder, dramatically speeds the welding of plastic sheet materials utilizing molten plastic. This function, combined with its simple construction and easy-to-use controls, makes performing welding tasks very efficient. With minimal setup, the welder speeds up processing time while providing a very rugged and reliable welder. You can be assured that the Pro-X has been built using the highest quality materials available which include billet aluminum and ground and hardened steel. DEMTECH Services, Inc. strives to make our welders easy to use and built to last. Just like all other DEMTECH Services, Inc. products, even a first-time user will be productive in minutes.

4 Operating Environment

The Pro-X is intended to be operated within the following environmental ranges and conditions. Operating the welder in environments which are less than or greater than the nominal values listed can adversely affect performance.

Temperature+32 to +100° Fahrenheit (F); 74° F Nominal
.....(+0 to +38° Centigrade (C); 23°C Nominal)

Humidity0 to 90% (non-condensing); 45% Nominal

Elevation0 to 7,000 Feet; 2,000 Feet Nom
.....(0 to 2,134 meters; 610 meters Nominal)

5 Site Preparation

Before proceeding with the unpacking and installation instructions in the following section(s) make sure the work site is prepared and ready to use the Pro-X. You should have an adequate power source capable of providing clean Alternating Current (AC) power at 220-240 Volts at the rated current. Refer to the welder serial plate affixed to the front side of the controller housing for the voltage and current requirements of your welder. The install and use area should be clean, dry and free of debris and provide adequate working area to allow efficient and effective use of the welder.

Carefully follow the detailed unpacking and installation instructions provided in this manual.

6 Unpacking & Installation Instructions

This section contains instructions for the unpacking, placement and installation of the Pro-X. Carefully review the following information, sub-sections and each procedure before beginning unpacking and installation of the welder.

The Pro-X comes complete in a sturdy, reusable, portable shipping/storage case. The custom foam inserts protect the welder from damage during shipping and storage and should always be left inside the case. When the welder is out of the case, make sure to keep the lid closed to avoid dirt, dust, debris and/or water from getting inside. The welder must be removed from the case and placed onto the work site for use. When not in use, the Pro-X should always be stored in the shipping/storage case to protect it from the elements and potential damage.

Note: The welder illustrated in this manual shows ALL available features for the Pro-X, therefore, your welder may vary slightly in appearance from that depicted.

6.1 Unpacking and Preparation

- a. Before opening the shipping/storage case for the first time and unpacking the welder, inspect the outside of the case thoroughly for any signs of mishandling or damage during shipping. Report any damage to the shipping carrier immediately and **do not proceed with unpacking.** You should consult your administration concerning claims for shipping damage. Please notify DEMTECH Services, Inc. or your authorized DEMTECH distributor where the product was purchased in the event of any shipping damage.
- b. Unlatch and open the shipping/storage case lid and inspect inside the case and the welder thoroughly for any signs of mishandling or damage during shipping. Report any damage to the shipping carrier immediately and **do not proceed with unpacking.** You should consult your administration concerning claims for shipping damage. Please notify DEMTECH Services, Inc. or your authorized DEMTECH distributor where the product was purchased in the event of any shipping damage.
- c. Make note of the orientation of the welder and packing foam inserts inside the shipping case to facilitate repackaging the welder after use.
- d. To avoid injury to personnel and/or damage to the welder, be sure to use adequate care when lifting and removing or lowering and replacing the welder into the shipping/storage case.

- e. The welder must be removed from the shipping/storage case and placed in an appropriate location suitable for the welding you intend to perform.

6.2 Electrical Plug Connection

- a. The Pro-X is supplied with a power cord, which is permanently connected to the bottom side of the controller housing. Depending on the intended country of use, the plug at the other end of the power cord will vary but, in all cases, must be rated for the voltage and current requirements of the welder. It is highly recommended to use a twist-lock or twist-to-connect type plug with a permanent ground connection. Refer to the welder serial plate affixed to the front of the controller housing for the voltage and current requirements of the welder. Install the power cord plug into an appropriate electrical outlet supplying the proper ~(AC) power. In all cases the connection should only be made to a circuit with a maximum 20A breaker rating.
- b. Verify basic operation of the Pro-X before proceeding with the remainder of the installation. The welder main power rocker switch is white and is located on the front of the controller housing (see Figure 6.1). Toggle the switch to "I" to turn ON the welder. Toggle the switch to "O" to turn OFF the welder.



Figure 6.1

- c. Turn ON the welder. The two temperature controller displays should turn on. Use caution because depending on welder configuration the pre-heat blower motor may start and hot air may exit the pre-heat nozzle. Use caution as the exhaust air can be very hot. This procedure verifies the Pro-X is receiving suitable power and the welder is functioning properly. If the displays power-up as described you are now ready to operate the welder. If the welder does not power-up as described please contact DEMTECH Services, Inc. or your authorized DEMTECH service center.
- d. The operating voltage requirement for the Pro-X is 220-240 Volts ~ (AC) only. This operating voltage range refers to the actual voltage as measured at the welder power cord plug after any extension cords while operating the welder under load. The following procedure should only be performed by a qualified electrician. To measure the voltage under load, connect the welder to any extension cord(s) to be used and the proper ~ (AC) source which may be an in-field generator supplying the power. If applicable, start the generator then turn the welder power switch to the ON position. Turn on the “Pre-Heat” and “Plastic Heat” heaters. Wait for the “Ready to Run” timer to expire. Power the drill motor utilizing the trigger switch. Next, carefully separate the plug at the end of the welder power cord just enough to expose the prongs but without disconnecting the power. Using a digital volt meter measure the voltage under load between the prongs. The measured value must be between 220 and 240 Volts ~ (AC).

Electrical Extension Cords

The Pro-X is capable of welding very long seams. This ability may warrant the use of electrical extension cords. It is imperative to consider the length and wire gauge of any extension cord used, as these factors will ultimately determine the actual welder operating voltage. Extension cords should be a minimum of 12 gauge and regardless of overall length should have a minimum number of plug connections. Table 6.2 lists extension cord gauge and length recommendations.

Conductor Size	<u>3-Wire</u> 10 AWG (5.3 mm ²)	<u>3-Wire</u> 12 AWG (3.3 mm ²)
	500 Feet (152 meters)	250 Feet (76 meters)

Table 6.2 Maximum recommended extension cord lengths.

6.3 Generator Recommendations

When operating the Pro-X using house power from a building circuit use the appropriate plug and power cord configuration. When in-field generators are used they must be rated for a minimum of 5,000 watts, however a rating of 6,500 watts or more is highly recommended in order to obtain the best welder performance and temperature control. As a rule, higher wattage generators provide better welder performance. Keep in mind that the length and wire gauge of any extension cord being used combined with the capacity of the generator ultimately determines the operating voltage and therefore welder performance.

7 Welder Controls

The Pro-X utilizes two temperature controllers located on the main control panel. The upper controller operates the Pre-Heat (Air) temperature, and the lower controller operates the Plastic Heat (Barrel/molten rod) temperature (see Figure 7.1).



Figure 7.1

7.1 Recommended Temperature Settings

Pre-Heat and Plastic Heat temperature settings will vary due to the wide range of variables that can be experienced in the field. For example, ambient temperature, sheet material type, temperature and thickness, wind conditions and other factors are all variables that impact the appropriate temperature settings. These factors make it impractical to create a chart that can universally cover all these varying conditions: Therefore, we recommend contacting DEMTECH Services, Inc. or your authorized DEMTECH distributor where the product was purchased to receive guidance for appropriate settings.

7.2 Setting Pre-Heat Temperature

The upper temperature controller regulates the Pre-Heat temperature. The current Pre-Heat temperature set point is displayed on the smaller green digits to the right of the controller display. The actual Pre-Heat temperature is displayed on the larger green digits to the left of the controller display. To adjust the set point, press the up or down arrow buttons. Once the set point has been adjusted to the desired temperature, allow approximately five minutes for the Pre-Heat temperature to rise or fall and stabilize at the new set point.

7.3 Setting Plastic Heat Temperature

The right temperature controller regulates the Plastic Heat temperature. The current Plastic Heat temperature set point is displayed on the smaller green digits to the right of the controller display. The actual Plastic Heat temperature is displayed on the larger green digits to the left of the controller display. To adjust the set point, press the up or down arrow buttons. Once the set point has been adjusted to the desired temperature, allow approximately five minutes for the welder Barrel temperature to rise or fall and stabilize at the new set point before attempting to feed welding rod. The Pro-X is equipped with electronic cold start protection, which prevents activation of the drill motor until a proper operating temperature has been reached. Feeding welding rod before the welder Barrel temperature has reached set point can cause damage to the drive motor unit.

7.4 Shut-Down Procedure

When all welding operations are complete perform the following procedure to shut-down the Pro-X and ready it for storage.

1. Start the drive motor to cause one or two inches of extrudate to be pumped out of the Welding Shoe exit orifice.
2. Stop the drive motor and allow the extrudate hanging from the exit orifice to cool for several minutes.
3. Cut the welding rod approximately 6-12 inches back from the Feed Port leaving the rod protruding from the Feed Port.
4. Once the extrudate hanging from the Welding Show exit orifice has cooled, use a pair of pliers with insulated handles to pull it from the end of the welder in a twisting motion. This removes all material remaining in the Welding Shoe Assembly area and prevents a “cold plug” from causing problems on next start-up.

Turn OFF the Pre-Heat heater toggle switch located on the back of the green Pre-Heat blower housing by switching to the “O” (OFF) position. Allow the blower to run for several minutes or until the temperature displayed on the Pre-Heat controller display is at 200 °F or below then turn OFF the Pre-Heat blower toggle switch located on the controller main panel.

Unplug the Pro-X AC power cord and allow the welder to cool for at least fifteen (15) minutes. Once safely cooled place the welder into the shipping/storage case.

8 Welder Set-Up & Operation

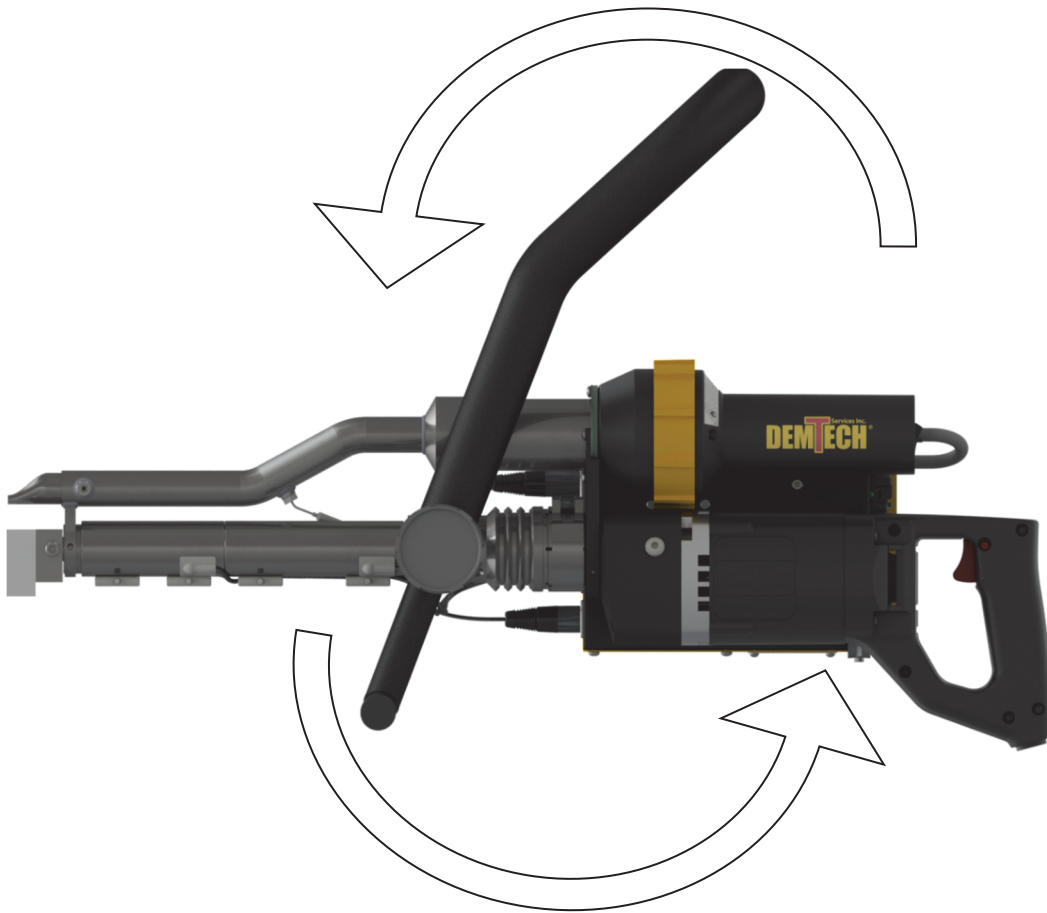
The initial set-up of the Pro-X is by far the most critical aspect for proper welder operation. Proper set-up not only leads to quality welding results but also minimizes wear and tear on the welder itself. Improper adjusting of the welder can result in excessive wear on critical components.

8.1 Set-Up Preparation

The procedures described in the following sections cover the initial set-up required for welding. Initial operations must be made while the welder is at room temperature.

Install the desired welding shoe onto the end of the welder and orient the shoe and pre-heat shield as necessary for the welding to be performed (refer to Section 8.7).

Adjust the grip handle to the best position for the welding to be performed (see Figure 8.1). Loosen the handle by gripping it and twisting counter-clockwise. This will loosen the handle clamp. Position the handle within its 180° swing and tighten the handle clamp by twisting the handle clockwise.

**Figure 8.1**

The welder contains a **cold start protection** feature that prevents operation of the drill motor before the welder has reached the proper operating temperature. To prepare the welder for operation set the Pre-Heat and Plastic Heat temperatures. These settings will vary depending on the material to be welded and the ambient environment. Operating experience will dictate the proper setting. Once set turn ON the Pre-Heat and Plastic Heat by switching the toggle switches on the welder front panel.

8.2 *Start a Weld*

Once the welder has stabilized at the operating temperature insert the end of the welding rod into the feed port while simultaneously powering the drill motor (see Figure 8.2). Once the welding rod starts to feed it will continue to self-feed as you weld. The welder drill motor should only be operated when welding rod is being continuously fed into the welder and should never be run dry. Direct the pre-heat nozzle toward the area to be welded. Pre-warm the welding zone with back-and-forth movements of the welder tip. Position the welder on the prepared welding zone and operate the drill motor trigger switch.



Figure 8.2

8.3 *During a Weld*

Keep the welding rod being fed into the welder clean and dry. Foreign material such as dust, dirt, sand and water droplets introduced into the feed port can cause premature wear to the welder.

For long welds the Pro-X drill motor has a locking pin which allows you to lock the drill motor trigger switch in the ON position.

Further adjustments of the Pre-Heat and Plastic Heat temperatures may be required.

8.4 *Stop a Weld*

To stop welding either release the drill motor trigger or if trigger is locked "ON" pull and release trigger to stop.

If there is going to be a short pause before the next weld, clear the excess molten plastic (refer to Section 8.5) from the tip of the shoe to prevent it from cooling and inadvertently blocking the welder output. If there is going to be a long pause before the next weld it is recommended that the welding rod be cut at the feed port and the plastic within the barrel run out the nozzle. This procedure should also be followed before shutting down the welder in preparation for cooling and storage.

8.5 *Between Welds*

After the drill motor is stopped if there is going to be a short pause before the next weld, depending on the length of time the excess plastic protruding from the tip can cool and block the welder output. Before the next weld is begun this plastic "plug" must be removed. Take caution as the plastic is still hot. Use a pair of pliers with insulated handles to perform this procedure. Grab the tip of extrudate protruding from the welding shoe and pull. This will remove a small plug of semi-cooled extrudate with a bit of molten plastic at the end.

With the Plastic Heat enabled the plastic inside the barrel will continue to melt. If the welder sits idle between welds for 30 seconds or more this causes the plastic in the barrel to become "overheated". Before beginning the next weld, it is important to purge this overheated plastic from the barrel. This should be done off to the side of the work area by activating the drill motor for a sufficient period to push out any "old" plastic and refill the barrel with "new" plastic. This procedure assures good and consistent welds throughout the work shift.

8.6 *Checking the Output Temperature*

The temperatures of the extruded material and pre-heat air stream should be verified at regular intervals while performing welds over an extended period. An appropriate high-speed electronic temperature meter with matching temperature probes must be used when performing these measurements. To measure the extruded material temperature, place the probe up into the nozzle opening at the center of the output stream. To measure the pre-heat air stream temperature, place the probe up into the slot on the top of the shoe underneath the shield at the center of the output stream (see Figure 8.3).

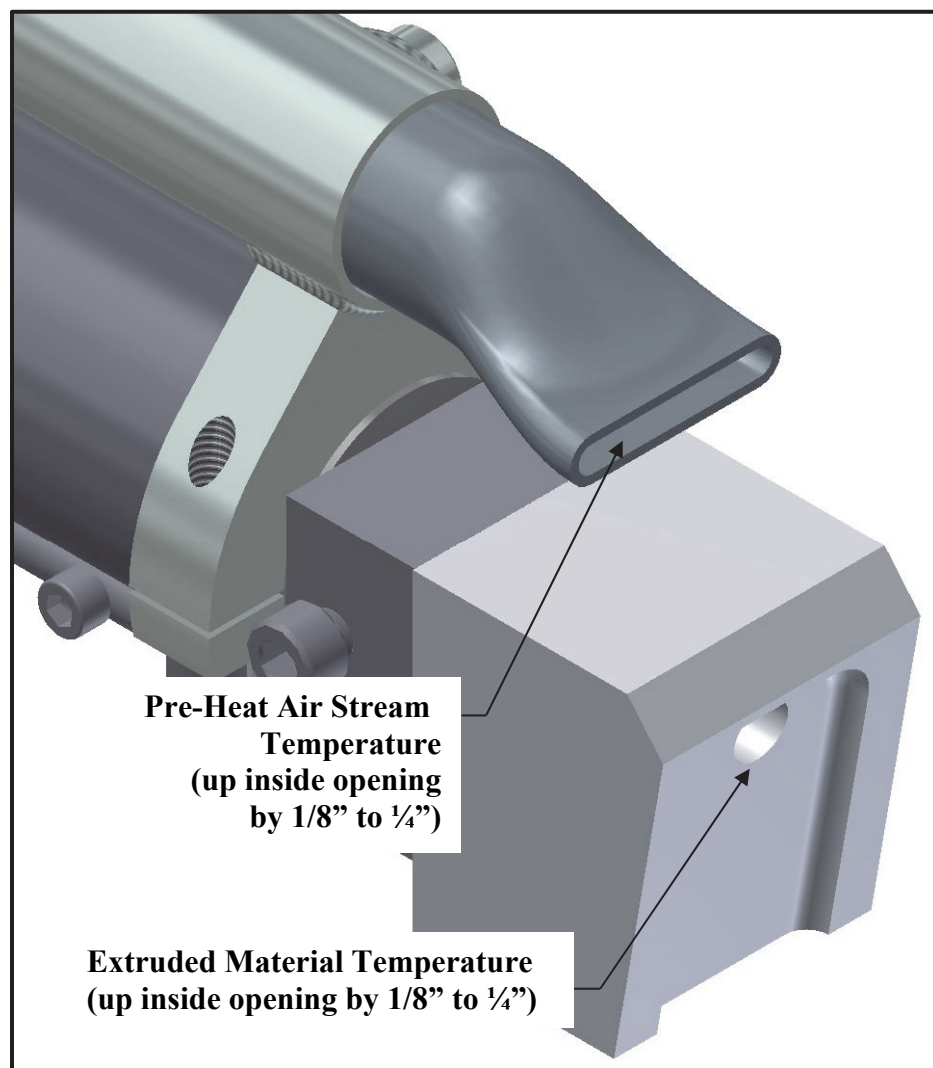


Figure 8.3

8.7 *Changing the Welding Shoe*

Make sure to turn off the Pre-Heat and Plastic Heat, allow the extruder to cool to room temperature then remove the ~ (AC) line cord from the power outlet before attempting to service the equipment. Do not perform service unless you are qualified and trained to do so.

- a. Using a 5mm hex wrench remove the two socket head cap Screws, part number 605-018, from the Welding Shoe Assembly. The Shoe Assembly may be one of the following: TS-605-B/A, TS-605-60/A or TS-605-0500/A (see Figures 8.4 and 8.5).

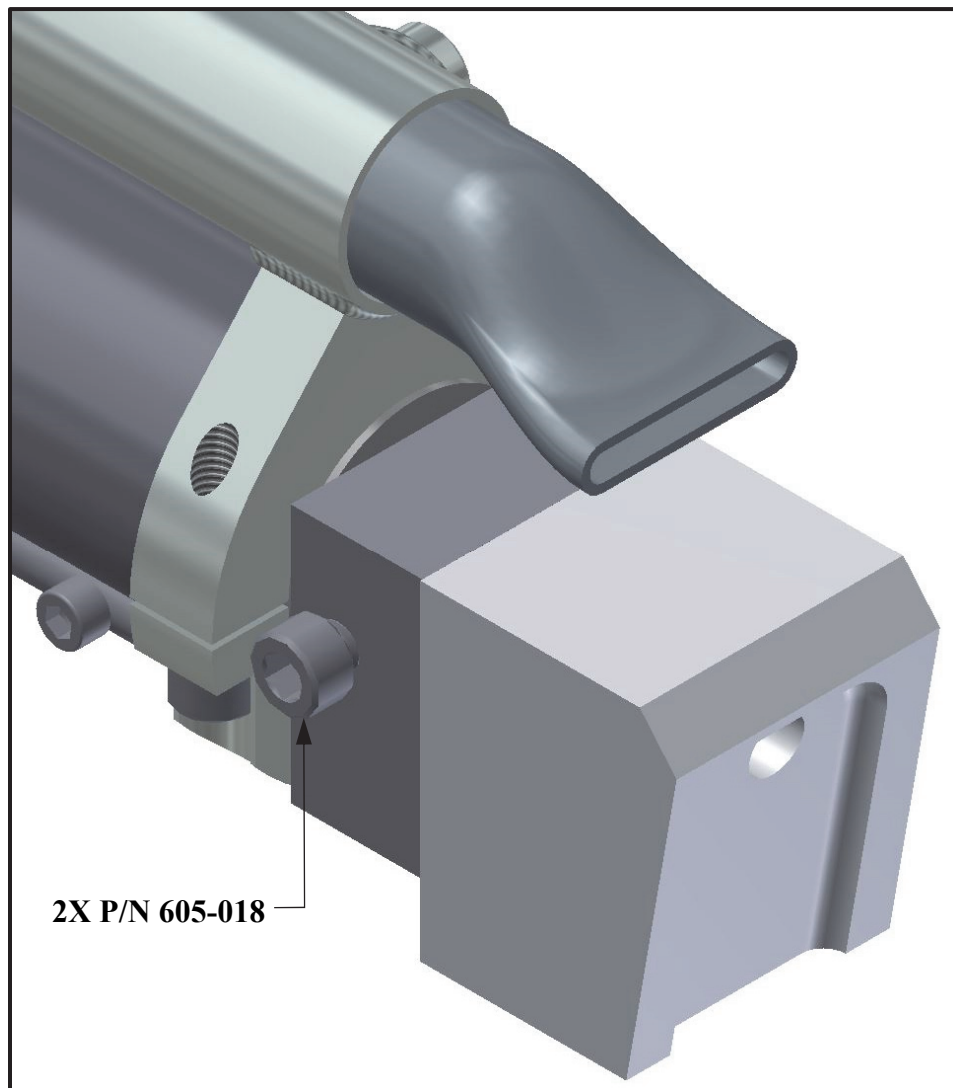


Figure 8.4

- b. Remove the Shoe Assembly from the Nozzle, part number 605-017. Due to melted plastic material buildup removal may require strong twisting clockwise-to-counterclockwise, wiggling from side-to-side and substantial pulling force to remove (see Figure 8.5).

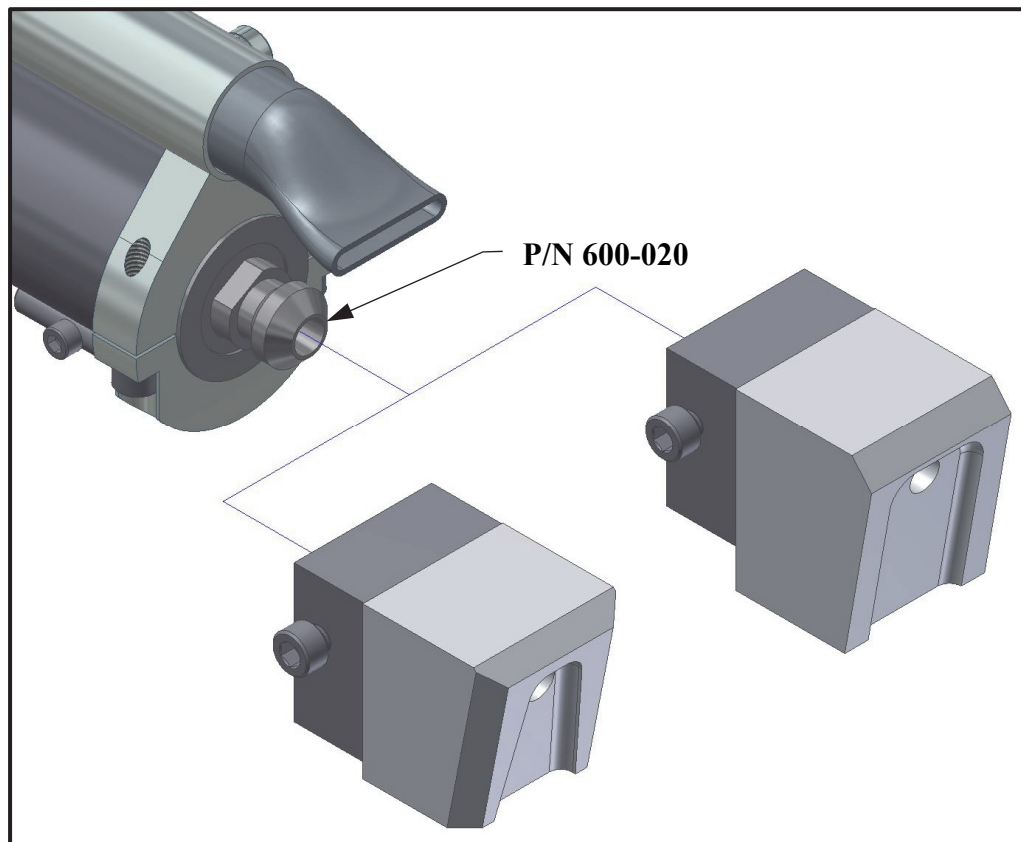


Figure 8.5

- c. Clean any residual melted plastic material from the Welding Shoe Assembly and Nozzle to facilitate and ease reinstallation of the new Shoe Assembly.
- d. Install the new Welding Shoe Assembly in the reverse order.

9 Factory Servicing

In the event your Pro-X should require factory service, the entire welder needs to be returned to the factory. Refer to the following step for preparing the Pro-X for return.

Carefully pack the Pro-X in the reusable portable shipping/storage case provided with the welder for return to DEMTECH Services, Inc.'s factory for service. Unless previous arrangements are made, shipping charges and insurance are the responsibility of the customer. Ship the packaged Pro-X to DEMTECH Services, Inc. at:

DemTech Services, Inc
Ship to address: 6414 Capitol Avenue
Diamond Springs, CA 95619
U.S.A.

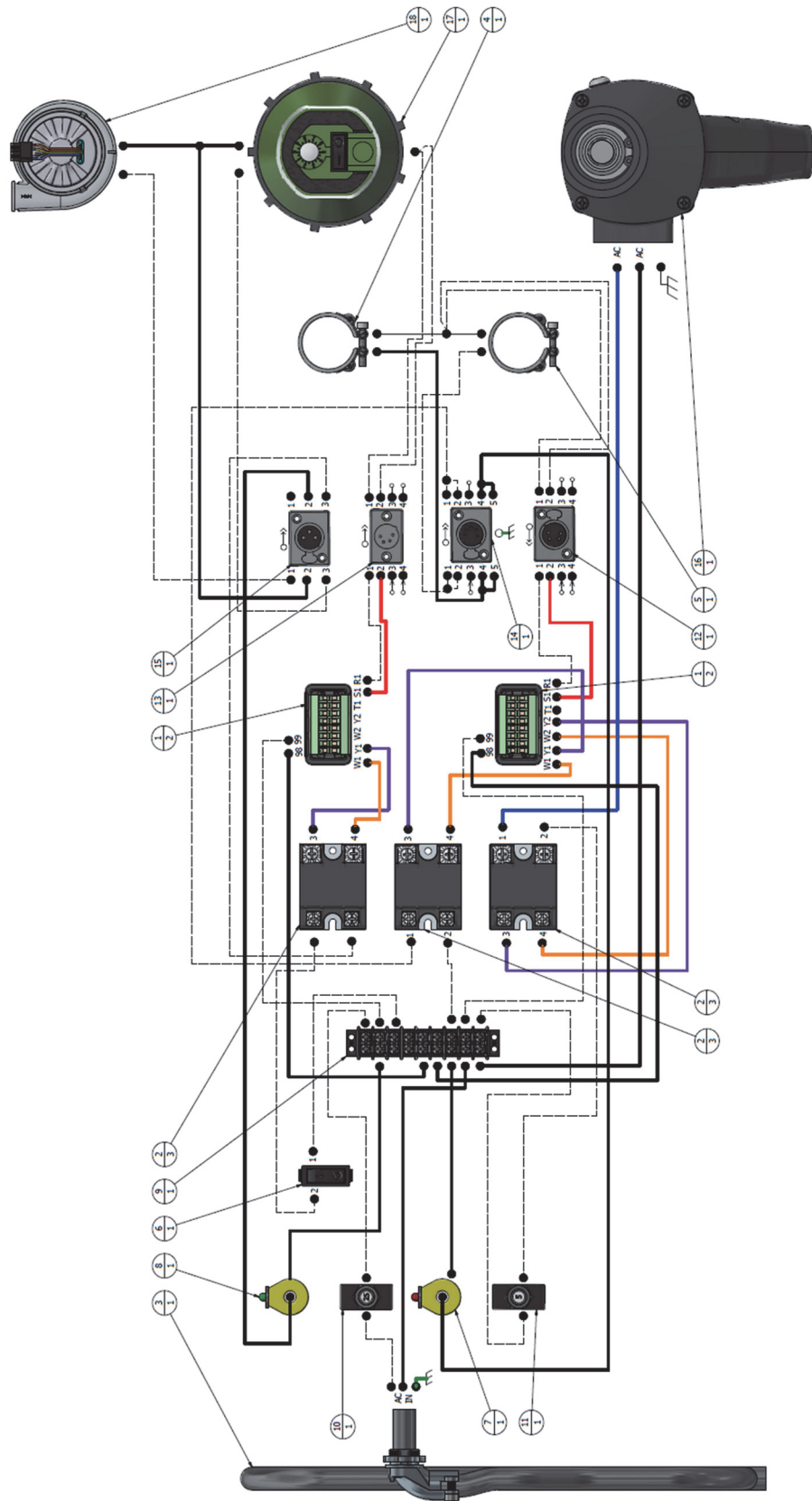
10 Welder Wiring Diagram

Refer to Diagram 11.1 for the Pro-X Welder Wiring Interconnect Diagram.

Refer to Figure 11.2 for the Pro-X Welder Wiring Parts List.

11 Welder Product Warranty

Refer to Page 21 for the DEMTECH Services, Inc. product warranty.



11.1 600-0100/A/WD – PRO-X WIRING DIAGRAM (Parts ID)

PARTS LIST			
ITEM	PART NO	DESCRIPTION	QTY
1	100-426	CONTROLLER, TEMPERATURE, EZ-ZONE	2
2	100-431	RELAY, SOLID STATE, 25A, 3-32VDC, 240V	3
3	100-475/A	ASSEMBLY, POWER CORD, 120V	1
4	600-03A	HEATER, BARREL, 530 WATT, 240 VAC	1
5	600-03B	HEATER, BARREL, 670 WATT, 240 VAC	1
6	600-06	SWITCH, PRE-HEAT / PLASTIC HEAT	1
7	600-09	CURRENT INDICATOR, RED	1
8	600-10	CURRENT INDICATOR, GREEN	1
9	600-28	TERMINAL STRIP	1
10	600-29	CIRCUIT BREAKER, 25A	1
11	600-29EX	CIRCUIT BREAKER, 5A	1
12	600-39EX	RECEPTACLE, HEAT BAND, T/C	1
13	600-40EX	RECEPTACLE, PRE HEAT, T/C	1
14	600-41EX	RECEPTACLE, HEATBAND	1
15	600-42EX	RECEPTACLE, PREHEATER	1
16	600-DRILL/A	ASSEMBLY, DRILL MOTOR COMPLETE, PRO-X	1
17	600-PREHEAT/ERON	PRE-HEATER, ERON, 230V, 2300W	1
18	605-E004	BLOWER, MINIATURE RADIAL, 70 X 45.7mm, 24 VDC	1

11.2 600-0100/A/WD – PRO-X WIRING DIAGRAM (Parts List)

Warranty

DEMTECH Services, Inc. warrants all equipment of its manufacture to be free from defects in materials, workmanship, mechanical parts, and labor for a period of one year from the date of shipment to the original buyer and ninety days for electrical. This warranty excludes normal wear items such as gears, bearings and chains. The liability under this warranty is limited to replacement parts and labor on equipment when the equipment is returned prepaid to the factory or its authorized service center with prior authorization from DEMTECH Services, Inc., and upon examination by DEMTECH Services, Inc., is determined to be defective. At DEMTECH Services, Inc.'s option, a service representative may be dispatched to the equipment location.

As an additional protection, DEMTECH Services, Inc. warrants that for a period of 90 days from the date of shipment to the original buyer, pending prior authorization from DEMTECH Services, Inc., there will be no charge for service related shipping of parts and/or equipment or for authorized travel of a service representative to the equipment location. After 90 days, all costs incurred for shipping the equipment or parts thereof or for travel are the responsibility of the buyer. Our warranty for this equipment is rendered void if the unit has been repaired, taken apart or modified, or attempted to be, unless such actions have been taken in accordance with written instructions received from DEMTECH Services, Inc. The warranty is also void if the equipment has been subjected to abuse, accident or other abnormal conditions.

IF ANY FAULT DEVELOPS, THE FOLLOWING STEPS SHOULD BE TAKEN:

1. Notify DEMTECH Services, Inc. by calling 1-888-324-9353. Overseas customers should contact the local DEMTECH authorized service center. Please be prepared with the model number, serial number and full details of the difficulty. Upon receipt of this information, service data or shipping instructions will be provided by DEMTECH Services, Inc. Do not return the unit for repair without first contacting the factory or its representative for instructions.
2. After the initial 90 day period, on receipt of shipping instructions, forward the equipment prepaid to the factory or its authorized service center as instructed. If requested, an estimate of the charges will be made before work begins, especially with those cases where the DEMTECH Services, Inc. product is not covered by the warranty.
3. If the original carton and packing are not available, the product should be packed in a container with a strong exterior and surrounded by a protective layer of shock-absorbing material. DEMTECH Services, Inc. advises returning the equipment at full value to the carrier.

DEMTECH Services, Inc. reserves the right to make changes in design at any time without incurring any obligation to install the same changes on units previously purchased.

This warranty states the essence of the obligations or liabilities on the part of DEMTECH Services, Inc. THE FORMAL, COMPLETE AND EXCLUSIVE STATEMENT OF DEMTECH SERVICES, INC.'S WARRANTY IS CONTAINED IN ITS QUOTATIONS, ACKNOWLEDGEMENTS AND INVOICES. DEMTECH Services, Inc. neither assumes, nor authorizes any person to assume for it, any liability in connection with the sale of its equipment other than those set forth herein.