Spectrum® 875 Auto-Line
And ICE-60T/TM Torch
From Miller to You

Thank you and congratulations on choosing Miller. Now you can get the job done and get it done right. We know you don’t have time to do it any other way.

That’s why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn’t afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They’re just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner’s Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.

We’ve made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there’s a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranties and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.
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COMPLETE PARTS LIST – Available at www.MillerWelds.com

WARRANTY
SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

1-1. Symbol Usage

DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Plasma arc cutting requires higher voltages than welding to start and maintain the arc (200 to 400 volts dc are common), but may also use torches designed with safety interlock systems which turn off the machine when the shield cup is loosened or if tip touches electrode inside the nozzle. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not touch torch parts if in contact with the work or ground.
- Disconnect input power before checking, cleaning, or changing torch parts.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA CFR 1910.147 (see Safety Standards).
- Properly install, ground, and operate this equipment according to its Owner's Manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet — always verify the supply ground.
- When making input connections, attach proper grounding conductor first.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring — replace immediately if damaged — bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or repaired cables.
- Do not wrap torch cable around your body.
- Ground the workpiece to a good electrical (earth) ground if required by codes.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Do not bypass or try to defeat the safety interlock systems.
- Use only torch(es) specified in Owner's Manual.
- Keep away from torch tip and pilot arc when trigger is pressed.
- Clamp work cable with good metal-to-metal contact to workpiece (not piece that will fall away) or worktable as near the cut as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.

1-2. Plasma Arc Cutting Hazards

The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.

Only qualified persons should install, operate, maintain, and repair this unit.

During operation, keep everybody, especially children, away.

CUTTING can cause fire or explosion.

Hot metal and sparks blow out from the cutting arc. The flying sparks and hot metal, hot workpiece, and hot equipment can cause fires and burns. Check and be sure the area is safe before doing any cutting.

- Remove all flammables within 35 ft (10.7 m) of the cutting arc. If this is not possible, tightly cover them with approved covers.
- Do not cut where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that sparks and hot materials from cutting can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that cutting on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut on containers that have held combustibles, or on closed containers such as tanks, drums, or pipes unless they are properly prepared according to AWS F4.1 and AWS A6.0 (see Safety Standards).
- Connect work cable to the work as close to the cutting area as practical to prevent cutting current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use plasma cutter to thaw frozen pipes.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Do not cut where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Do not cut pressurized cylinders, pipes, or vessels.
- Wear body protection made from durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Do not locate unit on or over combustible surfaces.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any cutting.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.

NOTICE – Indicates statements not related to personal injury.
**ELECTRIC SHOCK can kill.**

**SIGNIFICANT DC VOLTAGE exists in inverter power sources AFTER the removal of input power.**

- Turn Off unit, disconnect input power, check voltage on input capacitors, and be sure it is near zero (0) volts before touching any parts. Check capacitors according to instructions in Maintenance Section of Owner’s Manual or Technical Manual before touching any parts.

**EXPLODING PARTS can injure.**

- On inverter power sources, failed parts can explode or cause other parts to explode when power is applied. Always wear a face shield and long sleeves when servicing inverters.

**FLYING SPARKS can injure.**

- Sparks and hot metal blow out from the cutting arc. Chipping and grinding cause flying metal.

**ARC RAYS can burn eyes and skin.**

- Wear face protection (helmet or shield) with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when cutting or watching. ANSI Z49.1 (see Safety Standards) suggests a No. 9 shade (with No. 8 as minimum) for all cutting currents less than 300 amperes. Z49.1 adds that lighter filter shades may be used when the arc is hidden by the workpiece. As this is normally the case with low current cutting, the shades suggested in Table 1 are provided for the operator’s convenience.

**FUMES AND GASES can be hazardous.**

- Keep your head out of the fumes. Do not breathe the fumes.

**PLASMA ARC can injure.**

- Keep away from the torch tip.

**NOISE can damage hearing.**

- Use approved ear plugs or ear muffs if noise level is high.

- Use approved ear plugs or ear muffs if noise level is high.

**Table 1. Eye Protection For Plasma Arc Cutting**

<table>
<thead>
<tr>
<th>Current Level In Amperes</th>
<th>Minimum Shade Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 20</td>
<td>#4</td>
</tr>
<tr>
<td>20 – 40</td>
<td>#5</td>
</tr>
<tr>
<td>40 – 60</td>
<td>#6</td>
</tr>
<tr>
<td>60 – 100</td>
<td>#8</td>
</tr>
</tbody>
</table>

**APPLICATIONS**

- Prolonged noise from some cutting applications can damage hearing if levels exceed limits specified by OSHA (see Safety Standards).

- Use approved ear plugs or ear muffs if noise level is high.

- Warn others nearby about noise hazard.

- Use approved ear plugs or ear muffs if noise level is high.
1-3. Additional Symbols For Installation, Operation, And Maintenance

**HOT PARTS can burn.**
- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

**BATTERY EXPLOSION can injure.**
- Do not use plasma cutter to charge batteries or jump start vehicles unless it has a battery charging feature designed for this purpose.

**MOVING PARTS can injure.**
- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.

**FALLING EQUIPMENT can injure.**
- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94–110) when manually lifting heavy parts or equipment.

**READ INSTRUCTIONS.**
- Read and follow all labels and the Owner’s Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner’s Manuals, industry standards, and national, state, and local codes.

**FLYING METAL or DIRT can injure eyes.**
- Wear safety glasses with side shields or wear face shield.

**STATIC (ESD) can damage PC boards.**
- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

**ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.**
- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.

**H.F. RADIATION can cause interference.**
- High frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

**ARC CUTTING can cause interference.**
- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- To reduce possible interference, keep cables as short as possible, close together, and down low, such as on the floor.
- Locate cutting operation 100 meters from any sensitive electronic equipment.
- Be sure this cutting power source is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the machine, using shielded cables, using line filters, or shielding the work area.

**OVERUSE can cause OVERHEATING.**
- Allow cooling period; follow rated duty cycle.
- Reduce amperage (thickness) or reduce duty cycle before starting to cut again.

**EXPLODING HYDROGEN hazard.**
- When cutting aluminum underwater or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece.
- See your cutting engineer and water table instructions for help.

**FIRE OR EXPLOSION hazard.**
- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

**BATTERY EXPLOSION can injure.**
- Do not use plasma cutter to charge batteries or jump start vehicles unless it has a battery charging feature designed for this purpose.

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1-4. California Proposition 65Warnings

Welding or cutting equipment 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 Section 25249.5 et seq.)

This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. Wash hands after use.

1-5. Principal Safety Standards


1-6. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). The current from arc welding (and allied processes including spot welding, gouging, plasma arc cutting, and induction heating operations) creates an EMF field around the welding circuit. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, restrict access for passers-by or conduct individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.

2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.

3. Do not coil or drape cables around your body.

4. Keep head and trunk as far away from the equipment in the welding circuit as possible.

5. Connect work clamp to workpiece as close to the weld as possible.

6. Do not work next to, sit or lean on the welding power source.

7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.
SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

Pour écarter les risques de blessure pour vous–même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

2-1. Signification des symboles

DANGER! – Indique une situation dangereuse qui si on l’évit ne peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

Indique une situation dangereuse qui si on l’évit ne peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

NOTE – Indique des déclarations pas en relation avec des blessures personnelles.

Indique des instructions spécifiques.

Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ÉLECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférent pour les actions nécessaires afin d’éviter le danger.

2-2. Dangers liés au coupage à l’arc au plasma

Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d’éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l’information contenue dans les normes de sécurité énumérées à la section 1-5. Veuillez lire et respecter toutes ces normes de sécurité.

L’installation, l’utilisation, l’entretien et les réparations ne doivent être confiés qu’à des personnes qualifiées.

Au cours de l’utilisation, tenir toute personne à l’écart et plus particulièrement les enfants.

LE COUPAGE présente un risque de feu ou d’explosion.

Des particules de métal chaud et des étincelles peuvent jaillir de la pièce au moment du coupage. Les étincelles et le métal chaud, la pièce à couper chaufée et l’équipement chauf peuvent causer un feu ou des brûlures. Avant de commencer à travailler, assurez-vous que l’endroit est sécuritaire.

- Déplacez toute matière inflammable se trouvant à l’intérieur d’un périmètre de 10,7 m (35 pi) de la pièce à couper. Si cela est impossible, vous devez les couvrir avec des housses approuvées et bien ajustées.
- Ne coupez pas dans un endroit où des étincelles pourraient causer un feu ou des brûlures. Avant de commencer à travailler, assurez-vous que l’endroit est sécuritaire.
- Portez des gants isolants et des vêtements de protection secs et sans trous.
- Ne coupez pas quand l’atmosphère risque de contenir des poussières, gaz ou vapeurs (comme l’essence) inflammables.
- Ne coupez pas dans un endroit où l’atmosphère risque de contenir de la poussière ou des vapeurs explosives.
- Ne coupez pas de bouteilles, de tuyaux ou de contenants pressurisés.
- Porter un équipement de protection pour le corps fait d’un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Ne placez pas le poste sur une surface combustible ou au-dessus de celle-ci.
- Une fois le travail achevé, assurez-vous qu’il ne reste aucune trace d’étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les poncer.
- Avant le coupage, retirez tout combustible de vos poches, par exemple un briquet au butane ou des allumettes.

UN CHOC ÉLECTRIQUE peut tuer.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Le coupage plasma nécessite des tensions plus importantes que le soudage pour amorer et maintenir l’arc (200 à 400VDC est typique), mais peut être utilisé avec des torches équipées de systèmes de verrouillage de sécurité qui arrêtent la machine en cas de buse desserrée ou si l’électrode touche la tuyère. Incorrectly installed or improperly grounded equipment is a hazard.

- Ne coupez jamais des contennants qui peuvent contenir des matières inflammables. Vous devez en premier lieu les vider et les nettoyer convenablement.
- Ne coupez pas quand l’atmosphère peut contenir des poussières, gaz ou vapeurs (comme l’essence) inflammables.
- Ne coupez pas dans un endroit où l’atmosphère risque de contenir de la poussière ou des vapeurs explosives.
- Ne coupez pas de bouteilles, de tuyaux ou de contenants pressurisés.
- Porter un équipement de protection pour le corps fait d’un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.
- Ne placez pas le poste sur une surface combustible ou au-dessus de celle-ci.
- Une fois le travail achevé, assurez-vous qu’il ne reste aucune trace d’étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe-circuits appropriés. Ne pas augmenter leur puissance; ne pas les poncer.
- Avant le coupage, retirez tout combustible de vos poches, par exemple un briquet au butane ou des allumettes.
• Installer le poste correctement et le mettre à la terre convenablement selon les consignes du manuel de l’opérateur et les normes nationales, départementales et locales.

• Assurez-vous que le fil de terre du cordon d’alimentation est correctement relié à la borne de terre dans la boîte de coupure ou que la fiche du cordon est branchée à une prise correctement mise à la terre – vous devez toujours vérifier la mise à la terre.

• Avant d’effectuer les connexions d’alimentation, vous devez relier le bon fil de terre.

• Les câbles doivent être exemptes d’humidité, d’huile et de graisse; protégez-les contre les étincelles et les pièces métalliques chau des.

• Vérifier fréquemment le cordon d’alimentation et le conducteur de mise à la terre afin de s’assurer qu’il n’est pas altéré ou dénudé – le remplacer immédiatement s’il l’est –. Un fil dénudé peut entraîner la mort.

• L’équipement doit être hors tension lorsqu’il n’est pas utilisé.

• Ne pas utiliser des câbles usés, endommagés, sous dimensionnés ou réparés.

• Vérifiez et remplacez les cosse du câble du chalumeau si elles sont usées ou altérées.

• Le câble du chalumeau ne doit pas s’enrouler autour de votre corps.

• Si les normes le stipulent, la pièce à couper doit être mise à la terre.

• Utilisez uniquement de l’équipement en bonne condition. Réparez ou remplacez immédiatement toute pièce altérée.

• Portez un harnais de sécurité si vous devez travailler au-dessus du sol.

• Assurez-vous que tous les panneaux et couvercles sont correctement en place.

• N’essayez pas d’aller à l’encontre des systèmes de verrouillage de sécurité ou de les contourner.

• Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l’opérateur.

• N’approchez pas le tube du chalumeau et l’arc pilote lorsque la gâchette est enfoncée.

• Le câble de masse doit être pincé correctement sur la pièce à couper, métal contre métal (et non de telle sorte qu’il puisse se détacher), ou sur la table de travail le plus près possible de la ligne de coupage.

• Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

• Portez un équipement de protection pour le corps fait d’un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du visage et les yeux des rayonnements de l’arc et des étincelles éblouissants et les pièces métalliques chau des.

• Mettre l’unité hors tension, mesurer la tension des condensateurs d’entrée et s’assurer qu’elle est pratiquement nulle avant de toucher à l’une quelconque des pièces. Mesurer cette tension conformément aux directives énoncées à la section Entretien du manuel de l’utilisateur ou du manuel technique avant de toucher à l’une quelconque des pièces.

• Risque de blessure en cas d’explosion des pièces.

• Mise sous tension, toute pièce défectueuse des sources d’alimentation de l’inverseur peut exploser ou faire exploser d’autres pièces. Pour entretenir les inverseurs, toujours porter un masque protecteur et un vêtement à manches longues.

• DECHARGES ELECTRIQUES potentiellement mortelles.

Il reste une TENSION DC NON NÉGLIGABLE dans les sources de soudage ondulée UNE FOIS l’alimentation coupée.

• Mettre l’unité hors tension, mesurer la tension des condensateurs d’entrée et s’assurer qu’elle est pratiquement nulle avant de toucher à l’une quelconque des pièces. Mesurer cette tension conformément aux directives énoncées à la section Entretien du manuel de l’utilisateur ou du manuel technique avant de toucher à l’une quelconque des pièces.

• LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.

Le coupage plasma produit des étincelles et projections de métal à très haute température. Lorsque la pièce refroidit, du laitier peut se former.

• Portez une visière ou des lunettes de sécurité avec des écrans Lateraux approuvés.

• Portez des vêtements de protection adéquats afin de protéger votre peau.

• Ayez recours à des protège-tymphans ou à un serre-tête ignifuges afin d’éviter que les étincelles n’entrent dans vos oreilles.

• LES RAYONS D’ARC peuvent entraîner des brûlures aux yeux et à la peau.

Les rayons d’arc provenant du procédé de coupage produisent des rayons visibles et invisibles intenses (ultraviolets et infrarouges) qui peuvent entraîner des brûlures aux yeux et à la peau.

• Une protection faciale (masque ou masque) avec des lunettes filtrantes de teinte adéquate est indispensable pour protéger le visage et les yeux des rayonnements de l’arc et des étincelles pendant la découpe ou en regardant simplement ANSI Z49.1 (reportez-vous aux Principales normes de sécurité) suggère d’utiliser un filtre de teinte de n° 9 (n° 8 étant le minimum) pour tout travail de coupage faisant appel à un courant de moins de 300 A. On mentionne également dans la norme Z49.1 qu’un filtre plus faible peut être utilisé lorsque l’arc est caché par le pièces à couper. Comme cela est habituellement le cas pour les travaux de coupage à faible courant, les teintes énumérées au tableau 1 sont fournies à titre d’information pour l’opérateur.

• Porter des lunettes de sécurité à coques latérales sous votre casque ou écran facial.

• Ayez recours à des écrans protecteurs ou à des rideaux pour protéger d’autres contre les rayonnements, les étincelles et les éblouissements; prévenez toute personne sur les lieux de ne pas regarder l’arc.

• Portez un équipement de protection pour le corps fait d’un matériau résistant et ignifuge (cuir, coton robuste, laine). La protection du corps comporte des vêtements sans huile comme par ex. des gants de cuir, une chemise solide, des pantalons sans revers, des chaussures hautes et une casquette.

Tableau 1. Protection des yeux pour le coupage au plasma d’arc

<table>
<thead>
<tr>
<th>Intensité de courant en ampères</th>
<th>Filtre de teinte (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moins de 20</td>
<td>n° 4</td>
</tr>
<tr>
<td>20 - 40</td>
<td>n° 5</td>
</tr>
<tr>
<td>40 - 60</td>
<td>n° 6</td>
</tr>
<tr>
<td>60 - 100</td>
<td>n° 8</td>
</tr>
</tbody>
</table>

• LE BRUIT peut endommager l’ouïe.

Certaines applications de coupage produisent un bruit constant, ce qui peut endommager l’ouïe si le niveau sonore dépasse les limites permises par l’OSHA (reportez-vous aux Principales normes de sécurité).

• Utilisez des protège-tymphans ou un serre-tête antibruit si le niveau sonore est élevé.

• Prévenez toute personne sur les lieux du danger relié au bruit.
LES FUMÉES ET LES GAZ peuvent être dangereux.
Le coupage produit des vapeurs et des gaz. Respirer ces vapeurs et ces gaz peut être dangereux pour la santé.
- Ne mettez pas votre tête au-dessus des vapeurs. Ne respirez pas ces vapeurs.
- Si vous êtes à l’intérieur au moment du coupage, ventilez la pièce ou ayez recours à une ventilation aspirante installée près de l’arc pour évacuer les vapeurs et les gaz. Pour déterminer la bonne ventilation, il est recommandé de procéder à un prélèvement pour la composition et la quantité de fumées et de gaz auxquels est exposé le personnel.
- Si la ventilation est médiocre, utilisez un respirateur anti-vapeurs approuvé.
- Lire et comprendre les fiches de données de sécurité et les instructions du fabricant concernant les adhésifs, les revêtements, les nettoyants, les consommables, les produits de refroidissement, les dégraissieurs, les flux et les métaux.
- Travaillez dans un espace restreint uniquement s’il est bien ventilé, ou si vous portez un respirateur anti-vapeurs. Les vapeurs causées par le coupage et l’épuration de l’oxygène peuvent altérer la qualité de l’air et entraîner des blessures ou la mort. Assurez-vous que l’air ambiant est sain pour la santé.
- Ne coupez pas dans un endroit près d’opérations de décavage, de nettoyage ou de vaporisation. La chaleur et les rayons d’arc peuvent réagir avec les vapeurs et former des gaz hautement toxiques et irritants.
- Ne coupez pas des métaux enrobés tels que des métaux galvanisés, contenant du plomb ou de l’acier plaqué au cadmium, à moins que l’enrobage ne soit ôté de la surface du métal à couper, que l’en- droit où vous travaillez ne soit bien ventilé, ou que vous ne portiez un respirateur anti-vapeurs. Les enrobages ou tous métaux qui contiennent ces éléments peuvent créer des vapeurs toxiques s’ils sont coupés.
- Ne coupez pas de contenants qui renferment ou ont renfermés des matières toxiques ou réactives – vous devez en premier lieu les vidder et les nettoyer convenablement.

L’ARC PLASMA peut provoquer des blessures.
La chaleur dégagée par le plasma d’arc peut entraîner de sérieuses brûlures. La force de l’arc est un facteur qui s’ajoute au danger de brûlures. La chaleur intense et la puissance de l’arc peuvent rapidement passer au travers de gants et de tissus.
- N’approchez pas le tube du chalumeau.
- Ne saisissez pas la pièce à couper près de la ligne de coupage.
- L’arc pilote peut causer des brûlures – n’approchez pas le tube du chalumeau lorsque vous avez appuyé sur le gâchette.

LES PIÈCES CHAUDES peuvent provoquer des brûlures.
- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant d’utiliser l’équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.

LES BOUTEILLES peuvent exploser si elles sont endommagées.
Les bouteilles de gaz comprimé contiennent du gaz sous haute pression. Si une bouteille est endomma- gée, elle peut exploser. Puisque les bouteilles de gaz font habituellement partie d’un processus de travail des métaux, assurez-vous de les manipuler correctement.
- Protégez les bouteilles de gaz comprimé contre la chaleur excessive, les chocs mécaniques, des dommages physiques, le laitier, la flamme, les étincelles et l’arc.
- Installez et attachez les bouteilles dans la position verticale à l’aide d’une chaîne, sur un support stationnaire ou un châssis porte-bouteille afin de prévenir qu’elles ne tombent ou ne basculent.
- Les bouteilles ne doivent pas être près de la zone de coupage ni de tout autre circuit électrique.
- Un contact électrique ne doit jamais se produire entre un chalumeau de plasma d’arc et une bouteille.
- Ne coupez jamais sur une bouteille pressurisée – une explosion en résulterait.
- Utilisez uniquement des bouteilles de gaz comprimé, des détendeurs, des boyaux et des raccords conçus pour l’application déterminée. Gardez-les, ainsi que toute autre pièce associée, en bonne condition.
- Tournez le dos à la sortie de vanne lors de l’ouverture de la vanne de la bouteille. Ne pas se tenir devant ou derrière le régulateur lors de l’ouverture de la vanne.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque vous utilisez la bouteille ou qu’elle est reliée pour usage ultérieur.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l’équipement connexe et le dépilant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.


LES PIÈCES MOBILES peuvent provoquer des blessures.
- S’abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Lorsque cela est nécessaire pour des travaux d’entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l’entretien est terminé et avant de rebrancher l’alimentation électrique.
LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d’emploi avant l’installation, l’utilisation ou l’entretien de l’appareil. Lire les informations de sécurité à début du manuel et dans chaque section.
- N’utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l’entretien en respectant les manuels d’utilisation, les normes industrielles et les codes nationaux, d’état et locaux.

DES PIECES DE METAL OU DES SALETES peuvent provoquer des blessures dans les yeux.

- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.

- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.
- Les porteurs d’implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s’approcher de la zone où se déroule du soudage à l’arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.

L’EMPLOI EXCESSIF peut SURCHAUFFER L’ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire l’ampérage (épaisseur) avant de continuer à couper ou réduire le facteur de marche.

Danger D’EXPLOSION D’HYDROGÈNE.

- Lors du coupage d’aluminium partiellement ou totalement immergé dans l’eau, de l’hydrogène libre peut s’accumuler sous la pièce.
- Consultez votre ingénieur de coupe et les instructions de la table de coupe.

L’EXPLOSION DE LA BATTERIE peut provoquer des blessures.

- Ne pas utiliser le découpeur plasma pour charger des batteries ou faire démarrer des véhicules à l’aide de câbles de démarrage, sauf si l’appareil dispose d’une fonctionnalité de charge de batterie destinée à cet usage.

LA CHUTE DE L’ÉQUIPEMENT peut provoquer des blessures.

- Utiliser l’anneau de levage uniquement pour soulever l’appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d’une capacité appropriée pour soulever l’appareil.
- En utilisant des fourches de levage pour déplacer l’unité, s’assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l’appareil.

- Tenir l’équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l’équation de levage NIOSH révisée (Publication Nº94–110) lors du levage manuelle de pièces ou équipements lourds.

Risque D’INCENDIE OU D’EXPLOSION.

- Ne pas installer l’appareil à proximité de produits inflammables.
- Ne pas placer l’appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas surcharger l’installation électrique – s’assurer que l’alimentation est correctement dimensionné et protégé avant de mettre l’appareil en service.

LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Etablir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes PC.

LE RAYONNEMENT HAUTE FREQUENCE (H.F.) risque de provoquer des interférences.

- Le Rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio-navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l’installation.
- L’utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l’installation.
- Si le FCC signale des interférences, arrêter immédiatement l’appareil.
- Effectuer régulièrement le contrôle et l’entretien de l’installation.
- Maintien soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.

LE COUPAGE À L’ARC peut causer des interférences.

- L’énergie électromagnétique peut générer le fonctionnement d’appareils électroniques comme des ordinateurs et des robots.
- Pour réduire la possibilité d’interférence, maintenir les câbles aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à couper à une distance de 100 mètres de tout équipement électronique sensible.
- S’assurer que la source de coupage est correctement branchée et mise à la terre.
- Si l’interférence persiste, l’utilisateur doit prendre des mesures supplémentaires comme écarter la machine, utiliser des câbles blindés de des filtres, ou boucler la zone de travail.
2-4. Proposition californienne 65 Avertissements

Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l’État de Californie reconnaît qu’ils provoquent des malformations congénitales et, dans certains cas, des cancers. 
(Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)

Ce produit contient des éléments chimiques, dont le plomb, reconnus par l’État de Californie pour leur caractère cancérogène ainsi que provoquant des malformations congénitales ou autres problèmes de procréation. Se laver les mains après toute manipulation.

2-5. Principales normes de sécurité


3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d’une source de soudage, ni s’asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux :
Les porteurs d’implants doivent d’abord consulter leur médecin avant de s’approcher des opérations de soudage à l’arc, de soudage par points, de gougeage, du découpage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

2-6. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant issu d’un soudage à l’arc (et de procédés connexes, y compris le soudage par points, le gougeage, le découpage plasma et les opérations de chauffage par induction) crée un champ électromagnétique (CEM) autour du circuit de soudage. Les CEM peuvent créer des interférences avec certains implants médicaux comme des stimulateurs cardiaques. Des mesures de protection pour les porteurs d’implants médicaux doivent être prises : Limiter par exemple tout accès aux passants ou procéder à une évaluation des risques individuels pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l’exposition aux CEM provenant du circuit de soudage:

1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d’un côté et à distance de l’opérateur.
### SECTION 3 – DEFINITIONS

#### 3-1. Additional Safety Symbols And Definitions

Some symbols are found only on CE products.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Amperes</td>
</tr>
<tr>
<td>V</td>
<td>Volts</td>
</tr>
<tr>
<td>🌍</td>
<td>Protective Earth (Ground)</td>
</tr>
<tr>
<td>🔄</td>
<td>On</td>
</tr>
<tr>
<td>🔄</td>
<td>Off</td>
</tr>
<tr>
<td>U₀</td>
<td>Rated No Load Voltage (Average)</td>
</tr>
<tr>
<td>U₁</td>
<td>Primary Voltage</td>
</tr>
<tr>
<td>U₂</td>
<td>Conventional Load Voltage</td>
</tr>
<tr>
<td>I₁max</td>
<td>Rated Maximum Supply Current</td>
</tr>
<tr>
<td>I₂</td>
<td>Rated Welding Or Cutting Current</td>
</tr>
<tr>
<td>IP</td>
<td>Degree Of Protection</td>
</tr>
<tr>
<td>pf</td>
<td>Power factor</td>
</tr>
<tr>
<td>S</td>
<td>Suitable for Some Hazardous Locations</td>
</tr>
<tr>
<td>S₁</td>
<td>Power Rating, Product Of Voltage And Current (kVA)</td>
</tr>
</tbody>
</table>

**Notes**

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SECTION 4 – SPECIFICATIONS

4-1. Serial Number And Rating Label Location
The serial number and rating information for this product is located on the bottom. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

4-2. Selecting a Location

Do not move or operate unit where it could tip.

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lifting Handle Use handle to lift unit.</td>
</tr>
<tr>
<td>2 Line Disconnect Device Locate unit near correct input power supply.</td>
</tr>
<tr>
<td>Locate unit at least 18 in. (460 mm) away from a wall or other obstruction to allow adequate clearance for cooling air flow.</td>
</tr>
</tbody>
</table>

Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.
## 4-3. Specifications

### Power Supply

#### Input

<table>
<thead>
<tr>
<th>Rated AC Phase and line frequency (Hz)</th>
<th>1−3−Phase</th>
<th>50 / 60 Hz</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rated Input Voltage (U1) and rated Input Current (I1)</strong> and I_{1, ef} at rated output. I_{1, ef} used to determine power cord rating</td>
<td>Volts AC RMS – (U1)</td>
<td>Amps RMS – (I1)</td>
<td>I_{1, ef}</td>
</tr>
<tr>
<td>208 VAC 1−Phase</td>
<td>47.4</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>230 VAC 1−Phase</td>
<td>42.2</td>
<td>26.7</td>
<td></td>
</tr>
<tr>
<td>208 VAC 3−Phase</td>
<td>27.5</td>
<td>19.4</td>
<td></td>
</tr>
<tr>
<td>230 VAC 3−Phase</td>
<td>25</td>
<td>17.7</td>
<td></td>
</tr>
<tr>
<td>380 VAC 3−Phase</td>
<td>15</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>460 VAC 3−Phase</td>
<td>12.4</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td>575 VAC 3−Phase</td>
<td>9.8</td>
<td>7.6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Power Factor/kVA/kW at Rated Output</strong></th>
<th>Volts AC RMS – (U1)</th>
<th>Power Factor</th>
<th>kVA/kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>208 VAC 1−Phase</td>
<td>0.98</td>
<td>9.9 / 9.7</td>
<td></td>
</tr>
<tr>
<td>230 VAC 1−Phase</td>
<td>0.98</td>
<td>9.7 / 9.6</td>
<td></td>
</tr>
<tr>
<td>208 VAC 3−Phase</td>
<td>0.95</td>
<td>9.9 / 9.5</td>
<td></td>
</tr>
<tr>
<td>230 VAC 3−Phase</td>
<td>0.95</td>
<td>9.9 / 9.5</td>
<td></td>
</tr>
<tr>
<td>380 VAC 3−Phase</td>
<td>0.95</td>
<td>9.9 / 9.4</td>
<td></td>
</tr>
<tr>
<td>460 VAC 3−Phase</td>
<td>0.95</td>
<td>9.9 / 9.4</td>
<td></td>
</tr>
<tr>
<td>575 VAC 3−Phase</td>
<td>0.95</td>
<td>9.8 / 9.3</td>
<td></td>
</tr>
</tbody>
</table>

**Peak kW at Arc Stretch**

| 15.5 kW | --- | --- |

#### Output

<table>
<thead>
<tr>
<th><strong>Rated Open Circuit Voltage (U0) Type</strong></th>
<th>400 Volts DC/Electrode Negative</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output Characteristic</strong></td>
<td>Constant Current</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Rated Output Current (I2)</strong></td>
<td>60 A</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Rated Output Voltage (U2)</strong></td>
<td>140 Volts DC</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Output Current Range</strong></td>
<td>20 – 60 A</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Duty Cycle at 104°F (405°C) and Rated Conditions (U1, I1, U2, I2) based on a 10 minute period</strong></th>
<th>Duty Cycle %</th>
<th>Amps DC – (I2)</th>
<th>Volts AC RMS – (U1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>60 A</td>
<td>208–230 VAC</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>60 A</td>
<td>208–230 VAC</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>60 A</td>
<td>380–575 VAC</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>50 A</td>
<td>208–230 VAC</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>50 A</td>
<td>208–575 VAC</td>
<td></td>
</tr>
</tbody>
</table>
### General

<table>
<thead>
<tr>
<th>Operating Temperature</th>
<th>5° to 104°F (−15° to 40°C)</th>
<th>—</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toppling or tilting</td>
<td>Up to 15° incline</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Gas Type</td>
<td>Air or Nitrogen</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Gas Quality</td>
<td>Clean, moisture-free,</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>oil-free</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Gas Inlet Flow and Pressure</td>
<td>6.75 SCFM (191 L/min)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>90 PSI (621 kPa) Min</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>120 PSI (827 kPa) Max</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Gas Filtering</td>
<td>Particulates to 5 microns</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

### Torch

Mild Steel capacities (see Section for cutting speeds vs material type and thickness)

<table>
<thead>
<tr>
<th>Rated Capacity (edge start)</th>
<th>7/8 in. at 10 ipm (254 mm/min)*</th>
<th>—</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sever Cut Capacity (edge start)</td>
<td>1−1/4 in.</td>
<td>—</td>
</tr>
<tr>
<td>Pierce Capacity</td>
<td>7/16 in.</td>
<td>—</td>
</tr>
</tbody>
</table>

*Travel speeds are approximately 80% of maximum.

**This equipment is designed for outdoor use. It may be stored, but is not intended to be used outside during precipitation unless sheltered.

### 4-4. Unit Dimensions And Weight

<table>
<thead>
<tr>
<th>Unit Dimensions And Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>47 lb (21.3 kg)</td>
</tr>
<tr>
<td>Torch Weight</td>
</tr>
<tr>
<td>Hand-Held: 20 ft (6.1 m) 6 lb (2.7 kg)</td>
</tr>
<tr>
<td>Hand-Held: 50 ft (15.2 m) 12-3/4 lb (5.8 kg)</td>
</tr>
<tr>
<td>Machine: 25 ft (7.6 m) 8 lb (3.6 kg)</td>
</tr>
<tr>
<td>Machine: 50 ft (15.2 m) 13-1/2 lb (6.1 kg)</td>
</tr>
<tr>
<td>Work Cable Weight</td>
</tr>
<tr>
<td>20 ft (6.1 m) 3-1/2 lb (1.6 kg)</td>
</tr>
<tr>
<td>50 ft (15.2 m) 7-1/2 lb (3.4 kg)</td>
</tr>
</tbody>
</table>

![Diagram of unit dimensions and weight]
4-5. Torch Dimensions

**Hand-Held Torch**

- 4 in. (100 mm)
- 2-5/16 in. (58 mm)
- 1-1/16 in. (27 mm)
- 8-27/32 in. (225 mm)

**Machine Torch**

- 15-9/32 in. (388 mm)
- 2-9/64 in. (54 mm)
- 1/8 in. (3.2 mm) width
- 1/8 in. (3.2 mm) height
- 1-3/8 in. (35 mm) Gear rack 32 pitch
- 8 in. (202 mm)

4-6. Duty Cycle And Overheating

Duty Cycle is percentage of 10 minutes that unit can cut at rated load without overheating. Duty cycle is based on an ambient temperature of 104°F (40°C).

If unit overheats, output stops, temperature status light illuminates, and cooling fan runs. Wait fifteen minutes for unit to cool or temperature light to go off. Reduce amperage or duty cycle before cutting or gouging.

**NOTICE** – Exceeding duty cycle can damage unit and void warranty.

<table>
<thead>
<tr>
<th>Duty Cycle</th>
<th>Cutting Time</th>
<th>Resting Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>4 min</td>
<td>6 min</td>
</tr>
<tr>
<td>50%</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>60%</td>
<td>6 min</td>
<td>4 min</td>
</tr>
</tbody>
</table>

4-7. Environmental Specifications

<table>
<thead>
<tr>
<th>IP Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP23CS</td>
</tr>
</tbody>
</table>

This equipment is designed for outdoor use. It may be stored, but is not intended to be used outside during precipitation unless sheltered.
5-1. Connecting Work Clamp and Gas/Air Supply

Connect work clamp to portion of workpiece that does not fall away after being cut.

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

Use only clean, dry air with 90 to 120 psi (621 to 827 kPa) pressure @ 6.75 CFM (191 L/min) minimum.

Use filter kit 300 491 or 228 926 where conditions at the work-site allow moisture, oil or other particulates into the air line.

Gas/Air Filter Inlet Opening

Hose Filter Inlet Opening

Hose must have a minimum inside diameter of 3/8 in (9.5 mm).

Teflon Tape

Obtain hose with 1/4 NPT right-hand thread fitting. Wrap threads with teflon tape (optional) or apply pipe sealant, and install fitting in opening. Route hose to gas/air supply.

NOTICE – Exceeding input pressure rating of 120 PSI (827 kPa) can damage unit.

Tools Needed:

9/16 in.
5-2. Connecting And Disconnecting Torch

Turn off power source and disconnect input power.

1. Torch Connector
2. Quick Connect Collar
3. Nipple
4. Receptacle
5. Securing Pin

To connect torch:
Push torch connector onto receptacle and quick connect until collar secures nipple.
Rotate securing pin clockwise to lock connector to unit.

To disconnect torch:
Rotate securing pin counterclockwise to unlock connector from unit.
Push quick connect collar back towards unit to release nipple, and pull torch connector away from unit.

Use supplied hook and loop strap to manage torch and work cables.

5-3. Connecting And Disconnecting Work Cable

1. Work Cable Receptacle
2. Work Cable Plug

To connect plug, align key with receptacle keyway and insert into receptacle. Rotate plug clockwise (hand tight only) to secure in receptacle.

To disconnect plug, rotate counterclockwise until key aligns with keyway and pull plug from receptacle.

Use supplied hook and loop strap to manage torch and work cables.
5-4. Electrical Service Guide

**NOTICE** – INCORRECT INPUT POWER can damage this welding power source. Phase to ground voltage shall not exceed +10% of rated input voltage.

Actual input voltage should not be 10% less than minimum and/or 10% more than maximum input voltages listed in table. If actual input voltage is outside this range, output may not be available.

Failure to follow these electrical service guide recommendations could create an electric shock or fire hazard. These recommendations are for a dedicated circuit sized for the rated output and duty cycle of the welding power source.

In dedicated circuit installations, the National Electrical Code (NEC) allows the receptacle or conductor rating to be less than the rating of the circuit protection device. All components of the circuit must be physically compatible. See NEC articles 210.21, 630.11, and 630.12.

<table>
<thead>
<tr>
<th>Input Voltage (V)</th>
<th>Single-Phase</th>
<th>Three-Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>208</td>
<td>230</td>
</tr>
<tr>
<td>Input Amperes (A) At Rated Output</td>
<td>48</td>
<td>42</td>
</tr>
<tr>
<td>Max Recommended Standard Fuse Rating In Amperes</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Time-Delay Fuses</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Normal Operating Fuses</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Min Input Conductor Size In AWG/Kcmil</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Max Recommended Input Conductor Length In Feet (Meters)</td>
<td>55</td>
<td>68</td>
</tr>
<tr>
<td>Min Grounding Conductor Size In AWG/Kcmil</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Reference: 2014 National Electrical Code (NEC) (including article 630)

1. If a circuit breaker is used in place of a fuse, choose a circuit breaker with time-current curves comparable to the recommended fuse.
2. “Time-Delay” fuses are UL class “RK5”. See UL 248.
3. “Normal Operating” (general purpose - no intentional delay) fuses are UL class “K5” (up to and including 60 amps), and UL class “H” (65 amps and above).
4. Conductor data in this section specifies conductor size (excluding flexible cord or cable) between the panelboard and the equipment per NEC Table 310.15(B)(16). If a flexible cord or cable is used, minimum conductor size may increase. See NEC Table 400.5(A) for flexible cord and cable requirements.
5-5. Extension Cord Data

When calculating max. cord length, remember to include conductor length from line disconnect device to input power receptacle.

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>Input Power Phase</th>
<th>Hertz</th>
<th>Fuse Size Or Circuit Breaker Rating</th>
<th>Conductor Size</th>
<th>Max. Cord Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>208 V</td>
<td>1</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>50 A</td>
<td>10 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>70 A</td>
<td></td>
</tr>
<tr>
<td>230 V</td>
<td>1</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>50 A</td>
<td>10 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>60 A</td>
<td></td>
</tr>
<tr>
<td>208 V</td>
<td>3</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>30 A</td>
<td>12 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>40 A</td>
<td></td>
</tr>
<tr>
<td>230 V</td>
<td>3</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>30 A</td>
<td>12 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>35 A</td>
<td></td>
</tr>
<tr>
<td>380 V</td>
<td>3</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>15 A</td>
<td>14 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>20 A</td>
<td></td>
</tr>
<tr>
<td>460 V</td>
<td>3</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>15 A</td>
<td>14 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>20 A</td>
<td></td>
</tr>
<tr>
<td>575 V</td>
<td>3</td>
<td>50/60</td>
<td>Time-Delay 2</td>
<td>10 A</td>
<td>14 AWG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Normal Operating</td>
<td>15 A</td>
<td></td>
</tr>
</tbody>
</table>

2 “Time-Delay” fuses are UL class “RK5”.
3 “Normal Operating” (general purpose – no intentional delay) fuses are UL class “K5” (up to and including 60 amp), and UL class “H” (65 amp and above).

Notes
5-6. Connecting 1-Phase Input Power

Tools Needed:

= GND/PE Earth Ground
5-6. Connecting 1-Phase Input Power (Continued)

⚠️ Installation must meet all National and Local Codes – have only qualified persons make this installation.

⚠️ Disconnect and lockout/tagout input power before connecting input conductors from unit. Follow established procedures regarding the installation and removal of lockout/tagout devices.

⚠️ Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.

NOTICE – The Auto-Line circuitry in this unit automatically adapts the power source to the primary voltage being applied. Check input voltage available at site. This unit can be connected to any input power between 208 and 230 VAC without removing cover to relink the power source.

See rating label on unit and check input voltage available at site.

1. Black And White Input Conductor (L1 And L2)
2. Red Input Conductor
3. Green Or Green/Yellow Grounding Conductor
4. Insulation Sleeving
5. Electrical Tape
7. Disconnect Device (switch shown in the OFF position)
8. Disconnect Device Grounding Terminal
9. Disconnect Device Line Terminals
10. Over-Current Protection

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

Connect input conductors L1 and L2 to disconnect device line terminals.

Select type and size of over-current protection using Section 5-4 (fused disconnect switch shown).

Close and secure door on disconnect device. Follow established lockout/tagout procedures to put unit in service.

Notes

Work like a Pro!

Pros weld and cut safely. Read the safety rules at the beginning of this manual.
5-7. Connecting 3-Phase Input Power

Tools Needed:

= GND/PE Earth Ground

L1  L2  L3
5-7. Connecting 3-Phase Input Power (Continued)

**Installation must meet all National and Local Codes – have only qualified persons make this installation.**

**Disconnect and lockout/tagout input power before connecting input conductors from unit. Follow established procedures regarding the installation and removal of lockout/tagout devices.**

**Always connect green or green/yellow conductor to supply grounding terminal first, and never to a line terminal.**

**NOTICE** – The Auto-Line circuitry in this unit automatically adapts the power source to the primary voltage being applied. Check input voltage available at site. This unit can be connected to any input power between 208 and 575 VAC without removing cover to relink the power source.

See rating label on unit and check input voltage available at site.

**For Three-Phase Operation**
1. Input Power Cord.
2. Disconnect Device (switch shown in the OFF position)
3. Green Or Green/Yellow Grounding Conductor
4. Disconnect Device Grounding Terminal
5. Input Conductors (L1, L2 And L3)
6. Disconnect Device Line Terminals

Connect green or green/yellow grounding conductor to disconnect device grounding terminal first.

Connect input conductors L1, L2, and L3 to disconnect device line terminals.

7. Over-Current Protection

Select type and size of over-current protection using Section 5-4 (fused disconnect switch shown).

Close and secure door on disconnect device. Follow established lockout/tagout procedures to put unit in service.

---

**Notes**

---

**Work like a Pro!**

Pros weld and cut safely. Read the safety rules at the beginning of this manual.
5-8. Wiring Optional 240 Volt Plug (119 172) For Connection To Miller Bobcat, Trailblazer Or Hobart Champion 10,000

Check input voltage available at the power supply.

The Auto-Line circuitry in this unit automatically adapts the power source to the 240 volts, single-phase, 50 or 60 Hz primary voltage from the power supply.

1 Input And Grounding Conductors
2 Plug Wired for 240 V, 2-Wire Load
3 Neutral (Brass) Terminal And Prong (Not Used)
4 Load 1 (Brass) Terminal And Prong
5 Load 2 (Brass) Terminal And Prong
6 Ground (Brass) Terminal And Prong
7 Black And White Input Conductors
8 Red Input Conductor
9 Insulation Sleeving
10 Electrical Tape
11 Green Or Green/Yellow Ground Conductor

Insulate and isolate red conductor as shown.

Always connect green or green/yellow wire to ground terminal, never to a load terminal. Connect black (L1) and white (L2) wires to load terminals.

Tools Needed:

3/16 in.
5-9. Connecting To Miller Welder/Generator With A Three-Phase AC Power Plant

Three-Phase Generator Power

⚠️ Stop engine.

⚠️ Power and weld outputs are live at the same time. Disconnect or insulate unused cables.

⚠️ Have qualified person install according to circuit diagram and Generator Power Guidelines (see generator Owner’s Manual).

Remove generator power panel mounting screws. Tilt panel forward.

1. Circuit Breaker CB7
2. Lead 93
3. Lead 92
4. Lead 91
5. Lead 42 (Circuit Grounding Lead)
6. Lead 90 (Neutral)
7. Isolated Neutral Terminal
8. Jumper Lead 42
9. Grounding Terminal

Jumper 42 is connected to lead 90 at factory. Jumper 42 may be disconnected from neutral to meet applicable electrical codes.

Lead 42 connects to front panel Ground stud.

10. Power Cord
11. Circuit Breaker CB7 User Terminals

⚠️ Circuit breaker CB7 protects single-phase receptacle RC5 and the load wires from overload. If CB7 opens, all three-phase generator output stops and the receptacle does not work.

Connect user-supplied ring lug to green (ground) lead. Connect ring lug on end of green (ground) lead to grounding terminal (9).

Connect black, white, and red leads to circuit breaker CB7 user terminals (11).

Reinstall power panel.

Three-Phase Power Connection

Close panel opening if no connections are made to generator.

Remove plug before inserting leads. Reinstall bushing.

Rear Of Panel

Close panel opening if no connections are made to generator.

AC ∼ Output | Single Phase 1 ∼ | Three Phase 3 ∼
--- | --- | ---
Volts | 120/240 | 240
Amps | 50 | 48
KVA/KW | 12 | 20
Frequency | 60 Hz | Engine Speed 1850 RPM

Tools Needed:

Connect user-supplied ring lug to GROUND stud on front of unit.

Jumper 42 is connected to 90 at factory.

Ref. 197 399 / 802 332-B
5-10. Generator Settings For Plasma Cutter Operation

- Engine Control Switch must be set at “RUN” position – not “RUN/IDLE”.
- Set generator Fine Adjustment Control to 10 for maximum auxiliary power, if applicable.

The peak kW at arc stretch of this plasma power source is 15.5 kW. Reducing output to 45 amps may be necessary to operate the unit using a 10 kW generator.

Ref. 803 222

5-11. Power Cable Management Strap

1 Power Cable Management Strap
Coil power cable and secure to unit using the power cable management strap.

Ref. 805 275-A
SECTION 6 – OPERATION

6-1. Controls

1. Output Control
   Use control to set cutting output.

2. Status Lights (See Section 8-6)

3. Power Switch
   The fan will operate for approximately 10 seconds after power switch is placed in the Off position to reduce DC bus voltage.

4. Cut/Gouge Switch
   Place switch in appropriate position for desired process. Unit will automatically regulate pressure to 70 psi (483 kPa) for cutting and 60 psi (413 kPa) for gouging. Pilot current is automatically increased in gouge mode to provide better gouging starts.

- Use only clean, dry air with 90 to 120 psi (621 to 827 kPa) pressure. Prevent moisture from entering air supply at extreme cold temperatures.
- Use filter kit 300 491 or 228 926 where conditions at the worksite allow moisture, oil or other particulates into the air line.
6-2. Trigger Safety Lock

![Trigger Safety Lock Diagram]

1 Trigger

Trigger Locked
Trigger Unlocked

6-3. Plasma Cutting System Practices

![Plasma Cutting Practices Diagram]

- The pilot arc starts immediately when trigger is pressed.
- Set switch to either cut or gouge depending on desired process.
- DO NOT start pilot arc without cutting or gouging as this shortens the service life of the nozzle and electrode.
- Always connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.
- Connect work clamp to portion of workpiece that does not fall away after being cut.
- Maintain approximately a 90° angle to the workpiece surface for proper cutting results.
- Sparks should pass through the workpiece and out the bottom when cutting.
- If sparks flare back from surface, this usually is an indication that either travel speed is too fast or amperage is set too low.
- When doing extended (non-shielded) cutting, maintain approximately 1/8 in standoff between tip and surface.
- DO NOT put pressure on shield when drag cutting; instead, slide shield along the surface for proper cutting results.
- Pulling rather than pushing the torch makes cutting easier. Use a proper guide or template for accurate cutting operations.

For more information, go to MillerWelds.com.

Ref. 803 640-A / 801 400-B / Ref. 802 878
6-4. Sequence Of Cutting Operation

- Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.
- Connect work clamp to portion of workpiece that does not fall away after being cut.
- The pilot arc starts immediately when trigger is pressed.
- The unit automatically regulates pressure to 70 psi (483 kPa) for cutting.

- For standard (shielded) cutting, place drag shield on edge of metal. For extended (non-shielded) cutting, use 1/8 in (3.2 mm) standoff distance (dragging tip will reduce tip life).
- Raise trigger lock and press trigger. Pilot arc starts and will go out after 3 seconds if cutting arc is not established.
- After cutting arc starts, slowly start moving torch across metal.

- Adjust torch speed so sparks go thru metal and out bottom of cut.
- Pause briefly at end of cut before releasing trigger.
- Postflow continues after releasing trigger; cutting arc can be instantly restarted during postflow by raising trigger lock and pressing trigger.

For more information, go to MillerWelds.com.
6-5. Sequence Of Gouging Operation

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

The pilot arc starts immediately when trigger is pressed.

Hold torch at approximately 45° angle to workpiece.

Raise trigger lock and press trigger. Pilot arc starts and will go out after 3 seconds if gouging arc is not established. Move tip to within approximately 3/16 in (4.8 mm). Start gouging across workpiece surface. Maintain approximately a 45° angle to surface.

Release trigger. Postflow continues after releasing trigger; arc can be instantly restarted during postflow by raising trigger lock and pressing trigger.

Unit automatically regulates pressure to 60 psi (413 kPa) for gouging.

Connect work clamp to portion of workpiece that does not fall away after being cut.
6-6. Sequence Of Piercing Operation

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

⚠️ Connect work clamp to portion of workpiece that does not fall away after being cut.

Hold torch at an angle to the workpiece. Raise trigger lock and press trigger. Pilot arc starts and will go out after 3 seconds if cutting arc is not established.

Rotate torch to upright position approximately 90° to surface. When arc has pierced through workpiece, start cutting.

Maintain approximately 90° torch position to surface, and continue cutting.

Release trigger. Postflow continues after releasing trigger; arc can be instantly restarted during postflow by raising trigger lock and pressing trigger.

⚠️ The pilot arc starts immediately when trigger is pressed.

⚠️ Recommended maximum piercing capacity is 7/16 in (11 mm).

Unit automatically regulates pressure to 70 psi (483 kPa) for cutting.

For more information, go to MillerWelds.com and click on Resources/Improving Your Skills.
6-7. Cutting Speed

**Mild Steel**

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Material Thickness</th>
<th>Recommended Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inches</td>
<td>mm</td>
</tr>
<tr>
<td>60</td>
<td>1/4</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>5/8</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>19.1</td>
</tr>
<tr>
<td></td>
<td>7/8</td>
<td>22.2</td>
</tr>
</tbody>
</table>

**Stainless**

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Material Thickness</th>
<th>Recommended Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inches</td>
<td>mm</td>
</tr>
<tr>
<td>60</td>
<td>1/4</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>5/8</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>3/4</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>7/8</td>
<td>22.2</td>
</tr>
</tbody>
</table>

**Aluminum**

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Material Thickness</th>
<th>Recommended Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inches</td>
<td>mm</td>
</tr>
<tr>
<td>60</td>
<td>1/4</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>3/8</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>1/2</td>
<td>12.7</td>
</tr>
<tr>
<td></td>
<td>5/8</td>
<td>15.9</td>
</tr>
</tbody>
</table>

- Recommended cut speed is approximately 80% of maximum.
- Recommended maximum piercing capacity is 7/16 in (11 mm).

6-8. Consumables Storage Compartment

This compartment provides convenient access to consumables and parts.

Ref. 805 160-A
SECTION 7 – MECHANIZED OPERATION

7-1. ICE-60TM Mounting Position

Use a square to align torch perpendicular to the work surface.

7-2. Remote Control Receptacle

Remote trigger will only operate with a machine torch installed. Remote trigger is disabled when a handheld torch is installed.

1 Remote Control Receptacle RC61

RC61 provides remote arc start inputs when using the ICE-60TM machine torch. Connect supplied remote control cable or remote pendant control to receptacle on rear panel. See Section 7-3 for remote control cable input and output functions.

7-3. Remote Control Cable Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Lead</th>
<th>Socket</th>
<th>Lead Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote Start</td>
<td>White</td>
<td>1</td>
<td>White and red leads connect to a set of customer-supplied remote contacts to provide a remote trigger input signal to RC61 sockets 1 and 5 for the remote start function.</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td>5</td>
<td>Black and green leads connect to a customer-supplied machine torch drive device. Normally open contacts close after arc start to provide an output signal to begin machine torch movement. These contacts can be either dry (RMT1) or hot [RMT2 (+24 volts dc)] depending on plug position at RMT1 or RMT2 receptacle on Control board PC1.</td>
</tr>
<tr>
<td>Okay To Move</td>
<td>Black</td>
<td>2</td>
<td>Black and green leads connect to a customer-supplied machine torch drive device. Normally open contacts close after arc start to provide an output signal to begin machine torch movement. These contacts can be either dry (RMT1) or hot [RMT2 (+24 volts dc)] depending on plug position at RMT1 or RMT2 receptacle on Control board PC1.</td>
</tr>
<tr>
<td></td>
<td>Green</td>
<td>4</td>
<td>Black and green leads connect to a customer-supplied machine torch drive device. Normally open contacts close after arc start to provide an output signal to begin machine torch movement. These contacts can be either dry (RMT1) or hot [RMT2 (+24 volts dc)] depending on plug position at RMT1 or RMT2 receptacle on Control board PC1.</td>
</tr>
<tr>
<td>Noise Suppression</td>
<td>Shielding</td>
<td>3</td>
<td>Chassis ground.</td>
</tr>
</tbody>
</table>

NOTE: The Spectrum 875 Auto-Line with factory-installed machine torch is shipped from the factory with the plug connected to RMT1 (dry contacts). To power a relay or isolated input module with +24 volts DC on black lead (socket 2) and circuit common on green lead (socket 4), see Section 7-4 or 7-5.
7-4. +24 Volts DC Hot Contacts For Relay Operation

Turn off power source and disconnect input power.

Remove wrapper (see Section 8-4). Control board PC1 can supply +24 volts DC from receptacle RMT2 to operate a customer-supplied relay for the Okay To Move signal.

1. Control Board PC1
2. Receptacle RMT1
3. Receptacle RMT2
4. Receptacle RC61

Move plug from RMT1 into receptacle RMT2 on PC1. Be sure remote control cable plug is connected to RC61 on rear of unit.

If voltage sensing is required, see Section 7-8.

Install wrapper on unit.

Required Items:
- Customer-supplied 24 volts DC relay coil with resistance greater than 240 ohms.
- Suppression diode (1A, 100V) such as type IN4002 through IN4004 across relay coil.

Machine torch equipped plasma cutter is shipped from the factory with plug connected to receptacle RMT1 (dry contacts).

Tools Needed:
- Torx 25

+24 volts DC will activate relay coil after unit is triggered and the cutting arc is initiated.
7-5. +24 Volts DC Hot Contacts For Isolated Input Module Operation

**Important Safety Instructions**
- Turn off power source and disconnect input power.
- Remove wrapper (see Section 8-4).

Control board PC1 can supply +24 volts DC from receptacle RMT2 to operate a customer-supplied isolated input module for the Okay To Move signal.

1. Control Board PC1
2. Receptacle RMT1
3. Receptacle RMT2
4. Receptacle RC61

Move plug from RMT1 into receptacle RMT2 on PC1. Be sure remote control cable plug is connected to RC61 on rear of unit.

If voltage sensing is required, see Section 7-8.

Install wrapper on unit.

**Required Items:**
- Customer-supplied isolated input module.

**Tools Needed:**
- Remote Control Cable
- White
- Red
- Black +24 VDC
- Green

Machine torch equipped plasma cutter is shipped from the factory with plug connected to receptacle RMT1 (dry contacts).

+24 volts DC will activate relay coil after unit is triggered and the cutting arc is initiated.
7-6. Dry Contacts Using An External Power Supply For Relay Operation

- Turn off power source and disconnect input power.

Remove wrapper (see Section 8-4). Control board PC1 can provide dry contacts from receptacle RMT1 to operate a customer-supplied relay using an external power supply for the Okay To Move signal.

1. Control Board PC1
2. Receptacle RMT1
3. Receptacle RC61

Machine torch equipped units are shipped from factory with plug connected to receptacle RMT1.

Be sure that remote control cable plug is connected to RC61 on rear of unit.

If voltage sensing is required, see Section 7-8.

Install wrapper on unit.

Required Items:
- Customer-supplied +24 volts DC power supply.
- 24 volts DC relay coil with resistance greater than 240 ohms.
- Suppression diode (1A, 100V) such as type IN4002 through IN4004 across relay coil.

Remote Control Cable

Tools Needed:
- Torx 25

+24 volts DC will activate relay coil after unit is triggered and the cutting arc is initiated.
7-7. Dry Contacts Using An External Power Supply For Isolated Input Module Operation

**Warning:** Turn off power source and disconnect input power.

Remove wrapper (see Section 8-4).

Control board PC1 can provide dry contacts from receptacle RMT1 to operate a customer-supplied isolated input module using an external power supply for the Okay To Move signal.

1. Control Board PC1
2. Receptacle RMT1
3. Receptacle RC61

Unit is shipped from factory with plug connected to receptacle RMT1.

Be sure that remote control cable plug is connected to RC61 on rear of unit.

If voltage sensing is required, see Section 7-8.

Install wrapper on unit.

**Required Items:**

- Customer-supplied +24 volts DC power supply.
- Isolated input module.

---

**Tools Needed:**

- Torx 25

---

**Remote Control Cable**

- White
- Red
- Green
- Black

**Remote Start**

**Output**

- Okay To Move

**+24 VDC Power Supply**

**Tools Needed:**

- Torx 25

---

**Notice:** +24 volts DC will activate relay coil after unit is triggered and the cutting arc is initiated.
7-8. Remote Voltage Sense Connection

1. Remove wrapper (see Section 8-4).
2. Remote voltage sense is an arc voltage output signal for automatic torch height adjustment.
3. Snap-in Blank
4. Secondary Interconnect Board PC4
5. Receptacle RC48
   - Remove snap-in blank from rear panel.
   - Route plug end of cable through opening in rear panel.
   - Route plug end of cable over to PC4.
   - Allowing adequate slack inside the machine, secure cable and strain relief by snapping strain relief into opening in rear panel.
   - Connect plug to RC48 on PC4.
   - Install wrapper on unit.
6. Cut off crimped terminals on lead ends, and connect lead 1 to +volts DC (electrode) and lead 2 to −volts DC (work) on customer-supplied voltage sense device.

Tools Needed:
- Torx 25

7-9. Shield Sense Tab

1. Shield sense tab is located in the consumable storage box on left side of unit wrapper.
2. Shield sense tab is included only with units originally sold with machine torches.

Shield sense tab provides feedback to a compatible torch height controller before starting the cutting process. Place the shield sense tab between the cup and shield.
7-10. Cut Charts

60 Amp Machine Torch Shielded Consumables

The following cut charts are based on a distance of 1/16 in. (1.5 mm) between torch and workpiece for all cuts.

*Shield sense tab 226 763 provides feedback to a compatible torch height controller before starting the cutting process.

Shield sense tab is located in the consumable storage box on left side of unit wrapper.

Mild Steel

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Arc Voltage</th>
<th>Pierce Delay</th>
<th>Material Thickness</th>
<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inches</td>
<td>mm</td>
<td>IPM</td>
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<td>16 Ga</td>
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<td>627</td>
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<td>10 Ga</td>
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<td>0.25</td>
<td>1/4</td>
<td>6.4</td>
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<td>141</td>
<td>0.75</td>
<td>3/8</td>
<td>9.5</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>143</td>
<td>1.50</td>
<td>1/2</td>
<td>12.7</td>
<td>44</td>
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<td>147</td>
<td></td>
<td>5/8</td>
<td>15.9</td>
<td>31</td>
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<td>153</td>
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Stainless

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<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
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<td></td>
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<td>Inches</td>
<td>mm</td>
<td>IPM</td>
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<td>9.5</td>
<td>53</td>
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<td>1/2</td>
<td>12.7</td>
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<td>15.9</td>
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Aluminum

<table>
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<th>Arc Current</th>
<th>Arc Voltage</th>
<th>Pierce Delay</th>
<th>Material Thickness</th>
<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
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<td></td>
<td></td>
<td></td>
<td>Inches</td>
<td>mm</td>
<td>IPM</td>
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</table>

Without concern for cut appearance, the fastest speed for cutting material is the maximum cut speed. For better cut angle, less dross, and cut surface appearance, use the optimum cut speed. The values in the cut charts are basic starting points and each application may require some adjustment to achieve the best cut characteristics.
40 Amp Machine Torch Shielded Consumables

The following cut charts are based on a distance of 1/16 in. (1.5 mm) between torch and workpiece for all cuts.

*Shield sense tab 226 763 provides feedback to a compatible torch height controller before starting the cutting process.

Shield sense tab is located in the consumable storage box on left side of unit wrapper.

**Shielding Specifications**

- **Shield Sense Tab**: Provides feedback to a compatible torch height controller before starting the cutting process.
- **Retaining Cap**: Secures the consumables in the torch.
- **Tip**: Connects the consumables to the torch.
- **Electrode**: Transfers energy from the torch to the workpiece.
- **Swirl Ring**: Aids in directing and stabilizing the arc.
- **ICE-60TM Torch**: The torch housing and assembly for the consumables.

**Mild Steel**

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Arc Voltage</th>
<th>Pierce Delay</th>
<th>Material Thickness</th>
<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
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**Stainless**

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<td>Inches</td>
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**Aluminum**

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</table>

Without concern for cut appearance, the fastest speed for cutting material is the maximum cut speed. For better cut angle, less dross, and cut surface appearance, use the optimum cut speed. The values in the cut charts are basic starting points and each application may require some adjustment to achieve the best cut characteristics.
### 40 Amp Machine Torch Extended Consumables

The following cut charts are based on a distance of 1/16 in. (1.5 mm) between torch tip and workpiece for all cuts.

**Mild Steel**

<table>
<thead>
<tr>
<th>Arc Current</th>
<th>Arc Voltage</th>
<th>Pierce Delay</th>
<th>Material Thickness</th>
<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>125</td>
<td>0</td>
<td>26 ga, 0.5</td>
<td>550 IPM, 13970 mm/min</td>
<td>353 IPM, 8966 mm/min</td>
</tr>
<tr>
<td>25</td>
<td>128</td>
<td>0</td>
<td>22 ga, 0.8</td>
<td>484 IPM, 12294 mm/min</td>
<td>315 IPM, 8001 mm/min</td>
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<tr>
<td>25</td>
<td>128</td>
<td>0</td>
<td>18 ga, 1.3</td>
<td>232 IPM, 5893 mm/min</td>
<td>151 IPM, 3830 mm/min</td>
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<tr>
<td>25</td>
<td>130</td>
<td>0</td>
<td>16 Ga, 1.5</td>
<td>167 IPM, 4242 mm/min</td>
<td>109 IPM, 2757 mm/min</td>
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<tr>
<td>40</td>
<td>129</td>
<td>0.25</td>
<td>14 Ga, 1.9</td>
<td>336 IPM, 8534 mm/min</td>
<td>218 IPM, 5547 mm/min</td>
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**Stainless**

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<thead>
<tr>
<th>Arc Current</th>
<th>Arc Voltage</th>
<th>Pierce Delay</th>
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<th>Maximum Cut Speeds</th>
<th>Optimum Cut Speeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>127</td>
<td>0</td>
<td>26 ga, 0.5</td>
<td>561 IPM, 14249 mm/min</td>
<td>365 IPM, 9271 mm/min</td>
</tr>
<tr>
<td>25</td>
<td>127</td>
<td>0</td>
<td>22 ga, 0.8</td>
<td>453 IPM, 11506 mm/min</td>
<td>295 IPM, 7493 mm/min</td>
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<tr>
<td>40</td>
<td>123</td>
<td>0.25</td>
<td>18 Ga, 1.3</td>
<td>500 IPM, 12700 mm/min</td>
<td>325 IPM, 8255 mm/min</td>
</tr>
<tr>
<td>40</td>
<td>127</td>
<td>0.25</td>
<td>16 GA, 1.5</td>
<td>365 IPM, 9271 mm/min</td>
<td>237 IPM, 6026 mm/min</td>
</tr>
<tr>
<td>40</td>
<td>128</td>
<td>0.25</td>
<td>14 GA, 1.9</td>
<td>220 IPM, 5588 mm/min</td>
<td>143 IPM, 3632 mm/min</td>
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**Aluminum**

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<tbody>
<tr>
<td>25</td>
<td>125</td>
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<td>1/32, 0.8</td>
<td>564 IPM, 14326 mm/min</td>
<td>366 IPM, 9296 mm/min</td>
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<td>127</td>
<td>0</td>
<td>1/16, 1.5</td>
<td>236 IPM, 5994 mm/min</td>
<td>153 IPM, 3886 mm/min</td>
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<td>127</td>
<td>0.25</td>
<td>3/32, 2.4</td>
<td>268 IPM, 6807 mm/min</td>
<td>174 IPM, 4425 mm/min</td>
</tr>
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</table>

Without concern for cut appearance, the fastest speed for cutting material is the maximum cut speed. For better cut angle, less dross, and cut surface appearance, use the optimum cut speed. The values in the cut charts are basic starting points and each application may require some adjustment to achieve the best cut characteristics.
# SECTION 8 – MAINTENANCE & TROUBLESHOOTING

## 8-1. Routine Maintenance

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<th>Period</th>
<th>Task</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>Each Use</td>
<td>Check Torch Tip, Electrode, And Shield Cup</td>
<td></td>
</tr>
<tr>
<td>Every Week</td>
<td>Check Gas/Air Pressure</td>
<td></td>
</tr>
<tr>
<td>Every 3 Months</td>
<td><em>Damaged Or Unreadable Labels</em></td>
<td></td>
</tr>
<tr>
<td>Every 6 Months</td>
<td><em>Cracked Parts</em></td>
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<tr>
<td></td>
<td><em>Air Filter/Regulator Assembly Filter</em></td>
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</tr>
<tr>
<td></td>
<td><em>Gas/Air Hose</em></td>
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<td></td>
<td><em>Torch Body, Cable</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>OR</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Inside Unit</em></td>
<td></td>
</tr>
</tbody>
</table>

### Power must be reset whenever the cup shutdown system is activated. Always turn Off power when changing or checking consumables. Do NOT overtighten torch shield cup. Gently finger tighten cup onto torch.

## 8-2. Checking Shield Cup Shutdown System

1. Torch Shield Cup
   - Turn Power On and loosen shield cup. If shutdown system works properly, Cup light comes on. If not, immediately turn Off power and have Factory Authorized Service Agent check unit.
   - If system works properly, retighten cup and reset power.

   **DO NOT** overtighten torch shield cup.

Ref. 801 300 A
8-3. Checking/Replacing Retaining Cup, Tip, And Electrode

**Turn Off power source.**

1. **Drag Shield**
   - Check this area for any debris or foreign material. Clean out if necessary.
2. **Retaining Cup**
   - Remove retaining cup. Check retaining cup for cracks, and replace if necessary.
3. **Tip**
4. **Opening**

Remove tip. Check tip, and replace if opening is deformed or 50% oversize. If inside of tip is not clean and bright, clean with steel wool. Be sure to remove any pieces of steel wool afterwards.

5. **Electrode**
   - Check electrode. Performance may degrade if center has a pit more than a 1/32 in. (1 mm) deep, remove and replace electrode.
6. **Swirl Ring**
   - Remove swirl ring. Check ring, and replace if side holes are plugged.
7. **O-Ring**
   - Check O-rings on torch. If needed, coat with thin film of silicone lubricant (part no. 169 231). Replace if damaged.
8. **Plunger Area**
   - Check this area for any debris or foreign material. Clean out if necessary.
   - Carefully reassemble parts in reverse order.

**Overtightening will strip threads.** Do not overtighten electrode, tip, and retaining cup during assembly. Do not cross-thread parts causing stripping. Use care during torch assembly and parts replacement.

**Inspect shield cup, tip, and electrode for wear before cutting or whenever cutting speed has been significantly reduced.** Do not operate torch without a tip or electrode in place. Be sure to use genuine replacement parts.

**Turn Off power source before checking torch parts.**

A good practice is to replace both the tip and electrode at the same time.
8-4. Wrapper Removal/Installation

Turn off power, and disconnect input power plug from receptacle or turn off and lockout/tagout line disconnect device before working on unit.

Significant DC voltage can remain on capacitors after unit is Off. Check to see that front panel lights (LEDs) have stopped flashing and are off before removing wrapper.

1 Wrapper
2 Front Bezel
3 Rear Bezel
4 Torx Screw (Fine Thread)

Remove 13 screws from wrapper, and front and rear bezels as shown. Spread open tops of front and rear bezels.

5 Consumables Storage Compartment Opening

Be sure that opening clears the storage compartment. Lift wrapper off unit.

When installing wrapper, front and rear wrapper flanges must be on outside of front and rear portion of metal chassis.

Tools Needed:

- Torx 25
8-5. Checking Or Replacing Filter Element (Part No. 227 877)

- **Turn off power and lockout/tagout line disconnect device before working on unit.**

- **Significant DC voltage can remain on capacitors after unit is Off.** Check to see that front panel lights (LEDs) have stopped flashing and are off before removing wrapper.

Remove wrapper from unit (see Section 8-4):

1. **Rear Bezel**
   - Remove rear bezel from unit.

2. **Filter Bracket Screws**
   - Remove filter bracket screws. Pull filter bracket toward front of unit until gas/air supply fitting is past rear panel, and swing filter assembly out to the side to allow filter cup removal.

3. **Filter Base**

4. **Filter Element (Part No. 227877)**

5. **Filter Cup**
   - Unscrew filter cup from base.
   - Remove cup.
   - Unscrew filter element from base.
   - Check filter element for dirt and moisture, and replace if necessary.
   - Be sure that all parts are clean and dry.
   - Reinstall filter element, and secure filter cup.
   - Secure filter bracket to rear panel.
   - Reinstall wrapper and rear bezel.

**Tools Needed:**

- 5/16 in.
8-6. Status/Trouble Lights

<table>
<thead>
<tr>
<th>Light</th>
<th>Condition</th>
<th>Status/Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>On</td>
<td>Input power is okay.</td>
</tr>
<tr>
<td>Pressure/Cup/Temp</td>
<td>Off</td>
<td>When Power light is on, system is normal if these lights are off.</td>
</tr>
<tr>
<td>Power</td>
<td>Flashing rate is steady for 15 seconds or until torch trigger is pressed, whichever comes first.</td>
<td>Input power was above 300 volts AC or below 156 volts AC, but has returned to normal.</td>
</tr>
<tr>
<td>Power</td>
<td>Repetitive flashing rate of two quick cycles, then a one second pause.</td>
<td>Input power is above 300 volts AC or below 156 volts AC or precharge PTCs have overheated.</td>
</tr>
<tr>
<td>Pressure</td>
<td>On</td>
<td>No or low [below 40 psi (276 kPa)] input pressure.</td>
</tr>
<tr>
<td>Pressure</td>
<td>Flashing rate is steady for 15 seconds or until torch trigger is pressed, whichever comes first.</td>
<td>Regulated pressure in the unit is low.</td>
</tr>
<tr>
<td>Pressure</td>
<td>Repetitive flashing rate of two quick cycles, then a one second pause for a 15 second period.</td>
<td>Regulated pressure in the unit is high.</td>
</tr>
<tr>
<td>Cup</td>
<td>On</td>
<td>Torch cup is loose or off. Once cup is finger tightened, unit power must be cycled off and back on again.</td>
</tr>
<tr>
<td>Cup</td>
<td>Flashing rate is steady for 15 seconds or until torch trigger is pressed, whichever comes first.</td>
<td>No arc was established. Plasma system failed to strike an arc.</td>
</tr>
<tr>
<td>Cup</td>
<td>Repetitive flashing rate of two quick cycles, then a one second pause for a 15 second period or until torch trigger is pressed, whichever comes first.</td>
<td>No pilot arc established possibly due to a loss of current.</td>
</tr>
<tr>
<td>Cup</td>
<td>Repetitive flashing rate of three quick cycles, then a one second pause for a 15 second period or until torch trigger is pressed, whichever comes first.</td>
<td>Consumables in torch failed to separate during pilot arc possibly due to being stuck.</td>
</tr>
<tr>
<td>Temperature</td>
<td>On</td>
<td>Power source overheated.</td>
</tr>
<tr>
<td>Temperature</td>
<td>On (indefinitely)</td>
<td>Power source temperature sensors may have failed or ambient temperature is below -22° F (-30° C).</td>
</tr>
<tr>
<td>Temperature</td>
<td>Flashing rate is steady (indefinitely).</td>
<td>Power source temperature sensor provided inaccurate readings, but returned to normal. Unit power must be cycled off and back on again.</td>
</tr>
</tbody>
</table>

For system troubleshooting see Section 8-7 and Section 8-8.
## 8-7. Troubleshooting Power Source

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| No pilot arc; difficulty in establishing an arc. | Clean or replace worn consumables as necessary (see Section 8-3).  
Check for damaged torch or torch cable.  
Check position of cut/gouge switch. If using cutting consumables, be sure that switch is in the CUT position. If using gouging consumables, be sure that switch is in the GOUGE position.  
Check retaining cup. DO NOT overtighten cup, hand-tighten only. |
| No cutting output; Power light off; status lights off; fan motor FM does not run. | Place Power switch in On position.  
Place line disconnect device in On position (see Section 5-6 or 5-7).  
Check line fuse(s) and replace if needed or reset circuit breakers (see Section 5-6 or 5-7). |
| Pilot arc working; no cutting output; Power light on; status lights off; fan motor running. | Be sure work clamp is connected to a clean, rust-free workpiece.  
Clean or replace worn consumables as necessary (see Section 8-3). |
| No gas/air flow; Power light on; status lights off; fan motor running. | Have Factory Authorized Service Agent check for proper torch connections. Check operation of gas valve AS1, and check gas/air system for leaks. Check filter element (see Section 8-5).  
Check for dirty air filter and replace, if necessary (see Section 8-5).  
Check air lines for leaks.  
Have Factory Authorized Service Agent check pressure switch and control board. |
| Pressure status light On. | Check for sufficient gas/air supply pressure (see Section 4-3).  
Check for dirty air filter and replace, if necessary (see Section 8-5).  
Check air lines for leaks.  
Have Factory Authorized Service Agent check pressure switch and control board. |
| Cup status light On. | Check torch shield cup (see Section 8-2). Reset power switch.  
If trouble persists, have Factory Authorized Service Agent check torch and unit. |
| Temperature status light On. | Unit overheating (see Section 4-6). Allow fan to run; the Trouble light goes out when the unit has cooled.  
If trouble persists, have Factory Authorized Service Agent check unit. |
| Temperature status light On indefinitely. | Power source temperature sensors may have failed or ambient temperature is below \(-22^\circ\) F (\(-30^\circ\) C). Operate unit in a warmer ambient temperature.  
Power source temperature sensor(s) provided inaccurate feedback, but have returned to normal. Unit power must be cycled off and back on again. |
| Power light flashing steady for 15 seconds or until torch trigger is pressed, whichever happens first. | Input power was above 300 volts AC or below 156 volts AC, but has returned to normal. Have a qualified technician check input line power at idle and while cutting.  
Input power is above 300 volts AC or below 156 volts AC. Have a qualified technician check input power at idle and while cutting.  
Pre-charge PTCs are overheated. Allow 15 minutes for unit to cool. |
<p>| Pressure status light flashes at a rate of two quick flashes and then a one second pause. | Unit regulated pressure is too high. Check for input pressure between 90-120 PSI (see Section 4-3). If trouble persists, have a Factory Authorized Service Agent check unit. Reset power switch. |
| Pressure status light flashes steady for 15 seconds or until torch trigger is pressed, whichever happens first. | Regulated pressure is too low. Check for leaks. Check for input pressure between 90-120 PSI during cutting (see Section 4-3). |</p>
<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc goes out while cutting.</td>
<td>Be sure work clamp is securely attached to a clean, paint-free, rust-free workpiece. Make sure drag shield is on the workpiece or the extended tip is 1/16 in. (1.6 mm) to 1/8 in. (3.2 mm) from workpiece while cutting (see Section 6-3). On thin metal, check travel speed. Constant travel speed must be maintained when cutting thin material. Check that compressed air is clean, dry and oil-free. Use filter kit 300491 or 228926, if necessary.</td>
</tr>
<tr>
<td>Check retaining cup. DO NOT overtighten cup, hand-tighten only. Clean or replace worn consumables as necessary (see Section 8-3).</td>
<td></td>
</tr>
<tr>
<td>Cup status light flashes steady for 15 seconds or until torch trigger is pressed, whichever happens first.</td>
<td>System failed to strike an arc. Power source failed to deliver current to the output. Check continuity of torch connections (pilot lead and electrode lead). If torch connections are good, have a Factory Authorized Service Agent check unit.</td>
</tr>
<tr>
<td>Cup status light flashes at a rate of two quick cycles and then a one second pause for 15 seconds or until torch trigger is pressed, whichever comes first.</td>
<td>No pilot arc established. The power source failed to maintain a pilot arc. Try a different set of torch consumables (tip and electrode). Check for input pressure between 90-120 PSI.</td>
</tr>
<tr>
<td>Cup status light flashes at a rate of three quick cycles and then a one second pause for 15 seconds or until torch trigger is pressed, whichever comes first.</td>
<td>Power source detected that tip and electrode failed to separate when gas valve turned on. Check that cup is not too tight (finger tight only). Check for correct torch consumables. Check for gas flow through the torch head.</td>
</tr>
<tr>
<td>Short tip life.</td>
<td>Check and clean drag shield of any slag, particles, and debris. Check position of cut/gouge switch. Place switch in correct position to match the process. Check input air pressure. Check that compressed air is clean, dry and oil-free. Use filter kit 300 491 or 228 926, if necessary. Maintain 1/8 in (3.2 mm) standoff for extended tip cutting over 40 amps. Do not drag tip on workpiece.</td>
</tr>
</tbody>
</table>

If trouble persists, have system checked by a Factory Authorized Service Agent.
## 8-8. Troubleshooting Torch

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc goes on and off while cutting.</td>
<td>Torch travel speed too slow; increase travel speed (see Section 6-7).</td>
</tr>
<tr>
<td></td>
<td>Clean or replace worn consumables as necessary (see Section 8-3).</td>
</tr>
<tr>
<td></td>
<td>Be sure work clamp is securely attached to a clean, paint-free, rust-free workpiece.</td>
</tr>
<tr>
<td>Arc goes out while cutting.</td>
<td>Be sure work clamp is securely attached to a clean, paint-free, rust-free workpiece.</td>
</tr>
<tr>
<td></td>
<td>Make sure drag shield is on the workpiece or the extended tip is 1/16 in. (1.6 mm) to 1/8 in. (3.2 mm) from workpiece while cutting (see Section 6-3).</td>
</tr>
<tr>
<td></td>
<td>On thin metal, check travel speed. Constant travel speed must be maintained when cutting thin material.</td>
</tr>
<tr>
<td></td>
<td>Check that compressed air is clean, dry and oil-free. Use filter kit 300491 or 228926, if necessary.</td>
</tr>
<tr>
<td></td>
<td>Check retaining cup. DO NOT overtighten cup, hand-tighten only.</td>
</tr>
<tr>
<td></td>
<td>Clean or replace worn consumables as necessary (see Section 8-3).</td>
</tr>
<tr>
<td>Sparks come out top of cut or cut is not clean.</td>
<td>Torch travel speed too fast; reduce travel speed (see Section 6-7).</td>
</tr>
<tr>
<td></td>
<td>Clean or replace worn consumables as necessary (see Section 8-3).</td>
</tr>
<tr>
<td></td>
<td>Be sure work clamp is securely attached to a clean, paint-free, rust-free workpiece.</td>
</tr>
<tr>
<td></td>
<td>Unit not capable of cutting metals thicker than rating (see Section 4-3) or faster than shown in Section 6-7.</td>
</tr>
</tbody>
</table>
SECTION 9 – ELECTRICAL DIAGRAM

Figure 9-1. Circuit Diagram
10-1. Recommended Spare Parts

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Dia.</th>
<th>Part No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>234843</td>
<td></td>
<td></td>
<td>Label, Ice 60t Consumables</td>
<td>1</td>
</tr>
<tr>
<td>227677</td>
<td></td>
<td></td>
<td>Filter, Air Element</td>
<td>1</td>
</tr>
<tr>
<td>234838</td>
<td></td>
<td></td>
<td>Cable, Work 20 Ft 6 Ga W/Clamp And Male Dinse</td>
<td>1</td>
</tr>
<tr>
<td>234930</td>
<td></td>
<td></td>
<td>Cable, Work 50 Ft 6 Ga W/Clamp And Male Dinse</td>
<td>1</td>
</tr>
<tr>
<td>213619</td>
<td></td>
<td></td>
<td>Clamp, Work 300 A Stl Chrome Pld W/Copper Contacts</td>
<td>1</td>
</tr>
<tr>
<td>234206</td>
<td></td>
<td>234206</td>
<td>Contact Tip, Work Clamp 300amp Copper</td>
<td>2</td>
</tr>
<tr>
<td>234132</td>
<td></td>
<td></td>
<td>ICE–60T 20 Ft Hand Held Replacement Torch Or</td>
<td>1</td>
</tr>
<tr>
<td>234134</td>
<td></td>
<td></td>
<td>ICE–60T 50 Ft Hand Held Replacement Torch</td>
<td>1</td>
</tr>
<tr>
<td>234136</td>
<td></td>
<td></td>
<td>ICE–60TM 25 Ft Machine Replacement Torch</td>
<td>1</td>
</tr>
<tr>
<td>234138</td>
<td></td>
<td></td>
<td>ICE–60TM 50 Ft Machine Replacement Torch</td>
<td>1</td>
</tr>
</tbody>
</table>

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model (located on nameplate on front of unit) and serial number (located on outside bottom of plasma cutter base) is required when ordering parts from your local distributor.

Figure 8-1. Consumable Parts For ICE–60T

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model (located on nameplate on front of unit) and serial number (located on outside bottom of plasma cutter base) is required when ordering parts from your local distributor.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>215 594</td>
<td>Handle W/Screws (1)</td>
</tr>
<tr>
<td>2</td>
<td>215 478</td>
<td>Kit, Cup Sensor (1)</td>
</tr>
<tr>
<td>3</td>
<td>215 479</td>
<td>Torch Head Repair Kit (1)</td>
</tr>
<tr>
<td>4</td>
<td>185 833</td>
<td>Switch Assy w/Spring (1)</td>
</tr>
<tr>
<td>5</td>
<td>190 220</td>
<td>Trigger Spring (1)</td>
</tr>
<tr>
<td>6</td>
<td>215 592</td>
<td>Switch Trigger (1)</td>
</tr>
<tr>
<td>7</td>
<td>215 477</td>
<td>Main Body (1)</td>
</tr>
<tr>
<td>8</td>
<td>234 170</td>
<td>Torch Lead, Replacement w/Quick Disconnect 20ft (1)</td>
</tr>
<tr>
<td>8</td>
<td>234 171</td>
<td>Torch Lead, Replacement w/Quick Disconnect 50ft (1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>215 606</td>
<td>Clip, Retaining (1)</td>
</tr>
<tr>
<td>10</td>
<td>212 735</td>
<td>O-Ring, Main Body (1)</td>
</tr>
<tr>
<td>11</td>
<td>234 829</td>
<td>Kit, Ice 60T/TM Quick Connect W/Wing Head Fastener (1)</td>
</tr>
<tr>
<td></td>
<td>169 231</td>
<td>Grease, Silicon</td>
</tr>
<tr>
<td>11</td>
<td>234 132</td>
<td>Torch, Replacement 20 ft (1)</td>
</tr>
<tr>
<td>11</td>
<td>234 134</td>
<td>Torch, Replacement 50 ft (1)</td>
</tr>
</tbody>
</table>

See Figure 8-1 for additional consumable parts.

Figure 8-2. Torch, ICE-60T

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model (located on nameplate on front of unit) and serial number (located on outside bottom of plasma cutter base) is required when ordering parts from your local distributor.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>215 607</td>
<td>Sleeve, Torch Position (1)</td>
</tr>
<tr>
<td>2</td>
<td>234 172</td>
<td>Torch Lead, Replacement W/QD 25 ft (1)</td>
</tr>
<tr>
<td>2</td>
<td>234 173</td>
<td>Torch Lead, Replacement W/QD 50 ft (1)</td>
</tr>
<tr>
<td>3</td>
<td>215 599</td>
<td>Torch Sleeve (1)</td>
</tr>
<tr>
<td>4</td>
<td>215 598</td>
<td>Main Body W/Switch (1)</td>
</tr>
<tr>
<td>5</td>
<td>195 513</td>
<td>Remote Pendant Control (1)</td>
</tr>
<tr>
<td>234 136</td>
<td></td>
<td>Torch, Replacement 25 ft (1)</td>
</tr>
<tr>
<td>234 138</td>
<td></td>
<td>Torch, Replacement 50 ft (1)</td>
</tr>
<tr>
<td>220 240</td>
<td></td>
<td>Cable, Remote Control Trigger 25 ft (1)</td>
</tr>
<tr>
<td>246 285</td>
<td></td>
<td>Cable, Remote Voltage Sense 26.5 ft (1)</td>
</tr>
<tr>
<td>6</td>
<td>234 829</td>
<td>Kit, Ice-60t/Tm QD W/Wing Head Fastener</td>
</tr>
<tr>
<td>7</td>
<td>215 606</td>
<td>Clip, Retaining</td>
</tr>
</tbody>
</table>

See Figure 8-1 for additional consumable parts.

Figure 8-3. Torch, ICE-60TM

To maintain the factory original performance of your equipment, use only Manufacturer’s Suggested Replacement Parts. Model (located on nameplate on front of unit) and serial number (located on outside bottom of plasma cutter base) is required when ordering parts from your local distributor.
LIMTED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the equipment to the original end-user purchaser, and not to exceed twelve months after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original Main Power Rectifiers Only to Include SCRs, Diodes, and Discrete Rectifier Modules

2. 3 Years — Parts and Labor
   * Auto-Darkening Helmet Lenses (Except Classic Series) (No Labor)
   * Engine Driven Welding Generators
   * Inverter Power Sources (Unless Otherwise Stated)
   * Plasma Arc Cutting Power Sources
   * Process Controllers
   * Semi-Automatic and Automatic Wire Feeders
   * Transformer/Rectifier Power Sources

3. 2 Years — Parts and Labor
   * Auto-Darkening Helmet Lenses – Classic Series Only (No Labor)
   * Fume Extractors – Capture 5, Filtair 400 and Industrial Collector Series

4. 1 Year — Parts and Labor Unless Specified
   * Automatic Motion Devices
   * CoolBelt and CoolBand Blower Unit (No Labor)
   * External Monitoring Equipment and Sensors
   * Field Options
      (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
   * RFCS Foot Controls (Except RFCS-RJ45)
   * Fume Extractors – Filtair 130, MWX and SWX Series
   * HF Units
   * ICE/XT Plasma Cutting Torches (No Labor)
   * Induction Heating Power Sources, Coolers
      (NOTE: Digital Recorders are Warranted Separately by the Manufacturer.)
   * Load Banks
   * Motor Driven Guns (except Spoolmate Spoolguns)
   * PAPR Blower Unit (No Labor)
   * Positioners and Controllers
   * Racks
   * Running Gear/Trailers
   * Spot Welders
   * Subarc Wire Drive Assemblies
   * Water Coolant Systems
   * TIG Torches (No Labor)
   * Wireless Remote Foot/Hand Controls and Receivers
   * Work Stations/Weld Tables (No Labor)

5. 6 Months — Parts
   * Batteries
   * Bernard Guns (No Labor)
   * Tregaskiss Guns (No Labor)

6. 90 Days — Parts
   * Accessory (Kits)
   * Canvas Covers
   * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
   * M-Guns
   * MIG Guns and Subarc (SAW) Guns
   * Remote Controls and RFCS-RJ45
   * Replacement Parts (No labor)
   * Roughneck Guns
   * Spoolmate Spoolguns

Miller’s True Blue® Limited Warranty shall not apply to:

1. Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)

2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer’s warranty, if any.

3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT. IN THE EVENT OF A WARRANTY CLAIM COVERED BY THIS WARRANTY, THE EXCLUSIVE REMEDIES SHALL BE, AT MILLER’S OPTION: (1) REPAIR; OR (2) REPLACEMENT; OR, WHERE AUTHORIZED IN WRITING BY MILLER IN APPROPRIATE CASES, (3) THE REASONABLE COST OF REPAIR OR REPLACEMENT AT AN AUTHORIZED MILLER SERVICE STATION; OR (4) PAYMENT OF OR CREDIT FOR THE PURCHASE PRICE (LESS REASONABLE DEPRECIATION BASED UPON ACTUAL USE) UPON RETURN OF THE GOODS TO MILLER AT MILLER’S OPTION.

MILLER WILL NOT BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFIT, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTEE OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.
Owner’s Record

Please complete and retain with your personal records.

Model Name  Serial/Style Number

Purchase Date  (Date which equipment was delivered to original customer.)

Distributor

Address

City

State   Zip

For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

Contact your Distributor for:
- Welding Supplies and Consumables
- Options and Accessories
- Personal Safety Equipment
- Service and Repair
- Replacement Parts
- Training (Schools, Videos, Books)
- Technical Manuals (Servicing Information and Parts)
- Circuit Diagrams
- Welding Process Handbooks

To locate a Distributor or Service Agency visit www.millerwelds.com or call 1-800-4-A-Miller

Contact the Delivering Carrier to:
- File a claim for loss or damage during shipment.

For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer’s Transportation Department.