



SL60QD 	OUTPUT DC	MAX OUTPUT 60 AMPS	VOLTAGE 208- 460V	VOLTAGE 460V	VOLTAGE 600V
				INPUT POWER 1 PHASE 	INPUT POWER 3 PHASE

CutMaster® 58

PLASMA CUTTING SYSTEM

OPERATING MANUAL



Art # A-13750_AB

Revision: AA	Issue Date: 11-07-2018	Manual No.: 0-5544
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WE APPRECIATE YOUR BUSINESS!

Congratulations on your new Thermal Dynamics product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency call 1-800-426-1888, or visit us on the web at www.esab.com.

This Operating Manual has been designed to instruct you on the correct use and operation of your Thermal Dynamics product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

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Thermal Dynamics is a Global Brand of manual and automation Plasma Cutting Products for ESAB.

We distinguish ourselves from our competition through market-leading, dependable products that have stood the test of time. We pride ourselves on technical innovation, competitive prices, excellent delivery, superior customer service and technical support, together with excellence in sales and marketing expertise.

Above all, we are committed to developing technologically advanced products to achieve a safer working environment within the welding industry.



WARNING

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment.

While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Plasma Cutting Power Supply
CutMaster™ 58
SL60QD™ 1Torch™
Operating Manual Number 0-5544

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For Material Print Specifications, refer to document 47x1948
Original Publication Date: 11-07-2018
Revision Date:

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Power Supply Serial #: _____

Torch Serial #: _____

**Be sure this information reaches the operator.
You can get extra copies through your supplier.**

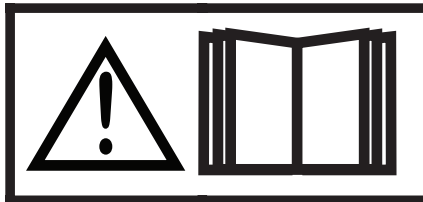
CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Booklet 0-5407. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.



**READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR
OPERATING.
PROTECT YOURSELF AND OTHERS!**

**ASSUREZ-VOUS QUE CETTE INFORMATION EST DISTRIBUÉE À L'OPÉRATEUR.
VOUS POUVEZ OBTENIR DES COPIES SUPPLÉMENTAIRES CHEZ VOTRE FOURNISSEUR.**

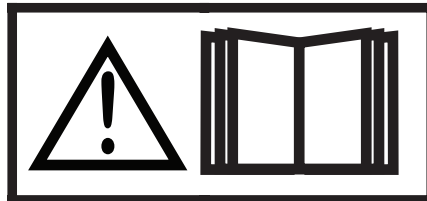
MISE EN GARDE

Les **INSTRUCTIONS** suivantes sont destinées aux opérateurs qualifiés seulement. Si vous n'avez pas une connaissance approfondie des principes de fonctionnement et des règles de sécurité pour le soudage à l'arc et l'équipement de coupage, nous vous suggérons de lire notre brochure « Precautions and Safe Practices for Arc Welding, Cutting and Gouging, » Brochure 0-5407. Ne permettez **PAS** aux personnes non qualifiées d'installer, d'opérer ou de faire l'entretien de cet équipement. Ne tentez **PAS** d'installer ou d'opérer cet équipement avant de lire et de bien comprendre ces instructions. Si vous ne comprenez pas bien les instructions, communiquez avec votre fournisseur pour plus de renseignements. Assurez-vous de lire les Règles de Sécurité avant d'installer ou d'opérer cet équipement.

RESPONSABILITÉS DE L'UTILISATEUR

Cet équipement opérera conformément à la description contenue dans ce manuel, les étiquettes d'accompagnement et/ou les feuillets d'information si l'équipement est installé, opéré, entretenu et réparé selon les instructions fournies. Vous devez faire une vérification périodique de l'équipement. Ne jamais utiliser un équipement qui ne fonctionne pas bien ou n'est pas bien entretenu. Les pièces qui sont brisées, usées, déformées ou contaminées doivent être remplacées immédiatement. Dans le cas où une réparation ou un remplacement est nécessaire, il est recommandé par le fabricant de faire une demande de conseil de service écrite ou par téléphone chez le Distributeur Autorisé de votre équipement.

Cet équipement ou ses pièces ne doivent pas être modifiés sans permission préalable écrite par le fabricant. L'utilisateur de l'équipement sera le seul responsable de toute défaillance résultant d'une utilisation incorrecte, un entretien fautif, des dommages, une réparation incorrecte ou une modification par une personne autre que le fabricant ou un centre de service désigné par le fabricant.



**ASSUREZ-VOUS DE LIRE ET DE COMPRENDRE LE MANUEL D'UTILISATION AVANT
D'INSTALLER OU D'OPÉRER L'UNITÉ.**

PROTÉGEZ-VOUS ET LES AUTRES!

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SECTION 1: GENERAL INFORMATION

1.01 Notes, Cautions and Warnings

Throughout this manual, notes, cautions, and warnings are used to highlight important information. These highlights are categorized as follows:

**NOTE!**

An operation, procedure, or background information which requires additional emphasis or is helpful in efficient operation of the system.

**CAUTION**





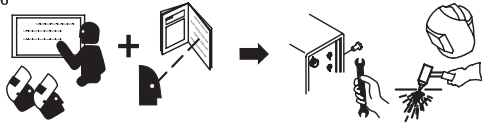

A procedure which, if not properly followed, may cause damage to the equipment.

**WARNING**

A procedure which, if not properly followed, may cause injury to the operator or others in the operating area.

**WARNING**

Gives information regarding possible electrical shock injury.

 				 WARNING	 AVERTISSEMENT
1	1.1	1.2	1.3	1. Cutting sparks can cause explosion or fire. 1.1 Do not cut near flammables. 1.2 Have a fire extinguisher nearby and ready to use. 1.3 Do not use a drum or other closed container as a cutting table.	1. Les étincelles de coupage peuvent provoquer une explosion ou un incendie. 1.1 Ne pas couper près des matières inflammables. 1.2 Un extincteur doit être à proximité et prêt à être utilisé. 1.3 Ne pas utiliser un fût ou un autre contenant fermé comme table de coupage.
2	2.1	2.2	2.3	2. Plasma arc can injure and burn; point the nozzle away from yourself. Arc starts instantly when triggered. 2.1 Turn off power before disassembling torch. 2.2 Do not grip the workpiece near the cutting path. 2.3 Wear complete body protection.	2. L'arc plasma peut blesser et brûler; éloigner la buse de soi. Il s'allume instantanément quand on l'amorce. 2.1 Couper l'alimentation avant de démonter la torche. 2.2 Ne pas saisir la pièce à couper de la trajectoire de coupage. 2.3 Se protéger entièrement le corps.
3	3.1	3.2	3.3	3. Hazardous voltage. Risk of electric shock or burn. 3.1 Wear insulating gloves. Replace gloves when wet or damaged. 3.2 Protect from shock by insulating yourself from work and ground. 3.3 Disconnect power before servicing. Do not touch live parts.	3. Tension dangereuse. Risque de choc électrique ou de brûlure. 3.1 Porter des gants isolants. Remplacer les gants quand ils sont humides ou endommagés. 3.2 Se protéger contre les chocs en s'isolant de la pièce et de la terre. 3.3 Couper l'alimentation avant l'entretien. Ne pas toucher les pièces sous tension.
4	4.1	4.2	4.3	4. Plasma fumes can be hazardous. 4.1 Do not inhale fumes. 4.2 Use forced ventilation or local exhaust to remove the fumes. 4.3 Do not operate in closed spaces. Remove fumes with ventilation.	4. Les fumées plasma peuvent être dangereuses. 4.1 Ne pas inhaler les fumées. 4.2 Utiliser une ventilation forcée ou un extracteur local pour dissiper les fumées. 4.3 Ne pas couper dans des espaces clos. Chasser les fumées par ventilation.
5	5.1			5. Arc rays can burn eyes and injure skin. 5.1 Wear correct and appropriate protective equipment to protect head, eyes, ears, hands, and body. Button shirt collar. Protect ears from noise. Use welding helmet with the correct shade of filter.	5. Les rayons d'arc peuvent brûler les yeux et blesser la peau. 5.1 Porter un bon équipement de protection pour se protéger la tête, les yeux, les oreilles, les mains et le corps. Boutonner le col de la chemise. Protéger les oreilles contre le bruit. Utiliser un masque de soudeur avec un filtre de nuance appropriée.
6				6. Become trained. Only qualified personnel should operate this equipment. Use torches specified in the manual. Keep non-qualified personnel and children away.	6. Suivre une formation. Seul le personnel qualifié a le droit de faire fonctionner cet équipement. Utiliser exclusivement les torches indiquées dans le manuel. Le personnel non qualifié et les enfants doivent se tenir à l'écart.
7				7. Do not remove, destroy, or cover this label. Replace if it is missing, damaged, or worn.	7. Ne pas enlever, détruire ni couvrir cette étiquette. La remplacer si elle est absente, endommagée ou usée.

Art # A-13294

SECTION 2 SYSTEM: INTRODUCTION

2.01 How To Use This Manual

This Owner's Manual applies to Thermal Dynamics® and ESAB CutMaster 58 systems

To ensure safe operation, read the entire manual, including the chapter on safety instructions and warnings.

Throughout this manual, the words WARNING, CAUTION, and NOTE may appear. Pay particular attention to the information provided under these headings. These special annotations are easily recognized as follows:



NOTE!

An operation, procedure, or background information which requires additional emphasis or is helpful in efficient operation of the system.



CAUTION

A procedure which, if not properly followed, may cause damage to the equipment.



WARNING

A procedure which, if not properly followed, may cause injury to the operator or others in the operating area.



WARNING

Gives information regarding possible electrical shock injury. Warnings will be enclosed in a box such as this.

Additional copies of this manual may be purchased by contacting Thermal Dynamics at the address and phone number in your area listed on back cover of this manual. Include the Operating Manual number and equipment identification numbers.

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the ESAB web site listed below and clicking on "Product Support" / "ESAB Documentation": / "Download Library", then navigate to "Plasma Equipment" and then "Manual".

<http://www.esab.com>

2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a data tag attached to the bottom. Equipment which does not have a data tag such as torch and cable assemblies are identified only by the specification or part number printed on loosely attached card or the shipping container. Record these numbers on the bottom of page i for future reference.

2.03 Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to the location in your area listed in the inside back cover of this manual.

Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before un-crating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to un-crate the unit.

2.04 Power Supply Specifications

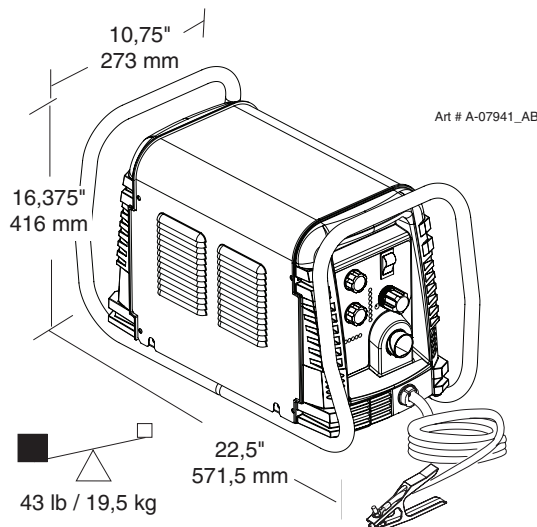
CutMaster 58 Power Supply Specifications				
Input Power	208 / 230 VAC (187 - 253 VAC), Single Phase, 60 Hz			
	230 VAC (187 - 253 VAC), Three Phase, 50/60 Hz			
	380 VAC (360 - 440 VAC), Three Phase, 50/60 Hz			
	400 VAC (360 - 440 VAC), Three Phase, 50/60 Hz			
	460 VAC (414 - 506 VAC), Single Phase, 60 Hz			
	460 VAC (414 - 506 VAC), Three Phase, 60 Hz			
	600 VAC (540 - 630), Three Phase, 60 Hz			
Input Power Cable	Power Supply includes input cable. Cable for 208/230V input power includes molded plug.			
Output Current	20 - 60 Amps, Continuously Adjustable			
Power Supply Gas Filtering Ability	Particulates to 5 Microns			
CutMaster 58 Power Supply Duty Cycle *				
Ambient Temperature	Duty Cycle Ratings @ 40° C (104° F) Operating Range 0° - 50° C			
		IEC Rating		
All Units	Duty Cycle	40%	60%	100%
	Current	60 Amps	50 Amps	30 Amps
	DC Voltage	104	100	92
* NOTE: The duty cycle will be reduced if the primary input power (AC) is low or the output voltage (DC) is higher than shown in this chart.				



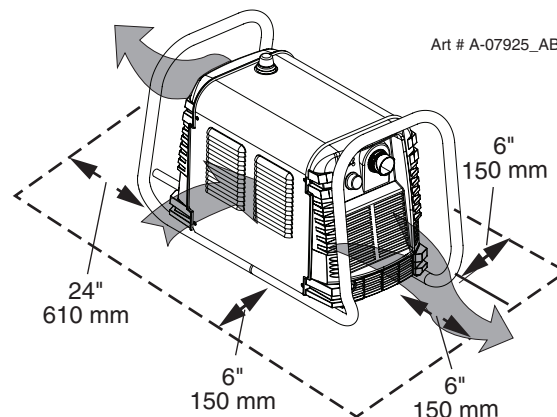
NOTE!

IEC Rating is determined as specified by the International Electro-Technical Commission. These specifications include calculating an output voltage based upon power supply rated current. To facilitate comparison between power supplies, all manufacturers use this output voltage to determine duty cycle.

Power Supply Dimensions & Weight



Ventilation Clearance Requirements



2.05 Input Wiring Specifications

CutMaster 58 Power Supply Input Cable Wiring Requirements							
	Input voltage	Freq	Power Input			Suggested Sizes	
	Volts	Hz	kVA	I max	I _{eff}	Fuse (amps)	Flexible Cord (Min. AWG)
1 Phase	208	60	10.4	47	30	50	10
	230	60	10.8	45	29	50	10
	460	60	15.2	31	20	35	12
3 Phase	208	60	5.4	26	17	30	12
	230	50/60	5.8	24	16	30	12
	380	50/60	6.1	16	11	20	14
	400	50/60	6.4	16	11	20	14
	460	60	7.4	16	10	20	12
	600	60	7.8	13	11	15	12

Line Voltages with Suggested Circuit Protection and Wire Sizes
Based on National Electric Code and Canadian Electric Code

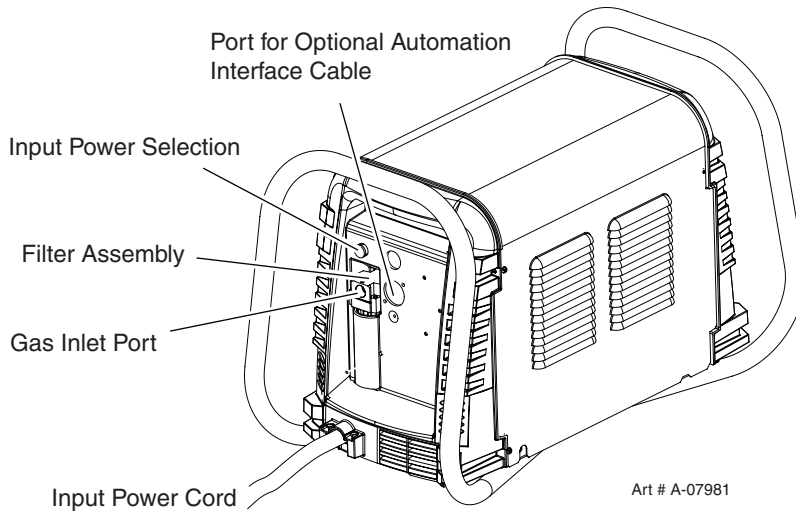
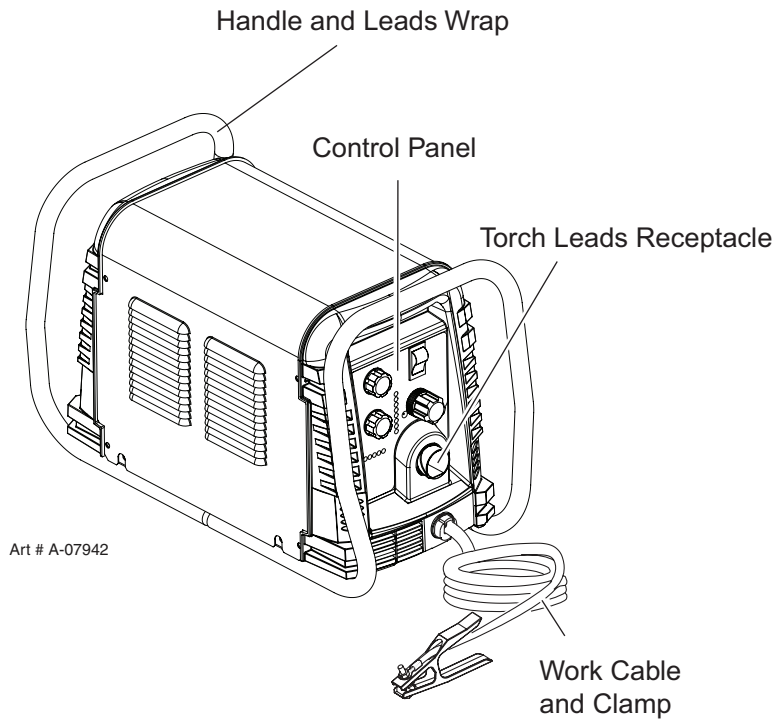


NOTE!

Refer to Local and National Codes or local authority having jurisdiction for proper wiring requirements.

Cable size is de-rated based on the Duty Cycle of the equipment.

2.06 Power Supply Features



SECTION 2 TORCH: INTRODUCTION

2T.01 Scope of Manual


This manual contains descriptions, operating instructions and maintenance procedures for the 1Torch Models SL60, SL60QD™ and SL100/Mechanized Plasma Cutting Torches. Service of this equipment is restricted to properly trained personnel; unqualified personnel are strictly cautioned against attempting repairs or adjustments not covered in this manual, at the risk of voiding the Warranty.

Read this manual thoroughly. A complete understanding of the characteristics and capabilities of this equipment will assure the dependable operation for which it was designed.

2T.02 General Description


Plasma torches are similar in design to the automotive spark plug. They consist of negative and positive sections separated by a center insulator. Inside the torch, the pilot arc starts in the gap between the negatively charged electrode and the positively charged tip. Once the pilot arc has ionized the plasma gas, the superheated column of gas flows through the small orifice in the torch tip, which is focused on the metal to be cut.

A single torch lead provides gas from a single source to be used as both the plasma and secondary gas. The air flow is divided inside the torch head. Single - gas operation provides a smaller sized torch and inexpensive operation.



CAUTION

Torch Leads are flexible but internal wires can be broken. Do not exceed a 2" radius bend and avoid repeated tight bends when possible.



NOTE!

Refer to Section "2T.05 Introduction to Plasma", for a more detailed description of plasma torch operation.

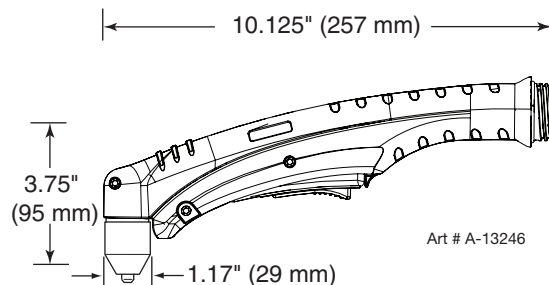
Refer to the Appendix Pages for additional specifications as related to the Power Supply used.

2T.03 Specifications

A. Torch Configurations

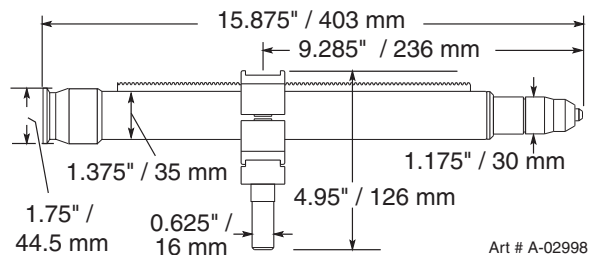
1. Hand/Manual Torch, Model SL60QD™

The hand torch head is at 75° to the torch handle. The hand torches include a torch handle and torch trigger assembly.



2. Mechanized Torch, Model

The standard machine torch has a positioning tube with rack & pinch block assembly.



B. Torch Leads Lengths

Hand Torches are available as follows:

- 20 ft / 6.1 m, with ATC connectors
- 50 ft / 15.2 m, with ATC connectors

Machine Torches are available as follows:

- 5 foot / 1.5 m, with ATC connectors
- 10 foot / 3.05 m, with ATC connectors
- 25 foot / 7.6 m, with ATC connectors
- 50 foot / 15.2 m, with ATC connectors

C. Torch Parts

Starter Cartridge, Electrode, Tip, Shield Cup

D. Parts - In - Place (PIP)

Torch Head has built - in switch

15 VDC circuit rating

E. Type Cooling

Combination of ambient air and gas stream through torch.

F. Torch Ratings

Manual Torch Ratings	
Ambient Temperature	104° F 40° C
Duty Cycle	100% @ 60 Amps @ 400 scfh
Maximum Current	60 Amps
Voltage (V _{peak})	500V
Arc Striking Voltage	500V

Mechanized Torch Ratings	
Ambient Temperature	104° F 40° C
Duty Cycle	100% @ 100 Amps @ 400 scfh
Maximum Current	120 Amps
Voltage (V _{peak})	500V
Arc Striking Voltage	500V

G. Gas Requirements

Manual and Mechanized Torch Gas Specifications	
Gas (Plasma and Secondary)	Compressed Air
Operating Pressure Refer to NOTE	90 - 120 psi 6.2 - 8.3 bar
Maximum Input Pressure	125 psi / 8.6 bar
Gas Flow (Cutting and Gouging)	5 - 8.3 SCFM 300 - 500 scfh 142 - 235 lpm



WARNING

This Torch is not to be used with oxygen (O₂).

The SL60QD torch should not be used on an HF system.



NOTE!

Operating pressure varies with torch model, operating amperage, and torch leads length. Refer to gas pressure settings charts for each model..

H. Direct Contact Hazard

For standoff tip the recommended standoff is 3/16 inches / 4.7 mm.

2T.04 Quick Connection Torch

The new SL60QD™ (Quick Disconnect) torch allows for a quick change of the torch handle assembly from the leads. To change the torch handle assembly do the following.

1. Remove the torch handle assembly by grasping the torch handle in one hand and the coupler nut and leads in the other.
2. Rotate the nut a minimum of one full turn to the left (counter clockwise) and pull the torch handle assembly out from the leads in a straight line.
3. To reattach, grasp both as before and carefully align the internal connecting parts.
4. Carefully press the two together in a straight line.
5. Align the mark on the coupler nut with that on the top of the torch handle and rotate to the right (clockwise) drawing the two together and seating the connections inside. Do not use tools to tighten.

2T.05 Options And Accessories

For options and accessories, see Section 6.

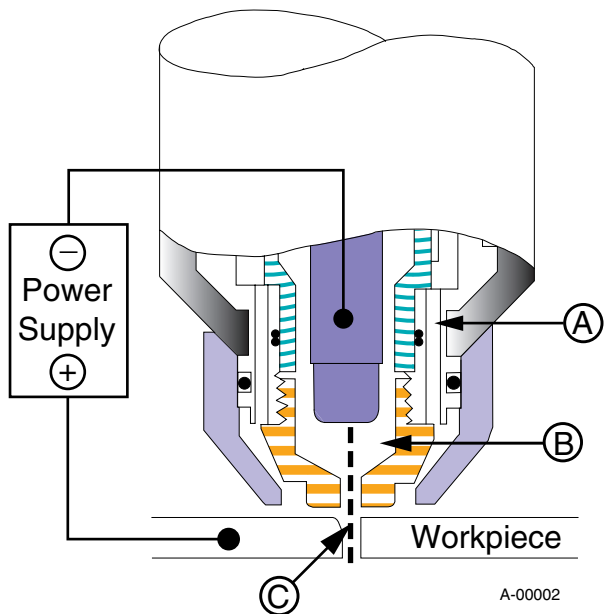
2T.06 Introduction to Plasma

A. Plasma Gas Flow

Plasma is a gas which has been heated to an extremely high temperature and ionized so that it becomes electrically conductive. The plasma arc cutting and gouging processes use this plasma to transfer an electrical arc to the workpiece. The metal to be cut or removed is melted by the heat of the arc and then blown away.

While the goal of plasma arc cutting is separation of the material, plasma arc gouging is used to remove metals to a controlled depth and width.

In a Plasma Cutting Torch a cool gas enters Zone B, where a pilot arc between the electrode and the torch tip heats and ionizes the gas. The main cutting arc then transfers to the workpiece through the column of plasma gas in Zone C.



Typical Torch Head Detail

By forcing the plasma gas and electric arc through a small orifice, the torch delivers a high concentration of heat to a small area. The stiff, constricted plasma arc is shown in Zone C. Direct current (DC) straight polarity is used for plasma cutting, as shown in the illustration.

Zone A channels a secondary gas that cools the torch. This gas also assists the high velocity plasma gas in blowing the molten metal out of the cut allowing for a fast, slag - free cut.

B. Gas Distribution

The single gas used is internally split into plasma and secondary gases.

The plasma gas flows into the torch through the negative lead, through the starter cartridge, around the electrode, and out through the tip orifice.

The secondary gas flows down around the outside of the torch starter cartridge, and out between the tip and shield cup around the plasma arc.

C. Pilot Arc

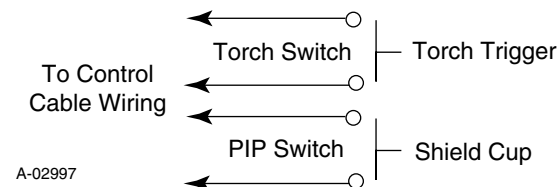
When the torch is started a pilot arc is established between the electrode and cutting or gouging tip. This pilot arc creates a path for the main arc to transfer to the work.

D. Main Cutting Arc

DC power is also used for the main cutting arc. The negative output is connected to the torch electrode through the torch lead. The positive output is connected to the workpiece via the work cable and to the torch through a pilot wire.

E. Parts - In - Place (PIP)

The torch includes a 'Parts - In - Place' (PIP) circuit. When the shield cup is properly installed, it closes a switch. The torch will not operate if this switch is open.



Parts - In - Place Circuit Diagram for Hand Torch

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SECTION 3 SYSTEM: INSTALLATION

3.01 Unpacking

1. Use the packing lists to identify and account for each item.
2. Inspect each item for possible shipping damage. If damage is evident, contact your distributor and / or shipping company before proceeding with the installation.
3. Record Power Supply and Torch model and serial numbers, purchase date and vendor name, in the information block at the front of this manual.

3.02 Lifting Options

The Power Supply includes a handle for **hand lifting only**. Be sure unit is lifted and transported safely and securely.



WARNING

Do not touch live electrical parts.

Disconnect input power cord before moving unit.



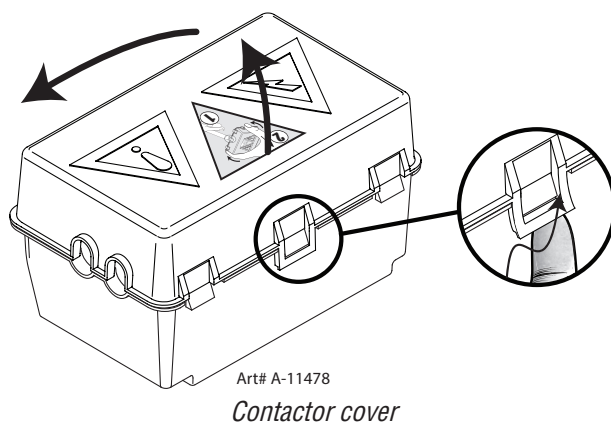
FALLING EQUIPMENT can cause serious personal injury and can damage equipment.

HANDLES are not for mechanical lifting.

- Only persons of adequate physical strength should lift the unit.
- Lift unit by the handles, using two hands. Do not use straps for lifting.
- Use optional cart or similar device of adequate capacity to move unit.
- Place unit on a proper skid and secure in place before transporting with a fork lift or other vehicle.

3.03 Opening the Contactor Cover

The input power cord is connected to the main contactor, the contactor is located inside a box with a snap on cover. The cover is held in place with two or more snap lock tabs. To remove the cover release the front latch and tilt the cover up about 1/2 inch. Then squeeze both sides of the cover and lift it straight up. See the Primary Input Power Connections section for the necessary changes to the Contactor. Remember to replace the Contactor Cover when the changes are complete.



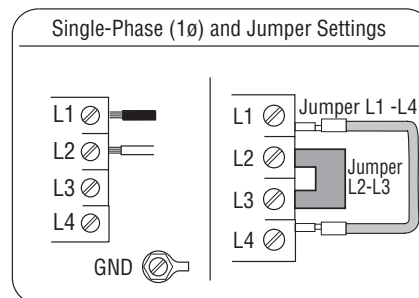
3.04 Primary Input Power Connections



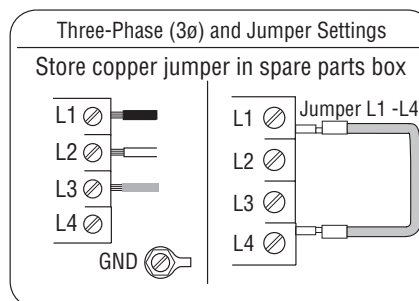
CAUTION

Check your power source for correct voltage before plugging in or connecting the unit. Check the Voltage Selector at the rear of the unit for correct setting before plugging in or connecting the unit. The primary power source, fuse, and any extension cords used must conform to local electrical code and the recommended circuit protection and wiring requirements as specified in Section 2.

Most units are shipped from the factory with a 230Volt input power cable wired to the input contactor in the single - phase configuration. The following illustrations and directions are for changing that configuration to a different voltage and or to three - phase operation or back again if a change had already been made.



Single Phase Input Power Wiring



Three Phase Input Power Wiring



NOTE!

There is only one jumper setting that changes between the single and three phase settings. To change from single phase to three phase, the jumper connected to L2 needs to be removed and placed on the other L3 connection so both ends of the jumper are attached to the same electrical point. See previous illustrations..

A. Connections to Single Phase Input Power



WARNING

Disconnect input power from the power supply and input cable before attempting this procedure.

These instructions are for changing the input power and or cable on the 208/230, 400, 460 VAC Power Supply to Single - Phase input power.

1. Remove the Power Supply cover per instructions found in Section 5.
2. Disconnect the original input power cable from the main input contactor and the chassis ground connection.
3. Loosen the through - hole protector on the back panel of the power supply. Pull the original power cable out of power supply.
4. If the power cable being used is not the factory - supplied cable, use a three - conductor input power cable for the voltage desired and strip back the insulation on the individual wires.
5. Pass the cable being used through the access opening in the back panel of the power supply. Refer to Section 2 for power cable specifications.



CAUTION

The primary power source and power cable must conform to local electrical code and the recommended circuit protection and wiring requirements (refer to table in Section 2).

6. Connect the wires as follows.
 - Set Jumper wires on the contactor. See previous illustrations.
 - Green / Yellow wire to Ground.
 - Remaining wires to L1 and L2 input. It does not matter what order these wires are attached.

7. With a little slack in the wires, tighten the through - hole protector to secure the power cable.
8. Reinstall the Power Supply cover per instructions found in Section 5.
9. Connect the opposite end of individual wires to a customer supplied plug or main disconnect.
10. Connect the input power cable (or close the main disconnect switch) to supply power.

B. Connections to Three Phase Input Power



WARNING

Disconnect input power from the power supply and input cable before attempting this procedure.

These instructions are for changing the input power and or cable on the 208/230, 400, 460 VAC Power Supply to Three - Phase input power.

1. Remove the Power Supply cover per instructions found in Section 5.
2. Disconnect the original input power cable from the main input contactor and the chassis ground connection.
3. Loosen the through - hole protector on the back panel of the power supply. Pull the original power cable out of the power supply.
4. Using a customer supplied four - conductor input power cable for the voltage desired, strip back the insulation on the individual wires.
5. Pass the cable being used through the access opening in the back panel of the power supply. Refer to Section 2 for power cable specifications.



CAUTION

The primary power source and power cable must conform to local electrical code and the recommended circuit protection and wiring requirements (refer to table in Section 2).

The primary power source and power cable must conform to local electrical code and the recommended circuit protection and wiring requirements (refer to table in Section 2).

6. Connect the wires as follows.
 - Set Jumper wires on the contactor. See previous illustrations..
 - Green / Yellow wire to Ground.
 - Remaining wires to L1, L2 and L3 input. It does not matter what order these wires are attached.
7. With a little slack in the wires, tighten the through-hole protector to secure the power cable.
8. Reinstall the Power Supply cover per instructions found in Section 5.
9. Connect the opposite end of individual wires to a customer supplied plug or main disconnect.
10. Connect the input power cable (or close the main disconnect switch) to supply power.

3.05 Gas Connections

Connecting Gas Supply to Unit

The connection is the same for compressed air or high pressure cylinders. Refer to the following two subsections if an optional air line filter is to be installed.

1. Connect the air line to the inlet port. The illustration shows typical fittings as an example.



NOTE!

For a secure seal, apply thread sealant to the fitting threads, according to manufacturer's instructions. Do not use Teflon tape as a thread sealer, as small particles of the tape may break off and block the small air passages in the torch.

Installing Optional Single - Stage Air Filter

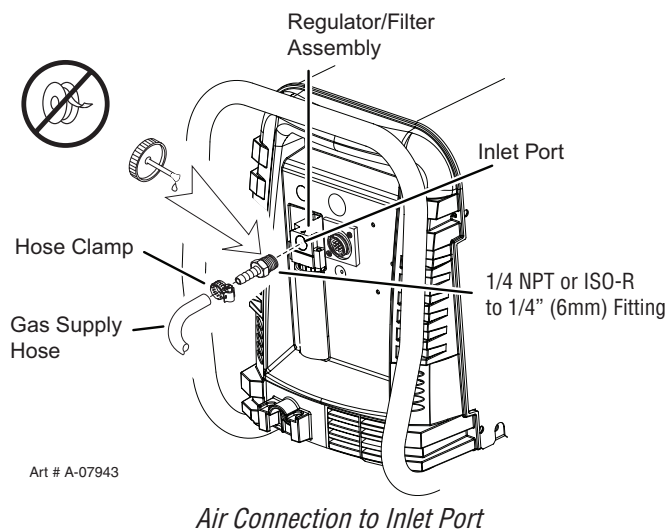
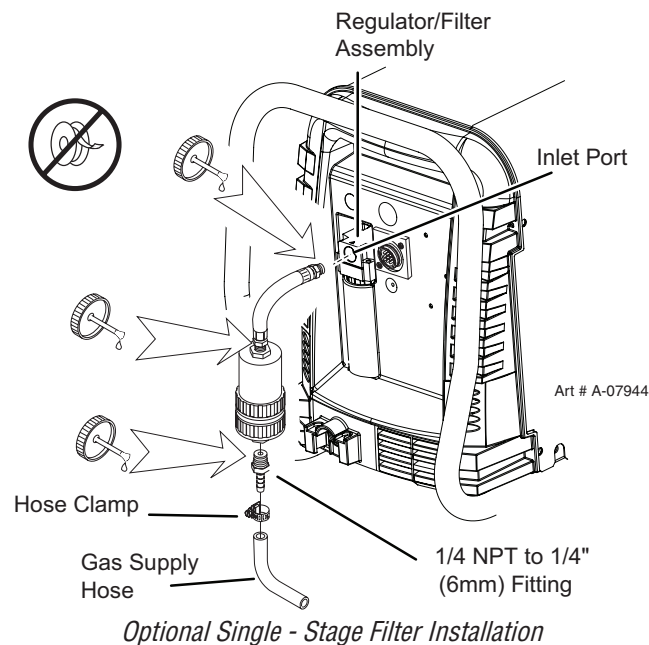
An optional filter kit is recommended for improved filtering with compressed air, to keep moisture and debris out of the torch.

1. Attach the Single - Stage Filter Hose to the Inlet Port.
2. Attach the Filter Assembly to the filter hose.
3. Connect the air line to the Filter. The illustration shows typical fittings as an example.



NOTE!

For a secure seal, apply thread sealant to the fitting threads, according to manufacturer's instructions. Do not use Teflon tape as a thread sealer, as small particles of the tape may break off and block the small air passages in the torch.



Installing Optional Two - Stage Air Filter Kit

This optional two - stage air line filter is also for use on compressed air shop systems. Filter removes moisture and contaminants to at least 5 microns.

Connect the air supply as follows:

1. Attach the Two Stage Filter bracket to the back of the power supply per instructions supplied with the filter assembly.



NOTE!

For a secure seal, apply thread sealant to the fitting threads, according to manufacturer's instructions. Do not use Teflon tape as a thread sealer, as small particles of the tape may break off and block the small air passages in the torch.

2. Connect the two stage filter outlet hose to the inlet port of the Regulator / Filter Assembly.
3. Use customer - supplied fittings to connect the air line to the Filter. A 1/4" NPT to 1/4" hose barbed fitting is shown as an example.

Using High Pressure Air Cylinders

When using high pressure air cylinders as the air supply:

1. Refer to the manufacturer's specifications for installation and maintenance procedures for high pressure regulators.
2. Examine the cylinder valves to be sure they are clean and free of oil, grease or any foreign material. Briefly open each cylinder valve to blow out any dust which may be present.
3. The cylinder must be equipped with an adjustable high - pressure regulator capable of outlet pressures up to 100 psi (6.9 bar) maximum and flows of at least 300 scfh (141.5 lpm).
4. Connect supply hose to the cylinder.

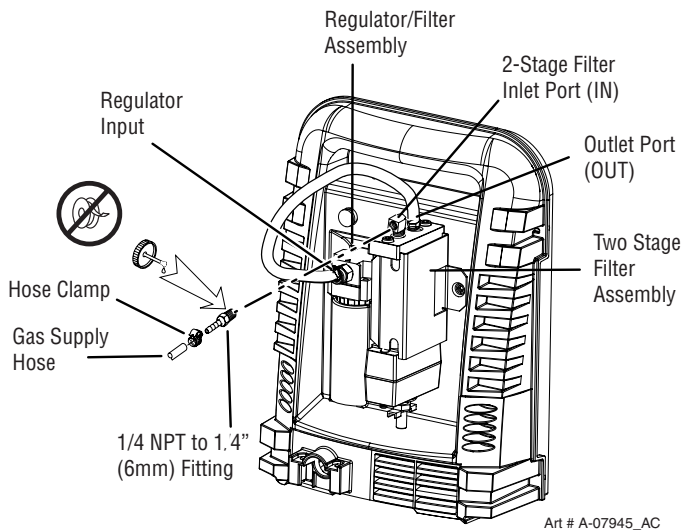


NOTE!

Pressure should be set at 100 psi (6.9 bar) at the high pressure cylinder regulator.

Supply hose must be at least 1/4 inch (6 mm) I.D.

For a secure seal, apply thread sealant to the fitting threads, according to manufacturer's instructions. Do Not use Teflon tape as a thread sealer, as small particles of the tape may break off and block the small air passages in the torch.




Optional Two - Stage Filter Installation

SECTION 3 TORCH: INSTALLATION

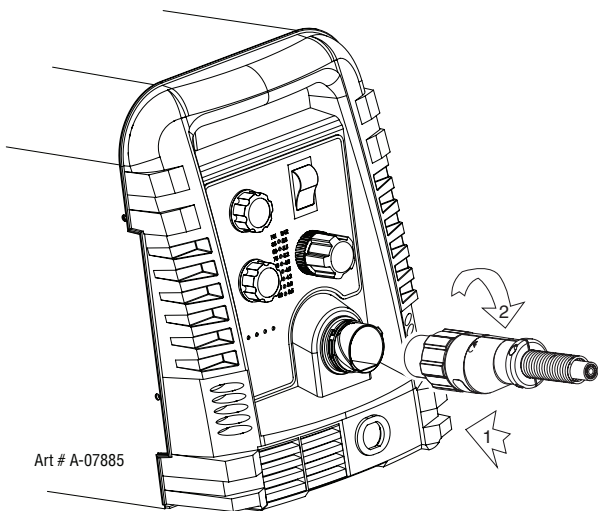
3T.01 Torch Connections

If necessary, connect the torch to the Power Supply. Connect only the ESAB model SL60, SL60QD™ or SL100 / Mechanical Torch to this power supply. Maximum torch leads length is 100 feet / 30.5 m, including extensions.



WARNING
Disconnect primary power at the source before connecting the torch.

1. Align the ATC male connector (on the torch lead) with the female receptacle. Push the male connector into the female receptacle. The connectors should push together with a small amount of pressure.
2. Secure the connection by turning the locking nut clockwise until it clicks. **DO NOT** use the locking nut to pull the connection together. Do not use tools to secure the connection.







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Connecting the Torch to the Power Supply

3. The system is ready for operation.

Check Air Quality


To test the quality of air:

1. Put the ON  / OFF  switch in the ON  (up) position.
2. Put the Function Control switch in the SET  position.

3. Place a welding filter lens in front of the torch and turn ON the air. **Do not start an arc!**

Any oil or moisture in the air will be visible on the lens.

3T.02 Setting Up Mechanical Torch



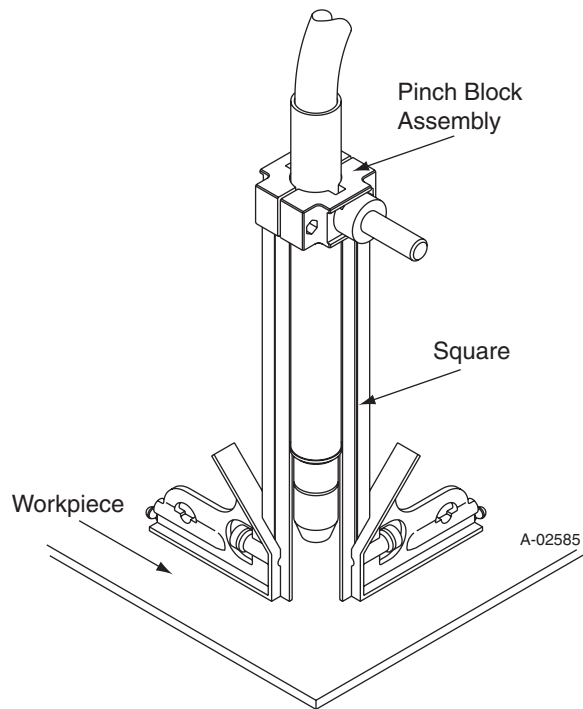
NOTE!
When converting a hand torch or a machine torch system to operate an Automation 100SLV torch, one of the CNC interface options will be required if not previously installed.



WARNING
Disconnect primary power at the source before disassembling the torch or torch leads.

The mechanical torch includes a positioning tube with rack and pinch block assembly.

1. Mount the torch assembly on the cutting table.
2. To obtain a clean vertical cut, use a square to align the torch perpendicular to the surface of the workpiece.



Mechanical Torch Set - Up

3. The proper torch parts (shield cup, tip, start cartridge, and electrode) must be installed for the type of operation. Refer to Section "4T.01 Torch Parts Selection" on page 4T-1 for details.

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SECTION 4 SYSTEM: OPERATION

4.01 Front Panel Controls / Features


See Illustration for numbering Identification

1. Output Current Control

Sets the desired output current. Output settings up to 60 Amps may be used for drag cutting (with the torch tip contacting the workpiece) or for standoff cutting.



2. Function Control

Function Control Knob; Used to select between the different operating modes.



SET  Used to purge the air through the unit and torch and leads and to adjust gas pressure.

RUN  Used for general cutting operations


RAPID AUTO RESTART  Allows for faster restarting of the Pilot Arc for uninterrupted cutting.

LATCH   Used for longer hand held cuts. Once a cutting arc is established, the torch switch can be released. The cutting arc will remain ON until the torch is lifted away from the work piece, the torch leaves the edge of the work piece the torch switch is activated again or if one of the system interlocks is activated.

3. ON OFF Power Switch

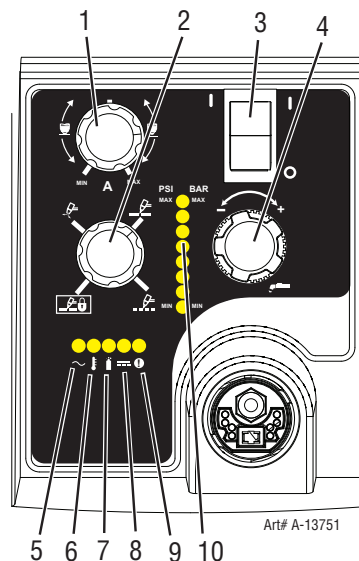
ON  / **OFF**  Switch controls input power to the power supply. Up is ON, down is OFF.

4. Air/Gas Pressure Control

The Pressure  Control is used in the "SET" mode to adjust the air/gas pressure. Pull the knob OUT to adjust and push IN to lock.

5. AC Indicator

Steady light indicates power supply is ready for operation. Blinking light indicates unit is in protective interlock mode. Shut unit OFF, shut OFF or disconnect input power, correct the fault, and restart the unit. Refer to Section 5 for details.



6. Temp Indicator

Indicator is normally OFF. Indicator is ON when internal temperature exceeds normal limits. Let the unit cool before continuing operation.

7. Gas Indicator

Indicator is ON when minimum input gas pressure for power supply operation is present. Minimum pressure for power supply operation is not sufficient for torch operation.

8. DC Indicator

Indicator is ON when DC output circuit is active.

9. Fault Error Indicator

Indicator is ON when Fault circuit is active. See Section 5 for explanations of fault lights.

10. Pressure Indicators


PSI	BAR
MAX	MAX
90	6.3
85	5.9
80	5.5
75	5.2
70	4.8
65	4.5
MIN	MIN

The Indicators will illuminate according to the pressure set by the Pressure Control Knob (number 4).

CUTMASTER 58

4.02 Preparations for Operation

At the start of each operating session:



WARNING
Disconnect primary power at the source before assembling or disassembling power supply, torch parts, or torch and leads assemblies.

Torch Parts Selection

Check the torch for proper assembly and appropriate torch parts. The torch parts must correspond with the type of operation, and with the amperage output of this Power Supply (60 amps maximum). Refer to Section 4T.07 and following for torch parts selection.

Torch Connection

Check that the torch is properly connected. Only Thermal Dynamics model SL60QD or SL60 / Manual or SL100 / Mechanical Torches may be connected to this Power Supply. See Section 3T of this manual.

Check Primary Input Power Source

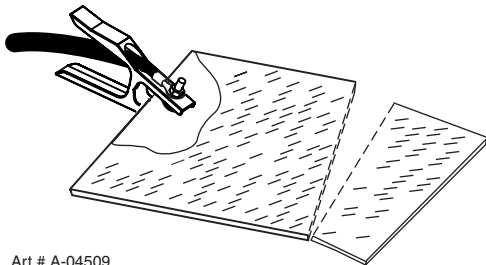
1. Check the power source for proper input voltage. Make sure the input power source meets the power requirements for the unit per Section 2, Specifications.
2. Connect the input power cable (or close the main disconnect switch) to supply power to the system.

Air Source

Ensure source meets requirements (refer to Section 2). Check connections and turn air supply ON.

Connect Work Cable


Clamp the work cable to the workpiece or cutting table. The area must be free from oil, paint and rust. Connect only to the main part of the workpiece; do not connect to the part to be cut off.



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Power ON

Place the Power Supply ON / OFF switch to the ON (up) position. AC indicator  turns ON. Gas indicator


 turns ON if there is sufficient gas pressure for power supply operation and the cooling fans turn ON.

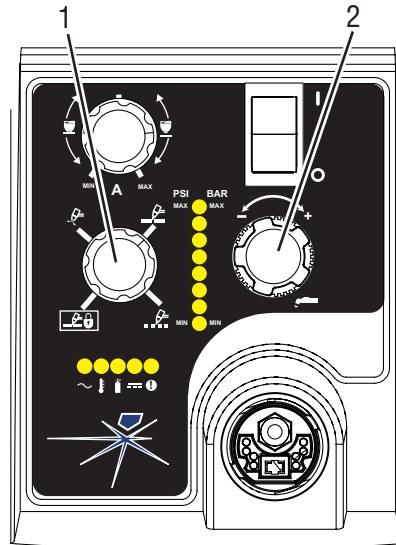


NOTE!

Minimum pressure for power supply operation is lower than minimum for torch operation. The cooling fans will turn ON as soon as the unit is turned ON. After the unit is idle for ten (10) minutes the fans will turn OFF. The fans will come back ON as soon as the torch switch (Start Signal) is activated or if the unit is turned OFF, then turned ON again. If an over temperature condition occurs, the fans will continue to run while the condition exists and for a ten (10) minute period once the condition is cleared.

Set Operating Pressure

1. Place the Power Supply Function Control knob to the SET  position. Gas will flow.
2. For Standoff cutting, adjust gas pressure from 70 - 85 psi / 4.8 - 5.9 bar (LED's in center of control panel). Refer to the Standoff chart for pressure setting details.



Art# A-07946

STANDOFF		
CutMaster 58 Gas Pressure Settings		
Leads Length	SL60QD (Hand Torch)	SL100 (Mechanized Torch)
Up to 25' (7.6 m)	75 psi 5.2 bar	75 psi 5.2 bar
Each additional 25' (7.6 m)	Add 5 psi 0.4 bar	Add 5 psi 0.4 bar

- For Drag cutting, adjust gas pressure from 75 - 95 psi / 5.2 - 6.5 bar (LED's in center of control panel). Refer to the Drag Cutting chart for pressure setting details.

DRAG	
CutMaster 58 Gas Pressure Settings	
Leads Length	SL60QD (Hand Torch)
Up to 25' (7.6 m)	80 psi 5.5 bar
Each additional 25' (7.6 m)	Add 5 psi 0.4 bar

Select Current Output Level

- Place the Function Control Knob in one of the three operating positions available:

RUN 

RAPID AUTO RESTART 

or LATCH  . Gas flow stops.

- Set the output current to desired amperage with the Output Current Control Knob.

Cutting Operation

When the torch leaves the workpiece during cutting operations with the Function Control Knob in the RUN position, there is a brief delay in restarting the pilot arc. With the knob in the RAPID AUTO RESTART position, when the torch leaves the workpiece the pilot arc restarts instantly, and the cutting arc restarts instantly when the pilot arc contacts the workpiece. (Use the 'Rapid Auto Restart' position when cutting expanded metal or gratings, or in gouging or trimming operations when an uninterrupted restart is desired). And with the knob in the LATCH position the main cutting arc will be maintained after the torch switch is released.

Typical Cutting Speeds



Cutting speeds vary according to torch output amperage, the type of material being cut, and operator skill. Refer to Section "4T.08 Recommended Cutting Speeds for Mechanized Torch With Exposed Tip" and following for greater details.

Output current setting or cutting speeds may be reduced to allow slower cutting when following a line, or using a template or cutting guide while still producing cuts of excellent quality.

Postflow

Release the trigger to stop the cutting arc. Gas continues to flow for approximately 20 seconds. During post-flow, if the user moves the trigger release to the rear and presses the trigger, the pilot arc starts. The main arc transfers to the workpiece if the torch tip is within transfer distance to the workpiece.

Shutdown

Turn the ON / OFF  switch to OFF  (down). All Power Supply indicators shut OFF. Unplug the input power cord or disconnect input power. Power is removed from the system.

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SECTION 4 TORCH: OPERATION

4T.01 Torch Prts Selection

Depending on the type of operation to be done determines the torch parts to be used.

Type of operation:

Drag cutting, standoff cutting or gouging

Torch parts:

Shield Cup, Cutting Tip, Electrode and Start Cartridge



NOTE!

Refer to Section 4T.07 and following for additional information on torch parts.

Change the torch parts for a different operation as follows:



WARNING

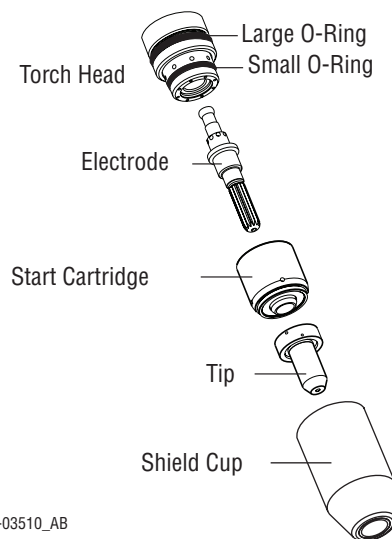
Disconnect primary power at the source before assembling or disassembling torch parts, or torch and leads assemblies.



NOTE!

The shield cup holds the tip and start cartridge in place. Position the torch with the shield cup facing upward to keep these parts from falling out when the cup is removed.

1. Unscrew and remove the shield cup assembly from the torch head.
2. Remove the Electrode by pulling it straight out of the Torch Head.



A-03510_AB

Torch Parts

3. Install the replacement Electrode by pushing it straight into the torch head until it clicks.
4. Install the start cartridge and desired tip for the operation into the torch head.
5. Hand tighten the shield cup assembly until it is seated on the torch head. If resistance is felt when installing the cup, check the threads before proceeding.

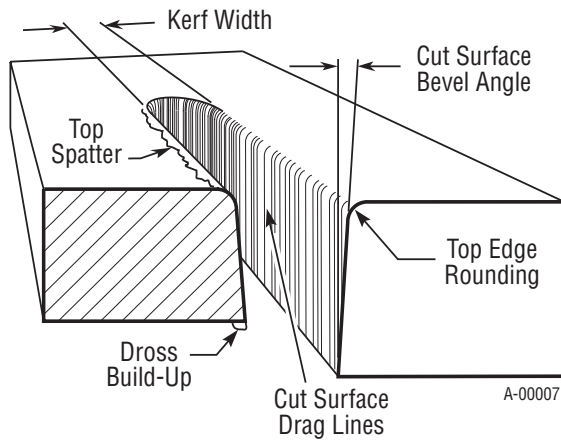
4T.02 Cut Quality



NOTE!

Cut quality depends heavily on setup and parameters such as torch standoff, alignment with the work-piece, cutting speed, gas pressures, and operator ability.

Cut quality requirements differ depending on application. For instance, nitride build - up and bevel angle may be major factors when the surface will be welded after cutting. Dross - free cutting is important when finish cut quality is desired to avoid a secondary cleaning operation. The following cut quality characteristics are illustrated in the following figure:



Cut Quality Characteristics

Cut Surface

The desired or specified condition (smooth or rough) of the face of the cut.

Nitride Build - Up

Nitride deposits can be left on the surface of the cut when nitrogen is present in the plasma gas stream. These buildups may create difficulties if the material is to be welded after the cutting process.

Bevel Angle

The angle between the surface of the cut edge and a plane perpendicular to the surface of the plate. A perfectly perpendicular cut would result in a 0° bevel angle.

Top - Edge Rounding

Rounding on the top edge of a cut due to wearing from the initial contact of the plasma arc on the workpiece.

Bottom Dross Buildup

Molten material which is not blown out of the cut area and resolidifies on the plate. Excessive dross may require secondary cleanup operations after cutting.

Kerf Width

The width of the cut (or the width of material removed during the cut).

Top Spatter (Dross)

Top spatter or dross on the top of the cut caused by slow travel speed, excess cutting height, or cutting tip whose orifice has become elongated.

4T.03 General Cutting Information



WARNING

Disconnect primary power at the source before disassembling the power supply, torch, or torch leads.



Frequently review the Important Safety Precautions at the front of this manual. Be sure the operator is equipped with proper gloves, clothing, eye and ear protection. Make sure no part of the operator's body comes into contact with the workpiece while the torch is activated.



CAUTION

Sparks from the cutting process can cause damage to coated, painted, and other surfaces such as glass, plastic and metal.



NOTE!

Handle torch leads with care and protect them from damage.

Piloting

Piloting is harder on parts life than actual cutting because the pilot arc is directed from the electrode to the tip rather than to a workpiece. Whenever possible, avoid excessive pilot arc time to improve parts life.

Torch Standoff

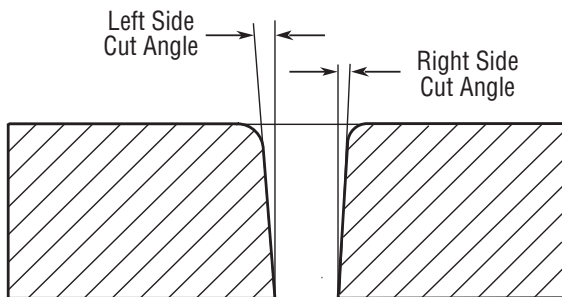
Improper standoff (the distance between the torch tip and workpiece) can adversely affect tip life as well as shield cup life. Standoff may also significantly affect the bevel angle. Reducing standoff will generally result in a more square cut.

Edge Starting

For edge starts, hold the torch perpendicular to the workpiece with the front of the tip near (not touching) the edge of the workpiece at the point where the cut is to start. When starting at the edge of the plate, do not pause at the edge and force the arc to "reach" for the edge of the metal. Establish the cutting arc as quickly as possible.

Direction of Cut

In the torches, the plasma gas stream swirls as it leaves the torch to maintain a smooth column of gas. This swirl effect results in one side of a cut being more square than the other. Viewed along the direction of travel, the right side of the cut is more square than the left.



A-00512

Side Characteristics Of Cut

To make a square - edged cut along an inside diameter of a circle, the torch should move counterclockwise around the circle. To keep the square edge along an outside diameter cut, the torch should travel in a clockwise direction.

Dross

When dross is present on carbon steel, it is commonly referred to as either "high speed, slow speed, or top dross". Dross present on top of the plate is normally caused by too great a torch to plate distance. "Top dross" is normally very easy to remove and can often be wiped off with a welding glove. "Slow speed dross" is normally present on the bottom edge of the plate. It can vary from a light to heavy bead, but does not adhere tightly to the cut edge, and can be easily scraped off. "High speed dross" usually forms a narrow bead along the bottom of the cut edge and is very difficult to remove. When cutting a troublesome steel, it is sometimes useful to reduce the cutting speed to produce "slow speed dross". Any resultant cleanup can be accomplished by scraping, not grinding.

4T.04 Hand Torch Operation

Standoff Cutting With Hand Torch



NOTE!

For best performance and parts life, always use the correct parts for the type of operation.

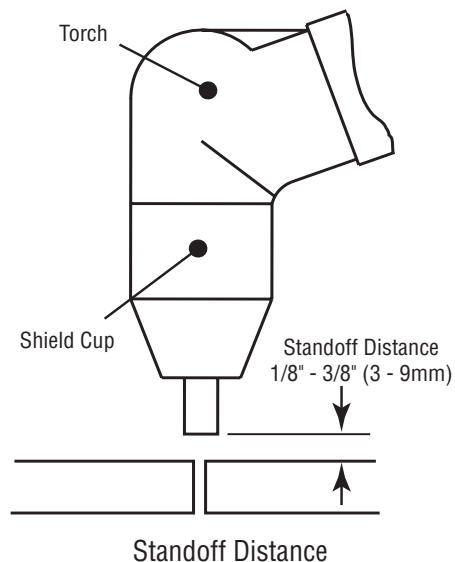
1. The torch can be comfortably held in one hand or steadied with two hands. Position the hand to press the Trigger on the torch handle. With the hand torch, the hand may be positioned close to the torch head for maximum control or near the back end for maximum heat protection. Choose the holding technique that feels most comfortable and allows good control and movement.



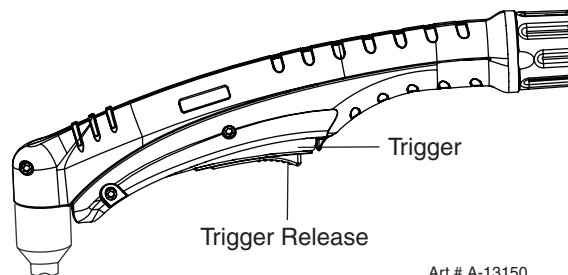
NOTE!

The tip should never come in contact with the work-piece except during drag cutting operations.

2. Depending on the cutting operation, do one of the following:
 - a. For edge starts, hold the torch perpendicular to the workpiece with the front of the tip on the edge of the workpiece at the point where the cut is to start.
 - b. For **standoff cutting**, hold the torch 1/8 - 3/8 in (3-9 mm) from the workpiece as shown below.



3. Hold the torch away from your body.
4. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



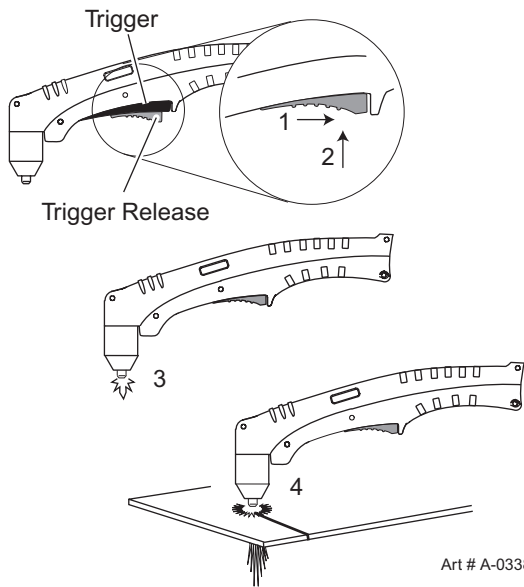
Art # A-13150

5. Bring the torch within transfer distance to the work. The main arc will transfer to the work, and the pilot arc will shut OFF.



NOTE!

The gas preflow and postflow are a characteristic of the power supply and not a function of the torch.



Art # A-03383

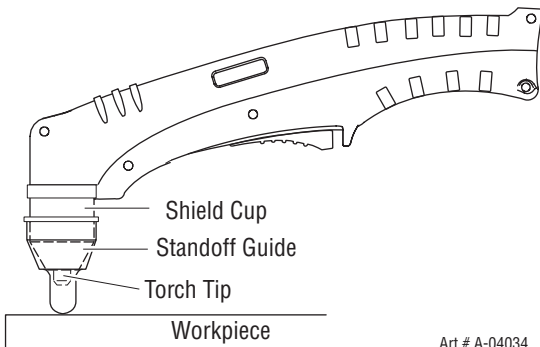
6. Cut as usual. Simply release the trigger assembly to stop cutting.
7. Follow normal recommended cutting practices as provided in the power supply operator's manual.



NOTE!

When the shield cup is properly installed, there is a slight gap between the shield cup and the torch handle. Gas vents through this gap as part of normal operation. Do not attempt to force the shield cup to close this gap. Forcing the shield cup against the torch head or torch handle can damage components.

8. For a consistent standoff height from the workpiece, install the standoff guide by sliding it onto the torch shield cup. Install the guide with the legs at the sides of the shield cup body to maintain good visibility of the cutting arc. During operation, position the legs of the standoff guide against the workpiece.



Art # A-04034

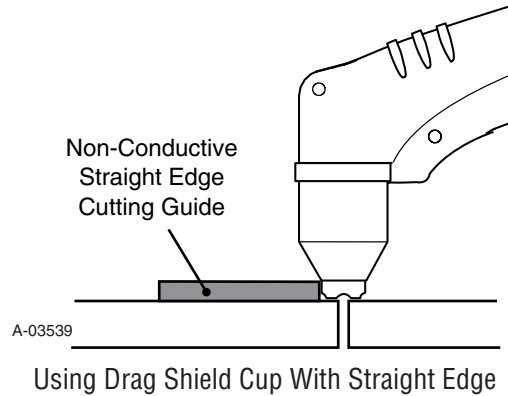
Shield Cup With Straight Edge

The drag shield cup can be used with a non conductive straight edge to make straight cuts by hand.



WARNING

The straight edge must be non - conductive.



The crown shield cup functions best when cutting 3/16 inch (4.7 mm) solid metal with relatively smooth surface.

Drag Cutting With a Hand Torch

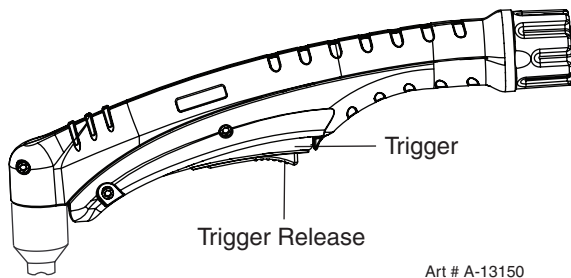
Drag cutting works best on metal 1/4" (6 mm) thick or less.



NOTE!

For best parts performance and life, always use the correct parts for the type of operation.

1. Install the drag cutting tip and set the output current.
2. The torch can be comfortably held in one hand or steadied with two hands. Position the hand to press the Trigger on the torch handle. With the hand torch, the hand may be positioned close to the torch head for maximum control or near the back end for maximum heat protection. Choose the holding technique that feels most comfortable and allows good control and movement.
4. Keep the torch in contact with the workpiece during the cutting cycle.
5. Hold the torch away from your body.
6. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.

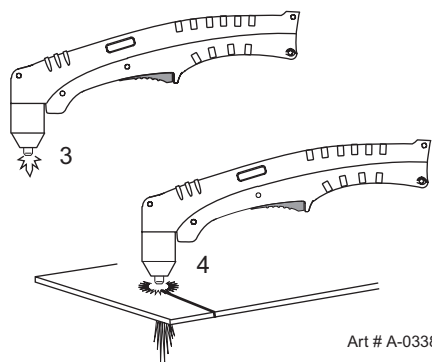
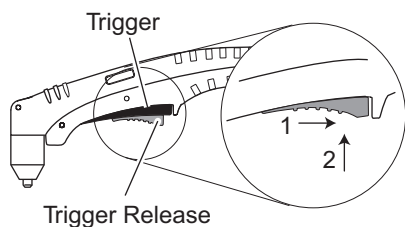


- Bring the torch within transfer distance to the work. The main arc will transfer to the work, and the pilot arc will shut OFF.



NOTE!

The gas preflow and postflow are a characteristic of the power supply and not a function of the torch.



- Cut as usual. Simply release the trigger assembly to stop cutting.
- Follow normal recommended cutting practices as provided in the power supply operator's manual.



NOTE!

When the shield cup is properly installed, there is a slight gap between the shield cup and the torch handle. Gas vents through this gap as part of normal operation. Do not attempt to force the shield cup to close this gap. Forcing the shield cup against the torch head or torch handle can damage components.

Piercing With Hand Torch

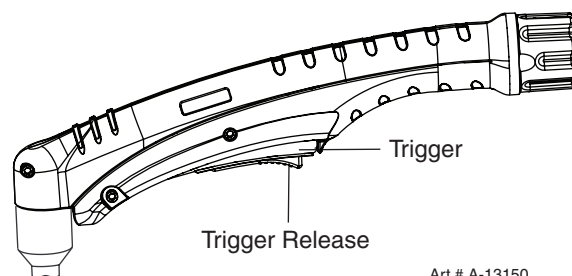
- The torch can be comfortably held in one hand or steadied with two hands. Position the hand to press the Trigger on the torch handle. With the hand torch, the hand may be positioned close to the torch head for maximum control or near the back end for maximum heat protection. Choose the technique that feels most comfortable and allows good control and movement.



NOTE!

The tip should never come in contact with the work-piece except during drag cutting operations.

- Angle the torch slightly to direct blowback particles away from the torch tip (and operator) rather than directly back into it until the pierce is complete.
- In a portion of the unwanted metal start the pierce off the cutting line and then continue the cut onto the line. Hold the torch perpendicular to the work-piece after the pierce is complete.
- Hold the torch away from your body.
- Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



- Bring the torch within transfer distance to the work. The main arc will transfer to the work, and the pilot arc will shut OFF.



NOTE!

The gas preflow and postflow are a characteristic of the power supply and not a function of the torch. When the shield cup is properly installed, there is a slight gap between the shield cup and the torch handle. Gas vents through this gap as part of normal operation. Do not attempt to force the shield cup to close this gap. Forcing the shield cup against the torch head or torch handle can damage components.

7. Clean spatter and scale from the shield cup and the tip as soon as possible. Spraying the shield cup in anti - spatter compound will minimize the amount of scale which adheres to it.

Cutting speed depends on material, thickness, and the operator's ability to accurately follow the desired cut line. The following factors may have an impact on system performance:

- Torch parts wear
- Air quality
- Line voltage fluctuations
- Torch standoff height
- Proper work cable connection

4T.05 Gouging



WARNING

Be sure the operator is equipped with proper gloves, clothing, eye and ear protection and that all safety precautions at the front of this manual have been followed. Make sure no part of the operator's body comes in contact with the workpiece when the torch is activated.



Disconnect primary power to the system before disassembling the torch, leads, or power supply.



CAUTION

Sparks from plasma gouging can cause damage to coated, painted or other surfaces such as glass, plastic, and metal.

Check torch parts. The torch parts must correspond with the type of operation. Refer to Section 4T.07, Torch Parts Selection.

Gouging Parameters

Gouging performance depends on parameters such as torch travel speed, current level, lead angle (the angle between the torch and workpiece), and the distance between the torch tip and workpiece (standoff).



CAUTION

Touching the torch tip or shield cup to the work surface will cause excessive parts wear.

Torch Travel Speed



NOTE!

Refer to Appendix Pages for additional information as related to the Power Supply used.

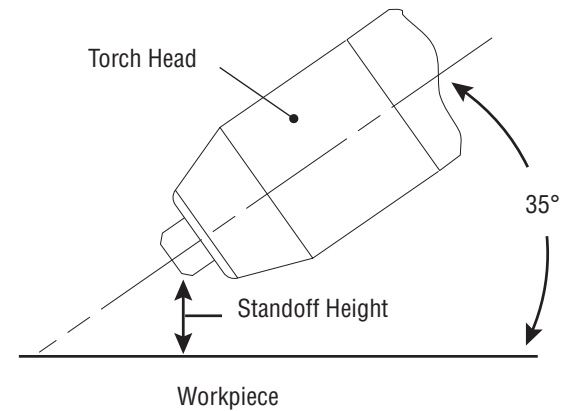
Optimum torch travel speed is dependent on current setting, lead angle, and mode of operation (hand or machine torch).

Current Setting

Current settings depend on torch travel speed, mode of operation (hand or machine torch), and the amount of material to be removed.

Lead Angle

The angle between the torch and workpiece depends on the output current setting and torch travel speed. The recommended lead angle is 35°. At a lead angle greater than 45° the molten metal will not be blown out of the gouge and may be blown back onto the torch. If the lead angle is too small (less than 35°), less material may be removed, requiring more passes. In some applications, such as removing welds or working with light metal, this may be desirable.



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Gouging Angle and Standoff Distance

Standoff Distance

The tip to work distance affects gouge quality and depth. Standoff distance of 1/8 - 1/4 inch (3 - 6 mm) allows for smooth, consistent metal removal. Smaller standoff distances may result in a severance cut rather than a gouge. Standoff distances greater than 1/4 inch (6 mm) may result in minimal metal removal or loss of transferred main arc.

Slag Buildup

Slag generated by gouging on materials such as carbon and stainless steels, nickels, and alloyed steels, can be removed easily in most cases. Slag does not obstruct the gouging process if it accumulates to the side of the gouge path. However, slag build - up can cause inconsistencies and irregular metal removal if large amounts of material build up in front of the arc. The build - up is most often a result of improper travel speed, lead angle, or standoff height.

4T.06 Mechanized Torch Operation

Cutting With Mechanized Torch

The mechanized torch can be activated by remote control pendant or by a remote interface device such as CNC.

1. To start a cut at the plate edge, position the center of the torch along the edge of the plate.

Travel Speed

Proper travel speed is indicated by the trail of the arc which is seen below the plate. The arc can be one of the following:

1. Straight Arc

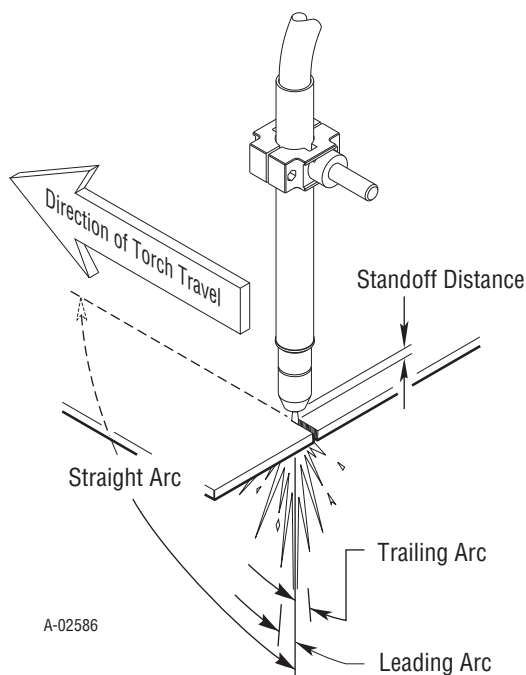
A straight arc is perpendicular to the workpiece surface. This arc is generally recommended for the best cut using air plasma on stainless or aluminum.

2. Leading Arc

The leading arc is directed in the same direction as torch travel. A five degree leading arc is generally recommended for air plasma on mild steel.

3. Trailing Arc

The trailing arc is directed in the opposite direction as torch travel.



Mechanized Torch Operation

For optimum smooth surface quality, the travel speed should be adjusted so that only the leading edge of the arc column produces the cut. If the travel speed is too slow, a rough cut will be produced as the arc moves from side to side in search of metal for transfer.

Travel speed also affects the bevel angle of a cut. When cutting in a circle or around a corner, slowing down the travel speed will result in a squarer cut. The power source output should be reduced also. Refer to the appropriate Control Module Operating Manual for any Corner Slowdown adjustments that may be required.

Piercing With Machine Torch

To pierce with a machine torch, the arc should be started with the torch positioned as high as possible above the plate while allowing the arc to transfer and pierce. This standoff helps avoid having molten metal blow back onto the front end of the torch.

When operating with a cutting machine, a pierce or dwell time is required. Torch travel should not be enabled until the arc penetrates the bottom of the plate. As motion begins, torch standoff should be reduced to the recommended 1/8 - 1/4 inch (3-6 mm) distance for optimum speed and cut quality. Clean spatter and scale from the shield cup and the tip as soon as possible. Spraying or dipping the shield cup in anti-spatter compound will minimize the amount of scale which adheres to it.

4T.07 Parts Selection for Manual Torch Cutting

COMMON ERRORS	
MAX - Over Pressure	75 - Start Error
90 - Internal Error	70 - Parts in Place
85 - Check Consumables	65 - Input Power
80 - Consumables Missing	MIN - Under Pressure

Input Gas Supply (Service d'entrée de gaz)	Air Only, Not for Use with O ₂ (Air seulement, Ne utilisez pas avec O ₂)
Max. Gas Pressure (Pression de gaz max.)	125 psi (8.6 bar)
Operating Pressure (Pression d'opération)	75 psi (5.2 bar)
Cutting (Coupage)	350 scfh (165.1 lpm)

1Torch
with SureLock® Technology

**60 AMP PARTS
SL60®**

O-Ring
(Joint torique)
8-3487 8-3486

9-8215 9-8213

Patented
SURELOCK
U.S. Patent 6,160,889

9-8252 (60A) 9-8218

9-8210 (60A) 9-8218 9-8251

9-8226 A (60A) 9-8237 9-8241

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Check the electrode for excessive wear. Replace electrode if worn back more than 0.062" (1.5 mm) or if excessive off center wearing.

0.062" (1.5 mm)

Place your electrode here and compare
Placez votre électrode ici pour comparaison

Vérifiez si l'usure de l'électrode est excessive. Remplacez-la si l'usure est plus de 0.062" (1.5 mm) ou si l'usure excessive est hors centre.

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4T.08 Recommended Cutting Speeds for Mechanized Torch With Exposed Tip

Type Torch: SL60QDQD With Exposed Tip							Type Material: Mild Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.036	0.9	9-8208	104	40	340	8.64	0.19	4.8	70	4.8	55	170	0.00	0.2	5.1
0.06	1.5	9-8208	108	40	250	6.35	0.19	4.8	70	4.8	55	170	0.10	0.2	5.1
0.075	1.9	9-8208	108	40	190	4.83	0.19	4.8	70	4.8	55	170	0.30	0.2	5.1
0.135	3.4	9-8208	110	40	105	2.67	0.19	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	113	40	60	1.52	0.19	4.8	70	4.8	55	170	0.60	0.2	5.1
0.25	6.4	9-8208	111	40	40	1.02	0.19	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	124	40	21	0.53	0.19	4.8	70	4.8	55	170	NR	NR	NR
0.500	12.7	9-8208	123	40	11	0.28	0.19	4.8	70	4.8	55	170	NR	NR	NR
0.625	15.9	9-8208	137	40	7	0.18	0.19	4.8	70	4.8	55	170	NR	NR	NR

Type Torch: SL60QD With Exposed Tip							Type Material: Stainless Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.036	0.9	9-8208	103	40	355	9.02	0.125	3.2	70	4.8	55	170	0.00	0.2	5.1
0.05	1.3	9-8208	98	40	310	7.87	0.125	3.2	70	4.8	55	170	0.00	0.2	5.1
0.06	1.5	9-8208	98	40	240	6.10	0.125	3.2	70	4.8	55	170	0.10	0.2	5.1
0.078	2.0	9-8208	100	40	125	3.18	0.125	3.2	70	4.8	55	170	0.30	0.2	5.1
0.135	3.4	9-8208	120	40	30	0.76	0.187	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	124	40	20	0.51	0.187	4.8	70	4.8	55	170	0.60	0.2	5.1
0.25	6.4	9-8208	122	40	15	0.38	0.187	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	126	40	10	0.25	0.187	4.8	70	4.8	55	170	NR	NR	NR


Type Torch: SL60QD With Exposed Tip							Type Material: Aluminum								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.032	0.8	9-8208	110	40	440	11.18	0.187	4.8	70	4.8	55	170	0.00	0.2	5.1
0.051	1.3	9-8208	109	40	350	8.89	0.187	4.8	70	4.8	55	170	0.10	0.2	5.1
0.064	1.6	9-8208	112	40	250	6.35	0.187	4.8	70	4.8	55	170	0.10	0.2	5.1
0.079	2.0	9-8208	112	40	200	5.08	0.19	4.8	70	4.8	55	170	0.30	0.2	5.1
0.125	3.2	9-8208	118	40	100	2.54	0.19	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	120	40	98	2.49	0.187	4.8	70	4.8	55	170	0.60	0.2	5.1
0.250	6.4	9-8208	123	40	50	1.27	0.187	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	134	40	16	0.41	0.187	4.8	70	4.8	55	170	NR	NR	NR

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Type Torch: SL60QD With Exposed Tip							Type Material: Mild Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.060	1.5	9-8210	110	60	290	7.37	0.19	4.8	75	5.2	90	245	0.00	0.19	4.8
0.075	1.9	9-8210	120	60	285	7.24	0.19	4.8	75	5.2	90	245	0.10	0.19	4.8
0.120	3.0	9-8210	120	60	180	4.57	0.19	4.8	75	5.2	90	245	0.10	0.19	4.8
0.135	3.4	9-8210	119	60	170	4.32	0.19	4.8	75	5.2	90	245	0.10	0.19	4.8
0.188	4.8	9-8210	121	60	100	2.54	0.19	4.8	75	5.2	90	245	0.20	0.19	4.8
0.250	6.4	9-8210	119	60	80	2.03	0.19	4.8	75	5.2	90	245	0.30	0.19	4.8
0.375	9.5	9-8210	124	60	50	1.27	0.19	4.8	75	5.2	90	245	0.50	0.19	4.8
0.500	12.7	9-8210	126	60	26	0.66	0.19	4.8	75	5.2	90	245	0.75	0.19	4.8
0.625	15.9	9-8210	127	60	19	0.48	0.19	4.8	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	134	60	14	0.36	0.19	4.8	75	5.2	90	245	NR	NR	NR
1.000	25.4	9-8210	140	60	6	0.15	0.19	4.8	75	5.2	90	245	NR	NR	NR

Type Torch: SL60QD With Exposed Tip							Type Material: Stainless Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.06	1.5	9-8210	119	60	350	8.91	0.19	4.8	75	5.2	90	245	0.00	0.20	5.1
0.075	1.9	9-8210	116	60	300	7.64	0.19	4.8	75	5.2	90	245	0.10	0.20	5.1
0.120	3.0	9-8210	123	60	150	3.82	0.19	4.8	75	5.2	90	245	0.10	0.20	5.1
0.135	3.4	9-8210	118	60	125	3.18	0.19	4.8	75	5.2	90	245	0.10	0.20	5.1
0.188	4.8	9-8210	122	60	90	2.29	0.19	4.8	75	5.2	90	245	0.20	0.20	5.1
0.250	6.4	9-8210	120	60	65	1.65	0.19	4.8	75	5.2	90	245	0.30	0.20	5.1
0.375	9.5	9-8210	130	60	30	0.76	0.19	4.8	75	5.2	90	245	0.50	0.20	5.1
0.500	12.7	9-8210	132	60	21	0.53	0.19	4.8	75	5.2	90	245	0.75	0.20	5.1
0.625	15.9	9-8210	130	60	15	0.38	0.19	4.8	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	142	60	12	0.31	0.25	6.4	75	5.2	90	245	NR	NR	NR

Type Torch: SL60QD With Exposed Tip							Type Material: Aluminum								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.060	1.5	9-8210	110	60	440	11.18	0.25	6.4	75	5.2	90	245	0.00	0.25	6.4
0.075	1.9	9-8210	110	60	440	11.18	0.25	6.4	75	5.2	90	245	0.10	0.25	6.4
0.120	3.0	9-8210	116	60	250	6.35	0.25	6.4	75	5.2	90	245	0.10	0.25	6.4
0.188	3.4	9-8210	116	60	170	4.32	0.25	6.4	75	5.2	90	245	0.20	0.25	6.4
0.250	6.4	9-8210	132	60	85	2.16	0.25	6.4	75	5.2	90	245	0.30	0.25	6.4
0.375	9.5	9-8210	140	60	45	1.14	0.25	6.4	75	5.2	90	245	0.50	0.25	6.4
0.500	12.7	9-8210	143	60	30	0.76	0.25	6.4	75	5.2	90	245	0.80	0.25	6.4
0.625	15.9	9-8210	145	60	20	0.51	0.25	6.4	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	145	60	18	0.46	0.25	6.4	75	5.2	90	245	NR	NR	NR



NOTE!
 * Gas pressure shown is for torches with leads up to 25' / 7.6 m long. For 50' / 15.2 m leads, refer to Section "Set Operating Pressure" on page 4T-1.
 ** Total flow rate includes plasma and secondary gas flow

4T.09 Recommended Cutting Speeds for Mechanized Torch With Shielded Tip

Type Torch: SL60QD With Shielded Tip							Type Material: Mild Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.036	0.9	9-8208	114	40	170	4.32	0.19	4.8	70	4.8	55	170	0.00	0.2	5.1
0.06	1.5	9-8208	120	40	90	2.29	0.19	4.8	70	4.8	55	170	0.10	0.2	5.1
0.075	1.9	9-8208	121	40	80	2.03	0.19	4.8	70	4.8	55	170	0.30	0.2	5.1
0.135	3.4	9-8208	122	40	75	1.91	0.19	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	123	40	30	0.76	0.19	4.8	70	4.8	55	170	0.60	0.2	5.1
0.25	6.4	9-8208	125	40	25	0.64	0.19	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	138	40	11	0.28	0.19	4.8	70	4.8	55	170	NR	NR	NR
0.500	12.7	9-8208	142	40	7	0.18	0.19	4.8	70	4.8	55	170	NR	NR	NR
0.625	15.9	9-8208	152	40	3	0.08	0.19	4.8	70	4.8	55	170	NR	NR	NR

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Type Torch: SL60QD With Shielded Tip							Type Material: Stainless Steel								
Type Plasma Gas: Air					Type Secondary Gas: Single Gas Torch										
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.036	0.9	9-8208	109	40	180	4.57	0.125	3.2	70	4.8	55	170	0.00	0.2	5.1
0.05	1.3	9-8208	105	40	165	4.19	0.125	3.2	70	4.8	55	170	0.00	0.2	5.1
0.06	1.5	9-8208	115	40	120	3.05	0.125	3.2	70	4.8	55	170	0.10	0.2	5.1
0.078	2.0	9-8208	120	40	65	1.65	0.187	4.8	70	4.8	55	170	0.30	0.2	5.1
0.135	3.4	9-8208	125	40	25	0.64	0.187	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	132	40	20	0.51	0.187	4.8	70	4.8	55	170	0.60	0.2	5.1
0.25	6.4	9-8208	130	40	15	0.38	0.187	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	130	40	10	0.25	0.187	4.8	70	4.8	55	170	NR	NR	NR

Type Torch: SL60QD With Shielded Tip							Type Material: Aluminum								
Type Plasma Gas: Air					Type Secondary Gas: Single Gas Torch										
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.032	0.8	9-8208	116	40	220	5.59	0.187	4.8	70	4.8	55	170	0.00	0.2	5.1
0.051	1.3	9-8208	116	40	210	5.33	0.187	4.8	70	4.8	55	170	0.00	0.2	5.1
0.064	1.6	9-8208	118	40	180	4.57	0.187	4.8	70	4.8	55	170	0.10	0.2	5.1
0.079	2.0	9-8208	116	40	150	3.81	0.19	4.8	70	4.8	55	170	0.30	0.2	5.1
0.125	3.2	9-8208	130	40	75	1.91	0.19	4.8	70	4.8	55	170	0.40	0.2	5.1
0.188	4.8	9-8208	132	40	60	1.52	0.187	4.8	70	4.8	55	170	0.60	0.2	5.1
0.250	6.4	9-8208	134	40	28	0.71	0.187	4.8	70	4.8	55	170	1.00	0.2	5.1
0.375	9.5	9-8208	143	40	11	0.28	0.187	4.8	70	4.8	55	170	NR	NR	NR

Type Torch: SL60QD With Shielded Tip							Type Material: Mild Steel								
Type Plasma Gas: Air					Type Secondary Gas: Single Gas Torch										
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.060	1.5	9-8210	124	60	250	6.35	0.19	4.8	75	5.2	90	245	0.00	0.2	5.1
0.075	1.9	9-8210	126	60	237	6.02	0.19	4.8	75	5.2	90	245	0.10	0.2	5.1
0.120	3.0	9-8210	126	60	230	5.84	0.19	4.8	75	5.2	90	245	0.10	0.2	5.1
0.135	3.4	9-8210	128	60	142	3.61	0.19	4.8	75	5.2	90	245	0.10	0.2	5.1
0.188	4.8	9-8210	128	60	125	3.18	0.19	4.8	75	5.2	90	245	0.20	0.2	5.1
0.250	6.4	9-8210	123	60	80	2.03	0.19	4.8	75	5.2	90	245	0.30	0.2	5.1
0.375	9.5	9-8210	132	60	34	0.86	0.19	4.8	75	5.2	90	245	0.50	0.2	5.1
0.500	12.7	9-8210	137	60	23	0.58	0.19	4.8	75	5.2	90	245	0.75	0.2	5.1
0.625	15.9	9-8210	139	60	14	0.36	0.19	4.8	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	145	60	14	0.36	0.19	4.8	75	5.2	90	245	NR	NR	NR
1.000	25.4	9-8210	156	60	4	0.10	0.19	4.8	75	5.2	90	245	NR	NR	NR

Type Torch: SL60QD With Shielded Tip							Type Material: Stainless Steel								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.06	1.5	9-8210	110	60	165	4.19	0.13	3.2	75	5.2	90	245	0.00	0.20	5.1
0.075	1.9	9-8210	116	60	155	3.94	0.13	3.2	75	5.2	90	245	0.10	0.20	5.1
0.120	3.0	9-8210	115	60	125	3.18	0.13	3.2	75	5.2	90	245	0.10	0.20	5.1
0.135	3.4	9-8210	118	60	80	2.03	0.13	3.2	75	5.2	90	245	0.10	0.20	5.1
0.188	4.8	9-8210	120	60	75	1.91	0.13	3.2	75	5.2	90	245	0.20	0.20	5.1
0.250	6.4	9-8210	121	60	60	1.52	0.13	3.2	75	5.2	90	245	0.30	0.20	5.1
0.375	9.5	9-8210	129	60	28	0.71	0.13	3.2	75	5.2	90	245	0.50	0.20	5.1
0.500	12.7	9-8210	135	60	17	0.43	0.19	4.8	75	5.2	90	245	0.75	0.20	5.1
0.625	15.9	9-8210	135	60	14	0.36	0.19	4.8	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	142	60	10	0.25	0.19	4.8	75	5.2	90	245	NR	NR	NR

Type Torch: SL60QD With Shielded Tip							Type Material: Aluminum								
Type Plasma Gas: Air							Type Secondary Gas: Single Gas Torch								
Thickness		Tip	Output	Amperage	Speed (Per Minute)		Standoff		Plasma Gas Press		Flow (CFH)		Pierce	Pierce Height	
Inches	mm	(Cat. No.)	Volts (VDC)	(Amps)	Inches	Meters	Inches	mm	psi*	bar	Plasma	Total**	Delay (Sec)	Inches	mm
0.060	1.5	9-8210	105	60	350	8.89	0.13	3.2	75	5.2	90	245	0.00	0.20	5.1
0.075	1.9	9-8210	110	60	350	8.89	0.13	3.2	75	5.2	90	245	0.10	0.20	5.1
0.120	3.0	9-8210	110	60	275	6.99	0.13	3.2	75	5.2	90	245	0.10	0.20	5.1
0.188	3.4	9-8210	122	60	140	3.56	0.13	3.2	75	5.2	90	245	0.20	0.20	5.1
0.250	6.4	9-8210	134	60	80	2.03	0.19	4.8	75	5.2	90	245	0.30	0.20	5.1
0.375	9.5	9-8210	140	60	45	1.14	0.19	4.8	75	5.2	90	245	0.50	0.20	5.1
0.500	12.7	9-8210	144	60	26	0.66	0.19	4.8	75	5.2	90	245	0.80	0.20	5.1
0.625	15.9	9-8210	145	60	19	0.48	0.19	4.8	75	5.2	90	245	NR	NR	NR
0.750	19.1	9-8210	150	60	15	0.38	0.19	4.8	75	5.2	90	245	NR	NR	NR

 **NOTE!**
 * Gas pressure shown is for torches with leads up to 25' / 7.6 m long. For 50' / 15.2 m leads, refer to Section "Set Operating Pressure" on page 4T-1.
 ** Total flow rate includes plasma and secondary gas flow

PATENT INFORMATION

Plasma Cutting Torch Patents

The following parts are covered under U.S. and Foreign Patents as follows:

Catalog #	Description	Patent(s)
9-8215	Electrode	US Pat No(s) 6163008; 6987238 Other Pat(s) Pending
9-8213	Cartridge	US Pat No(s) 6903301; 6717096; 6936786; 6703581; D496842; D511280; D492709; D499620; D504142 Other Pat(s) Pending
9-8205	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8206	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8207	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8252	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8208	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8209	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8210	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8231	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8211	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8212	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8253	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8225	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8226	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8227	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8228	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8241	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8243	Shield Cap	US Pat No(s) 6914211; D493183 Other Pat(s) Pending
9-8235	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8236	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8237	Shield Cup	US Pat No(s) 6914211; D501632; D511633 Other Pat(s) Pending
9-8238	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending
9-8239	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending
9-8244	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending

Catalog #	Description	Patent(s)
9-8245	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending

The following parts are also licensed under U.S. Patent No. 5,120,930 and 5,132,512:

Catalog #	Description
9-8235	Shield Cap
9-8236	Shield Cap
9-8237	Shield Cup
9-8238	Shield Cap
9-8239	Shield Cap
9-8244	Shield Cap
9-8245	Shield Cap

SECTION 5 SYSTEM: SERVICE

5.01 General Maintenance

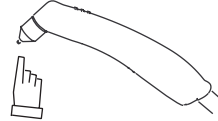


Warning!
Disconnect input power before maintaining.

Maintain more often
if used under severe
conditions

Each Use

Visual check of
torch tip and electrode

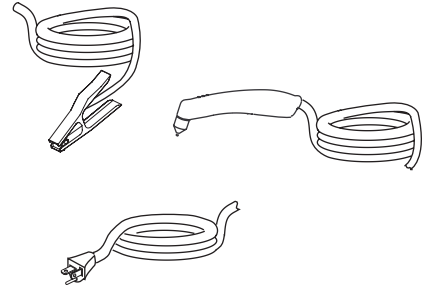


Weekly

Visually inspect the torch body tip,
electrode, start cartridge and shield cup

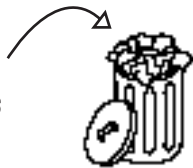


Visually inspect the
cables and leads.
Replace as needed

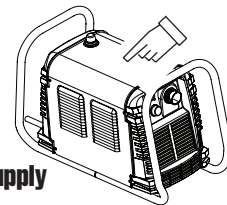


3 Months

Replace all
broken parts

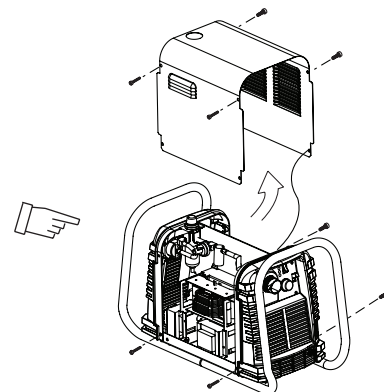


Clean
exterior
of power supply



6 Months

Visually check and
Carefully clean the
interior



5.02 Maintenance Schedule



NOTE!

The actual frequency of maintenance may need to be adjusted according to the operating environment

Daily Operational Checks or Every Six Cutting Hours:

1. Check torch consumable parts, replace if damaged or worn.
2. Check plasma and secondary supply and pressure/flow.
3. Purge plasma gas line to remove any moisture build-up.

Weekly or Every 30 Cutting Hours:

1. Check fan for proper operation and adequate air flow.
2. Inspect torch for any cracks or exposed wires, replace if necessary.
3. Inspect input power cable for damage or exposed wires, replace if necessary.

Six Months or Every 720 Cutting Hours:

1. Check the in-line air filter(s), clean or replace as required.
2. Check cables and hoses for leaks or cracks, replace if necessary.
3. Check all contactor points for severe arcing or pits, replace if necessary.
4. Vacuum dust and dirt out of the entire machine.



CAUTION

Do not blow air into the power supply during cleaning. Blowing air into the unit can cause metal particles to interfere with sensitive electrical components and cause damage to the unit.

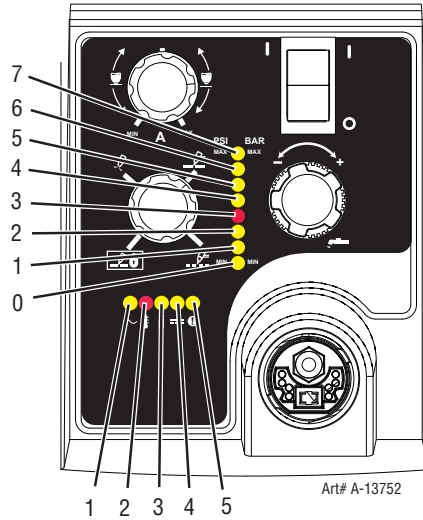
5.03 Common Faults


Problem - Symptom	Common Cause
Insufficient Penetration	<ol style="list-style-type: none"> 1. Cutting speed too fast. 2. Torch tilted too much. 3. Metal too thick. 4. Worn torch parts 5. Cutting current too low. 6. Non - Genuine Thermal Dynamics parts used 7. Incorrect gas pressure
Main Arc Extinguishes	<ol style="list-style-type: none"> 1. Cutting speed too slow. 2. Torch standoff too high from workpiece. 3. Cutting current too high. 4. Work cable disconnected. 5. Worn torch parts. 6. Non - Genuine Thermal Dynamics parts used
Excessive Dross Formation	<ol style="list-style-type: none"> 1. Cutting speed too slow. 2. Torch standoff too high from workpiece. 3. Worn torch parts. 4. Improper cutting current. 5. Non - Genuine Thermal Dynamics parts used 6. Incorrect gas pressure
Short Torch Parts Life	<ol style="list-style-type: none"> 1. Oil or moisture in air source. 2. Exceeding system capability (material too thick). 3. Excessive pilot arc time 4. Gas pressure too low. 5. Improperly assembled torch. 6. Non - Genuine Thermal Dynamics parts used
Difficult Starting	<ol style="list-style-type: none"> 1. Worn torch parts. 2. Non - Genuine Thermal Dynamics parts used. 3. Incorrect gas pressure.

5.04 Fault Indicator

At initial power up, two lights will temporarily illuminate for 2-3 seconds to show the version of software used.

To determine the first digit, count the function indicators left to right, 1 through 5. To determine the second digit count the pressure indicators, reading from bottom to top, 0 through 7. In the example below the Temp indicator and 75 psi indicators are ON indicating the version would be 2.3.



When the  "Fault" indicator is ON or blinking it will be accompanied by one of the pressure indicator lights depending on what the fault is. The following table explains each of those Faults.

Pressure Indicator	Fault
Max	Over Pressure
90	Internal Error
85	Shorted Torch
80	Consumables Missing
75	Start Error
70	Parts in Place
65	Input Power
Min	Under Pressure



NOTE!

Fault explanations are covered in the following tables.

5.05 Basic Troubleshooting Guide



WARNING

There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unless you have had training in power electronics measurement and troubleshooting techniques.

Problem - Symptom	Possible Cause	Recommended Action
ON / OFF Switch is ON but the A/C Indicator does not light	<ol style="list-style-type: none"> 1. Primary power disconnect is in OFF position. 2. Primary fuses / breakers are blown or tripped. 3. Units internal fuse blown. 4. Faulty components in unit. 	<ol style="list-style-type: none"> 1. Turn primary power disconnect switch to ON position. 2. a) Have qualified person check primary fuses / breakers. b) Connect unit to known good primary power receptacle 3. a) Replace fuse. b) If fuse blows again, return to authorized service center for repair or replacement. 4. Return to authorized service center for repair or replacement.
Fault indicator flashing, 65 PSI indicator flashing	<ol style="list-style-type: none"> 1. INPUT VOLTAGE SELECTION SWITCH set for incorrect voltage. 2. Primary input voltage problem. 3. Faulty components in unit. 	<ol style="list-style-type: none"> 1. Set INPUT VOLTAGE SELECTION SWITCH to match primary input voltage. 2. Have qualified person check primary voltage to insure it meets unit requirements see Section "2.05 Input Wiring Specifications" on page 2-3. 3. Return to authorized service center for repair or replacement.
TEMPERATURE indicator ON . FAULT indicator flashing.	<ol style="list-style-type: none"> 1. Air flow through or around the unit is obstructed. 2. Duty cycle of the unit has been exceeded. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Refer to clearance information – see Section "2.04 Power Supply Specifications" on page 2-2 2. Allow unit to cool. 3. Return to authorized service center for repair or replacement.
GAS LED OFF , FAULT and MIN pressure indicators flashing.	<ol style="list-style-type: none"> 1. Gas supply not connected to unit. 2. Gas supply not turned ON. 3. Gas supply pressure too low. 4. AIR PRESSURE CONTROL regulator set too low. 5. Failed components in unit. 	<ol style="list-style-type: none"> 1. Connect gas supply to unit. 2. Turn gas supply ON. 3. Set air supply inlet pressure to unit to 120 psi. 4. Adjust regulator to set air pressure - see Section "4. Air/Gas Pressure Control" on page 4-1 5. Return to authorized service center for repair or replacement.
FAULT and 70 PSI indicators flashing.	<ol style="list-style-type: none"> 1. Shield Cup loose. 2. Torch not properly connected to power supply. 3. Problem in torch and leads PIP circuit. 4. Failed components in unit. 	<ol style="list-style-type: none"> 1. Hand tighten the shield cup until it is snug. 2. Insure torch ATC is securely fastened to unit. 3. Replace torch and leads or return to authorized service center for repair or replacement. 4. Return to authorized service center for repair or replacement.
FAULT and 75 PSI indicators flashing.	<ol style="list-style-type: none"> 1. Start signal is active when ON/OFF SWITCH is turned to ON position. 2. Problem in the torch and leads switch circuit. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Start can be active for one of the following: <ul style="list-style-type: none"> • Hand torch switch held closed • Hand pendant switch held closed • CNC START signal is active low Release the START signal source 2. Replace torch and leads or return to authorized service center for repair or replacement. 3. Return to authorized service center for repair or replacement.

Problem - Symptom	Possible Cause	Recommended Action
FAULT & 80 PSI indicators flashing. Gas flow is cycling ON and OFF.	<ol style="list-style-type: none"> 1. Torch shield cup is loose. 2. Torch tip, electrode or starter cartridge missing. 3. Torch start cartridge is stuck. 4. Open conductor in torch leads. 5. Problem in the torch and leads switch circuit. 6. Failed components in unit. 	<ol style="list-style-type: none"> 1. Tighten shield cup by hand. Do not overtighten. 2. Turn OFF power supply. Remove shield cup. Install missing parts. 3. Turn OFF power supply. Bleed down system pressure. Remove shield cup, tip and start cartridge. Check start cartridge lower end fitting for free movement. Replace if fitting does not move freely. 4. Replace torch and leads or return to authorized service center for repair or replacement. 5. Replace torch and leads or return to authorized service center for repair or replacement. 6. Return to authorized service center for repair or replacement.
Nothing happens when torch switch or remote switch is closed (Or CNC START signal is active) No gas flow, DC LED OFF.	<ol style="list-style-type: none"> 1. Problem in the torch and leads switch circuit (Remote pendant switch circuit). 2. CNC Controller device not providing Start signal. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Take Torch and Leads (Remote Pendant) to Authorized Repair Facility. 2. Contact Controller manufacturer. 3. Return to authorized service center for repair or replacement.
FAULT and 85 PSI indicators flashing.	<ol style="list-style-type: none"> 1. Upper O-ring on torch head is in wrong position. 2. Torch starter cartridge is stuck. 3. Worn or faulty torch parts. 4. Shorted Torch. 5. Temporary Short indicated by 5 blinks per second. 6. Power Supply Failure (Standard rate of blinking) 	<ol style="list-style-type: none"> 1. Remove shield cup from torch; check upper O-ring position; correct if necessary. 2. Turn OFF power supply. Bleed down system pressure. Remove shield cup, tip and starter cartridge. Check starter cartridge lower end fitting for free movement. Replace if fitting does not move freely. 3. Inspect torch consumable parts. Replace if necessary. 4. Replace torch and leads or return to an authorized service center for repair. 5. Release torch switch and reactivate. 6. Return to authorized service center for repair or replacement.
No Fault lights ON, no arc in torch.	<ol style="list-style-type: none"> 1. Failed components in unit. 	<ol style="list-style-type: none"> 1. Return to an authorized service center for repair.
FAULT and 85 PSI indicators flashing	<ol style="list-style-type: none"> 1. Internal Error 	<ol style="list-style-type: none"> 1. Turn the ON / OFF switch OFF then back ON again. If that does not clear the fault, return to an authorized service center for repair.
Pilot arc is ON but cutting arc will not establish	<ol style="list-style-type: none"> 1. Work cable not connected to work piece. 2. Work cable/connector broken. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Connect work cable. 2. Replace work cable. 3. Return to an authorized service center for repair.
Torch cutting is diminished	<ol style="list-style-type: none"> 1. Incorrect current setting. 2. Worn torch consumables. 3. Poor work cable connection to work piece. 4. Torch being moved too fast. 5. Excessive oil or water in torch. 6. Failed components in unit. 	<ol style="list-style-type: none"> 1. Check and adjust to proper setting. 2. Check torch consumables and replace as needed. 3. Check the connection of the Work Lead to the work piece. 4. Reduce cutting speed. 5. Refer to "Check air quality" in Section 3 Torch. 6. Return to an authorized service center for repair.

5.06 Power Supply Basic Parts Replacement



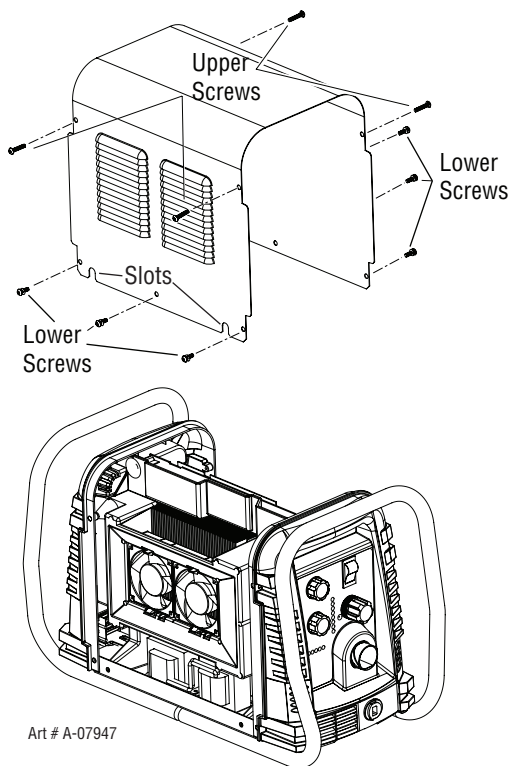
WARNING

Disconnect primary power to the system before disassembling the torch, leads, or power supply

This section describes procedures for basic parts replacement. For more detailed parts replacement procedures, refer to the Power Supply Service Manual.

A. Cover Removal

1. Remove the upper and lower screws which secure the cover to the main assembly. Do not loosen the lower screws inside the cut out slots in the bottom of the cover.



2. Carefully pull the Cover up and away from the unit.

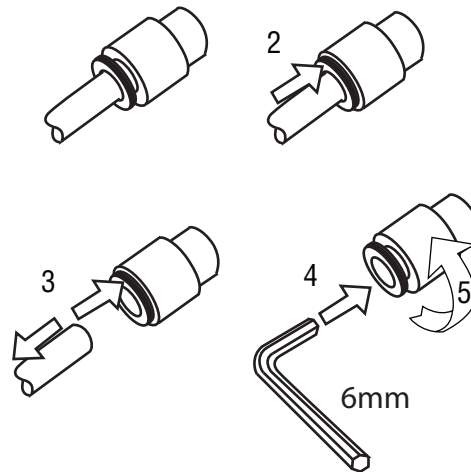
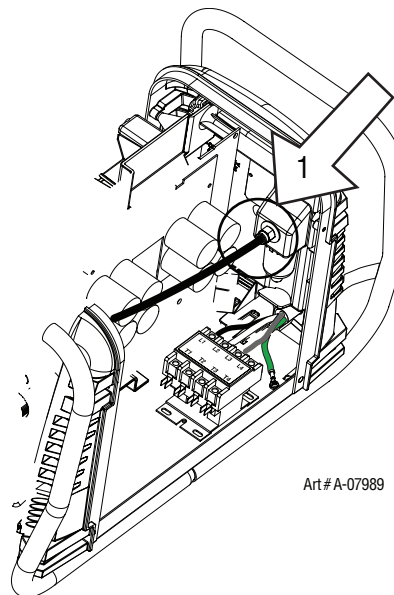
B. Cover Installation

1. Reconnect the ground wire, if necessary.
2. Place the cover onto the power supply so that slots in the bottom edges of the cover engage the lower screws.
3. Tighten lower screws.
4. Reinstall and tighten the upper screws.

C. Filter Element Assembly Replacement

The Filter Element Assembly is in the rear panel. For better system performance, the filter element should be checked per the Maintenance Schedule (Section 5.02), and either cleaned or replaced.

1. Remove power from the power supply; turn OFF the gas supply and bleed down the system.
2. Remove the system cover. See "A Cover Removal" in this section.
3. Locate the internal air line and the fitting from the filter assembly. Number 1 in the following illustration.
4. Hold a wrench or similar tool against the locking ring on the filter assembly fitting, then pull on the hose to release it. (Numbers 2 and 3 in the following illustration).



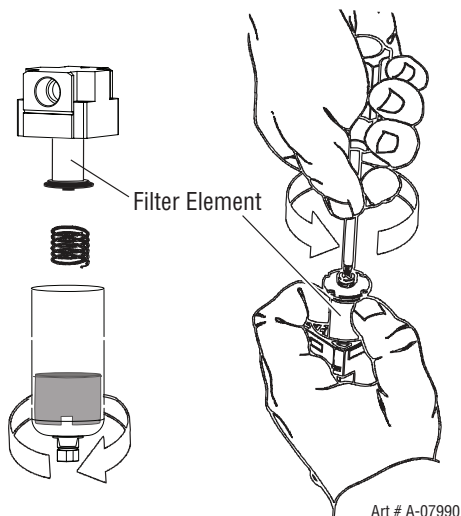
5. Remove the fitting from the filter element assembly by inserting a 6 mm hex wrench into the internal hex fitting and turning it counter clock-wise (left). Numbers 4 and 5 in the previous illustration.

6. Disconnect the input line from the filter element assembly.
7. Remove the filter element assembly through the rear opening.



NOTE!

If replacing or cleaning just the filter element refer to the following illustration for disassembly.



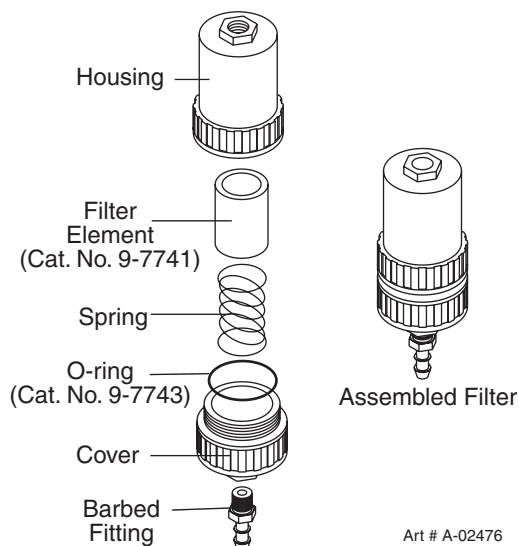
8. Install the new or cleaned assembly by reversing these procedures.
9. Turn ON the air supply and check for leaks before reinstalling the cover.

Optional Single-Stage Filter Element Replacement

These instructions apply to power supplies where the optional Single-Stage Filter has been installed.

The Power Supply shuts down automatically when the Filter Element becomes completely saturated. The Filter Element can be removed from its housing, dried, and reused. Allow 24 hours for Element to dry. Refer to Section 6, Parts List, for replacement filter element catalog number.

1. Remove power from power supply.
2. Shut OFF air supply and bleed down system before disassembling Filter to change Filter Element.
3. Disconnect gas supply hose.
4. Turn the Filter Housing Cover counter-clockwise and remove it. The Filter Element is located inside the Housing.



Optional Single-Stage Filter Element Replacement

5. Remove the Filter Element from the Housing and set Element aside to dry.
6. Wipe inside of housing clean, then insert the replacement Filter Element open side first.
7. Replace Housing on Cover.
8. Reattach gas supply.



NOTE!

If unit leaks between housing and cover, inspect the O-ring for cuts or other damage.

Optional Two-Stage Filter Element Replacement

The Two-Stage Air Filter has two Filter Elements. When the Filter Elements become dirty the Power Supply will continue to operate but cut quality may become unacceptable. Refer to Section 6, Parts List, for replacement filter element catalog number.

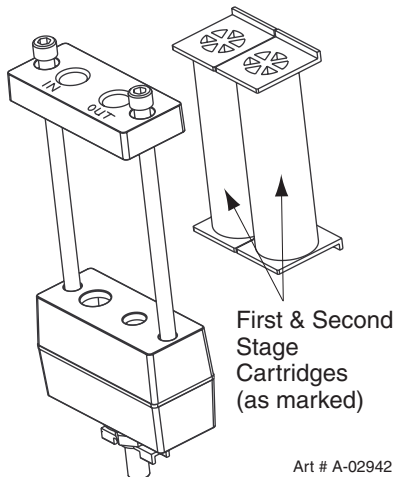
1. Shut OFF primary input power.
2. Shut OFF air supply and bleed down system.



WARNING

Always turn OFF the air supply and bleed the system before disassembling the Filter Assembly as injury could result.

3. Loosen the two bolts on the top of the Filter Assembly enough to allow the Filter Elements to move freely.
4. Note the location and orientation of the old Filter Elements.
5. Slide out the old Filter Elements.



Optional Two-Stage Filter Replacement

6. Slide the replacement Filter Elements into the Filter Assembly, with the same orientation as noted in Step 4 above.
7. Hand tighten the two bolts evenly, then torque each bolt to 20 - 30 in-lbs (2.3 - 3.4 Nm). Improper torque may damage the gasket.
8. Slowly apply air pressure to the assembly, checking for leaks.



NOTE!

A small amount of air leakage from the bottom fitting is normal..

This completes the parts replacement procedures.

SECTION 5 TORCH: SERVICE

5T.01 General Maintenance



NOTE!
Refer to Previous "Section 5: System" for common and fault indicator descriptions.

Cleaning Torch

Even if precautions are taken to use only clean air with a torch, eventually the inside of the torch becomes coated with residue. This buildup can affect the pilot arc initiation and the overall cut quality of the torch.



WARNING
Disconnect primary power to the system before disassembling the torch or torch leads.
DO NOT touch any internal torch parts while the AC indicator light of the Power Supply is ON.

The inside of the torch should be cleaned with electrical contact cleaner using a cotton swab or soft wet rag. In severe cases, the torch can be removed from the leads and cleaned more thoroughly by pouring electrical contact cleaner into the torch and blowing it through with compressed air.

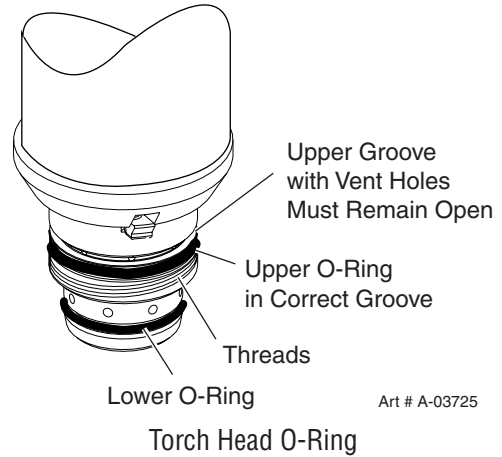


CAUTION
Dry the torch thoroughly before reinstalling.

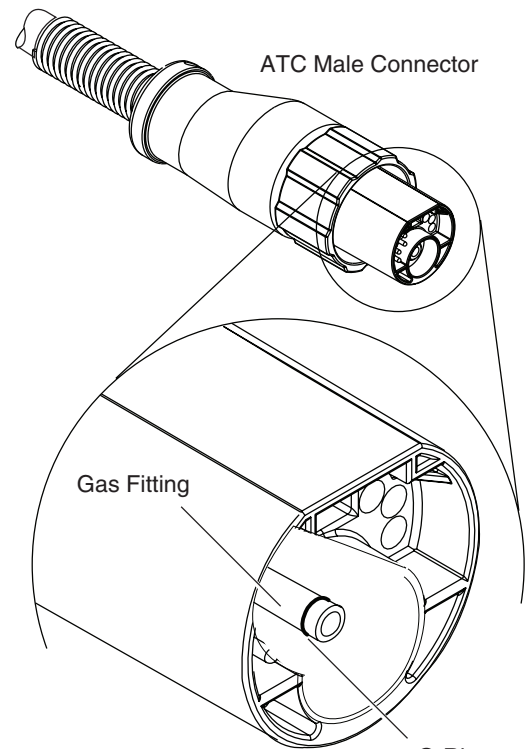
O-Ring Lubrication

An O-Ring on the Torch Head and ATC Male Connector requires lubrication on a scheduled basis. This will allow the O-Rings to remain pliable and provide a proper seal. The O-Rings will dry out, becoming hard and cracked if the lubricant is not used on a regular basis. This can lead to potential performance problems.

It is recommended to apply a very light film of O-Ring lubricant (Catalog # 8-4025) to the O-Rings on a weekly basis.



Art # A-03725



Art #A-03791_AB

ATC O-Ring



NOTE!
DO NOT use other lubricants or grease, they may not be designed to operate within high temperatures or may contain "unknown elements" that may react with the atmosphere. This reaction can leave contaminants inside the torch. Either of these conditions can lead to inconsistent performance or poor parts life.

5T.02 Inspection and Replacement of Consumable Torch Parts



WARNING

Disconnect primary power to the system before disassembling the torch or torch leads. DO NOT touch any internal torch parts while the AC indicator light of the Power Supply is ON.

Remove the consumable torch parts as follows:



NOTE!

The shield cup holds the tip and starter cartridge in place. Position the torch with the shield cup facing upward to prevent these parts from falling out when the cup is removed.

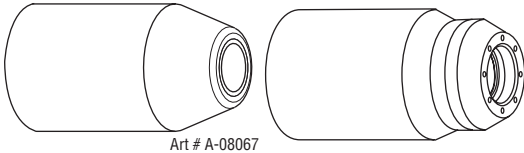
1. Unscrew and remove the shield cup from the torch.



NOTE!

Slag built up on the shield cup that cannot be removed may effect the performance of the system.

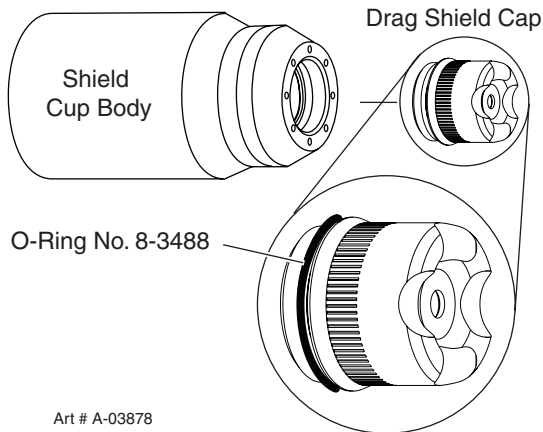
2. Inspect the cup for damage. Wipe it clean or replace if damaged.



Art # A-08067

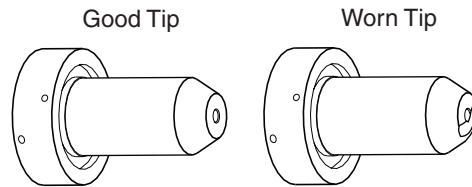
Shield Cups

3. On torches with a shield cup body and a shield cap or deflector, ensure that the cap or deflector is threaded snugly against the shield cup body. In shielded drag cutting operations (only), there may be an O-Ring between the shield cup body and drag shield cap. Do not lubricate the O-Ring.



Art # A-03878

4. Remove the tip. Check for excessive wear (indicated by an elongated or oversized orifice). Clean or replace the tip if necessary.



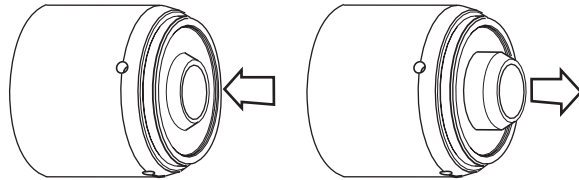
A-03406

Example of Tip Wear

5. Remove the starter cartridge. Check for excessive wear, plugged gas holes, or discoloration. Check the lower end fitting for free motion. Replace if necessary.

Spring-Loaded Lower End Fitting Full Compression

Spring-Loaded Lower End Fitting at Reset / Full Extension

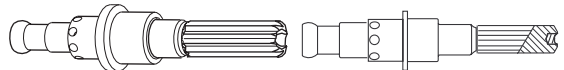


Art # A-08064_AC

6. Pull the Electrode straight out of the Torch Head. Check the face of the electrode for excessive wear. Refer to the following figure.



New Electrode



Worn Electrode

Art # A-03284

Electrode Wear

7. Reinstall the Electrode by pushing it straight into the torch head until it clicks.
8. Reinstall the desired starter cartridge and tip into the torch head.
9. Hand tighten the shield cup until it is seated on the torch head. If resistance is felt when installing the cup, check the threads before proceeding.

This completes the parts replacement procedures.

SECTION 6: PARTS LISTS

6.01 Introduction

A. Parts List Breakdown

The parts list provide a breakdown of all replaceable components. The parts lists are arranged as follows:

6.03	Power Supply Replacement
6.04	Replacement Power Supply Parts
6.05	Options and Accessories
6.06	Replacement Parts for Hand Torch
6.07	Replacement Parts - for Machine Torches with Unshielded Leads
6.08	Replacement Shielded Machine Torch Leads Assemblies
6.09	Torch Consumable Parts (SL60)
6.10	Torch Consumable Parts (SL100)



NOTE!

Parts listed without item numbers are not shown, but may be ordered by the catalog number shown.

B. Returns

If a product must be returned for service, contact your distributor. Materials returned without proper authorization will not be accepted.

6.02 Ordering Information

Order replacement parts by catalog number and complete description of the part or assembly, as listed in the parts list for each type item. Also include the model and serial number of the power supply. Address all inquiries to your authorized distributor.

6.03 Power Supply Replacement

The following items are included with the replacement power supply: work cable & clamp, input power cable, gas pressure regulator / filter, and operating manual.

Qty	Description	Catalog #
1	CutMaster 58 Power Supply 208/230 - 460VAC, Single or 3 Phase, 60Hz, with input power cable and plug	3-5830-1
	460VAC, Single or 3 Phase, 60Hz, with input power cable	3-5830-2
	600VAC, 3 Phase, 60Hz, with input power cable	3-5830-5

6.04 Replacement Power Supply Parts

Qty	Description	Catalog #
1	Regulator 9-0115*	
1	Filter Assembly Replacement Element	9-0116
1	Input Power Cord for 208/230 V Power Supply	8-4384
1	Input Power Cord for 460/600 V Power Supply	9-8593

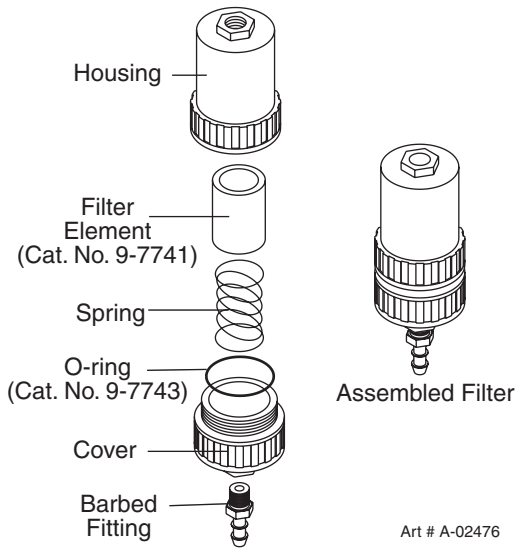


NOTE!

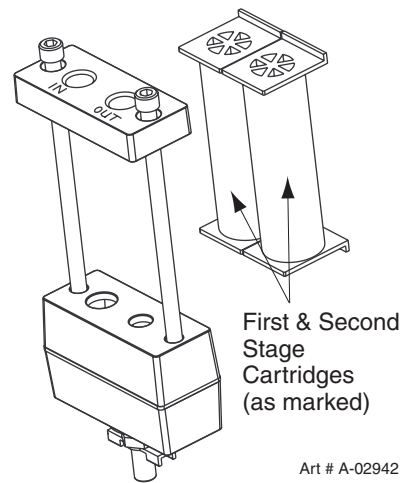
*9-0115 regulator, If the serial number of the power supply is prior to #05078755 then kit number 9-0201 will be needed to replace not only the regulator (9-0115) but the logic PCB as well. Another way to tell if the kit is needed is to see if the regulator has a small diameter tube coming out of the bottom fitting. If there is a transducer and wire harness instead of the tube, the kit is not needed

6.05 Options and Accessories

Qty	Description	Catalog #
1	Single - Stage Filter Kit (includes Filter & Hose)	7-7507
1	Replacement Filter Body	9-7740
1	Replacement Filter Hose (not shown)	9-7742
2	Replacement Filter Element	9-7741
1	Two - Stage Filter Kit (includes Hose & Mounting Screws)	9-9387
1	Two - Stage Air Filter Assembly	9-7527
1	First Stage Cartridge	9-1021
1	Second Stage Cartridge	9-1022
1	Extended Work Cable (50 ft / 15.2 m) with Clamp	9-8529
1	Multi - Purpose Cart	7-8888
1	Automation Interface Kit	9-8311
1	25' / 7.6 m CNC Cable for Automation Interface Kit	9-1008
1	35' / 10.7 m CNC Cable for Automation Interface Kit	9-1010
1	50' / 15.2 m CNC Cable for Automation Interface Kit	9-1011
1	Nylon Dust Cover	9-7071



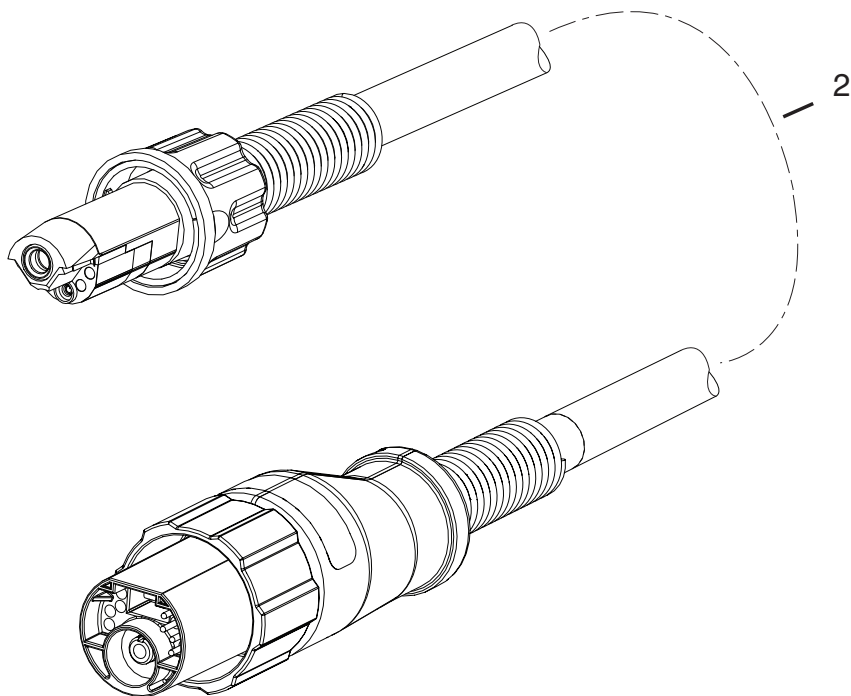
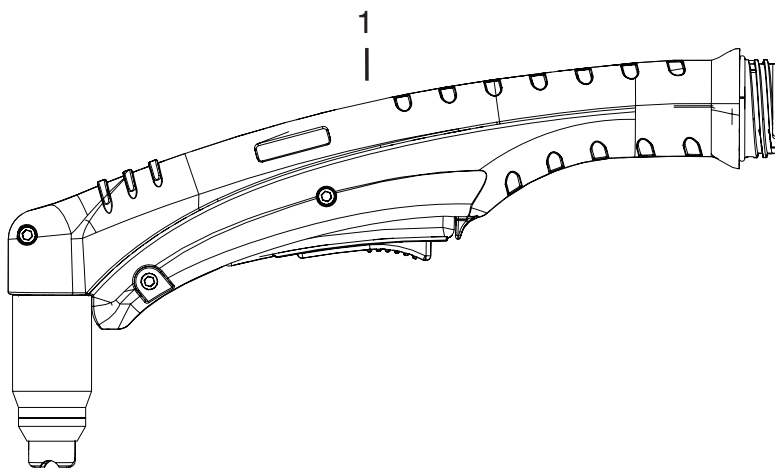
Optional Single - Stage Filter Kit



Optional Two - Stage Filter Kit

6.06 Replacement Parts for Hand Torch

Item #	Qty	Description	Catalog #
1	1	Torch Handle Assembly Replacement	7-5680
2		Leads Assemblies with ATC connector and Quick Connectors	
	1	SL60QD™, 20 - foot Leads Assembly with ATC and QD connectors	4-5604
	1	SL60QD™, 50 - foot Leads Assembly with ATC and QD connectors	4-5605
1&2	1	Torch and Leads Assembly, 20 - foot	7-5604
1&2	1	Torch and Leads Assembly, 50 - foot	7-5605



Art # A-13248_AB

6.07 Torch Consumable Parts (SL60)

COMMON ERRORS			
MAX - Over Pressure	75 - Start Error	Input Gas Supply (Service d'entrée de gaz)	Air Only, Not for Use with O ₂ (Air seulement, Ne utilisez pas avec O ₂)
90 - Internal Error	70 - Parts in Place	Max. Gas Pressure (Pression de gaz max.)	125 psi (8.6 bar)
85 - Check Consumables	65 - Input Power	Operating Pressure (Pression d'opération)	75 psi (5.2 bar)
80 - Consumables Missing	MIN - Under Pressure	Cutting (Coupage)	350 scfh (165.1 lpm)

60 AMP PARTS SL60®

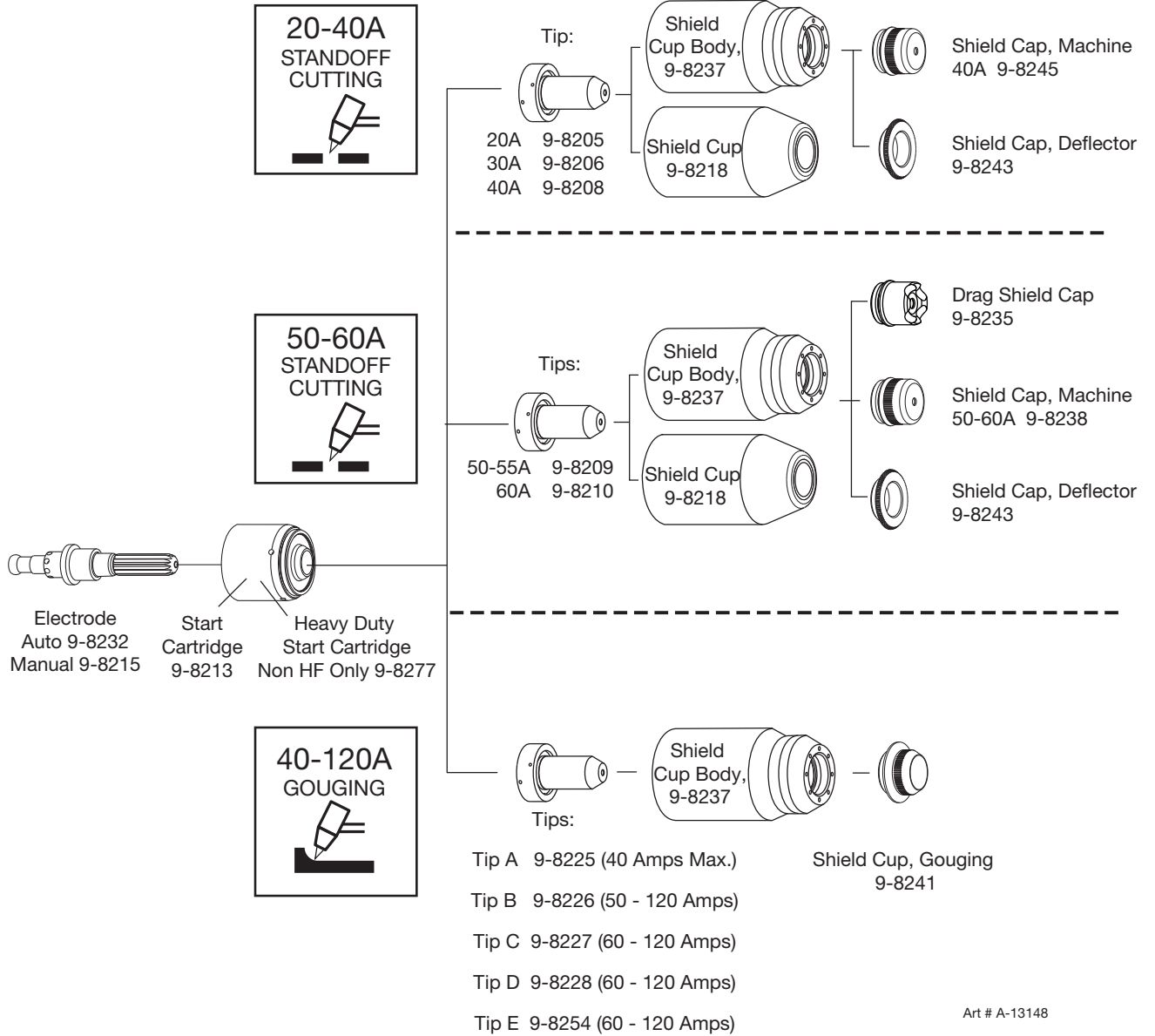
Check the electrode for excessive wear. Replace electrode if worn back more than 0.062" (1.5 mm) or if excessive off center wearing.

Place your electrode here and compare
Placez votre électrode ici pour comparaison

Vérifiez si l'usure de l'électrode est excessive. Remplacez-la si l'usure est plus de 0.062" (1.5 mm) ou si l'usure excessive est hors centre.

23x5235_AI
Art # A-13753

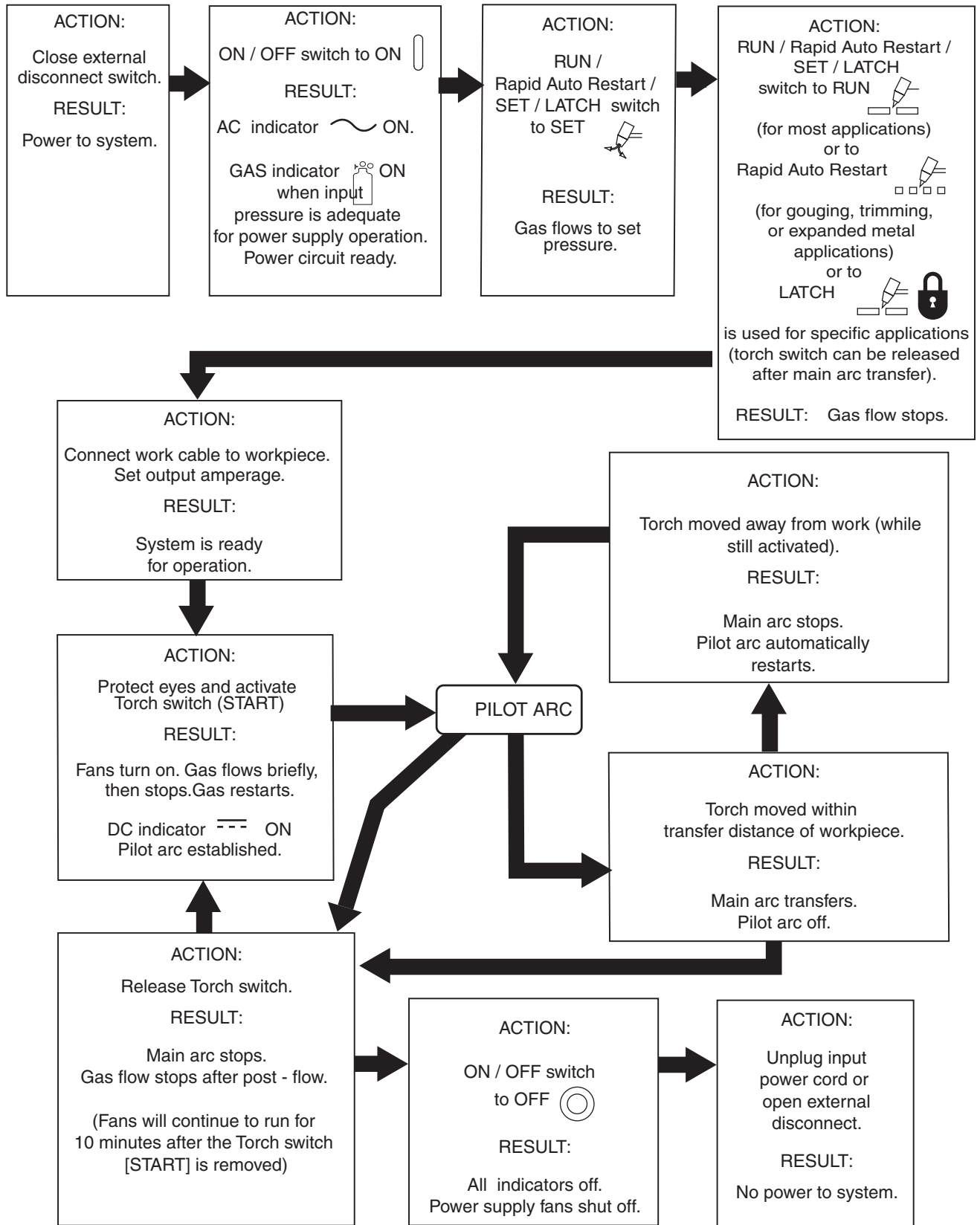
6.08 Torch Consumable Parts (SL100)



Art # A-13148

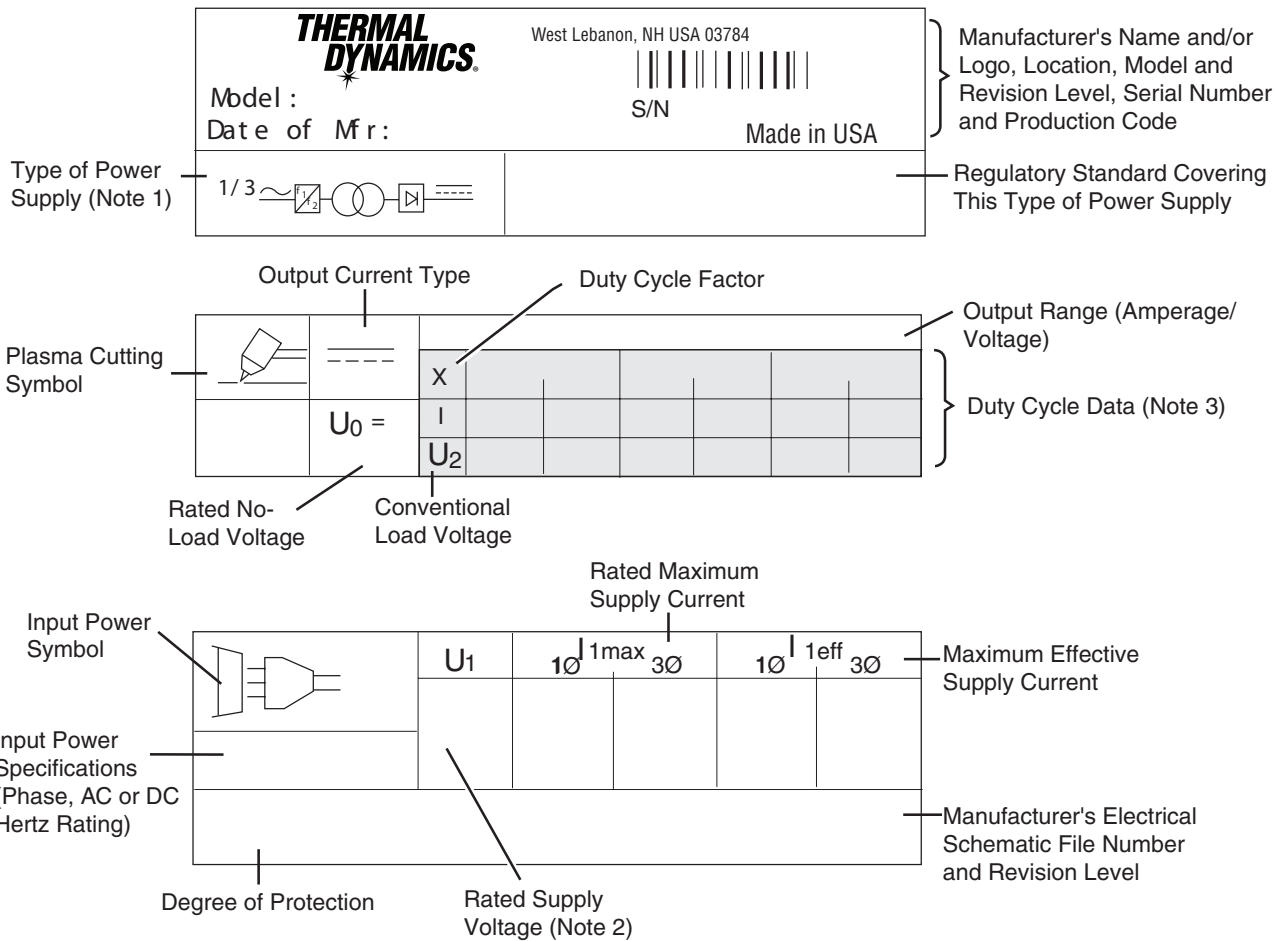
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APPENDIX 1: SEQUENCE OF OPERATION (BLOCK DIAGRAM)



Art #A-08793

APPENDIX 2: DATA TAG INFORMATION



NOTES:

- Symbol shown indicates single- or three-phase AC input, static frequency converter-transformer-rectifier, DC output.
- Indicates input voltages for this power supply. Most power supplies carry a label at the input power cord showing input voltage requirements for the power supply as built.
- Top row: Duty cycle values.
IEC duty cycle value is calculated as specified by the International ElectroTechnical Commission.
TDC duty cycle value is determined under the power supply manufacturer's test procedures.
Second row: Rated cutting current values.
Third row: Conventional load voltage values.
- Sections of the Data Tag may be applied to separate areas of the power supply.

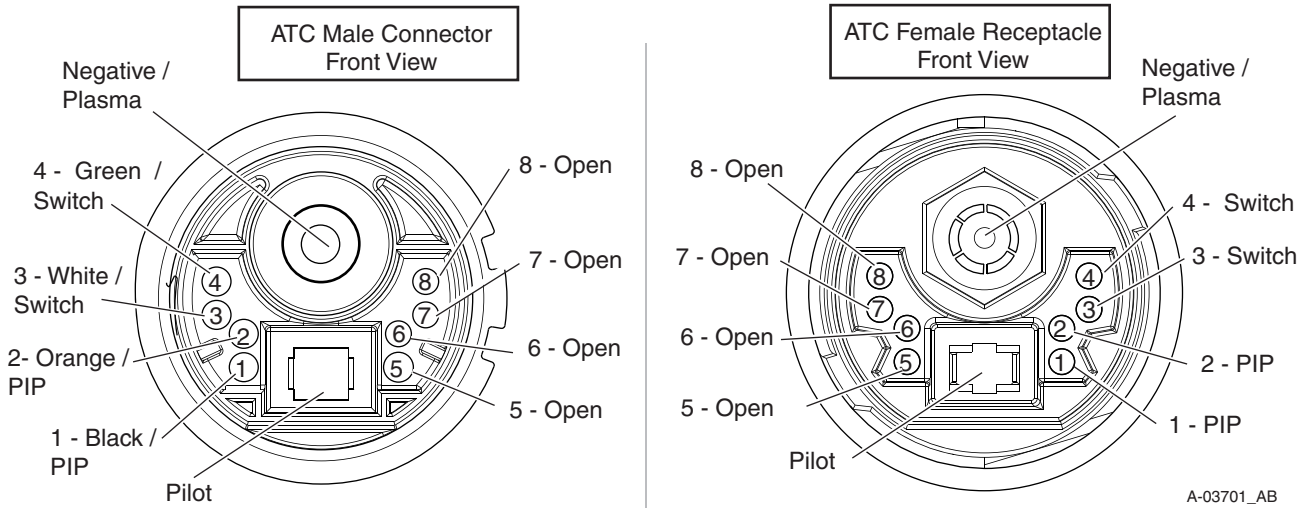
Standard Symbols

- ~ AC
- DC
- ∅ Phase

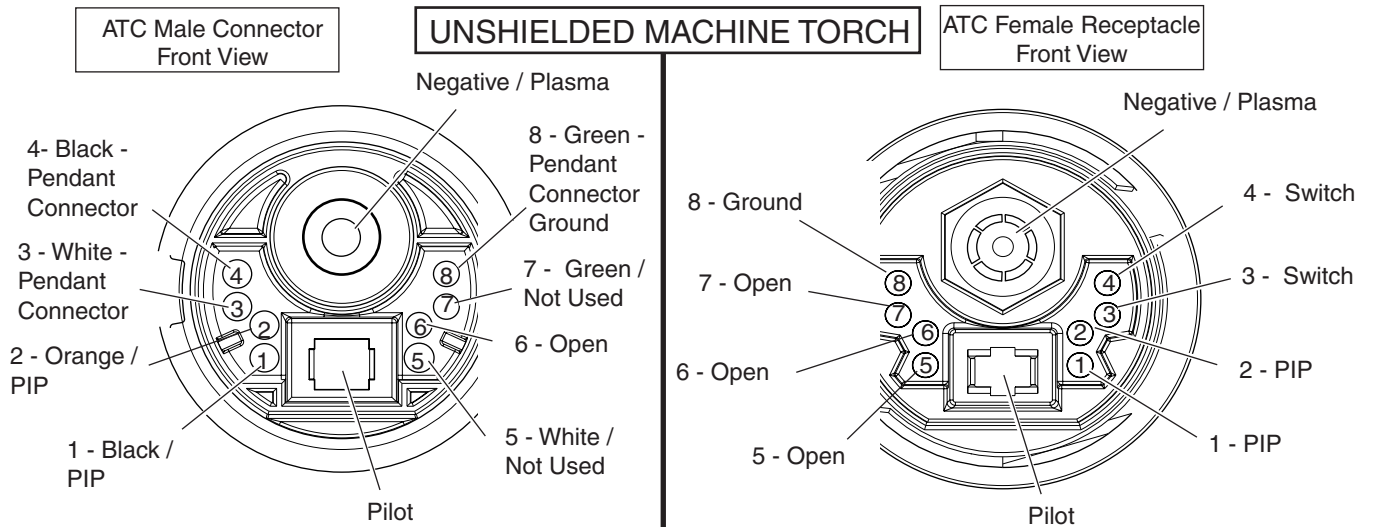
Art # A-03288_AC

APPENDIX 3: TORCH PIN - OUT DIAGRAMS

A. Hand Torch Pin - Out Diagram



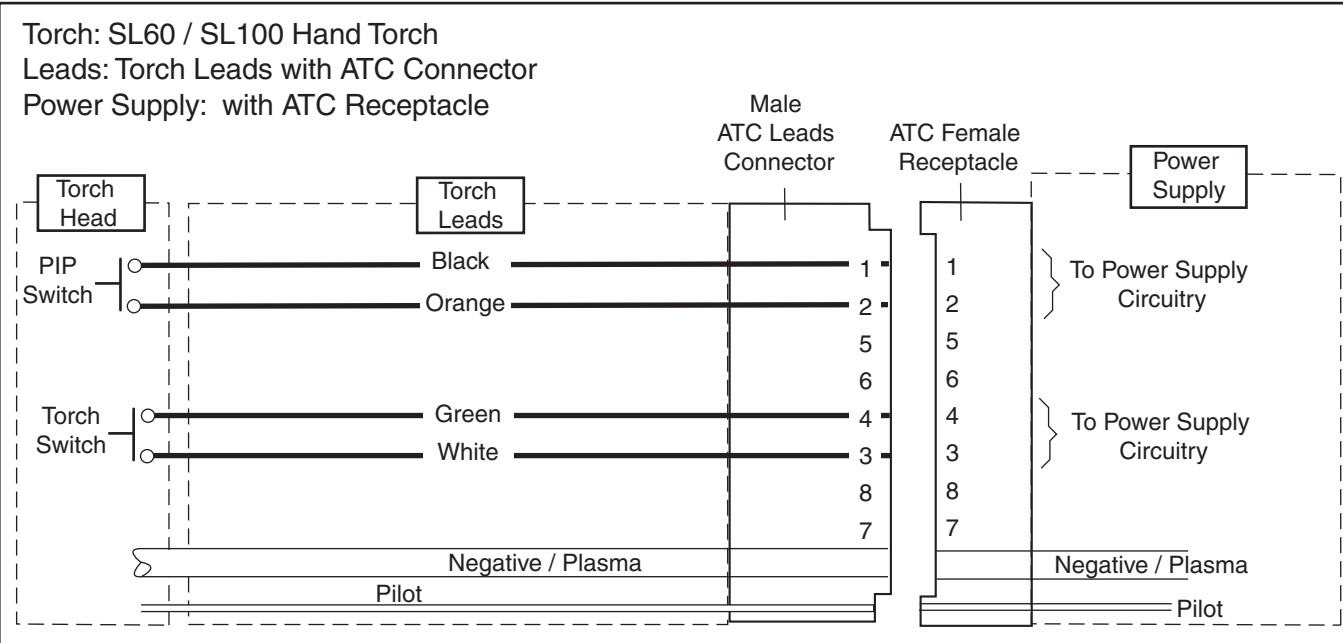
B. Mechanized (Machine) Torch Pin - Out Diagram



Art # A-03799

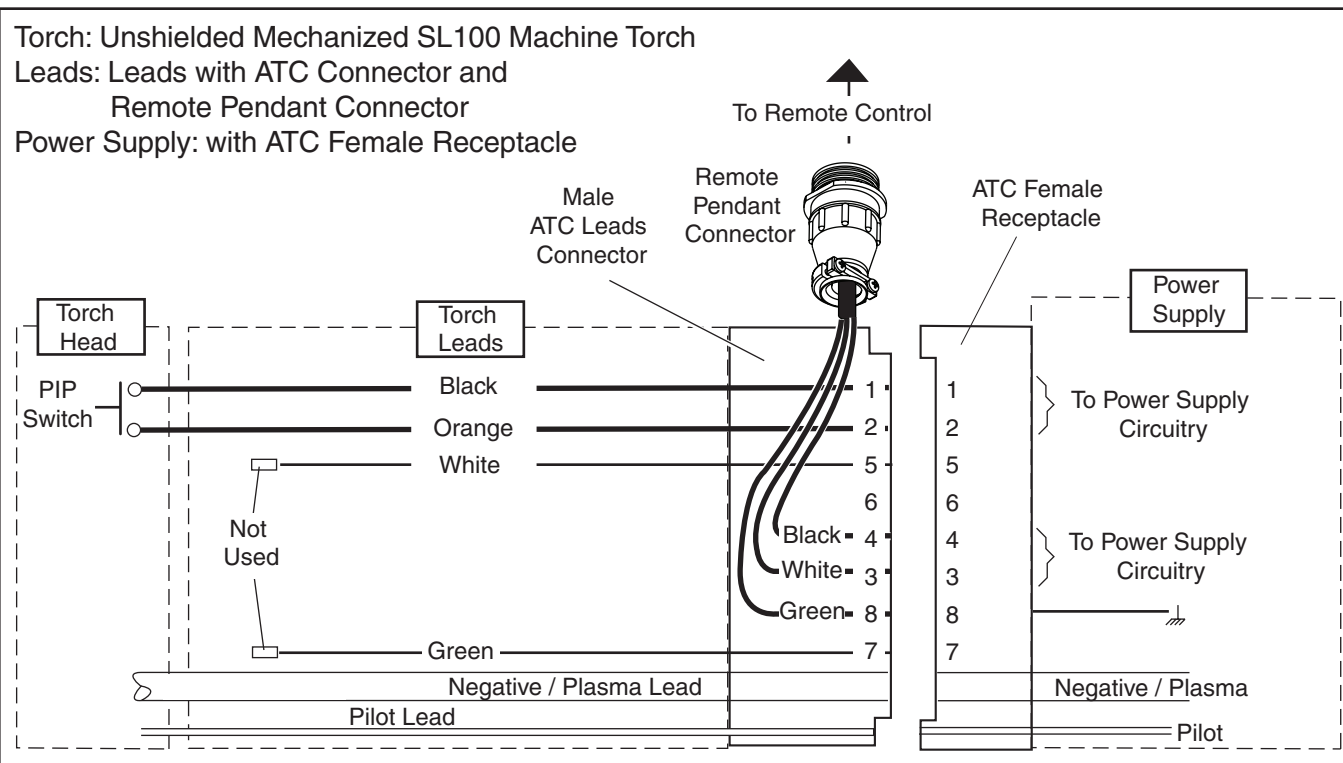
APPENDIX 4: TORCH CONNECTION DIAGRAMS

A. Hand Torch Connection Diagram



Art # A-03797_AB

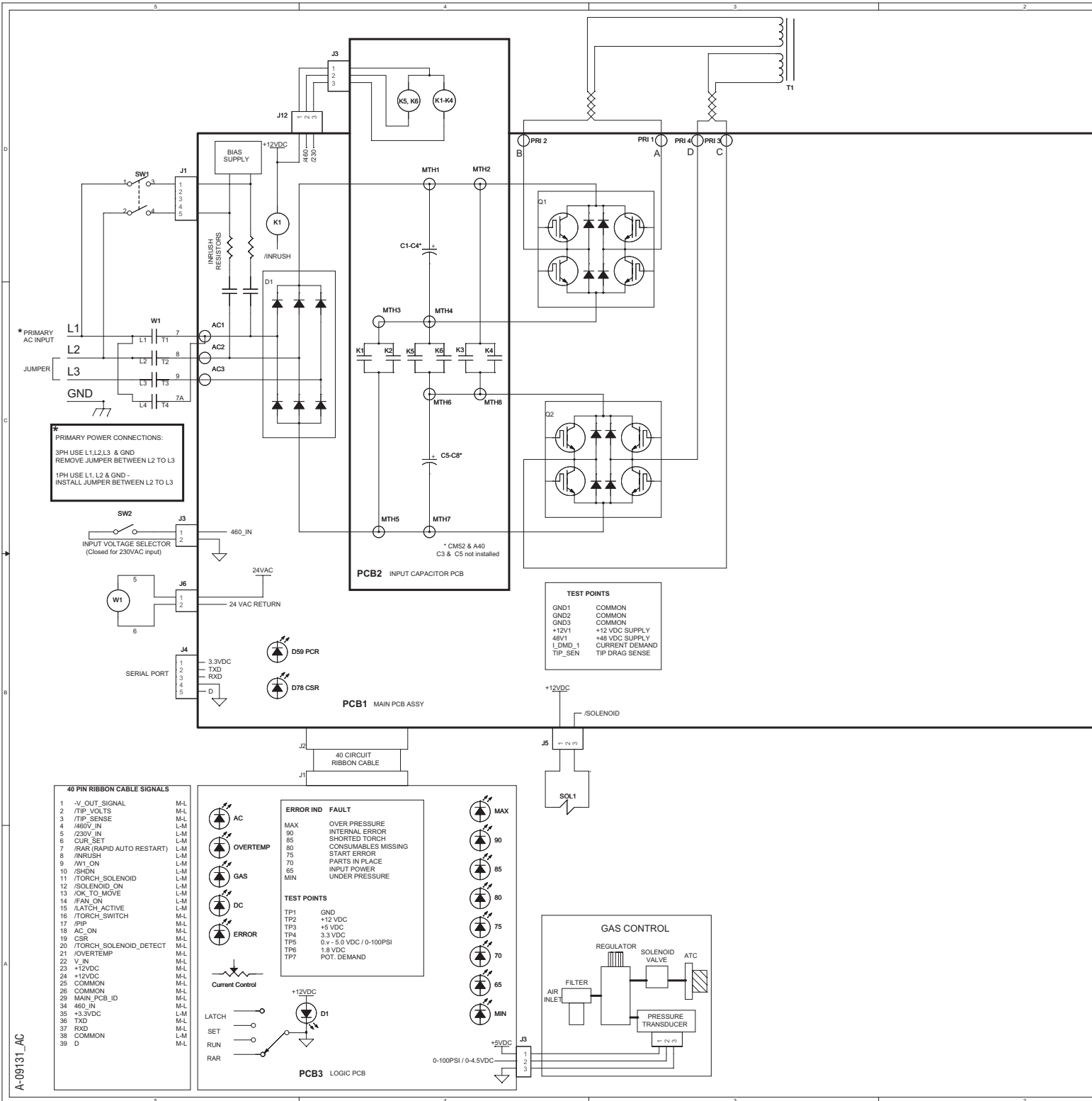
B. Mechanized Torch Connection Diagram

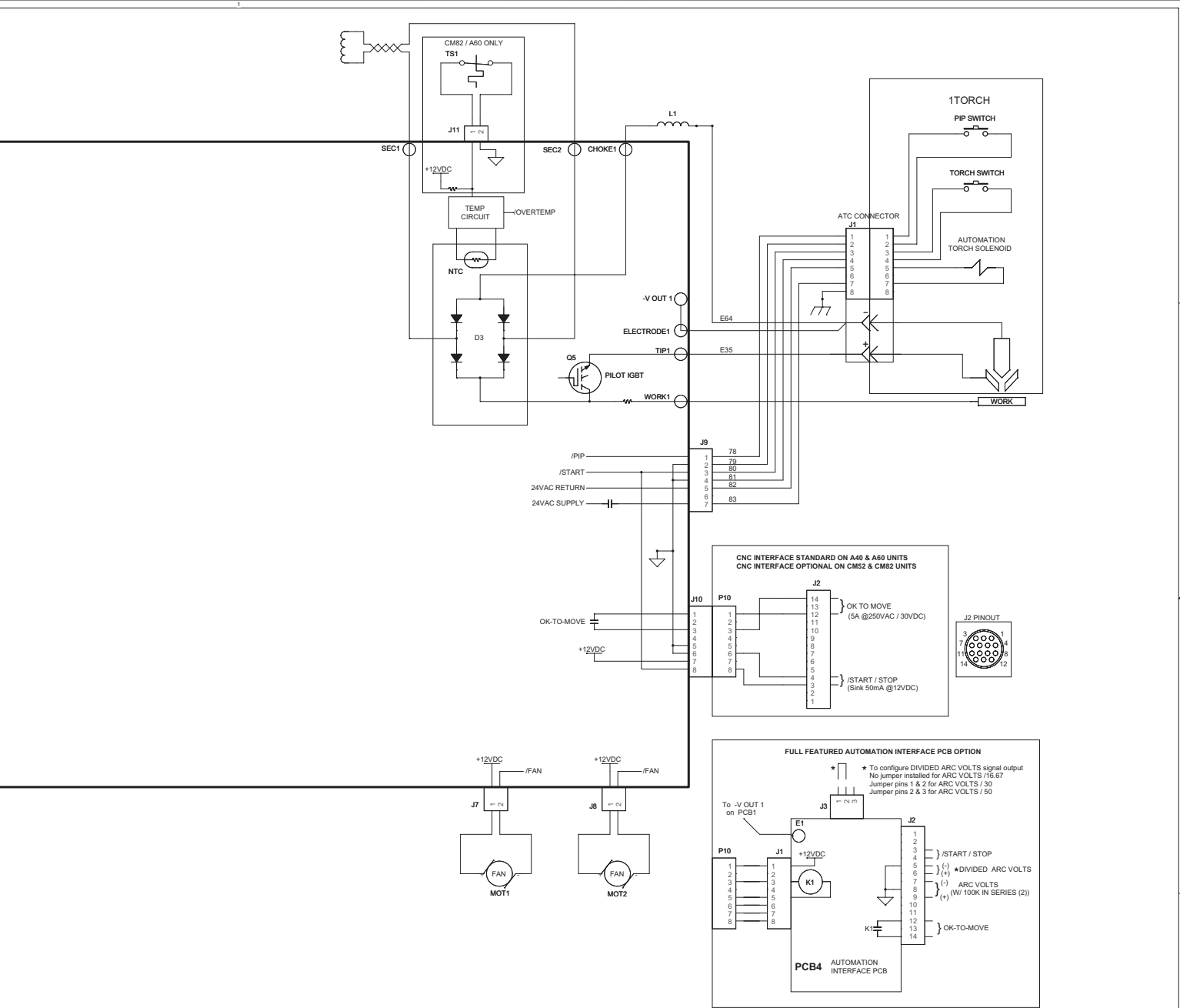


Art # A-03798

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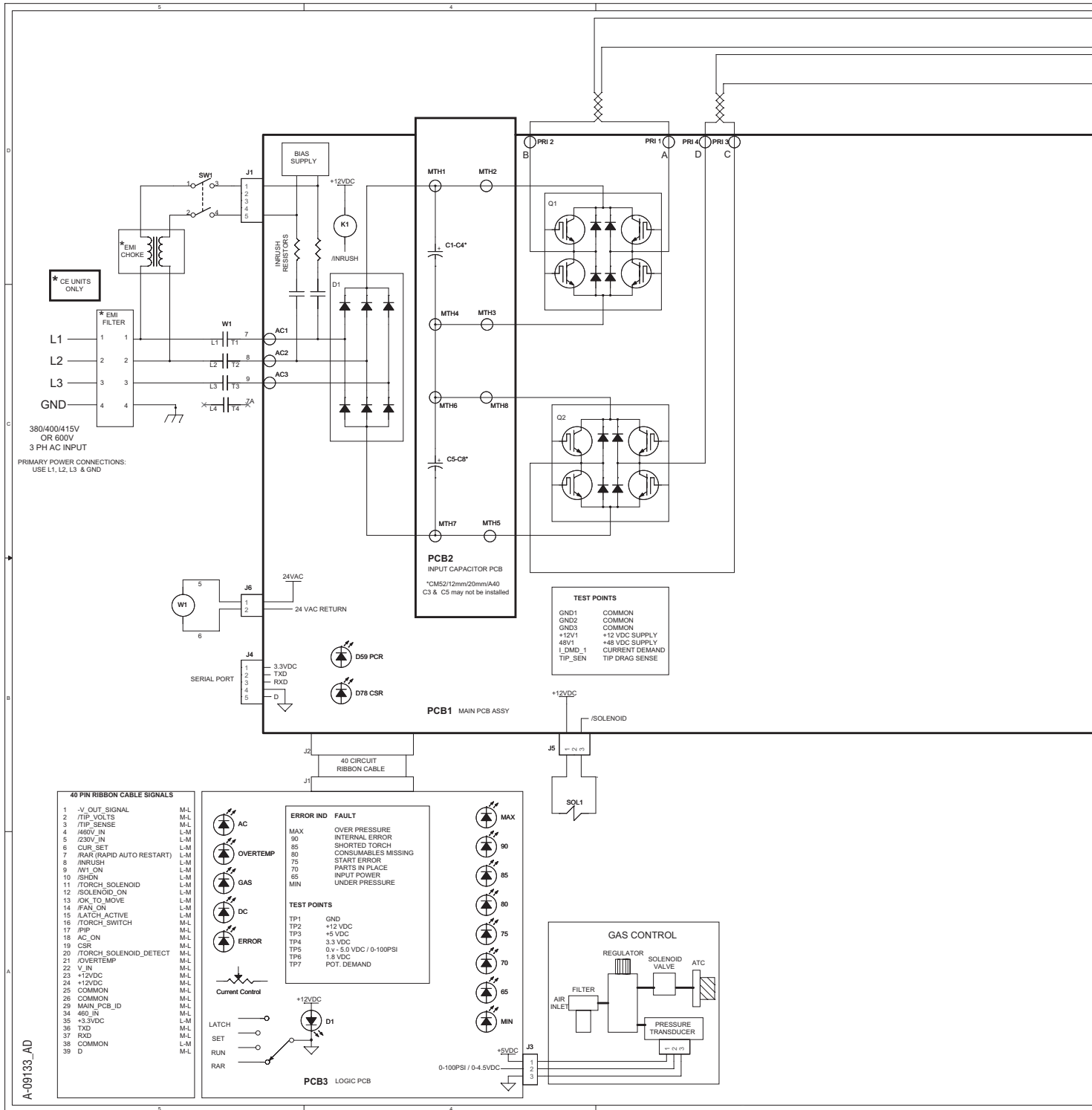
APPENDIX 5: SYSTEM SCHEMATIC, 208/460V UNITS

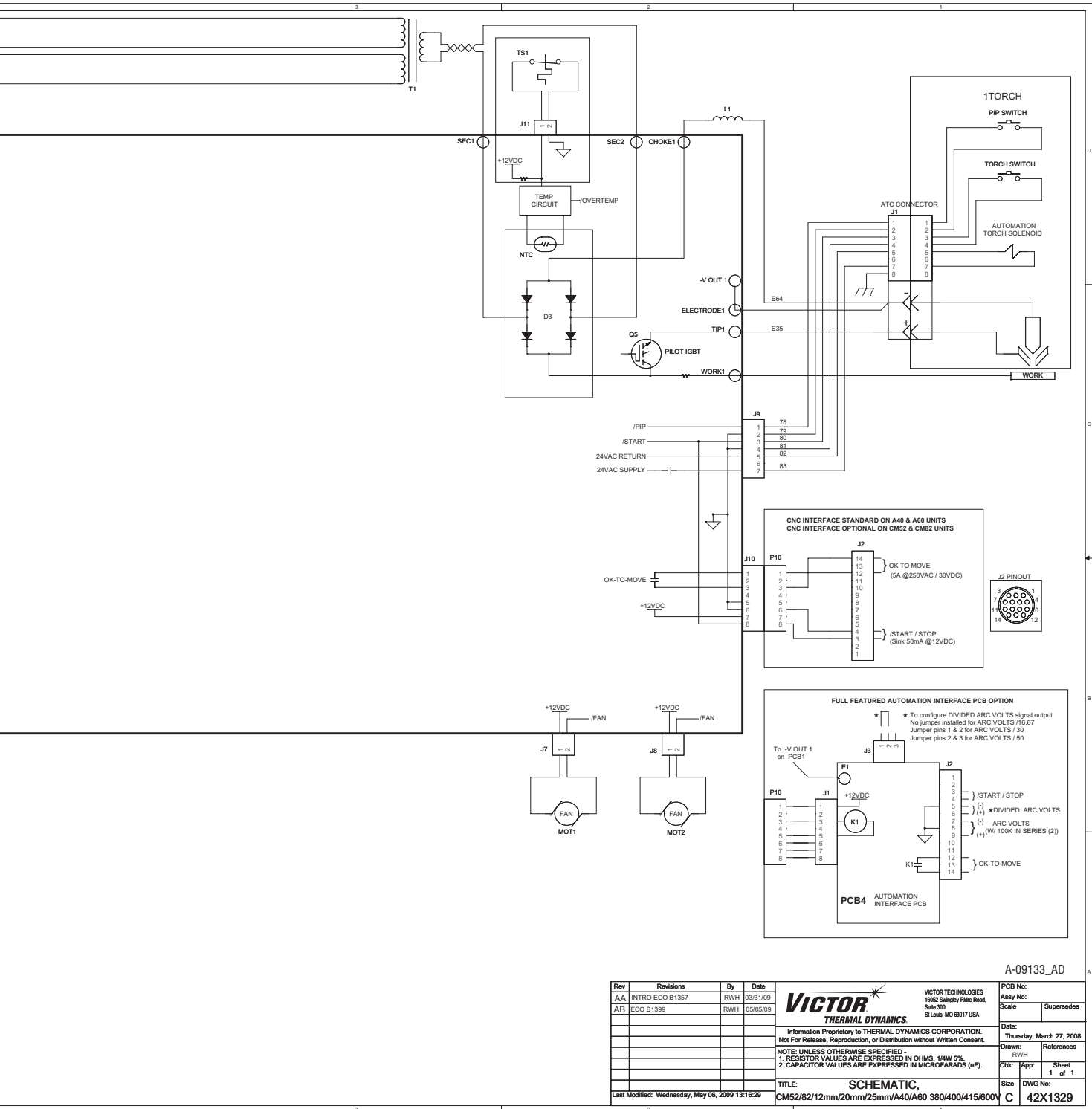




Rev	Revisions	By	Date	VICTOR THERMAL DYNAMICS		PCB No:
AA	INTRO ECO B534	RWH	07/23/07	VICTOR THERMAL DYNAMICS Information Proprietary to THERMAL DYNAMICS CORPORATION. Not For Release, Reproduction, or Distribution without Written Consent. NOTE: UNLESS OTHERWISE SPECIFIED: 1. RESISTOR VALUES ARE EXPRESSED IN OHMS, 1/4W 5%. 2. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS (uF). TITLE: SCHMATIC, CUTMASTER 52/82/A40/A60 230/460V		1692 Spring Ridge Road Suite 300 St Louis, MO 63017 USA
AB	ECO B890	MNC	04/23/08			PCB No:
AC	ECO B855	MNC	05/09/08			Asy No:
AD	ECO B1159	MNC	10/03/08			Scale
AE	ECO B1357	RWH	03/31/09			Supersedes
Last Modified: Monday, March 30, 2009 13:16:29				Date:	Thursday, March 27, 2008	
				Drawn:	RWH	
				CHK:	App: 1 of 1	
				Size:	DWG No: 42X1298	

APPENDIX 6: SYSTEM SCHEMATIC, 600V UNITS





Rev	Revisions	By	Date	PCB No:
AA	INTRO ECO B1357	RWH	03/31/09	Assy No:
AB	ECO B1389	RWH	05/05/09	Scale
				Supersedes
				Date:
				Thursday, March 27, 2008
				Drawn:
				RWH
				References
				Chk: App: Sheet
				1 of 1
				Size DWG No:
				C 42X1329

A-09133_AD

APPENDIX 7: Publication History

Cover Date	Rev.	Change(s)
July 11, 2018	AA	Manual released.

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