

Model Advantage[®] HF
High Frequency Arc Starter

For the Following Specs:

- 7027 115 V, 60 Hz
- 7027A 115 V, 60 Hz



OWNER'S MANUAL Number **430429-255**
Revised December 1, 1997

IMPORTANT: Read these instructions before installing, operating, or servicing this system.

THERMAL ARC INC., TROY, OHIO 45373-1085, U.S.A.

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INTRODUCTION

How To Use This Manual

This Owner's Manual usually applies to just the underlined specification or part numbers listed on the cover. If none are underlined, they are all covered by this manual.

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

WARNING gives information regarding possible personal injury. Warnings will be enclosed in a box such as this.

CAUTION refers to possible equipment damage. Cautions will be shown in bold type.

NOTE offers helpful information concerning certain operating procedures. Notes will be shown in italics.

Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually

appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers for future reference.

Receipt Of Equipment

When you receive the equipment, check it against the invoice to make sure it is complete and inspect the equipment for possible damage due to shipping. If there is any damage, notify the carrier immediately to file a claim. Furnish complete information concerning damage claims or shipping errors to Thermal Arc, Order Department, 2200 Corporate Drive, Troy, Ohio 45373-1085. Include all equipment identification numbers as described above along with a full description of the parts in error.

Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

Additional copies of this manual may be purchased by contacting Thermal Arc at the address given above. Include the Owner's Manual number and equipment identification numbers.

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ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS

 WARNING	ARC WELDING can be hazardous.
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PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS KEEP AWAY UNTIL CONSULTING YOUR DOCTOR. DO NOT LOSE THESE INSTRUCTIONS. READ OPERATING/INSTRUCTION MANUAL BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.


Welding products and welding processes can cause serious injury or death, or damage to other equipment or property, if the operator does not strictly observe all safety rules and take precautionary actions.

Safe practices have developed from past experience in the use of welding and cutting. These practices must be learned through study and training before using this equipment. Anyone not having extensive training in welding and cutting practices should not attempt to weld. Certain of the practices apply to equipment connected to power lines; other practices apply to engine driven equipment.

Safe practices are outlined in the American National Standard Z49.1 entitled: **SAFETY IN WELDING AND CUTTING**. This publication and other guides to what you should learn before operating this equipment are listed at the end of these safety precautions.

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE, AND REPAIR WORK PERFORMED ONLY BY QUALIFIED PEOPLE.

	<p>ELECTRIC SHOCK can kill.</p> <p>Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.</p>	<ol style="list-style-type: none"> 6. Turn off all equipment when not in use. Disconnect power to equipment if it will be left unattended or out of service. 7. Use fully insulated electrode holders. Never dip holder in water to cool it or lay it down on the ground or the work surface. Do not touch holders connected to two welding machines at the same time or touch other people with the holder or electrode. 8. Do not use worn, damaged, undersized, or poorly spliced cables. 9. Do not wrap cables around your body. 10. Ground the workpiece to a good electrical (earth) ground. 11. Do not touch electrode while in contact with the work (ground) circuit. 12. Use only well-maintained equipment. Repair or replace damaged parts at once. 13. In confined spaces or damp locations, do not use a welder with AC output unless it is equipped with a voltage reducer. Use equipment with DC output. 14. Wear a safety harness to prevent falling if working above floor level. 15. Keep all panels and covers securely in place.
<ol style="list-style-type: none"> 1. Do not touch live electrical parts. 2. Wear dry, hole-free insulating gloves and body protection. 3. Insulate yourself from work and ground using dry insulating mats or covers. 4. Disconnect input power or stop engine before installing or servicing this equipment. Lock input power disconnect switch open, or remove line fuses so power cannot be turned on accidentally. 5. Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes. 		

	<p>ARC RAYS can burn eyes and skin; NOISE can damage hearing.</p> <p>Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.</p>	<ol style="list-style-type: none"> 1. Wear a welding helmet fitted with a proper shade of filter (see ANSI Z49.1 listed in Safety Standards) to protect your face and eyes when welding or watching. 2. Wear approved safety glasses. Side shields recommended. 3. Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc. 4. Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection. 5. Use approved ear plugs or ear muffs if noise level is high.
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Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.

Welding or Cutting Operation	Electrode Size Metal Thickness or Welding Current	Filter Shade No.	Welding or Cutting Operation	Electrode Size Metal Thickness or Welding Current	Filter Shade No.
Torch soldering	—	2	Gas metal-arc welding (MIG)		
Torch brazing	—	3 or 4	Non-ferrous base metal	All	11
Oxygen cutting			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding (TIG)	All	12
Medium	1 to 6 in., 25-150 mm	4 or 5	Atomic hydrogen welding	All	12
Heavy	Over 6 in., 150 mm	5 or 6	Carbon arc welding	All	12
Gas welding			Plasma arc welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Carbon arc air gouging		
Medium	1/8 to 1/2 in., 3-12 mm	5 or 6	Light		12
Heavy	Over 1/2 in., 12 mm	6 or 8	Heavy		14
Shielded metal-arc welding (stick) electrodes	Under 5/32 in., 4 mm	10	Plasma arc cutting		
	5/32 to 1/4 in., 4 to 6.4 mm	12	Light	Under 300 Amp	9
	Over 1/4 in., 6.4 mm	14	Medium	300 to 400 Amp	12
			Heavy	Over 400 Amp	14

ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS

Instruction 830001



FUMES AND GASES can be hazardous to your health.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

1. Keep your head out of the fumes. Do not breath the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.

4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.
6. Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
7. Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

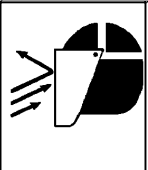


WELDING can cause fire or explosion.

Sparks and spatter fly off from the welding arc. The flying sparks and hot metal, weld spatter, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode or welding wire to metal objects can cause sparks, overheating, or fire.

1. Protect yourself and others from flying sparks and hot metal.
2. Do not weld where flying sparks can strike flammable material.
3. Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
4. Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.

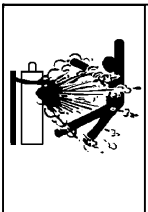
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
9. Do not use welder to thaw frozen pipes.
10. Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
11. Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.



FLYING SPARKS AND HOT METAL can cause injury.

Chipping and grinding cause flying metal. As welds cool, they can throw off slag.

1. Wear approved face shield or safety goggles. Side shields recommended.
2. Wear proper body protection to protect skin.



CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.

3. Keep cylinders away from any welding or other electrical circuits.
4. Never allow a welding electrode to touch any cylinder.
5. Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
6. Turn face away from valve outlet when opening cylinder valve.
7. Keep protective cap in place over valve except when cylinder is in use or connected for use.
8. Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.



WARNING

ENGINES can be hazardous.







ENGINE EXHAUST GASES can kill.

Engines produce harmful exhaust gases.

1. Use equipment outside in open, well-ventilated areas.
2. If used in a closed area, vent engine exhaust outside and away from any building air intakes.

ARC WELDING SAFETY INSTRUCTIONS AND WARNINGS
Instruction 830001

	<p>ENGINE FUEL can cause fire or explosion.</p> <p>Engine fuel is highly flammable.</p> <p>1. Stop engine before checking or adding fuel.</p>	<p>2. Do not add fuel while smoking or if unit is near any sparks or open flames.</p> <p>3. Allow engine to cool before fueling. If possible, check and add fuel to cold engine before beginning job.</p> <p>4. Do not overfill tank — allow room for fuel to expand.</p> <p>5. Do not spill fuel. If fuel is spilled, clean up before starting engine.</p>
	<p>MOVING PARTS can cause injury.</p> <p>Moving parts, such as fans, rotors, and belts can cut fingers and hands and catch loose clothing.</p> <p>1. Keep all doors, panels, covers, and guards closed and securely in place.</p> <p>2. Stop engine before installing or connecting unit.</p>	<p>3. Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.</p> <p>4. To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.</p> <p>5. Keep hands, hair, loose clothing, and tools away from moving parts.</p> <p>6. Reinstall panels or guards and close doors when servicing is finished and before starting engine.</p>
	<p>SPARKS can cause BATTERY GASES TO EXPLODE; BATTERY ACID can burn eyes and skin.</p> <p>Batteries contain acid and generate explosive gases.</p>	<p>1. Always wear a face shield when working on a battery.</p> <p>2. Stop engine before disconnecting or connecting battery cables.</p> <p>3. Do not allow tools to cause sparks when working on a battery.</p> <p>4. Do not use welder to charge batteries or jump start vehicles.</p> <p>5. Observe correct polarity (+ and -) on batteries.</p>
	<p>STEAM AND PRESSURIZED HOT COOLANT can burn face, eyes, and skin.</p> <p>The coolant in the radiator can be very hot and under pressure.</p>	<p>1. Do not remove radiator cap when engine is hot. Allow engine to cool.</p> <p>2. Wear gloves and put a rag over cap area when removing cap.</p> <p>3. Allow pressure to escape before completely removing cap.</p>

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Sec. 25249.5 et seq.)

NOTE: Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

The following is a quotation from the General Conclusions Section of the U.S. Congress, Office of Technology Assessment, Biological Effects of Power Frequency Electric & Magnetic Fields — Background Paper, OTA-BP-E-63 (Washington, DC: U.S. Government Printing Office, May 1989): "... there is now a very large volume of scientific findings based on experiments at the cellular level and from studies with animals and people which clearly establish that low frequency magnetic fields can interact with, and produce changes in, biological systems. While most of this work is of very high quality, the results are complex. Current scientific understanding does not yet allow us to interpret the evidence in a single coherent framework. Even more frustrating, it does not yet allow us to draw definite conclusions about questions of possible risk or to offer clear science-based advice on strategies to minimize or avoid potential risks."

To reduce magnetic fields in the workplace, use the following procedures:

- | | |
|---|---|
| 1. Keep cables close together by twisting or taping them. | 3. Do not coil or drape cables around the body. |
| 2. Arrange cables to one side and away from the operator. | 4. Keep welding power source and cables as far away from body as practical. |

About Pacemakers:

The above procedures are among those also normally recommended for pacemaker wearers. Consult your doctor for complete information.

PRINCIPAL SAFETY STANDARDS

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

Safe Practices for Occupation and Educational Eye and Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Cutting and Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

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PRECAUTIONS DE SECURITE EN SOUDAGE A L'ARC

MISE EN GARDE

LE SOUDAGE A L'ARC EST DANGEREUX

PROTEGEZ-VOUS, AINSI QUE LES AUTRES, CONTRE LES BLESSURES GRAVES POSSIBLES OU LA MORT. NE LAISSEZ PAS LES ENFANTS S'APPROCHER, NI LES PORTEURS DE STIMULATEUR CARDIAQUE (A MOINS QU'ILS N'AIENT CONSULTE UN MEDECIN). CONSERVEZ CES INSTRUCTIONS. LISEZ LE MANUEL D'OPERATION OU LES INSTRUCTIONS AVANT D'INSTALLER, UTILISER OU ENTREtenir CET EQUIPEMENT.

Les produits et procédés de soudage peuvent sauser des blessures graves ou la mort, de même que des dommages au reste du matériel et à la propriété, si l'utilisateur n'adhère pas strictement à toutes les règles de sécurité et ne prend pas les précautions nécessaires.

En soudage et coupage, des pratiques sécuritaires se sont développées suite à l'expérience passée. Ces pratiques doivent être apprises par étude ou entraînement avant d'utiliser l'équipement. Toute personne n'ayant pas suivi un entraînement intensif en soudage et coupage ne devrait pas tenter de souder. Certaines pratiques concernent les équipements raccordés aux lignes d'alimentation alors que d'autres s'adressent aux groupes électrogènes.

La norme Z49.1 de l'American National Standard, intitulée "SAFETY IN WELDING AND CUTTING" présente les pratiques sécuritaires à suivre. Ce document ainsi que d'autres guides que vous devriez connaître avant d'utiliser cet équipement sont présentés à la fin de ces instructions de sécurité.

SEULES DES PERSONNES QUALIFIEES DOIVENT FAIRE DES TRAVAUX D'INSTALLATION, DE REPARATION, D'ENTRETIEN ET D'ESSAI.



L'ELECTROCUTION PEUT ETRE MORTELLE.

Une décharge électrique peut tuer ou brûler gravement. L'électrode et le circuit de soudage sont sous tension dès la mise en circuit. Le circuit d'alimentation et les circuits internes de l'équipement sont aussi sous tension dès la mise en marche. En soudage automatique ou semi-automatique avec fil, ce dernier, le rouleau ou la bobine de fil, le logement des galets d'entraînement et toutes les pièces métalliques en contact avec le fil de soudage sont sous tension. Un équipement inadéquatement installé ou inadéquatement mis à la terre est dangereux.

1. Ne touchez pas à des pièces sous tension.
2. Portez des gants et des vêtements isolants, secs et non troués.
3. Isolez-vous de la pièce à souder et de la mise à la terre au moyen de tapis isolants ou autres.
4. Déconnectez la prise d'alimentation de l'équipement ou arrêtez le moteur avant de l'installer ou d'en faire l'entretien. Bloquez le commutateur en circuit ouvert ou enlevez les fusibles de l'alimentation afin d'éviter une mise en marche accidentelle.
5. Veuillez à installer cet équipement et à le mettre à la terre selon le manuel d'utilisation et les codes nationaux, provinciaux et locaux applicables.

6. Arrêtez tout équipement après usage. Coupez l'alimentation de l'équipement s'il est hors d'usage ou inutilisé.
7. N'utilisez que des porte-électrodes bien isolés. Ne jamais plonger les porte-électrodes dans l'eau pour les refroidir. Ne jamais les laisser traîner par terre ou sur les pièces à souder. Ne touchez pas aux porte-électrodes raccordés à deux sources de courant en même temps. Ne jamais toucher quelqu'un d'autre avec l'électrode ou le porte-électrode.
8. N'utilisez pas de câbles électriques usés, endommagés, mal épissés ou de section trop petite.
9. N'enroulez pas de câbles électriques autour de votre corps.
10. N'utilisez qu'une bonne prise de masse pour la mise à la terre de la pièce à souder.
11. Ne touchez pas à l'électrode lorsqu'en contact avec le circuit de soudage (terre).
12. N'utilisez que des équipements en bon état. Réparez ou remplacez aussitôt les pièces endommagées.
13. Dans des espaces confinés ou mouillés, n'utilisez pas de source de courant alternatif, à moins qu'il soit muni d'un réducteur de tension. Utilisez plutôt une source de courant continu.
14. Portez un harnais de sécurité si vous travaillez en hauteur.
15. Fermez solidement tous les panneaux et les capots.



LE RAYONNEMENT DE L'ARC PEUT BRÛLER LES YEUX ET LA PEAU; LE BRUIT PEUT ENDOMMAGER L'OUÏE.

L'arc de soudage produit une chaleur et des rayons ultraviolets intenses, susceptibles de brûler les yeux et la peau. Le bruit causé par certains procédés peut endommager l'ouïe.

1. Portez une casque de soudeur avec filtre oculaire de nuance appropriée (consultez la norme ANSI Z49 indiquée ci-après)

pour vous protéger le visage et les yeux lorsque vous soudez ou que vous observez l'exécution d'une soudure.

2. Portez des lunettes de sécurité approuvées. Des écrans latéraux sont recommandés.
3. Entourez l'aire de soudage de rideaux ou de cloisons pour protéger les autres des coups d'arc ou de l'éblouissement; avertissez les observateurs de ne pas regarder l'arc.
4. Portez des vêtements en matériaux ignifuges et durables (laine et cuir) et des chaussures de sécurité.
5. Portez un casque antibruit ou des bouchons d'oreille approuvés lorsque le niveau de bruit est élevé.

PRECAUTIONS DE SECURITE EN SOUDAGE A L'ARC
Instruction 830002

SELECTION DES NUANCES DE FILTRES OCULAIRES POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE
 (selon AWS A 8.2-73)

Opération de Coupage ou soudage	Dimension d'électrode ou Epaisseur de métal ou Intensité de courant	Nuance de de filtre oculaire
Brasage tendre au chalumeau	toutes conditions	2
Brasage fort au chalumeau	toutes conditions	3 ou 4
Oxycoupage		
mince	moins de 1 po. (25 mm)	2 ou 3
moyen	de 1 à 6 po. (25 à 150 mm)	4 ou 5
épais	plus de 6 po. (150 mm)	5 ou 6
Soudage aux gaz		
mince	moins de 1/8 po. (3 mm)	4 ou 5
moyen	de 1/8 à 1/2 po. (3 à 12 mm)	5 ou 6
épais	plus de 1/2 po. (12 mm)	6 ou 8
Soudage à l'arc avec électrode enrobées (SMAW)		
	moins de 5/32 po. (4 mm)	10
	de 5/32 à 1/4 po. (4 à 6.4 mm)	12
	plus de 1/4 po. (6.4 mm)	14
Soudage à l'arc sous gaz avec fil plein (GMAW)		
métaux non-ferreux	toutes conditions	11
métaux ferreux	toutes conditions	12
Soudage à l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
Soudage à l'hydrogène atomique (AHW)	toutes conditions	12
Soudage à l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage à l'arc Plasma (PAW)	toutes dimensions	12
Gougeage Air-Arc avec électrode de carbone		
mince		12
épais		14
Coupage à l'arc Plasma (PAC)		
mince	moins de 300 ampères	9
moyen	de 300 à 400 ampères	12
épais	plus de 400 ampères	14



LES VAPEURS ET LES FUMÉES SONT DANGEREUSES POUR LA SANTE.

Le soudage dégage des vapeurs et des fumées dangereuses à respirer.

- Eloignez la tête des fumées pour éviter de les respirer.
- A l'intérieur, assurez-vous que l'aire de soudage est bien ventilée ou que les fumées et les vapeurs sont aspirées à l'arc.
- Si la ventilation est inadéquate, portez un respirateur à adduction d'air approuvé.
- Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consommables, aux revêtements et aux produits nettoyants.
- Ne travaillez dans un espace confiné que s'il est bien ventilé; sinon, portez un respirateur à adduction d'air. Les gaz protecteurs de soudage peuvent déplacer l'oxygène de l'air et ainsi causer des malaises ou la mort. Assurez-vous que l'air est propre à la respiration.
- Ne soudez pas à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir avec des vapeurs et former des gaz hautement toxiques et irritants.
- Ne soudez des tôles galvanisées ou plaquées au plomb ou au cadmium que si les zones à souder ont été grattées à fond, que si l'espace est bien ventilé; si nécessaire portez un respirateur à adduction d'air. Car ces revêtements et tout métal qui contient ces éléments peuvent dégager des fumées toxiques au moment du soudage.



LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

L'arc produit des étincelles et des projections. Les particules volantes, le métal chaud, les projections de soudure et l'équipement surchauffé peuvent causer un incendie et des brûlures. Le contact accidentel de l'électrode ou du fil-électrode avec un

objet métallique peut provoquer des étincelles, un échauffement ou un incendie.

1. Protégez-vous, ainsi que les autres, contre les étincelles et du métal chaud.
2. Ne soudez pas dans un endroit où des particules volantes ou des projections peuvent atteindre des matériaux inflammables.
3. Enlevez toutes matières inflammables dans un rayon de 10, 7 mètres autour de l'arc, ou couvrez-les soigneusement avec des bâches approuvées.
4. Méfiez-vous des projections brûlantes de soudage susceptibles de pénétrer dans des aires adjacentes par de petites ouvertures ou fissures.
5. Méfiez-vous des incendies et gardez un extincteur à portée de la main.
6. N'oubliez pas qu'une soudure réalisée sur un plafond, un plancher, une cloison ou une paroi peut enflammer l'autre côté.
7. Ne soudez pas un récipient fermé, tel un réservoir ou un baril.
8. Connectez le câble de soudage le plus près possible de la zone de soudage pour empêcher le courant de suivre un long parcours inconnu, et prévenir ainsi les risques d'électrocution et d'incendie.
9. Ne dégelez pas les tuyaux avec un source de courant.
10. Otez l'électrode du porte-électrode ou coupez le fil au tube-contact lorsqu'inutilisé après le soudage.
11. Portez des vêtements protecteurs non huileux, tels des gants en cuir, une chemise épaisse, un pantalon revers, des bottines de sécurité et un casque.



LES ETINCELLES ET LES PROJECTIONS BRULANTES PEUVENT CAUSER DES BLESSURES.

Le piquage et le meulage produisent des particules métalliques volantes. En refroidissant, la soudure peut projeter du éclats de laitier.

1. Portez un écran facial ou des lunettes protectrices approuvées. Des écrans latéraux sont recommandés.
2. Portez des vêtements appropriés pour protéger la peau.



LES BOUTEILLES ENDOMMAGEES PEUVENT EXPLOSER

Les bouteilles contiennent des gaz protecteurs sous haute pression. Des bouteilles endommagées peuvent exploser. Comme les bouteilles font normalement partie du procédé de soudage, traitez-les avec soin.

1. Protégez les bouteilles de gaz comprimé contre les sources de chaleur intense, les chocs et les arcs de soudage.
2. Enchaînez verticalement les bouteilles à un support ou à un cadre fixe pour les empêcher de tomber ou d'être renversées.
3. Eloignez les bouteilles de tout circuit électrique ou de tout soudage.
4. Empêchez tout contact entre une bouteille et une électrode de soudage.
5. N'utilisez que des bouteilles de gaz protecteur, des détendeurs, des boyaux et des raccords conçus pour chaque application spécifique; ces équipements et les pièces connexes doivent être maintenus en bon état.
6. Ne placez pas le visage face à l'ouverture du robinet de la bouteille lors de son ouverture.
7. Laissez en place le chapeau de bouteille sauf si en utilisation ou lorsque raccordé pour utilisation.
8. Lisez et respectez les consignes relatives aux bouteilles de gaz comprimé et aux équipements connexes, ainsi que la publication P-1 de la CGA, identifiée dans la liste de documents ci-dessous.

MISE EN GARDE



LES GAZ D'ÉCHAPPEMENT DES MOTEURS PEUVENT ÊTRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

LES MOTEURS PEUVENT ÊTRE DANGEREUX

1. Utilisez l'équipement à l'extérieur dans des aires ouvertes et bien ventilées.
2. Si vous utilisez ces équipements dans un endroit confiné, les fumées d'échappement doivent être envoyées à l'extérieur, loin des prises d'air du bâtiment.



LE CARBURANT PEUT CAUSER UN INCENDIE OU UNE EXPLOSION.




Le carburant est hautement inflammable.

1. Arrêtez le moteur avant de vérifier le niveau de carburant ou de faire le plein.

2. Ne faites pas le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
3. Si c'est possible, laissez le moteur refroidir avant de faire le plein de carburant ou d'en vérifier le niveau au début du soudage.
4. Ne faites pas le plein de carburant à ras bord: prévoyez de l'espace pour son expansion.
5. Faites attention de ne pas renverser de carburant. Nettoyez tout carburant renversé avant de faire démarrer le moteur.

PRECAUTIONS DE SECURITE EN SOUDAGE A L'ARC

Instruction 830002

	DES PIÈCES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.	<ol style="list-style-type: none">3. Seules des personnes qualifiées doivent démonter des protecteurs ou des capots pour faire l'entretien ou le dépannage nécessaire.4. Pour empêcher un démarrage accidentel pendant l'entretien, débranchez le câble d'accumulateur à la borne négative.5. N'approchez pas les mains ou les cheveux de pièces en mouvement; elles peuvent aussi accrocher des vêtements amples et des outils.6. Réinstallez les capots ou les protecteurs et fermez les portes après des travaux d'entretien et avant de faire démarrer le moteur.
<ol style="list-style-type: none">1. Assurez-vous que les portes, les panneaux, les capots et les protecteurs soient bien fermés.2. Avant d'installer ou de connecter un système, arrêtez le moteur.	<p>Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.</p>	
	DES ETINCELLES PEUVENT FAIRE EXPLOSER UN ACCUMULATEUR; L'ELECTROLYTE D'UN ACCUMULATEUR PEUT BRULER LA PEAU ET LES YEUX.	<ol style="list-style-type: none">1. Portez toujours un écran facial en travaillant sur un accumulateur.2. Arrêtez le moteur avant de connecter ou de déconnecter des câbles d'accumulateur.3. N'utilisez que des outils anti-étincelles pour travailler sur un accumulateur.4. N'utilisez pas une source de courant de soudage pour charger un accumulateur ou survolter momentanément un véhicule.5. Utilisez la polarité correcte (+ et -) de l'accumulateur.
<p>Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.</p>		
	LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRULANT SOUS PRESSION PEUVENT BRULER LA PEAU ET LES YEUX.	<ol style="list-style-type: none">1. N'ôtez pas le bouchon de radiateur tant que le moteur n'est pas refroidi.2. Mettez des gants et posez un torchon sur le bouchon pour l'ôter.3. Laissez la pression s'échapper avant d'ôter complètement le bouchon.
<p>Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.</p>		

PRINCIPALES NORMES DE SECURITE

Safety in Welding and Cutting, norme ANSI Z49.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

Safety and Health Standards, OSHA 29 CFR 1910, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33128.

National Electrical Code, norme 70 NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, document P-1, Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, norme CSA W117.2 Association canadienne de normalisation, Standards Sales, 276 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices for Occupation and Educational Eye and Face Protection, norme ANSI Z87.1, American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme 51B NFPA, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

DESCRIPTION OF EQUIPMENT

General

The Advantage® HF High Frequency Arc Starter has been designed to be used with Thermal Arc welding systems for TIG welding. The need to minimize high-frequency radiation is needed. The shorter the distance from the high frequency to the electrode welding tungsten, the less chance of having High-Frequency radiation problems.

The High Frequency Arc Starter superimposes a high voltage, very low current, high frequency signal onto the pilot arc output. This creates an arc initiation between the tungsten electrode inside the torch and the welding surface. This high frequency signal is generated by a spark gap oscillator powered by a small transformer. Each breakover of the two-series spark gaps creates a burst of 1 to 4 MHz energy at a very rapid repetitive rate, until the arc is established. The circuitry automatically disables the high frequency operation whenever the pilot arc, or the transferred arc, is present when DC welding. It operates continuously when AC welding. For proper operation, each spark gap should be set for .006 inch. The inside and insulating surfaces should be kept clean and dry. The torch must be properly connected, and the proper type and amount of gas must be supplied.

WARNING: High frequency waves can damage electronic components. Check with equipment manufacturer before using equipment with or near this unit.

NOTE: When using with engine-driven equipment, automatic idling systems will not operate with the high frequency arc starter attached. Switch the auto idle to the "OFF" or "HIGH IDLE" positions.

Controls, Instruments, Features

1. Power Switch — This toggle switch must be in the ON position to place the unit in a ready mode for operation. A light indicates when power is on.

2. High Frequency Switch — This switch is a 3-position type switch which controls the operation of the high frequency circuitry.

The START position is for welding with DC current. When in the START position, the high frequency will only be available until the arc is established. It will stay off until the arc is broken.

The CONTINUOUS position is for welding with AC current. When in the CONTINUOUS position, the high frequency will be available at all times.

The OFF position disconnects the high frequency circuitry and places the unit back into a ready mode.

3. Control Remote/Local Switch — Place this switch in the LOCAL position and high frequency will be available without the need for a remote or torch-mounted switch.

If placed in the REMOTE position, an external switch is required (attached to the remote control receptacle) to turn on the high frequency.

4. Remote Control Receptacle — For connection of a remote hand switch.

Model and Input Volts	Rated Welding Amps. 60% Duty Cycle	Dimensions			Weight	
		Width	Height	Depth	Net	Ship
115 V	250	9-3/4 in. (248 mm)	19-1/8 in. (486 mm)	16 in. (406 mm)	42 lbs. (19 kg)	50 lbs. (23 kg.)
230 V (Opt.)	250	9-3/4 in. (248 mm)	19-1/8 in. (486 mm)	16 in. (406 mm)	48 lbs. (22 kg.)	55 lbs. (25 kg.)

Table 3-1 Specifications

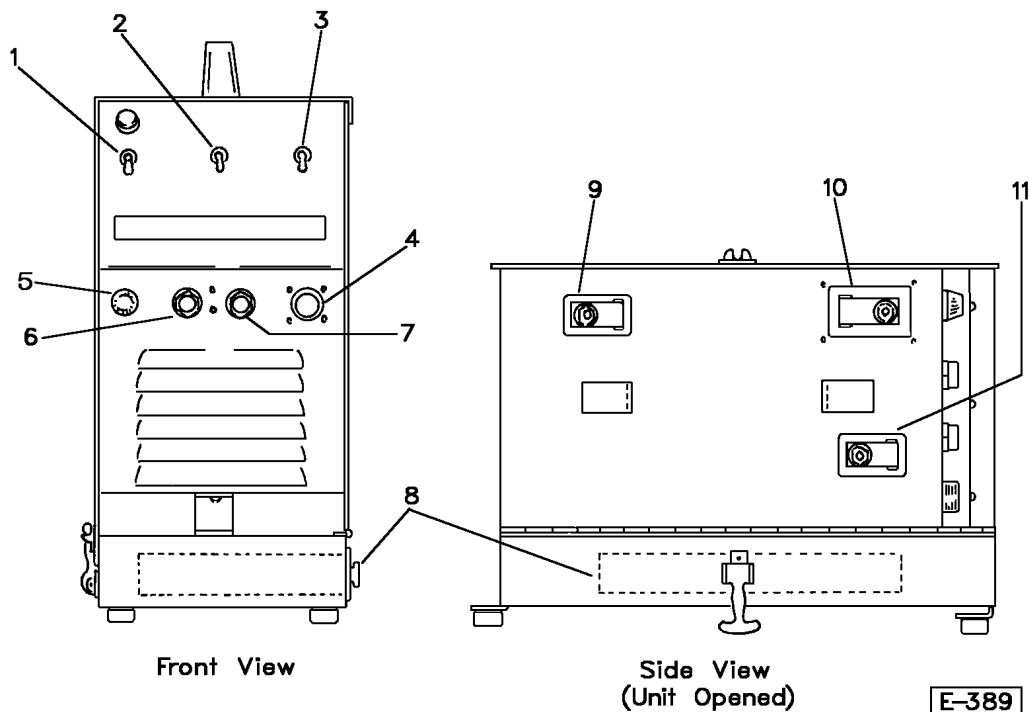


Figure 3-1

- 5. Fuse — 3 amp fast blow for control circuits.
- 6. Gas inlet connection.
- 7. Gas outlet for connection to TIG torch.
- 8. Storage drawer.
- 9. Electrode In Terminal — Connect the electrode cable from the welder to this terminal.
- 10. Electrode Out Terminal — Connect the TIG torch to this terminal.
- 11. Work Terminal — Connect the work cables from the welder and the ground cable from the workpiece to this terminal.

12. Secondary Contactor (Option) — A field-installed secondary contactor kit option is available for remote control of the open circuit voltage.

13. Input Power Connections — This unit comes standard as a 115-volt AC powered unit equipped with a 3-prong parallel plug. Never connect this to a DC power source.

A 230-volt AC option is available which can be field installed at any time to any unit. However, a plug is not supplied due to the number of different receptacles available.

INSTALLATION

Location

For best operating characteristics and longest unit life, take care in selecting an installation site. When installing the equipment, avoid locations exposed to high humidity, dust, high ambient temperature or corrosive fumes. Moisture condenses on machine parts and electrical controls, causing corrosion which can seriously affect operation and efficiency. Dust and dirt cause extra wear on all moving parts. Therefore, use care to locate the equipment so that excess moisture, dust, or corrosive fumes will not be drawn into the unit.

Adequate air circulation is needed at all times in order to assure proper operation. Provide a minimum of 12 inches (305 mm) of free air space at both the sides and rear of the unit. Make sure that the ventilator openings are not obstructed. Air enters through the front panels and rear of machine.

Because high frequency stabilized arc welding machines inherently radiate power at frequencies which may interfere with radio communication, including commercial, police, and aviation broadcasts, their operation is subject to control by the Federal Communications Commission.

Some general information on radio frequency radiation from high frequency stabilized arc welding machines is given below:

Direct Radiation From Welding Machine

The manufacturer controls direct radiation from the welding machine by proper design of the unit. If the user complies with the installation and operation instructions furnished by the manufacturer, direct radiation from the machine will be relatively low.

Direct Radiation From Welding Leads

The initial radiation, due almost entirely to the welding leads acting as an antenna, decreases rapidly with the distance from the leads. This radiation can be kept to a minimum by making the welding leads as short as possible. The frequency spectrum emitted by a particular unit can be altered substantially by changing the length or position of the welding leads and by differences in loading

caused by operation with the electrode arcing to the work.

Radiation From Power Lines

High frequency voltage which is conducted from the welding machine to the power line may cause radiation from the line itself. This radiation can be kept to a minimum by careful design of the unit and, in some cases, by the use of line filters.

In a welding machine that has been certified by the manufacturer, the radiation from the power line is generally small when compared to the direct radiation from the welding leads.

Wiring In The Welding Area

The term "welding area" refers to the area in which the welding machine, the welding leads, and the welding work are located.

Re-Radiation

Ungrounded metallic objects in close proximity to the welding area can act as antenna which will pick up, conduct and re-radiate the high frequency generated by the welding machine. Unshielded wires in the immediate vicinity may conduct radiation, and re-radiate it. Therefore, no unshielded conductors shall be located within 50 feet (15,240 mm) of the welding area.

This means that all electrical power or lighting wiring within 50 feet (15,240 mm) of the welding area shall be enclosed in grounded rigid metallic conduit, copper braid, or some other material having an equivalent shielding efficiency, or shall consist of lead-covered cable. (Ordinary flexible helically wrapped metallic conduit is generally not suitable.) The shielding or cable covering shall be grounded at 50-foot (15,240 mm) intervals. Good electrical bonding shall be maintained between conduit sections.

Wiring, other than electrical power and lighting wiring within 50 feet (15,240 mm) of the welding area, shall be shielded and the shields shall be grounded. [This includes wiring located within 50 feet (15,240 mm) of the welding machine in a vertical or vertical-diagonal direction.]

The foregoing procedure shall apply even if:

1. The welding area is not a fixed location.
2. There are exposed wires off the premises but within 50 feet (15,240 mm) of the welding area.

Wiring Changes

All changes in power and lighting wiring shall be made by a qualified electrician. Any shielding or relocation of telephone or signal wires must be done by the service company concerned or with their specific permission.

This type of radiation can be kept to a minimum by installing the welding machine in accordance with the installation procedures outlined in this instruction manual.

Use In Metal Buildings

Where the welding area is enclosed within a metal building, proper precautions must be taken to insure that the building is properly grounded. This can be accomplished by placing several good electrical grounds around the periphery of the building. Refer to following grounding procedure.

The installation procedures described in this publication shall be observed even if the welding machine is operated within a shielded structure.

Welding Leads

The TORCH lead and the WORK lead must each be 25 feet (7620 mm) or less in length and run together at floor level whenever possible except the last 7 feet (2134 mm) at the torch or "whip" end.

Remote Control Cables

(When used)

The remote control cables for gun trigger or foot control switch must also be 25 feet (7620 mm) in length, or less, and must be brought out close to and parallel to the welding leads.

Certification Notice

In order to comply with F.C.C. regulations after the unit has been installed in accordance with the preceding instructions, the user must post the certification notice at the location of the welding machine. A convenient form is enclosed which may be used for this purpose after it has been properly filled out.

Individual Installation Certification

1. The user may waive any of the requirements outlined in these special installation requirements if he desires to exercise the option of having an installation test survey made. This survey shall be made by a competent engineer in accordance with the test procedure requirements set forth in Part 18 of the Federal Communications' Rules and Regulations.

2. Certification may cover a unit installation or may be included in the certification of a complete plant.

Responsibility For Interference

In the event this equipment causes interference, it is the user's responsibility to take steps in eliminating the interference.

Grounding

The frame of this welding machine should be grounded for personnel safety. Where grounding is mandatory under state or local codes, it is the responsibility of the user to comply with all applicable rules and regulations. Where no state or local codes exist, it is recommended that the National Electrical Code be followed.

The work or work table must also be grounded by using a conductor attached to a driven ground or water pipe as described below. See Figures 4-1 and 4-2.

The requirements and recommendations for grounding apply to rubber tire mounted equipment. In addition to the usual function of protecting personnel against the hazard of electrical shock due to fault in the equipment, grounding serves to discharge the static electrical charges which tend to build up on the surfaces of tire mounted equipment. These static charges sometimes cause painful shock to personnel, and in some instances, lead to the erroneous conclusion that an electrical fault exists in the equipment.

Use an input-power cable assembly which includes a grounding conductor to connect this equipment to the input power supply. When included in the cable assembly, the grounding conductor will be green or green with a yellow stripe, or bare. Connect the grounding conductor to the equipment grounding terminal, if provided, and if not, to the equipment frame, taking care to see that good electrical contact is made between conductor and frame. Connect the other end of the grounding conductor to the system ground.

If, for any reason, an input cable which does not include a grounding conductor is used, the equipment may be grounded with a separate conductor if permitted under applicable code, or by special permission of the jurisdictional body responsible for enforcement of the code. Minimum size and color coding requirements must be in accordance with any applicable state or local code, or the National Electrical Code.

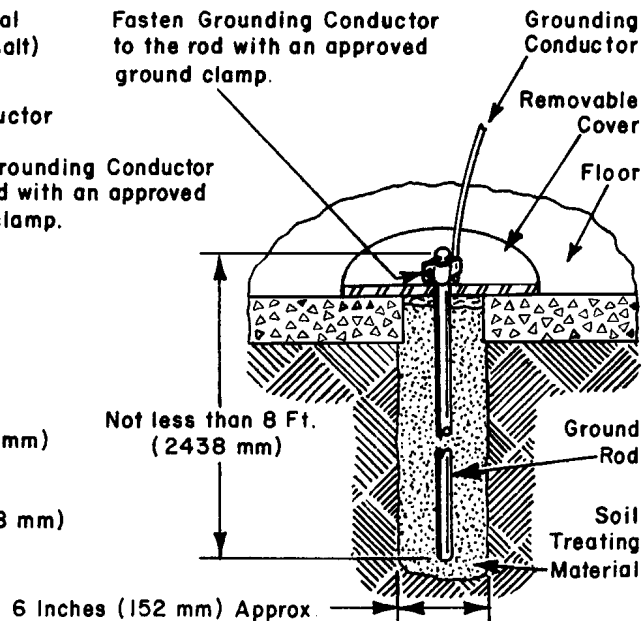
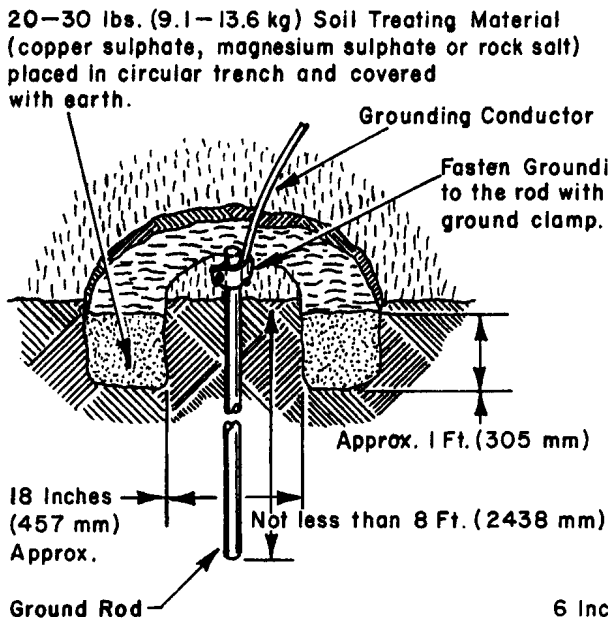
If metallic armored cable or conduit is used, the metal sheathing or conduit must be effectively grounded as required by state or local code, or the National Electrical Code.

If a system ground is not available, the welding machine must be connected to a driven ground rod (see Figures 4-1 and 4-2) or to a water pipe that enters the ground not more than 10 feet (3,048 mm) from the machine.

NOTE: The grounding conductor must be as short as possible in order to produce the most efficient installation.

Treating An Outside Ground — The soil treating materials are placed in a circular trench around the rod, but not in direct contact. The crystals are gradually dissolved by surface waters and the solution is carried into the most useful area of earth surrounding the electrode (rod). Flood the trench several times when making original installation. See Figure 4-1.

Treating An Inside Ground — Reduce the diameter of the hole to 6 inches (152 mm), pour soil treating material in and around the rod. Add enough water to dissolve 8 pounds (4.0 kg) of soil treating material. Flood the hole every 6 months and replace the soil treating material when it is all dissolved. See Figure 4-2.



A-008

Figure 4-1 Outside Ground

Figure 4-2 Inside Ground

Connection To Line Voltage

The power supply wires serving the welding machine shall be completely enclosed for a distance of at least 50 feet (15,240 mm) (in any direction) from the machine in solid metallic conduit or closely braided copper sheathing. This shielding shall be connected to the ground at the extreme end of the shielding. The shielding shall be solidly connected to the case so as to make good electrical contact and there shall be no gaps in the shielding run. (Ordinary flexible helically wrapped metal conduit is generally not suitable.)

CAUTION: Conductor size shall be selected to meet NEC, CE Code, and local codes and shall be modified as required for line voltage drop and ambient temperature.

This welding machine operates on a single-phase, AC input. See nameplate of the machine to determine required input voltage and frequency. Make certain that the welding machine is connected for the power supply voltage available. The input power cables should be connected to the power supply through a fused disconnect switch (furnished by the customer). Refer to the identification nameplate to determine the rating of the machine, then consult the local power company for wire and fuse size code.

External Power/Control/Hose Installation

WARNING: Before making any connections to the power supply's output terminals, make sure that all primary input power to the machine is deenergized (off) at the customer's disconnect switch.

The proper operation of the welding machine depends to a great extent on the use of output cables that are insulated copper, adequately sized, in good condition and properly connected to the machine. It is recommended that the output cables be kept shorter than 25 ft. (this is particularly important for TIG applications using ACHF), and be of adequate current carrying capacity.

The resistance of the output cables and connections cause a voltage drop which is added to the voltage of the arc. Excessive cable resistance may result in overloading as well as reducing the maximum current output of which the power supply is capable. The welding output terminals are located on the front panel.

Welding Adjustments

Keep spark gaps set at .006 inch.

CAUTION: When the machine is in operation, make sure that the top is in place, and all access holes covered in the cabinet. Proper flow of cooling air must be directed through the unit to avoid overheating. Make no changes or adjustments not covered in this manual, as modification might affect radiation and void the manufacturer's certification.

OPERATION

TIG Welding Procedure

1. Check installation to be certain all connections are tight and proper controls, gas, and torches are installed.

2. Preset all controls as practical.

3. Turn on gas supply at gas cylinder.

4. Adjust the gas supply to the desired flow rate.

5. Place the welding torch in proximity of the work.

6. Switch control switch to "LOCAL" (if using a remote hand switch, leave control switch in REMOTE and switch hand switch to "ON"). Open circuit voltage will appear, and high frequency will immediately initiate the welding arc.

NOTE: On DC TIG welding, the high frequency will shut off after the arc is established. On AC TIG, the high frequency will run continuously to stabilize the AC welding current.

7. Readjust any controls as necessary

CAUTION: Once a welding arc is established, power should not be removed from the welding machine, and the POWER ON/OFF SWITCH should not be turned OFF until after postflow is completed. The work or the torch may be damaged if water and/or gas ceases to flow too soon.

8. To terminate welding, proceed in the following manner:

a. Switch control switch to "REMOTE" (hand switch to "OFF"). Gas will continue to flow, until postflow times out (a maximum of 25 seconds).

b. Leave torch in position over the work to provide shielding gas until the end of the post-flow cycle.

c. After the flow of gas stops, that is, on completion of postflow, turn off the gas at source.

d. Place the fused disconnect switch in the OFF position.

Welding Currents For The TIG Process

Welding currents for the TIG process depend upon the size of the tungsten electrode used, the material being welded, welding speed, size and shape of the material, and other factors. Table 5-1 is a rough guide for usable current ranges for various tungsten electrode sizes.

Regulation Of Inert Gas

The inert gas flow should be controlled accurately with a regulator and flowmeter. No specific recommendations for rates of flow can be given as this depends entirely on the welding conditions and the torch and nozzle used. Correct argon flow is usually between 8 and 35 cubic feet (226 to 990 liters) of gas per hour; and helium flow is between 18 and 85 cubic feet (510 to 2410 liters) per hour.

More specific information concerning the torch configurations available and the gas flows for each can be obtained from the manufacturer of the torch equipment.

Electrode Diameter Inches	Welding Current, Amps			
	ACHF		DCEN	DCEP
	Using pure tungsten electrodes	Using thoriated electrodes	Using pure or thoriated tungsten electrodes	
.020	5-15	5-20	5-20	— — — —
.040	10-60	15-80	15-80	— — — —
1/16	50-100	70-150	70-150	10-20
3/32	100-160	140-235	150-250	15-30
1/8	150-210	225-325	250-400	25-40
5/32	200-275	300-400	— — — —	40-55
3/16	250-350	— — — —	— — — —	55-80
1/4	— — — —	— — — —	— — — —	80-125

Table 5-1 Typical Current Ranges for Tungsten Electrodes

MAINTENANCE

If this equipment does not operate properly, stop work immediately and investigate the cause of the malfunction. Maintenance work must be performed by an experienced person, and electrical work by a trained electrician. Do not permit untrained persons to inspect, clean, or repair this equipment. Use only recommended replacement parts.

WARNING: The welding arc is extremely bright and penetrating. Do not weld without the proper protective lenses, and clothing. Make sure workpiece is separated from combustible or dangerous materials, and an adequate fire watch has been established.

Refer also to:

ANSI Z87.1 Practice for Occupational and Educational Eye and Face Protection.

ANSI Z49.1 Safety in Welding and Cutting.

OSHA 29 CFR 1910 Occupational Safety and Health Standards.

AWS A6.0-65 Safe Practices For Welding and Cutting Containers That Have Held Combustibles.

High Frequency Arc Starter

WARNING: High voltage can KILL. Before service, inspection, or cleaning is performed on the High Frequency Arc Starter module, disconnect the four cables between the Advantage[®] HF and the power source. The power source (welding machine) should be turned OFF also.

Inspection And Cleaning

Every Day — Every day that the system is used, first check closely for any gas leaks, evidence of plugged lines or valves, and a proper supply of inert gas.

Every Thirty Days — Remove the cover.

1. Inspect the interior for evidence of leaking, corrosion, overheated components, arcing, damaged insulation, defective components, or loose hardware.

2. Check the high frequency spark gaps for proper spacing. Resurface the gas "faces" as necessary to permit accurate gap spacing of .006 inch.

3. Clean the interior and the vents in the cover with a vacuum cleaner or with dry, compressed air of not over 25 psi (172 kPa) pressure. Oily residue may require cleaning with a cloth and a non-volatile solvent.

4. Replace cover and all securing screws.

5. Inspect all the connections, especially on the front panel, the electrode in terminal, for tightness, arcing, etc. Recondition and tighten if arcing has occurred.

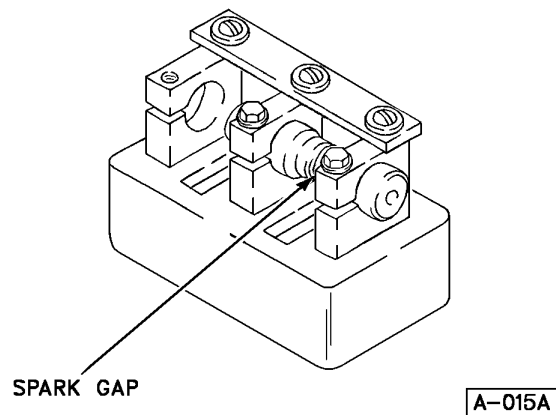


Figure 6-1 Spark Gap Assembly

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MAINTENANCE

Frequent inspection and cleaning of the power source is recommended. Some suggestions for inspecting and cleaning are as follows:

WARNING: Make sure the power is shut off.

1. Make sure cable and hoses are not damaged or kinked.
2. Make sure all plugs, fittings, and ground connections are tight.

3. With all input power disconnected, and wearing proper eye and face protection, blow out the inside of the power source using low pressure dry compressed air.

WARNING: Water occasionally accumulates in compressed air lines. Be sure to direct the first blast of air away from the equipment to avoid damage.

4. Drain the water from the air regulator. See the instruction label on the regulator.

TROUBLESHOOTING

WARNING: Be sure that all primary power to the machine has been externally disconnected. Open the wall disconnect switch or circuit breaker before attempting inspection or work inside of the power supply.

Check the problem against the symptoms in the following troubleshooting guide. The remedy may be quite simple. If the cause cannot be quickly located, shut off the input power, open up the unit, and perform a simple visual inspection of all components and wiring. Check for secure terminal connections, loose or burned wiring or components, bulged or leaking capacitors, or any other sign of damage or discoloration.

The following chart contains information which can be used to diagnose and correct unsatisfactory operation or failure of the various components of the welding machine. Each symptom of trouble is followed by a list of probable causes and procedures to correct them.

Troubleshooting Guide

No high frequency

No AC voltage at plug

Check to make sure that cable is plugged into power source.

Check HIGH-FREQUENCY Switch is in the correct mode. Start for DC, Continuous for AC.

No power supply to transformer

Check primary power supply to transformer.

No secondary power from transformer

Check secondary of transformer using extreme caution with the high voltage (3500 volts). Only use meter leads which have heavy duty insulation for very high voltages.

Weak high frequency

Incorrect gap on Spark Gaps

Adjust gaps to .006" (.1524 mm). Also check that the gaps are not deteriorated.

Failed component in the HF feedback circuit

Check components R1, R2, C1, and C4. Also check for good electrical connections throughout the entire circuit.

Increase in high frequency interference in other equipment

Unit not properly grounded

Make good ground connection.

Capacitors C2, C3 failed

Replace failed capacitors.

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PARTS LIST

Equipment Identification

All identification numbers as described in the Introduction chapter must be furnished when ordering parts or making inquiries. This information is usually found on the nameplate attached to the equipment. Be sure to include any dash numbers following the Specification or Assembly numbers.

How To Use This Parts List

The Parts List is a combination of an illustration (Figure Number) and a corresponding list of parts which contains a breakdown of the equipment into assemblies, subassemblies, and detail parts. All parts of the equipment are listed except for commercially available hardware, bulk items such as wire, cable, sleeving, tubing, etc., and permanently attached items which are soldered, riveted, or welded

to another part. The part descriptions may be indented to show part relationships.

To determine the part number, description, quantity, or application of an item, simply locate the item in question from the illustration and refer to that item number in the corresponding Parts List.

An "Application Code" is used to distinguish parts that are applicable only to certain Specifications and/or Assemblies. This code is found in the right-most column of the Parts List. If an item in the Parts List applies to all Specifications or Assemblies, the word "ALL" will be in the Application Code column. Refer to the following list to determine the appropriate Application Codes for the Specifications or Assemblies covered by this manual. If only the assembly or specification number is listed, the use of an Application Code does not apply to this manual.

SPEC NUMBER

7027

7027A

APPLICATION NUMBER

A

B

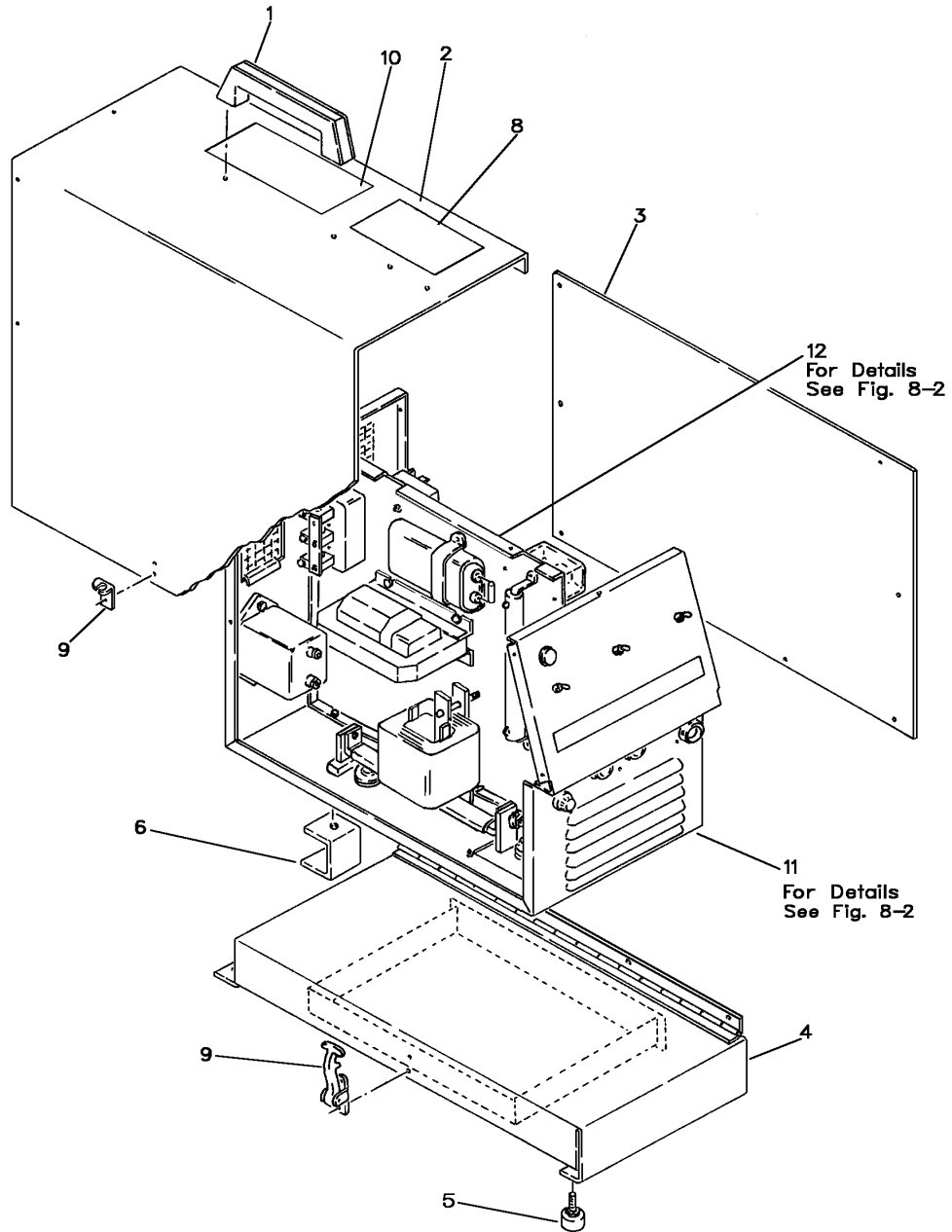


Figure 8-1

Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
	493894	Starter - Arc, Hi-Freq. Assembly	1	A
	493894-1	Starter - Arc, Hi-Freq. Assembly	1	B
1	493795	. Handle - Grab	1	All
2	493791	. Panel - Wrapper	1	A
	493791-1	. Panel - Wrapper	1	B
3	493792	. Panel - Side	1	A
	493792-1	. Panel - Side	1	B
4	493844	. Base - Assembly	1	A
	493844-1	. Base - Assembly	1	B
5	493802	. Mount - Shock	4	All
6	493812	. Support - Bottom	2	A
	493812-1	. Support - Bottom	2	B
7	Deleted			
8	170653	. Label - Danger	1	All
9	493831	. Latch - Draw	1	All
10	204036	. Label - Precautionary	1	All
11	493807-1	. Panel - Front, Rear, & Bottom Assembly (For Details See Fig. 8-2)	1	A
	493807-2	. Panel - Front, Rear, & Bottom Assembly (For Details See Fig. 8-2)	1	B
12	493810	. Panel - Interior, Assembly (For Details See Fig. 8-2)	1	A
	493810-1	. Panel - Interior, Assembly (For Details See Fig. 8-2)	1	B

(Breakdown continued on Figure 8-2)

460429-255
PARTS LIST

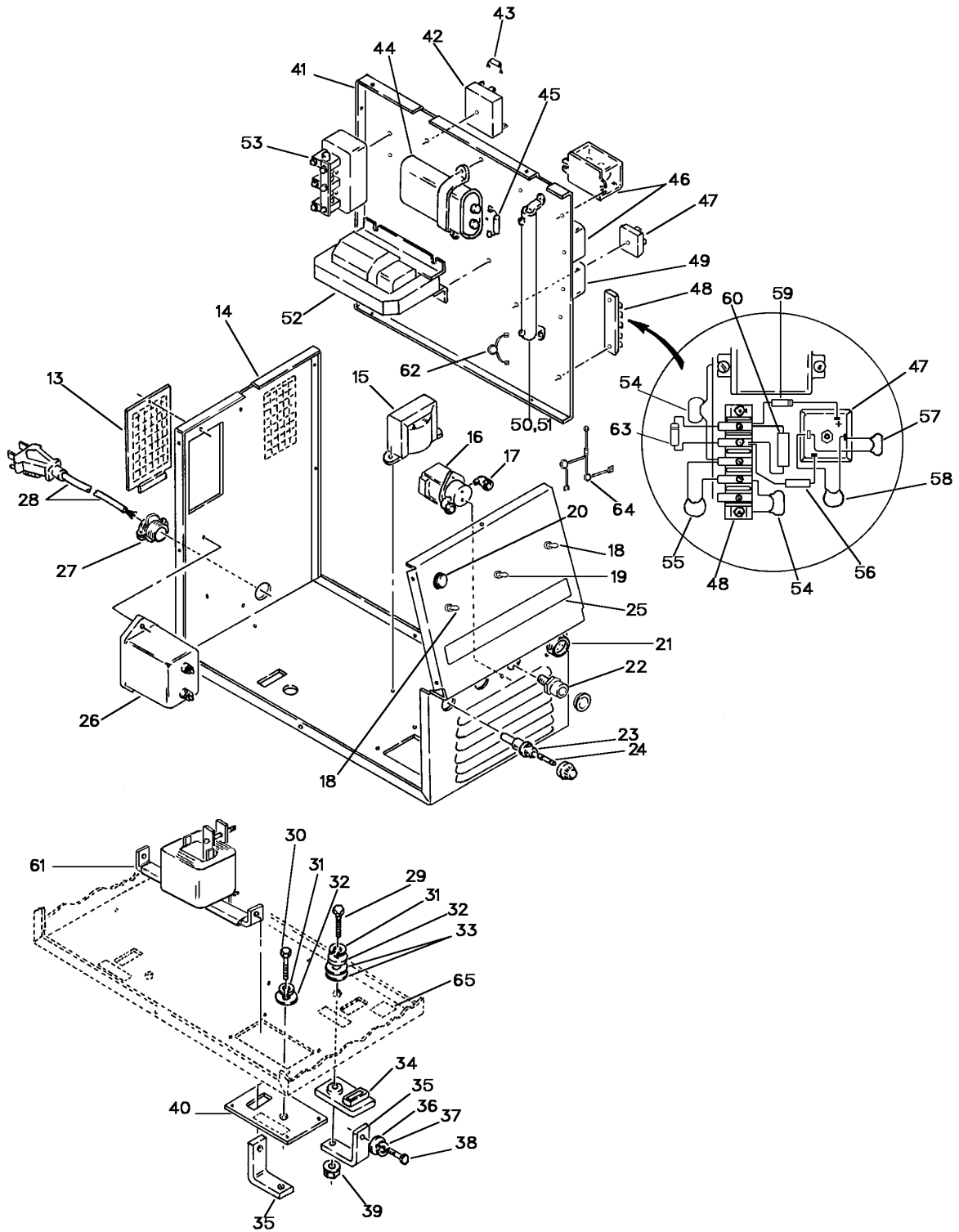


Figure 8-2

Parts List for Figure 8-2

Item No	Part Number	Description	Qty per Assy	Application Code
13	493809	. Cover - Hole	1	A
	493809-1	. Cover - Hole	1	B
	493807-1	. Panel - Front, Rear, & Bottom Assembly	Ref.	A
	493807-2	. Panel - Front, Rear, & Bottom Assembly	Ref.	B
14	493793	.. Panel - Front, Bottom, & Rear	1	A
	493793-1	.. Panel - Front, Bottom, & Rear	1	B
15	376388-2	.. Transformer	1	All
16	404162-3	.. Valve - Solenoid (120 V, 60 PSI)	1	All
17	W-10892-1	.. Elbow - Street, 90° Brs.	2	All
18	400400	.. Switch - Toggle (Quick Connect)	2	All
19	407016	.. Switch - Toggle, D.P.D.T. (Center Off)	1	All
20	402421-3	.. Light - Indicator	1	All
21	16DA-4107	.. Receptacle - Box, Solid Shell (5 Pin)	1	All
22	370447	.. Adapter - Gas, Right Hand	2	All
23	402658	.. Holder - Fuse	1	All
24	W-11166-10	.. Fuse - Fast Blow (3 Amp, 250 V)	1	All
25	494091	.. Label - Ident.	1	A
26	493838	.. Capacitor - Mica	1	All
27	W-10080-2	.. Connector - Straight	1	All
28	375432-9	.. Cable - W/Plug, Assembly	1	All
29	No Number	.. Screw - 1/2-13 x 1-3/4, HHC, ST.	2	All
30	No Number	.. Screw - 1/2-13 x 1-1/2, HHC, ST.	1	All
31	No Number	.. Washer - LK, Std. 1/2	3	All
32	No Number	.. Washer - Flat, ST. 1/2	3	All
33	5CW-976A	.. Washer - Insulator	4	All
34	5CW-975-1	.. Bushing - Insulator, Cable Stud	2	All
35	5CW-974-1	.. Bus - Cable Stud	3	All
36	No Number	.. Washer - Flat, ST. 1/4	5	All
37	No Number	.. Washer - LK. Std. 1/4	3	All
38	402119-4	.. Screw - 1/4-20 x 3/4, HHC. ST.	3	All
39	No Number	.. Nut - 1/2-13, Hex, Flg., ST.	3	All
40	493805	.. Board - Terminal	1	All
	493810	. Panel - Interior, Assembly	Ref.	A
	493810-1	. Panel - Interior, Assembly	Ref.	B
41	493794	.. Panel - Interior	1	A
	493794-1	.. Panel - Interior	1	B
42	409996	.. Timer - Delay	1	All
43	367703-7	.. Resistor - W/Lugs Assembly	1	All

Parts List for Figure 8-2

Item No	Part Number	Description	Qty per Assy	Application Code
44	405182-1	. . Capacitor - 330 V. A.C.	1	All
45	362909	. . Resistor - 10,000 Ohm	1	All
46	403056-11	. . Relay - Enclosed	2	All
47	404065-2	. . Rectifier	1	All
48	401937-1	. . Terminal - Block, 5 Station	1	All
49	403056-7	. . Relay - Enclosed	1	All
50	403765-5	. . Resistor - 100 W.	1	All
51	400078	. . Bracket - Mtg. Resistor	2	All
52	493811-1	. . Transformer - High Freq.	1	All
53	369286-1	. . Spark Gap - Assembly	1	All
54	396971-8	. . Capacitor - Assembly	2	All
55	202258-1	. . Suppressor - Assembly	1	All
56	398646-3	. . Resistor - Discharge, Assembly	1	All
57	396971-9	. . Capacitor - Assembly	1	All
58	202258-2	. . Suppressor - Assembly	1	All
59	490597-4	. . Diode - Assembly	1	All
60	396971-10	. . Capacitor - Assembly	1	All
61	493834	. . Coil - High Freq. (Mounts on Item 41)	1	All
62	200116	. . Capacitor - Assembly	1	All
63	490597-4	. . Diode - Assembly	1	All
—	490597-3	. . Diode - Assembly	1	All
64	493848 of Item 18)	. Capacitor - Assembly (Mounts on rear 1	All	
65	405548	. Label - Ground	1	All
—	494040	Kit - Diode (Replaces Item 59 in 60 Volt OCV machines)	1	All
—	493855	Kit - Suppression	1	All

— Not Illustrated

CERTIFICATION NOTICE

HIGH FREQUENCY STABILIZER

Serial No. _____

Model No. _____

This equipment may be reasonably expected to meet radiation limits of ten microvolts per meter at one mile, provided installation, operation, and maintenance is in accordance with the instructions of the manufacturer.

Thermal Arc Inc.
Troy, Ohio 45373

USER CERTIFICATE

The above equipment has been installed in accordance with manufacturer's instructions, and is being operated and maintained as outlined in these instructions.

USER: _____

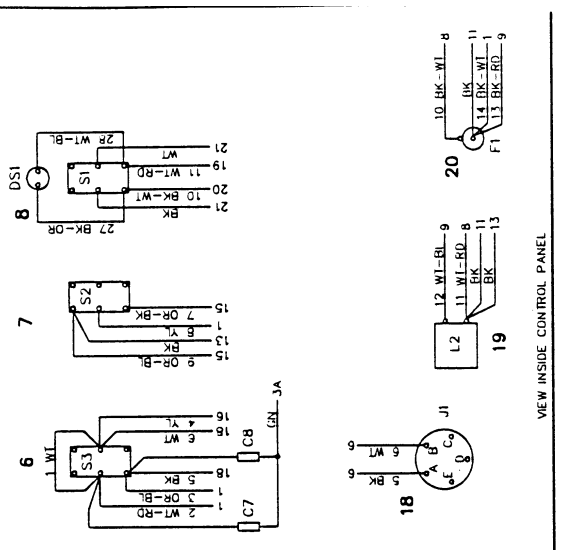
Date: _____

**THIS CERTIFICATION NOTICE MUST BE POSTED NEAR THE WELDING
MACHINE.**

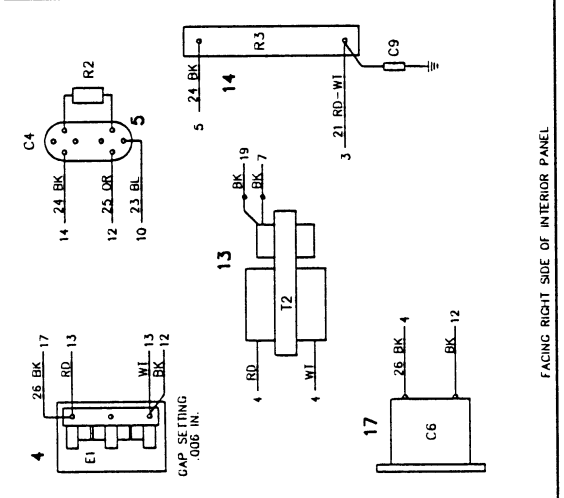
DIAGRAMS

- Note the model and specification number shown on the equipment nameplate.
- Locate these numbers in the model and specification number columns below.
- Use only those diagrams and instructions that are applicable.

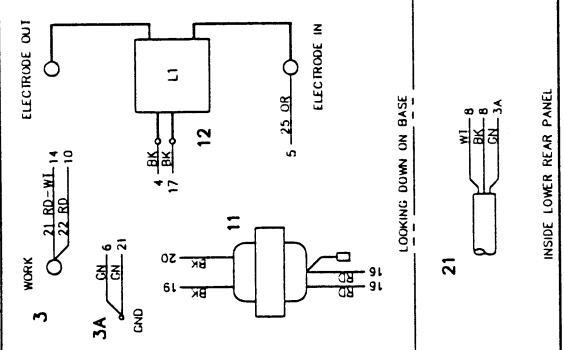
MODEL	SPECIFICATION NUMBER	CONNECTION & SCHEMATIC DIAGRAM
ADVANTAGE HF[®]	7027 7027A	493823



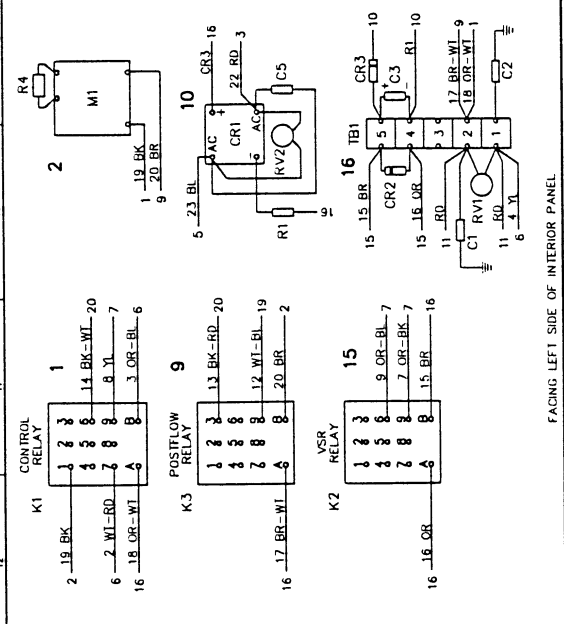
FACING LEFT SIDE OF INTERIOR PANEL



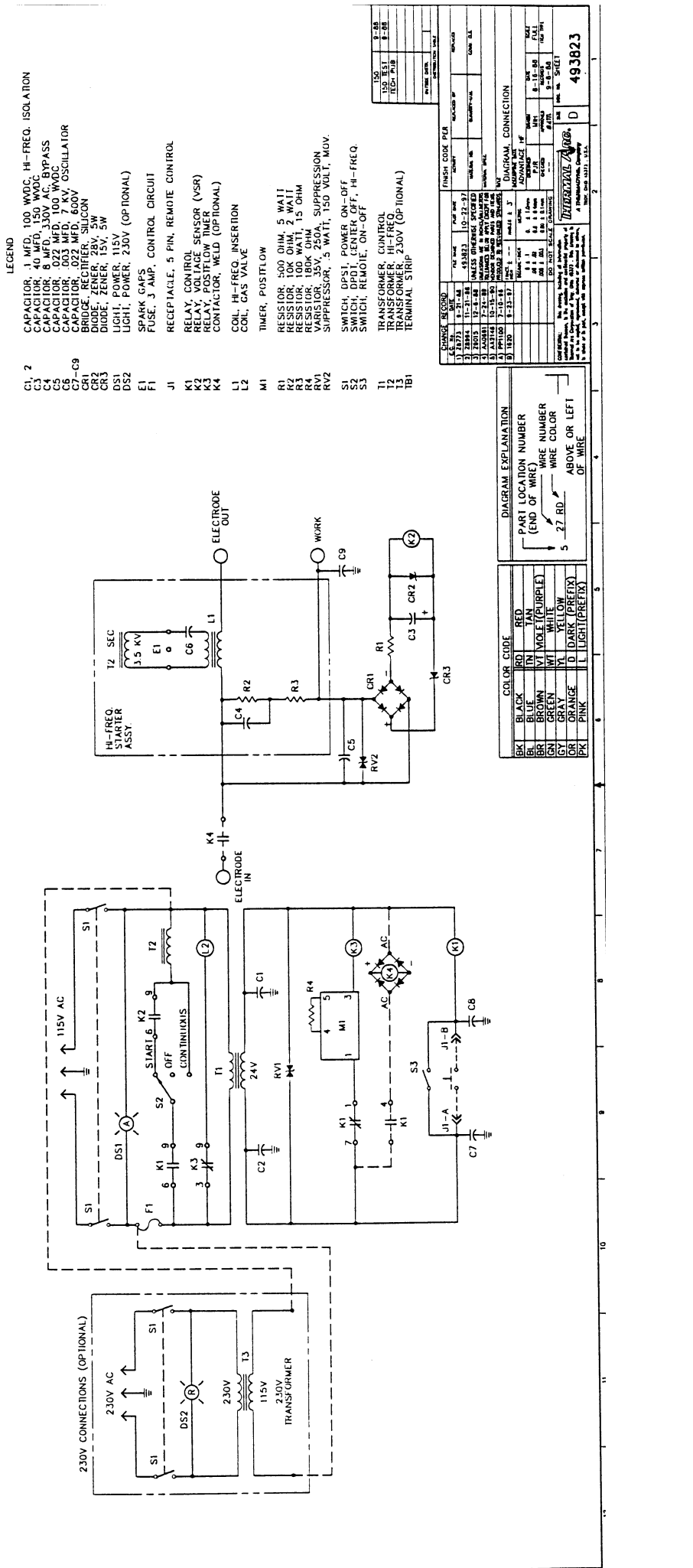
FACING RIGHT SIDE OF INTERIOR PANEL



INSIDE LOWER REAR PANEL



VIEW INSIDE CONTROL PANEL



LEGEND

- C1, 2 CAPACITOR, .1 MFD, 100 WVDC, HI-FREQ. ISOLATION
- C3 CAPACITOR, 40 MFD, 150 WVDC, BYPASS
- C4 CAPACITOR, .022 MFD, 100 VAC
- C5 CAPACITOR, .022 MFD, 100 VAC
- C6 CAPACITOR, .022 MFD, 7 KV, OSCILLATOR
- C7-C8 CAPACITOR, .022 MFD, 600V
- CR1 BRIDGE RECTIFIER, SILICON
- CR2 DIODE, ZENER, 15V, 5W
- CR3 DIODE, ZENER, 15V, 5W
- DS1 LIGHT, POWER, 115V
- DS2 LIGHT, POWER, 115V
- DS3 SPARK GAPS
- DS4 FUSE, 3 AMP, CONTROL CIRCUIT
- F1 RECEPTACLE, 5 PIN, REMOTE CONTROL
- J1 RELAY, CONTROL
- K1 RELAY, VOLTAGE SENSOR (VSR)
- K2 RELAY, POSITFLOW TIMER (OPTIONAL)
- K3 CONTACTOR, WELD (OPTIONAL)
- K4 COIL, HI-FREQ. INSERTION
- L1 COIL, GAS VALVE
- M1 TIMER
- R1 RESISTOR, 100 OHM, 5 WATT
- R2 RESISTOR, 100 OHM, 5 WATT
- R3 RESISTOR, 100 WATT, 1.5 OHM
- R4 RESISTOR, 180K OHM
- RV1 VARIATOR, 35V, 250A, SUPPRESSION
- RV2 SUPPRESSOR, .5 WATT, 150 VOLT, MOV.
- S1 SWITCH, DPST, POWER ON-OFF
- S2 SWITCH, DPST, CENTER OFF, HI-FREQ.
- S3 SWITCH, REMOTE, ON-OFF
- T1 TRANSFORMER, CONTROL
- T2 TRANSFORMER, HI-FREQ.
- T3 TERMINAL STRIP

COLOR CODE		DIAGRAM EXPLANATION	
BK	BLACK	RD	RED
BL	BLUE	IN	TAN
BR	BROWN	VI	MOLE (PURPLE)
GN	GREEN	WT	WHITE
GY	GRAY	YL	YELLOW
OR	ORANGE	DR	DARK (GREY)
PK	PINK	LT	LIGHT (GREY)

PART LOCATION NUMBER (END OF WIRE)	WIRE NUMBER	WIRE COLOR
5	27	RD

DIAGRAM EXPLANATION

5 27 RD ABOVE OR LEFT OF WIRE

493623

INTERNATIONAL

STATEMENT OF WARRANTY

LIMITED WARRANTY: Thermal Arc[®], Inc., A Thermadyne Company, warrants that its products will be free of defects in workmanship or material. Should any failure to conform to this warranty appear within the time period applicable to the Thermal Arc products as stated below, Thermal Arc shall, upon notification thereof and substantiation that the product has been stored, installed, operated, and maintained in accordance with Thermal Arc's specifications, instructions, recommendations and recognized standard industry practice, and not subject to misuse, repair, neglect, alteration, or accident, correct such defects by suitable repair or replacement, at Thermal Arc's sole option, of any components or parts of the product determined by Thermal Arc to be defective.

THERMAL ARC MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF LIABILITY: Thermal Arc shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of purchased or replacement goods, or claims of customers of distributor (hereinafter "Purchaser") for service interruption. The remedies of the Purchaser set forth herein are exclusive and the liability of Thermal Arc with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any goods covered by or furnished by Thermal Arc whether arising out of contract, negligence, strike tort, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based. No employee, agent, or representative of Thermal Arc is authorized to change this warranty in any way or grant any other warranty.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF REPLACEMENT PARTS OR ACCESSORIES ARE USED WHICH IN THERMAL ARC'S SOLE JUDGMENT MAY IMPAIR THE SAFETY OR PERFORMANCE OF ANY THERMAL ARC PRODUCT.

PURCHASER'S RIGHTS UNDER THIS WARRANTY ARE VOID IF THE PRODUCT IS SOLD TO PURCHASER BY NON-AUTHORIZED PERSONS.

Except with regards to the products listed below, this warranty shall remain effective three (3) years from the date Thermal Arc's authorized distributor delivers the product to Purchaser, but in no event more than (4) years from the date Thermal Arc delivers the product to the authorized distributor.

Shorter warranty periods apply to the products listed below. On these products, the warranty is effective for the time stated below beginning on the date that the authorized distributor delivers the products to the Purchaser. Notwithstanding the foregoing, in no event shall the warranty period extend more than the time stated plus one year from the date Thermal Arc delivered the product to the authorized distributor.

	<u>ALL OTHER</u>	<u>P-WEE, PRO-LITE</u>	
<u>POWER SUPPLIES</u>	<u>POWER SUPPLIES</u>	<u>PRO-PLUS, PRO-WAVE</u>	<u>LABOR</u>
MAIN POWER MAGNETICS (STATIC & ROTATING)	3 YEARS	2 YEARS	1 YEAR
ORIGINAL MAIN POWER RECTIFIER	3 YEARS	2 YEARS	1 YEAR
CONTROL PC BOARD	3 YEARS	2 YEARS	1 YEAR
ALL OTHER CIRCUITS AND COMPONENTS INCLUDING	1 YEAR	1 YEAR	1 YEAR
BUT NOT LIMITED TO, CONTACTORS, RELAYS, SOLENOID, PUMPS, POWER SWITCHING SEMI-CONDUCTORS			

ENGINES: ENGINES ARE NOT WARRANTED BY THERMAL ARC, ALTHOUGH MOST ARE WARRANTED BY THE ENGINE MANUFACTURER. SEE THE ENGINE MANUFACTURES WARRANTY FOR DETAILS.

<u>CONSOLES, CONTROL EQUIPMENT, HEAT</u>	1 YEAR	1 YEAR	1 YEAR
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EXCHANGES, AND ACCESSORY EQUIPMENT

<u>TORCH AND LEADS</u>	180 DAYS	180 DAYS	180 DAYS
<u>REPAIR/REPLACEMENT PARTS</u>	90 DAYS	90 DAYS	90 DAYS

Warranty repairs or replacement claims under this limited warranty must be submitted to Thermal Arc by an authorized Thermal Arc[®] repair facility within thirty (30) days of the repair. No transportation costs of any kind will be paid under this warranty. Transportation charges to send products to an authorized warranty repair facility shall be the responsibility of the customer. All returned goods shall be at the customer's risk and expense. This warranty supersedes all previous Thermal Arc warranties.

Thermal Arc[®] is a Registered Trademark of Thermadyne Industries Inc.

