Hypertherm®

powermax30®

Plasma arc cutting system

Operator Manual – 805160
Revision 2

Register your new Hypertherm system

Register your product on-line at **www.hypertherm.com/registration** for easier technical and warranty support. You can also receive updates on new Hypertherm products and a free gift as a token of our appreciation.

For your records

Serial number: _____

Purchase date: _____

Distributor: _____

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Maintenance notes:

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powermax30

Operator Manual

(P/N 805160)

Revision 2 – November 2009

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EMC Introduction

Hypertherm's CE-marked equipment is built in compliance with standard EN60974-10. The equipment should be installed and used in accordance with the information below to achieve electromagnetic compatibility.

The limits required by EN60974-10 may not be adequate to completely eliminate interference when the affected equipment is in close proximity or has a high degree of sensitivity. In such cases it may be necessary to use other measures to further reduce interference.

This cutting equipment is designed for use only in an industrial environment.

Installation and use

The user is responsible for installing and using the plasma equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing the cutting circuit, see *Earthing of Workpiece.* In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Assessment of area

Before installing the equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a. Other supply cables, control cables, signalling and telephone cables; above, below and adjacent to the cutting equipment.

b. Radio and television transmitters and receivers.

c. Computer and other control equipment.

d. Safety critical equipment, for example guarding of industrial equipment.

e. Health of the people around, for example the use of pacemakers and hearing aids.

f. Equipment used for calibration or measurement.

g. Immunity of other equipment in the environment. User shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures.

h. Time of day that cutting or other activities are to be carried out.

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

Methods of reducing emissions

Mains supply

Cutting equipment must be connected to the mains supply according to the manufacturer's recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed cutting equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the cutting mains supply so that good electrical contact is maintained between the conduit and the cutting power source enclosure.

Maintenance of cutting equipment

The cutting equipment must be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened when the cutting equipment is in operation. The cutting equipment should not be modified in any way except for those changes and adjustments covered in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

Cutting cables

The cutting cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

Equipotential bonding

Bonding of all metallic components in the cutting installation and adjacent to it should be considered. However, metallic components bonded to the workpiece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode (nozzle for laser heads) at the same time. The operator should be insulated from all such bonded metallic components.

Earthing of workpiece

Where the workpiece is not bonded to earth for electrical safety, nor connected to earth because of its size and position, for example, ship's hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitances selected according to national regulations.

Note: the cutting circuit may or may not be earthed for safety reasons. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, for example, by allowing parallel cutting current return paths which may damage the earth circuits of other equipment. Further guidance is given in IEC/ TS 62081 Arc Welding Equipment Installation and Use.

Screening and shielding

Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire plasma cutting installation may be considered for special applications.

Attention

Genuine Hypertherm parts are the factory-recommended replacement parts for your Hypertherm system. Any damage caused by the use of other than genuine Hypertherm parts may not be covered by the Hypertherm warranty.

You are responsible for the safe use of the Product. Hypertherm does not and cannot make any guarantee or warranty regarding the safe use of the Product in your environment.

General

Hypertherm, Inc. warrants that its Products shall be free from defects in materials and workmanship, if Hypertherm is notified of a defect (i) with respect to the power supply within a period of two (2) years from the date of its delivery to you, with the exception of Powermax brand power supplies, which shall be within a period of three (3) years from the date of delivery to you, and (ii) with respect to the torch and leads within a period of one (1) year from its date of delivery to you, and with respect to torch lifter assemblies within a period of one (1) year from its date of delivery to you, and with respect to laser heads within a period of one (1) year from its date of delivery to you. This warranty shall not apply to any Powermax brand power supplies that have been used with phase converters. In addition, Hypertherm does not warranty systems that have been damaged as a result of poor power quality, whether from phase converters or incoming line power. This warranty shall not apply to any Product which has been incorrectly installed, modified, or otherwise damaged. Hypertherm, at its sole option, shall repair, replace, or adjust, free of charge, any defective Products covered by this warranty which shall be returned with Hypertherm's prior authorization (which shall not be unreasonably withheld), properly packed, to Hypertherm's place of business in Hanover, New Hampshire, or to an authorized Hypertherm repair facility, all costs, insurance and freight prepaid. Hypertherm shall not be liable for any repairs, replacement, or adjustments of Products covered by this warranty, except those made pursuant to this paragraph or with Hypertherm's prior written consent. **The warranty above is exclusive and is in lieu of all other warranties, express, implied, statutory, or otherwise with respect to the Products or as to the results which may be obtained therefrom, and all implied warranties or conditions of quality or of merchantability or fitness for a particular purpose or against infringement. The foregoing shall constitute the sole and exclusive remedy for any breach by Hypertherm of its warranty**. Distributors/OEMs may offer different or additional warranties, but Distributors/OEMs are not authorized to give any additional warranty protection to you or make any representation to you purporting to be binding upon Hypertherm.

Certification test marks

Certified products are identified by one or more certification test marks from accredited testing laboratories. The certification test marks are located on or near the data plate. Each certification test mark means that the product and its safety-critical components conform to the relevant national safety standards as reviewed by that testing laboratory. Hypertherm places a certification test mark on its products only after that product is manufactured with safety-critical components that have been authorized by the accredited testing laboratory.

Once the product has left the Hypertherm factory, the certification test marks are invalidated if any of the following occurs:

- The product is significantly modified in a manner that creates a hazard or non-conformance.
- Safety-critical components are replaced with unauthorized spare parts.

- Any unauthorized assembly or accessory that uses or generates a hazardous voltage is added.
- There is any tampering with a safety circuit or other feature that is designed into the product as part of the certification.

CE marking constitutes a manufacturer's declaration of conformity to applicable European directives and standards. Only those versions of Hypertherm products with a CE Marking located on or near the data plate have been tested for compliance with the European Low Voltage Directive and the European EMC Directive. EMC filters needed to comply with the European EMC Directive are incorporated within versions of the power supply with a CE Marking.

Differences in National Standards

Differences in standards include, but are not limited to:

- Voltages
- Plug and cord ratings
- Language requirements
- Electromagnetic compatibility requirements

These differences in national standards may make it impossible or impractical for all certification test marks to be placed on the same version of a product. For example, the CSA versions of Hypertherm's products do not comply with European EMC requirements and they do not have a CE marking on the data plate.

Countries that require CE marking or have compulsory EMC regulations must use CE versions of Hypertherm products with the CE marking on the data plate. These include:

- Australia
- New Zealand
- Countries in the European Union
- Russia

It is important that the product and its certification test mark be suitable for the end-use installation site. When Hypertherm products are shipped to one country for export to another country, the product must be configured and certified properly for the end-use site.

Higher-level systems

When a system integrator adds additional equipment; such as cutting tables, motor drives, motion controllers or robots; to a Hypertherm plasma cutting system, the combined system may be considered a higher-level system. A higher-level system with hazardous moving parts may constitute industrial machinery or robotic equipment, in which case the OEM or end-use customer may be subject to additional regulations and standards than those relevant to the plasma cutting system as manufactured by Hypertherm.

It is the responsibility of the end-use customer and the OEM to perform a risk assessment for the higher-level system and to provide protection against hazardous moving parts. Unless the higher-level system is certified when the OEM incorporates Hypertherm products into it, the installation also may be subject to approval by local authorities. Seek advice from legal counsel and local regulatory experts if uncertain about compliance.

External interconnecting cables between component parts of the higher level system must be suitable for contaminants and movement as required by the final end-use installation site. When the external interconnecting cables are subject to oil, dust, or water contaminants, hard usage ratings may be required. When external interconnecting cables are subject to continuous movement, constant flexing ratings may be required. It is the responsibility of the end-use customer or the OEM to ensure the cables are suitable for the application. Since there are differences in the

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Section 1

SAFETY

In this section:

RECOGNIZE SAFETY INFORMATION

The symbols shown in this section are used to identify potential hazards. When you see a safety symbol in this manual or on your machine, understand the potential for personal injury, and follow the related instructions to avoid the hazard.

FOLLOW SAFETY INSTRUCTIONS

Read carefully all safety messages in this manual and safety labels on your machine.

- Keep the safety labels on your machine in good condition. Replace missing or damaged labels immediately.
- Learn how to operate the machine and how to use the controls properly. Do not let anyone operate it without instruction.
- Keep your machine in proper working condition. Unauthorized modifications to the machine may affect safety and machine service life.

DANGER WARNING CAUTION

Hypertherm uses American National Standards Institute guidelines for safety signal words and symbols. A signal word DANGER or WARNING is used with a safety symbol. DANGER identifies the most serious hazards.

- DANGER and WARNING safety labels are located on your machine near specific hazards.
- DANGER safety messages precede related instructions in the manual that will result in serious injury or death if not followed correctly.
- WARNING safety messages precede related instructions in this manual that may result in injury or death if not followed correctly.
- CAUTION safety messages precede related instructions in this manual that may result in minor injury or damage to equipment if not followed correctly.

CUTTING CAN CAUSE FIRE OR EXPLOSION

Fire Prevention

- Be sure the area is safe before doing any cutting. Keep a fire extinguisher nearby.
- Remove all flammables within 35 feet (10 m) of the cutting area.
- Quench hot metal or allow it to cool before handling or before letting it touch combustible materials.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Ventilate potentially flammable atmospheres before cutting.
- When cutting with oxygen as the plasma gas, an exhaust ventilation system is required.

Explosion Prevention

- Do not use the plasma system if explosive dust or vapors may be present.
- Do not cut pressurized cylinders, pipes, or any closed container.
- Do not cut containers that have held combustible materials.

WARNING
Explosion Hazard
Argon-Hydrogen and Methane

Hydrogen and methane are flammable gases that present an explosion hazard. Keep flames away from cylinders and hoses that contain methane or hydrogen mixtures. Keep flames and sparks away from the torch when using methane or argon-hydrogen plasma.

WARNING
Hydrogen Detonation with Aluminum Cutting

- When cutting aluminum underwater, or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece and detonate during plasma cutting operations.
- Install an aeration manifold on the floor of the water table to eliminate the possibility of hydrogen detonation. Refer to the Appendix section of this manual for aeration manifold details.


ELECTRIC SHOCK CAN KILL

Touching live electrical parts can cause a fatal shock or severe burn.

- Operating the plasma system completes an electrical circuit between the torch and the workpiece. The workpiece and anything touching the workpiece are part of the electrical circuit.
- Never touch the torch body, workpiece or the water in a water table when the plasma system is operating.

Electric Shock Prevention

All Hypertherm plasma systems use high voltage in the cutting process (200 to 400 VDC are common). Take the following precautions when operating this system:

- Wear insulated gloves and boots, and keep your body and clothing dry.
- Do not stand, sit or lie on – or touch – any wet surface when using the plasma system.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground. If you must work in or near a damp area, use extreme caution.
- Provide a disconnect switch close to the power supply with properly sized fuses. This switch allows the operator to turn off the power supply quickly in an emergency situation.
- When using a water table, be sure that it is correctly connected to earth ground.
- Install and ground this equipment according to the instruction manual and in accordance with national and local codes.
- Inspect the input power cord frequently for damage or cracking of the cover. Replace a damaged power cord immediately. **Bare wiring can kill.**
- Inspect and replace any worn or damaged torch leads.
- Do not pick up the workpiece, including the waste cutoff, while you cut. Leave the workpiece in place or on the workbench with the work cable attached during the cutting process.
- Before checking, cleaning or changing torch parts, disconnect the main power or unplug the power supply.
- Never bypass or shortcut the safety interlocks.
- Before removing any power supply or system enclosure cover, disconnect electrical input power. Wait 5 minutes after disconnecting the main power to allow capacitors to discharge.
- Never operate the plasma system unless the power supply covers are in place. Exposed power supply connections present a severe electrical hazard.
- When making input connections, attach proper grounding conductor first.
- Each Hypertherm plasma system is designed to be used only with specific Hypertherm torches. Do not substitute other torches which could overheat and present a safety hazard.

STATIC ELECTRICITY CAN DAMAGE CIRCUIT BOARDS

Use proper precautions when handling printed circuit boards.

- Store PC boards in anti-static containers.
- Wear a grounded wrist strap when handling PC boards.

TOXIC FUMES CAN CAUSE INJURY OR DEATH

The plasma arc by itself is the heat source used for cutting. Accordingly, although the plasma arc has not been identified as a source of toxic fumes, the material being cut can be a source of toxic fumes or gases that deplete oxygen.

Fumes produced vary depending on the metal that is cut. Metals that may release toxic fumes include, but are not limited to, stainless steel, carbon steel, zinc (galvanized), and copper.

In some cases, the metal may be coated with a substance that could release toxic fumes. Toxic coatings include, but are not limited to, lead (in some paints), cadmium (in some paints and fillers), and beryllium.

Gases produced by plasma cutting vary based on the material to be cut and the method of cutting, but may include ozone, oxides of nitrogen, hexavalent chromium, hydrogen, and other substances if such are contained in or released by the material being cut.

Caution should be taken to minimize exposure to fumes produced by any industrial process. Depending upon the chemical composition and concentration of the fumes (as well as other factors, such as ventilation), there may be a risk of physical illness, such as birth defects or cancer.

It is the responsibility of the equipment and site owner to test the air quality in the area where the equipment is used and to ensure that the air quality in the workplace meets all local and national standards and regulations.

The air quality level in any relevant workplace depends on site-specific variables such as:

- Table design (wet, dry, underwater).
- Material composition, surface finish, and composition of coatings.
- Volume of material removed.
- Duration of cutting or gouging.
- Size, air volume, ventilation and filtration of the work area.
- Personal protective equipment.
- Number of welding and cutting systems in operation.
- Other site processes that may produce fumes.

If the workplace must conform to national or local regulations, only monitoring or testing done at the site can determine whether the site is above or below allowable levels.

To reduce the risk of exposure to fumes:

- Remove all coatings and solvents from the metal before cutting.
- Use local exhaust ventilation to remove fumes from the air.
- Do not inhale fumes. Wear an air-supplied respirator when cutting any metal coated with, containing, or suspected to contain toxic elements.
- Assure that those using welding or cutting equipment, as well as air-supplied respiration devices, are qualified and trained in the proper use of such equipment.
- Never cut containers with potentially toxic materials inside. Empty and properly clean the container first.
- Monitor or test the air quality at the site as needed.
- Consult with a local expert to implement a site plan to ensure safe air quality.

A PLASMA ARC CAN CAUSE INJURY AND BURNS

Instant-On Torches
Plasma arc comes on immediately when the torch switch is activated.

The plasma arc will cut quickly through gloves and skin.
- Keep away from the torch tip.
- Do not hold metal near the cutting path.
- Never point the torch toward yourself or others.

ARC RAYS CAN BURN EYES AND SKIN

Eye Protection Plasma arc rays produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.
- Use eye protection in accordance with applicable national or local codes.
- Wear eye protection (safety glasses or goggles with side shields, and a welding helmet) with appropriate lens shading to protect your eyes from the arc's ultraviolet and infrared rays.

Skin Protection Wear protective clothing to protect against burns caused by ultraviolet light, sparks and hot metal.
- Gauntlet gloves, safety shoes and hat.
- Flame-retardant clothing to cover all exposed areas.
- Cuffless trousers to prevent entry of sparks and slag.
- Remove any combustibles, such as a butane lighter or matches, from your pockets before cutting.

Cutting Area Prepare the cutting area to reduce reflection and transmission of ultraviolet light:
- Paint walls and other surfaces with dark colors to reduce reflection.
- Use protective screens or barriers to protect others from flash and glare.
- Warn others not to watch the arc. Use placards or signs.

Arc current (amps)	Minimum protective shade number (ANSI Z49.1:2005)	Suggested shade number for comfort (ANSI Z49.1:2005)	OSHA 29CFR 1910.133(a)(5)	Europe EN168:2002
Less than 40 A	5	5	8	9
41 to 60 A	6	6	8	9
61 to 80 A	8	8	8	9
81 to 125 A	8	9	8	9
126 to 150 A	8	9	8	10
151 to 175 A	8	9	8	11
176 to 250 A	8	9	8	12
251 to 300 A	8	9	8	13
301 to 400 A	9	12	9	13
401 to 800 A	10	14	10	

GROUNDING SAFETY

Work Cable Attach the work cable securely to the workpiece or the work table with good metal-to-metal contact. Do not connect it to the piece that will fall away when the cut is complete.

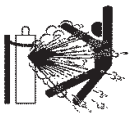
Work Table Connect the work table to an earth ground, in accordance with appropriate national or local electrical codes.

Input Power

- Be sure to connect the power cord ground wire to the ground in the disconnect box.
- If installation of the plasma system involves connecting the power cord to the power supply, be sure to connect the power cord ground wire properly.
- Place the power cord's ground wire on the stud first, then place any other ground wires on top of the power cord ground. Fasten the retaining nut tightly.
- Tighten all electrical connections to avoid excessive heating.

COMPRESSED GAS EQUIPMENT SAFETY

- Never lubricate cylinder valves or regulators with oil or grease.
- Use only correct gas cylinders, regulators, hoses and fittings designed for the specific application.
- Maintain all compressed gas equipment and associated parts in good condition.
- Label and color-code all gas hoses to identify the type of gas in each hose. Consult applicable national or local codes.



GAS CYLINDERS CAN EXPLODE IF DAMAGED

Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode.

- Handle and use compressed gas cylinders in accordance with applicable national or local codes.
- Never use a cylinder that is not upright and secured in place.
- Keep the protective cap in place over valve except when the cylinder is in use or connected for use.
- Never allow electrical contact between the plasma arc and a cylinder.
- Never expose cylinders to excessive heat, sparks, slag or open flame.
- Never use a hammer, wrench or other tool to open a stuck cylinder valve.

NOISE CAN DAMAGE HEARING

Prolonged exposure to noise from cutting or gouging can damage hearing.

- Use approved ear protection when using plasma system.
- Warn others nearby about the noise hazard.

A PLASMA ARC CAN DAMAGE FROZEN PIPES

Frozen pipes may be damaged or can burst if you attempt to thaw them with a plasma torch.

PACEMAKER AND HEARING AID OPERATION

Pacemaker and hearing aid operation can be affected by magnetic fields from high currents.

Pacemaker and hearing aid wearers should consult a doctor before going near any plasma arc cutting and gouging operations.

To reduce magnetic field hazards:

- Keep both the work cable and the torch lead to one side, away from your body.
- Route the torch leads as close as possible to the work cable.
- Do not wrap or drape the torch lead or work cable around your body.
- Keep as far away from the power supply as possible.

ADDITIONAL SAFETY INFORMATION

1. ANSI Standard Z49.1, *Safety in Welding and Cutting,* American Welding Society, 550 LeJeune Road, P.O. Box 351020, Miami, FL 33135
2. ANSI Standard Z49.2, *Fire Prevention in the Use of Cutting and Welding Processes,* American National Standards Institute, 1430 Broadway, New York, NY 10018
3. ANSI Standard Z87.1, *Safe Practices for Occupation and Educational Eye and Face Protection,* American National Standards Institute, 1430 Broadway, New York, NY 10018
4. AWS F4.1, *Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances,* American Welding Society, 550 LeJeune Road, P.O. Box 351040, Miami, FL 33135
5. AWS F5.2, *Recommended Safe Practices for Plasma Arc Cutting,* American Welding Society, 550 LeJeune Road, P.O. Box 351040, Miami, FL 33135
6. CGA Pamphlet P-1, *Safe Handling of Compressed Gases in Cylinders,* Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202
7. CSA Standard W117.2, *Code for Safety in Welding and Cutting,* Canadian Standards Association Standard Sales, 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3, Canada
8. NFPA Standard 51B, *Cutting and Welding Processes,* National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
9. NFPA Standard 70–1978, *National Electrical Code,* National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
10. OSHA, *Safety and Health Standards,* 29FR 1910 U.S. Government Printing Office, Washington, D.C. 20402
11. AWS Safety and Health Fact Sheets, American Welding Society 550 LeJeune Road, P.O. Box 351040, Miami, FL 33135 www.aws.org/technical/facts/

SYMBOLS AND MARKINGS

Your Hypertherm product may have one or more of the following markings on or near the data plate. Due to differences and conflicts in national regulations, not all marks are applied to every version of a product.

S mark symbol

The S mark symbol indicates that the power supply and torch are suitable for operations carried out in environments with increased hazard of electrical shock per IEC 60974-1.

CSA mark

Hypertherm products with a CSA mark meet the United States and Canadian regulations for product safety. The products were evaluated, tested, and certified by CSA-International. Alternatively the product may have a mark by one of the other Nationally Recognized Testing Laboratories (NRTL) accredited in both the United States and Canada, such as Underwriters Laboratories, Incorporated (UL) or TÜV.

CE marking

The CE marking signifies the manufacturer's declaration of conformity to applicable European directives and standards. Only those versions of Hypertherm products with a CE marking located on or near the data plate have been tested for compliance with the European Low Voltage Directive and the European Electromagnetic Compatibility (EMC) Directive. EMC filters needed to comply with the European EMC Directive are incorporated within versions of the product with a CE marking.

GOST-R mark

CE versions of Hypertherm products that include a GOST-R mark of conformity meet the product safety and EMC requirements for export to the Russian Federation.

c-Tick mark

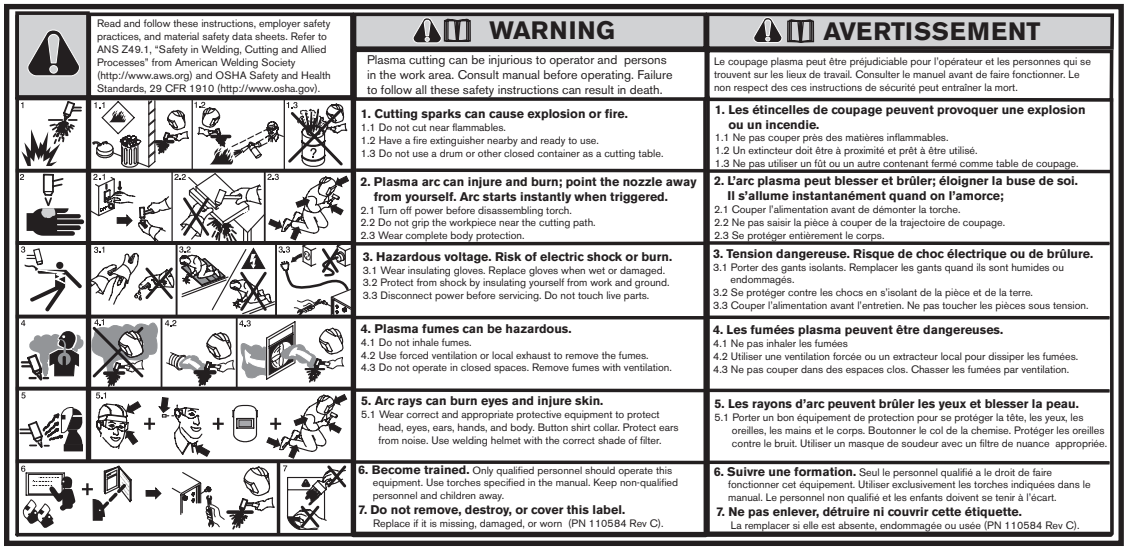
CE versions of Hypertherm products with a c-Tick mark comply with the EMC regulations required for sale in Australia and New Zealand.

CCC mark

The China Compulsory Certification (CCC) mark indicates that the product has been tested and found compliant with product safety regulations required for sale in China.

WARNING LABEL

This warning label is affixed to some power supplies. It is important that the operator and maintenance technician understand the intent of these warning symbols as described. The numbered text corresponds to the numbered boxes on the label.



Read and follow these instructions, employer safety practices, and material safety data sheets. Refer to ANS Z49.1, "Safety in Welding, Cutting and Allied Processes" from American Welding Society (http://www.aws.org) and OSHA Safety and Health Standards, 29 CFR 1910 (http://www.osha.gov).

WARNING

Plasma cutting can be injurious to operator and persons in the work area. Consult manual before operating. Failure to follow all these safety instructions can result in death.

1. Cutting sparks can cause explosion or fire.
1.1 Do not cut near flammables.
1.2 Have a fire extinguisher nearby and ready to use.
1.3 Do not use a drum or other closed container as a cutting table.

2. Plasma arc can injure and burn; point the nozzle away from yourself. Arc starts instantly when triggered.
2.1 Turn off power before disassembling torch.
2.2 Do not grip the workpiece near the cutting path.
2.3 Wear complete body protection.

3. Hazardous voltage. Risk of electric shock or burn.
3.1 Wear insulating gloves. Replace gloves when wet or damaged.
3.2 Protect from shock by insulating yourself from work and ground.
3.3 Disconnect power before servicing. Do not touch live parts.

4. Plasma fumes can be hazardous.
4.1 Do not inhale fumes.
4.2 Use forced ventilation or local exhaust to remove the fumes.
4.3 Do not operate in closed spaces. Remove fumes with ventilation.

5. Arc rays can burn eyes and injure skin.
5.1 Wear correct and appropriate protective equipment to protect head, eyes, ears, hands, and body. Button shirt collar. Protect ears from noise. Use welding helmet with the correct shade of filter.

6. Become trained. Only qualified personnel should operate this equipment. Use torches specified in the manual. Keep non-qualified personnel and children away.
7. Do not remove, destroy, or cover this label. Replace if it is missing, damaged, or worn (PN 110584 Rev C).

AVERTISSEMENT

Le coupage plasma peut être préjudiciable pour l'opérateur et les personnes qui se trouvent sur les lieux de travail. Consulter le manuel avant de faire fonctionner. Le non respect des ces instructions de sécurité peut entraîner la mort.

1. Les étincelles de coupage peuvent provoquer une explosion ou un incendie.
1.1 Ne pas couper près des matières inflammables.
1.2 Un extincteur doit être à proximité et prêt à être utilisé.
1.3 Ne pas utiliser un fût ou un autre contenant fermé comme table de coupage.

2. L'arc plasma peut blesser et brûler; éloigner la buse de soi. Il s'allume instantanément quand on l'amorce;
2.1 Couper l'alimentation avant de démonter la torche.
2.2 Ne pas saisir la pièce à couper de la trajectoire de coupage.
2.3 Se protéger entièrement le corps.

3. Tension dangereuse. Risque de choc électrique ou de brûlure.
3.1 Porter des gants isolants. Remplacer les gants quand ils sont humides ou endommagés.
3.2 Se protéger contre les chocs en s'isolant de la pièce et de la terre.
3.3 Couper l'alimentation avant l'entretien. Ne pas toucher les pièces sous tension.

4. Les fumées plasma peuvent être dangereuses.
4.1 Ne pas inhaler les fumées
4.2 Utiliser une ventilation forcée ou un extracteur local pour dissiper les fumées.
4.3 Ne pas couper dans des espaces clos. Chasser les fumées par ventilation.

5. Les rayons d'arc peuvent brûler les yeux et blesser la peau.
5.1 Porter un bon équipement de protection pour se protéger la tête, les yeux, les oreilles, les mains et le corps. Boutonner le col de la chemise. Protéger les oreilles contre le bruit. Utiliser un masque de soudeur avec un filtre de nuance appropriée.

6. Suivre une formation. Seul le personnel qualifié a le droit de faire fonctionner cet équipement. Utiliser exclusivement les torches indiquées dans le manual. Le personnel non qualifié et les enfants doivent se tenir à l'écart.
7. Ne pas enlever, détruire ni couvrir cette étiquette. La remplacer si elle est absente, endommagée ou usée (PN 110584 Rev C).

1. Cutting sparks can cause explosion or fire.

1.1 Do not cut near flammables.

1.2 Have a fire extinguisher nearby and ready to use.

1.3 Do not use a drum or other closed container as a cutting table.

2. Plasma arc can injure and burn; point the nozzle away from yourself. Arc starts instantly when triggered.

2.1 Turn off power before disassembling torch.

2.2 Do not grip the workpiece near the cutting path.

2.3 Wear complete body protection.

3. Hazardous voltage. Risk of electric shock or burn.

3.1 Wear insulating gloves. Replace gloves when wet or damaged.

3.2 Protect from shock by insulating yourself from work and ground.

3.3 Disconnect power before servicing. Do not touch live parts.

4. Plasma fumes can be hazardous.

4.1 Do not inhale fumes.

4.2 Use forced ventilation or local exhaust to remove the fumes.

4.3 Do not operate in closed spaces. Remove fumes with ventilation.

5. Arc rays can burn eyes and injure skin.

5.1 Wear correct and appropriate protective equipment to protect head, eyes, ears, hands, and body. Button shirt collar. Protect ears from noise. Use welding helmet with the correct shade of filter.

6. Become trained. Only qualified personnel should operate this equipment. Use torches specified in the manual. Keep non-qualified personnel and children away.

7. Do not remove, destroy, or cover this label. Replace if it is missing, damaged, or worn.

WARNING LABEL

This warning label is affixed to some power supplies. It is important that the operator and maintenance technician understand the intent of these warning symbols as described. The numbered text corresponds to the numbered boxes on the label.

1. Cutting sparks can cause explosion or fire.

1.1 Do not cut near flammables.

1.2 Have a fire extinguisher nearby and ready to use.

1.3 Do not use a drum or other closed container as a cutting table.

2. Plasma arc can injure and burn; point the nozzle away from yourself. Arc starts instantly when triggered.

2.1 Turn off power before disassembling torch.

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2.3 Wear complete body protection.

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5.1 Wear correct and appropriate protective equipment to protect head, eyes, ears, hands, and body. Button shirt collar. Protect ears from noise. Use welding helmet with the correct shade of filter.

6. Become trained. Only qualified personnel should operate this equipment. Use torches specified in the manual. Keep non-qualified personnel and children away.

7. Do not remove, destroy, or cover this label. Replace if it is missing, damaged, or worn.

DRY DUST COLLECTION INFORMATION

At some sites, dry dust can represent a potential explosion hazard.

The U.S. National Fire Protection Association's 2007 edition of NFPA standard 68, "Explosion Protection by Deflagration Venting," provides requirements for the design, location, installation, maintenance, and use of devices and systems to vent combustion gases and pressures after any deflagration event. Consult with the manufacturer or installer of any dry dust collection system for applicable requirements before you install a new dry dust collection system or make significant changes in the process or materials used with an existing dry dust collection system.

Consult your local "Authority Having Jurisdiction" (AHJ) to determine whether any edition of NFPA 68 has been "adopted by reference" in your local building codes.

Refer to NFPA68 for definitions and explanations of regulatory terms such as deflagration, AHJ, adopted by reference, the Kst value, deflagration index, and other terms.

Note 1 – Hypertherm's interpretation of these new requirements is that unless a site-specific evaluation has been completed to determine that all dust generated is not combustible, the 2007 edition of NFPA 68 requires the use of explosion vents designed to the worst-case Kst value (see annex F) that could be generated from dust so that the explosion vent size and type can be designed. NFPA 68 does not specifically identify plasma cutting or other thermal cutting processes as requiring deflagration venting systems, but it does apply these new requirements to all dry dust collection systems.

Note 2 – Users of Hypertherm manuals should consult and comply with all applicable federal, state, and local laws and regulations. Hypertherm does not, by the publication of any Hypertherm manual, intend to urge action that is not in compliance with all applicable regulations and standards, and this manual may never be construed as doing so.

Section 1a

SÉCURITÉ

Dans cette section :

IDENTIFIER LES CONSIGNES DE SÉCURITÉ

Les symboles indiqués dans cette section sont utilisés pour identifier les risques éventuels. Si vous trouvez un symbole de sécurité, que ce soit dans ce manuel ou sur l'équipement, soyez conscient des risques de blessures et suivez les instructions correspondantes afin d'éviter ces risques.

SUIVRE LES INSTRUCTIONS DE SÉCURITÉ

Lire attentivement toutes les consignes de sécurité dans le présent manuel et sur les étiquettes de sécurité se trouvant sur la machine.

- Les étiquettes de sécurité doivent rester lisibles. Remplacer immédiatement les étiquettes manquantes ou abîmées.
- Apprendre à faire fonctionner la machine et à utiliser correctement les commandes. Ne laisser personne utiliser la machine sans connaître son fonctionnement.
- Garder la machine en bon état. Des modifications non autorisées sur la machine peuvent engendrer des problèmes de sécurité et raccourcir la durée d'utilisation de l'équipement.

DANGER AVERTISSEMENT ATTENTION

Hypertherm adopte les lignes directrices de l'American National Standards Institute relativement aux termes, aux symboles et à la signalisation de sécurité. Les signaux DANGER ou AVERTISSEMENT sont utilisés avec un symbole de sécurité, DANGER correspondant aux risques les plus sérieux.

- Les étiquettes de sécurité DANGER et AVERTISSEMENT sont situées sur la machine pour signaler certains dangers spécifiques.
- Les messages de sécurité DANGER précèdent les directives associées dans le manuel qui, si elles ne sont pas suivies scrupuleusement, entraînent des blessures graves voire mortelles.
- Les messages d'AVERTISSEMENT précèdent les instructions d'utilisation expliquées dans ce manuel et signalent les risques de blessures ou de mort au cas où ces instructions ne seraient pas suivies correctement.
- Les messages de sécurité ATTENTION précèdent les directives associées dans le manuel qui, si elles ne sont pas suivies scrupuleusement, peuvent entraîner des blessures secondaires ou endommager l'équipement.

LE COUPAGE PEUT PROVOQUER UN INCENDIE OU UNE EXPLOSION

Prévention des incendies

- Avant de commencer, s'assurer que la zone de coupage ne présente aucun danger. Conserver un extincteur à proximité.
- Éloigner toute matière inflammable à une distance d'au moins 10 m du poste de coupage.
- Tremper le métal chaud ou le laisser refroidir avant de le manipuler ou avant de le mettre en contact avec des matériaux combustibles.
- Ne jamais couper des récipients pouvant contenir des matières inflammables avant de les avoir vidés et nettoyés correctement.
- Aérer toute atmosphère potentiellement inflammable avant d'utiliser un système plasma.
- Lors de l'utilisation d'oxygène comme gaz plasma, un système de ventilation par aspiration est nécessaire.

Prévention des explosions

- Ne pas couper en présence de poussière ou de vapeurs.
- Ne pas couper de bouteilles, de tuyaux ou autres récipients fermés et pressurisés.
- Ne pas couper de récipients contenant des matières combustibles.

AVERTISSEMENT
Risque d'explosion
argon-hydrogène et méthane

L'hydrogène et le méthane sont des gaz inflammables et potentiellement explosifs. Conserver à l'écart de toute flamme les bouteilles et tuyaux contenant des mélanges à base d'hydrogène ou de méthane. Maintenir toute flamme et étincelle à l'écart de la torche lors de l'utilisation d'un plasma d'argon-hydrogène ou de méthane.

AVERTISSEMENT
Détonation de l'hydrogène lors du coupage de l'aluminium

- Lors du coupage de l'aluminium sous l'eau, ou si l'eau touche la partie inférieure de la pièce d'aluminium, de l'hydrogène libre peut s'accumuler sous la pièce à couper et détonner lors du coupage plasma.
- Installer un collecteur d'aération au fond de la table à eau afin d'éliminer les risques de détonation de l'hydrogène. Se référer à l'annexe du manuel pour plus de renseignements sur les collecteurs d'aération.


LES CHOCS ÉLECTRIQUES PEUVENT ÊTRE FATALS

Toucher une pièce électrique sous tension peut provoquer un choc électrique fatal ou des brûlures graves.

- La mise en fonctionnement du système plasma ferme un circuit électrique entre la torche et la pièce à couper. La pièce à couper et tout autre élément en contact avec cette pièce font partie du circuit électrique.
- Ne jamais toucher le corps de la torche, la pièce à couper ou l'eau de la table à eau pendant le fonctionnement du système plasma.

Prévention des chocs électriques

Tous les systèmes plasma Hypertherm utilisent des hautes tensions pour le coupage (souvent de 200 à 400 V). On doit prendre les précautions suivantes quand on utilise le système plasma :

- Porter des bottes et des gants isolants et garder le corps et les vêtements au sec.
- Ne pas se tenir, s'asseoir ou se coucher sur une surface mouillée, ni la toucher quand on utilise le système plasma.
- S'isoler de la surface de travail et du sol en utilisant des tapis isolants secs ou des couvertures assez grandes pour éviter tout contact physique avec le travail ou le sol. S'il s'avère nécessaire de travailler dans ou près d'un endroit humide, procéder avec une extrême prudence.
- Installer un sectionneur avec fusibles appropriés, à proximité de la source de courant. Ce dispositif permet à l'opérateur d'arrêter rapidement la source de courant en cas d'urgence.
- En cas d'utilisation d'une table à eau, s'assurer que cette dernière est correctement mise à la terre.
- Installer et mettre à la terre l'équipement selon les instructions du présent manuel et conformément aux codes électriques locaux et nationaux.
- Inspecter fréquemment le cordon d'alimentation primaire pour s'assurer qu'il n'est ni endommagé, ni fendu. Remplacer immédiatement un cordon endommagé. **Un câble dénudé peut tuer**.
- Inspecter et remplacer les câbles de la torche qui sont usés ou endommagés.
- Ne pas saisir la pièce à couper ni les chutes lors du coupage. Laisser la pièce à couper en place ou sur la table de travail, le câble de retour connecté lors du coupage.
- Avant de vérifier, de nettoyer ou de remplacer les pièces de la torche, couper l'alimentation ou débrancher la prise de courant.
- Ne jamais contourner ou court-circuiter les verrouillages de sécurité.
- Avant d'enlever le capot du système ou de la source de courant, couper l'alimentation électrique. Attendre ensuite 5 minutes pour que les condensateurs se déchargent.
- Ne jamais faire fonctionner le système plasma sans que les capots de la source de courant ne soient en place. Les raccords exposés de la source de courant sont extrêmement dangereux.
- Lors de l'installation des connexions, attacher tout d'abord la prise de terre appropriée.
- Chaque système plasma Hypertherm est conçu pour être utilisé uniquement avec des torches Hypertherm spécifiques. Ne pas utiliser des torches inappropriées qui pourraient surchauffer et présenter des risques pour la sécurité.

L'ÉLECTRICITÉ STATIQUE PEUT ENDOMMAGER LES CARTES DE CIRCUITS IMPRIMÉS

On doit prendre les précautions qui s'imposent quand on manipule les circuits imprimés.

- On doit ranger les cartes de circuits imprimés dans des contenants antistatiques.
- On doit porter un bracelet antistatique quand on manipule les cartes de circuits imprimés.

LES VAPEURS TOXIQUES PEUVENT PROVOQUER DES BLESSURES OU LA MORT

L'arc plasma est lui-même la source de chaleur utilisée pour le coupage. Par conséquent, bien que l'arc plasma n'ait pas été reconnu comme une source de vapeurs toxiques, le matériau coupé peut être une source de vapeurs ou de gaz toxiques qui épuisent l'oxygène.

Les vapeurs produites varient selon le métal coupé. Les métaux qui peuvent dégager des vapeurs toxiques comprennent, entre autres, l'acier inoxydable, l'acier au carbone, le zinc (galvanisé) et le cuivre.

Dans certains cas, le métal peut être revêtu d'une substance susceptible de dégager des vapeurs toxiques. Les revêtements toxiques comprennent entre autres, le plomb (dans certaines peintures), le cadmium (dans certaines peintures et enduits) et le béryllium.

Les gaz produits par le coupage plasma varient selon le matériau à couper et la méthode de coupage, mais ils peuvent comprendre l'ozone, les oxydes d'azote, le chrome hexavalent, l'hydrogène et autres substances présentes dans le matériau coupé ou en émanent.

On doit prendre les précautions qui s'imposent pour réduire au minimum l'exposition aux vapeurs produites par tout processus industriel. Selon la composition chimique et la concentration des vapeurs (ainsi que d'autres facteurs comme la ventilation), il peut y avoir un risque de maladie physique, comme des malformations ou le cancer.

Il incombe au propriétaire du matériel et du site de vérifier la qualité de l'air dans le secteur où l'on utilise le matériel et de s'assurer que la qualité de l'air sur les lieux de travail répond aux normes et réglementation locales et nationales.

Le niveau de qualité de l'air dans tout lieu de travail dépend des variables propres au site comme :

- Type de table (humide, sèche, sous l'eau).
- Composition du matériau, fini de la surface et composition des revêtements.
- Volume de matériau enlevé.
- Durée du coupage ou du gougeage.
- Dimensions, volume d'air, ventilation et filtration de la zone de travail.
- Équipement de protection individuelle.
- Nombre de systèmes de soudage et de coupage en fonctionnement.
- Autres procédés du site qui peuvent produire des vapeurs.

Si les lieux de travail doivent être conformes aux règlements nationaux ou locaux, seuls les contrôles ou les essais effectués au site peuvent déterminer si celui-ci se situe au-dessus ou au-dessous des niveaux admissibles.

Pour réduire le risque d'exposition aux vapeurs :

- Éliminer tout revêtement et solvant du métal avant le coupage.
- Utiliser la ventilation d'extraction locale pour éliminer les vapeurs de l'air.
- Ne pas inhaler les vapeurs. Porter un respirateur à adduction d'air quand on coupe des métaux revêtus d'éléments toxiques ou qui en contiennent ou sont susceptibles d'en contenir.
- S'assurer que les personnes qui utilisent un matériel de soudage ou de coupage ainsi que les dispositifs de respiration par adduction d'air sont qualifiés et ont reçu la formation sur la bonne utilisation d'un tel matériel.
- Ne jamais couper les contenants dans lesquels il peut y avoir des matériaux toxiques. En premier lieu, vider et nettoyer correctement le contenant.
- Contrôler ou éprouver la qualité de l'air au site selon les besoins.
- Consulter un expert local pour mettre en œuvre un plan du site afin d'assurer une qualité de l'air sûre.

L'ARC PLASMA PEUT PROVOQUER DES BLESSURES OU DES BRÛLURES

Torches à allumage instantané

L'arc plasma s'allume immédiatement après que la torche soit mise en marche.

L'arc plasma coupe facilement les gants et la peau.

- Rester éloigné de l'extrémité de la torche.
- Ne pas tenir de métal près de la trajectoire de coupe.
- Ne jamais pointer la torche vers soi ou d'autres personnes.

LES RAYONS DE L'ARC PEUVENT BRÛLER LES YEUX ET LA PEAU

Protection des yeux Les rayons de l'arc plasma produisent de puissants rayons visibles ou invisibles (ultraviolets et infrarouges) qui peuvent brûler les yeux et la peau.

- Utiliser des lunettes de sécurité conformément aux codes locaux ou nationaux en vigueur.
- Porter des lunettes de protection (lunettes ou masque muni d'écrans latéraux et encore masque de soudure) avec des verres teintés appropriés pour protéger les yeux des rayons ultraviolets et infrarouges de l'arc.

Protection de la peau Porter des vêtements de sécurité pour se protéger contre les brûlures que peuvent causer les rayons ultraviolets, les étincelles et le métal brûlant :

- Gants à crispin, chaussures et casque de sécurité.
- Vêtements ignifuges couvrant toutes les parties exposées du corps.
- Pantalon sans revers pour éviter que des étincelles ou des scories puissent s'y loger.
- Avant le coupage, retirer de ses poches tout objet combustible comme les briquets au butane ou les allumettes.

Zone de coupage Préparer la zone de coupage afin de réduire la réverbération et la transmission de la lumière ultraviolette :

- Peindre les murs et autres surfaces de couleur sombre pour réduire la réflexion de la lumière.
- Utiliser des écrans et autres dispositifs de protection afin de protéger les autres personnes de la lumière et de la réverbération.
- Prévenir les autres personnes de ne pas regarder l'arc. Utiliser des affiches ou des panneaux.

Courant de l'arc (A)	Indice de protection minimum (ANSI Z49.1:2005)	Indice de protection suggéré pour assurer le confort (ANSI Z49.1:2005)	OSHA 29CFR 1910.133(a)(5)	Europe EN168:2002
Moins de 40 A	5	5	8	9
41 à 60 A	6	6	8	9
61 à 80 A	8	8	8	9
81 à 125 A	8	9	8	9
126 à 150 A	8	9	8	10
151 à 175 A	8	9	8	11
176 à 250 A	8	9	8	12
251 à 300 A	8	9	8	13
301 à 400 A	9	12	9	13
401 à 800 A	10	14	10	

MISE À LA MASSE ET À LA TERRE

Câble de retour Bien fixer le câble de retour (ou de masse) à la pièce à couper ou à la table de travail de façon à assurer un bon contact métal-métal. Ne pas fixer le câble de retour à la partie de la pièce qui doit se détacher.

Table de travail Raccorder la table de travail à la terre, conformément aux codes de sécurité locaux ou nationaux appropriés.

Alimentation

- S'assurer que le fil de terre du cordon d'alimentation est connecté à la terre dans le coffret du sectionneur.
- S'il est nécessaire de brancher le cordon d'alimentation à la source de courant lors de l'installation du système, s'assurer que le fil de terre est correctement branché.
- Placer tout d'abord le fil de terre du cordon d'alimentation sur le plot de mise à la terre puis placer les autres fils de terre par-dessus. Bien serrer l'écrou de retenue.
- S'assurer que toutes les connexions sont bien serrées pour éviter la surchauffe.

SÉCURITÉ DES BOUTEILLES DE GAZ COMPRIMÉ

- Ne jamais lubrifier les robinets des bouteilles ou les régulateurs avec de l'huile ou de la graisse.
- Utiliser uniquement les bouteilles, régulateurs, tuyaux et accessoires appropriés et conçus pour chaque application spécifique.
- Entretenir l'équipement et les pièces d'équipement à gaz comprimé afin de les garder en bon état.
- Étiqueter et coder avec des couleurs tous les tuyaux de gaz afin d'identifier le type de gaz contenu dans chaque tuyau. Se référer aux codes locaux ou nationaux en vigueur.

LES BOUTEILLES DE GAZ COMPRIMÉ PEUVENT EXPLOSER EN CAS DE DOMMAGES

Les bouteilles de gaz contiennent du gaz à haute pression. Si une bouteille est endommagée, elle peut exploser.

- Manipuler et utiliser les bouteilles de gaz comprimé conformément aux codes locaux ou nationaux.
- Ne jamais utiliser une bouteille qui n'est pas placée à la verticale et bien assujettie.
- Le capuchon de protection doit être placé sur le robinet sauf si la bouteille est en cours d'utilisation ou connectée pour utilisation.
- Éviter à tout prix le contact électrique entre l'arc plasma et une bouteille.
- Ne jamais exposer des bouteilles à une chaleur excessive, aux étincelles, aux scories ou aux flammes nues.
- Ne jamais utiliser des marteaux, des clés ou d'autres outils pour débloquer le robinet des bouteilles.

LE BRUIT PEUT PROVOQUER DES PROBLÈMES AUDITIFS

Une exposition prolongée au bruit du coupage ou du gougeage peut provoquer des problèmes auditifs.

- Utiliser un casque de protection homologué lors de l'utilisation du système plasma.
- Prévenir les personnes aux alentours des risques encourus en cas d'exposition au bruit.

UN ARC PLASMA PEUT ENDOMMAGER LES TUYAUX GELÉS

Les tuyaux gelés peuvent être endommagés ou éclater si l'on essaie de les dégeler avec une torche plasma.

PACEMAKERS ET PROTHÈSES AUDITIVES

Les champs magnétiques produits par les courants à haute tension peuvent affecter le fonctionnement des prothèses auditives et des pacemakers.

Les personnes portant ce type d'appareil doivent consulter un médecin avant de s'approcher d'un lieu où s'effectue le coupage ou le gougeage plasma.

Pour réduire les risques associés aux champs magnétiques :

- Garder loin de soi et du même côté du corps le câble de retour et le faisceau de la torche.
- Faire passer le faisceau de la torche le plus près possible du câble de retour.
- Ne pas s'enrouler le faisceau de la torche ou le câble de retour autour du corps.
- Se tenir le plus loin possible de la source de courant.

SYMBOLES ET MARQUAGE

Votre produit Hypertherm peut comporter une ou plusieurs des marques suivantes sur sa plaque signalétique ou à proximité. En raison des différends et des conflits relatifs aux règlements nationaux, toutes les marques ne sont pas appliquées à chaque version d'un produit.

Symbole marque S

Le symbole de marque S indique que la source de courant et la torche conviennent pour les travaux effectués dans les milieux à risque accru de choc électrique selon l'IEC 60974-1.

Marque CSA

Les produits Hypertherm comportant la marque CSA répondent aux règlements des États-Unis et du Canada relatifs à la sécurité du produit. Les produits sont évalués, mis à l'essai et certifiés par la CSA-International. En outre, le produit peut porter une marque d'un des laboratoires d'essai reconnus sur le plan national (NRTL) accrédité aux États-Unis et au Canada comme les Underwriters Laboratories, Incorporated (UL) ou TÜV.

Marque CE

La marque CE signifie la déclaration de conformité du fabricant aux directives et normes européennes applicables. Seules les versions des produits Hypertherm portant la marque CE placée sur la plaque signalétique ou à proximité ont été mises à l'essai de conformité à la directive européenne sur la basse tension et la compatibilité électromagnétique européenne (CEM). Les filtres CEM qui doivent se conformer à la directive CEM européenne sont intégrés aux versions du produit portant la marque CE.

Marque GOST-R

Les versions CE des produits Hypertherm qui portent la marque de conformité GOST-R répondent aux exigences de sécurité du produit et de CEM en vue de l'exportation à la Fédération russe.

Marque c-Tick

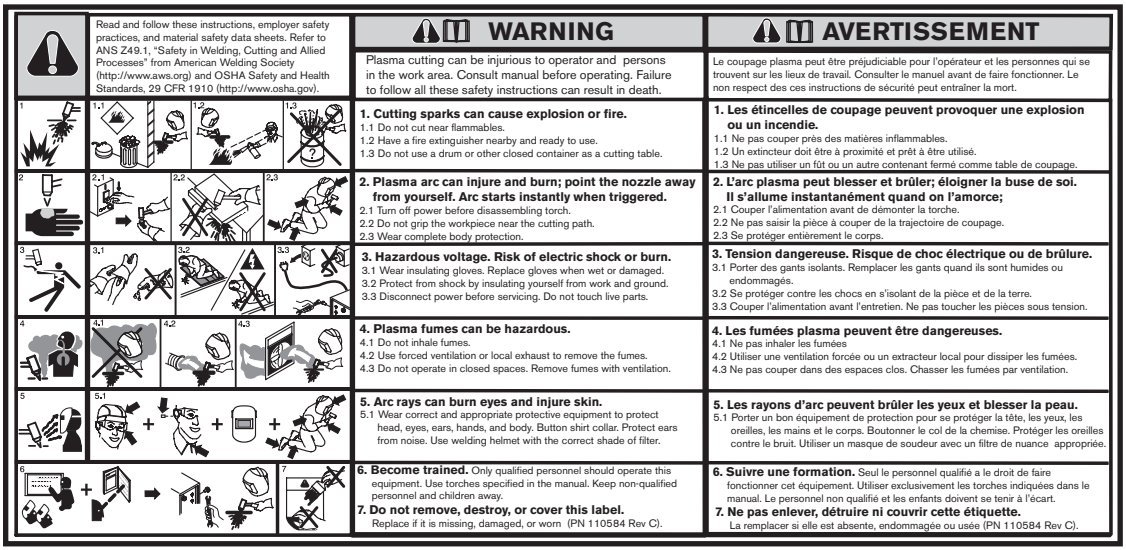
Les versions CE des produits Hypertherm portant la marque c-Tick sont conformes aux règlements CEM prescrits pour la vente en Australie et en Nouvelle-Zélande.

Marque CCC

La marque de certification obligatoire en Chine (CCC) indique que le produit a été mis à l'essai et déclaré conforme aux règlements de sécurité du produit prescrits pour la vente en Chine.

ÉTIQUETTE DE SÉCURITÉ

Cette étiquette est affichée sur la source de courant. Il est important que l'utilisateur et le technicien de maintenance comprennent la signification des symboles de sécurité. Les numéros de la liste correspondent aux numéros des images.



1. Les étincelles de coupage peuvent provoquer une explosion ou un incendie.

1.1 Ne pas couper près des matières inflammables.

1.2 Un extincteur doit se trouver sur les lieux et prêt à être utilisé.

1.3 Ne pas utiliser un fût ou un autre contenant fermé comme table de coupe.

2. L'arc plasma peut blesser et brûler ; ne jamais pointer la buse vers soi. L'arc s'amorce instantanément quand on appuie sur la gâchette.

2.1 Couper l'alimentation avant de démonter la torche.

2.2 Ne pas saisir la pièce près de la trajectoire de coupage.

2.3 Se protéger entièrement le corps.

3. Tension dangereuse. Risque de choc électrique ou de brûlure.

3.1 Porter des gants isolants. Remplacer les gants s'ils sont humides ou endommagés.

3.2 Se protéger contre les chocs en s'isolant de la pièce et de la terre.

3.3 Couper l'alimentation avant d'entretenir. Ne pas toucher les pièces sous tension.

4. Les fumées du plasma peuvent être dangereuses.

4.1 Ne pas inhaler les fumées.

4.2 Utiliser une ventilation forcée ou par aspiration à la source pour éliminer les fumées.

4.3 Ne pas utiliser dans des espaces clos. Chasser les fumées avec la ventilation.

5. Les rayons d'arc peuvent brûler les yeux et blesser la peau.

5.1 Porter un bon équipement de protection pour se protéger la tête, les yeux, les oreilles, les mains et le corps. Boutonner le col de la chemise. Se protéger les oreilles contre le bruit. Utiliser le masque de soudage avec le filtre ayant le bon indice de protection.

6. S'entraîner. Seul le personnel qualifié doit faire fonctionner cet équipement. Utiliser les torches prescrites dans le manuel. Tenir le personnel non qualifié et les enfants à l'écart.

7. Ne pas enlever, détruire ou couvrir cette étiquette. La remplacer si elle est manquante, endommagée ou usée.

ÉTIQUETTE DE SÉCURITÉ

Cette étiquette est affichée sur la source de courant. Il est important que l'utilisateur et le technicien de maintenance comprennent la signification des symboles de sécurité. Les numéros de la liste correspondent aux numéros des images.

1. Les étincelles de coupage peuvent provoquer une explosion ou un incendie.

1.1 Ne pas couper près des matières inflammables.

1.2 Un extincteur doit se trouver sur les lieux et prêt à être utilisé.

1.3 Ne pas utiliser un fût ou un autre contenant fermé comme table de coupe.

2. L'arc plasma peut blesser et brûler ; ne jamais pointer la buse vers soi. L'arc s'amorce instantanément quand on appuie sur la gâchette.

2.1 Couper l'alimentation avant de démonter la torche.

2.2 Ne pas saisir la pièce près de la trajectoire de coupage.

2.3 Se protéger entièrement le corps.

3. Tension dangereuse. Risque de choc électrique ou de brûlure.

3.1 Porter des gants isolants. Remplacer les gants s'ils sont humides ou endommagés.

3.2 Se protéger contre les chocs en s'isolant de la pièce et de la terre.

3.3 Couper l'alimentation avant d'entretenir. Ne pas toucher les pièces sous tension.

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7. Ne pas enlever, détruire ou couvrir cette étiquette. La remplacer si elle est manquante, endommagée ou usée.

INFORMATION SUR LE DÉPOUSSIÉRAGE

À certains endroits, la poussière peut représenter un risque d'explosion potentiel. À certains endroits, la poussière peut représenter un risque d'explosion potentiel.

La norme NFPA 68 de la National Fire Protection Association des É.-U. (édition 2007) « Explosion Protection by Deflagration Venting » établit les exigences relatives à la conception, à l'emplacement, à l'installation, à l'entretien et à l'utilisation de dispositifs et de systèmes pour évacuer à l'air libre les gaz de combustion et les pressions après une éventuelle déflagration. Communiquer avec le fabricant ou avec l'installateur pour tout système de dépoussiérage afin de connaître les exigences applicables avant d'installer un tel système neuf ou d'apporter des modifications importantes aux procédés ou aux matériaux utilisés à un système de dépoussiérage existant.

Consultez l'autorité compétente locale pour déterminer si une édition de la NFPA 68 a été adoptée par référence dans vos codes du bâtiment locaux.

Voir le document NFPA68 pour obtenir des définitions et des explications des termes réglementaires tels que « déflagration, autorité compétente, adopté par référence, valeur du pire cas, indice de déflagration » et autres termes.

Note 1 – L'interprétation d'Hypertherm de ces nouvelles exigences est que, sauf évaluation particulière du site, pour déterminer que toute la poussière produite n'est pas combustible, l'édition 2007 de la NFPA 68 exige l'utilisation d'évents d'explosion conçus pour la valeur du pire des cas (voir annexe F) qui pourrait provenir de la poussière de sorte que l'on puisse concevoir la dimension et le type d'évent d'explosion. La NFPA 68 ne stipule pas particulièrement le procédé de coupage plasma particulier ou autres procédés de coupage thermique comme le prescrivent ces nouveaux règlements à tous les systèmes de dépoussiérage.

Note 2 – Les utilisateurs des manuels d'Hypertherm doivent consulter tous les règlements et lois fédéraux et locaux applicables et s'y conformer. Hypertherm n'a pas l'intention, en publiant un manuel d'Hypertherm, de demander des mesures qui ne sont pas conformes aux règlements et normes applicables et ce manuel ne peut jamais être interprété dans ce sens.

Seccíon 1b

SEGURIDAD

En esta sección:

RECONOCIMIENTO DE INFORMACIÓN DE SEGURIDAD

Los símbolos que se muestran en esta sección se utilizan para identificar los posibles peligros. Cuando vea un símbolo de seguridad en este manual o en su máquina, recuerde que existe la posibilidad de que se produzcan lesiones personales y siga las instrucciones correspondientes para evitar el peligro.

SIGA LAS INSTRUCCIONES DE SEGURIDAD

Lea atentamente todos los mensajes de seguridad de este manual y las etiquetas de seguridad en su máquina.

- Mantenga las etiquetas de seguridad de su máquina en buen estado. Reemplace las etiquetas que se pierdan o se dañen inmediatamente.
- Aprenda a utilizar la máquina y a utilizar los controles de la manera correcta. No permita que sea utilizada por alguien que no conozca su funcionamiento.
- Mantenga su máquina en buenas condiciones de funcionamiento. La realización de modificaciones no autorizadas a la máquina puede comprometer la seguridad y la vida útil de la máquina.

PELIGRO ADVERTENCIA PRECAUCIÓN

Hypertherm usa las directivas del Instituto Americano de Normas Nacionales (American National Standards Institute) para las palabras y símbolos que señalan seguridad. Las palabras PELIGRO y ADVERTENCIA se utilizan conjuntamente con un símbolo de seguridad. La palabra PELIGRO se utiliza para identificar los mayores peligros.

- Encontrará etiquetas de seguridad con las inscripciones PELIGRO y ADVERTENCIA en su máquina, junto a peligros específicos.
- Los mensajes de seguridad de PELIGRO preceden instrucciones relacionadas en el manual que resultarán en lesión grave o muerte si no se las sigue correctamente.
- En este manual, la palabra ADVERTENCIA va seguida de instrucciones que, si no se siguen correctamente, pueden provocar lesiones e inclusive la muerte.
- Los mensajes de seguridad de CUIDADO o PRECAUCIÓN preceden mensajes relacionados con instrucciones en el manual que puede resultar en lesiones menores, o daño a equipo, si no se siguen correctamente.

LOS CORTES PUEDEN PROVOCAR INCENDIOS O EXPLOSIONES

Prevención ante el fuego

- Asegúrese de que el área sea segura antes de proceder a cortar. Tenga a mano un extinguidor de incendios.
- Retire todos los materiales inflamables, colocándolos a por lo menos 10 metros del área de corte.
- Remoje los metales calientes o permita que se enfríen antes de que entren en contacto con materiales combustibles.
- Nunca corte depósitos que contengan materiales inflamables – primero es necesario vaciarlos y limpiarlos debidamente.
- Antes de realizar cortes en atmósferas potencialmente inflamables, asegúrese de ventilar bien.
- Al realizar cortes utilizando oxígeno como gas plasma, se requiere tener un sistema de ventilación de escape.

Prevención ante explosiones

- No corte en atmósferas que contengan polvo o vapores explosivos.
- No corte depósitos o tubos a presión ni cualquier depósito cerrado.
- No corte depósitos que hayan contenido materiales combustibles.

ADVERTENCIA

Peligro de explosión
Argón-Hidrógeno y metano

El hidrógeno y el metano son gases inflamables que suponen un peligro de explosión. Mantenga el fuego lejos de los cilindros y las mangueras que contengan mezclas de hidrógeno o metano. Mantenga la llama y las chispas lejos de la antorcha al utilizar metano o argón-hidrógeno como plasma.

ADVERTENCIA

Detonación de hidrógeno con el corte de aluminio

- Al cortar aluminio bajo agua o con agua en contacto con el lado inferior del aluminio, puede acumularse gas hidrógeno bajo la pieza a cortar y detonar durante la operación de corte por plasma.
- Instale un múltiple de aireación en el fondo de la mesa de agua para eliminar la posibilidad de la detonación del hidrógeno. Consulte la sección del apéndice de este manual para conocer detalles acerca del múltiple de aireación.


EL CHOQUE ELÉCTRICO PUEDE PROVOCAR LA MUERTE

El contacto directo con piezas eléctricas conectadas puede provocar un electrochoque fatal o quemaduras graves.

- Al hacer funcionar el sistema de plasma, se completa un circuito eléctrico entre la antorcha y la pieza a cortar. La pieza a cortar es una parte del circuito eléctrico, como también cualquier cosa que se encuentre en contacto con ella.
- Nunca toque el cuerpo de la antorcha, la pieza a cortar o el agua en una mesa de agua cuando el sistema de plasma se encuentre en funcionamiento.

Prevención ante el electrochoque

Todos los sistemas por plasma de Hypertherm usan alto voltaje en el proceso de corte (son comunes los voltajes CD de 200 a 400). Tome las siguientes precauciones cuando se utiliza el equipo de plasma:

- Use guantes y botas aislantes y mantenga el cuerpo y la ropa secos.
- No se siente, se pare o se ponga sobre cualquier superficie húmeda cuando esté trabajando con el equipo.
- Aíslese eléctricamente de la pieza a cortar y de la tierra utilizando alfombrillas o cubiertas de aislamiento secas lo suficientemente grandes como para impedir todo contacto físico con la pieza a cortar o con la tierra. Si su única opción es trabajar en una área húmeda o cerca de ella, sea muy cauteloso.
- Instale un interruptor de corriente adecuado en cuanto a fusibles, en una pared cercana a la fuente de energía. Este interruptor permitirá al operador desconectar rápidamente la fuente de energía en caso de emergencia.
- Al utilizar una mesa de agua, asegúrese de que ésta se encuentre correctamente conectada a la toma a tierra.
- Instale este equipo y conéctelo a tierra según el manual de instrucciones y de conformidad con los códigos locales y nacionales.
- Inspeccione el cordón de alimentación primaria con frecuencia para asegurarse de que no esté dañado ni agrietado. Si el cordón de alimentación primaria está dañado, reemplácelo inmediatamente. **Un cable pelado puede provocar la muerte**.
- Inspeccione las mangueras de la antorcha y reemplácelas cuando se encuentren dañadas.
- No toque la pieza ni los recortes cuando se está cortando. Deje la pieza en su lugar o sobre la mesa de trabajo con el cable de trabajo conectado en todo momento.
- Antes de inspeccionar, limpiar o cambiar las piezas de la antorcha, desconecte la potencia primaria o desenchufe la fuente de energía.
- Nunca evite o descuide los bloqueos de seguridad.
- Antes de retirar la cubierta de una fuente de energía o del gabinete de un sistema, desconecte la potencia primaria de entrada. Espere 5 minutos después de desconectar la potencia primaria para permitir la descarga de los condensadores.
- Nunca opere el sistema de plasma sin que las tapas de la fuente de energía estén en su lugar. Las conexiones expuestas de la fuente de energía presentan un serio riesgo eléctrico.
- Al hacer conexiones de entrada, conecte el conductor de conexión a tierra en primer lugar.
- Cada sistema de plasma Hypertherm está diseñado para ser utilizado sólo con antorchas Hypertherm específicas. No utilice antorchas diferentes, que podrían recalentarse y ser peligrosas.

ELECTRICIDAD ESTÁTICA PUEDE DAÑAR TABLILLAS DE CIRCUITO

Use precauciones adecuadas cuando maneje tablillas impresas de circuito

- Almacene las tablillas PC en recipientes antiestáticos.
- Use la defensa de muñeca conectada a tierra cuando maneje tablillas PC.

HUMOS TÓXICOS PUEDEN CAUSAR LESIONES O MUERTE

El arco plasma es por si solo la fuente de calor que se usa para cortar. Según esto, aunque el arco de plasma no ha sido identificado como la fuente de humo tóxico, el material que se corta puede ser la fuente de humo o gases tóxicos que vacían el oxígeno.

El humo producido varía según el metal que está cortándose. Metales que pueden liberar humo tóxico incluyen, pero no están limitados a, acero inoxidable, acero al carbón, cinc (galvanizado), y cobre.

En algunos casos, el metal puede estar recubierto con una sustancia que podría liberar humos tóxicos. Los recubrimientos tóxicos incluyen, pero no están limitados a, plomo (en algunas pinturas), cadmio (en algunas pinturas y rellenos), y berilio.

Los gases producidos por el corte por plasma varían basándose en el material a cortarse y el método de cortar, pero pueden incluir ozono, óxidos de nitrógeno, cromo hexavalente, hidrógeno, y otras substancias, si están contenidas dentro o liberadas por el material que se corta.

Se debe tener cuidado de minimizar la exposición del humo producido por cualquier proceso industrial. Según la composición química y la concentración del humo (al igual que otros factores, tales como ventilación), puede haber el riesgo de enfermedad física, tal como defectos de natividad o cáncer.

Es la responsabilidad del dueño del equipo y instalación el comprobar la calidad de aire en el lugar donde se está usando el equipo para garantizar que la calidad del aire en el lugar de trabajo cumpla con todas las normas y reglamentos locales y nacionales.

El nivel de la calidad del aire en cualquier lugar de trabajo relevante depende en variables específicas al sitio tales como:

- Diseño de mesa (mojada, seca, bajo agua).
- La composición del material, el acabado de la superficie, y la composición de los recubrimientos.
- Volumen que se quita del material.
- La duración del corte o ranura.
- Tamaño, volumen del aire, ventilación y filtración del lugar de trabajo.
- Equipo de protección personal.
- Número de sistemas de soldar y cortar en la operación.
- Otros procesos del lugar que pueden producir humo.

Si el lugar de trabajo debe cumplir reglamentos nacionales o locales, solamente el monitoreo o las pruebas que se hacen en el lugar pueden determinar si el sitio está encima o debajo de los niveles permitidos.

Para reducir el riesgo de exposición a humo:

- Quite todos los recubrimientos y solventes del metal antes de cortar.
- Use ventilación extractora local para quitar humo del aire.
- No inhale el humo. Use un respirador con fuente propia de aire cuando corte cualquier metal recubierto con, o sospechado de contener, elementos tóxicos.
- Garantice que aquéllos usando equipo de soldar o cortar, al igual que aparatos de respiración con aire propio de aire, estén capacitados y entrenados en el uso apropiado de tal equipo.
- Nunca corte recipientes con materiales potencialmente tóxicos adentro. Primero, vacíe y limpie el recipiente adecuadamente.
- Monitoree o compruebe la calidad del aire en el sitio como fuera necesario.
- Consulte con un experto local para realizar un plan al sitio para garantizar la calidad de aire seguro.

EL ARCO DE PLASMA PUEDE CAUSAR LESIONES Y QUEMADURAS

Antorchas de encendido instantáneo

El arco de plasma se enciende inmediatamente después de activarse el interruptor de la antorcha.

El arco de plasma puede cortar a través de guantes y de la piel con rapidez.

- Manténgase alejado de la punta de la antorcha.
- No sostenga el metal junto al trayecto de corte.
- Nunca apunte la antorcha hacia Ud. mismo o hacia otras personas.

LOS RAYOS DEL ARCO PUEDEN PRODUCIR QUEMADURAS EN LOS OJOS Y EN LA PIEL

Protección para los ojos Los rayos del arco de plasma producen rayos intensos visibles e invisibles (ultravioleta e infrarrojo) que pueden quemar los ojos y la piel.

- Utilice protección para los ojos de conformidad con los códigos locales o nacionales aplicables.
- Colóquese protectores para los ojos (gafas o anteojos protectores con protectores laterales, y bien un casco de soldar) con lentes con sombreado adecuado para proteger sus ojos de los rayos ultravioleta e infrarrojos del arco.

Protección para la piel Vista ropa de protección para proteger la piel contra quemaduras causadas por la radiación ultravioleta de alta intensidad, por las chispas y por el metal caliente:

- Guantes largos, zapatos de seguridad y gorro.
- Roipa de combustión retardada y que cubra todas las partes expuestas.
- Pantalones sin dobladillos para impedir que recojan chispas y escorias.
- Retire todo material combustible de los bolsillos, como encendedores a butano e inclusive cerillas, antes de comenzar a cortar.

Área de corte Prepare el área de corte para reducir la reflexión y la transmisión de la luz ultravioleta:

- Pinte las paredes y demás superficies con colores oscuros para reducir la reflexión.
- Utilice pantallas o barreras protectoras para proteger a los demás de los destellos.
- Advierta a los demás que no debe mirarse el arco. Utilice carteles o letreros.

Corriente de arco (amps.)	El número de matiz protector mínimo (ANSI Z49.1:2005)	El número de matiz sugerido para comodidad (ANSI Z49.1:2005)	OSHA 29CFR 1910.133(a)(5)	Europa EN168:2002
Menos de 40 A	5	5	8	9
41 a 60 A	6	6	8	9
61 a 80 A	8	8	8	9
81 a 125 A	8	9	8	9
126 a 150 A	8	9	8	10
151 a 175 A	8	9	8	11
176 a 250 A	8	9	8	12
251 a 300 A	8	9	8	13
301 a 400 A	9	12	9	13
401 a 800 A	10	14	10	

SEGURIDAD DE TOMA A TIERRA

Cable de trabajo La pinza del cable de trabajo debe estar bien sujetada a la pieza y hacer un buen contacto de metal a metal con ella o bien con la mesa de trabajo. No conecte el cable con la parte que va a quedar separada por el corte.

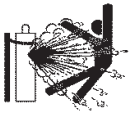
Mesa de trabajo Conecte la mesa de trabajo a una buena toma de tierra, de conformidad con los códigos eléctricos nacionales o locales apropiados.

Potencia primaria de entrada

- Asegúrese de que el alambre de toma a tierra del cordón de alimentación está conectado al terminal de tierra en la caja del interruptor de corriente.
- Si la instalación del sistema de plasma supone la conexión del cordón de alimentación primaria a la fuente de energía, asegúrese de conectar correctamente el alambre de toma a tierra del cordón de alimentación primaria.
- Coloque en primer lugar el alambre de toma a tierra del cordón de alimentación primaria en el espárrago luego coloque cualquier otro alambre de tierra sobre el conductor de tierra del cable. Ajuste firmemente la tuerca de retención.
- Asegúrese de que todas las conexiones eléctricas están firmemente realizadas para evitar sobrecalentamientos.

SEGURIDAD DE LOS EQUIPOS DE GAS COMPRIMIDO

- Nunca lubrique reguladores o válvulas de cilindros con aceite o grasa.
- Utilice solamente cilindros, reguladores, mangueras y conectores de gas correctos que hayan sido diseñados para la aplicación específica.
- Mantenga todo el equipo de gas comprimido y las piezas relacionadas en buen estado.
- Coloque etiquetas y códigos de color en todas las mangueras de gas para identificar el tipo de gas que conduce cada una. Consulte los códigos locales o nacionales aplicables.



LOS CILINDROS DE GAS PUEDEN EXPLOTAR SI ESTÁN DAÑADOS

Los cilindros de gas contienen gas bajo alta presión. Un cilindro dañado puede explotar.

- Manipule y utilice los cilindros de gas comprimido de acuerdo con los códigos locales o nacionales aplicables.
- No use nunca un cilindro que no esté de pie y bien sujeto.
- Mantenga la tapa de protección en su lugar encima de la válvula, excepto cuando el cilindro se encuentre en uso o conectado para ser utilizado.
- No permita nunca el contacto eléctrico entre el arco de plasma y un cilindro.
- No exponga nunca los cilindros a calor excesivo, chispas, escorias o llamas.
- No emplee nunca martillos, llaves u otro tipo de herramientas para abrir de golpe la válvula del cilindro.

EL RUIDO PUEDE DETERIORAR LA AUDICIÓN

La exposición prolongada al ruido propio de las operaciones de corte y ranurado puede dañar la audición.

- Utilice un método de protección de los oídos aprobado al utilizar el sistema de plasma.
- Advierta a las demás personas que se encuentren en las cercanías acerca del peligro que supone el ruido excesivo.

UN ARCO PLASMA PUEDE DAÑAR TUBOS CONGELADOS

Se puede hacer daño a los tubos congelados, o se los puede reventar, si uno trata de descongelarlos con una antorcha por plasma.

OPERACIÓN DE MARCAPASOS Y DE AUDÍFONOS

Los campos magnéticos producidos por las elevadas corrientes pueden afectar la operación de marcapasos y de audífonos.

Las personas que lleven marcapasos y audífonos deberán consultar a un médico antes de acercarse a sitios donde se realizan operaciones de corte y ranurado por plasma.

Para reducir los peligros de los campos magnéticos:

- Mantenga el cable de trabajo y la manguera de la antorcha a un lado, lejos del cuerpo.
- Dirija la manguera antorcha lo más cerca posible del cable de trabajo.
- No envuelva el cable de trabajo ni la manguera de la antorcha en su cuerpo.
- Manténgase tan lejos de la fuente de energía como sea posible.

SÍMBOLOS Y MARCAS

Su producto de Hypertherm puede tener una o más de las marcas que siguen en, o cerca de la placa de datos. Debido a diferencias y conflictos en reglamentos nacionales, no todas las marcas se aplican a toda versión del producto.

Símbolo de marca S

El símbolo de marca S indica que la fuente de energía y antorcha son aptas para operaciones que se llevan a cabo en entornos con peligro aumentado de choque o descarga eléctrica según IEC 60974-1.

Marca CSA

Los productos de Hypertherm con la marca CSA cumplen con los reglamentos de Estados Unidos y Canadá para la seguridad del producto. Estos productos fueron evaluados, comprobados, y certificados por CSA-Internacional. Alternativamente, el producto puede tener la marca según uno de los otros Laboratorios de Prueba Reconocidos nacionalmente (NRTL siglas en inglés) acreditados en ambos Estados Unidos y Canadá, tales como Underwriters Laboratories, Incorporated (UL) ó TÜV.

Marcas CE

Las marcas CE significan una declaración del fabricante de conformidad a las directivas y estándares aplicables Europeos. Sólo aquellas versiones del producto Hypertherm con la marca CE ubicada en o cerca de la placa de datos han sido comprobadas para cumplir con la Directiva Europea de Voltaje Bajo, la Compatibilidad Electromagnético Europea (EMC). Los filtros EMC que necesitan cumplir con la Directiva Europea EMC están incorporados dentro de las versiones del producto con la marca CE.

Marca GOST-R

Las versiones de los productos Hypertherm CE que incluye la marca de conformidad GOST-R cumplen con la seguridad del productos y los requisitos EMC para exportarse a la Federación Rusa.

Marca c-Tick

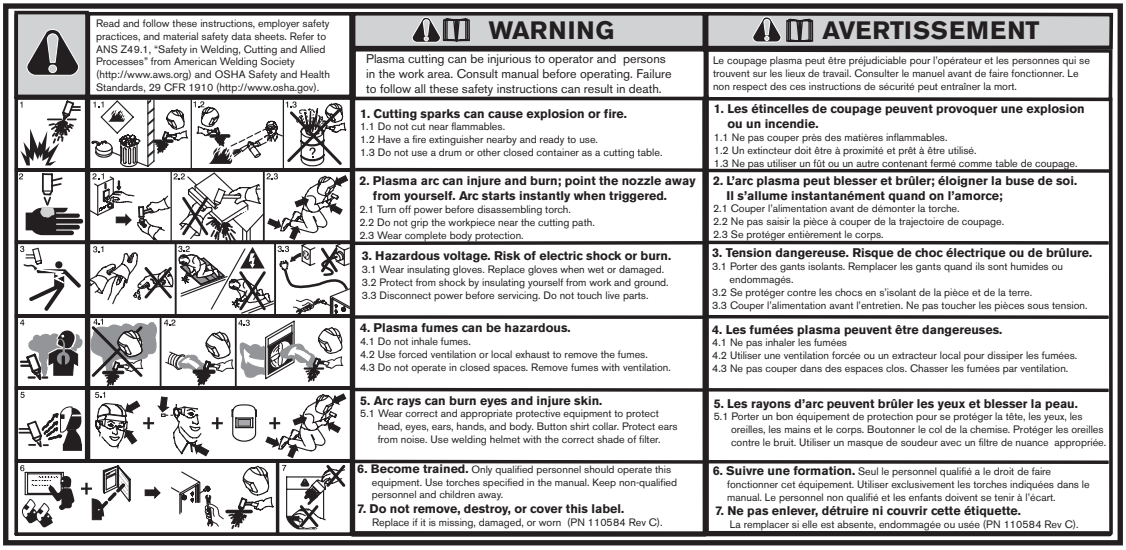
Las versiones CE de los productos Hypertherm con la marca c-Tick cumple con los reglamentos EMC requeridos para venta en Australia y Nueva Zelandia.

Marca CCC

La marca de Certificación Obligatoria China (CCC en inglés) indica que el producto ha sido comprobado y se lo ha encontrado que cumple con los reglamentos de seguridad del producto requeridos para venta en China.

ETIQUETA DE ADVERTENCIA

Esta etiqueta de advertencia se encuentra adherida a la fuente de energía. Es importante que el operador y el técnico de mantenimiento comprendan el sentido de estos símbolos de advertencia según se describen. El texto numerado corresponde a los cuadros numerados de la etiqueta.



1. Las chispas producidas por el corte pueden causar explosiones o incendios.

1.1 Mantenga los materiales inflamables lejos del lugar de corte.

1.2 Tenga a mano un extinguidor de incendios y asegúrese de que alguien esté preparado para utilizarlo.

1.3 No corte depósitos cerrados.

2. El arco de plasma puede causar quemaduras y lesiones.

2.1 Apague la fuente de energía antes de desarmar la antorcha.

2.2 No sostenga el material junto al trayecto de corte.

2.3 Proteja su cuerpo completamente.

3. Los electrochoques provocados por la antorcha o el cableado pueden ser fatales. Protéjase del electrochoque.

3.1 Colóquese guantes aislantes. No utilice guantes dañados o mojados.

3.2 Aíslese de la pieza de trabajo y de la tierra.

3.3 Antes de trabajar en una máquina, desconecte el enchufe de entrada o la potencia primaria.

4. La inhalación de los humos provenientes del área de corte puede ser nociva para la salud.

4.1 Mantenga la cabeza fuera de los gases tóxicos.

4.2 Utilice ventilación forzada o un sistema local de escape para eliminar los humos.

4.3 Utilice un ventilador para eliminar los humos.

5. Los rayos del arco pueden producir quemaduras en los ojos y en la piel.

5.1 Utilice un sombrero y gafas de seguridad. Utilice protección para los oídos y abróchese el botón del cuello de la camisa. Utilice un casco de soldar con el filtro de sombreado adecuado. Proteja su cuerpo completamente.

6. Antes de trabajar en la máquina o de proceder a cortar, capacítese y lea las instrucciones completamente.

7. No retire las etiquetas de advertencia ni las cubra con pintura.

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7. No retire las etiquetas de advertencia ni las cubra con pintura.

INFORMACIÓN SOBRE LA COLECCIÓN DE POLVO SECO

En algunos sitios, el polvo seco puede representar un peligro potencial de explosión.

La edición del 2007 de "U.S. National Fire Protection Association" iniciales en inglés NFPA (La Asociación Americana Nacional de Protección Contra Incendios) del estándar 68 "Protección de Explosión por medio de Respiradero de Deflagración" proporciona requisitos para el diseño, ubicación, instalación, mantenimiento, y uso de aparatos y sistemas para dar salida a gases de combustión y presiones después de todo evento de deflagración. Consulte con el fabricante o instalador de cualquier sistema de colección de polvo seco para los requisitos aplicables antes de que instale un sistema nuevo de colección de polvo seco, o haga cambios significativos en el proceso o materiales que se usen con un sistema existente de colección de polvo seco.

Consulte su "Autoridad que Tenga Jurisdicción" (iniciales en inglés AHJ) local para determinar si cualquier edición de la NFPA 68 ha sido "adoptada por referencia" en los códigos de construcción locales.

Remítase a la NFPA 68 para definiciones y explicaciones de los términos reguladores como "deflagración, AHJ, adoptada por referencia, el valor Kst, índice de deflagración" y otros términos.

Nota 1 – La interpretación de Hypertherm de estos nuevos requisitos es que, a no ser que se haya completado una evaluación específica del sitio para determinar que todo polvo generado no es combustible, la edición del 2007 de la NFPA 68 requiere el uso de respiraderos de explosión diseñados para el peor caso del valor Kst (vea anexo F) que pudiera ser generado por el polvo, de manera que el tamaño y tipo del respiradero de explosión pueda diseñarse. La NFPA 68 no identifica específicamente corte por plasma u otros procesos de cortes termales como si requirieran sistemas de respiraderos de deflagración, pero en realidad aplica estos nuevos requisitos a todos los sistemas de colección de polvos secos.

Nota 2 – Los usuarios de los manuales de Hypertherm deberían consultar y cumplir con todas las leyes y reglamentos federales, estatales y locales aplicables. Hypertherm, al publicar todo manual de Hypertherm, no intenta urgir acción que no esté en cumplimiento con todos los reglamentos y normas, y este manual nunca debe interpretarse como si lo hiciera así.

Section 2

SPECIFICATIONS

In this section:

System description

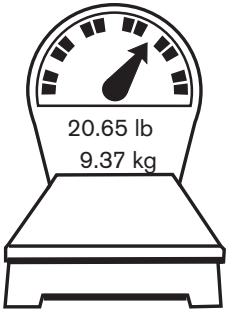
The Powermax30 is a highly portable, 30-amp, hand-held plasma cutting system appropriate for a wide range of applications.

The standard Powermax30 includes one complete set of the consumables needed for cutting (retaining cap, swirl ring, nozzle, electrode), a spare electrode, a spare nozzle, an air fitting reducer (1/4 FPT x 1/8 NPT), a consumables holder, an Operator Manual, and a Quick Setup Card. The Powermax30 with the deluxe carrying case includes 3 spare electrodes, 3 spare nozzles, a retaining cap, a swirl ring, a deflector, silicone lubricant, 3 o-rings, gloves, a circle cutting guide, and a carrying strap in addition to the consumables holder, air fitting reducer, Operator Manual, and Quick Setup Card.

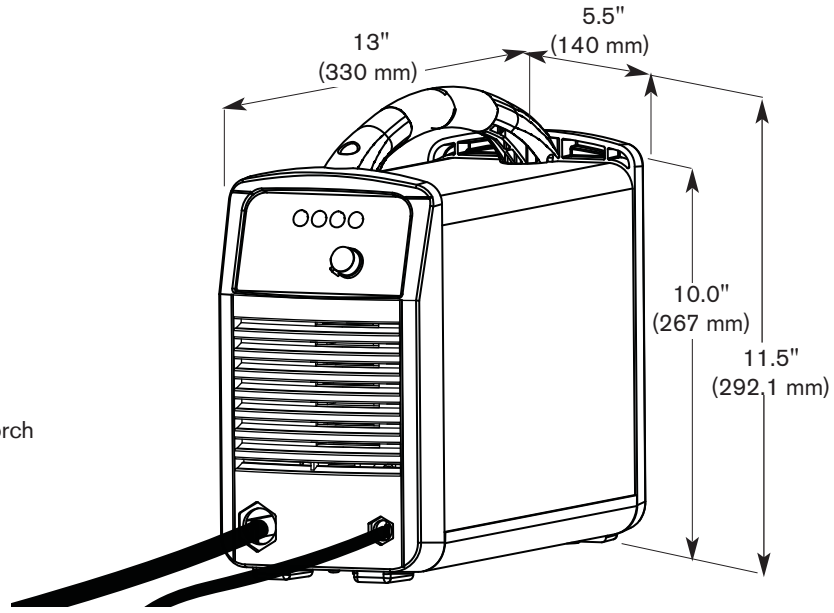
The power cords on the CSA units have a quick disconnect adapter and are shipped with a 120V/15A (NEMA 5-15P) plug and a 240V/20A (NEMA 6-50P) plug in addition to the twist-lock 240V/20A (NEMA L6-20P) plug wired to the system. The CE units are shipped without a plug on the power cord. See Section 3, *Power cord considerations*, for more information.

You can order additional consumables and accessories – such as the carrying case, carrying strap, and circle cutting guide – from any Hypertherm distributor. See *Section 5*, *Maintenance and Parts*, for a list of spare and optional parts.

Power supply dimensions and weight



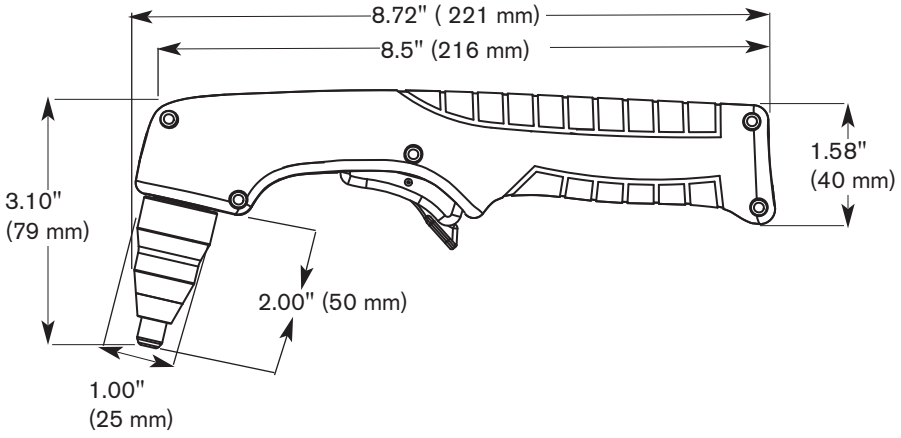
Weight includes the hand torch and 15 ft (4.57 m) lead.



Power supply ratings

Rated open-circuit voltage (U_0)	240 VDC	
Rated output current (I_2)	15 A to 30 A	
Rated output voltage (U_2)	83 VDC	
Duty cycle at 40° C, U_1=120 VAC (See data plate on power supply for more information on duty cycle.)	35 % (I_2=30 A, U_2=83 V) 60 % (I_2=23 A, U_2=83 V) 100 % (I_2=18 A, U_2=83 V)	
Duty cycle at 40° C, U_1=200–240 VAC	50 % (I_2=30 A, U_2=83 V) 75 % (I_2=24 A, U_2=83 V) 100 % (I_2=21 A, U_2=83 V)	
Operating temperature	14° to 104° F (-10° to 40° C)	
Storage temperature	-13° to 131° F (-25° to 55° C)	
Power factor (120 V – 240 V)	0.99 – 0.97	
Input voltage (U_1)/ Input current (I_1) at rated output ($U_{2\ MAX}$, $I_{2\ MAX}$)	120 V / 26 A 200-240 V / 15,5-13 A	
Gas type	Air	Nitrogen
Gas quality	Clean, dry, oil-free	99.995 % pure
Minimum required gas inlet pressure and flow	3.5 scfm @ 65 psi (99.1 l/min @ 4.5 bar	
Recommended gas inlet flow and flow	4.0 scfm @ 80 psi (113.3 l/min @ 5.5 bar)	

Torch dimensions



T30v torch ratings

Recommended capacity	1/4 inch (6 mm) at 30 A (35% duty cycle)
Maximum capacity	3/8 inch (10 mm) at 30 A (35% duty cycle)
Severance capacity	1/2 inch (12 mm) at 30 A (35% duty cycle)
Weight	2.1 lbs (1.0 kg)

Symbols and markings

S mark

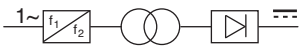
The S mark indicates that the power supply and torch are suitable for use in environments with increased hazard of electrical shock.

CE mark

The CE mark ( ) constitutes a manufacturer's declaration of conformity to applicable European directives and standards. Only those versions of Hypertherm products with a CE mark located on or near the data plate have been tested for compliance with the European Low Voltage Directive and the European EMC Directive. EMC filters needed to comply with the European EMC Directive are incorporated within versions of the power supply with a CE mark.

IEC symbols

The following symbols may appear on the power supply data plate, control labels, switches, and LEDs:

	Direct current (DC)		An inverter-based power source
	Alternating current (AC)		Volt/amp curve, "drooping" characteristic
	Plasma torch cutting		Power is ON (LED)
	AC input power connection		Inlet gas pressure is low
	The terminal for the external protective (earth) conductor		Missing or loose consumables
I	Power is ON		Power supply is overheated
O	Power is OFF		

Section 3

SETUP

In this section:

Unpack the Powermax30

1. Verify that all items on your order have been received in good condition. Contact your distributor if any parts are damaged or missing.

2. Inspect the power supply for damage that may have occurred during shipping. If there is evidence of damage, refer to *Claims*, below. All communications regarding this equipment must include the model number and serial number located on the bottom of the power supply.

3. Before you set up and operate this Hypertherm system, read Section 1, *Safety*.

Claims

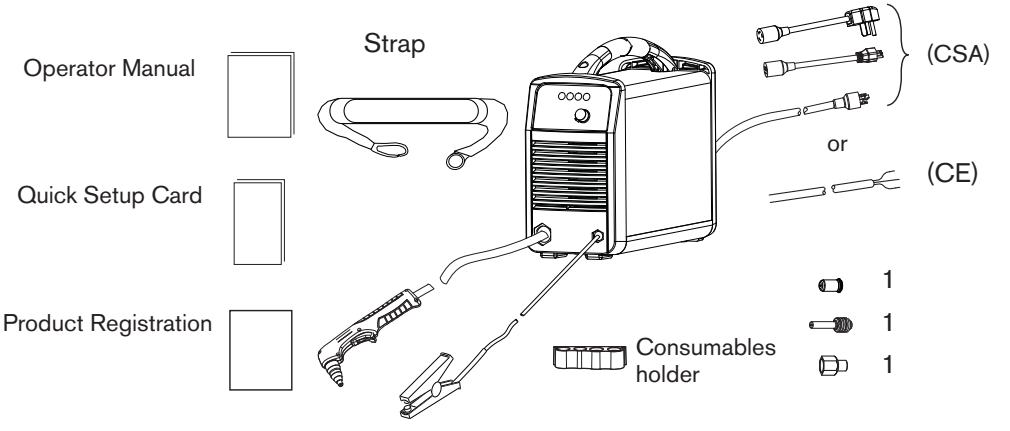
- **Claims for damage during shipment** – If your unit was damaged during shipment, you must file a claim with the carrier. Hypertherm will furnish you with a copy of the bill of lading upon request. If you need additional assistance, call the nearest Hypertherm office listed in the front of this manual.

- **Claims for defective or missing merchandise** – If any component is missing or defective, contact your Hypertherm distributor. If you need additional assistance, call the nearest Hypertherm office listed in the front of this manual.

Contents

Verify the items in the box against the illustration.

Note: If you purchased the Powermax30 with the deluxe carrying case, your package will include the case, 3 electrodes, 3 nozzles, a swirl ring, a retaining cap, a deflector, silicone lubricant, 3 o-rings, gloves, and a plasma cutting guide in addition to the consumables holder, air fitting reducer (1/4 FPT x 1/8 NPT), Operator Manual, Quick Setup Card, and Product Registration Card.



Position the power supply

Locate the Powermax30 power supply near a 120 volt or 230 volt power receptacle. Allow at least 10 inches (0.25 m) of space at the front and back of the power supply for proper ventilation.

Voltage configurations

The Powermax30 power supply automatically selects either 120 volts or 230 volts, as appropriate. The maximum output voltage will vary based on your input voltage and the circuit's amperage. The following chart shows the maximum rated output for typical combinations of input voltage and amperage. Input voltages can be ±10%.

Input voltage	Rated output	Amps (RMS) input at rated output, 60 Hz, single-phase	KVA
120 V, 15 A circuit	20 A, 83 V	17	2.1
120 V, 20 A circuit	30 A, 83 V	26	3.1
120 V, 30 A circuit	30 A, 83 V	26	3.1
200-240 V, 20A circuit	30 A, 83 V	15.5 – 13	3.0

Caution: **A circuit capable of 15 amps, 120 V or 20 amps, 230 V is required for proper operation. Protect the circuit with appropriately sized time-delay fuses or circuit breakers.**

Requirements for grounding

To ensure personal safety, proper operation, and to reduce electromagnetic interference (EMI), the Powermax30 must be properly grounded:

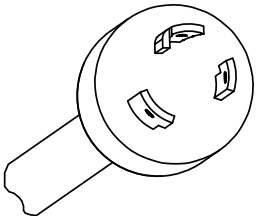
- The power supply must be grounded through the power cord according to national and local electrical codes:
- Single-phase service must be of the 3-wire type with a green or green/yellow wire for the protective earth ground. **Do not use a 2-wire service.**
- Refer to *Section 1*, *Grounding Safety*, for more information.

Power cord considerations

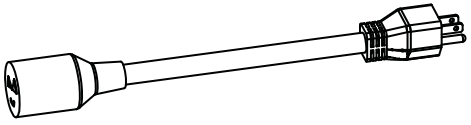
Powermax30 power supplies are shipped with CSA and CE power cord configurations.

Power cord and plugs for CSA power supplies

The power cords on the CSA power supplies are shipped with a 120V/15A (NEMA 5-15P) plug adapter and a 240V/20A (NEMA 6-50P) plug adapter in addition to the twist-lock 240V/20A (NEMA L6-20P) plug wired to the system. A 120V/20A plug adapter is available as an accessory. See Section 5, *Powermax30 accessory parts*, for part number information.

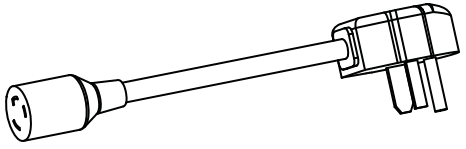


- The power cord on the Powermax30 power supply is equipped with a twist-lock plug (NEMA L6-20P) appropriate for use on a 240V/20A circuit with a twist-lock outlet.



- To operate the Powermax30 on a lower amperage circuit, attach the female end of the 120V/15A (NEMA 5-15P) plug adapter to the power supply's twist-lock plug.

  Note: Do not set the amperage adjustment knob above 20A or your circuit breaker may trip. See Section 4, *Power on the system*, for more information.

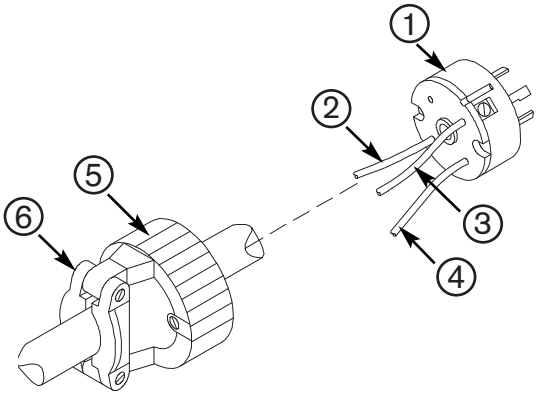


- To operate the Powermax30 on a 240V/20A circuit, attach the female end of the 240V (NEMA 6-50P) plug to the power supply's twist-lock plug.

Power cord for CE power supplies

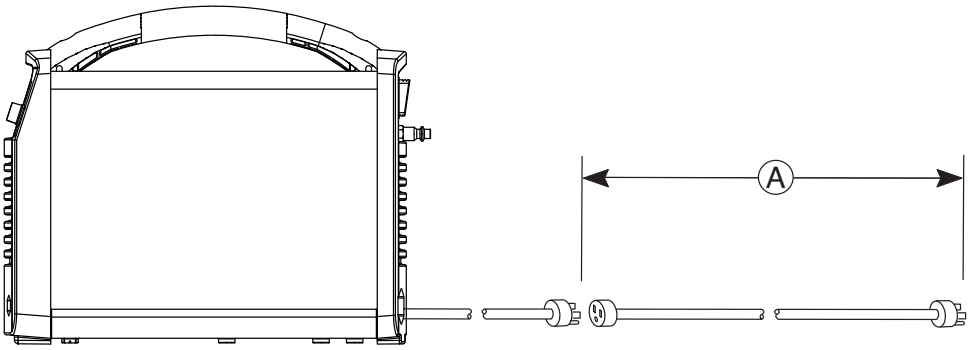
The CE power supplies are shipped without a plug on the power cord. To operate at 230 V, obtain the correct plug and have it installed by a licensed electrician as shown below.

1	230 V plug
2	To line 1 terminal (brass)
3	To line 2 terminal (brass)
4	To ground terminal (green)
5	Outer shell
6	Cord grip



1. Strip back the cord insulation to separate wires 3, 4, and 5.
2. Remove each wire's insulation in order to make good contact with the plug terminals.
3. Make the connections, reinstall the outer shell and cord grip, and tighten the cord grip's screws. Screws should be snug, but not overly tight.

Extension cord recommendations



Use an extension cord of an appropriate wire size for the cord length and system voltage. Use a cord that meets national and local codes.

Input-voltage	Phase	A	
		Recommended cord gauge size	Length
120 VAC	1	12 AWG	Up to 53 ft (16 m)
200 – 240 VAC	1	14 AWG	Up to 133 ft (40.5 m)

Generator recommendations

When using a generator with the Powermax30, it should produce 240 VAC.

Engine drive rating	Output current	Performance
5.5 KW	30 A	Full arc stretch
4 KW	25 A	Limited arc stretch

Powermax30 systems with serial numbers below 30-003132 may shut down and show an error condition (all LEDs flash) when used with a generator that has a higher than normal voltage (greater than 250 VAC). To avoid shutdown, check your generator's voltage regulator for proper operation.

Gas supply

The gas supply for the Powermax30 can be shop-compressed or cylinder-compressed. A high-pressure regulator must be used on either type of supply and must be capable of delivering gas to the filter on the power supply at 3.5 scfm @ 65 psi (99.1 l/min @ 4.5 bar). To ensure adequate pressure to the power supply, set the regulator to 80 to 100 psi (5.5 to 6.9 bar).

If gas supply quality is poor, cut speeds decrease, cut quality deteriorates, cutting thickness capability decreases, and the life for consumables shortens.

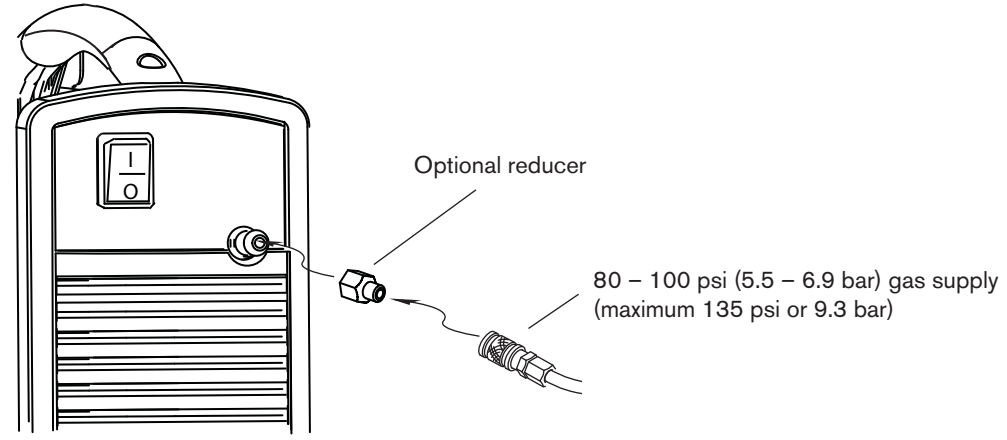
WARNING

Do not allow the gas supply pressure to exceed 135 psi (9.3 bar). The filter bowl may explode if this pressure is exceeded.

Connection

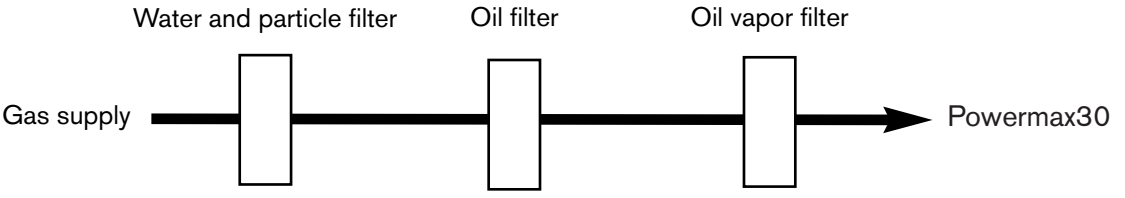
Connect the gas supply to the system using an inert gas hose with a 3/8 inch (9.5 mm) internal diameter and a 1/4 NPT quick-disconnect coupler. The Powermax30 consumables kit includes a 1/4 FPT x 1/8 NPT air fitting reducer as well.

Caution: **Synthetic lubricants containing esters that are used in some air compressors will damage polycarbonates used in the air regulator bowl.**



Additional gas filtration

When site conditions introduce moisture, oil or other contaminants into the gas line, use a three-stage coalescing filtration system, such as the Eliminizer filter kit (part number 128647) available from Hypertherm distributors. A three-stage filtering system works as shown below to clean contaminants from the gas supply.



The filtering system should be installed between the 1/4 NPT quick-disconnect coupler and the power supply.

Section 4

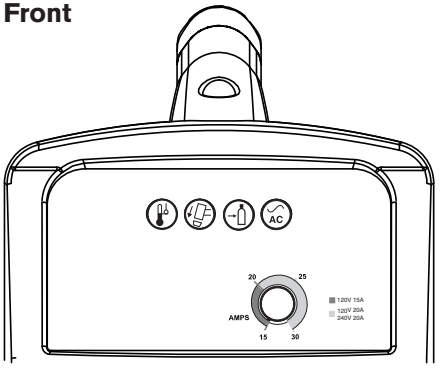
OPERATION

In this section:

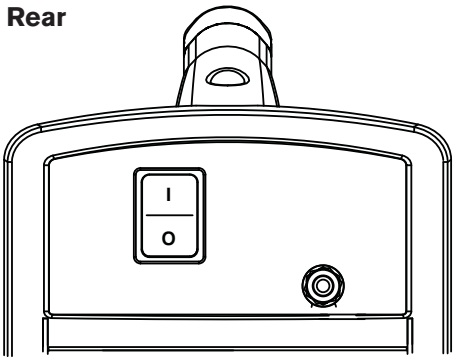
Controls and indicators

The Powermax30 has an ON/OFF rocker switch, an amperage adjustment knob and 4 indicator lights, which are described below.

Front



Rear



Front controls and LEDs

Power ON LED (green)
When illuminated, this LED indicates that the power switch has been set at I (ON) and that the safety interlocks are satisfied.

Gas pressure LED (yellow)
When illuminated, this LED indicates that the gas pressure is below 40 psi (2.8 bar). Correct this condition before you continue.

Torch cap LED (yellow)
When illuminated, this LED indicates that the consumables are loose, improperly installed, or missing.

Temperature LED (yellow)
When illuminated, this LED indicates that the power supply temperature is outside the acceptable operating range.

Amps adjustment knob
Use this knob to set the output current between 15 and 30 amps.

Some fault conditions will cause one or more of the LEDs to blink. For information on what these fault conditions are and how to correct them, see *Basic troubleshooting* in Section 5.

Rear controls

ON (I)/OFF (O) power switch
Activates the power supply and its control circuits.

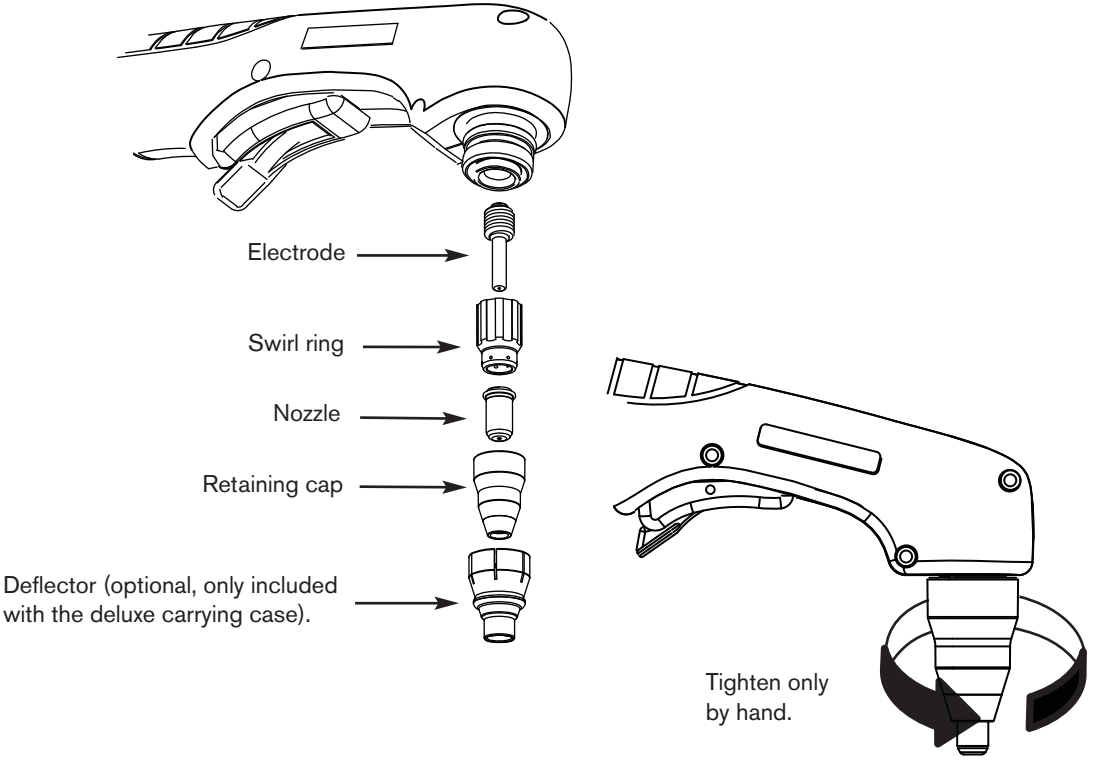
Install the consumables

WARNING
INSTANT-ON TORCHES
PLASMA ARC CAN CAUSE INJURY AND BURNS

The plasma arc comes on immediately when the torch trigger is activated. Make sure the power is OFF before changing consumables.

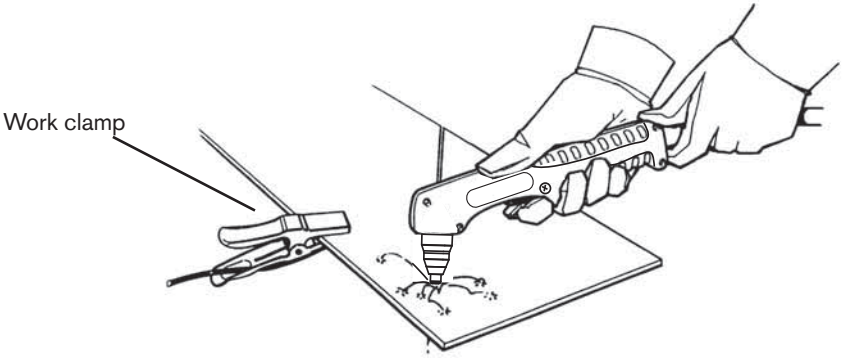
To operate the T30v torch, it must have a complete set of consumable parts installed: a retaining cap, nozzle, swirl ring and electrode. You may also use an optional deflector.

With the power switch in the OFF (O) position, verify that the torch consumables are installed as shown.



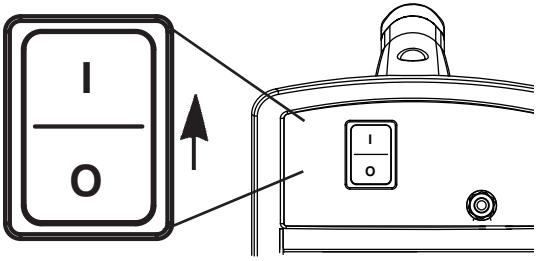
Attach the work clamp

The work clamp must be attached to the workpiece while you are cutting. Ensure that the work clamp and the workpiece make good metal-to-metal contact. Attach the work clamp as close as possible to the area being cut to reduce exposure to electric and magnetic fields (EMF). **Do not attach the work clamp to the portion of the workpiece to be cut away.**

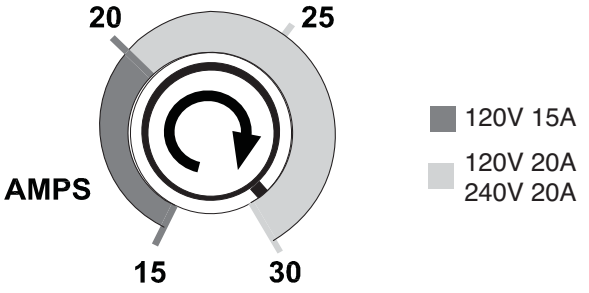


Power ON the system

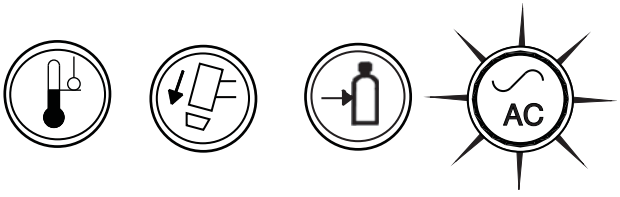
1. Set the ON/OFF rocker switch to the ON (I) position.



2. Adjust the amps knob to the desired cutting current based on the input voltage and circuit size. To operate your Powermax30 system on a 120-volt, 15-amp circuit, do not set the amps higher than 20 (the dark gray part of the dial). See *Section 3, Voltage configurations*, for more information.



3. Verify that the green power ON LED on the front of the power supply is illuminated and that none of the other LEDs are illuminated. If the gas pressure, temperature, or cap sensor LEDs are illuminated or blinking, correct the fault condition before continuing. See *Basic troubleshooting* in Section 5, for more information.



When the power ON LED is illuminated, none of the other LEDs are illuminated or blinking, and the amperage knob is set, the system is ready for use.

Hand torch operation

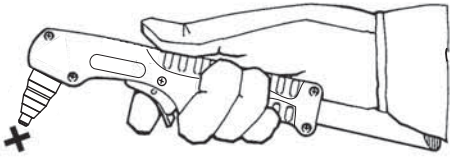
WARNING
INSTANT-ON TORCHES
PLASMA ARC CAN CAUSE INJURY AND BURNS

Plasma arc comes on immediately when the torch trigger is activated.
The plasma arc will cut quickly through gloves and skin.
- **Keep away from the torch tip.**
- **Do not hold the workpiece and keep your hands clear of the cutting path.**
- **Never point the torch toward yourself or others.**

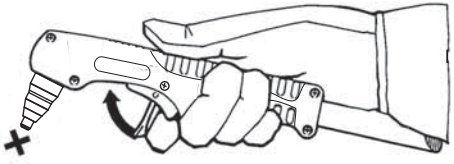
Safety trigger operation

The Powermax30 is equipped with a safety trigger to prevent accidental firings. When you are ready to cut with the torch, flip the yellow safety trigger forward (toward the torch head) and press the torch trigger as show below.

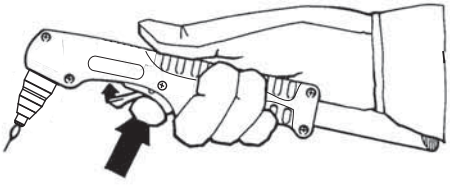
①



②

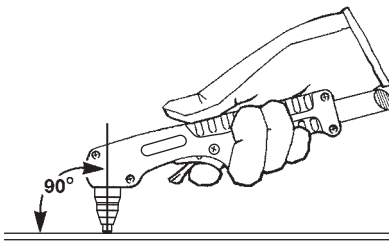


③



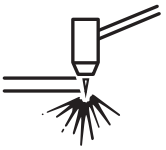
Hand torch cutting hints

- Drag the nozzle lightly along the workpiece.
- While cutting, make sure that sparks are exiting from the bottom of the workpiece.
- If sparks are spraying up from the workpiece, move the torch more slowly, or set the output current higher.
- Hold the torch nozzle perpendicular to the workpiece so that the nozzle is at a 90° angle to the cutting surface and watch the arc as it cuts along the line.

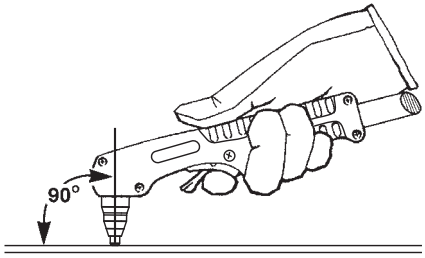


- If you fire the torch unnecessarily, you shorten the life of the nozzle and electrode.
- Pulling the torch along the cut is easier than pushing it.
- For straight-line cuts, use a straight edge as a guide. To cut circles, use a template or a radius cutter attachment (a circle cutting guide).

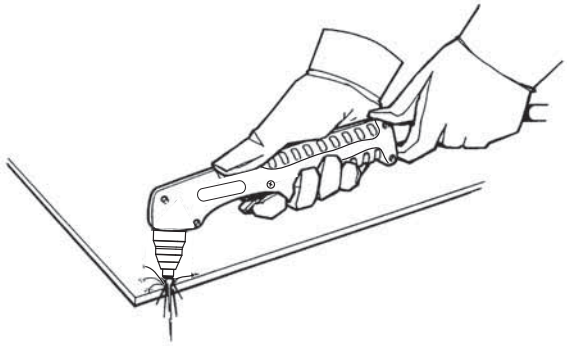
To start a cut from the edge of the workpiece



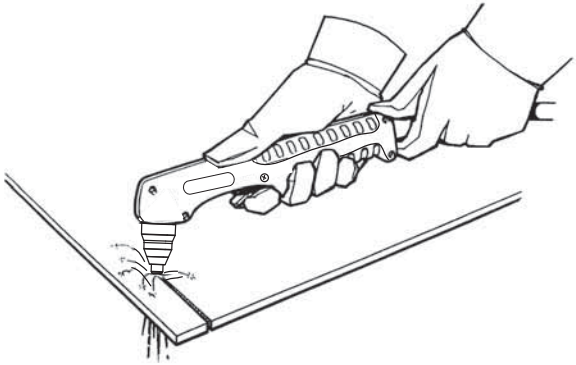
1. With the work clamp attached to the workpiece, hold the torch nozzle perpendicular to the edge of the workpiece.



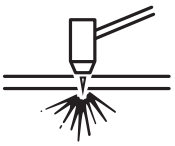
2. Press the torch trigger to start the arc. Pause at the edge until the arc has cut completely through the workpiece.



3. Drag the nozzle lightly across the workpiece to proceed with the cut.



To pierce a workpiece

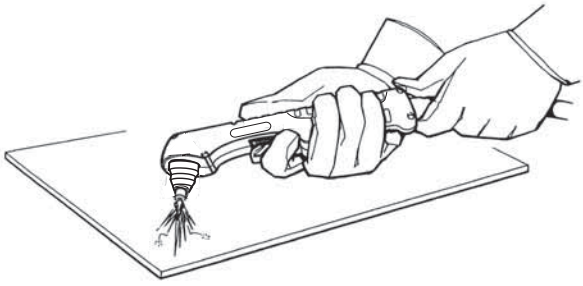


WARNING

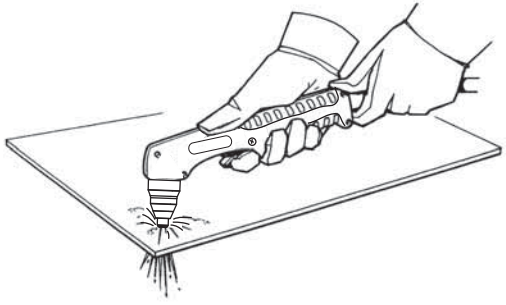
KSPARKS AND HOT METAL CAN INJURE EYES AND BURN SKIN. When firing the torch at an angle, sparks and hot metal will spray out from the nozzle. Point the torch away from yourself and others.

1. With the work clamp attached to the workpiece, hold the torch at an angle to the workpiece with the nozzle within 1/16 inch (1.5 mm) of it before firing the torch.

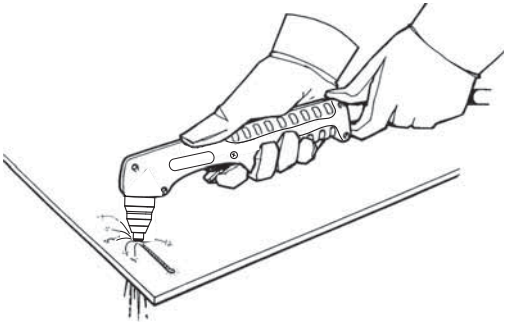
2. Fire the torch while still at an angle to the workpiece, then slowly rotate the torch to a perpendicular (90°) position.



3. Hold the torch in place. When sparks exit from the bottom of the workpiece, the arc has pierced the material.

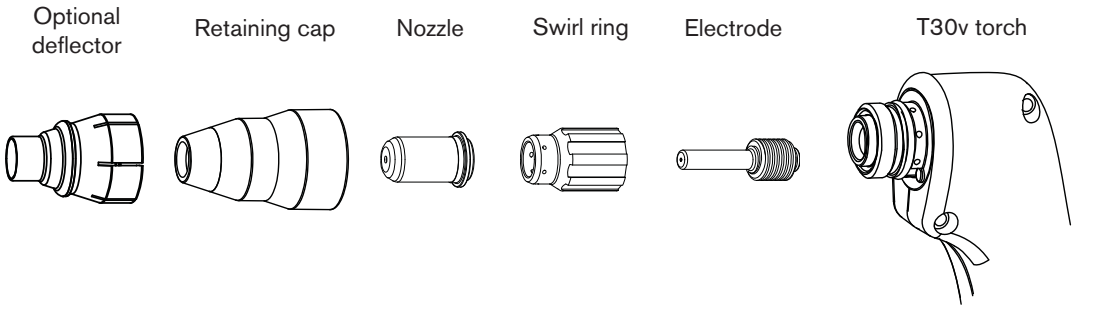


4. When the pierce is complete, drag the nozzle lightly along the workpiece to proceed with the cut.



Cut chart

The cut chart below is based on the use of 30-amp standard consumables and drag cutting.



Material thickness		Material	Arc current (A)	Maximum cutting speed	
gauge or inches	millimeters			inches per minute	millimeters per minute
18 ga.	1,3	Mild steel	30	394	10007
10 ga.	3,4	Mild steel	30	87	2210
3/16"	4,8	Mild steel	30	52	1321
1/4"	6,0	Mild steel	30	33	838
3/8"	9,0	Mild steel	30	15	381
18 ga.	1,3	Stainless steel	30	221	5613
10 ga.	3,4	Stainless steel	30	55	1397
1/4"	6,0	Stainless steel	30	24	610
3/8"	9,0	Stainless steel	30	11	279
18 ga.	1,3	Aluminum	30	399	10135
10 ga.	3,4	Aluminum	30	78	1981
1/4"	6,0	Aluminum	30	26	660
3/8"	9,0	Aluminum	30	11	279

* To cut material thicker than 1/4 inch (6 mm), start torch at edge of material.

Duty cycle and overheating

The duty cycle is the amount of time, in minutes, that a plasma arc can remain on within a 10-minute period when operating at an ambient temperature of 104° F (40° C). With a 120 V input:

- At 30 A, the arc can remain on for 3.5 minutes out of 10 minutes without causing the unit to overheat (35% duty cycle).
- At 23 A, the arc can remain on for 6 minutes out of 10 (60%).
- At 18 A, the arc can remain on for 10 minutes (100%).

With a 200-240 V input:

- At 30 A, the arc can remain on for 5 minutes out of 10 (50% duty cycle).
- At 24 A, the arc can remain on for 7.5 minutes out of 10 (75%).
- At 21 A, the arc can remain on for 10 minutes (100%).

If the power supply overheats because the duty cycle is exceeded, the temperature LED will illuminate, the arc will shut off, and the cooling fan will continue to run. To resume cutting, wait for the temperature LED to extinguish.

Common cutting faults

The torch does not cut completely through the workpiece. The causes can be:

- The cut speed is too fast.
- The consumables are worn.
- The metal being cut is too thick.
- The work clamp is not attached properly to the workpiece.

The arc sputters and consumables life is shorter than expected. The cause can be:

- Moisture in the gas supply.

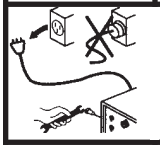
Section 5

MAINTENANCE AND PARTS

In this section:

Routine maintenance

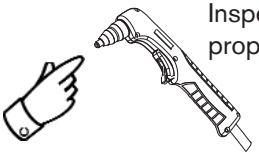

DANGER
ELECTRIC SHOCK CAN KILL



Disconnect the electrical power before you perform any maintenance. All work that requires removal of the power supply cover must be performed by a qualified technician.

Every use:

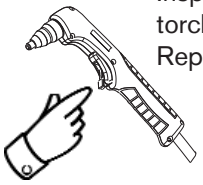
Check the indicator lights and correct any fault conditions.



Inspect the consumables for proper installation and wear.

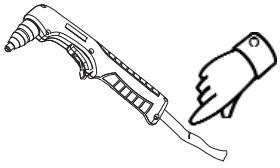
Every 3 months:

Replace any damaged labels.



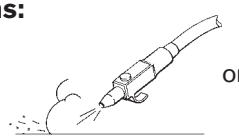
Inspect the trigger for damage. Inspect the torch body for cracks and exposed wires. Replace any damaged parts.

Inspect the power cord and plug. Replace if damaged.

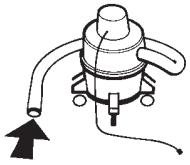


Inspect the torch lead. Replace if damaged.

Every 6 months:

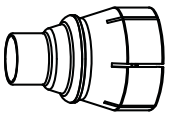
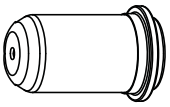
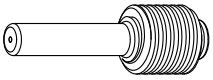
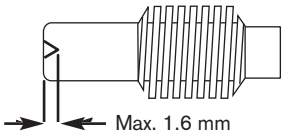
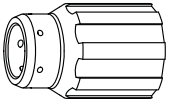


or



Clean the inside of the power supply with compressed air or a vacuum.

Inspect the consumables

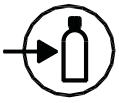
Part		Inspect	Action
	Deflector	The center hole for roundness. The gap between the deflector and the nozzle for accumulated debris.	Replace the deflector if the hole is no longer round. Remove the deflector and clean any material away.
	Nozzle	The center hole for roundness.  Good Worn	Replace if the center hole is not round.
	Electrode	The center surface for wear and verify the pit depth.	Replace if the surface is worn or the pit depth is greater than 1/16 inch (1.6 mm) deep. 
	Swirl ring	The internal surface for damage or wear and the gas holes for blockages.	Replace if the surface is damaged or worn or any of the gas holes are blocked.
	Torch o-ring	The surface for damage, wear, or a lack of lubrication.	If the o-ring is dry, lubricate it with a thin layer of silicone lubricant. If it is cracked or worn, replace it.

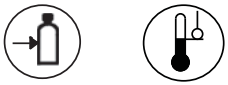
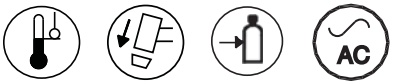
Basic troubleshooting

The following table provides an overview of the most common problems that may arise when using the Powermax30 and explains how to solve them.

If you are unable to fix the problem by following this basic troubleshooting guide or if you need further assistance:

1. Call your Hypertherm distributor or authorized Hypertherm repair facility.
2. Call nearest Hypertherm office listed in the front of this manual.

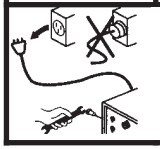
Problem	Solution
The ON/OFF power switch is set to ON (I), but the power ON LED is not illuminated.	• Verify that the power cord is plugged into the receptacle. • Verify that the power is on at the main power panel or at the disconnect-power switch box.
The power ON LED is illuminated and the gas pressure LED is illuminated. 	• Verify that the gas is turned on and the gas supply line is connected to the power supply. • Inspect the gas supply line for leaks and verify the incoming gas pressure.
The power ON LED is blinking.	• The input line voltage has a variance that is greater than ±15% of the rated voltage. Have an electrical technician check the incoming power. See *Section 2, Specifications*, for more information.
The power ON LED is illuminated and the temperature LED is illuminated. 	• Leave the power supply on to allow the fan to cool the power supply. • If the internal temperature of the power supply approaches -22° F (-30° C), the temperature LED may light. Move the power supply to a warmer location.

Problem	Solution
The power ON LED is illuminated and the torch cap LED is illuminated or blinks. 	• Turn OFF the power supply and tighten or install the consumables. See *Section 4*, *Install the consumables*. If the consumables become loose or were removed while the power supply is ON, turn OFF the power supply, correct the problem and then turn ON the power supply to clear this fault.
The gas pressure and temperature LEDs blink when the system is powered on. 	• If the power supply is turned on while the torch trigger is pressed, the system will be disabled. Release the trigger and restart the power supply.
All LEDs blink when the system is powered on or the torch is fired several times in succession. 	• All LEDs blinking indicates a major fault. A qualified service technician must service the system. Contact your distributor or use the information in the front of this book to contact Hypertherm Technical Service. Note: Using a generator with a Powermax30 system that has a serial number below 30-003132 can cause the LEDs to blink if the generator delivers a higher than normal voltage. To correct the fault, disconnect the Powermax30 from the generator and check the generator's voltage regulator.
The arc does not transfer to the workpiece.	• Clean the area where the clamp contacts the workpiece to ensure a good metal-to-metal connection. • Inspect the work clamp for damage and repair it if necessary. • The torch may be too far away from the workpiece. Move the torch closer to the workpiece and fire the torch again. See *Section 4*, *Hand torch operation*.

Problem	Solution
The arc blows out, but re-ignites when the torch trigger is pressed again.	• Inspect and replace the consumable parts if they are worn or damaged. See *Inspect the consumables*, in this section. • Replace the gas filter element inside the power supply if it is contaminated. See *Replace the air filter element,* in this section.
The arc sputters and hisses.	• The gas filter element inside the power supply is contaminated. Replace the element – See *Replace the air filter element,* in this section. • Inspect the gas line for water. If necessary, install or repair the gas filtration to the power supply. See *Section 3*, *Gas supply*.
The cut quality is poor.	• Verify that the torch is being used correctly. See *Section 4*, *Hand torch operation*. • Inspect the consumables for wear and replace as necessary. See *Inspect the consumables,* in this section.

Repairs

DANGER
ELECTRIC SHOCK CAN KILL



Disconnect electrical power before performing any maintenance. All work requiring removal of the power supply cover must be performed by a qualified technician.

Remove and replace the cover and Nomex® barrier

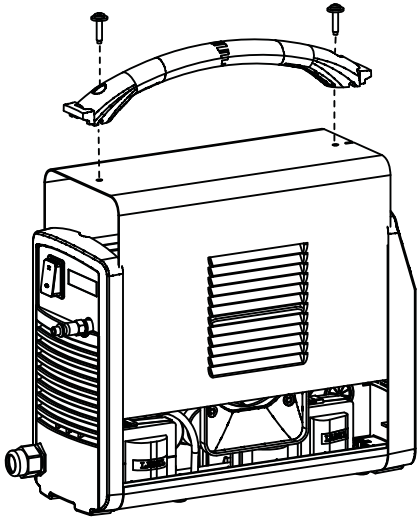
The first step in most maintenance and repair procedures for the Powermax30 is removing the cover and the Nomex barrier. To protect your power supply, it is important to replace both items properly when the maintenance is complete.

Removal

1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Use a #2 Phillips screwdriver to remove the 2 screws from the handle on the top of the power supply. Tip the endcaps back slightly so that you can get the edges of the handle out from underneath the endcaps. Set the handle screws aside and then lift the cover off the power supply.

3. Remove the Nomex barrier from the power board side of the power supply.



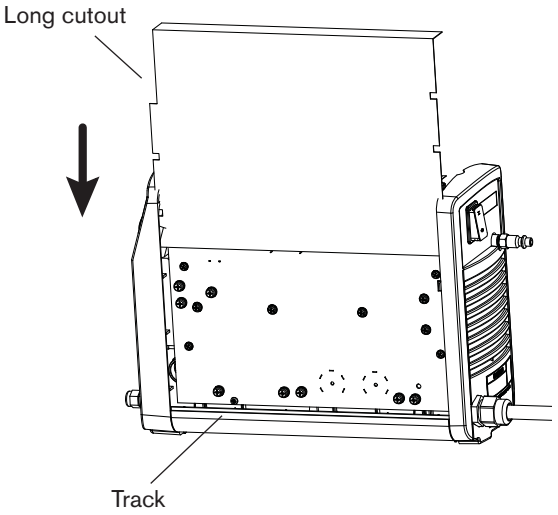
Replacement

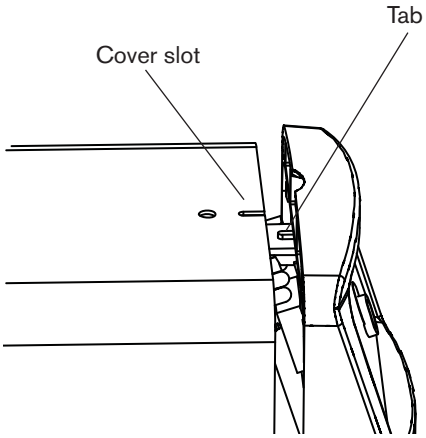
1. Hold the Nomex barrier so that the edge with the long cutout and 2 small notches is on the left and the edge with 3 notches is on the right.

2. There is a perforation across the top, about 1inch down from the top edge. If you are replacing the Nomex barrier with a new one, you will need to fold it along this perforation so that the top edge bends away from you.

3. Position the barrier so that the edge with the long cutout is toward the front (torch end) of the power supply. Slide the barrier into place with the bottom edge in the same track the cover rests in. The notches on each edge of the barrier should align with the ribs on the inside of the endcaps.

4. Being careful not to pinch any of the wires, slide the cover back onto the power supply. Make sure that the bottom edges are in the tracks and that the slot in the top of the cover lines up with the tab on the front endcap. . Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.





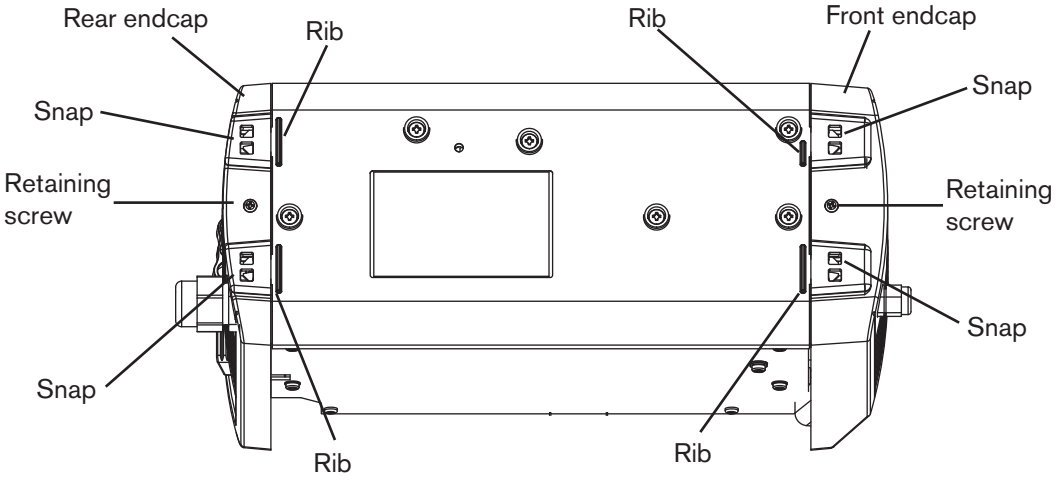
Remove an endcap

Endcaps can be removed to replace them. Also some repairs are easier to make with an endcap removed.

1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Remove the cover and the Nomex barrier.

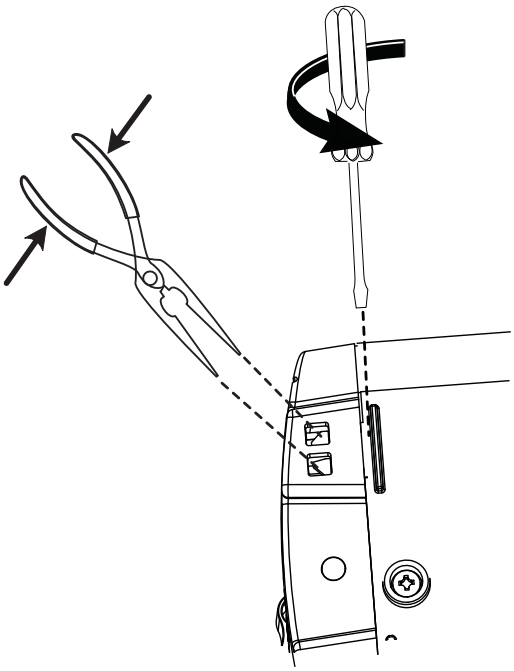
3. Lay the power supply on its side on a workbench or hold it upside down. The raised feet on the bottom of the unit have holes to provide access to the snaps that hold the endcaps in place. Next to each foot is a raised rib.



4. Remove the retaining screw from the bottom of the endcap.

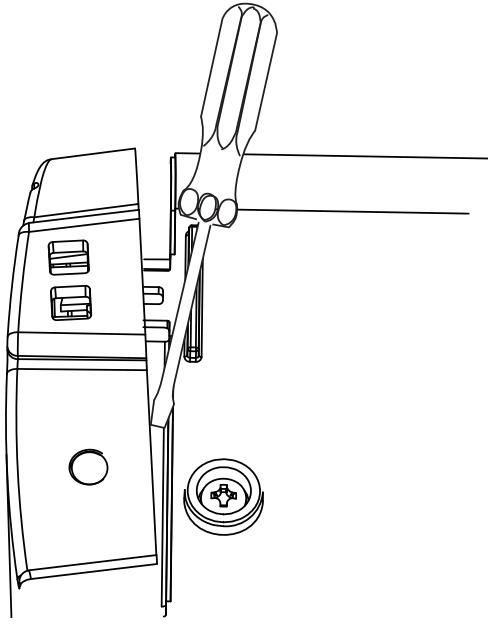
5. There are snaps on either side of each endcap that hold the endcaps in place. Insert needlenose pliers into the opening for one of the snaps and use the pliers to squeeze it together.

6. Place a flat-head screwdriver against the raised rib next to the snap and gently turn the screwdriver to push the endcap away from the base.



7. Place another screwdriver or similar object into the opening between the endcap and the base to keep the first corner of the endcap from returning to its original position when you release the other corner.

8. Repeat steps 5 and 6 on the other corner of the endcap.



9. To replace the endcap, push it into the base to re-engage the snaps and then replace the retaining screw.

10. Replace the Nomex barrier and slide the cover back onto the power supply.

11. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.

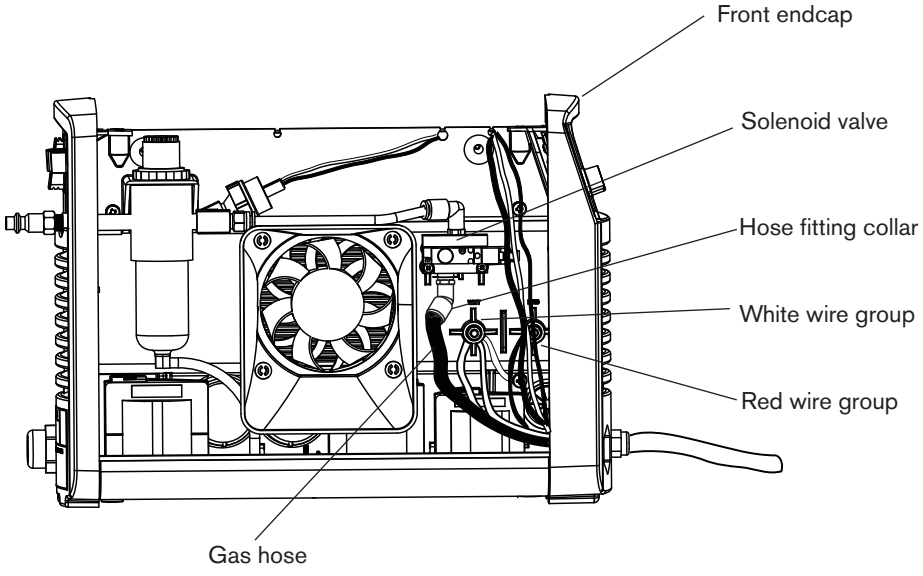
12. Reconnect the electrical power and the gas supply.

Disconnect the torch lead

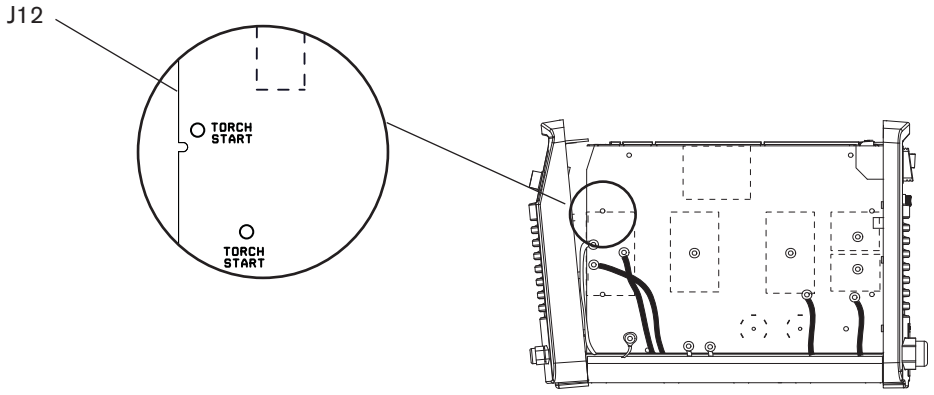
1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Remove the cover and remove the Nomex® barrier from in front of the power board.

3. Compress the hose fitting collar and pull the hose from the fitting to remove the gas hose from the solenoid valve.



4. Carefully tilt the front endcap away from the power supply. The orange, blue, and purple wires from the torch lead are connected to the power board with a 3-pin connector at J12. Remove the connector from the power supply by pulling it toward the front of the power supply.



5. The white wire group and the red wire from the torch lead are secured to studs in the power supply's center panel. Use a 5/16" (8mm) nut driver to remove the nuts from the studs and slide the ring terminals off the studs.

6. Unscrew the torch lead's strain relief from the front of the power supply and then remove the torch lead.

7. To reconnect the torch lead, route the wires and the gas supply line for the torch lead through the hole in the front of the power supply.

8. Push the torch gas supply hose into the fitting on the bottom of the solenoid valve. The hose goes in approximately .65" (16 mm).

9. Slide the ring terminal for the white wire group over the left stud (labeled "wht" on the center panel). Slide the ring terminal for the red wire onto the stud on the right (labeled "red" on the center panel). Tighten the nuts onto the studs.

10. Thread the orange, blue, and purple wire group over the center panel with the wires resting in the notch in the panel. Tip the endcap away from the power supply and press the connector into the slot on the power board.

11. Tighten the torch lead's strain relief onto the power supply by screwing it into place and reposition the endcap.

12. Replace the Nomex barrier and slide the cover back onto the power supply. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.

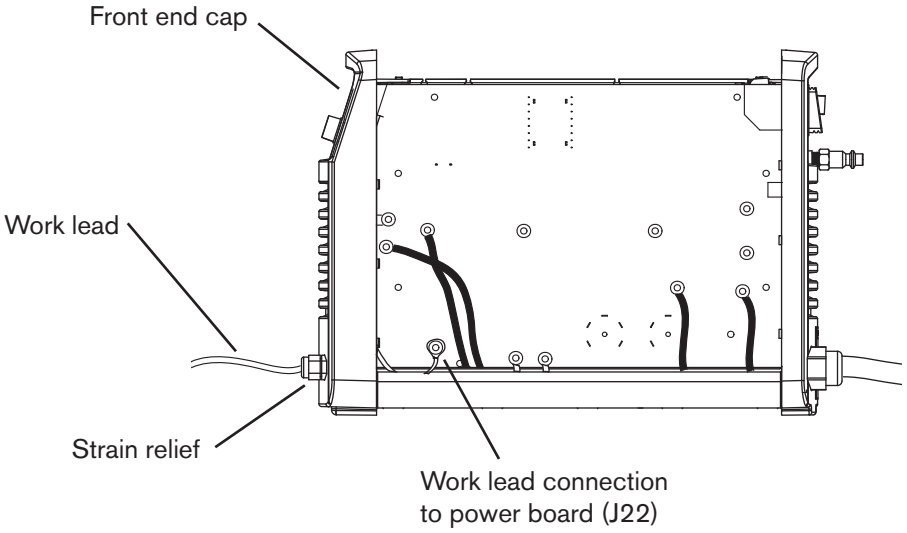
13. Reconnect the electrical power and the gas supply.

Replace the work lead

1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Remove the cover from the power supply and remove the Nomex barrier from in front of the power board.

3. Remove the screw and washer from J22 on the powerboard (also labeled “work lead”) that attaches the lead to the board. Set the screw and washer aside.



4. Either remove the front endcap or gently tilt it away from the power supply. From the inside of the endcap, unscrew the nut that secures the strain relief to the endcap.

5. The work lead may be knotted to adjust the length of the wire inside the power supply. If so, untie the knot and then thread the work lead through the opening in the end cap.

6. Thread the connector end of the new work lead through the end cap and fit the strain relief into the hole in the front endcap. Unscrew the strain relief to loosen it if you need to adjust the amount of work lead on either side of it.

7. Slide the nut over the work lead connector. Gently tilt the end cap away from the power supply and screw the nut onto the strain relief.

8. Attach the work lead to the power board at J22 using the screw and washer that you removed earlier. The torque setting for this connection is 20 inch-pounds (1.4 kg cm)

9. Replace or realign the end cap.

10. Replace the Nomex barrier and slide the cover back onto the power supply. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.

11. Reconnect the electrical power and the gas supply.

Replace the power cord (CSA)

1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

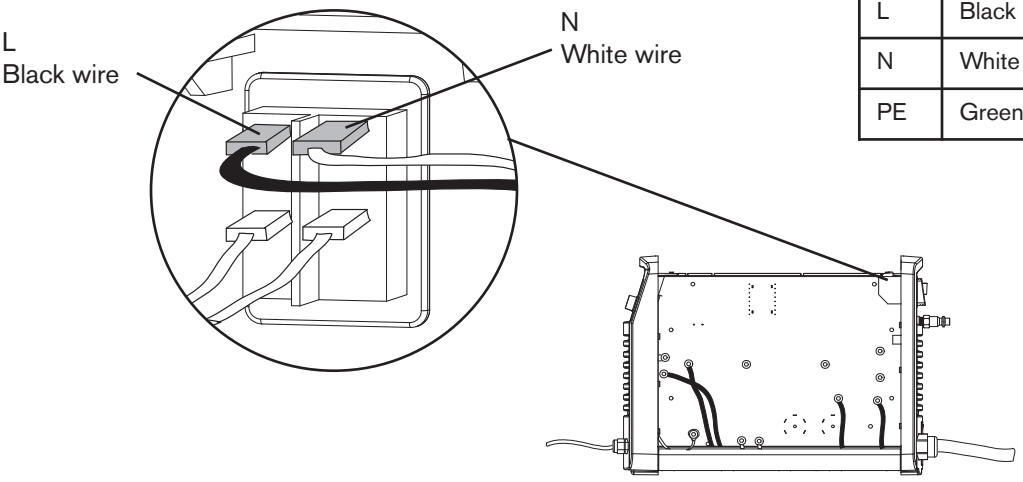
2. Remove the cover from the power supply and remove the Nomex barrier from in front of the power board.

3. Remove the rear endcap.

4. The power cord has a black wire and a white wire that connect to the power switch and a green ground wire that connects to the heatsink.

   Carefully pull the connector for the white wire away from the power switch to disconnect it. You can use needlenose pliers or a straight screwdriver to ease it out, if necessary.

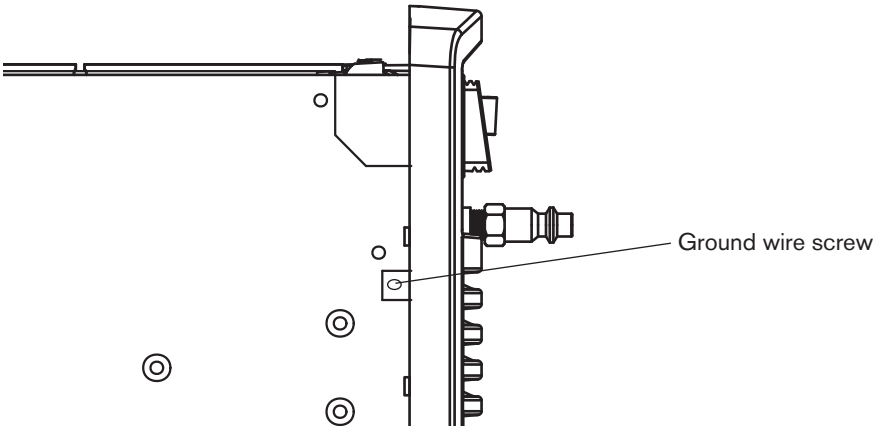
5. Remove the black wire the same way.



Single phase

L	Black
N	White
PE	Green

6. Remove the screw that holds the green wire to the heatsink. There is a notch in the powerboard to provide easier access to the screw.



7. On the outside of the power supply loosen the strain relief retention nut so that the wires move freely. If you are replacing the strain relief, unscrew the nut on the inside of the power supply as well.

8. Pull the wires through the hole in the endcap to remove the old power cord.

9. If you have a new strain relief, slide it onto the new power cord and thread the wires for the new power cord through the hole in the endcap. If the old strain relief is still in place, thread the wires through the strain relief.

10. Slide the strain relief's nut over the wires and screw it to the strain relief from the inside of the endcap.

11. Press the connector for the black wire onto the pin on the upper left side of the power switch.

12. Press the connector for the white wire onto the pin on the upper right side of the power switch.

13. Screw the green ground wire to the heatsink with a torque setting of 15 inch-pounds (17.28 kg cm).

14. Position the wires in the wire chase up the side of the endcap and out of the way of the power board. Once the wires are in place, tighten the strain relief's retention nut on the outside of the endcap.

15. Replace the endcap.

16. Replace the Nomex barrier and slide the cover back onto the power supply. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.

17. Reconnect the electrical power and the gas supply.

Replace the power cord (CE)

1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Remove the cover from the power supply and remove the Nomex barrier from in front of the power board.

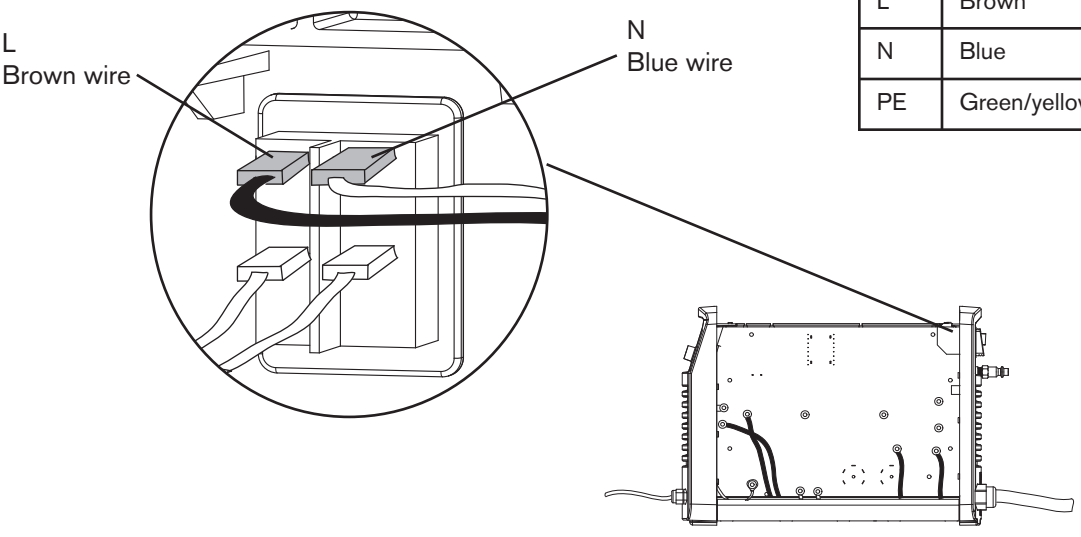
3. Remove the rear endcap.

4. The power cord has a brown wire and a blue wire that connect to the power switch and a green and yellow ground wire that connects to the heatsink.

   Carefully pull the connector for the blue wire away from the power switch to disconnect it. You can use needlenose pliers or a straight screwdriver to ease it out, if necessary.

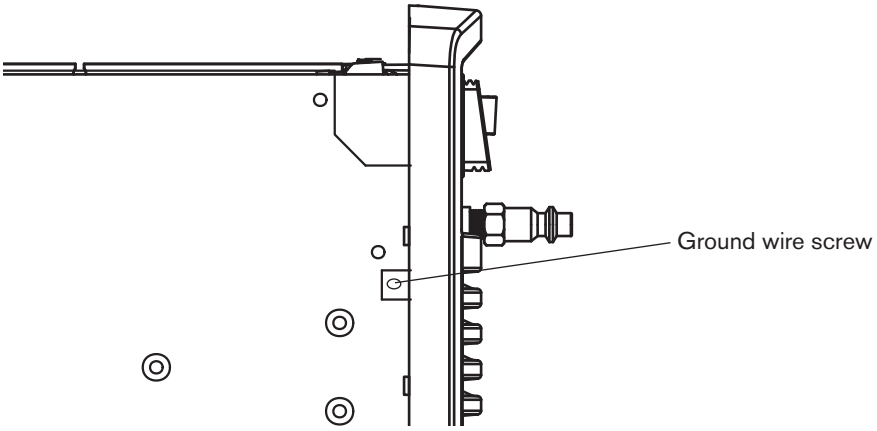
Single phase

L	Brown
N	Blue
PE	Green/yellow



5. Remove the brown wire the same way.

6. Remove the screw that holds the green and yellow ground wire to the heatsink. There is a notch in the powerboard to provide easier access to the screw.



7. On the outside of the power supply, loosen the strain relief retention nut so that the wires move freely. If you are replacing the strain relief, unscrew the nut on the inside of the power supply as well.

8. Remove the plug from the old power cord.

9. From the inside of the power supply, pull the wires through the strain relief and the hole in the endcap to remove the old power cord.

10. Route the plug wires of the new power cord through the strain relief and then through the hole in the endcap. Do not remove the tubular ferrite bead from the power switch end of brown and blue wires.

11. If you are replacing the strain relief, slide the new one onto the new power cord. On the inside of the endcap, screw the nut onto the strain relief.

12. Press the connector for the brown wire onto the pin on the upper left side of the power switch.

13. Press the connector for the blue wire onto the pin on the upper right side of the power switch.

14. Screw the green and yellow ground wire to the heatsink with a torque setting of 15 inch-pounds (17.28 kg cm).

15. Position the wires in the wire chase up the side of the endcap and out of the way of the power board.

16. Line up the end of the power cord's rubber casing with the inside edge of the strain relief. Tighten the strain relief retention nut on the outside of the endcap.

17. Replace the endcap.

18. Replace the Nomex barrier and slide the cover back onto the power supply. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.

19. Reconnect the electrical power and the gas supply.

Replace the air filter element

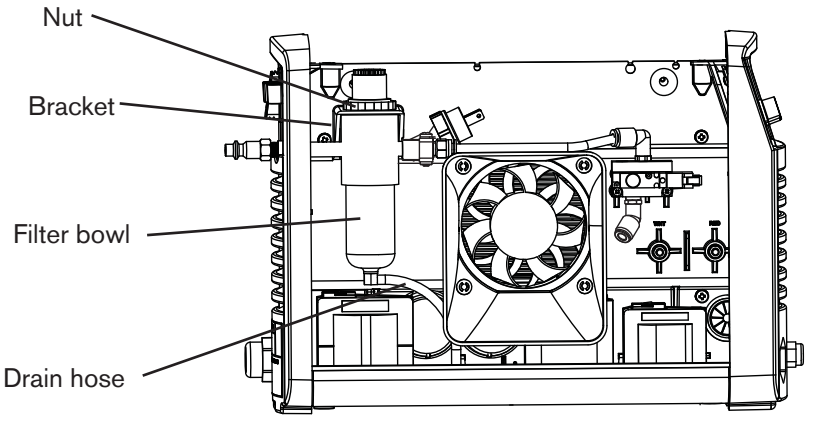
1. Turn OFF the power, disconnect the power cord, and disconnect the gas supply.

2. Remove the cover from the power supply.

3. Remove the drain hose from the hole in the bottom of the power supply's base.

4. Unscrew the nut that holds the air filter in the bracket. Tip the bottom of the air filter away from the power supply.

5. Unscrew the filter bowl from the body and remove it.



6. Unscrew the element from the filter body while being careful not to allow the element to rotate.
7. Screw the new element to the filter body.
8. Reattach the filter bowl.
9. Reposition the air filter assembly in the bracket and replace its retainer nut.
10. Reconnect the gas supply to check for leaks.
11. Slide the cover back onto the power supply. Position the handle over the holes in the top of the cover, then use the 2 screws to secure the cover.
12. Reconnect the electrical power and the gas supply.

Replacement and accessory parts

The following sections list part numbers and quantities needed for common replacement parts for the Powermax30.

Power cords and adapters

Part number	Description	Quantity
228142	Kit: Powermax30 CSA power cord and adapters	1
229135	Powermax30 CSA power cord	1
229132	Extension power cord subassembly: 120V/15A adapter	1
229133	Extension power cord subassembly: 240V/20A adapter	1
229134	Extension power cord subassembly: 120V/20A adapter	1
228140	Kit: Powermax30 CE power cord	1

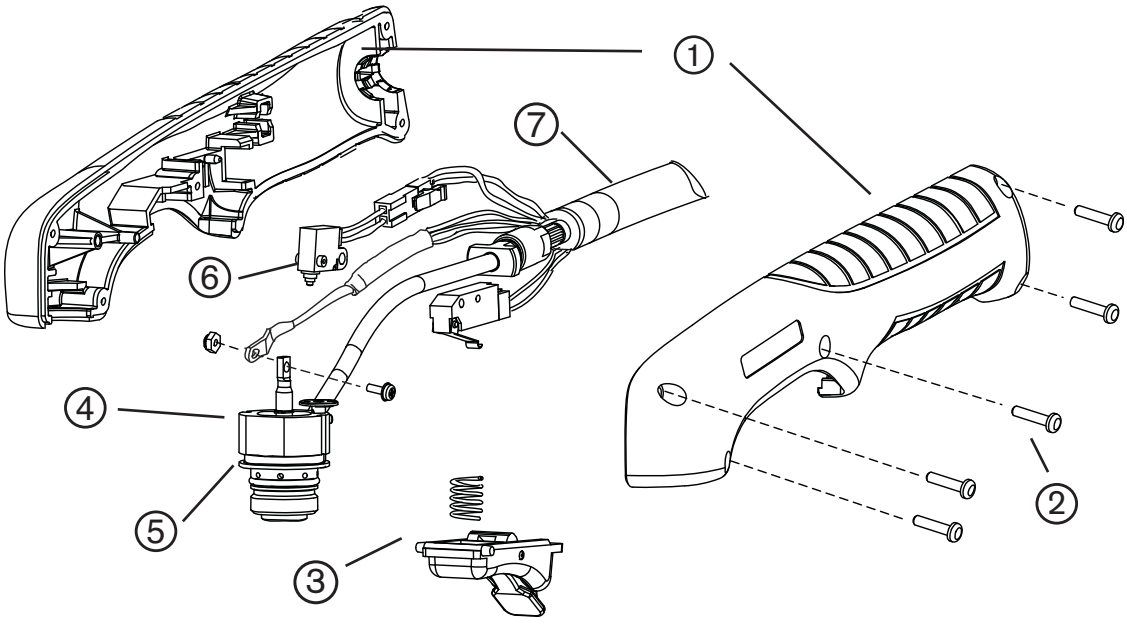
Accessory parts

Part number	Description
127102	Basic plasma cutting guide
027668	Deluxe plasma cutting guide
127144	Dust cover
127170	Carrying case
127217	Carry strap
128647	Air filtration kit

T30v hand torch assembly

Item	Part number	Description	Quantity
	088001*	T30v Hand Torch Assembly with 15 ft / 4.5 m Lead	
1	228111	Kit: Handle	1
2	075714	Screws, #4 x 1/2 SLTD Torx PAN, S/B	5
3	002244	Safety trigger and spring replacement	1
4	228110	Kit: torch head repair	1
5	058503	O-ring: Viton .626 x .070	1
6	228109	Kit: cap sensor replacement	1
7	228113	Kit: torch lead replacement, 15 ft / 4.5 m	1

* The torch assembly also includes one set of the consumables listed below.

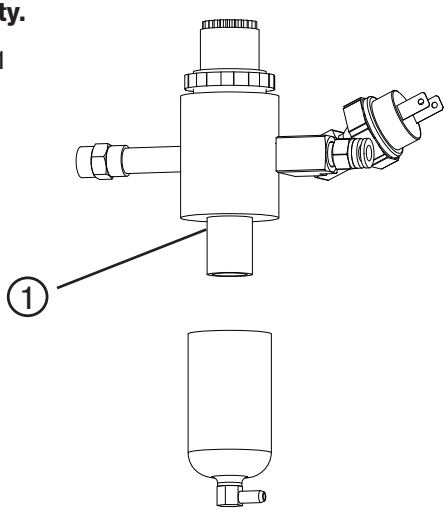


Consumables

Part number	Description	Quantity
220478	Electrode	1
220479	Swirl ring	1
220483	Retaining Cap	1
220480	Nozzle	1
220569	Deflector (optional)	1

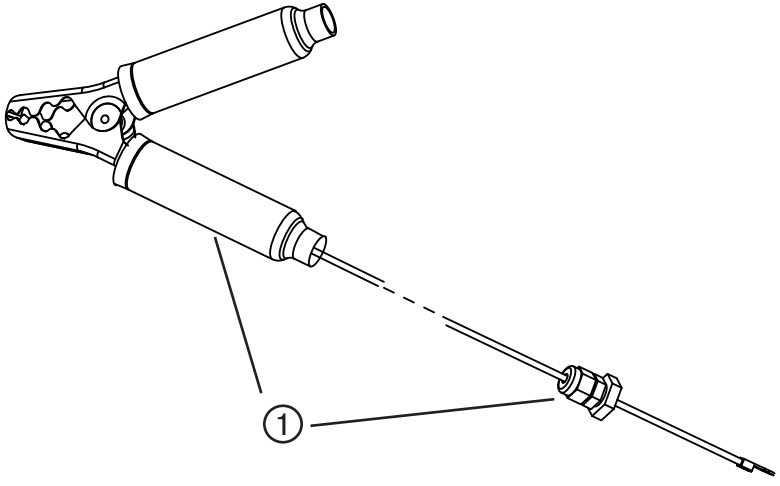
Filter regulator

Item	Part number	Description	Qty.
1	011106	Air filter element	1



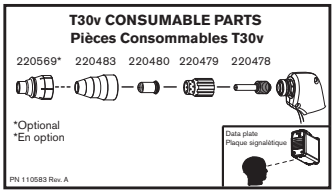
Work clamp

Item	Part number	Description	Qty.
1	123868	Work cable with clamp, 15 ft / 4.6 m	1

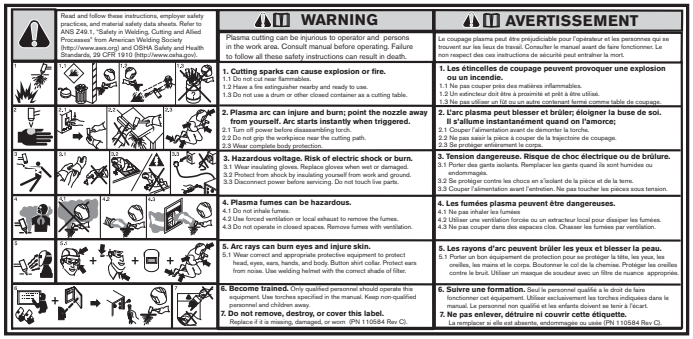


Powermax30 labels

Part number	Description
228097	Kit: Powermax30 labels, CE
228098	Kit: Powermax30 labels, CSA



110583



110584 .....CSA safety label

110261 .....CE safety label