



**10mm**

# **CUTMASTER™**

## **PLASMA CUTTING SYSTEM**



# **Operating Manual**

Rev. AA

Date: July 30, 2008

Manual # 0-5074

Operating Features:



**30**  
AMP

**DC**

**1**  
PHASE

**208-  
230**  
V



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



## WARNINGS

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*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.*

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Plasma Cutting Power Supply  
CutMaster™ 10mm  
SL60 1Torch™  
Operating Manual Number 0-5074

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**Record the following information for Warranty purposes:**

Where Purchased: \_\_\_\_\_

Purchase Date: \_\_\_\_\_

Power Supply Serial #: \_\_\_\_\_

Torch Serial #: \_\_\_\_\_

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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.*

## 1.02 Important Safety Precautions



**WARNINGS**

**OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.**

*Plasma arc cutting produces intense electric and magnetic emissions that may interfere with the proper function of cardiac pacemakers, hearing aids, or other electronic health equipment. Persons who work near plasma arc cutting applications should consult their medical health professional and the manufacturer of the health equipment to determine whether a hazard exists.*

*To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment. Call 1-603-298-5711 or your local distributor if you have any questions.*



**GASES AND FUMES**

Gases and fumes produced during the plasma cutting process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the welding fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.

- The kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the differing processes. You must be very careful when cutting or welding any metals which may contain one or more of the following:

|           |           |          |
|-----------|-----------|----------|
| Antimony  | Chromium  | Mercury  |
| Arsenic   | Cobalt    | Nickel   |
| Barium    | Copper    | Selenium |
| Beryllium | Lead      | Silver   |
| Cadmium   | Manganese | Vanadium |

- Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using. These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.
- For information on how to test for fumes and gases in your workplace, refer to item 1 in Subsection 1.03, Publications in this manual.
- Use special equipment, such as water or down draft cutting tables, to capture fumes and gases.
- Do not use the plasma torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.
- This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Sec. 25249.5 et seq.)



**ELECTRIC SHOCK**

Electric Shock can injure or kill. The plasma arc process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically “live” or “hot.”
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Install and maintain equipment according to NEC code, refer to item 9 in Subsection 1.03, Publications.
- Disconnect power source before performing any service or repairs.
- Read and follow all the instructions in the Operating Manual.



**FIRE AND EXPLOSION**

Fire and explosion can be caused by hot slag, sparks, or the plasma arc.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapors from the workplace.

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- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum workpieces when they are cut underwater or while using a water table. **DO NOT** cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.



## NOISE

Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.
- For information on how to test for noise, see item 1 in Subsection 1.03, Publications, in this manual.



## PLASMA ARC RAYS

Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

- To protect your eyes, always wear a welding helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
- Wear welding gloves and suitable clothing to protect your skin from the arc rays and sparks.
- Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
- Protect others in the work area from the arc rays. Use protective booths, screens or shields.
- Use the shade of lens as suggested in the following per ANSI/ASC Z49.1:

| Arc Current    | Minimum Protective Shade No. | Suggested Shade No. |
|----------------|------------------------------|---------------------|
| Less Than 300* | 8                            | 9                   |
| 300 - 400*     | 9                            | 12                  |
| 400 - 800*     | 10                           | 14                  |

\* These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.



## LEAD WARNING

This product contains chemicals, including lead, or otherwise produces chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. **Wash hands after handling.** (California Health & Safety Code § 25249.5 et seq.)

## 1.03 Publications

Refer to the following standards or their latest revisions for more information:

1. OSHA, SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
2. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
3. NIOSH, SAFETY AND HEALTH IN ARC WELDING AND GAS WELDING AND CUTTING, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
4. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
5. ANSI Standard Z41.1, STANDARD FOR MEN'S SAFETY-TOE FOOTWEAR, obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018
6. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018
7. AWS Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126
8. NFPA Standard 51, OXYGEN-FUEL GAS SYSTEMS FOR WELDING, CUTTING AND ALLIED PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
9. NFPA Standard 70, NATIONAL ELECTRICAL CODE, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
10. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
11. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CYLINDERS, obtainable from the Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
12. CSA Standard W117.2, CODE FOR SAFETY IN WELDING AND CUTTING, obtainable from the Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3
13. NWSA booklet, WELDING SAFETY BIBLIOGRAPHY obtainable from the National Welding Supply Association, 1900 Arch Street, Philadelphia, PA 19103



14. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

15. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018

**1.04 Note, Attention et Avertissement**

Dans ce manuel, les mots “note,” “attention,” et “avertissement” sont utilisés pour mettre en relief des informations à caractère important. Ces mises en relief sont classifiées comme suit :

**NOTE**

*Toute opération, procédure ou renseignement général sur lequel il importe d’insister davantage ou qui contribue à l’efficacité de fonctionnement du système.*



**ATTENTION**

*Toute procédure pouvant résulter l’endommagement du matériel en cas de non-respect de la procédure en question.*



**AVERTISSEMENT**

*Toute procédure pouvant provoquer des blessures de l’opérateur ou des autres personnes se trouvant dans la zone de travail en cas de non-respect de la procédure en question.*

**1.05 Precautions De Securite Importantes**



**AVERTISSEMENTS**

**L’OPÉRATION ET LA MAINTENANCE DU MATÉRIEL DE SOUDAGE À L’ARC AU JET DE PLASMA PEUVENT PRÉSENTER DES RISQUES ET DES DANGERS DE SANTÉ.**

*Coupant à l’arc au jet de plasma produit de l’énergie électrique haute tension et des émissions magnétique qui peuvent interférer la fonction propre d’un “pacemaker” cardiaque, les appareils auditif, ou autre matériel de santé électronique. Ceux qui travail près d’une application à l’arc au jet de plasma devrait consulter leur membre professionnel de médication et le manufacturier de matériel de santé pour déterminer s’il existe des risques de santé.*

*Il faut communiquer aux opérateurs et au personnel TOUS les dangers possibles. Afin d’éviter les blessures possibles, lisez, comprenez et suivez tous les avertissements, toutes les précautions de sécurité et toutes les consignes avant d’utiliser le matériel. Composez le + 603-298-5711 ou votre distributeur local si vous avez des questions.*



**FUMÉE et GAZ**

La fumée et les gaz produits par le procédé de jet de plasma peuvent présenter des risques et des dangers de santé.

- Eloignez toute fumée et gaz de votre zone de respiration. Gardez votre tête hors de la plume de fumée provenant du chalumeau.
- Utilisez un appareil respiratoire à alimentation en air si l’aération fournie ne permet pas d’éliminer la fumée et les gaz.
- Les sortes de gaz et de fumée provenant de l’arc de plasma dépendent du genre de métal utilisé, des revêtements se trouvant sur le métal et des différents procédés. Vous devez prendre soin lorsque vous coupez ou soudez tout métal pouvant contenir un ou plusieurs des éléments suivants:

|           |           |          |
|-----------|-----------|----------|
| antimoine | cadmium   | mercure  |
| argent    | chrome    | nickel   |
| arsenic   | cobalt    | plomb    |
| baryum    | cuivre    | sélénium |
| béryllium | manganèse | vanadium |

- Lisez toujours les fiches de données sur la sécurité des matières (sigle américain “MSDS”); celles-ci devraient être fournies avec le matériel que vous utilisez. Les MSDS contiennent des renseignements quant à la quantité et la nature de la fumée et des gaz pouvant poser des dangers de santé.
- Pour des informations sur la manière de tester la fumée et les gaz de votre lieu de travail, consultez l’article 1 et les documents cités à la page 5.
- Utilisez un équipement spécial tel que des tables de coupe à débit d’eau ou à courant descendant pour capter la fumée et les gaz.
- N’utilisez pas le chalumeau au jet de plasma dans une zone où se trouvent des matières ou des gaz combustibles ou explosifs.
- Le phosgène, un gaz toxique, est généré par la fumée provenant des solvants et des produits de nettoyage chlorés. Éliminez toute source de telle fumée.
- Ce produit, dans le procédé de soudage et de coupe, produit de la fumée ou des gaz pouvant contenir des éléments reconnu dans L’état de la Californie, qui peuvent causer des défauts de naissance et le cancer. (La sécurité de santé en Californie et la code sécurité Sec. 25249.5 et seq.)



**CHOC ELECTRIQUE**

Les chocs électriques peuvent blesser ou même tuer. Le procédé au jet de plasma requiert et produit de l’énergie électrique haute tension. Cette énergie électrique peut produire des chocs graves, voire mortels, pour l’opérateur et les autres personnes sur le lieu de travail.

- Ne touchez jamais une pièce “sous tension” ou “vive”; portez des gants et des vêtements secs. Isolez-vous de la pièce de travail ou des autres parties du circuit de soudage.
- Réparez ou remplacez toute pièce usée ou endommagée.
- Prenez des soins particuliers lorsque la zone de travail est humide ou moite.

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- Montez et maintenez le matériel conformément au Code électrique national des Etats-Unis. (Voir la page 5, article 9.)
- Débranchez l'alimentation électrique avant tout travail d'entretien ou de réparation.
- Lisez et respectez toutes les consignes du Manuel de consignes.



## INCENDIE ET EXPLOSION

Les incendies et les explosions peuvent résulter des scories chaudes, des étincelles ou de l'arc de plasma. Le procédé à l'arc de plasma produit du métal, des étincelles, des scories chaudes pouvant mettre le feu aux matières combustibles ou provoquer l'explosion de fumées inflammables.

- Soyez certain qu'aucune matière combustible ou inflammable ne se trouve sur le lieu de travail. Protégez toute telle matière qu'il est impossible de retirer de la zone de travail.
- Procurez une bonne aération de toutes les fumées inflammables ou explosives.
- Ne coupez pas et ne soudez pas les conteneurs ayant pu renfermer des matières combustibles.
- Prévoyez une veille d'incendie lors de tout travail dans une zone présentant des dangers d'incendie.
- Le gas hydrogène peut se former ou s'accumuler sous les pièces de travail en aluminium lorsqu'elles sont coupées sous l'eau ou sur une table d'eau. NE PAS couper les alliages en aluminium sous l'eau ou sur une table d'eau à moins que le gas hydrogène peut s'échapper ou se dissiper. Le gas hydrogène accumulé explosera si enflammé.



## RAYONS D'ARC DE PLASMA

Les rayons provenant de l'arc de plasma peuvent blesser vos yeux et brûler votre peau. Le procédé à l'arc de plasma produit une lumière infra-rouge et des rayons ultra-violet très forts. Ces rayons d'arc nuiront à vos yeux et brûleront votre peau si vous ne vous protégez pas correctement.

- Pour protéger vos yeux, portez toujours un casque ou un écran de soudeur. Portez toujours des lunettes de sécurité munies de parois latérales ou des lunettes de protection ou une autre sorte de protection oculaire.
- Portez des gants de soudeur et un vêtement protecteur approprié pour protéger votre peau contre les étincelles et les rayons de l'arc.
- Maintenez votre casque et vos lunettes de protection en bon état. Remplacez toute lentille sale ou comportant fissure ou rognure.
- Protégez les autres personnes se trouvant sur la zone de travail contre les rayons de l'arc en fournissant des cabines ou des écrans de protection.

- Utilisez la nuance de lentille qui est suggérée dans la recommandation qui suivent ANSI/ASC Z49.1:

| Courant Arc   | Nuance Minimum Protective Numéro | Nuance Suggestée Numéro |
|---------------|----------------------------------|-------------------------|
| Moins de 300* | 8                                | 9                       |
| 300 - 400*    | 9                                | 12                      |
| 400 - 800*    | 10                               | 14                      |

\* Ces valeurs s'appliquent ou l'arc actuel est observé clairement. L'expérience a démontré que les filtres moins foncés peuvent être utilisés quand l'arc est caché par moiceau de travail.



## BRUIT

Le bruit peut provoquer une perte permanente de l'ouïe. Les procédés de soudage à l'arc de plasma peuvent provoquer des niveaux sonores supérieurs aux limites normalement acceptables. Vous devez vous protéger les oreilles contre les bruits forts afin d'éviter une perte permanente de l'ouïe.

- Pour protéger votre ouïe contre les bruits forts, portez des tampons protecteurs et/ou des protections auriculaires. Protégez également les autres personnes se trouvant sur le lieu de travail.
- Il faut mesurer les niveaux sonores afin d'assurer que les décibels (le bruit) ne dépassent pas les niveaux sûrs.
- Pour des renseignements sur la manière de tester le bruit, consultez l'article 1, page 5.



## PLOMB AVERTISSEMENT

Ce produit contient des produits chimiques, comme le plomb, ou engendre des produits chimiques, reconnus par l'état de Californie comme pouvant être à l'origine de cancer, de malformations fœtales ou d'autres problèmes de reproduction. **Il faut se laver les mains après toute manipulation.** (Code de Californie de la sécurité et santé, paragraphe 25249.5 et suivants)

**1.06 Documents De Reference**

Consultez les normes suivantes ou les révisions les plus récentes ayant été faites à celles-ci pour de plus amples renseignements :

1. OSHA, NORMES DE SÉCURITÉ DU TRAVAIL ET DE PROTECTION DE LA SANTÉ, 29CFR 1910, disponible auprès du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
2. Norme ANSI Z49.1, LA SÉCURITÉ DES OPÉRATIONS DE COUPE ET DE SOUDAGE, disponible auprès de la Société Américaine de Soudage (American Welding Society), 550 N.W. LeJeune Rd., Miami, FL 33126
3. NIOSH, LA SÉCURITÉ ET LA SANTÉ LORS DES OPÉRATIONS DE COUPE ET DE SOUDAGE À L'ARC ET AU GAZ, disponible auprès du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
4. Norme ANSI Z87.1, PRATIQUES SURES POUR LA PROTECTION DES YEUX ET DU VISAGE AU TRAVAIL ET DANS LES ECOLES, disponible de l'Institut Américain des Normes Nationales (American National Standards Institute), 1430 Broadway, New York, NY 10018
5. Norme ANSI Z41.1, NORMES POUR LES CHAUSSURES PROTECTRICES, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018
6. Norme ANSI Z49.2, PRÉVENTION DES INCENDIES LORS DE L'EMPLOI DE PROCÉDÉS DE COUPE ET DE SOUDAGE, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018
7. Norme A6.0 de l'Association Américaine du Soudage (AWS), LE SOUDAGE ET LA COUPE DE CONTENEURS AYANT RENFERMÉ DES PRODUITS COMBUSTIBLES, disponible auprès de la American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126
8. Norme 51 de l'Association Américaine pour la Protection contre les Incendies (NFPA), LES SYSTEMES À GAZ AVEC ALIMENTATION EN OXYGENE POUR LE SOUDAGE, LA COUPE ET LES PROCÉDÉS ASSOCIÉS, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
9. Norme 70 de la NFPA, CODE ELECTRIQUE NATIONAL, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
10. Norme 51B de la NFPA, LES PROCÉDÉS DE COUPE ET DE SOUDAGE, disponible auprès de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
11. Brochure GCA P-1, LA MANIPULATION SANS RISQUE DES GAZ COMPRIMÉS EN CYLINDRES, disponible auprès de l'Association des Gaz Comprimés (Compressed Gas Association), 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202
12. Norme CSA W117.2, CODE DE SÉCURITÉ POUR LE SOUDAGE ET LA COUPE, disponible auprès de l'Association des Normes Canadiennes, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada, M9W 1R3
13. Livret NWSA, BIBLIOGRAPHIE SUR LA SÉCURITÉ DU SOUDAGE, disponible auprès de l'Association Nationale de Fournitures de Soudage (National Welding Supply Association), 1900 Arch Street, Philadelphia, PA 19103
14. Norme AWSF4.1 de l'Association Américaine de Soudage, RECOMMANDATIONS DE PRATIQUES SURES POUR LA PRÉPARATION À LA COUPE ET AU SOUDAGE DE CONTENEURS ET TUYAUX AYANT RENFERMÉ DES PRODUITS DANGEREUX , disponible auprès de la American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126
15. Norme ANSI Z88.2, PRATIQUES DE PROTECTION RESPIRATOIRE, disponible auprès de l'American National Standards Institute, 1430 Broadway, New York, NY 10018

# CUTMASTER 10mm

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## 1.07 Declaration of Conformity

Manufacturer: Thermal Dynamics Corporation  
Address: 82 Benning Street  
West Lebanon, New Hampshire 03784  
USA

The equipment described in this manual conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (European Council Directive 73/23/EEC as amended by Council Directive 93/68/EEC) and to the National legislation for the enforcement of this Directive.

The equipment described in this manual conforms to all applicable aspects and regulations of the "EMC Directive" (European Council Directive 89/336/EEC) and to the National legislation for the enforcement of this Directive.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

### National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements. Among them are:

- \* CSA (Canadian Standards Association) standard C22.2 number 60 for Arc welding equipment.
- \* UL (Underwriters Laboratory) rating 94VO flammability testing for all printed-circuit boards used.
- \* CENELEC EN50199 EMC Product Standard for Arc Welding Equipment.
- \* ISO/IEC 60974-1 (BS 638-PT10) (EN 60 974-1) (EN50192) (EN50078) applicable to plasma cutting equipment and associated accessories.
- \* For environments with increased hazard of electrical shock, Power Supplies bearing the '**S**' mark conform to EN50192 when used in conjunction with hand torches with exposed cutting tips, if equipped with properly installed standoff guides.
- \* Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process. This is to ensure the product is safe, when used according to instructions in this manual and related industry standards, and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

Thermal Dynamics has been manufacturing products for more than 30 years, and will continue to achieve excellence in our area of manufacture.

Manufacturers responsible representative: Steve Ward  
Operations Director  
Thermadyne Europe  
Europa Building  
Chorley N Industrial Park  
Chorley, Lancashire,  
England PR6 7BX



**1.08 Statement of Warranty**

**LIMITED WARRANTY:** Subject to the terms and conditions established below, Thermal Dynamics® Corporation warrants to the original retail purchaser that new Thermal Dynamics CUTMASTER™ 1Series plasma cutting systems sold after the effective date of this warranty are free of defects in material and workmanship. Should any failure to conform to this warranty appear within the applicable period stated below, Thermal Dynamics Corporation shall, upon notification thereof and substantiation that the product has been stored operated and maintained in accordance with Thermal Dynamics' specifications, instructions, recommendations and recognized industry practice, correct such defects by suitable repair or replacement.

**This warranty is exclusive and in lieu of any warranty of merchantability or fitness for a particular purpose.**

Thermal Dynamics will repair or replace, at its discretion, any warranted parts or components that fail due to defects in material or workmanship within the time periods set out below. Thermal Dynamics Corporation must be notified within 30 days of any failure, at which time Thermal Dynamics Corporation will provide instructions on the warranty procedures to be implemented.

Thermal Dynamics Corporation will honor warranty claims submitted within the warranty periods listed below. All warranty periods begin on the date of sale of the product to the original retail customer or 1 year after sale to an authorized Thermal Dynamics Distributor.

**LIMITED WARRANTY PERIOD**

| Product         | Power Supply Components<br>(Parts and Labor) | Torch and Leads<br>(Parts and Labor) |
|-----------------|----------------------------------------------|--------------------------------------|
| CUTMASTER™ 10mm | 3 Years                                      | 1 Year                               |
| CUTMASTER™ 12mm | 3 Years                                      | 1 Year                               |
| CUTMASTER™ 20mm | 3 Years                                      | 1 Year                               |
| CUTMASTER™ 25mm | 3 Years                                      | 1 Year                               |
| CUTMASTER™ 35mm | 3 Years                                      | 1 Year                               |
| CUTMASTER™ 40mm | 3 Years                                      | 1 Year                               |

This warranty does not apply to:

1. Consumable Parts, such as tips, electrodes, shield cups, o - rings, starter cartridges, gas distributors, fuses, filters.
2. Equipment that has been modified by an unauthorized party, improperly installed, improperly operated or misused based upon industry standards.

In the event of a claim under this warranty, the remedies shall be, at the discretion of Thermal Dynamics Corporation:

1. Repair of the defective product.
2. Replacement of the defective product.
3. Reimbursement of reasonable costs of repair when authorized in advance by Thermal Dynamics.
4. Payment of credit up to the purchase price less reasonable depreciation based on actual use.

These remedies may be authorized by Thermal Dynamics and are FOB West Lebanon, NH or an authorized Thermadyne service station. Product returned for service is at the owner's expense and no reimbursement of travel or transportation is authorized.

**LIMITATION OF LIABILITY:** Thermal Dynamics Corporation shall not under any circumstances be liable for special or consequential damages such as, but not limited to, damage or loss of purchased or replacement goods or claims of customer or distributors (hereinafter "Purchaser") for service interruption. The remedies of the Purchaser set forth herein are exclusive and the liability of Thermal Dynamics with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of the goods covered by or furnished by Thermal Dynamics whether arising out of contract, negligence, strict tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which liability is based.

**This warranty becomes invalid if replacement parts or accessories are used which may impair the safety or performance of any Thermal Dynamics product.**

**This warranty is invalid if the Thermal Dynamics product is sold by non - authorized persons.**

Effective September 4, 2007

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## SECTION 2 SYSTEM: INTRODUCTION

### 2.01 How To Use This Manual

This Operating Manual applies to just specification or part numbers listed on page i. 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:



#### **WARNING**

*A WARNING gives information regarding possible personal injury.*



#### **CAUTION**

*A CAUTION refers to possible equipment damage.*

#### **NOTE**

*A NOTE offers helpful information concerning certain operating procedures.*

Additional copies of this manual may be purchased by contacting Thermal Dynamics at the address and phone number in your area listed in the inside 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

Thermal Dynamics web site listed below and clicking on Thermal Dynamics and then on the Literature link:

<http://www.thermal-dynamics.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 rear panel. 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 1 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.



# CUTMASTER 10mm

## 2.04 Power Supply Specifications

| <b>Cutmaster 10mm Power Supply Specifications</b>                                                                                                                                                                                                                                                                    |                                                                  |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|---------|
| Input Power (See Note 1)                                                                                                                                                                                                                                                                                             | 208 - 230 VAC ( $\pm 10\%$ ), Single-Phase, 50/60 Hz             |         |
| Input Power Cable                                                                                                                                                                                                                                                                                                    | Cable without plug, for 230VAC, 20-Amp Single-Phase input power. |         |
| Output Current                                                                                                                                                                                                                                                                                                       | 20-30 Amps, continuously variable                                |         |
| Power Supply Gas Filtering Ability                                                                                                                                                                                                                                                                                   | Particulates to 20 Microns                                       |         |
| <b>Cutmaster 10mm Power Supply Duty Cycle (Note 2)</b>                                                                                                                                                                                                                                                               |                                                                  |         |
| Ambient Temperature                                                                                                                                                                                                                                                                                                  | 104° F (40° C)                                                   |         |
| Duty Cycle                                                                                                                                                                                                                                                                                                           | 35%                                                              | 60%     |
| DC Voltage                                                                                                                                                                                                                                                                                                           | 78 vdc                                                           | 89 vdc  |
| Current                                                                                                                                                                                                                                                                                                              | 30 Amps                                                          | 22 Amps |
| <b>SL 60 Torch Gas Requirements</b>                                                                                                                                                                                                                                                                                  |                                                                  |         |
| Gas Type                                                                                                                                                                                                                                                                                                             | Compressed Air                                                   |         |
| Gas specifications                                                                                                                                                                                                                                                                                                   | Clean, dry, oil-free (Note 3)                                    |         |
| Maximum Input Gas Pressure                                                                                                                                                                                                                                                                                           | 125 psi / 8.6 bar                                                |         |
| Operating Gas Pressure                                                                                                                                                                                                                                                                                               | 65 psi / 4.5 bar                                                 |         |
| Gas Flow Requirements                                                                                                                                                                                                                                                                                                | 300 scfh / 141.5 lpm                                             |         |
| <b>Notes</b>                                                                                                                                                                                                                                                                                                         |                                                                  |         |
| <b>1.</b> Duty Cycle is the percentage of time the system can be operated without overheating. Duty cycle is reduced if primary input voltage (AC) is low or the DC voltage is higher than shown in this chart.                                                                                                      |                                                                  |         |
| <b>2.</b> Air supply must be free of oil, moisture, and other contaminants. Excessive oil and moisture may cause double-arcing, rapid tip wear, or even complete torch failure. Contaminants may cause poor cutting performance and rapid electrode wear. Optional filters provide increased filtering capabilities. |                                                                  |         |

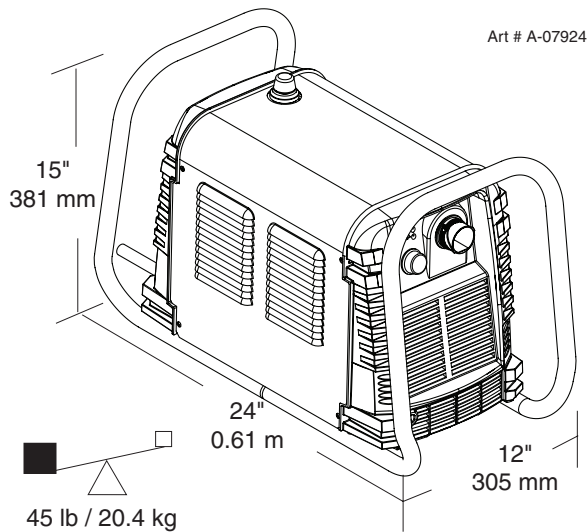
### NOTE

*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.*

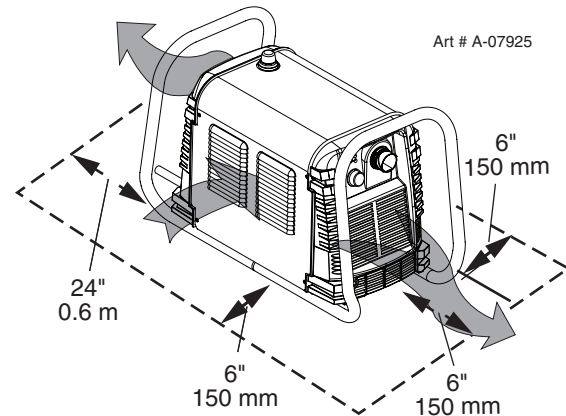
*TDC Rating is determined using an output voltage representative of actual output voltage during cutting with a TDC torch. This voltage may be more or less than IEC voltage, depending upon choice of torch, consumables, and actual cutting operation.*



## Power Supply Dimensions & Weight



## Ventilation Clearance Requirements



### NOTE

Weight includes torch & leads, input power cord, and work cable with clamp.



### CAUTION

Provide clearance for proper air flow through the power supply. Operation without proper air flow will inhibit proper cooling and reduce duty cycle.

## 2.05 Input Wiring Specifications

| Cutmaster 10mm Input Power Requirements |         |             |               |                             |            |               |
|-----------------------------------------|---------|-------------|---------------|-----------------------------|------------|---------------|
| Input                                   |         | Power Input | Current Input | Suggested Sizes (See Notes) |            |               |
| Voltage                                 | Freq.   | (kVA)       | (Amps)        | Fuse (Amps)                 | Wire (AWG) | Wire (Canada) |
| (Volts)                                 | (Hz)    | 1-Ph        | 1-Ph          | 1-Ph                        | 1-Ph       | 1-Ph          |
| 208                                     | 50 / 60 | 3.5         | 16            | 20                          | 12         | 12            |
| 230                                     | 50 / 60 | 3.4         | 14            | 20                          | 12         | 12            |

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

### NOTES

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

The suggested sizes are based on flexible power cable with power plug installations.

Cable conductor temperature used is 167° F (75° C).

An energy limiting fuse UL Class RK-1 (examples: BUSS LPS/LPN-RK or Gould-Shawmut AZK-A6K) should be used to minimize damage to Plasma Cutting, Welding or power distribution equipment.

NEVER use replaceable element fuses like UL Class H, or "one-time" fuses like UL Class K5.

### Extension Cords

Extension cords must meet National Electric Code Guidelines (and OSHA Guidelines, where applicable). Extension cords must have the same rating as the service and must have a three-pronged plug.

## 2.06 Power Supply Options and Accessories

The following options and accessories are available for this Power Supply. Section 6 provides catalog numbers and ordering information.

### A. Single-Stage Air Filter Kit

A single-stage air filter for use on compressed air shop systems. Highly effective at removing moisture and particulate matter from the air stream to at least 0.85 microns.

### B. Multi-Purpose Cart

Rugged steel cart on easy-rolling rear wheels and front-mounted swivel casters. Provides maximum mobility for the power supply and can also serve as a display cart. Top shelf is 12" (305 mm) x 20" (508 mm). Steel handle is 30" (762 mm) high.

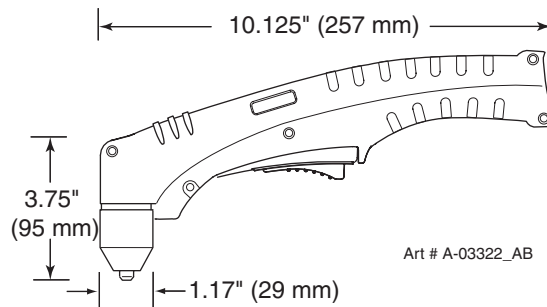
### C. Cutting Guide Kit

Easy add-on attachments for straight line, circle, or bevel cutting.

## 2.07 Torch Specifications

### A. Torch Configuration and Dimensions

The torch head is at 75° to the torch handle. The torch includes a torch handle and torch trigger assembly.



Torch Configuration and Dimensions

### B. Torch Leads Lengths

Leads are available in 20 ft (6.1 m) lengths.

### C. Parts-In-Place (PIP)

Torch has built-in switch.

12 vdc circuit rating

### D. Type of Cooling

Combination of ambient air and gas stream through torch

### E. SL60 Torch Ratings (*Refer to Note*)

#### NOTE

*Ratings shown apply to the SL60 Torch only. Refer to the Specifications chart on page 2T-1 for Cutmaster 10mm data.*

### F. Plasma Power Supply Used With

- Thermal Dynamics Cutmaster 10mm

## SECTION 2 TORCH: INTRODUCTION

### 2T.01 Scope of Manual

This manual contains descriptions, operating instructions and maintenance procedures for the 1Torch Model SL60 Plasma Cutting Torch. 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.

**NOTE**

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

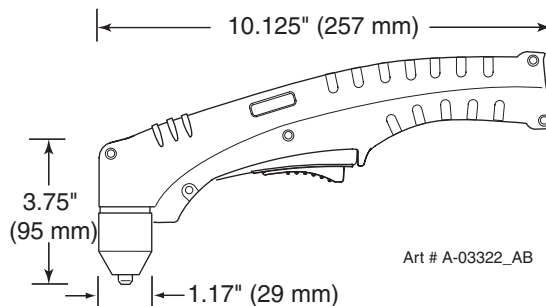
*Refer to the Appendix Pages for additional specifications as related to the Power Supply used.*

### 2T.03 Specifications

#### A. Torch Configurations

##### 1. Hand Torch, Model SL60

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



#### B. Torch Leads Lengths

**Hand Torches** are available as follows:

- 20 ft / 6.1 m.

#### C. Torch Parts

Starter Cartridge, Electrode, Tip, Shield Cup

#### D. Parts - In - Place (PIP)

Torch Head has built - in switch

12 vdc circuit rating

#### E. Type Cooling

Combination of ambient air and gas stream through torch.

#### F. Torch Ratings

| SL60 Torch Ratings                |                           |
|-----------------------------------|---------------------------|
| <b>Ambient Temperature</b>        | 104° F<br>40° C           |
| <b>Duty Cycle</b>                 | 100% @ 60 Amps @ 400 scfh |
| <b>Maximum Current</b>            | 60 Amps                   |
| <b>Voltage (V<sub>peak</sub>)</b> | 500V                      |
| <b>Arc Striking Voltage</b>       | 7kV                       |

#### G. Current Ratings

| SL60 Current Ratings |                                         |
|----------------------|-----------------------------------------|
| SL60 Torch & Leads   | Up to 60 Amps, DC,<br>Straight Polarity |

**NOTE**

*Power Supply characteristics will determine material thickness range.*

# CUTMASTER 10mm

## H. Gas Requirements

| SL60 Torch Gas Specifications              |                                 |
|--------------------------------------------|---------------------------------|
| Gas (Plasma and Secondary)                 | Compressed Air                  |
| Operating Pressure<br><i>Refer to NOTE</i> | 60 - 75 psi<br>4.1 - 5.2 bar    |
| Maximum Input Pressure                     | 125 psi / 8.6 bar               |
| Gas Flow (Cutting and Gouging)             | 300 - 500 scfh<br>142 - 235 lpm |



### WARNING

*This torch is not to be used with oxygen (O<sub>2</sub>).*

### NOTE

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

## I. Direct Contact Hazard

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

## 2T.04 Options And Accessories

These items can adapt a standard system to a particular application or further enhance performance.

- Deluxe Cutting Guide Kit - Easy add - on attachments for precise straight line, circle cutting, and beveling. Includes carrying case.
- Trigger Guard Kits - These offer additional protection from accidental activation of the torch switch.
- Leads Extensions for torches with ATC connectors
- Leather Leads Covers

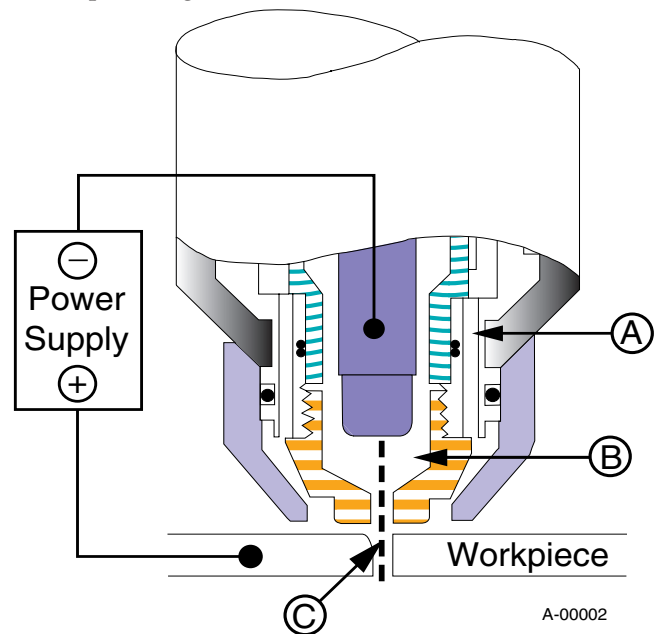
## 2T.05 Introduction to Plasma

### 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**

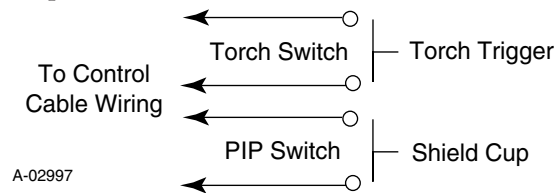
When the torch is started a pilot arc is established between the electrode and cutting tip. This pilot arc creates a path for the main arc to transfer to the work.

**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: INSTALLATION**

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### **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.*

***HANDLE** is not for mechanical lifting.*

---

- Only persons of adequate physical strength should lift the unit.
- Lift unit by the handle, 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 Primary Input Power Connections



### CAUTION

Check your power source for correct voltage 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.

### Power Cord

This power supply includes an input power cord suitable for 230 VAC, 20 Amp, Single - Phase input power.

Connect the input power cord as follows:

1. Check the power source for correct voltage before plugging in the unit.
2. Connect the input power cable (or close the main disconnect switch) to supply power to the system.

## 3.04 Gas Connections

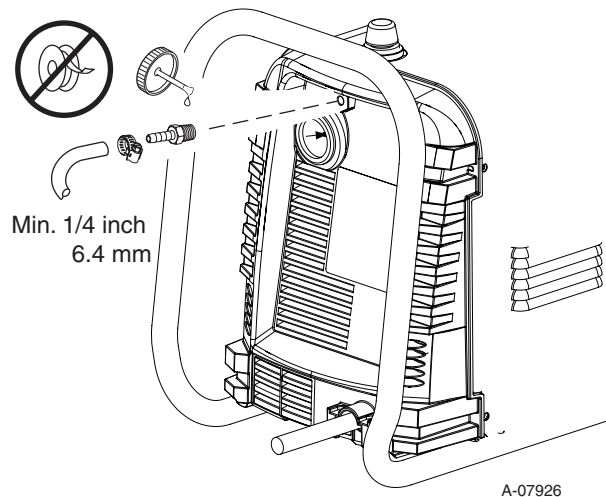
### A. Connecting Gas Supply to Unit

The connection is the same for compressed air or high pressure gas cylinders. Refer to subsection 3.4-C if an optional air line filter is to be installed.

1. Connect the gas 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 gas passages in the torch.



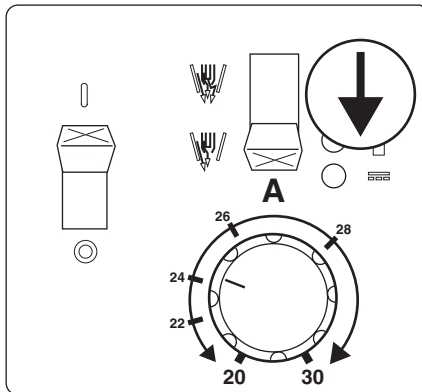
Gas Connection to Inlet Port



**B. Check Air Quality**

To test the quality of air, put the RUN / SET switch in the SET (down) position, place a welding filter lens in front of the torch and turn on the gas. Any oil or moisture in the air will be visible on the lens.

**Do not start an arc!**



A-07927

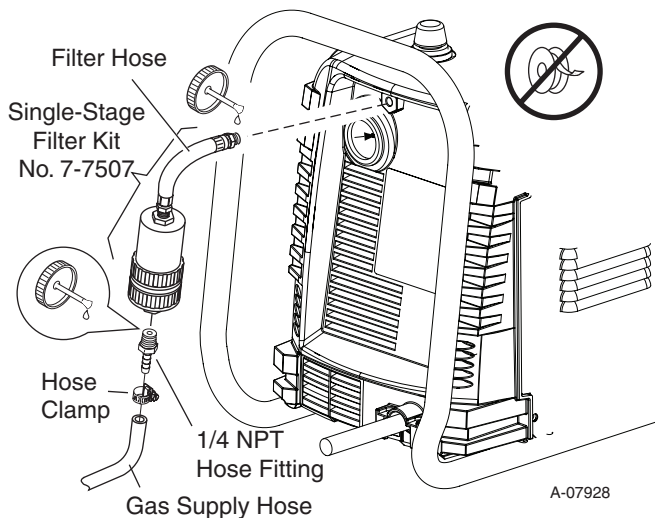
**C. Installing Optional Single - Stage Air Filter**

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 gas 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 the maker's instructions. Do Not use Teflon tape as a thread sealer, as small particles of the tape may break off and block the small gas passages in the torch. Connect as follows:*



A-07928

Optional Single - Stage Filter Installation

# CUTMASTER 10mm

## D. Using High Pressure Gas Cylinders

When using high pressure gas cylinders as the gas supply:

1. Refer to the manufacturer's specifications for installation and maintenance procedures for high pressure gas 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 gas supply hose to the cylinder.

### NOTE

*Pressure should be set at 100 psi (6.9 bar) at the high pressure gas 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 gas passages in the torch.*

## 3.05 Torch Connections

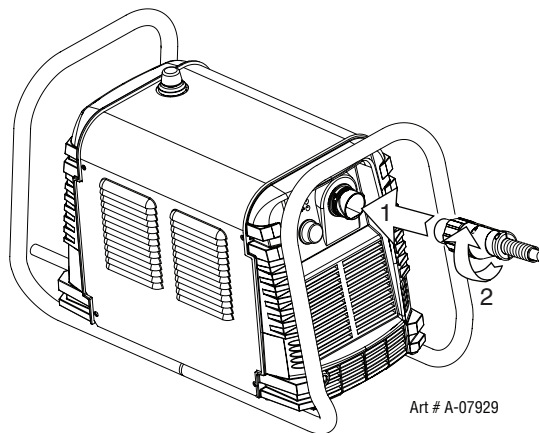
If necessary, connect the torch to the Power Supply. Connect only the Thermal Dynamics model SL60 Torch to this power supply.



### WARNING

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

1. Align the male connector (on the torch lead) with the female receptacle on the power supply. Press the connector into the receptacle fully.
2. Turn the locking ring on the male connector fully clockwise until it clicks.



Connecting the Torch to the Power Supply

3. The system is ready for operation.

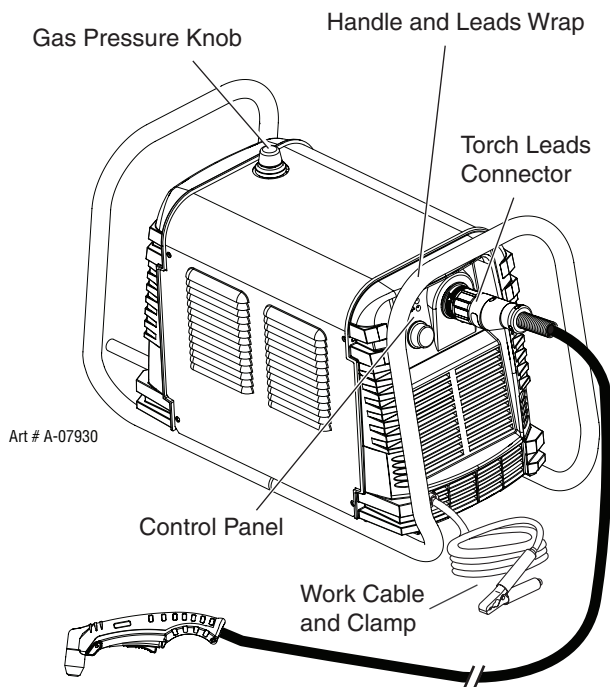
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## SECTION 4 SYSTEM: OPERATION

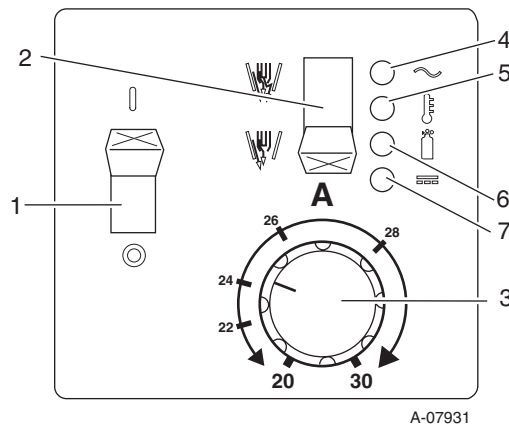
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### 4.01 Product Features

#### A. General Features



## B. Control Panel



### 1. ON / OFF Switch

Controls input power to the power supply. Up is ON, down is OFF.

### 2. RUN / SET Switch

RUN (up) position is for general torch operation. SET (down) position is for setting gas pressure and purging lines.

### 3. (A) Output Current Control

Sets the desired output current. If the overload protection (fuse or circuit breaker) on the input power circuit opens frequently, either reduce cutting output, reduce the cutting time, or connect the unit to more adequate input power. Refer to Section 2 for input power requirements.

### 4. 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.

### 5. TEMP Indicator

Indicator is normally OFF. Indicator is ON when internal temperature exceeds normal limits. Allow the unit to run with the fan on until the Temp indicator turns off.

### 6. GAS Indicator

Indicator is ON when adequate input gas pressure is present to operate the power supply.

### 7. DC Indicator

Indicator is ON when DC output circuit is active.

## 4.02 Preparations For Operating

At the start of each operating session:

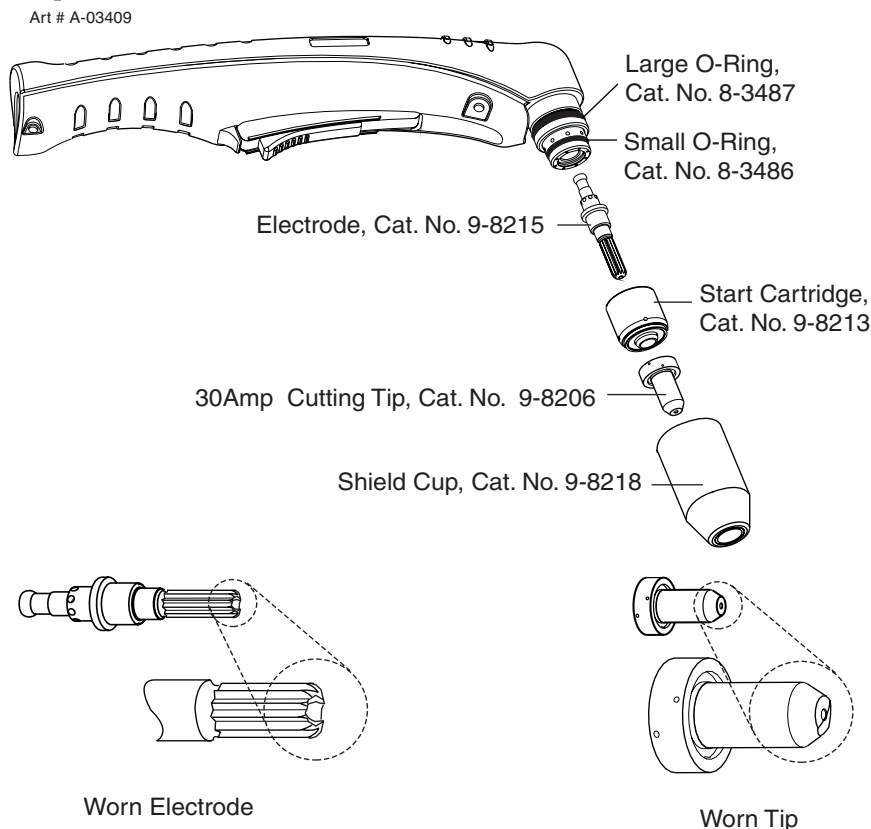


**WARNING**

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

### A. 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 (30 amps maximum). Use only genuine Thermal Dynamics parts with this torch.



#### NOTE

*When operating the torch in a normal condition, a small amount of gas vents through the gap between the shield cup and torch handle. Do not attempt to over tighten the shield cup as irreparable damage to internal components may result.*

### B. Torch Connection

Check that the torch is properly connected.

### C. 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.

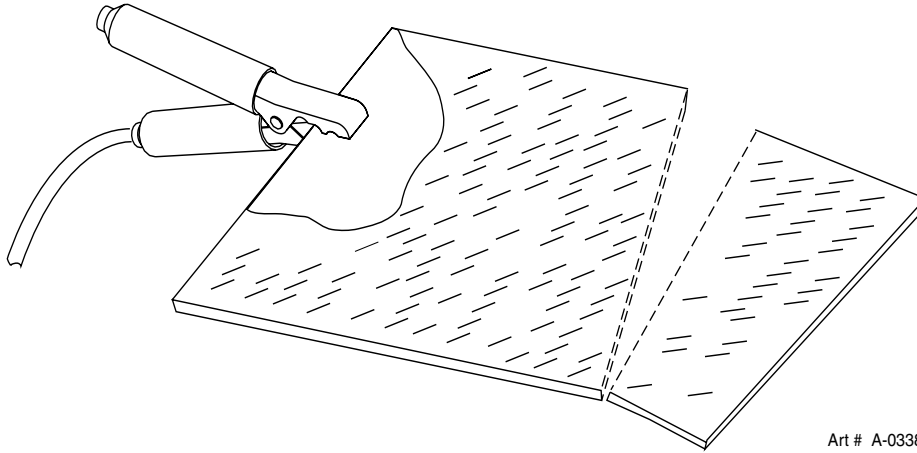
# CUTMASTER 10mm

## D. Gas Selection

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

## E. Connect Work Cable

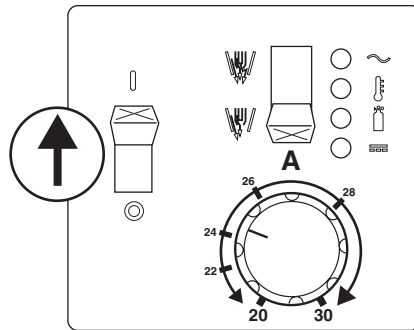
Clamp the work cable to the workpiece or cutting table. The area must be free from oil, paint and rust. Connect only to the main part of the workpiece; do not connect to the part to be cut off.



Art # A-03387


## F. Power On

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



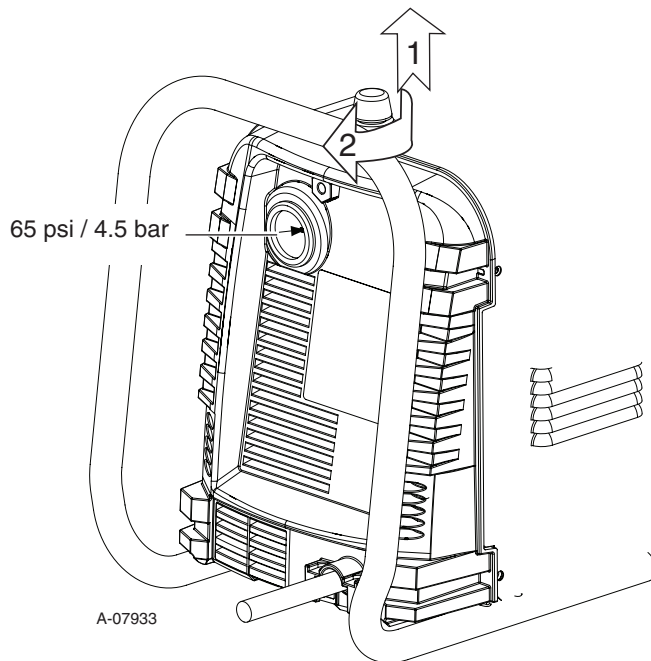
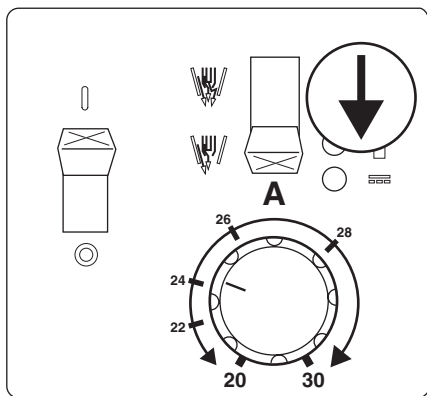
A-07932

**G. Set Operating Pressure**

Place the Power Supply RUN / SET switch to the SET (down) position. Gas will flow. Adjust gas pressure to 65 psi / 4.5 bar. Gas indicator  turns on.

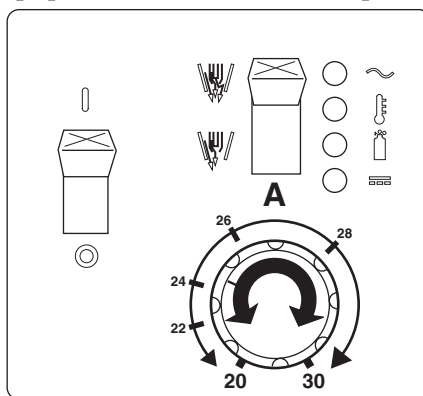
**NOTE**

*If gas regulator leaks, reset gas pressure to 0 psi, then reset to 65 psi / 4.5 bar.*



**H. Select Current Output Level**

Place RUN / SET switch to RUN (up) position. Gas flow will stop. Set the desired current output level.



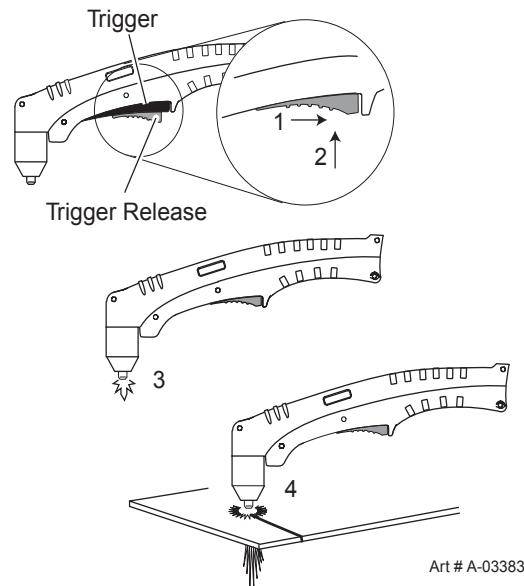
# CUTMASTER 10mm

## I. Cutting Operation

Refer to Section 1, Important Safety Precautions. Wear heavy welding gloves and protective clothing. Protect eyes with appropriate shielding. Aim the torch head away from yourself. Slide the trigger release to the rear. Squeeze and hold the trigger. Gas flows for approximately 1 second, then shuts off briefly. The pilot arc then starts. DC indicator  $\text{---}=\text{---}$  turns on. Bring the torch within transfer distance to the workpiece. The pilot arc stops and the main arc transfers to the workpiece.

### NOTE

*When operating the torch in a normal condition, a small amount of gas vents through the gap between the shield cup and torch handle. Do not attempt to over tighten the shield cup as irreparable damage to internal components may result.*



## J. Cutting Technique

Hold the torch with one or two hands, with the torch tip close to the workpiece. Do not cut or handle the workpiece without welding gloves and protective clothing. Always wear protective eye shielding when cutting or gouging. Move the torch along the cut line so the arc penetrates the workpiece and sparks emerge from the bottom of the cut. Good cutting speeds create a slight trailing arc.

## K. Postflow

Release the trigger to stop the cutting arc. Gas continues to flow for approximately 10 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.


## I. 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.



### 4.03 Sequence of Operation

The following is a typical sequence of operation for this power supply. Refer to Appendix 1 for block diagram.


1. Plug the input power cord into an active circuit.
  - a. AC power is available at the Power Supply.
2. Place the ON / OFF switch on the Power Supply to ON (up) position.
  - a. AC indicator  turns on; fan turns on.

---

#### NOTES

*If there is adequate gas supply pressure to the power supply, gas comes on if Torch Trigger is pressed.*


*If torch trigger is held while user turns on main AC power, system goes into 'protective interlock' mode. AC indicator flashes; torch will not pilot. Release torch trigger, turn AC switch OFF then ON.*

3. Put RUN / SET switch to SET (down position).
  - a. Gas flows to set pressure. Turn gas pressure adjustment knob to set pressure to 65 psi / 4.5 bar; Gas indicator  turns ON when there is sufficient gas pressure for power supply operation.

---

#### NOTE


*Minimum pressure for power supply operation is lower than minimum pressure for torch operation.*

4. Put RUN / SET switch to RUN (up position). Gas flow stops.
5. Wear protective clothing and welding gloves. Protect eyes. Slide the trigger release to the rear; squeeze and hold the trigger. Gas flows briefly, then shuts off momentarily. Then gas flow will resume. Pilot arc is established. DC indicator  turns ON. Move Torch within transfer distance of workpiece.
  - a. Main arc transfers to workpiece.
6. Complete cutting operation.

---

#### NOTE

*If the torch is lifted from the workpiece while the torch switch is activated, the main arc will stop and the pilot arc will automatically restart.*

7. Release the torch trigger.
  - a. Main arc stops; gas flows for approximately 10 seconds.
8. Set the power supply ON / OFF switch to OFF (down position).
  - a. AC indicator  turns OFF; fan turns OFF.
9. Set the main power disconnect to OFF, or unplug input power cord.
  - a. Input power is removed from the system.

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## SECTION 4 TORCH: OPERATION

### NOTE

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

### 4T.01 Introduction

This section provides a description of the SL60 and SL100 Torch Assemblies followed by operating procedures.

### 4T.02 Functional Overview

The Torch is designed to operate with various Power Supplies to provide a plasma cutting system which can cut most metals. With gouging torch parts the torch can be used for plasma arc gouging.

#### NOTE

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

### 4T.03 Getting Started

Follow this procedure at the beginning of each shift:



#### WARNING

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

#### Torch Parts

Check the torch for proper assembly. Install proper torch parts for the desired application (refer to next SubSection called "Torch Parts Selection").

#### Input Power

Check the power source for proper input voltage. Close main disconnect switch or plug unit in to supply primary power to the system.

#### Work Cable

Check for a solid cable connection to the work-piece.

#### Gas Supply

Select desired single gas supply. Make sure gas sources meet requirements (see Note). Check connections and turn gas supply on.

#### Power On

Place the ON - OFF Switch on the Power Supply to the ON position.

#### Function Control Knob

If the Function Control Knob is in SET position, gas will flow. If the control knob is in the RUN position there will be no gas flow.

#### Current Output Level

At the Power Supply, set the desired current output level. For drag cutting set the control at 40 amps or less only.

#### Pressure Settings

Place the Function Control Knob to the SET position. Adjust the gas pressure control on the Power Supply for the proper gas pressure. Refer to Appendix Pages for gas pressure and other specifics.

#### Ready for Operation

Return the Function Control Knob to RUN position.

#### NOTES

For general cutting, use the RUN position which provides normal torch operation where the torch switch must be held throughout the main arc transfer.

For specific applications, use the LATCH position where the torch switch can be released after the main arc transfer. The torch remains activated until the main arc breaks from the workpiece.

Refer to Appendix 1 for a typical detailed block diagram of Sequence of Operation.

The system is now ready for operation.

### 4T.04 Torch Parts 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 Starter Cartridge

## NOTE

Refer to Section 6 and the Appendix Pages for additional information on torch parts.

Change the torch parts for a different operation as follows:



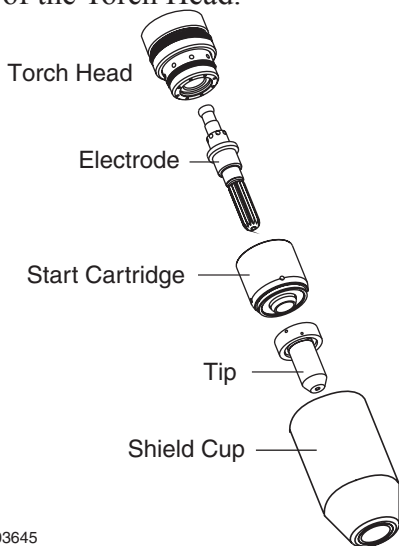
## WARNING

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 starter 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-03645

Torch Parts

3. Install the replacement Electrode by pushing it straight into the torch head until it clicks.
4. Install the starter cartridge and desired tip for the operation into the torch head.
5. 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.

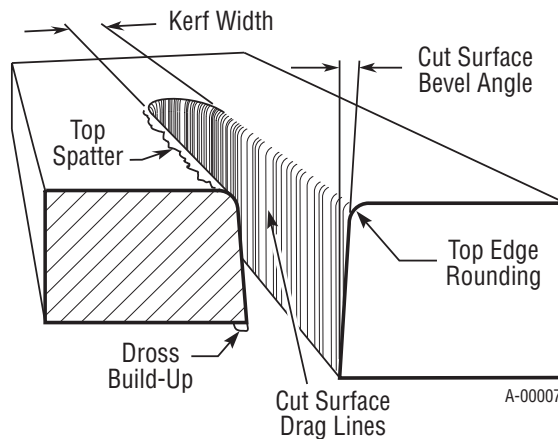
## 4T.05 Cut Quality

### NOTES

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

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

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:



A-00007

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.06 General Cutting Information**



**WARNINGS**

*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**

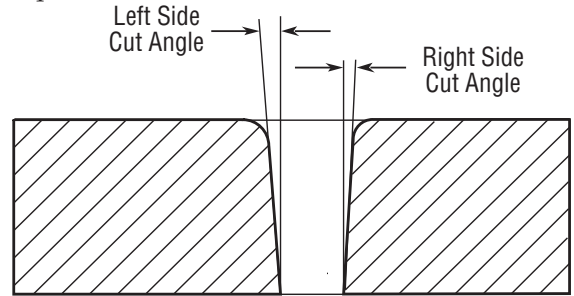
Improper standoff (the distance between the torch tip and workpiece) can adversely affect tip life as well as shield cup life. Standoff may also significantly affect the bevel angle. Reducing standoff will generally result in a more square cut.

**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.



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.

# CUTMASTER 10mm

## 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.07 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.*

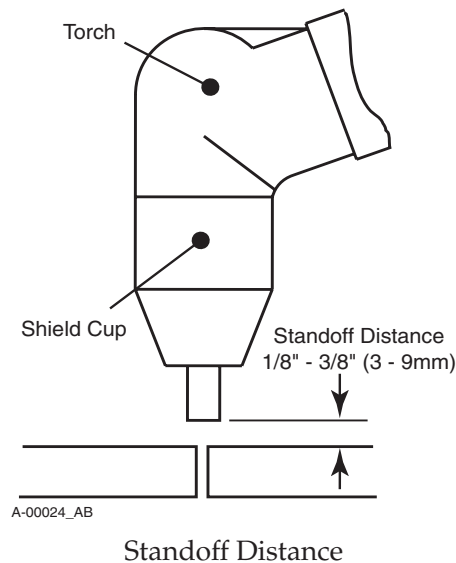
1. The torch can be comfortably held in one hand or steadied with two hands. Position the hand to press the Trigger on the torch handle. With the hand torch, the hand may be positioned close to the torch head for maximum control or near the back end for maximum heat protection. Choose the holding technique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

#### NOTE

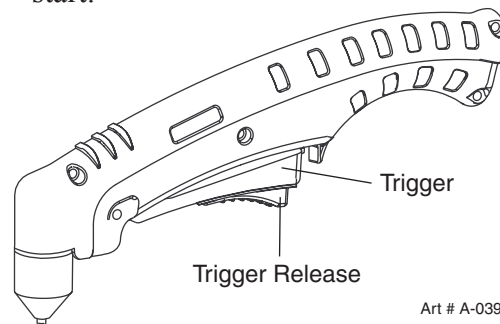
*The tip should never come in contact with the workpiece except during drag cutting operations.*

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.



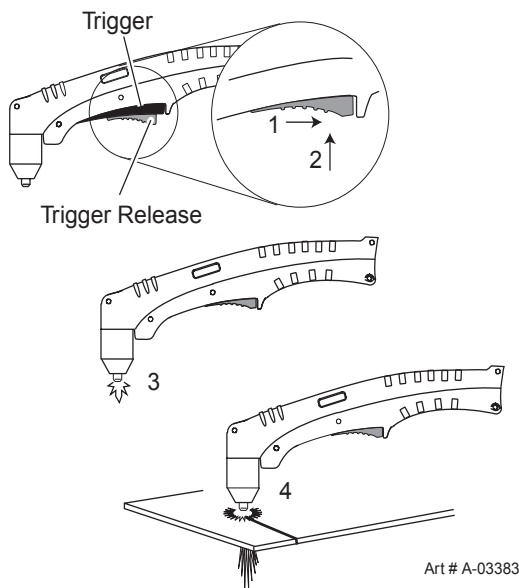
3. Hold the torch away from your body.
4. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



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.



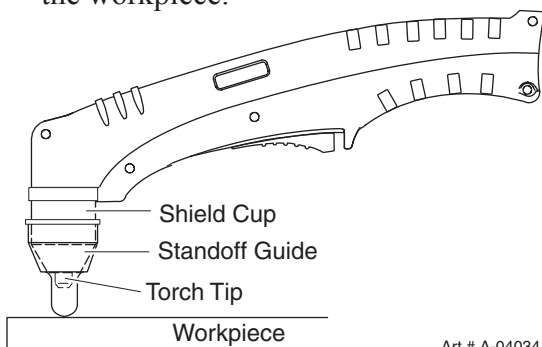
Art # A-03383

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

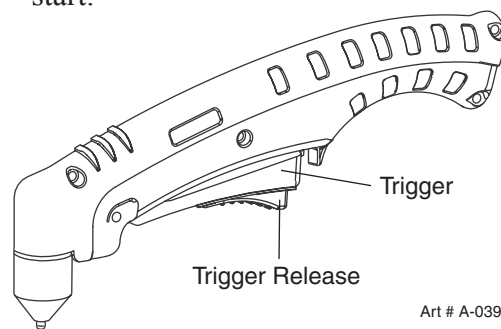
## Drag Cutting With a Hand Torch

Drag cutting works best on metal 3/16" (4.7 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 to 30 amps or less.
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.



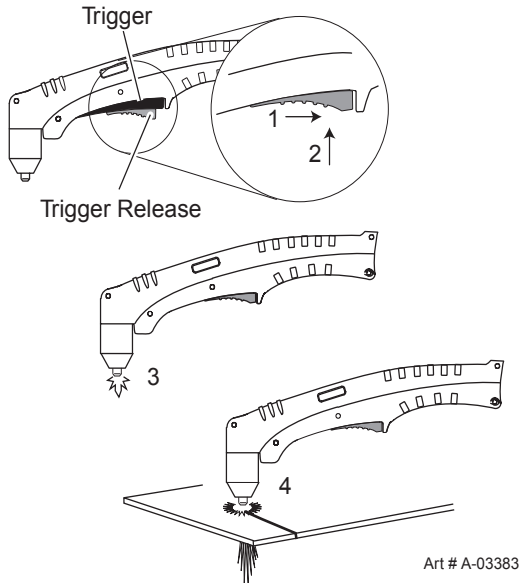
Art # A-03962



7. 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.



8. Cut as usual. Simply release the trigger assembly to stop cutting.
9. Follow normal recommended cutting practices as provided in the power supply operating 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.

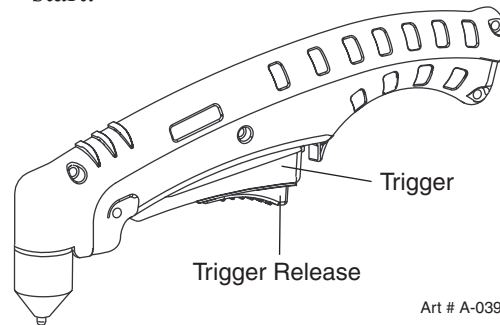
## Piercing With Hand Torch

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 technique that feels most comfortable and allows good control and movement.

### NOTE

The tip should never come in contact with the workpiece except during drag cutting operations.

2. 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.
3. 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 workpiece after the pierce is complete.
4. Hold the torch away from your body.
5. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



6. 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.

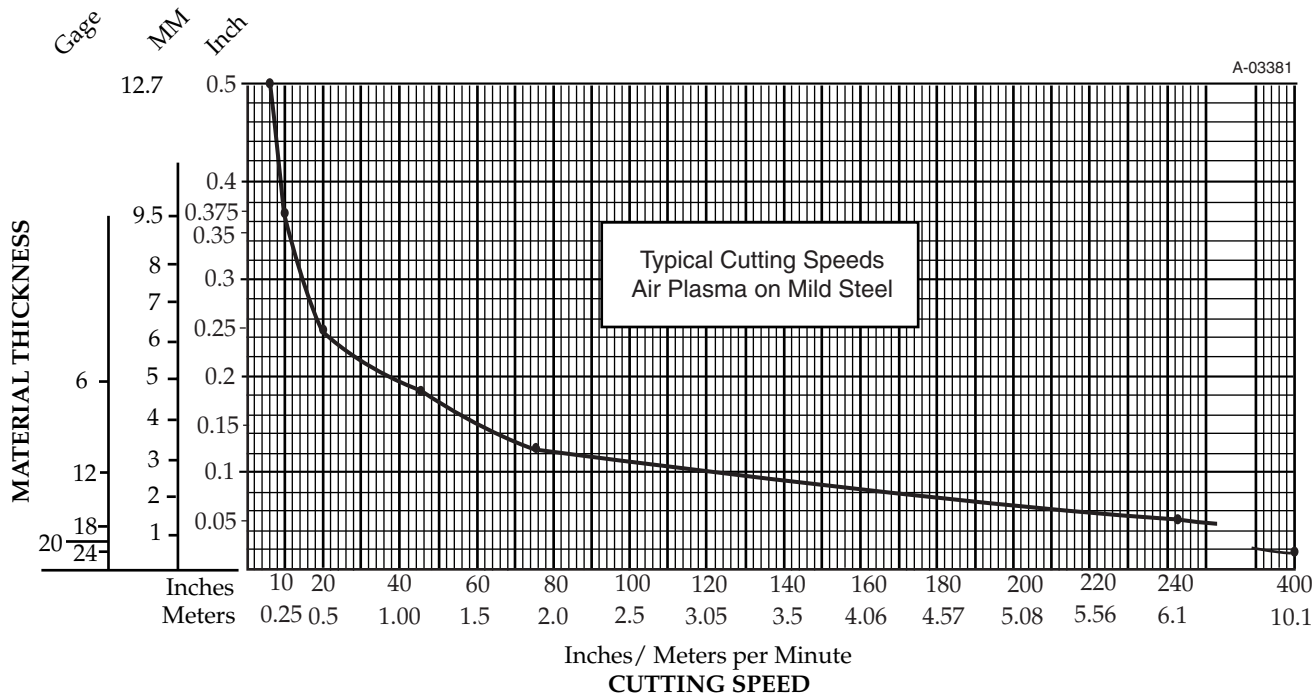
7. Clean spatter and scale from the shield cup and the tip as soon as possible. Spraying the shield cup in anti-spatter compound will minimize the amount of scale which adheres to it.

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.08 Recommended Cutting Speeds

Cutting speeds vary according to torch output, the type of material being cut, and operator skill. Speeds shown are typical for this cutting system using air plasma to cut mild steel, with output current at 30 amps and torch held at 0 - 1/16" (0 - 1.6 mm) standoff.



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

### 4T.09 Gouging



#### WARNINGS

*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.*



#### CAUTIONS

*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 6 and the Appendix Pages for additional information on torch parts.*

### 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).

### Torch Travel Speed

#### NOTE

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

# CUTMASTER 10mm

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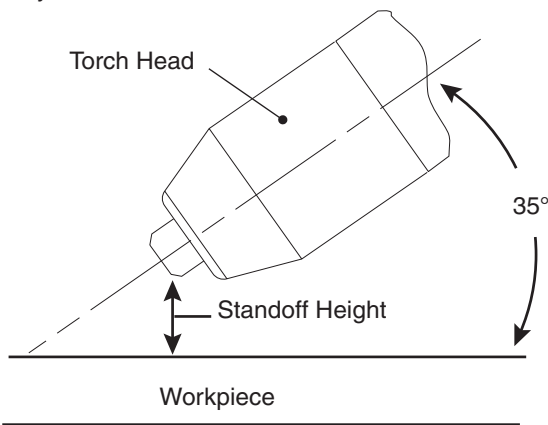
Optimum torch travel speed is dependent on current setting, lead angle, and mode of operation (hand or machine torch).

## 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. At 80 amps, 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.



A-00941\_AB

Gouging Angle and Standoff Distance

## Standoff Distance

The tip to work distance affects gouge quality and depth. Standoff distance of 1/16 inch (1.6 mm) allows for smooth, consistent metal removal. Smaller standoff distances may result in a severance cut rather than a gouge. Standoff distances greater than 1/16 inch (1.6 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.

# SECTION 5 SYSTEM: SERVICE

## 5.01 General Maintenance

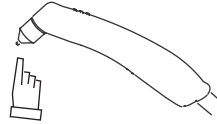


**Warning!**  
**Disconnect input power before maintaining.**

Maintain more often  
if used under severe  
conditions

### Each Use

Visual check of  
torch tip and electrode

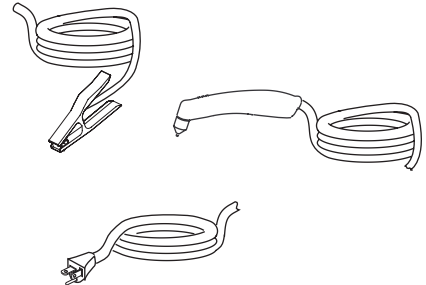


### Weekly

Visually inspect the torch body  
tip, electrode and shield cup

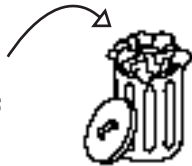


Visually inspect the  
cables and leads.  
Replace as needed

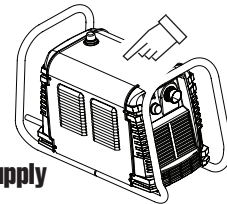


### 3 Months

Replace all  
broken parts

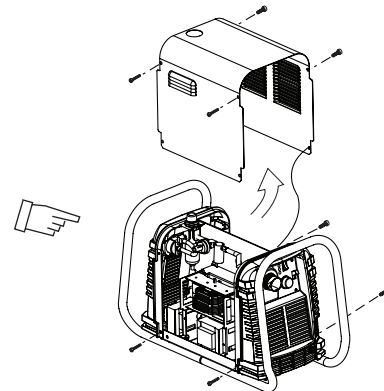


Clean  
exterior  
of power supply



### 6 Months

Visually check and  
Carefully clean the  
interior



# CUTMASTER 10mm

## A. Each Use

Check torch consumables for wear, replace if necessary.



**WARNING**

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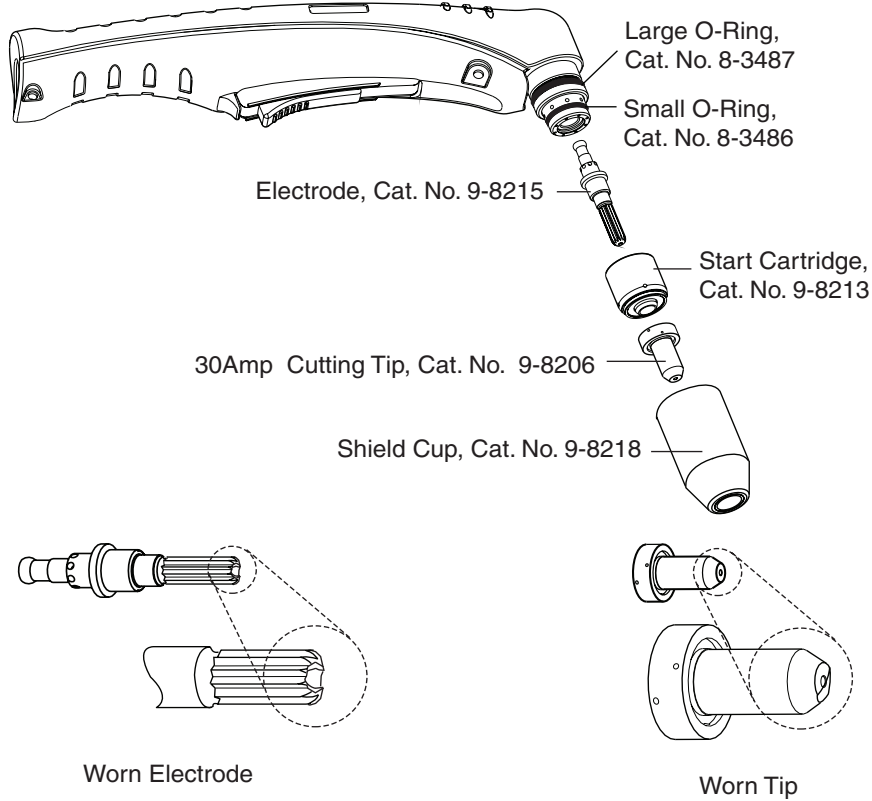
*Shut off power before inspecting or removing torch parts.*

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### NOTE

*When operating the torch in a normal condition, a small amount of gas vents through the gap between the shield cup and torch handle. Do not attempt to over tighten the shield cup as irreparable damage to internal components may result.*

Art # A-03409

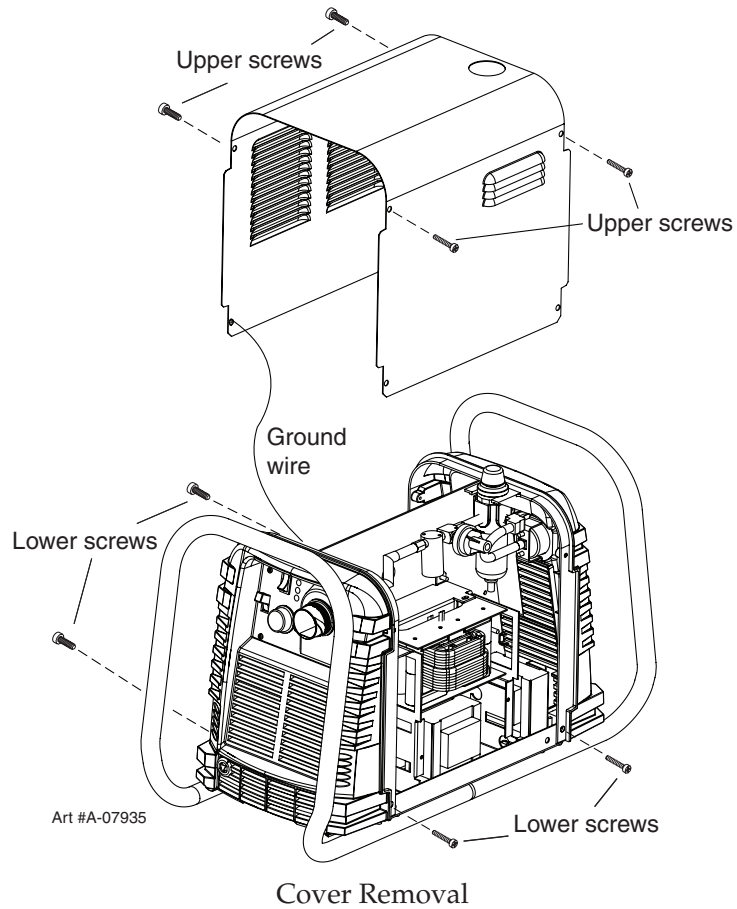


**B. Every three months****A. Check internal air filter, replace if necessary.**

1. Shut off input power; turn off the gas supply. Bleed down the gas supply.
2. Remove the upper cover screws.
3. Loosen the lower screws. Pull the cover up and away from the unit.

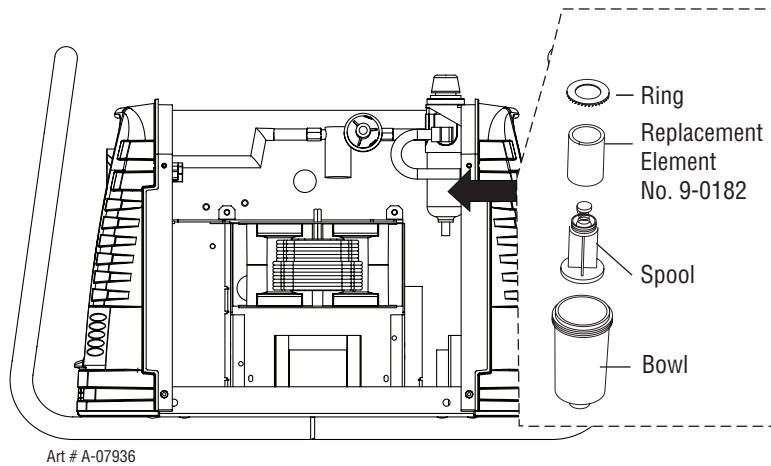
**NOTE**

*Leave internal ground wire in place.*



## CUTMASTER 10mm

4. Pull the upper end of the drain tube off the fitting on the filter bowl
5. Unscrew the bowl. The filter element will be visible and still attached to the main body of the Regulator / Filter.
6. Unscrew the filter element from the Regulator / Filter body. The filter element will come off with a spool and some additional pieces.
7. Note the correct assembly of the filter / spool then remove the filter from the spool and either clean it or replace it.
8. Screw the filter element and spool, with the baffle ring in place (teeth facing downward) back into the Regulator body by compressing the spring on the spool. Tighten firmly by hand.



Regulator / Filter Element Replacement

9. Clean the inside of the bowl if necessary. Check that the knurled valve on the bottom of the bowl is fully open.
10. Reinstall the bowl. Reconnect the drain tube.
11. Reinstall the cover as follows:
  - a. Reconnect the ground wire, if necessary.
  - b. Set the cover onto the base so that it rests on the lower screws.
  - c. Tighten lower screws.
  - d. Reinstall and tighten the upper screws.
12. Turn on the air supply.

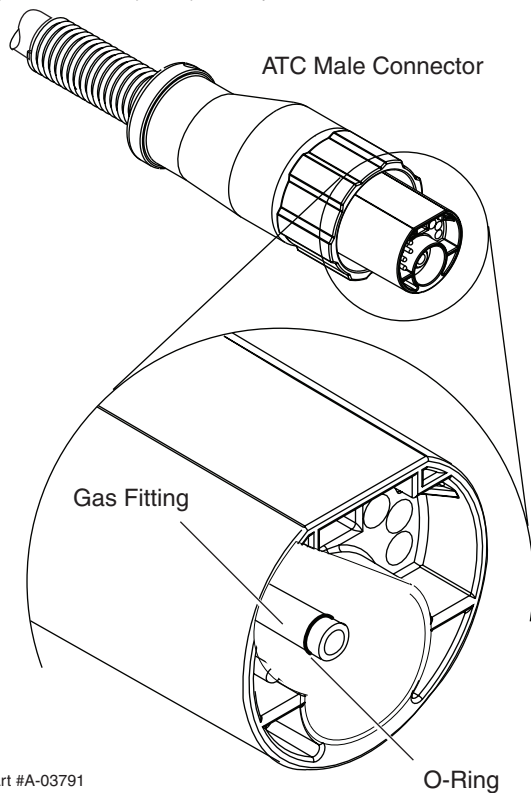
**C. O-Ring Lubrication**

An o-ring on the Torch ATC Male Connector requires lubrication on a regular basis, depending on how frequently the torch is disconnected and re-connected. This will allow the o-ring to remain pliable and provide a proper seal. The o-ring will dry out, becoming hard and cracked, if the o-ring 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-ring on a weekly basis.

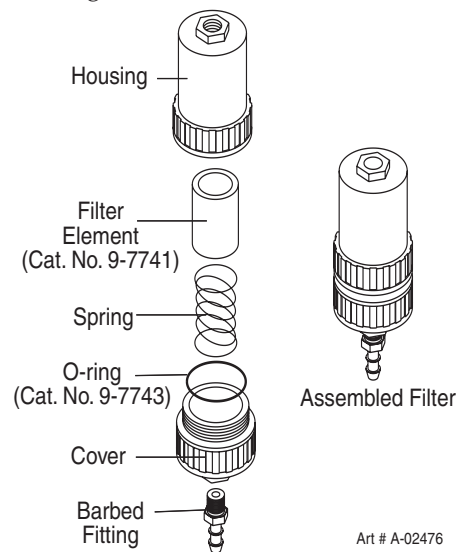
**NOTE**

*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.*



**D. Check Optional Single - Stage Filter Element, replace if necessary.**

1. Shut off input power.
2. Shut off air supply, bleed down system.
3. Disconnect gas supply hose from filter.
4. Turn the Cover counter - clockwise.
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 hose. If unit leaks between housing and cover, inspect the "O" Ring for cuts or other damage.



## 5.02 Common Faults

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

## 5.03 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.*

### A. Basic Troubleshooting: Overview

This guide covers basic troubleshooting. It is helpful for solving many of the common problems that can arise with this system. If major complex subassemblies are faulty, the unit must be returned to an authorized service center for repair.

Follow all instructions as listed and complete each section in the order presented.

For major troubleshooting and parts replacement procedures refer to the Power Supply Service Manual for this product.

### B. How to Use This Guide

The following information will help the Customer / Operator determine the most likely causes for various symptoms. Follow all instructions as listed and complete each section in the order presented.

This guide is set up in the following manner:

#### X. Symptom (Bold Type)

Any Special Instructions

1. Cause
  - a. Check / Remedy

Locate your **symptom**, check the *causes* (easiest listed first), then remedies. Repair as needed being sure to verify that unit operates properly after any repairs.

### C. Common Symptoms


#### A. Gas regulator leaks

1. Regulator is open
  - a. Reset regulator to 0 psi, then adjust to 65 psi ( 4.5 bar ).




**B. AC indicator  OFF**

1. Switch at customer's main power panel in OFF (open) position.
  - a. Close main power switch.
2. Power Supply ON / OFF switch in OFF position.
  - a. Turn switch to ON.
3. Customer's main power line fuse(s) or circuit breaker(s) blown
  - a. Check main power panel fuse(s) and replace as required.
4. Actual input voltage does not correspond to voltage of unit
  - a. Verify that the input line voltage is correct. Refer to Section 2, Input Wiring Requirements.
5. Faulty components in unit
  - a. Return for repair or have qualified technician repair per Service Manual.


**C. AC indicator  flashing; Torch cannot be activated**

1. System is in protective interlock mode. (User held torch trigger while turning on ON / OFF switch.)
  - a. Release torch trigger, set ON / OFF switch to OFF (down). Return ON / OFF switch to ON (up) position.
2. System is in protective interlock mode. (Torch parts are missing or loose.)
  - a. Release torch trigger, and set ON / OFF switch to OFF (down). Open main disconnect switch. Check torch parts, including O - rings on torch head. Refer to illustration on page 5 - 1. Replace parts as needed. Reinstall shield cup; hand - tighten it securely against the torch head. Close main disconnect switch. Set ON / OFF switch to ON (up) position.
3. System is in protective interlock mode. (User removed shield cup from torch while power supply ON / OFF switch was ON.)
  - a. Release torch trigger, and set ON / OFF switch to OFF (down). Set ON / OFF switch to ON (up).

**D. Torch will not pilot; DC indicator  and GAS**

**indicator  flash alternately when torch trigger is activated**

1. Gas pressure is too low. Adjust gas pressure to 65 psi / 4.5 bar.

**E. AC indicator  flashing; Temp indicator  ON**

1. Fan disconnected or blocked.
  - a. Clear fan if blocked; let power supply cool.

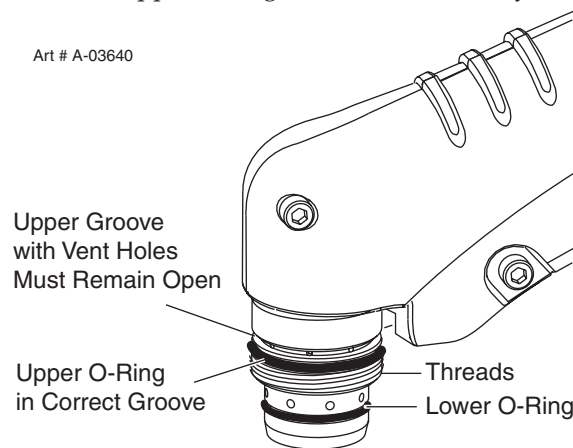
**F. AC indicator ON; TEMP indicator  ON**

1. Air flow blocked
  - a. Check for blocked air flow around the unit and correct condition.
2. Fan blocked
  - a. Check and correct condition.
3. Unit is overheated
  - a. Let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond Duty Cycle limit. Refer to duty cycle data in Section 2.
4. Input line voltage is below 100 Volts
  - a. Check and connect to proper input power line.
5. Faulty components in unit
  - a. Return for repair or have qualified technician repair per Service Manual.

**G. Torch will not pilot when torch switch is activated**

1. System is in SET mode
  - a. Change to RUN mode.
2. Upper O-ring on torch head is in wrong position.
  - a. Remove shield cup from torch; check position of upper O-ring. Correct if necessary.

Art # A-03640



3. *Faulty torch parts*
  - a. Inspect torch parts and replace if necessary.
4. *Gas pressure too high or too low*
  - a. Adjust to proper pressure.
5. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair per Service Manual.

## H. No cutting output; Torch activated; AC indicator ON; Gas flows; Fan operates

1. *Torch not properly connected to power supply*
  - a. Check that torch leads are properly connected to power supply.
2. *Work cable not connected to work piece, or connection is poor*
  - a. Make sure that work cable has a proper connection to a clean, dry area of the workpiece.
3. *Shield cup not properly installed on torch*
  - a. Open main disconnect switch. Check that shield cup is fully seated against torch head. Set ON / OFF switch to OFF, check shield cup, close main disconnect switch, turn power supply ON, and try cutting.
4. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair per Service Manual.
5. *Faulty Torch*
  - a. Return for repair or have qualified technician repair.

## I. Low cutting output

1. *Incorrect setting of CURRENT (A) control*
  - a. Check and adjust to proper setting.
2. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair.

## J. Limited output with no control

1. *Poor input or output connections*
  - a. Check all input and output connections.
2. *Work cable connection to work piece is poor*
  - a. Make sure that work cable has a proper connection to a clean, dry area of the workpiece.

3. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair per Service Manual.





## K. Erratic or improper cutting output

1. *Poor input or output connections*
  - a. Check all input and output connections.
2. *Poor work cable connection*
  - a. Make sure that work cable has a proper connection to a clean, dry area of the workpiece.
3. *Fluctuations in input power*
  - a. Have electrician check input line voltage.


## L. Difficult Starting

1. *Worn torch parts (consumables)*
  - a. Shut off input power. Remove and inspect torch shield cup, tip, starter cartridge, and electrode. Replace electrode or tip if worn; replace starter cartridge if end piece does not move freely; replace shield cup if excessive spatter adheres to it.

## M. Arc shuts off during operation; arc will not re-start when torch switch is activated.

1. *Power Supply is overheated (TEMP indicator  ON)*
  - a. Let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond Duty Cycle limit. Refer to Section 2 for duty cycle specifications.
2. *Fan blades blocked (AC indicator  flashing; TEMP indicator ON)*
  - a. Check and clear blades.
3. *Air flow obstructed (AC indicator  flashing; TEMP indicator ON)*
  - a. Check for obstructed air flow around the unit and correct condition.
4. *Gas pressure too low (GAS indicator  OFF when torch switch is activated)*
  - a. Check source for at least 65 psi / 4.5 bar; adjust as needed.

5. *Torch consumables worn*
  - a. Check torch shield cup, tip, starter element, and electrode; replace as needed.
6. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair per Service Manual.

**N. No gas flow; AC indicator  ON; Fan operates**

1. *Gas not connected or pressure too low*
  - a. Check gas connections. Adjust gas pressure to proper setting.
2. *Shield Cup not properly installed.*
  - a. Check to see that Shield Cup is properly installed.
3. *Faulty components in unit*
  - a. Return for repair or have qualified technician repair.

**O. Torch cuts but not adequately**

1. *Current (A) control set too low*
  - a. Increase current setting.
2. *Torch is being moved too fast across workpiece*
  - a. Reduce cutting speed.
3. *Excessive oil or moisture in torch*
  - a. Hold torch 1/8 inch (3 mm) from clean surface while purging and observe oil or moisture buildup (do not activate torch). If there are contaminants in the gas, additional filtering may be needed.

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# 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.



**WARNINGS**

*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.*

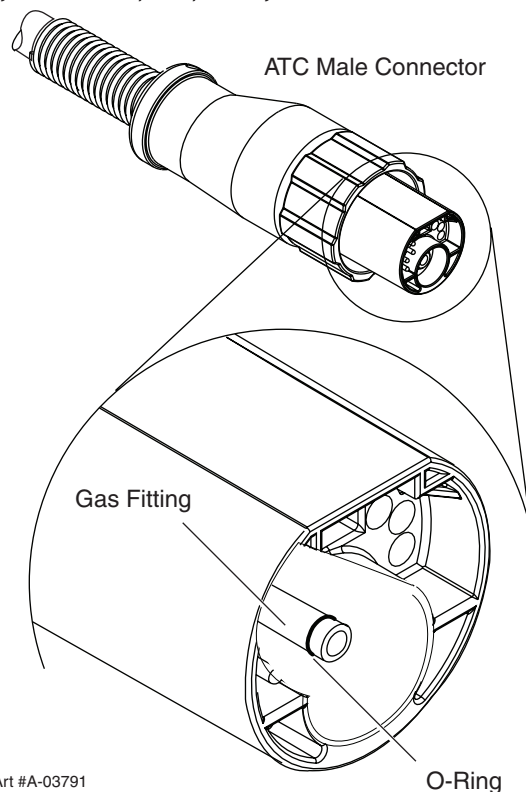
### O-Ring Lubrication

An o-ring on the Torch ATC Male Connector requires lubrication on a scheduled basis. This will allow the o-ring to remain pliable and provide a proper seal. The o-ring will dry out, becoming hard and cracked, if the o-ring 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-ring on a weekly basis.

**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.*



Art #A-03791

## 5T.02 Inspection and Replacement of Consumable Torch Parts



### WARNINGS

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

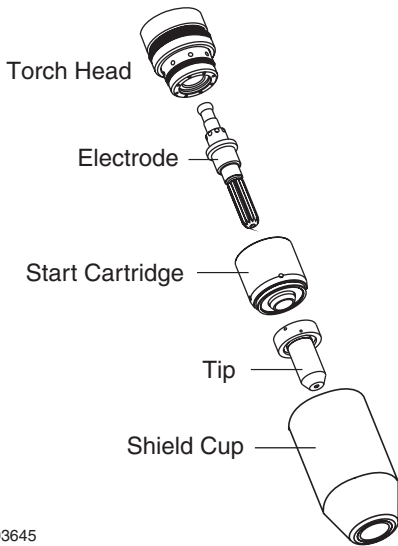
The shield cup holds the tip and starter cartridge shield cup in place. Position the torch with the shield cup facing upward to prevent these parts from falling out when the cup is removed.

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.

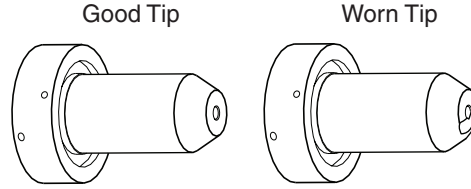
2. Inspect the cup for damage. Wipe it clean or replace if damaged.



A-03645

Consumable Parts

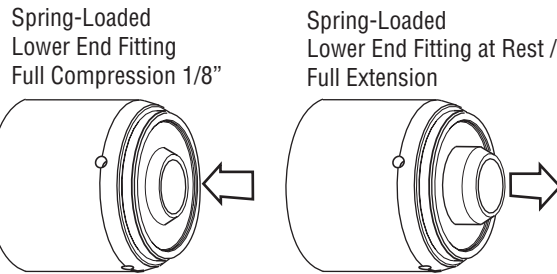
3. Remove the tip. Check for excessive wear (indicated by an elongated or oversized orifice). Clean or replace the tip if necessary.



A-03406

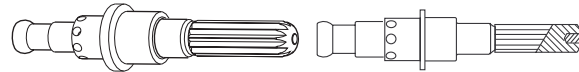
Tip Wear

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

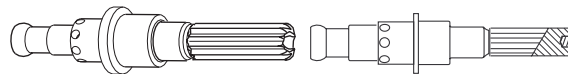


Art # A-08064

5. 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

6. Reinstall the Electrode by pushing it straight into the torch head until it clicks.
7. Reinstall the desired starter cartridge and tip into the torch head.
8. 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.

## SECTION 6: PARTS LISTS

### 6.01 Introduction

#### A. Parts List Breakdown

The parts list provides a breakdown of all replaceable components.

#### 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 torch. Address all inquiries to your authorized distributor.

### 6.03 Replacement Assemblies

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

| Qty | Description                        | Catalog # |
|-----|------------------------------------|-----------|
| 1   | Cutmaster 10mm CE Power Supply     | 3-4630    |
| 1   | Cutmaster 10mm Non CE Power Supply | 3-4631    |
| 1   | Surelok Model SL60 Torch           | 7-5204    |

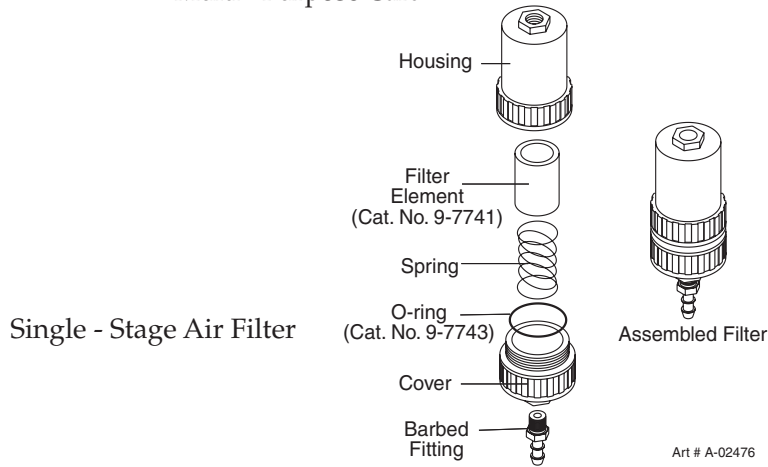
### 6.04 Power Supply Replacement Parts

| Qty | Description                                | Catalog # |
|-----|--------------------------------------------|-----------|
| 1   | Regulator / Filter Assembly Filter Element | 9-0182    |
| 1   | Input Power Cord with 120 VAC, 20A plug    | 9-8671    |

# CUTMASTER 10mm

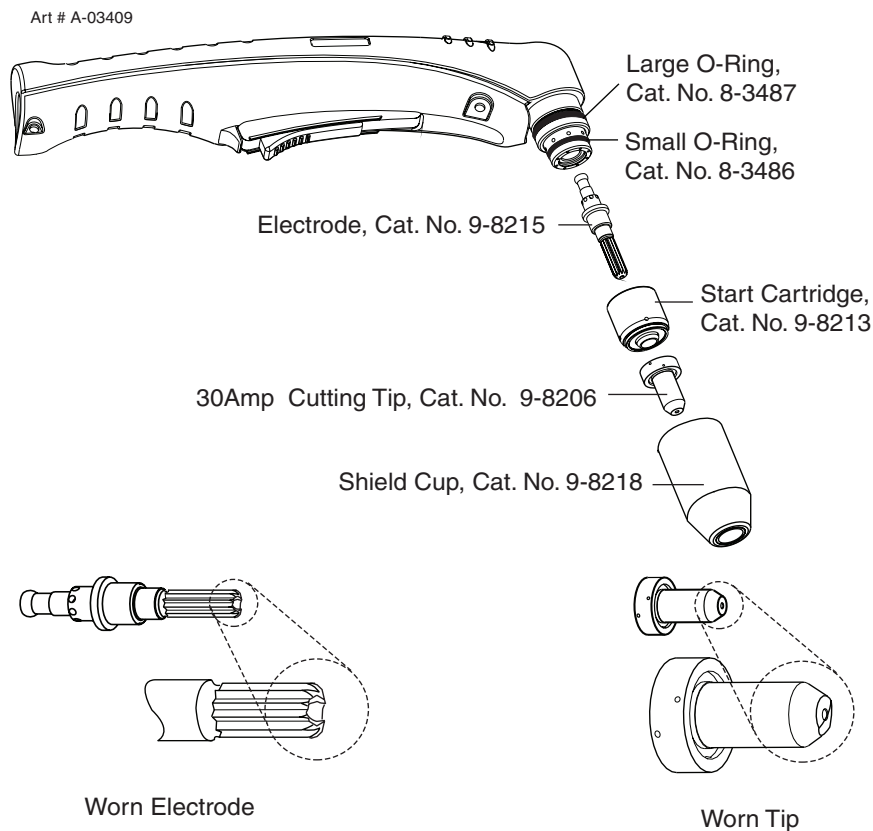
## 6.05 Options and Accessories

| Qty | Description                                        | Catalog # |
|-----|----------------------------------------------------|-----------|
| 1   | 230 V Input Power Cable                            | 9-8671    |
| 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   | Multi - Purpose Cart                               | 7-8888    |





**6.06 Torch Consumables**



**NOTE**

*When operating the torch in a normal condition, a small amount of gas vents through the gap between the shield cup and torch handle. Do not attempt to over tighten the shield cup as irreparable damage to internal components may result.*

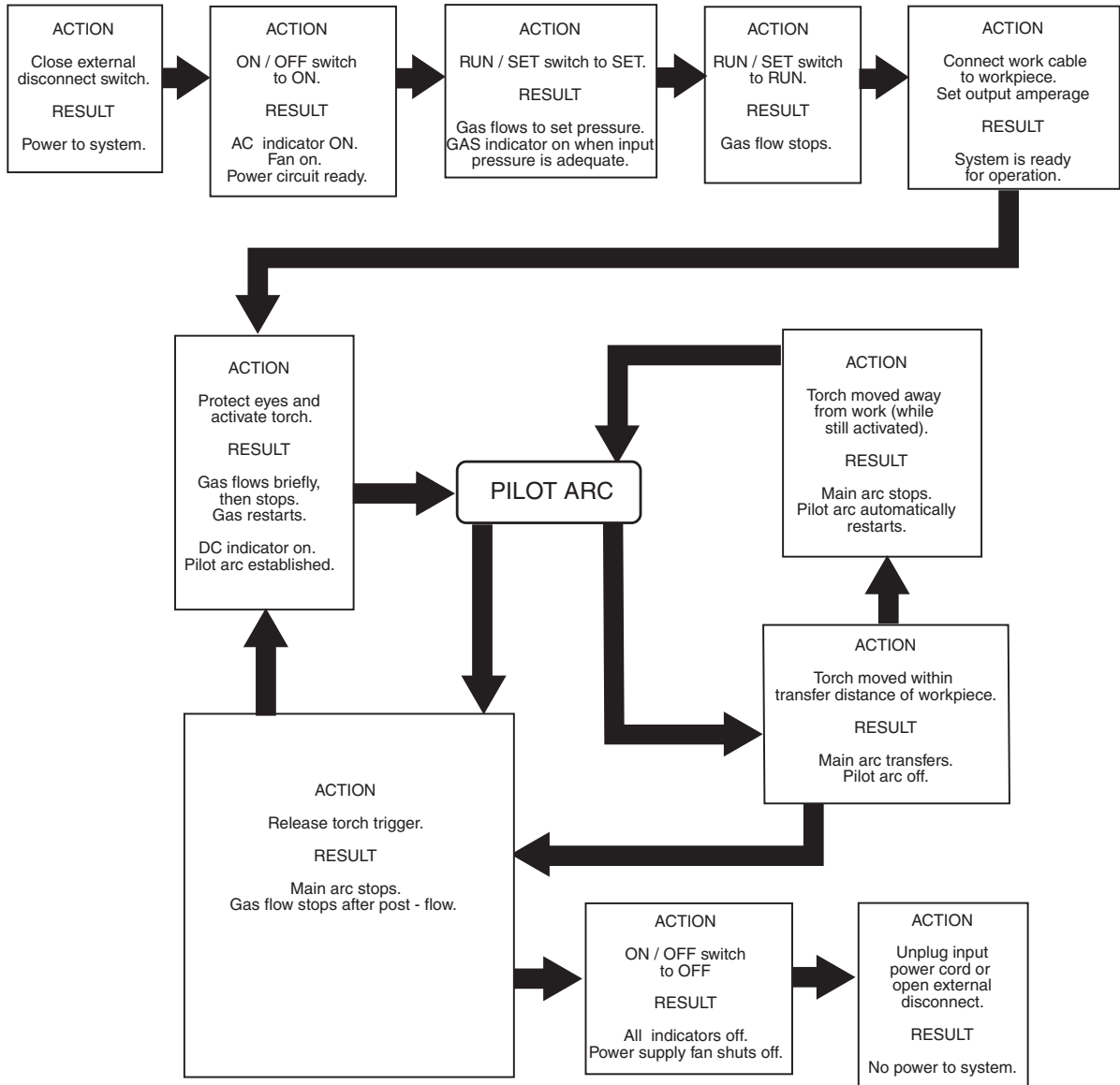
**PATENT INFORMATION**

The following parts are licensed under U.S. Patent No(s). 5120930 and 5132512

| Catalog Number | Description                 |
|----------------|-----------------------------|
| 9-8235         | Shield Cap, Drag 50-60A     |
| 9-8236         | Shield Cap, Drag 70-100A    |
| 9-8237         | Shield Cup, Body            |
| 9-8238         | Shield Cap, Machine 50-60A  |
| 9-8239         | Shield Cap, Machine 70-100A |
| 9-8244         | Shield Cap, Drag 40A        |
| 9-8245         | Shield Cap, Machine 40A     |

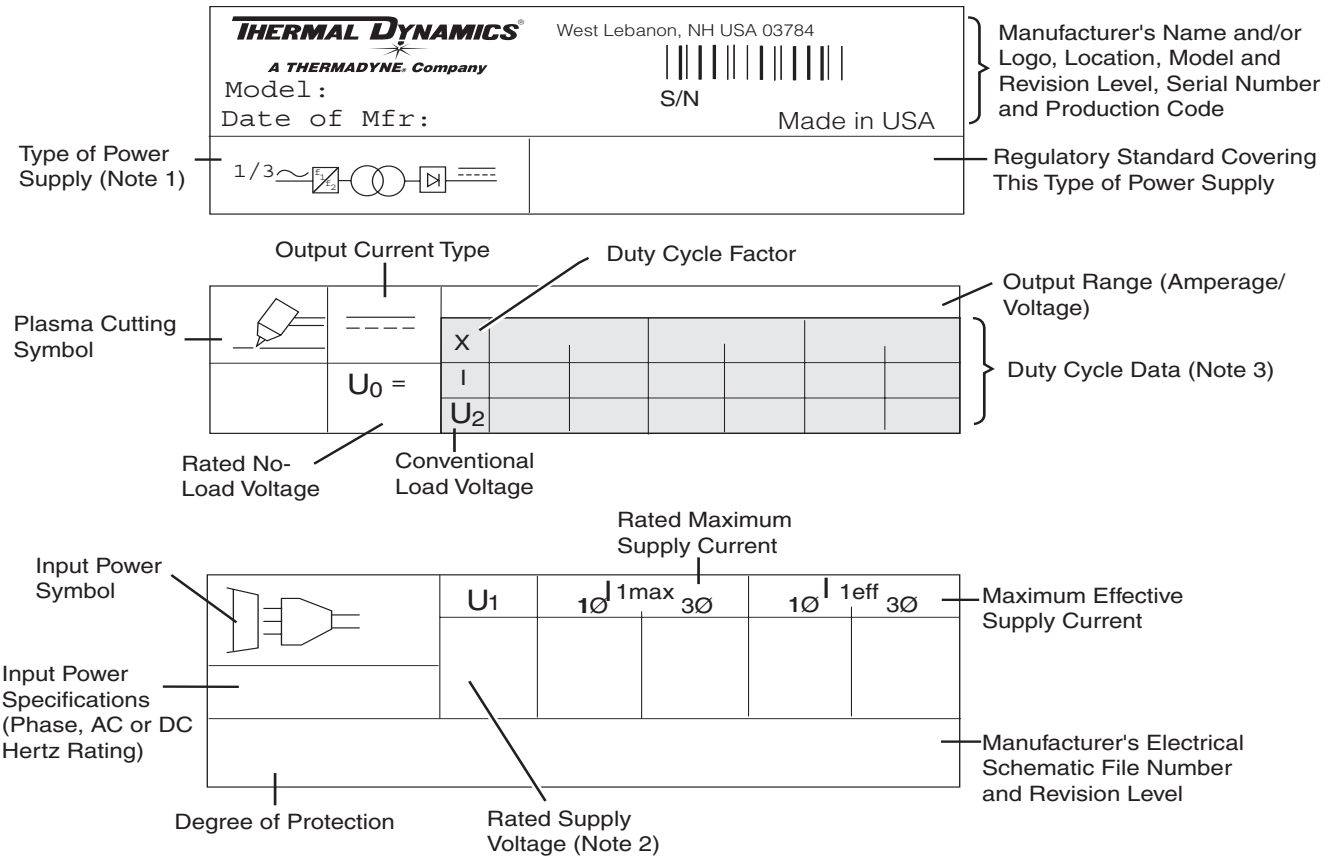


# APPENDIX 1: SEQUENCE OF OPERATION (BLOCK DIAGRAM)



A-03299

# 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

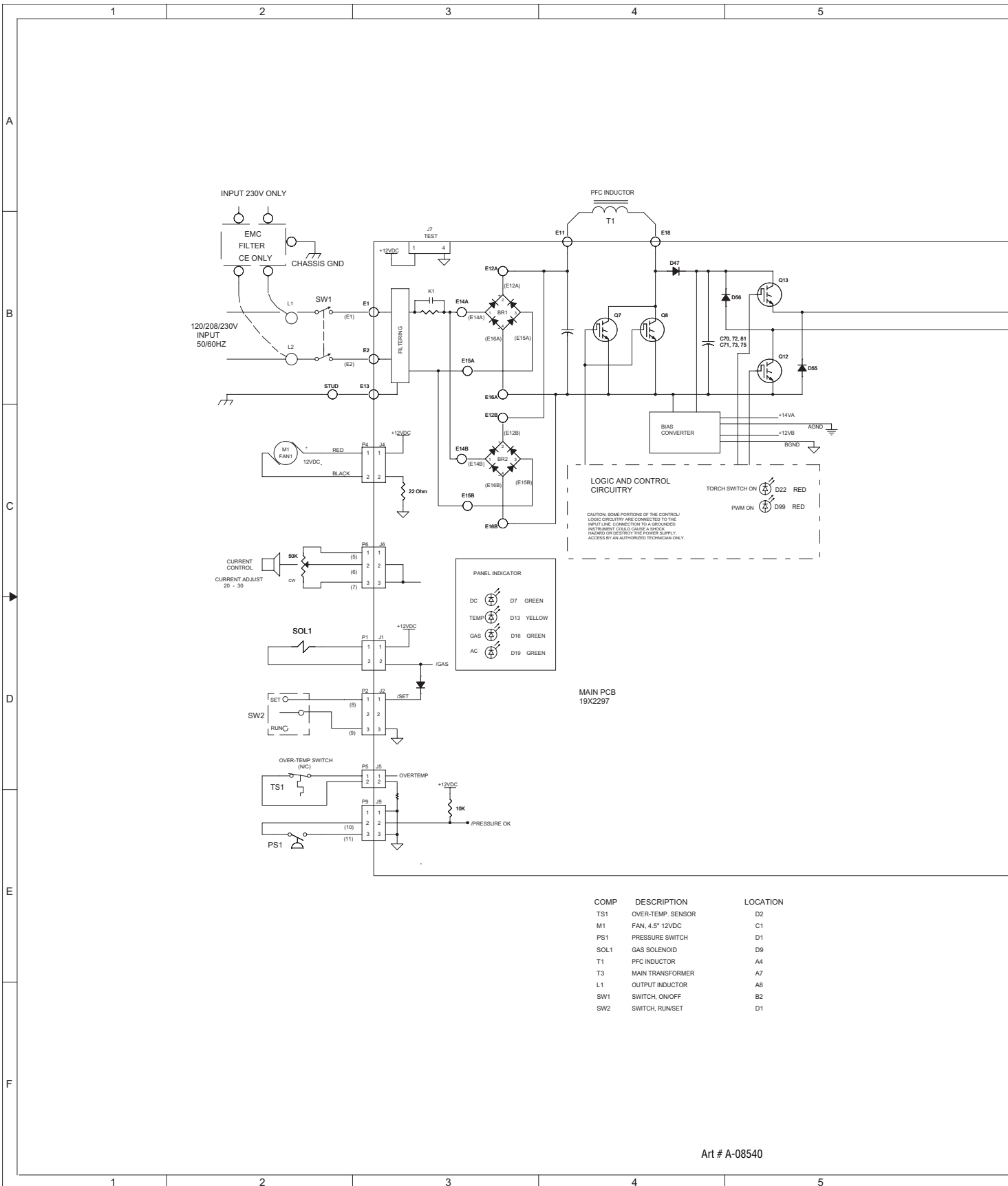
Art # A-03288

**NOTE**

*Sections of the data tag may be applied in separate locations on the Power Supply.*

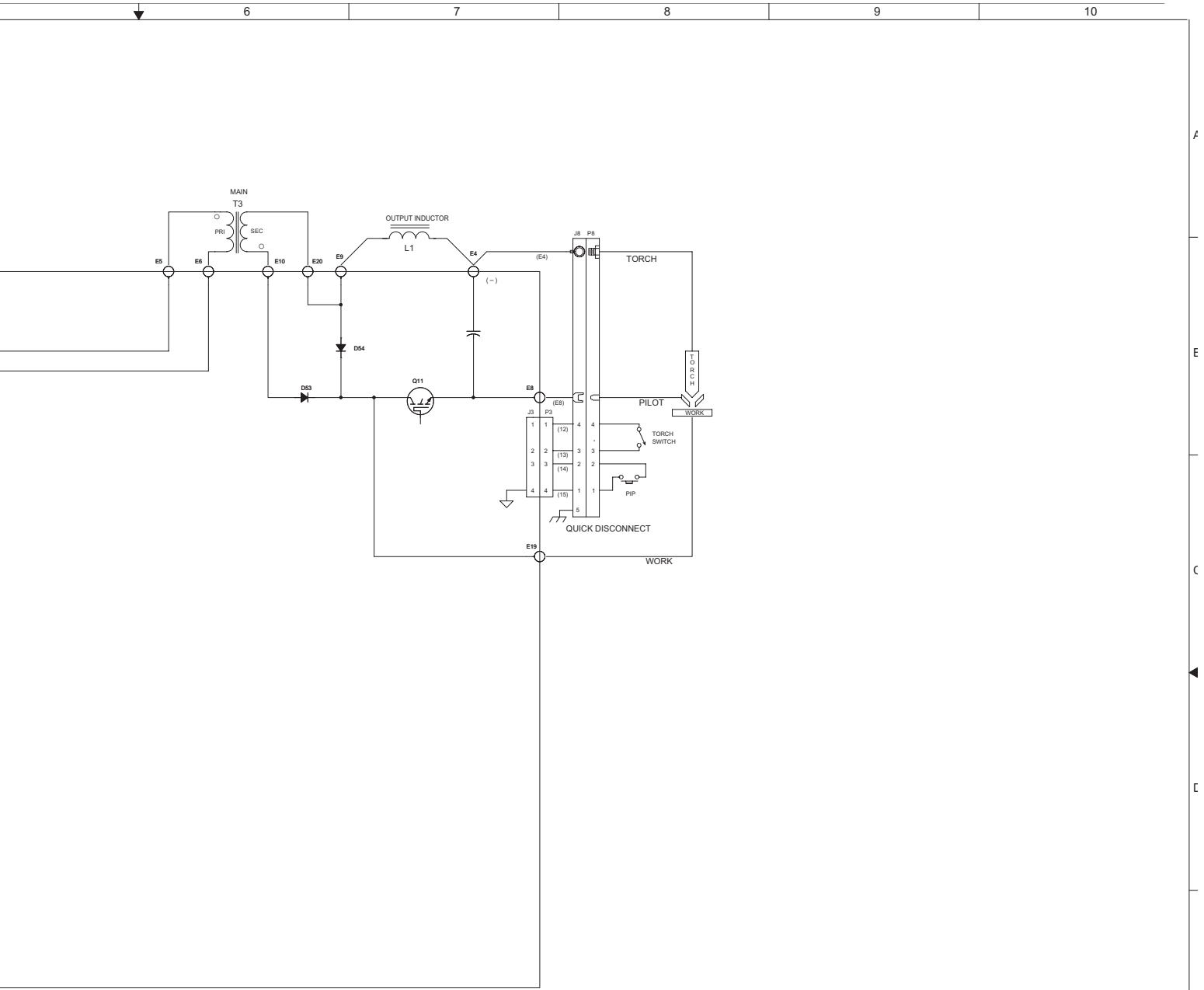
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# APPENDIX 3: SYSTEM SCHEMATIC



| COMP | DESCRIPTION       | LOCATION |
|------|-------------------|----------|
| TS1  | OVER-TEMP. SENSOR | D2       |
| M1   | FAN, 4.5" 12VDC   | C1       |
| PS1  | PRESSURE SWITCH   | D1       |
| SOL1 | GAS SOLENOID      | D9       |
| T1   | PFC INDUCTOR      | A4       |
| T3   | MAIN TRANSFORMER  | A7       |
| L1   | OUTPUT INDUCTOR   | A8       |
| SW1  | SWITCH, ON/OFF    | B2       |
| SW2  | SWITCH, RUN/SET   | D1       |

Art # A-08540



Art # A-08540

| Rev                                                                                                                                                                                                                                                                              | Change Description | By  | Date    | Scale        | Supersedes |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----|---------|--------------|------------|
| AA                                                                                                                                                                                                                                                                               | INTRO ECO-81033    | MNC | 7/08/09 | NONE         |            |
|                                                                                                                                                                                                                                                                                  |                    |     |         | Create Date: |            |
|                                                                                                                                                                                                                                                                                  |                    |     |         | Drawn:       |            |
|                                                                                                                                                                                                                                                                                  |                    |     |         | Checked:     |            |
|                                                                                                                                                                                                                                                                                  |                    |     |         | App:         |            |
|                                                                                                                                                                                                                                                                                  |                    |     |         | Sheet        | 1 of 1     |
|                                                                                                                                                                                                                                                                                  |                    |     |         | DWG No:      | 42X1324    |
| Information Proprietary to THERMADYNE INDUSTRIES<br>Not For Release, Reproduction, or Distribution without Written Consent.<br>NOTE: UNLESS OTHERWISE SPECIFIED:<br>1. RESISTOR VALUES ARE EXPRESSED IN OHMS, 1/4W 5%.<br>2. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS (uF). |                    |     |         |              |            |
| TITLE: SCHEMATIC,<br>CUTMASTER 10mm 120/208/230 1PH 50/60Hz                                                                                                                                                                                                                      |                    |     |         |              |            |
| Last Modified: Tuesday, July 08, 2008<br>11:55:29                                                                                                                                                                                                                                |                    |     |         |              |            |

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## GLOBAL CUSTOMER SERVICE CONTACT

Thermadyne USA  
2800 Airport Road  
Denton, Tx 76207 USA  
Telephone: (940) 566-2000  
800-426-1888  
Fax: 800-535-0557

Thermadyne Asia Sdn Bhd  
Lot 151, Jalan Industri 3/5A  
Rawang Integrated Industrial Park - Jln Batu Arang  
48000 Rawang Selangor Darul Ehsan  
West Malaysia  
Telephone: 603+ 6092 2988  
Fax : 603+ 6092 1085

Thermadyne Canada  
2070 Wyecroft Road  
Oakville, Ontario  
Canada, L6L5V6  
Telephone: (905)-827-1111  
Fax: 905-827-3648

Cigweld, Australia  
71 Gower Street  
Preston, Victoria  
Australia, 3072  
Telephone: 61-3-9474-7400  
Fax: 61-3-9474-7510

Thermadyne Europe  
Europe Building  
Chorley North Industrial Park  
Chorley, Lancashire  
England, PR6 7Bx  
Telephone: 44-1257-261755  
Fax: 44-1257-224800

Thermadyne Italy  
OCIM, S.r.L.  
Via Bolsena, 7  
20098 S. Giuliano  
Milan, Italy  
Tel: (39) 0236546801  
Fax: (39) 0236546840

Thermadyne, China  
RM 102A  
685 Ding Xi Rd  
Chang Ning District  
Shanghai, PR, 200052  
Telephone: 86-21-69171135  
Fax: 86-21-69171139

Thermadyne International  
2070 Wyecroft Road  
Oakville, Ontario  
Canada, L6L5V6  
Telephone: (905)-827-9777  
Fax: 905-827-9797

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**Corporate Headquarters**  
16052 Swingley Ridge Road  
Suite 300  
St. Louis, MO 63017  
Telephone: 636-728-3000  
Email: [TDCSales@Thermadyne.com](mailto:TDCSales@Thermadyne.com)  
**[www.thermadyne.com](http://www.thermadyne.com)**

