

THERMAL DYNAMICS®

AN ESAB® BRAND

OUTPUT
DC

MAX OUTPUT
**40
AMPS**

VOLTAGE
**120-
240V**

INPUT POWER
1 PHASE


CUTMASTER® 40 PLASMA CUTTING SYSTEM

OPERATING MANUAL



Art # A-14036_AB



Revision: AE

Issue Date: 29 June, 2020

Manual No.: 0-5557



WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov
Wash hands after handling.

esab.com

THERMAL DYNAMICS®

AN **ESAB®** BRAND

WE APPRECIATE YOUR BUSINESS!

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

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

YOU ARE IN GOOD COMPANY!

The Brand of Choice for Contractors and Fabricators Worldwide.

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

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

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



WARNING

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

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

Plasma Cutting Power Supply
CutMaster® 40
SL60™ 1Torch™
Operating Manual Number 0-5557

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www.esab.com

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For Material Print Specifications, refer to document 47x1961
Original Publication Date: 15 November, 2019
Revision Date: 29 June, 2020

See website for Warranty Information.

Record the following information for Warranty purposes:

Where Purchased: _____

Purchase Date: _____

Power Supply Serial #: _____

Torch Serial #: _____



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

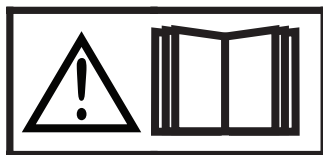
CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

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

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



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

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

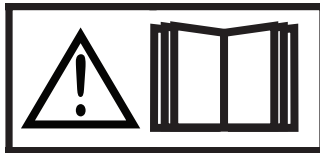
MISE EN GARDE

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

RESPONSABILITÉS DE L'UTILISATEUR

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

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



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

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EU DECLARATION OF CONFORMITY

According to

The Low Voltage Directive 2014/35/EU, entering into force 20 April 2016

The EMC Directive 2014/30/EU, entering into force 20 April 2016

The RoHS Directive 2011/65/EU, entering into force 2 January 2013

Type of equipment

PLASMA CUTTING SYSTEM

Type designation etc.

CutMaster 40, from serial number 007-XXXXXX

Brand name or trade mark

Thermal Dynamics, an ESAB brand

Manufacturer or his authorised representative

Name, address, telephone No:

OZAS-ESAB Ltd.

ul. A. Struga 10,

45-073 Opole, Poland

Phone: +48 77 4019270, FAX + 48 77 4019 201.

The following harmonised standard in force within the EEA has been used in the design:

IEC/EN 60974-1:2017 / AMD1:2019 Arc Welding Equipment - Part 1: Welding power sources.

IEC/EN 60974-10:2014 + AMD 1:2015 Published 2015-06-19 Arc Welding Equipment - Part 10: Electro-magnetic compatibility (EMC) requirements

Additional Information: Restrictive use, Class A equipment, intended for use in location other than residential.

By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative, that the equipment in question complies with the safety requirements stated above.

Date

10 February, 2020

Signature



Flavio Santos

Position

General Manager
Accessories and
Adjacencies

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SECTION 1: GENERAL INFORMATION**1.01 Notes, Cautions and Warnings**

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

**NOTE!**

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

**CAUTION**

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

**WARNING**

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

**WARNING**

Gives information regarding possible electrical shock injury.

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

Art # A-13294

SECTION 1 : INFORMATIONS GÉNÉRALES

1.01 Remarques, avertissements et mises en garde

Le présent manuel est ponctué de remarques, d'avertissements et de mises en garde qui attirent l'attention sur des informations importantes. Ces repères sont classés comme suit :

**REMARQUE :**

Fonction, procédé ou renseignement de base qui nécessite une plus grande attention ou contribue au bon fonctionnement du système.

**ATTENTION**

Procédé qui, s'il n'est pas suivi correctement, peut endommager l'équipement.

**AVERTISSEMENT**

Procédé qui, s'il n'est pas suivi correctement, peut causer des lésions à l'utilisateur ou aux personnes dans la zone d'exploitation.

**AVERTISSEMENT**

Fournit des renseignements relatifs à d'éventuelles blessures se devant à une décharge électrique.

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

Art # A-13294

SECTION 2 SYSTEM: INTRODUCTION

2.01 How To Use This Manual

This Owner's Manual applies to just product(s) listed on page i.

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

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

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

<http://www.esab.com>

2.02 Equipment Identification

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

2.03 Receipt Of Equipment

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

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

CSA / UL**Included items:**

- CutMaster 40 Power Supply
- SL60™ Torch and Leads
- Work Lead with Work Clamp
- Spare Parts Kit (2 Electrodes, 2 Standoff Tips, 1 Gouging Tip, 1 Shield Cap and 1 Shield cup)
- 50 Amp to 20 Amp Adapter
- 20 Amp to 15 Amp Adapter
- Operating Manual
- Quick Start Guide

CE**Included items:**

- CutMaster 40 Power Supply
- SL60™ Torch and Leads
- Work Lead with Work Clamp
- Spare Parts Kit (2 Electrodes, 2 Standoff Tips, 1 Gouging Tip, 1 Shield Cap and 1 Shield cup)
- 1/4" NPT to female BSP Adapter.
- Operating Manual
- Quick Start Guide

Move the equipment to the installation site before un-boxing the unit. Use care to avoid damaging the equipment when opening the box.

CM 40 120-240 VAC 1 Phase Power Supply Specifications	
Input Power	120 - 240 VAC, Single Phase, 50/60 Hz
1 Phase Input Power Cable CSA	Power Supply includes 9' single phase 12AWG 3/C input cable with NEMA 6-50P Plug
Output Current	15 - 40 Amps, Continuously Adjustable
Power Supply Gas Filtering Ability	Particulates to 5 Microns
Inlet Pressure	90-125 PSI (6.2-8.6 bar / 620-862 Kpa)

2.04.01 Additional Power Supply Specifications

CM 40 Power Supply Duty Cycle *				
Ambient Air Temperature	Duty Cycle Ratings @ 40° C (104° F) Operating Range 0° - 50° C			
		Rating		
120 VAC Units	Duty Cycle*	30%	60%	100%
	Current	27 Amps**	20 Amps	15 Amps
	DC Voltage	92	93	89
208-240 VAC Units	Duty Cycle*	40%	60%	100%
	Current	40 Amps	30 Amps	20 Amps
	DC Voltage	135	130	135
<p>* NOTE: The duty cycle will be reduced if the primary input power (AC) is low or the output voltage (DC) is higher than shown in this chart.</p> <p>** NOTE: 27 Amps is for a 20 Amp circuit ONLY! DO NOT exceed a 20 Amp output setting on a 15 Amp circuit!</p>				

2.05 Input Wiring Specifications CSA




1 Phase Input Cable Wiring Requirements

1 Phase CutMaster 40 Power Supply Input Cable Wiring Requirements							
	Input voltage	Freq	Power Input			Suggested Sizes	
	Volts	Hz	kVA	I max	I _{eff}	Fuse (amps)	Flexible Cord (Min. AWG)
1 Phase	120 / 15A	50/60	2.3	19.3	13.6	15	12 AWG
	120 / 20A	50/60	3.1	25.3	18.3	20	12 AWG
	208	50/60	6.1	29.2	18.5	50	12 AWG
	220	50/60	6.1	27.9	17.6	50	12 AWG
	230	50/60	6.0	26.1	16.5	50	12 AWG
	240	50/60	6.0	25.1	15.9	50	12 AWG

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

NOTE!
Refer to Local and National Codes or local authority having jurisdiction for proper wiring requirements. Cable size is de-rated based on the Duty Cycle of the equipment.

MAX OUTPUT POWER / INPUT POWER

 15 Amp 120 VAC	 20 Amp 120 VAC	 50 Amp 208-240V
---	---	--

Art# A-14359

NOTE!
Due to circuitry, age and condition two generators with the same ratings may produce different results. Adjust the amperage accordingly.

CM 40 Cut Capacity		
Recommended	Pierce	Maximum
1/2" (12.7mm)	1/2" (12.7mm)	1" (25.4mm)

CM 40 240 VAC 1 Phase Power Supply Specifications	
Input Power	230 VAC, Single Phase, 50 Hz
1 Phase Input Power Cable CE	Power Supply includes 2.5M single phase 2.5mm ² input cable with Schuko plug
Output Current	15 - 40 Amps, Continuously Adjustable
Power Supply Gas Filtering Ability	Particulates to 5 Microns
Inlet Pressure	90-125 PSI (6.2-8.6 bar / 620-862 Kpa)

2.06.01 Additional Power Supply Specifications

CM 40 Power Supply Duty Cycle *				
Ambient Air Temperature	Duty Cycle Ratings @ 40° C (104° F) Operating Range 0° - 50° C			
		Rating		
230VAC Units	Duty Cycle*	35%	60%	100%
	Current	40 Amps	30 Amps	20 Amps
	DC Voltage	135	130	135
* NOTE: The duty cycle will be reduced if the primary input power (AC) is low or the output voltage (DC) is higher than shown in this chart.				

2.07 Input Wiring Specifications CE

1 Phase Input Cable Wiring Requirements

1 Phase CutMaster 40 Power Supply Input Cable Wiring Requirements							
	Input voltage	Freq	Power Input			Suggested Sizes	
	Volts	Hz	kVA	I max	I _{eff}	Fuse (amps)	Flexible Cord (Min. AWG)
1 Phase	230 CE	50	6.0	26.1	15.5	50	2.5mm ²
Line Voltages with Suggested Circuit Protection and Wire Sizes Based on National Electric Code and Canadian Electric Code							



NOTE!

Refer to Local and National Codes or local authority having jurisdiction for proper wiring requirements. Cable size is de-rated based on the Duty Cycle of the equipment.

2.08 Generator Recommendations

When using generators to power the CM40 Plasma Cutting System, the following ratings are a minimum and are to be used along with the ratings previously listed.

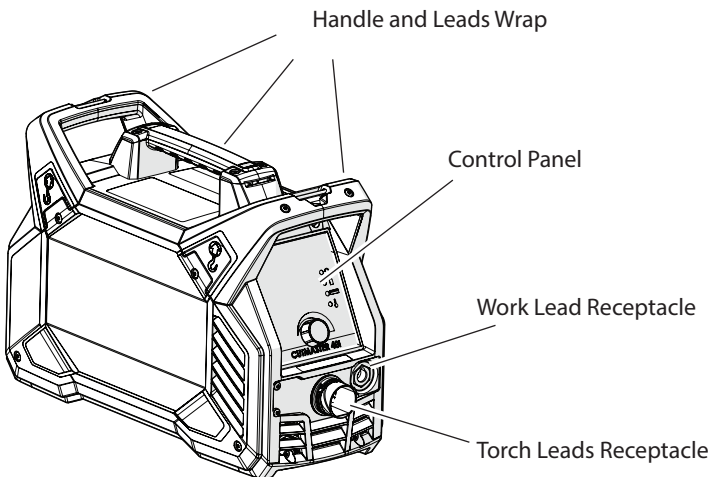
CM 40 Generator Specifications		
Generator Output Rating	CM 40 Output Current	Arc Characteristic
3 kW / 120V	20A on 15A circuit	Full
5 kW / 120V	27A on 20A circuit	Full
6.8 kW	40A	Full

NOTE: If Generator is equipped with an idle mode it will need to be in "Run" mode to operate at 40 amps.

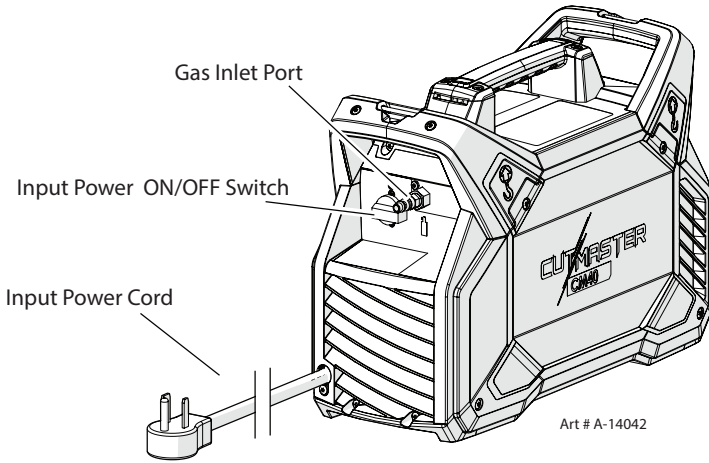
NOTE! Due to circuitry, age and condition two generators with the same ratings may produce different results. Adjust the amperage accordingly.

CM 40 Cut Capacity		
Recommended	Pierce	Maximum
1/2" (12.7mm)	1/2" (12.7mm)	1" (25.4mm)

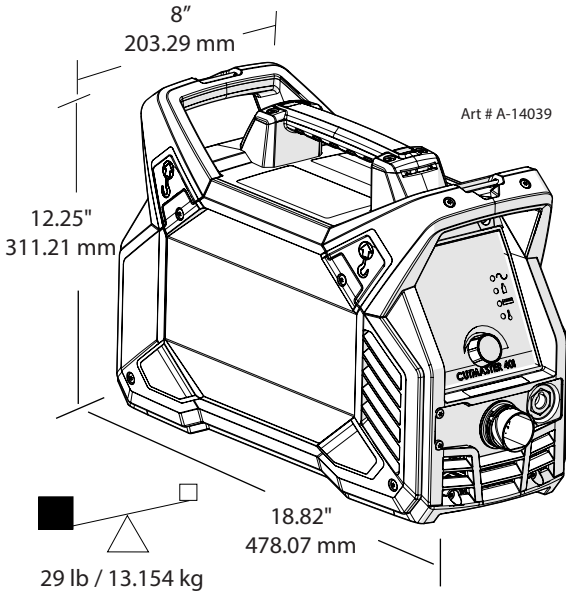
2.09 Power Supply Features



Art # A-14041

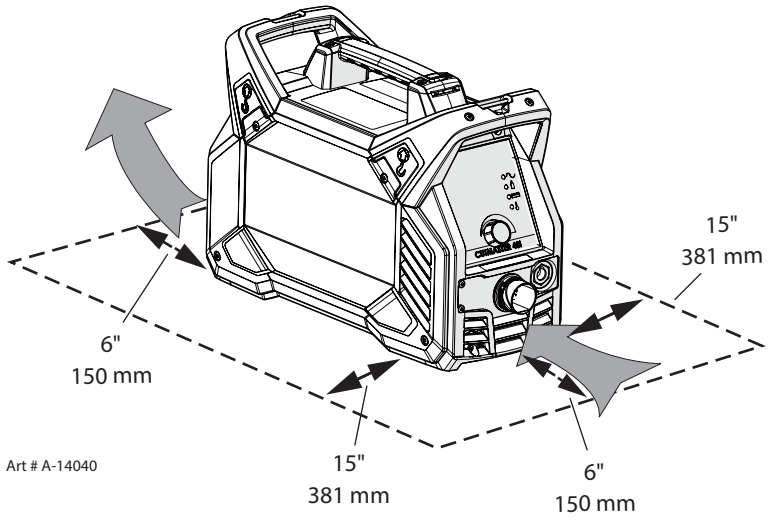


Weights and Dimensions



Power Supply Dimensions & Weight

Clearances for Operation and Ventilation



Art # A-14040

Ventilation Clearance Requirements

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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

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

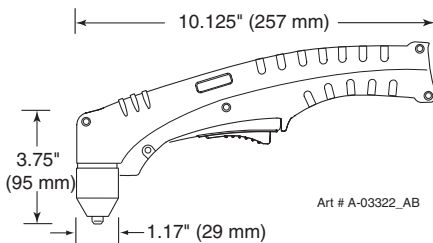
Refer to the Appendix Pages for additional specifications as related to the Power Supply used.

2T.03 Specifications

A. Torch Configurations

1. Hand/Manual Torch, Models

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



Hand Torches are available as follows:

- 20 ft / 6.1 m
- 50 ft / 15.2 m

C. Torch Parts

Starter Cartridge, Electrode, Tip, Shield Cup

D. Parts - In - Place (PIP)

Torch Head has built - in switch

15 VDC circuit rating

E. Type Cooling


Combination of ambient air and gas stream through torch.


F. Torch Ratings

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

G. Gas Requirements

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

	<p>WARNING <i>This Torch is not to be used with oxygen (O₂). The SL60QD torch should not be used on an HF system.</i></p>
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	<p>NOTE! Operating pressure varies with torch model, operating amperage, and torch leads length. Refer to gas pressure settings charts for each model.</p>
---	---

H. Direct Contact Hazard

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

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SECTION 3 SYSTEM: INSTALLATION

3.01 Unpacking

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

3.02 Lifting Options

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

**WARNING**

Do not touch live electrical parts.

Disconnect input power cord before moving unit.



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

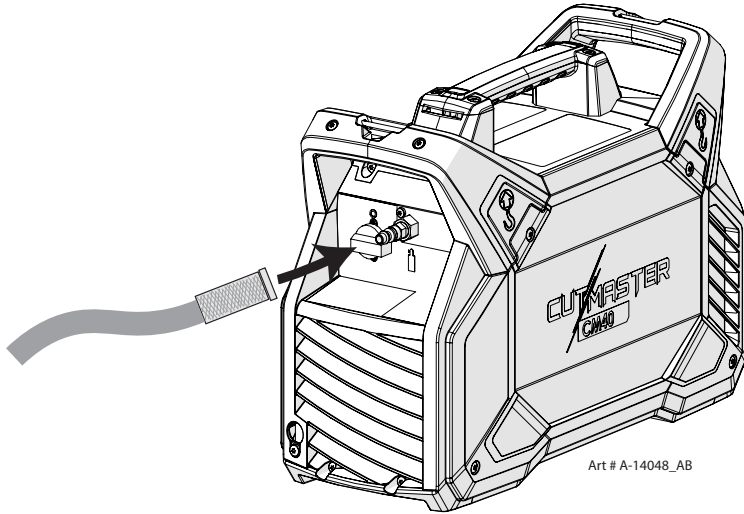
HANDLES are not for mechanical lifting.

- Only persons of adequate physical strength should lift the unit.
- Lift unit by the handles, using two hands. Do not use straps for lifting.
- Use optional cart or similar device of adequate capacity to move unit.

Connecting Gas Supply to Unit

The connection is the same for compressed air or high pressure cylinders.

1. Connect the air line to the quick connect inlet port. The following illustration shows typical gas line with quick connect fittings as an example.



Air Connection to Inlet Port



NOTE!

1/4" NPT to 1/4" female BSP adapter provided for European units if preferred.

3.04 Primary Input Power Connections



CAUTION

Check your power source for correct voltage before connecting the unit to input power. 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 Cords Included With the Power Supply

Power cords come attached on all systems. For North America it will come with a 50 amp plug for use on a 240V/50A circuit. For Europe it will come with a 2.5mm² cable and a Schuko plug for use on a 230V circuit. . .

Also included for **CSA systems ONLY**, are two adapters. One is a cable with a 120V/20A NEMA 5-20P plug which attaches to the power supply input cord via a NEMA 6-50R plug. The other is a 5-20R to 5-15P adapter plug that attaches to the other adapter.



CAUTION

When using the 120V/20A adapter cord (CSA systems ONLY), do not exceed a current output setting of 27 Amps on the power supply or the input power circuit breaker may trip.



WARNING



When using the 15A adapter in conjunction with the 20A adapter (CSA systems ONLY), extreme caution should be used to not exceed a current output setting of 20 Amps on the power supply. Failure to do so may result in the input power circuit breaker tripping or branch circuit overheating.

Input Voltage	Rated Output	Amps (RMS) input at rated output, 60 Hz, single-phase	kVA
120V, 15A Circuit (CSA)	20A, 93V	19.3	2.3
120V, 20A Circuit (CSA)	27A, 92V	25.3	3.1
208-240V, 50A Circuit (CSA)	40A, 135V	25-29	6.0
230V, (CE)	40A, 135V	26	6.0

CSA ONLY

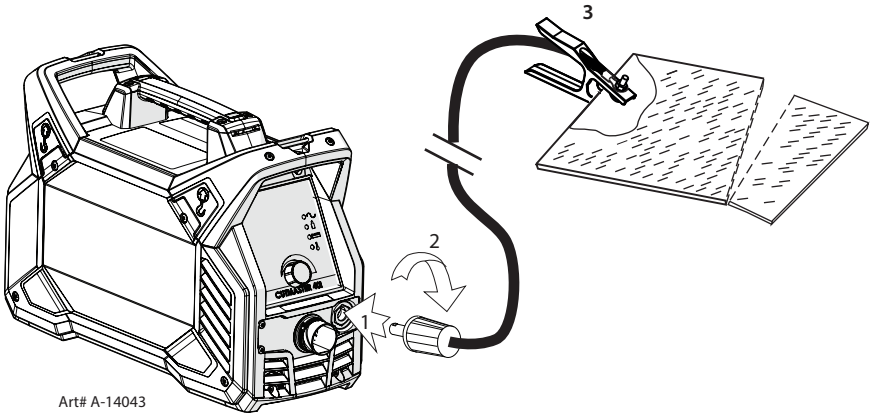
MAX OUTPUT POWER / INPUT POWER

<p>MAX OUTPUT 20A</p> <p>15 Amp 120 VAC</p>	<p>MAX OUTPUT 27A</p> <p>20 Amp 120 VAC</p>	<p>MAX OUTPUT 40A</p> <p>50 Amp 208-240V</p>
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Art# A-14359

Connect the Work Lead to the power supply and the work piece.

1. Attach the Dinse type connection of the work lead to the power supply front panel as shown below. Push in and turn clockwise to the right until tight.
2. Connect the work clamp to the workpiece or cutting table. The area must be free from oil, paint and rust. Connect only to the main part of the work piece; do not connect to the part to be cut off.



See section 3T for torch installation.

SECTION 3 TORCH: INSTALLATION

3T.01 Torch Connections

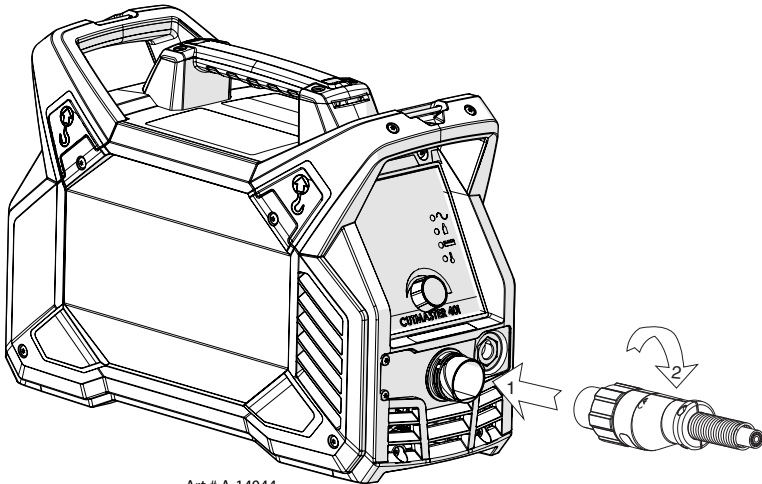
If necessary, connect the torch to the Power Supply. Connect only the ESAB model SL60 or SL60QD™ Torch to this power supply. Maximum torch leads length is 100 feet / 30.5 m, including extensions.



WARNING

Disconnect primary power at the source before connecting the torch.

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



Art # A-14044

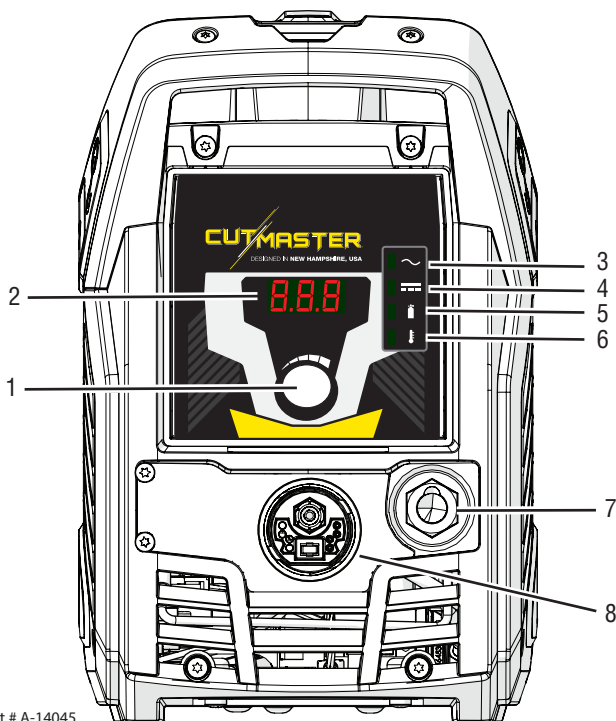
Connecting the Torch to the Power Supply

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SECTION 4 SYSTEM: OPERATION

4.01 Front Panel Controls / Features

See Illustration for numbering Identification



Art # A-14045

1. Current Control Knob

Knob used to adjust current output.



2. Numeric Display

- Displays software revision at start up
- Displays amperage values (Factory default)
- Displays Status Codes

3. AC Indicator

Steady light indicates power supply is ready for operation. No light indicates there is no input voltage, the input voltage is outside of operating range, or there is an internal fault.

4. DC Indicator

Indicator is ON when DC output circuit is active.

**5. Gas Pressure Indicator**

Indicator will be ON to show any gas pressure but not whether it is adequate or not. Check the inlet gas pressure. It should be between 90 - 125 PSI / 6.2 - 8.6 bar / 620 - 862 Kpa. NEVER EXCEED 150 PSI / 10.34 bar / 1034 Kpa.

**6. Over Temp Indicator**

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

7. Work Lead Dinse type receptacle

Align Dinse type connector on work lead with receptacle, press in and turn clockwise to the right until tight.

8. Torch Quick Disconnect Receptacle

Torch Leads are connected here by aligning the connectors, pressing in and turning locking ring clockwise-to-the-right to secure. Connection should only be snug with no tools used.

4.02 Preparations for Operation

At the start of each operating session:

**WARNING**

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

Torch Parts Selection

Check the torch for proper assembly and appropriate torch parts. The torch parts must correspond with the type of operation, and with the amperage output of this Power Supply (40 amps maximum at 240V or 27 amps at 120V). Refer to Section 4T.01 for torch parts order.

Torch Connection

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

Check Primary Input Power Source

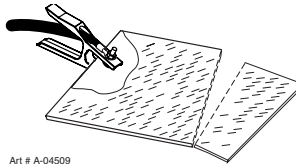
1. Check the power source for proper input voltage. Make sure the input power source meets the power requirements for the unit per Section 2, Specifications.
2. Connect the input power cable (or close the main disconnect switch) to supply power to the system.

Air Source

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


Connect Work Cable

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



Art # A-04509

Power ON

Place the Power Supply ON / OFF switch to the ON (right) position. AC indicator  turns ON. The Main Board performs several tests to determine the system is ready to operate. During the self-tests the digital display first shows the firmware revision number which includes decimals. 1.1.0 is an example of a production released code revision that may be displayed.

If there are no issues detected the output current setting will be displayed from 15 to 40 amps. Should a problem be detected the status code in letter format or Exx will display. Refer to Section 5 for fault / status code explanations.

The cooling fan will turn ON as soon as the unit is turned ON and will continue to run until the power is turned OFF.

Set Operating Pressure

Gas pressure cannot be set at the power supply and must be set at the source, from 90 - 125 PSI / 6.2 - 8.6 bar / 620 - 862 Kpa.

NEVER EXCEED 150 PSI / 10.34 bar / 1034 Kpa.

Cutting Operation

Once the cutting arc is established, it should continue to cut until the trigger is released, the torch is moved too far from the work piece or the duty cycle has been exceeded causing the system to go into an over temperature mode. In the first two instances release the torch trigger, ensure that the torch tip is close to the work piece, activate the trigger and reestablish the cutting arc. In the event of an over temperature fault, release the trigger, allow the unit to run so it will cool down. When the fault clears you can begin cutting again.

Typical Cutting Speeds

Cutting speeds vary according to torch output amperage, gas pressure, the type of material being cut, and operator skill.

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

Release the trigger to stop the cutting arc. Gas continues to flow for approximately 10 seconds. During post - flow, if the user quickly presses and releases the trigger, the gas will shut off. If the user continues to hold the trigger and not release it, the pilot arc starts. The main arc will transfer to the workpiece if the torch tip is within transfer distance.

Shutdown

Turn the ON / OFF switch to OFF, to the left as you face the unit from the rear. After a short delay all Power Supply indicators and fan shut OFF. Unplug the input power cord or disconnect input power. Power is removed from the system.

**NOTE!**

To maximize the longevity of the internal electronics, allow the power supply to continue running (without cutting) for a few minutes before turning OFF. This will allow them to cool faster.

SECTION 4 TORCH: OPERATION

4T.01 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 Start Cartridge

**NOTE!**

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

Change the torch parts for a different operation as follows:

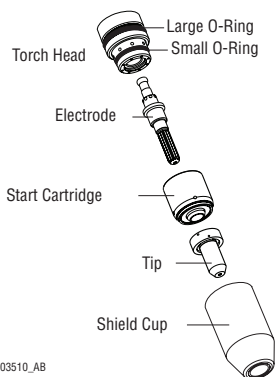
**WARNING**

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

**NOTE!**

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

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



A-03510_AB

Torch Parts

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

4T.02 Hand Torch Operation

Standoff Cutting With Hand Torch

**NOTE!**

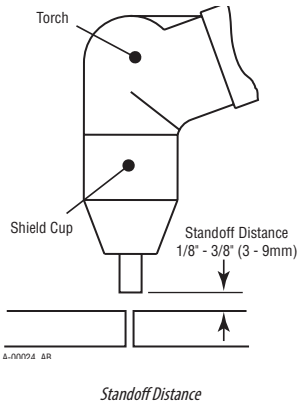
For best performance and parts life, always use the correct parts for the type of operation.

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.

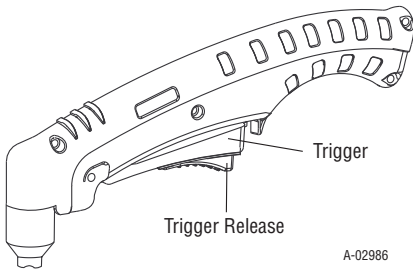
**NOTE!**

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.

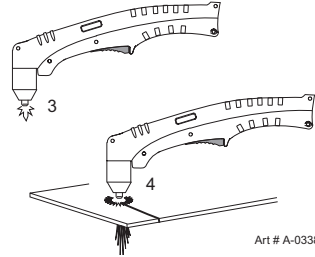
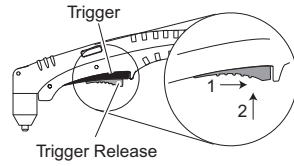


3. Hold the torch away from your body.
4. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



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.

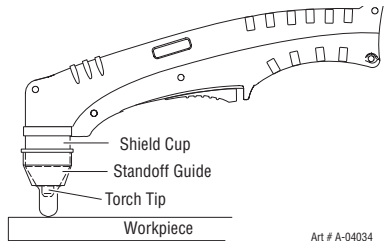
NOTE! The gas preflow and postflow are a characteristic of the power supply and not a function of the torch.



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

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

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

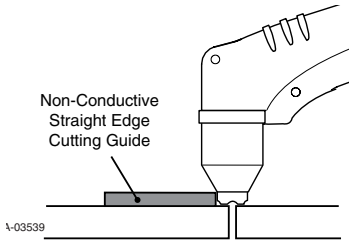


Shield Cup With Straight Edge

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



WARNING
The straight edge **must be non - conductive.**




Using Drag Shield Cup With Straight Edge

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

Drag Cutting With a Hand Torch

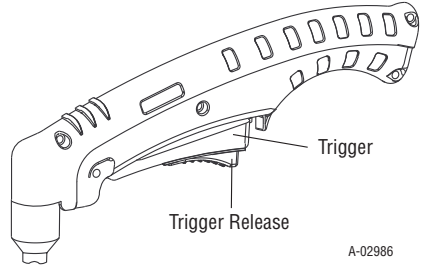
Drag cutting works best on metal 1/4" (6 mm) thick or less.




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

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

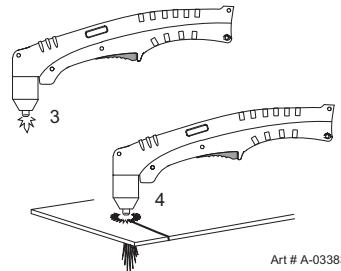
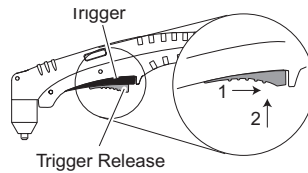
4. Keep the torch in contact with the work-piece during the cutting cycle.
5. Hold the torch away from your body.
6. Slide the trigger release toward the back of the torch handle while simultaneously squeezing the trigger. The pilot arc will start.



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.

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9. Follow normal recommended cutting practices as provided in the power supply operator's manual.

**NOTE!**

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

Piercing With Hand Torch

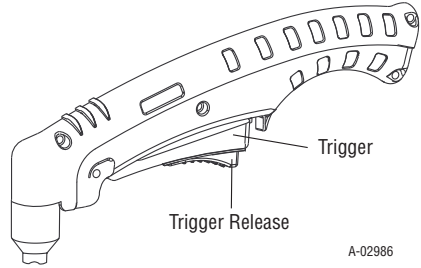
1. Hold the torch away from your body.
2. The torch can be comfortably held in one hand or steadied with two hands. Position the hand to press the Trigger on the torch handle. With the hand torch, the hand may be positioned close to the torch head for maximum control or near the back end for maximum heat protection. Choose the 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.

3. Angle the torch slightly to direct blow-back particles away from the torch tip (and operator) rather than directly back into it until the pierce is complete.
4. 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.

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.

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

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

**WARNING**

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

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

**CAUTION**

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

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

Gouging Parameters

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

**CAUTION**

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

Torch Travel Speed**NOTE!**

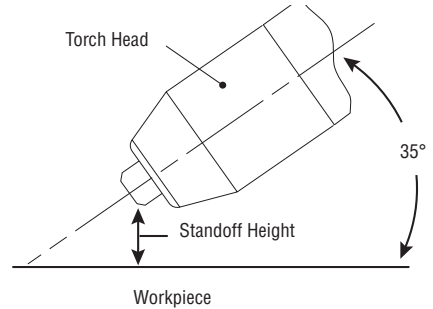
Refer to Appendix Pages for additional information as related to the Power Supply used.

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

Current Setting

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

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



A-00941 AR

*Gouging Angle and Standoff Distance***Standoff Distance**

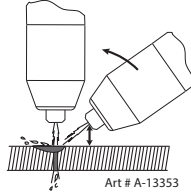
The tip to work distance affects gouge quality and depth. Standoff distance of 1/8 - 1/4 inch (3 - 6 mm) allows for smooth, consistent metal removal. Smaller standoff distances may result in a severance cut rather than a gouge. Standoff distances greater than 1/4 inch (6 mm) may result in minimal metal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

Slag Buildup

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

Rolling Pierce

A Rolling Pierce begins cutting with the torch head placed at an angle to the work surface. Splatter/dross are blown away from the work area as the torch cuts. The torch head rotates towards vertical as the cut grows deeper and pierces the workpiece.



Plasma Cutting Torch Patents

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

Catalog #	Description	Patent(s)
9-8215	Electrode	US Pat No(s) 6163008; 6987238 Other Pat(s) Pending
9-8214	Electrode	US Pat No(s) 6163008; 6987238 Other Pat(s) Pending
9-8213	Cartridge	US Pat No(s) 6903301; 6717096; 6936786; 6703581; D496842; D511280; D492709; D499620; D504142 Other Pat(s) Pending
9-8205	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8206	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8207	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8252	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8208	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8209	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8210	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8231	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8211	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8212	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8253	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8225	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8226	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8227	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8228	Tip	US Pat No(s) 6774336; 7145099; 6933461 Other Pat(s) Pending
9-8241	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8243	Shield Cap	US Pat No(s) 6914211; D493183 Other Pat(s) Pending
9-8235	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8236	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8237	Shield Cup	US Pat No(s) 6914211; D501632; D511633 Other Pat(s) Pending
9-8238	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending
9-8239	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending
9-8244	Shield Cap	US Pat No(s) 6914211; D505309 Other Pat(s) Pending
9-8245	Shield Cap	US Pat No(s) 6914211; D496951 Other Pat(s) Pending

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

Catalog #Description

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

Patents Pending for the following:

Quick Disconnect Torch and Quick Disconnect Torch Leads

SECTION 5 SYSTEM: SERVICE

5.01 General Maintenance

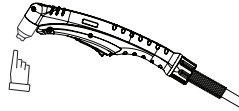


Warning!
Disconnect input power before maintaining.

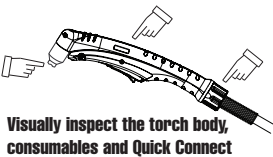
Maintain more often
 if used under severe
 conditions

Each Use

Visual check of
 torch tip and electrode

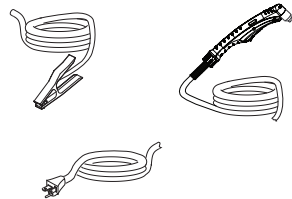


Weekly



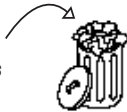
Visually inspect the torch body,
 consumables and Quick Connect

Visually inspect the
 cables and leads.
 Replace as needed



3 Months

Replace all
 broken parts



Clean
 exterior
 of power supply



Art# A-14037

5.02 Maintenance Schedule

**NOTE!**

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

Daily Operational Checks or Every Six Cutting Hours:

1. Check torch consumable parts, replace if damaged or worn.
2. Check plasma and secondary supply and pressure/flow.

Weekly or Every 30 Cutting Hours:

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

Six Months or Every 720 Cutting Hours:

1. Check the in-line air filter(s), clean or replace as required.
2. Check cables and hoses for leaks or cracks, replace if necessary.

**CAUTION**

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

5.03 Common Faults

Problem - Symptom	Common Cause
Insufficient Penetration	<ol style="list-style-type: none"> 1. Cutting speed too fast. 2. Torch tilted too much. 3. Metal too thick. 4. Worn torch parts 5. Cutting current too low. 6. Non - Genuine Thermal Dynamics parts used 7. Incorrect gas pressure. Line pressure 90-125 psi (6.2-8.6 bar / 620-862 Kpa).
Main Arc Extinguishes	<ol style="list-style-type: none"> 1. Cutting speed too slow. 2. Torch standoff too high from workpiece. 3. Cutting current too high. 4. Work cable disconnected. 5. Worn torch parts. 6. Non - Genuine Thermal Dynamics parts used 7. Line voltage drop due to extension cord or supply line being too long.
Excessive Dross Formation	<ol style="list-style-type: none"> 1. Cutting speed too slow. 2. Torch standoff too high from workpiece. 3. Worn torch parts. 4. Improper cutting current. 5. Non - Genuine Thermal Dynamics parts used 6. Incorrect gas pressure
Short Torch Parts Life	<ol style="list-style-type: none"> 1. Oil or moisture in air source. 2. Exceeding system capability (material too thick). 3. Excessive pilot arc time 4. Gas pressure too low. 5. Improperly assembled torch. 6. Non - Genuine Thermal Dynamics parts used
Difficult Starting	<ol style="list-style-type: none"> 1. Worn torch parts. 2. Non - Genuine Thermal Dynamics parts used. 3. Incorrect gas pressure. 4. Line voltage too low 5. Wrong parts for current selection. 6. Hose restriction.

5.04 Fault Indicator

At initial power up, the system goes through a series of self checks before it is ready for use. If during those checks it detects something is not within proper operating parameters, a fault will occur. If that happens, an Error Code will illuminate on the digital display. Depending on the type of error it may be accompanied by one of the indicator lights to the right of the digital display to turn ON or in the case of a low or high line voltage detection the AC indicator will turn OFF.

The Cutmaster 40 has two types of Fault Codes. One is the Communication Fault. This type of code is to help you determine what you can do to get the system up and running by correcting a problem like forgetting to put the consumables in the torch. These will show letters on the digital display.

The other type of Fault Code is the Error Fault for issues with the Power Supply or incoming power and will show "E0" and a number on the digital display and possibly a fault light such as the AC light being turned OFF.

Communication Fault	Description
---------------------	-------------

H I	Over Temp	Overtemp Error will activate if an Over Temperature status has been detected on the heatsink or transformer. "HI" will show on the 7 segment display and the Over Temp LED will be illuminated.
P I P	Parts InPlace Fault	Parts In Place Error is activated if the shield cup is removed. "PIP" will show on the 7-segment display
P I C	Parts In Contact	Parts In Contact Error is activated when the tip is not in contact with the electrode during initialization. Most likely to occur if the tip is missing from the torch. "PIC" will show on the 7-segment display.
S C C	Trigger Fault	SCC Trigger Fault Error is activated if the trigger is pulled during machine start up or while another fault is clearing. "SCC" will show on the 7-segment display.
L O P	Gas Fault	LoP Gas Fault Error is activated if the consumables do not separate when the gas is turned on. Most likely due to gas line not attached or pressure is too high closing the valve. The Gas LED on the front display will be flashing or not be illuminated.

Error Fault	Description
-------------	-------------

E 0 2	Bus Fault	Bus Fault Error is activated if the bus voltage drops below ~360V. Bus voltage will be checked in standby mode only. "E02" will show on the 7-segment display.
E 0 3	Bias Fault	Bias Fault Error is activated if the bias voltage drops below ~13.5V. "E03" will show on the 7-segment display.
E 0 6	Low Line Voltage Fault	Low Line Voltage Error is activated if the Input voltage is too low. "E06" will show on the 7-segment display and the AC LED indicator on the front display will not be illuminated.
E 0 7	High Line Voltage Fault	High Line Voltage Error is activated if the input voltage is too high. "E07" will show on the 7-segment display and the AC LED indicator on the front display will not be illuminated.



WARNING

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

Problem - Symptom	Possible Cause	Recommended Action
ON / OFF Switch is ON but the A/C Indicator does not light	<ol style="list-style-type: none"> 1. Primary power disconnect is in OFF position. 2. Primary fuses / breakers are blown or tripped. 3. Faulty components in unit. 	<ol style="list-style-type: none"> 1. Turn primary power disconnect switch to ON position. 2. a) Have qualified person check primary fuses / breakers. b) Connect unit to known good primary power receptacle 3. Return to authorized service center for repair or replacement.
Fault indicator showing Error Code E02	<ol style="list-style-type: none"> 1. Primary input voltage problem. 2. Faulty components in unit. 	<ol style="list-style-type: none"> 1. Have qualified person check primary voltage to insure it meets unit requirements see Section "2.05 Input Wiring Specifications" on page 19. 2. Return to authorized service center for repair or replacement.
TEMPERATURE LED ON . Communication Fault showing HI	<ol style="list-style-type: none"> 1. Air flow through or around the unit is obstructed. 2. Duty cycle of the unit has been exceeded. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Refer to clearance information – see Section "2.04 Power Supply Specifications" on page 18 2. Allow unit to cool. 3. Return to authorized service center for repair or replacement.
GAS LED OFF, Communication Fault showing LoP	<ol style="list-style-type: none"> 1. Gas supply not connected to unit. 2. Gas supply not turned ON. 3. Gas supply pressure too low. 4. Failed components in unit. 	<ol style="list-style-type: none"> 1. Connect gas supply to unit. 2. Turn gas supply ON. 3. Set air supply inlet pressure to unit to 120 psi. Set leads length to match the actual length being used. 4. Return to authorized service center for repair or replacement.
FAULT and Communication Fault showing PIP	<ol style="list-style-type: none"> 1. Shield Cup loose. 2. Torch not properly connected to power supply. 3. Problem in torch and leads PIP circuit. 4. Failed components in unit. 	<ol style="list-style-type: none"> 1. Hand tighten the shield cup until it is snug. 2. Insure torch ATC is securely fastened to unit. 3. Replace torch and leads or return to authorized service center for repair or replacement. 4. Return to authorized service center for repair or replacement.
FAULT and Communication Fault showing PIC	<ol style="list-style-type: none"> 1. Torch shield cup is loose. 2. Torch tip, electrode or starter cartridge missing. 3. Torch start cartridge is stuck. 4. Unit inlet gas pressure is too high causing continuous gas flow. 5. Open conductor in torch leads. 6. Problem in the torch and leads switch circuit. 7. Failed components in unit. 	<ol style="list-style-type: none"> 1. Tighten shield cup by hand. Do not over tighten. 2. Turn OFF power supply. Remove shield cup. Install missing parts. 3. Turn OFF power supply. Bleed down system pressure. Remove shield cup, tip and start cartridge. Check start cartridge lower end fitting for free movement. Replace if fitting does not move freely. 4. Decrease gas supply pressure to 125 PSI or less. 5. Replace torch and leads or return to authorized service center for repair or replacement. 6. Replace torch and leads or return to authorized service center for repair or replacement. 7. Return to authorized service center for repair or replacement

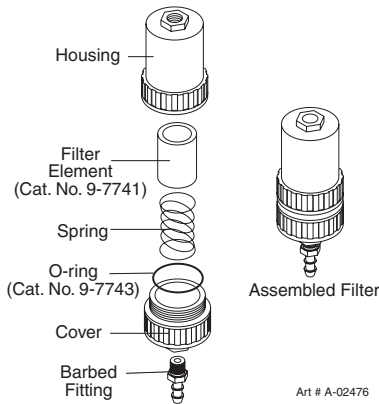
Problem - Symptom	Possible Cause	Recommended Action
Nothing happens when torch switch or remote switch is closed (Or CNC START signal is active). No gas flow, DC LED OFF.	<ol style="list-style-type: none"> 1. Problem in the torch and leads switch circuit (Remote pendant switch circuit). 2. Failed components in unit. 3. Gas pressure too high. 	<ol style="list-style-type: none"> 1. Take Torch and Leads (Remote Pendant) to Authorized Repair Facility. 2. Return to authorized service center for repair or replacement. 3. Reduce gas pressure.
No Fault lights ON, no arc in torch.	<ol style="list-style-type: none"> 1. Failed components in unit. 	<ol style="list-style-type: none"> 1. Return to an authorized service center for repair.
Pilot arc is ON but cutting arc will not establish	<ol style="list-style-type: none"> 1. Work cable not connected to work piece. 2. Work cable/connector broken. 3. Failed components in unit. 	<ol style="list-style-type: none"> 1. Connect work cable. 2. Replace work cable. 3. Return to an authorized service center for repair.
Torch cutting is diminished	<ol style="list-style-type: none"> 1. Incorrect current setting. 2. Worn torch consumables. 3. Poor work cable connection to work piece. 4. Torch being moved too fast. 5. Excessive oil or water in torch. 6. Failed components in unit. 	<ol style="list-style-type: none"> 1. Check and adjust to proper setting. 2. Check torch consumables and replace as needed. 3. Check the connection of the Work Lead to the work piece. 4. Reduce cutting speed. 5. Refer to "Check air quality" in Section 3 Torch. 6. Return to an authorized service center for repair.

Optional Single-Stage Filter Element Replacement

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

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

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

*Optional Single-Stage Filter Element Replacement*

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

**NOTE!**

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

This completes the parts replacement procedures.

SECTION 5 TORCH: SERVICE

5T.01 General Maintenance

**NOTE!**

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

Cleaning Torch

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

**WARNING**

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

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

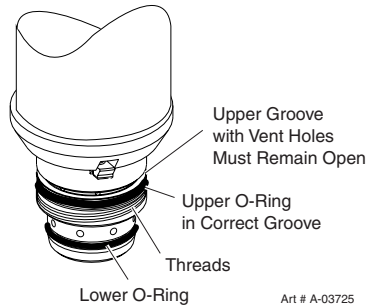
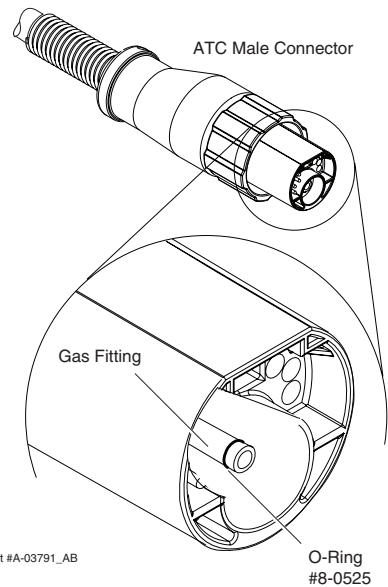
**CAUTION**

Dry the torch thoroughly before reinstalling.

O-Ring Lubrication

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

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

*Torch Head O-Ring**ATC O-Ring***NOTE!**

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

5T.02 Inspection and Replacement of Consumable Torch Parts



WARNING

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

Remove the consumable torch parts as follows:



NOTE!

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

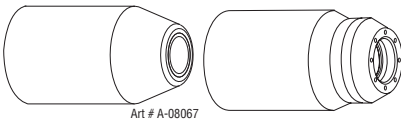
1. Unscrew and remove the shield cup from the torch.



NOTE!

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

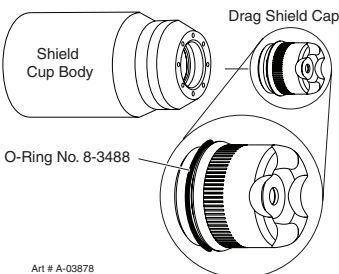
2. Inspect the cup for damage. Wipe it clean or replace if damaged.



Art # A-08067

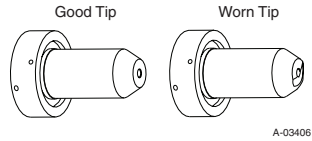
Shield Cups

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



Art # A-03878

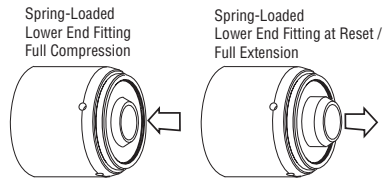
4. Remove the tip. Check for excessive wear (indicated by an elongated or oversized orifice). Clean or replace the tip if necessary.



A-03406

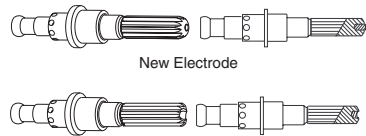
Example of Tip Wear

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



Art # A-08064_AC

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



Art # A-03284

Electrode Wear

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

This completes the parts replacement procedures.

SECTION 6: PARTS LISTS

6.01 Introduction**A. Parts List Breakdown**

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

6.03	Power Supply Replacement
6.04	Replacement Power Supply Parts
6.05	Options and Accessories
6.06	External Replacement Parts
6.07	Replacement Parts for SL60 Hand Torch
6.08	Replacement Parts for SL60QD Hand Torch
6.09	Torch Consumable Parts (SL60™)

**NOTE!**

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

B. Returns

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

6.02 Ordering Information

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

6.03 Power Supply System Replacement

The following items are included with the replacement power supply: work cable & clamp, input power cable, input power cable adapters (2), gas pressure regulator / filter, SL60 Torch, spare parts kit, and operating manual.

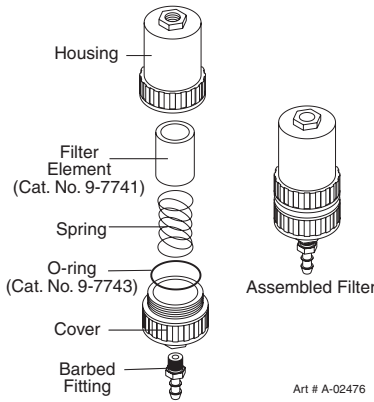
Qty	Description	Catalog #
1	CutMaster 40 Power Supply UL/CSA 120 -240 VAC, SINGLE Phase, 60Hz, with input power cable and plug	1-4000-1
1	CutMaster 40Power Supply CE 240 VAC, SINGLE Phase, 60Hz, with input power cable	1-4000-4

6.04 Replacement Power Supply Parts

Qty	Description	Catalog #
1	Filter Assembly Replacement Element (Factory filter)	9-0116
1	Cable, Pwr 2.5mm ² 3m EU Type F	9-4435

6.05 Options and Accessories

Qty	Description	Catalog #
1	Single - Stage Filter Kit (includes Filter & Hose)	7-7507
1	Replacement Filter Body	9-7740
1	Replacement Filter Hose (not shown)	9-7742
2	Replacement Filter Element	9-7741
1	Work Cable #8 with 50mm Dinse plug	9-9692
1	Multi - Purpose Cart	7-8888

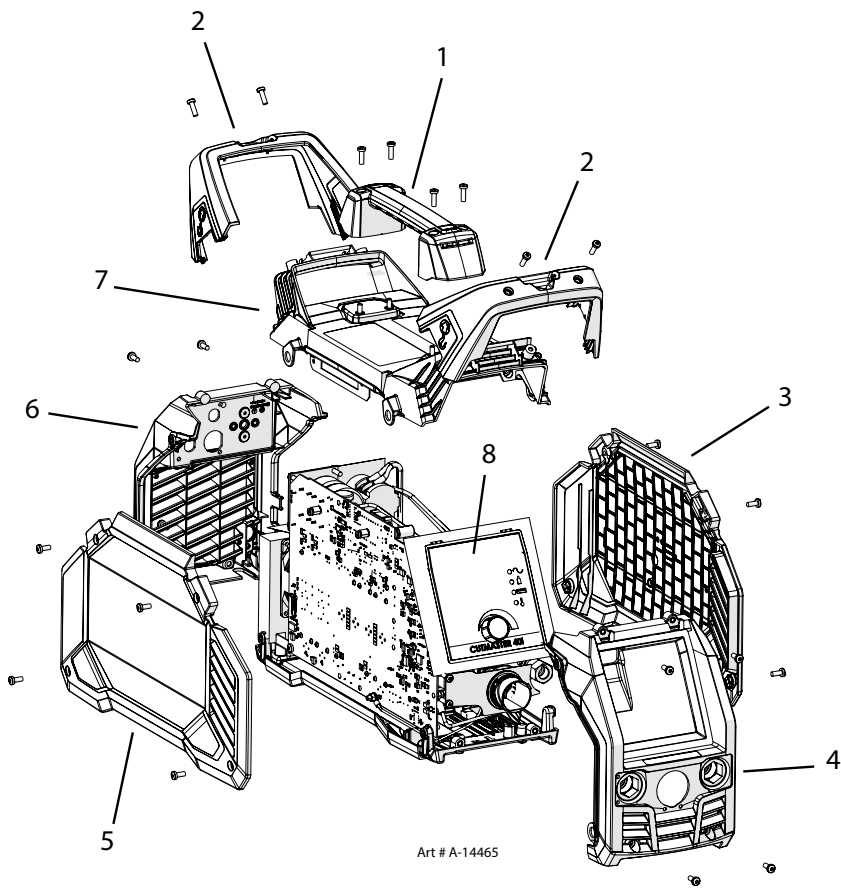


Optional Single - Stage Filter Kit

6.06 External Replacement Parts

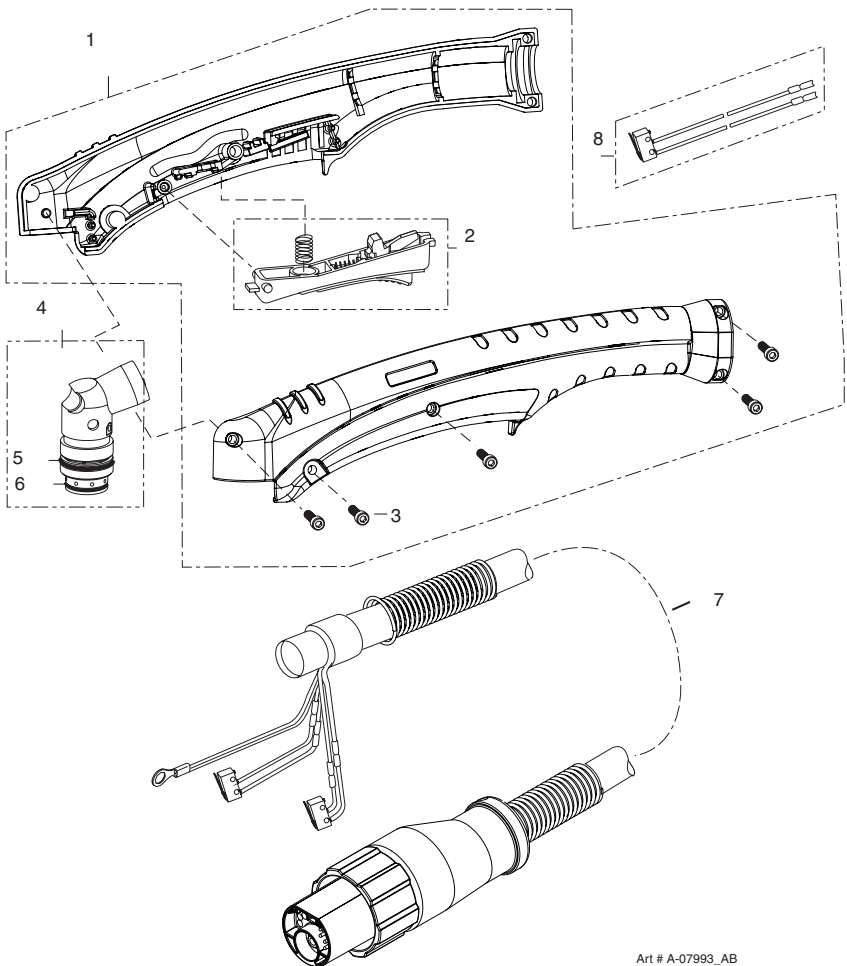
Item #	Qty	Description	Catalog #
1	1	Top Handle Kit	0464 565 880
2	1	Handle Cover	0465 952 001
3	1	Panel, RH CM40 TD_AEB	9-4440
4	1	Ass'y, Panel Frnt CM40	9-4437
5	1	Panel, LH CM40 TD_AEB	9-4439
6	1	Ass'y, Panel Rear CM40	9-4438
7	1	Top Panel	0465 951 001
8	1	Ass'y, Pcb Display	9-4433
9	1	Kit, Hardware CM40 (not shown)	9-4000

-Includes all the screws/nuts for this system



6.07 Replacement Parts for SL60 Hand Torch

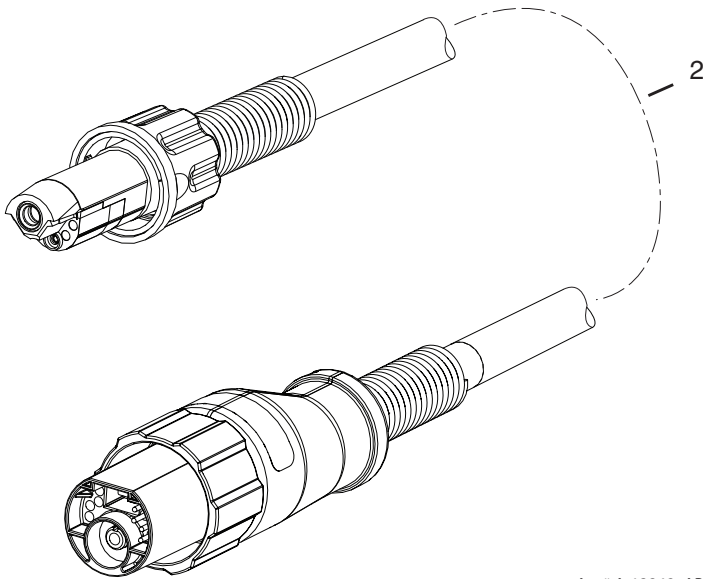
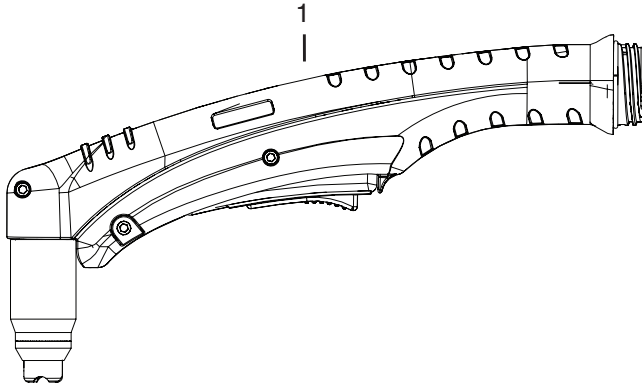
Item #	Qty	Description	Catalog #
1	1	Torch Handle Replacement Kit (includes items No. 2 & 3)	9-7030
2	1	Trigger Assembly Replacement Kit	9-7034
3	1	Handle Screw Kit (5 each, 6-32 x 1/2" cap screw, and wrench)	9-8062
4	1	Torch Head Assembly Replacement Kit (includes items No. 5 & 6)	9-8219
5	1	Large O-Ring	8-3487
6	1	Small O-Ring	8-3486
7	Leads Assemblies with ATC connectors (includes switch assemblies)		
	1	SL60, 20 - foot / 6.1m Leads Assembly with ATC connector	4-7834
	1	SL60, 50 - foot / 15.2m Leads Assembly with ATC connector	4-7835
8	1	Switch Kit	9-7031



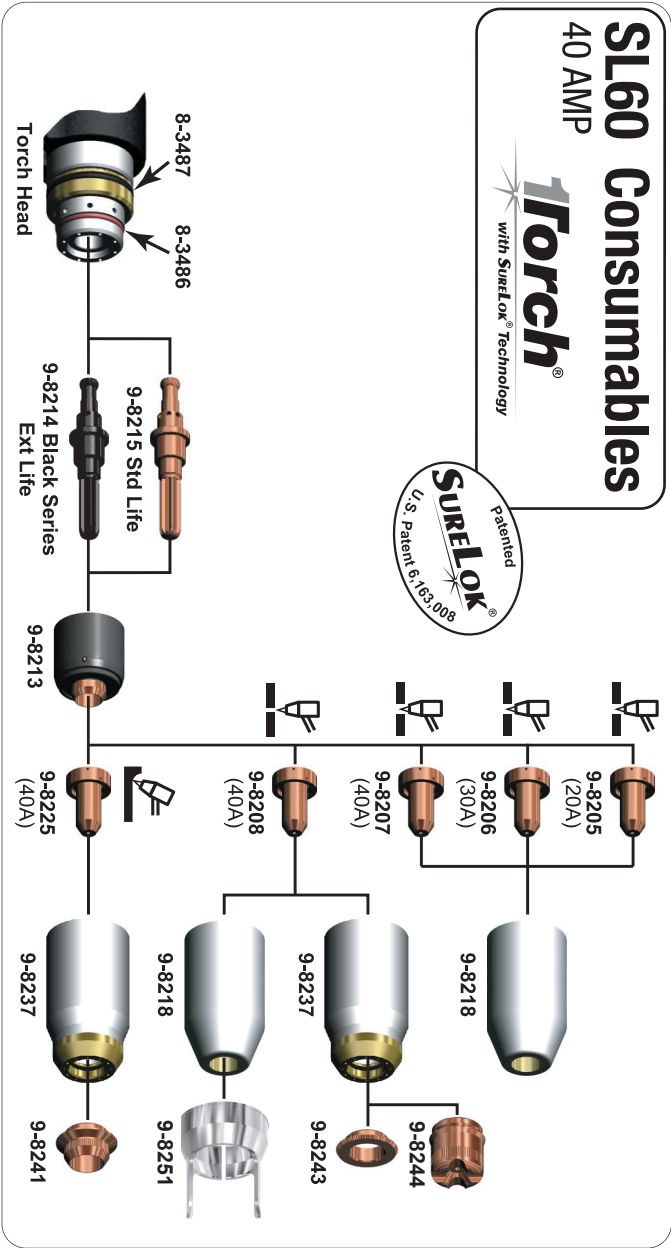
Art # A-07993_AB

6.08 Replacement Parts for SL60QD Hand Torch

Item #	Qty	Description	Catalog #
1	1	Torch Handle Assembly Replacement	7-5681
2		Leads Assemblies with ATC connector and Quick Connectors	
	1	SL60QD™, 20 - foot Leads Assembly with ATC and QD connectors	4-5620
	1	SL60QD™, 50 - foot Leads Assembly with ATC and QD connectors	4-5650
1&2	1	Torch and Leads Assembly, 20 - foot	7-5620
1&2	1	Torch and Leads Assembly, 50 - foot	7-5650



Art # A-13248_AB



Art # A-14049_AC

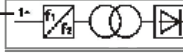
APPENDIX 1: DATA TAG INFORMATION

Manufacturer's Name and/or Logo, Location, Model and Revision Level

Regulatory Standard Covering This Type of Power Supply

	Victor Technologies Group, Inc. 2800 Airport Road Denton, TX 76207 USA Model: CM40 - CSA/UL Made in Poland		
	CSA E60974-1 ANSI/IEC 60974-1 Class A	Ser. No. _____ Art. No. _____	Serial Number

Type of Power Supply (Note 1)



Plasma Cutting Symbol 	Output Current Type 	Duty Cycle Factor X	Output Range (Amperage/Voltage)			
	Rated No-Load Voltage $U_0 =$	Conventional Load Voltage U_2	Duty Cycle Data (Note 3)			

Input Power Symbol 	Rated Supply Voltage (Note 2) U_1	Rated Maximum Supply Current $1 \emptyset$	I_{max}	$3 \emptyset$	Maximum Effective Supply Current $1 \emptyset$	I_{eff}	$3 \emptyset$
Input Power Specifications (Phase, AC or DC Hertz Rating)	Degree of Protection	Manufacturer's Electrical Schematic File Number and Revision Level					

NOTES:

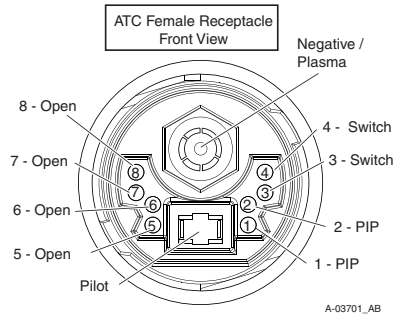
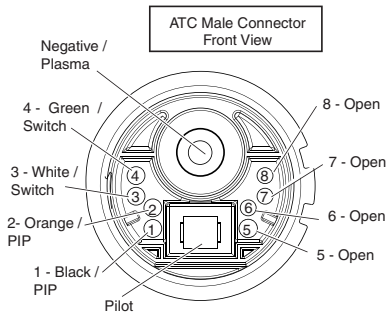
- Symbol shown indicates single- or three-phase AC input, static frequency converter-transformer-rectifier, DC output.
- Indicates input voltages for this power supply. Most power supplies carry a label on the bottom of the unit showing input voltage requirements for the power supply as built.
- Top row: Duty cycle values.
 Duty cycle values meet or exceed the IEC specified rating.
 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
- \emptyset Phase

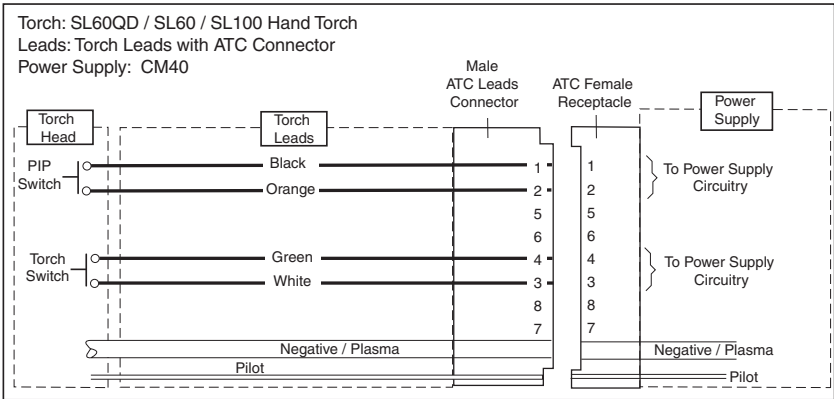
Art # A-14369

A. Hand Torch Pin - Out Diagram



APPENDIX 3: TORCH CONNECTION DIAGRAMS

A. Hand Torch Connection Diagram



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