

MEGA-ARC® 5040DD
400 Amp Constant Current Diesel
Engine-Driven Welding Generator

For the Following Specs:

- 6436A-1
- 6436B-1



OWNER'S MANUAL Number **430429-245**
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.

CALIFORNIA Proposition 65 Warning

**Diesel engine exhaust and some of its constituents
are known to the State of California to cause cancer,
birth defects, and other reproductive harm.**

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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 are 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. A lifting eye extends through the top of the cabinet on most equipment to facilitate handling with a hoist or crane. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

WARNING: Falling machine due to lifting eye failure may cause death or serious injury.

- Lifting device may fail when overloaded.
- This lifting device is designed to lift the power source **ONLY**. If the machine is equipped with a trailer or accessories over 100 pounds, **DO NOT LIFT** by lifting eyes.
- Avoid sudden jerks, drops, or swinging.
- Check lifting device components visually for looseness and signs of metal fatigue.
- Before changing any hardware, check grade and size of bolts, and replace with bolts of equal or higher size and grade.

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.

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.

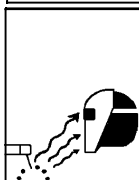


ELECTRIC SHOCK can kill.

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.

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.

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.



ARC RAYS can burn eyes and skin; NOISE can damage hearing.

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.

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.

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 breathe 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.

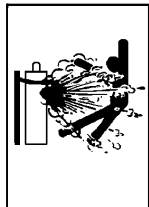
5. Watch for fire, and keep a fire extinguisher nearby.
6. Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
7. Do not weld on closed containers such as tanks or drums.
8. Connect work cable to the work as close to the welding area as practical to prevent 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.

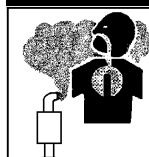
1. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.
2. Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.

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

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

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.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around the body.
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.

Safety and Health Standards, OSHA 29 CFR 1910, from 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, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126.

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

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

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.

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.

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'OÛIE.

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 electrode 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 SANTÉ.

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

1. Eloignez la tête des fumées pour éviter de les respirer.
2. 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.
3. Si la ventilation est inadéquate, portez un respirateur à adduction d'air approuvé.
4. Lisez les fiches signalétiques et les consignes du fabricant relatives aux métaux, aux produits consommables, aux revêtements et aux produits nettoyants.
5. 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.
6. 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.
7. 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.



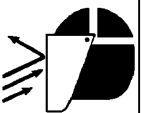
LE SOUDAGE PEUT CAUSER UN INCENDIE OU UNE EXPLOSION

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'ECHAPPEMENT DES MOTEURS PEUVENT ETRE MORTELS.

Les moteurs produisent des gaz d'échappement nocifs.

LES MOTEURS PEUVENT ETRE 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

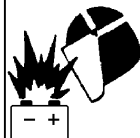


DES PIÈCES EN MOUVEMENT PEUVENT CAUSER DES BLESSURES.

Des pièces en mouvement, tels des ventilateurs, des rotors et des courroies peuvent couper doigts et mains, ou accrocher des vêtements amples.

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.

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.



DES ETINCELLES PEUVENT FAIRE EXPLOSER UN ACCUMULATEUR; L'ELECTROLYTE D'UN ACCUMULATEUR PEUT BRULER LA PEAU ET LES YEUX.

Les accumulateurs contiennent de l'électrolyte acide et dégagent des vapeurs explosives.

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.



LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRÛLANT SOUS PRESSION PEUVENT BRULER LA PEAU ET LES YEUX.

Le liquide de refroidissement d'un radiateur peut être brûlant et sous pression.

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.

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

Generator

The Mega-Arc 5040DD diesel engine-driven arc welding machine is a self-contained unit, mounted on a welded steel frame. The unit is covered by a sheet metal canopy, bolted directly to the frame. The control panel is at the back (generator) end of the unit.

The welding generator and auxiliary (exciter) generator revolving fields are mounted on a single heavy-duty shaft, supported by a ball bearing at the exciter end of the shaft, and by the engine coupling at the other end.

The welding generator is 400 ampere, 3-phase, wye connected, rectified to DC power by the output rectifier, and stabilized by the stability reactor.

The auxiliary generator is self-excited. The AC voltage output furnishes 115-volt power to a diode bridge rectifier which provides DC voltage for excitation of the auxiliary generator fields and welding generator fields. It provides 115-volt and 230-volt AC power to the receptacles on the Control Panel for operation of small tools, lights, etc. See Tabulated Data for rated auxiliary power of your unit.

Engine

The engine used in this unit is a Deutz, Model F3L-912D diesel engine. It is directly coupled to the welding generator shaft by a flexible coupling.

Identification

The welding generator unit has an identification plate attached to the control panel on the left-hand side. The unit is identified as to SPEC number, by the dash (—) number which follows it.

The engine identification number is stamped on right-hand side of the cylinder block. When ordering spare parts, or communicating about this machine, be sure to specify the engine serial number, engine type, unit specification and serial numbers. Left- and right-hand sides of the unit are determined when facing the control panel. See Supplementary Materials for address for communicating or ordering engine parts.

Tabulated Data

Generator:

Output, Auxiliary Power 3kVA, 115/230V AC
Output, Welding Generator 16 kW
Amperes, rated 400 Amps
Voltage, rated 40 Volts
Voltage, open-circuit (max.) 75 Volts
Duty Cycle, rated 100%
Current Range —
..... Low Range 20 to 250 A
..... High Range 40 to 500 A
Operating Speed See Engine Data

Engine:

Make and model —
..... Deutz, F3L-912D
Type Industrial diesel
Displacement 172.5 cu. in. (2826 cm³)
Brake horsepower 41 BHP @ 1800 RPM
Oil sump capacity 9-1/2 quarts (9 liters)
Fuel tank capacity —
..... 17 gallons (U.S.) (64.4 liters)
Weight (dry) 595 pounds (270 kg)
Normal operating RPM 1800 RPM

Dimensions and Weight: (See Figure 4-1)

Width (doors closed) 28 inches (711 mm)
Width (doors open) 78 inches (1981 mm)
Length 61-1/2 inches (1562 mm)
Height (top of canopy) —
..... 40 inches (1016 mm)
Height (over muffler) —
..... 47-1/2 inches (1207 mm)
Weight (shipping) —
..... approx. 1600 pounds (726 kg)

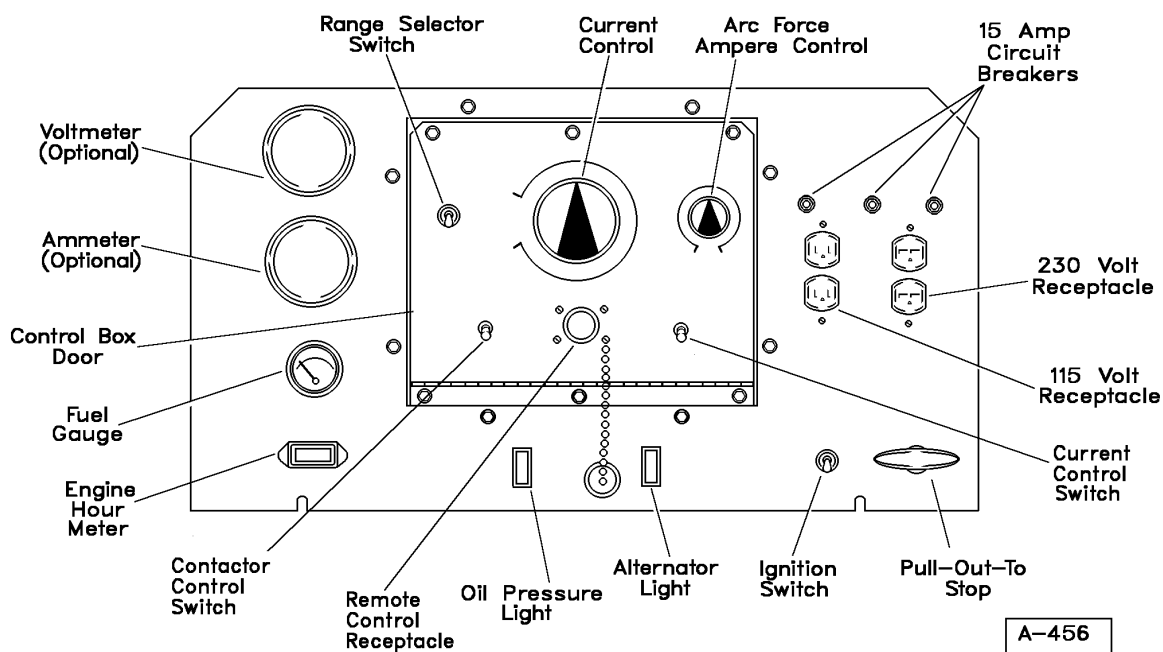


Figure 3-1 Control Panel

Supplementary Materials

A copy of the instruction manual for Deutz F3L-912D Diesel Engines is included with each welding generator unit. Additional copies may be obtained from the manufacturer. Order from:

Deutz Corporation
7585 Ponce de Leon Circle
Atlanta, Georgia 30340
U.S.A.

Engine Controls and Instruments

Ignition Switch — The diesel engine starting motor is actuated by this switch, located in the lower right-hand corner of the control panel. Do NOT crank the engine for more than 30 seconds at a time, as this may cause the starting motor to overheat. Allow motor to cool before attempting to start the engine again. Place switch in START position to start, and return to RUN position after the engine

has started. When engine is shut down, place switch in OFF position.

NOTE: Switch must be in OFF position to avoid lighting the Alternator and Oil Pressure light.

Pull-To-Stop Control — This control shuts the diesel fuel supply off to the engine to accomplish normal shutdown. Allow the spring-loaded handle to return to the IN position after engine stops.

Oil Pressure Light — Glows (red) when oil pressure drops to 3-5 psi for any reason.

Alternator Light — Glows when engine alternator circuit is not charging the battery at sufficient level.

Fuel Gauge — Indicates level of fuel in fuel tank.

Hour Meter — Indicates run time on engine.

Generator Controls

Range Selector Switch — This toggle switch is used to select either the low or high welding range, as indicated on the Current Control.

Current Control — The welding current control is located in the center of the control box door panel. Turning knob clockwise will increase welding current, counterclockwise will decrease current.

Voltmeter (Optional) — Indicates open-circuit and welding arc voltage, when supplied.

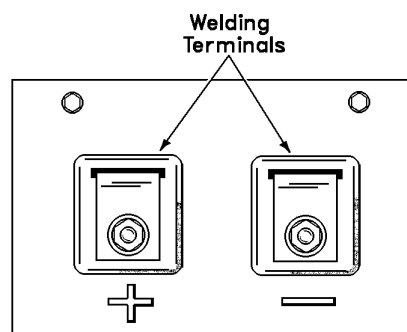
Ammeter (Optional) — Indicates welding current being used to weld, when supplied.

Arc Force Ampere Control — Varies the short-circuit (welding arc) current and produces an increase of amperage when arc length is shortened. Turning this control clockwise increases arc force, counterclockwise decreases arc force. See Operation chapter for details.

Welding Terminals — (See Figure 3-2) — The two welding terminals are located on the Welding Output Panel, which is located on the left-hand side of the unit (facing the control panel). See instructions in Initial Preparation for Use located in the Installation chapter.

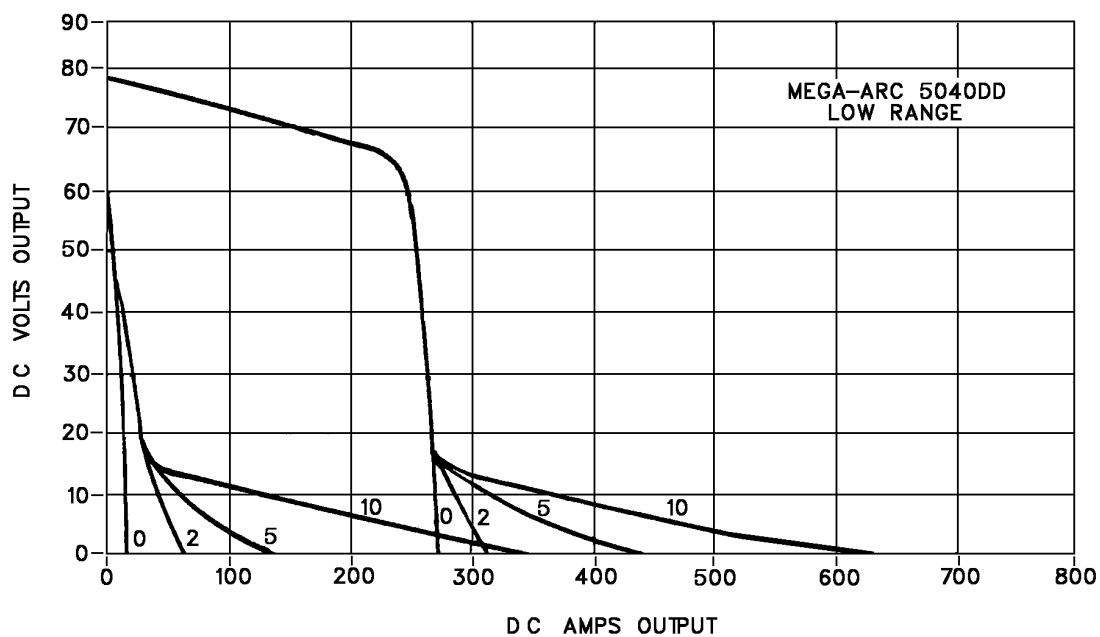
Auxiliary Power Receptacles — Duplex receptacles located on the Control Panel (see Figure 3-1) furnish 3-kVA, 115-volt and 230-volt, 60-Hz power.

NOTE: The output voltage will drop below the rated volts when engine is in the idling mode. Low voltage may damage electrical equipment connected to the generator through this receptacle.



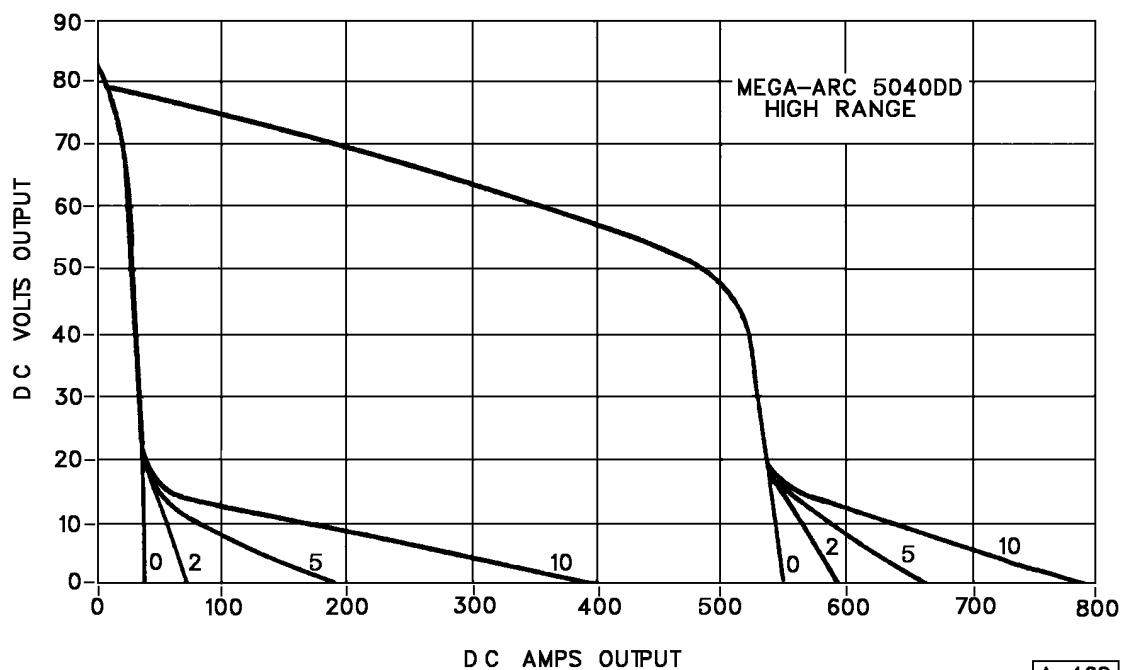
A-182

Figure 3-2 Weld Output Panel



A-461

Volt-Ampere Curve - Low Range Voltage



A-462

Volt-Ampere Curve - High Range Voltage

INSTALLATION

General Engine Driven Welder Installation

The frame of an engine driven welder is intended to be a base to hold the welder components together. This frame is not intended to be the primary structure of a trailer or wagon. This welder is intended to be installed on a rigid, flat surface. This surface must allow the weight of the welder to be distributed evenly along the length of the welder frame.

Never install any vibration isolation material (shock mounts, etc.) beneath the welder frame. This could defeat the engine/generator shock mounts and cause abnormal vibration throughout the welder and produce vibration related problems.

Before choosing an installation location, make note of where the service items are located on the welder (oil change/fill, battery, air filter, fuel fill, etc.) Install the welder for best access to the important service items. Allow sufficient room for cooling air intake and exhaust.

If you are unsure about any installation consult the factory.

Trailer Installation: Do not use the frame assembly of this welder as the frame of a trailer (do not attach axles or tongues directly to this frame). When a trailer is required, use only trailers with its own support frame that has a gross weight rated to carry the weight of the welder and any other components mounted on the trailer. Be sure the trailer tires are for use with trailers. The soft sidewall design used in radial tires can cause vibration related problems. Be sure welder frame and trailer frame are electrically bonded together.

Truck Bed Installation: When installing this welder on the bed of a truck allow the welder to sit flat on the bed, or a surface which completely contacts the bottom of the welder frame. Do not modify the welder frame by cutting or otherwise damaging it or the warranty may be voided. Bolt the welder frame directly to the bed to secure it. Do not install any vibration absorption device (shock mounts, etc) between the welder and the truck bed. Be sure welder frame and truck frame are electrically bonded together.

Ground Installation: The welder will operate perfectly fine just sitting on the ground, with or without

the shipping skid. No special precautions are required.

Location

For best operating characteristics and longest unit life, take care in selecting an installation site. Avoid locations exposed to high humidity, dust, high ambient temperature, or corrosive fumes. Moisture can condense on electrical components, causing corrosion or shorting of circuits. Dirt on components helps retain this moisture and also increases wear on moving parts.

Safety

Refer to additional installation instructions under the Safety Warnings chapter included in this manual.

Indoor Installation

Adequate air circulation is needed at all times in order to assure proper operation. Provide at least 24 inches (610 mm) of space at radiator end of unit. Make sure that ventilation openings are not obstructed. Allow ample space to open canopy doors on sides of the unit (see Tabulated Data in Description of Equipment chapter for dimensions) for servicing, and space at the control panel end of unit for operation.

If unit is to be operated inside a building, make certain there is adequate ventilation to carry off escaping exhaust fumes and to provide an ample supply of oxygen.

Place unit so that exhaust fumes are carried out of the building using the shortest exhaust pipe possible and one with the fewest possible number of bends. Exhaust back pressure can seriously affect engine efficiency.

All exhaust connections must be gastight.

Portable Installation

For portable use, the machine may be located within 12 inches (305 mm) of a truck cab, panel, or whatever, if it is to be operated in the open air.

The engine of the welding machine must be placed at the tongue end of the portable mounting for

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proper balance. If leads, etc., are to be stored on the unit, they must be forward of the axle to maintain proper balance of loading on the tongue end of the unit.

NOTE: The unit should be operated in as near a normal horizontal position as possible and never at a tilt greater than 15° from horizontal.

Initial Preparation For Use

1. Open canopy doors on sides of engine.

CAUTION: The canopy doors may fall to a closed position during operation of the unit if it is resting on an inclined surface, or for other reasons. Tie the doors to each other, to lifting eye or fuel filler cap. Failure to do so may result in injury to operating personnel.

2. Inspect unit thoroughly to be sure it is in proper working order. Check all fuel and wire connections to be certain they are secure. Tighten any loose screws, nuts, or bolts. Check closely for any damage which may have occurred in transit.

3. Remove all special tags from the machine, read carefully and follow any special directions they may carry. Keep tags with manual for future reference.

4. Make certain that all cooling air passages and cooling fins are free from foreign matter. Use clean, dry compressed air to blow dirt and dust out of cooling passages and control cabinet, 25 psi (172 kPa) maximum pressure.

5. Attach battery cables to poles of battery as indicated on wiring diagram. The negative (—) pole should be grounded to the frame of the unit in a secure manner.

WARNING: Connect proper battery cable clamp to the positive (+) battery post first, then the other cable clamp to the negative (—) post.

CAUTION: A short circuit to rectifier is created if a battery is installed with polarity reversed. Current can flow from positive terminal of battery through

negative and positive rectifiers and into heat sink. From heat sink a completed circuit exists back to negative battery terminal. Full battery voltage will be impressed on rectifiers, in the alternator. The resulting high current will damage rectifiers and/or wiring harness.

6. Fill fuel tank with grade of fuel recommended by engine manufacturer. (Consult engine instruction manual.) Be sure fuel is free of WATER and other foreign matter. Make sure air vent to fuel tank is open. See Safety Warnings chapter included in this manual for precautions necessary when filling the tank.

7. Pull the dipstick and check the oil level in crankcase. If it is necessary to add oil, fill to dipstick mark with correct seasonal grade of quality detergent oil. See engine operator's manual for recommended viscosity and temperature chart (unit is shipped with SAE 10W30 oil installed).

8. After engine has been properly prepared for use, start the engine, and allow it to idle for 30 minutes or so. Carefully check again for any leaks or loose connections during this period.

9. Determine which welding polarity will be suitable for the welding job to be done.

- a. For STRAIGHT polarity (DCEN) attach ELECTRODE lead (leading to electrode holder) to the NEGATIVE (—) terminal on the Terminal and Receptacle Panel. Attach the WORK lead (with clamp on end) to POSITIVE (+) terminal.

- b. For REVERSE polarity (DCEP) attach ELECTRODE lead (leading to electrode holder) to the POSITIVE (+) terminal. Attach the WORK lead (with clamp on end) to the NEGATIVE (—) terminal.

CAUTION: Do not change welding leads while generator is running, as open-circuit voltage (80 volts) is furnished to the terminals. Shut engine down to change leads.

10. Make sure that no loose bars, tools, parts, etc., are in or on any part of engine as they could cause serious damage to or wreckage of engine or generator, or personal injury to anyone standing nearby.

11. Carefully read and follow "Operating Instructions" in your engine operator's manual.

Welding Leads

Table 4-1 shows welding lead sizes recommended for various lengths of leads. The footage shown

includes complete welding circuit, both electrode and work leads.

Welding Current Amperes	TOTAL LENGTH OF LEAD CIRCUIT IN FEET (AND METERS) (ELECTRODE LEAD PLUS WORK LEAD)				
	50 Feet (15.2 M)	100 Feet (30.5 M)	150 Feet (45.7 M)	200 Feet (61.0 M)	250 Feet (76.2 M)
100	#4	#4	#2	#1	#1
150	#2	#2	#1	#1/0	#2/0
200	#1	#1	#1/0	#2/0	#3/0
250	#1/0	#1/0	#2/0	#3/0	#4/0
300	#2/0	#2/0	#3/0	#4/0	2 - #2/0
350	#3/0	#3/0	#3/0	2 - #2/0	2 - #3/0
400	#4/0	#4/0	#4/0	2 - #2/0	2 - #3/0

NOTE: Cable size shown is for 90°C(194°F) cable insulation, 30°C (86°F) ambient, and not over 4.5 volts cable drop.

Table 4-1 Suggested Copper Welding Lead Size Guide

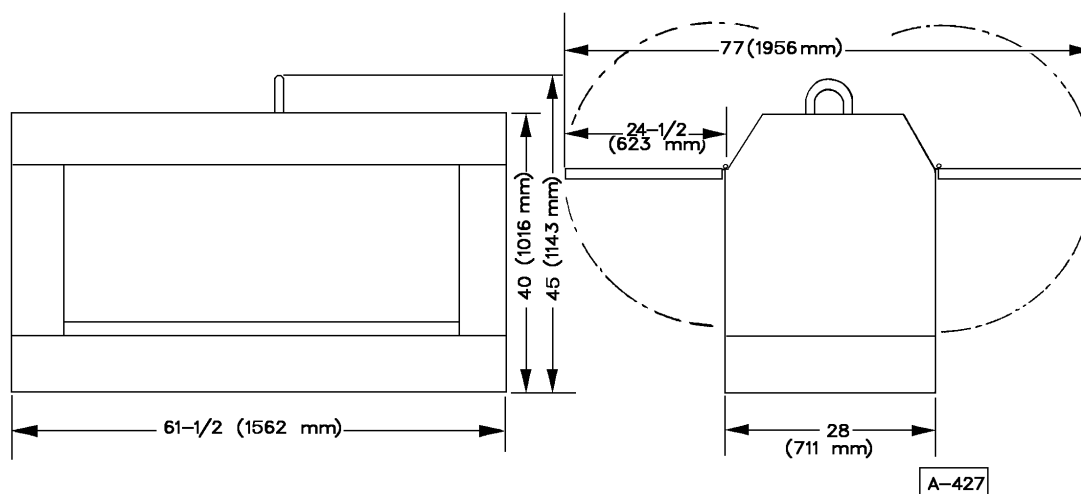


Figure 4-1 Dimensions

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OPERATION

Prestarting Instructions

In all probability, the welding unit will be moved from one location to another many times during its lifetime of service. Therefore, reference to Initial Preparation For Use located in Installation chapter is suggested each time the unit is moved prior to using it.

1. Check the supply of fuel and crankcase oil. See Deutz F3L-912D Instruction Manual for specifications.

2. Inspect the unit thoroughly to be sure it is in proper working order. Check all fuel line and wire connections to be certain they are secure. Tighten any loose screws, nuts or bolts.

3. Wipe off the entire unit and clean the air passages, control box and hard-to-reach places with compressed air not over 25 psi (172 kPa).

4. Make sure that no loose bars, tools, parts, etc., are in or on any part of the engine as they could cause serious damage to the engine, generator, or personal injury to anyone standing nearby.

5. If the unit is operated indoors, make sure that an exhaust line is properly connected to the engine exhaust system, and discharges out of doors. Avoid short bends or reduction in line size in exhaust pipes, and locate the unit so as to necessitate the shortest possible exhaust line to insure the least amount of back-pressure on the engine. Back-pressure can cause engine damage and loss of power.

6. Check welding leads. Attach welding leads, as described under Initial Preparation For Use located in Installation chapter. Observe Table 4-1 and determine that welding leads are proper size for amperage being used for welding.

Break-in Procedures

A proper break-in procedure for a new diesel engine-driven welding generator is extremely important to avoid future problems. *Long periods* of operation at idle or light load condition may result in cylinder wall "glazing" and resultant poor seating of piston rings so that oil consumption will be excessive. Also, it may result in "wet stacking", which is unburned fuel that accumulates in the exhaust pipe due to extremely low exhaust temperatures. The following procedure will apply a load to the engine,

assuring the hot exhaust [at least 450°F (232°C)], which will aid in preventing "wet stacking".

1. Open the fuel shut-off valve at fuel tank.

2. Start the engine (see instructions under Engine Controls and Instruments included in Description of Equipment chapter) and let it turn for a *few minutes* to warm up lubricating oil and coolant, and then shut the engine off.

NOTE: Idling RPM is approximately 1300.

3. Check engine for low oil pressure, leaks or malfunctioning parts. If oil pressure does not show a sufficient, steady pressure within 5 seconds, shut engine down and determine cause.

4. Start engine again. Operate unit with canopy doors *closed*.

5. Apply a load to the welding generator. This can be accomplished by attaching a proper resistance load across the welding terminals and setting the current control. The load should be equal to at least one-half of the normal full load output of the unit (rated 400 amps/40 volts).

6. Operate the engine-generator unit for approximately one hour under the above loading conditions.

NOTE: This procedure can be followed at any time that wet-stacking becomes a problem, in order to burn out the unburned hydrocarbons that accumulate in the exhaust stack.

Prewelding Instructions

To adjust weld current and arc characteristics while welding, the High/Low Range Switch, Current Control, and Arc Force Control can all be adjusted under load, without damaging the welding machine. However, caution should be used in switching from low to high range on the Range Selector Switch, as this would cause the welding current to be immediately doubled. This might be more than the electrode in use could stand. This would cause immediate problems with the welding arc.

Note that on the Current Control dial, the low range is just one-half of the high range values. For example, leaving the Current Control setting constant, the high range would deliver 200 amperes, and the low

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range 100 amperes. This relation holds consistent through the entire range of the welding machine, giving two widely overlapping current ranges. The low range is 20 to 250 amperes, and the high range is 40 to 500 amperes. The entire usable range of the machine for stick electrode (SMAW) welding can be obtained in the single high range.

Adjustable Arc Force control for the welding process gives the operator great flexibility in selecting the arc characteristics needed for a particular job. (Refer to Volt-Amp Curves in Installation chapter.)

Setting the Arc Force Control at 4 to 6, or in the FORCEFUL range will adjust the welding characteristics of the Mega-Arc 5040DD machine to be normal and similar to many of the conventionally controlled engine-driven stick-electrode welding machines. However, turning down the Arc Force Control to the 2 to 4, or SMOOTH range, gives a softer, less "spatter" type of welding arc. Setting the Arc Force Control to DIGGING, 6 to 10 range, gives a very forceful, driving arc, which makes "sticking" the electrode nearly impossible.

Note on the Volt-Amp Curves that this adjustment of arc characteristics is accomplished by changing the short-circuit-to-welding current ratios as indicated by the dotted lines for arc force settings of 0, 2, 5, and 10 on the dial.

Welding

After all Prestarting and Break-In Procedures have been carried out, the controls for using the generator for welding may be set and welding accomplished. Follow this procedure:

1. Start engine per instructions under Engine Controls and Instruments. Operate unit with canopy doors *closed*.
2. Set Range Selector Switch on desired range and adjust current control for desired current. Turning the current control clockwise increases the welding current and open-circuit voltage; while turning it counterclockwise decreases the welding current.
3. Strike an arc and begin welding. If a change in welding current is desired, increase by turning knob clockwise until desired current is obtained. See Prewelding Instructions above for details on current range, current level, and arc force control.

Stopping The Engine

1. Stop welding.
2. Pull the control handle OUT as far as it will come, until engine completely stops, and then release it.

3. Turn engine starting switch to OFF.

4. Allow engine to cool sufficiently, then check crankcase oil level. If engine oil is to be changed, it can be done most effectively while engine is still warm.

5. After engine has cooled completely, fill the fuel tank. See Safety Warnings chapter included in this manual for precautions that should be taken when filling the fuel tank.

Storage

Nightly — After operation, the following steps should be taken before storing the welding machine for short periods of time.

1. Clean up around working area. Put all tools, parts and supplies in their proper places.
2. Disconnect welding leads from machine. Coil them and stow away in their place.
3. If unit is to be stored outdoors, it is wise to cover it with a tarpaulin.

Extensive Storage Time — If unit is to be laid-up for some time, please refer to "Engine Preservation" in Deutz Engine Instruction Manual which is supplied with each unit.

Adverse Weather Precautions

Cold Weather Operation — Operation of engine-driven welding units at sub-zero temperatures requires special precautions and extra servicing from both operation and maintenance personnel if poor performance or total functional failure is to be avoided. Consult Deutz Engine Manual and recommendations below.

a. Fuel System — Keep system clean and free from water which may collect in a low spot in the fuel line and freeze, plugging the line. Fuel tanks should be kept FULL to prevent water condensation from the air above the fuel. Check the filter bowl daily for presence of water.

b. Fuel — Keep fuel storage tanks or drums as full as possible to avoid condensation of moisture from the air above the fuel. After filling or moving fuel containers, allow fuel to settle before using. Never draw fuel from the extreme bottom of the container. Strain all fuel to remove any foreign matter. When operating outdoors, take steps to prevent the entry of snow, water and ice into the fuel containers.

c. Lubrication — Drain the crankcase (preferably when warm after running) and fill with a lighter

grade of oil. See Engine Oil Recommendations chart in the Maintenance and Operator's Manual for recommended viscosity oil for various atmospheric temperatures. In cold weather, drain oil more frequently. Water condenses and collects quickly, mixes with the oil and increases deposits to form a sludge. Check oil frequently for this condition. Water in crankcase or oil lines may freeze and cause serious damage to the oil pump, or shut off the oil supply.

d. Battery — Battery efficiency decreases sharply with lower temperatures. Maintain the specific gravity of the battery between 1.275 and 1.300 (fully charged condition). Make sure of full charge before attempting to start engine in sub-zero conditions.

Operation In Hot And Humid Conditions

Battery — The specific gravity and proper level of the battery electrolyte should be maintained. Observe recommendations in the Maintenance and Operator's Engine Manual for proper care of the battery.

Operation In Extremely Dusty Conditions — If unit is to be operated under dusty, out-of-door conditions, place in a sheltered area. Take advantage of any natural barriers which may offer protection from blowing dust. If the installation is more than temporary, erect a protection shield.

a. Fuel System — Drain the fuel water-trap sediment bowl frequently, and keep all fuel containers covered and protected against dust entry.

b. Oil Filter and Air Cleaner — These both need more frequent attention under dusty conditions. Check air Restrictor Indicator daily. Clean oil filter cartridge as needed. Change or clean element in the air cleaner as required.

c. Crankcase — The crankcase oil level will bear close attention. Dusty conditions tend to load crankcase oil with dirt. Watch for dirty and gritty oil conditions, and change oil more frequently as required.

Operation In Salt Water Areas

a. Canopy — Wash canopy regularly to remove salt film. Repaint any damaged places and oil the side panel hinges regularly.

b. Covering — To protect the engine and generator as much as possible from salt water atmosphere, keep the side panels on the canopy closed, when not in use. It is advisable to keep the unit covered with a tarpaulin, if available, while not in operation. Salt water should be wiped from the engine, and all terminals and connections in the electrical system wiped dry. Keep all linkage oiled.

c. Brushes — The brushes of the welding generator and exciter should be inspected regularly to make certain that they are free in the holders. Lift the brushes in the brushholders about every two days to insure their freedom to slide within the holder. Wipe dry all the parts that can be reached, and use compressed air, if available, to dry the parts of the generator that cannot otherwise be reached. See Maintenance chapter for brush and commutator care.

d. Field Coils — The fields should be dried as thoroughly as possible. If they have become damp, proceed with recommended procedure in Maintenance chapter.

e. Battery Terminals — Thoroughly clean the battery terminals and connections. Coat terminals and connections with petroleum jelly to retard corrosion.

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MAINTENANCE

Engine And Related Components

NOTE: Check diesel engine instruction manual for all engine-related maintenance.

Inspection And Cleaning

Every Day, check for oil or fuel leaks. Also check for loose electrical connections. Check oil pressure with engine running at rated RPM (1800 RPM). Do not operate engine if oil pressure light stays ON. Wipe accumulated water off all electrical connections and instruments. Make sure that the alternator light is not glowing, which indicates battery is being fully charged.

Every Week, wipe accumulated dust, dirt, and oil off from the engine and generator. Check all parts for looseness and wear. If arcing has occurred at any electrical connection, recondition it and securely refasten. Check engine oil level.

Every Month, blow out generator windings with compressed air, not over 25 psi (172 kPa) pressure or remove with a suction type cleaner with a non-metallic nozzle. If windings should become slightly damp, use space heaters or electric light bulbs to effectively dry out the windings. If dampness is excessive, apply external heat under a canvas cover, well vented. Heating should not exceed 194°F (90°C).

Pound out any dents in the canopy. Sand, prime, or repaint any dented or rusted spots.

Lubrication

Engine — Consult Deutz Instruction Manual.

Exciter/Auxiliary Brushes

(See Figure 6-1)

1. Disconnect leads (A) from connectors on brushholder caps (B).

CAUTION: When removing the lead wires, do so one at a time and replace each brush accordingly, to insure that the lead wires are put back onto the proper brushes.

2. Lift brush (D) from brushholder (C) for inspection. If brushes are worn unevenly or are shorter than 7/16 inch (11 mm), replace them.

3. Inspect slip rings whenever brushes are removed for servicing brushes or brushholders. Note surface condition of rings. Surface should appear smooth and clean. Scoring or roughness of slip rings may be caused by grit or abrasive substance in brushes, or by oil on the rings. Moderately rough slip rings can be smoothed by holding grade 00 flint paper against their surface while the rings are revolving slowly. If the rings are badly scored, the unit must be sent to an overhaul facility for repair. After cleaning slip rings, blow dirt and grit out of the unit with compressed air. Do not use over 25 psi (172 kPa) air pressure to blow dirt out.

4. Slip new brushes into brushholder guides, and place caps on top, and screw them into the guides to a "bottomed" position. The spring attached to the brush will determine the pressure at which the brush contacts the slip rings.

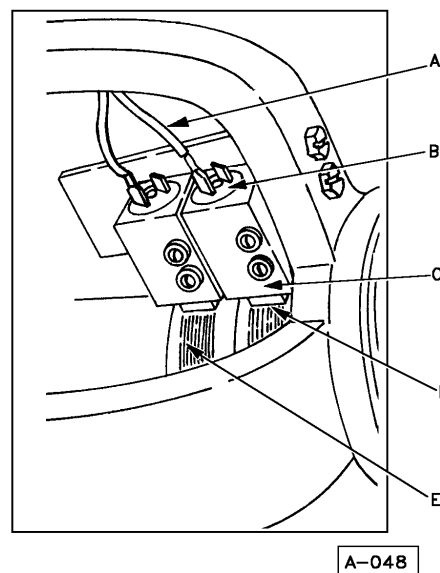


Figure 6-1 Exciter/Auxiliary Brushes

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MAINTENANCE

5. To fit new brushes to the slip rings, lay a strip of No. 00 sandpaper, smooth side down, on slip ring surface, and draw the sandpaper in the direction of rotation of the slip rings, lifting the brush on the return stroke. Continue until the brushes have the same curvature as the slip rings. Blow all carbon dust out of the machine using not over 25 psi (172 kPa) air pressure.

Failure To Build Up Voltage

Refer to Connection Diagram in Diagrams chapter included in this manual.

One common problem with engine-driven generators is failure to build up voltage from loss of residual magnetism in the fields.

Check all wiring from the exciter stator T1-T2 to rectifier (CR1) and to slip rings (SR). Also check

(CR1) diode bridge for a shorted diode which would not allow unit to build up. If this check does not solve problem, check the revolving fields for continuity, as explained below. See Figure 6-2.

To check for revolving field coil problems, it is necessary to understand that there are two field circuits permanently paralleled at the slip ring connections. A good armature will show 6-ohms resistance measured at the slip rings (with brushes lifted from rings). If the resistance measured at the rings is 8 ohms, then the exciter revolving fields (23-ohm coils) have an open circuit. If the measured resistance at the slip rings is 23 ohms, then the exciter fields (8 ohms) have an open circuit. A resistance measurement of much less than 6 ohms at the slip rings indicates that there is a short circuit somewhere in the revolving field windings.

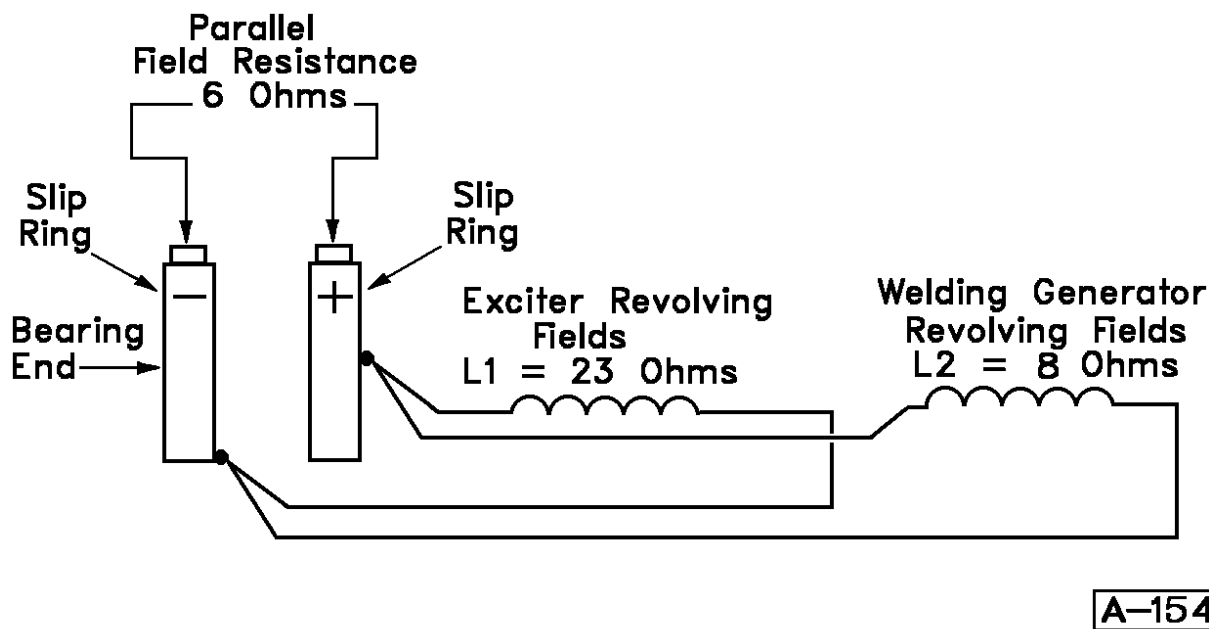


Figure 6-2 Slip Ring Continuity

TROUBLESHOOTING

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

Troubleshooting Guide

Auxiliary Power Generator (Exciter) and Welding Generator

No output at Auxiliary Power Receptacles or Welding Terminals (Unit won't build up voltage).

Loose connections.

Check connections completely.

Open circuit in exciter revolving field.

Replace armature (see detail instructions at end of chart).

Brush and slip rings dirty.

Check brushes and clean slip rings.

Broken wiring.

Repair.

Shorted diode in field rectifier bridge.

Replace bridge.

No output at welding terminals (auxiliary power receptacles output OK).

Open circuit in welding generator revolving field coils.

Replace armature.

Shorted power diode SCR, or flyback diode in output rectifier assembly.

Replace defective device.

Fuses to control P.C. Board blown.

Replace fuses.

Control P.C. Board failure.

Replace P.C. Board.

Output voltage too high.

Engine overspeeding.

Check engine RPM; should read 1825-1840 (no load).

Output voltage too low.

Engine running underspeed.

Check engine RPM.

One or more revolving field coils shorted.

Replace defective coils.

Engine

See Deutz Instruction Manual for F3L-912 engine.

Detailed Troubleshooting Instructions

The Mega-Arc 5040DD machines are solid-state welding machines. The method of troubleshooting is different, but it is not more difficult than troubleshooting a conventional unit. Do not overlook the obvious. As in the case of all electrical equipment, loose connections are the primary cause of malfunction both internal and external to the power source. Do not overlook bad grounds, shorted control cables, wrong settings, blown fuses, misconnections from auxiliary equipment, misapplications, etc. The only equipment needed to properly detect a problem on this power source is a simple voltohmmeter, although an oscilloscope is the best method to quickly "see" the problem.

Voltages — Refer to proper connection diagram. See Diagram chapter included in this manual.

The following voltages should be read at 1800 RPM engine speed.

1. Welding Generator phase-to-phase, on all three phases — 60 V AC $\pm$ 10%.
2. Phase-to-Neutral of Welding Generator — 35 V AC $\pm$ 10%.
3. Check for blown fuses F3-F8. Refer to Diagram 492107 included in the Diagrams chapter. Between wires 13/7 brown, 14/8 orange, 15/9 grey, 16/10 black, 17/11 yellow, and 18/12 blue on fuse block — 60 V AC $\pm$ 10%.

NOTE: The $\pm$ 10% value indicates the possibility of having a high or low engine RPM.

Malfunction In SCRs Or Diodes — The following conditions will probably exist:

One SCR does not turn on (either it is open, or gate signal is not being received by the SCR [gate circuit open]) and a very small change will occur at the welding arc, and will be difficult to detect by the average welding operator. Generally when this happens, it will be necessary to adjust the current control on the front of the power source (see Figure 3-1), increasing the current to obtain the same welding current that was being produced before the SCR defect occurred.

Open-Circuit Voltage Test

If the power source is suspected, a very simple test can tell you a great deal about the power source. Observe the open-circuit voltage of the machine by placing a voltmeter across the output terminals. The voltage reading should be approximately 75 V DC.

If the voltage is not equal or close to 75 V DC, there is something wrong with the power source (welding machine). Note that this voltage was observed at normal engine speed (1800 RPM). It will vary according to the engine speed. If the 75 V DC is observed, there is a very good chance that the power source is operating properly.

NOTE: It is important to note that in the LOW range (15 to 200 amperes) at minimum setting of the Current Control, the open-circuit voltage will drop to a lower value and vary slightly with the current control. This is not a malfunction, but a normal situation.

Power Diode And SCR Testing

In case of a severe malfunction such as a shorted SCR, do NOT turn the unit ON. Disconnect the leads from the generator to the rectifier assembly,

and check with a VOM for shorted SCRs and diodes.

An *open* gate or an *open* SCR cannot be checked with a VOM. If an SCR is not firing, the open-circuit voltage will shift down. Check the following table for typical values for a Mega-Arc 5040DD unit.

	All SCRs Firing	One Not Firing	Two Not Firing	Three Not Firing
Max OCV	75 V DC	50 V DC	25 V DC	0 V DC

Table 7-1

NOTE: The above values in Table 7-1 were recorded at normal engine RPM (1800).

Isolating Malfunctioning SCR

This can be done best by trial-and-error method. Use proper diagram as reference while inspecting the unit.

On the output rectifier heat sink there are three SCRs, each having a small lead. The lead, a white one, is connected to a wire harness providing the gate signal to the SCRs.

Turn the Current Control to maximum position (fully clockwise) and begin disconnecting the white

leads from the harness, one at a time. As the first lead is disconnected, observe the open-circuit voltage of the machine. If the OCV drops to a lower value, it will indicate that this particular SCR is working properly. Reconnect this lead, and proceed to do the same with the remaining two leads until you discover which disconnection does *not* cause the OCV to drop to a lower level. This will be the SCR which should be changed.

Printed Circuit Board Testing

The next step is to check the Printed Circuit Board inside the unit. See Figure 7-1 and Table 7-2 for location of test points and voltage values at the test points.

The following conditions indicate the possibility of a defective P.C. Board:

1. Loss of welding arc completely.
2. Rough, sputtering arc, very noticeable.
3. Loss of welding arc control.
4. Difficulty in starting arc.

If any voltage measurement does not agree with Table 7-2 voltage values, the P.C. Board is probably defective.

NOTE: Do not attempt to repair or recalibrate these voltages, as they are factory set.

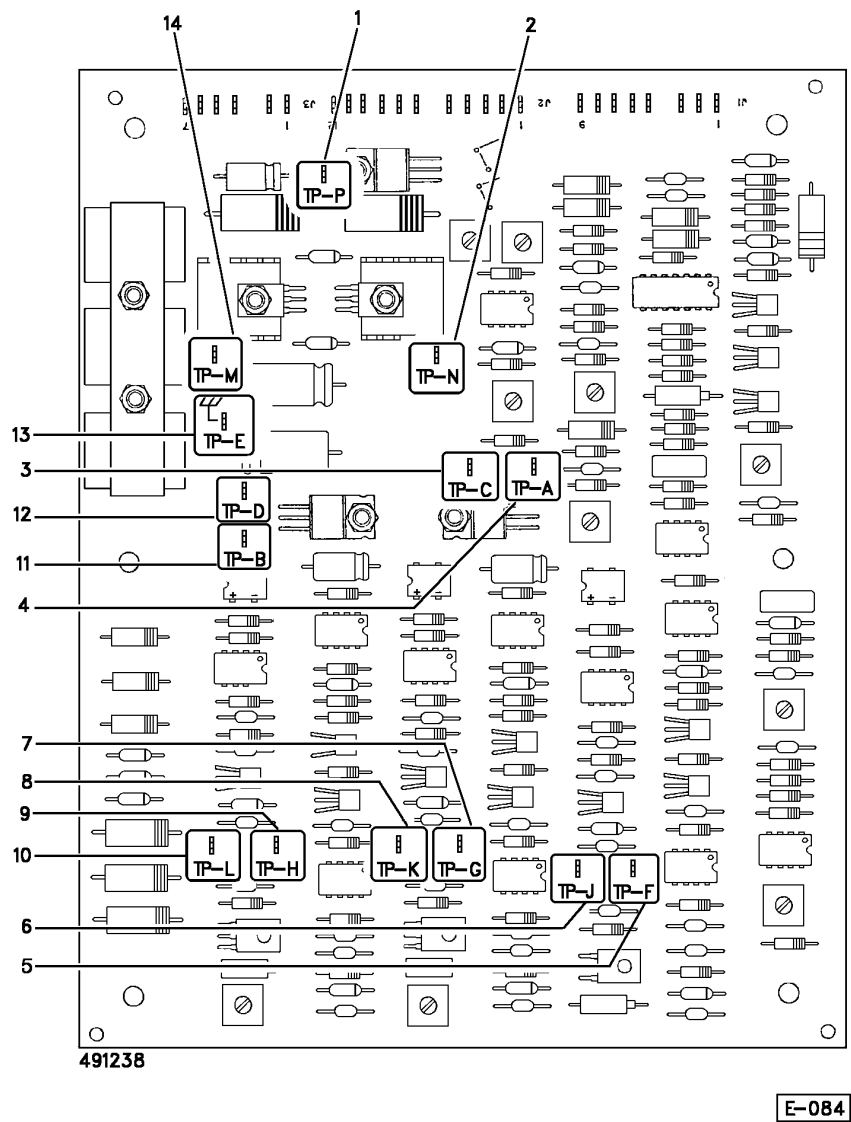


Figure 7-1 Control P.C. Board

TEST	TEST POINTS	CALLOUTS	VOLTAGE	CONDITIONS	REMARKS
1	TP-N to TP-E	2 to 13	+40.0/+21.0	1800 RPM/Idle	No Load
2	TP-M to TP-E	14 to 13	-40.0/-21.0	1800 RPM/Idle	No Load
3	TP-C to TP-E	3 to 13	+20.0	1800 or Idle	No Load
4	TP-D to TP-E	12 to 13	-20.0	1800 or Idle	No Load
5	TP-A to TP-E	4 to 13	+15.0	1800 or Idle	No Load
6	TP-B to TP-E	11 to 13	-15.0	1800 or Idle	No Load
7	TP-F to TP-E TP-G to TP-E TP-H to TP-E	5 to 13 7 to 13 9 to 13	+4.3 +4.3 +4.3	1800 or Idle 1800 or Idle 1800 or Idle	No Load No Load No Load
8	TP-J to TP-E TP-K to TP-E TP-L to TP-E	6 to 13 8 to 13 10 to 13	+18.3 +18.3 +18.3	1800 or Idle 1800 or Idle 1800 or Idle	No Load No Load No Load

Table 7-2

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

6436A-1
6436B-1

APPLICATION NUMBER

A
B

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PARTS LIST

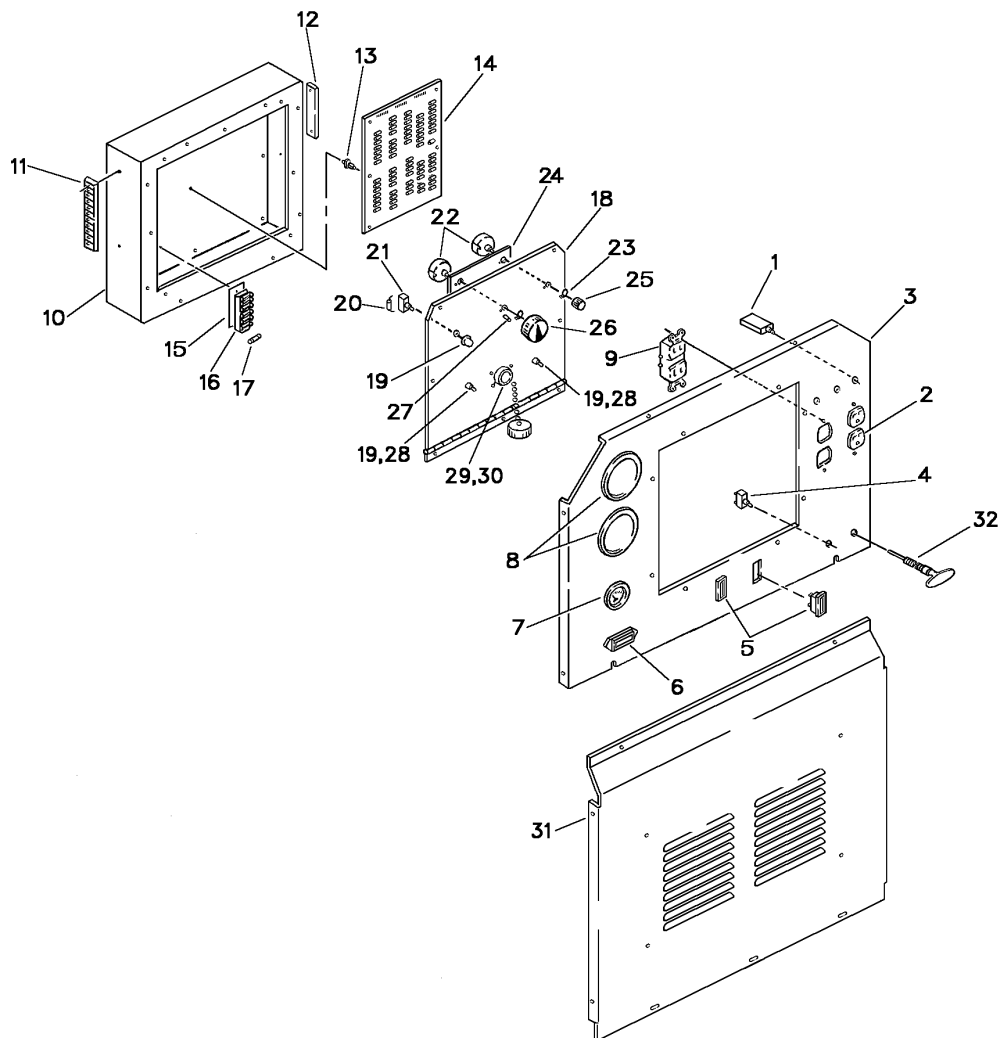


Figure 8-1 Control Panel

Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
	494120-2	Panel - Control Assembly	1	A
	494120-3	Panel - Control Assembly	1	B
1	409527-3	. Circuit Breaker - Thermal	3	All
2	404089	. Receptacle - Duplex, 3 Wire, 230 V	1	All
3	494121	. Panel - Control	1	A
	494121-1	. Panel - Control	1	B

Parts List for Figure 8-1

Item No	Part Number	Description	Qty per Assy	Application Code
4	404856	. Switch - Toggle	1	All
5	406004-1	. Light - Snap Mt., Red	2	All
6	79C-1149-1	. Meter - Hour	1	All
7	494134-1	. Gauge - Fuel, Electric	1	All
8	405982-1	. Cover - Meter Hole	2	All
9	402670	. Receptacle - Duplex, 3 Wire 115 V	1	All
	492010-1	. Box - Control Assembly	1	A
	492010-7	. Box - Control Assembly	1	B
10	492036	. . Box - Control	1	A
	492036-1	. . Box - Control	1	B
11	406003-2	. . Strip - Terminal, 12 Station	1	All
12	406003-1	. . Strip - Terminal, 6 Station	1	All
13	404915-1	. . Spacer - P.C. Board	6	All
14	491238	. . Board - P.C. Control	1	All
15	367579	. . Insulator - Fuse Block	1	All
16	405129-1	. . Block - Fuse, 6 Station	1	All
17	W-11166-9	. . Fuse - 1 Amp, Fast Blow	6	All
	—	405157	. . Label - Fuse	All
	492008	. . Door - Control Box Assembly	1	A
	492008-1	. . Door - Control Box Assembly	1	B
18	492009	. . . Door	1	A
	492009-1	. . . Door	1	B
19	406040	. . . Boot - Toggle Switch	3	All
20	367703-1	. . . Resistor - 1/2 Watt	1	All
21	405365-1	. . . Switch - Toggle	1	All
22	406926-1	. . . Potentiometer - 2 Watt, 5 K	2	All
23	402663	. . . Nut - Pot. Lock	2	All
24	492576	. . . Board - Mtg. Pot.	1	All
25	406806-1	. . . Knob - Control	1	A
	406806-3	. . . Knob - Control	1	B
26	491773-1	. . . Knob - Control	1	A
	491773-3	. . . Knob - Control	1	B
27	8BW-106A	. . . Spacer	1	All
28	402682	. . . Switch - Toggle	2	All
29	400758	. . . Receptacle - 6 Pin Amphenol	1	All
30	404875	. . . Cap & Chain - Assembly	1	All
31	494122	Panel - Control, Lower	1	A
	494122-1	Panel - Control, Lower	1	B
32	HF-1458	Rod - Shutoff	1	All
—	Not Illustrated			

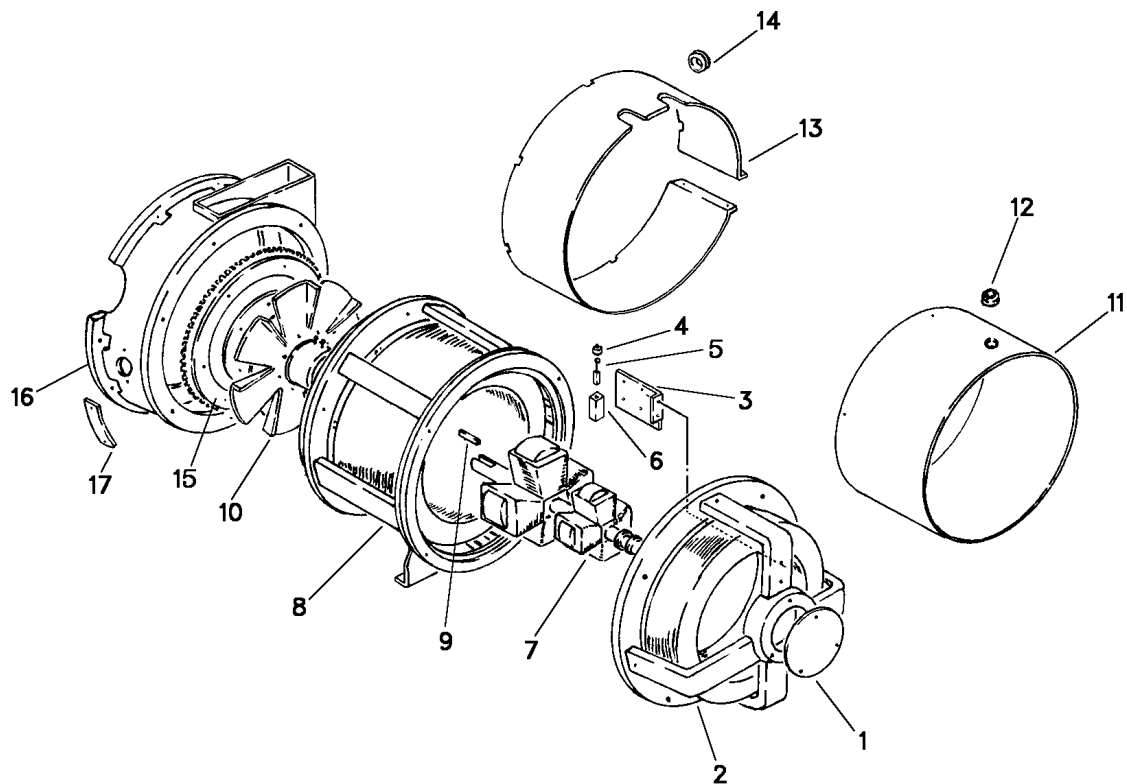


Figure 8-2 Generator Group

Parts List for Figure 8-2

Item No	Part Number	Description	Qty per Assy	Application Code
	491461-3	Generator - AC, Assembly	1	A
	491461-7	Generator - AC, Assembly	1	B
1	5J-260-0	. Cap - Bearing	1	A
	5J-260-3	. Cap - Bearing	1	B
2	356773-38	. Housing - Exciter, Assembly	1	All
	491464	. Brushholder - Assembly	1	All
3	491463	. . Bracket - Brushholder	1	All
4	402531	. . Cap - Brushholder	2	All
5	402788	. . Brush	2	All
6	402530	. . Guide - Brushholder	2	All
7	492021	. Armature	1	All
8	356773-43	. Housing - Gen. Assembly	1	All
9	C-31	Key - Coupling	1	All
10	491658-2	Fan & Coupling - Assembly	1	All
11	492183-1	Cover - Exc. Housing	1	A
	492183-2	Cover - Exc. Housing	1	B
12	402037-9	Grommet - Exc. Cover	1	All
13	491813	Cover - Gen. Housing	1	A
	491813-1	Cover - Gen. Housing	1	B
14	351683	Grommet - Lead Hole	1	All
15	No Number	Flywheel - (Supplied W/Engine)	1	All
16	492111-1	Housing - Flywheel Assembly	1	All
17	491758-1	Cover - Hole	1	A
	491758-3	Cover - Hole	1	B

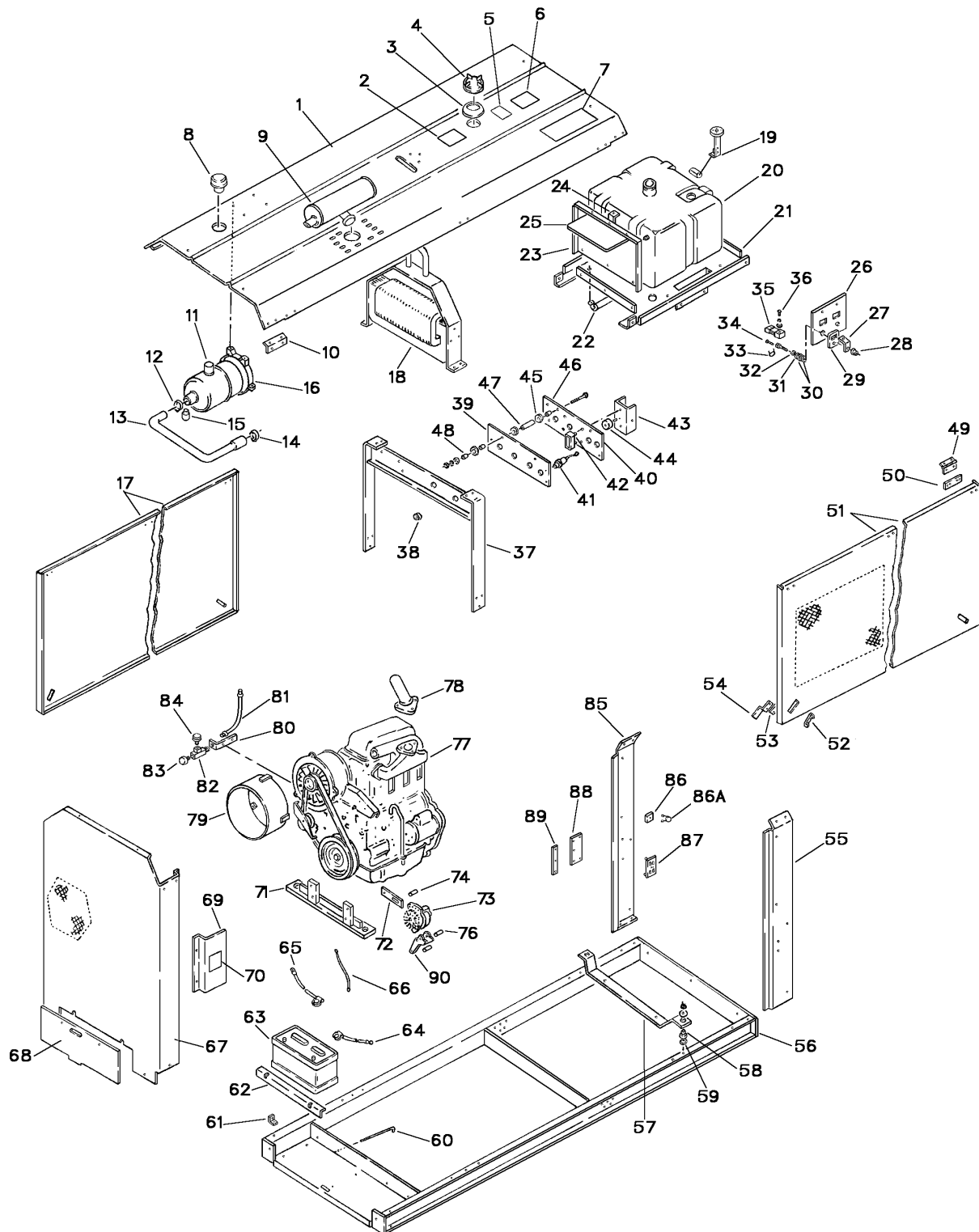


Figure 8-3 Frame Group

Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
1	492054-1	Top - Canopy	1	A
	492054-2	Top - Canopy	1	B
2	409158	Label - Danger	1	All
3	494130	Shield - Safety	1	All
4	494133	Cap - Fuel Tank	1	All
5	405089	Label - Fuel	1	All
6	406000	Label - Warning Fuel	1	All
7	494445	Label - Precautionary	1	All
8	406650-1	Hood - Air Cleaner	1	All
9	406652	Muffler	1	All
10	359699	Brace - Canopy	2	A
	359699-1	Brace - Canopy	2	B
11	406651	Air Cleaner	1	All
12	W-10869-5	Clamp - Air Hose	1	All
13	406672	Tube - Air Cleaner	1	All
14	W-10869-6	Clamp - Air Hose	1	All
15	406768-1	Indicator - Restriction	1	All
16	406538	Bracket - Mtg.	2	All
17	491763-1	Door - Side, Rt.	1	A
	491763-3	Door - Side, Rt.	1	B
18	491414	Reactor - Stability Assembly	1	All
19	494135-1	Sender - Fuel Gauge	1	All
20	494127	Tank - Fuel	1	All
21	494145	Support - Fuel Tank	1	A
	494145-1	Support - Fuel Tank	1	B
22	406358-2	Resistor - Preload	1	All
23	402191	Panel - Heat Shield	1	A
	402191-1	Panel - Heat Shield	1	B
24	491820	Support - Heat Shield	1	A
	491820-1	Support - Heat Shield	1	B
25	492195	Cover - Heat Shield	1	All
	492533-5	Panel - Terminal Assembly	1	A
	492533-7	Panel - Terminal Assembly	1	B
26	492532-1	. Panel - Output	1	A
	492532-2	. Panel - Output	1	B
27	5CW-974	. Bar - Bus	2	All
28	No Number	. Nut - 1/2-13, HWH, ST.	2	All
29	5CW-975	. Bushing	2	All

Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
30	5CW-976A	. Washer - Bakelite	4	All
31	No Number	. Washer - 1/2, FL, ST.	2	All
32	No Number	. Washer - 1/2, LK, ST.	5	All
33	368705-7	. Capacitor - Assembly	2	All
34	No Number	. Screw - #6-32 x 3/16 Rd. Hd. MH. ST.	2	All
35	492317	. Shunt	1	All
36	No Number	. Screw - 1/2-13 x 1-1/2 HHC. ST.	1	All
37	494456	Yoke - Lifting Assembly	1	A
	494456-1	Yoke - Lifting Assembly	1	B
38	402037-11	Grommet - Lifting Yoke	1	All
	492201-1	Rectifier - Assembly	1	All
39	492199-1	. Plate - Rect. Right	1	All
40	492200-1	. Plate - Rect. Left	1	All
41	W-10931-3	. Rectifier - Silicon Controlled	4	All
42	405140-1	. Clamp - Mtg.	3	All
43	492197	. Heat Sink - SCR	3	All
44	405826	. Rectifier - Silicon Controlled	3	All
—	16DA-954-12	. Pin - Spring	3	All
45	406436	. Washer - Rocker Arm	8	All
46	492029	. Bushing - Insulator	4	All
47	491905	. Spacer - Rect.	2	All
48	6FW-3167	. Spacer - Rect.	2	All
49	490040	Hinge	6	All
50	490174	Plate - Hinge	12	All
51	492090-1	Door - Side, Left	1	A
	492090-2	Door - Side, Left	1	B
52	492244	Handle - Door Latch	4	All
53	493457	Spacer - Door Latch	4	All
54	490234	Latch - Door	4	All
55	494129	Panel - Side, Left	1	A
	494129-1	Panel - Side, Left	1	B
56	492033-1	Frame - Mtg.	1	A
	492033-2	Frame - Mtg.	1	B
57	491683-1	Bar - Mtg. Gen.	1	A
	491683-2	Bar - Mtg. Gen.	1	B
58	406254-2	Mount - Shock	4	All
59	491799	Washer - Shock Mount	8	A
	491799-1	Washer - Shock Mount	8	B
—	Not Illustrated			

Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
60	494295	Rod - Battery	1 set	All
61	491122	Angle - Mtg. Front Panel	2	A
	491122-1	Angle - Mtg. Front Panel	2	B
62	491962-1	Clamp - Battery	1	A
62	491962-2	Clamp - Battery	1	B
63	402086-5	Battery	1	All
—	493797-2	Protector - Battery Term.	1	All
64	492132-1	Cable - Batt. Negative	1	All
65	492133-1	Cable - Batt. Positive	1	All
66	W-9360-229	Cable - Bonding	1	All
67	492053-1	Panel - Front	1	A
	492053-2	Panel - Front	1	B
68	491689-1	Plate - Front End	1	A
	491689-2	Plate - Front End	1	B
69	492142-1	Guards - Belt	2	A
	492142-2	Guards - Belt	2	B
70	406001	Label - Danger	2	All
71	492109-1	Support - Engine	1	A
	492109-2	Support - Engine	1	B
72	492143-1	Bracket - Alt. Adj.	1	A
	492143-2	Bracket - Alt. Adj.	1	B
—	408261-3	Belt - Alternator	1	All
73	494181	Alternator	1	All
—	494184	Pulley - Alt.	1	All
—	494183-1	Spacer - Pulley	1	All
74	492140-5	Spacer - Adj. Alt.	1	All
75	Deleted			
76	492140-7	Spacer - Mtg. Alt.	2	All
77	406602	Engine - Deutz, Diesel	1	All
78	492115-2	Pipe - Exhaust	1	All
79	492186-1	Duct - Intake, Assembly	1	A
	492186-2	Duct - Intake, Assembly	1	B
80	494174	Bracket - Mtg. Sender	1	A
	494174-1	Bracket - Mtg. Sender	1	B
81	494172-1	Hose - Oil Line	1	All
82	W-10909-1	Tee - Pipe, 1/8	1	All
83	409159	Switch - Oil Pressure	1	All
84	402130	Switch - Oil Pressure	1	All
—	Not Illustrated			

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Parts List for Figure 8-3

Item No	Part Number	Description	Qty per Assy	Application Code
85	494128	Panel - Side, Right	1	A
	494128-1	Panel - Side, Right	1	B
86	409554-1	Rectifier	1	All
86A	202258-5	Suppressor - W/Lugs	1	All
87	367634A-5	Suppressor - Surge Assembly	1	All
88	492049	Bracket - Mtg. Bus	1	All
89	492047	Bar - Bus	1	All
—	W-9234-338	Cable - Output Term. to Rectifier	1	All
—	W-9234-339	Cable - Output Term. to Reactor	1	All
—	491229	Pivot - Fuel Shutoff	1	All
—	16DW-34	Bushing - Shutoff Rod	1	All
—	492187	Rod - Speed Control	1	All
90	494383	Bracket - Mtg. Alt.	1	All
—	405548	Label - Ground	1	All
—	494541	Clamp - Throttle	1	All

— Not Illustrated

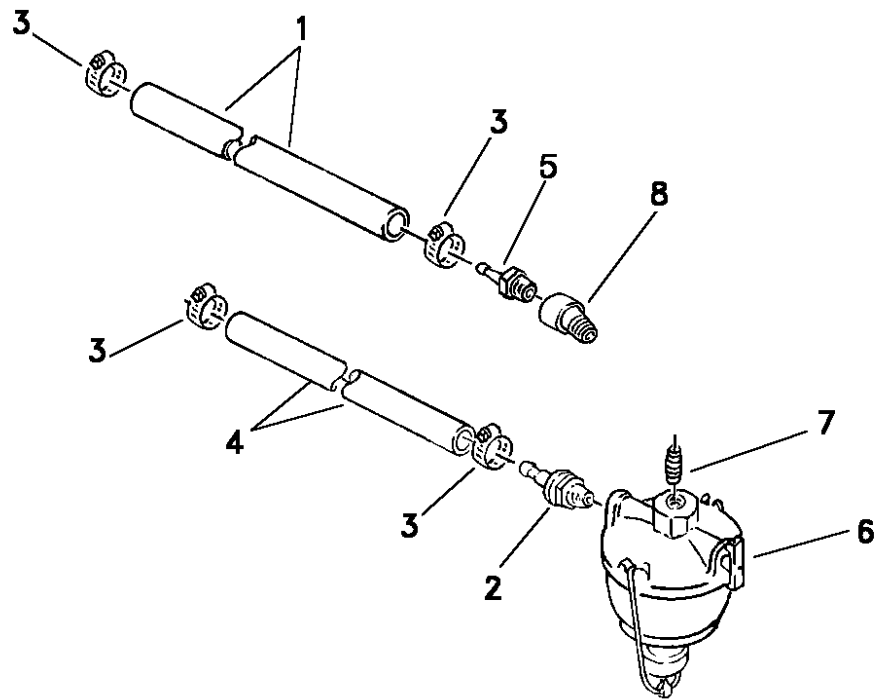


Figure 8-4 Fuel Lines and Speed Control

Parts List for Figure 8-4

Item No	Part Number	Description	Qty per Assy	Application Code
	492118-1	Lines - Fuel & Return Assembly	1	All
1	491889-3	. Hose - Rubber 3/16 I.D.	1	All
2	405814-1	. Insert - Hose	1	All
3	W-10869-14	. Clamp - Hose	4	All
4	491667-2	. Hose - Low Pressure 3/8 I.D.	1	All
5	402927-1	. Nut - Inverted Flare	1	All
6	400504	. Filter	1	All
7	W-10750-2	. Nipple - Pipe, 1/8	1	All
8	12CW-2125	. Elbow - Street, 45°	1	All

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- Material Safety Data Sheet - BATTERY ELECTRIC STORAGE, DRY

SECTION I

Manufacturer's Name:**Date Prepared:** Revised April 1994East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536**Telephone Number for Information:** (610) 682-6361**Emergency Telephone Number:** CHEMTREC: 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II

HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Lead and Lead Components	0.050 mg/m ³	0.15 mg/m ³	N/A	97

SECTION III

PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance and Odor: N/A**Solubility in Water:** N/A**Boiling Point:** N/A**Specific Gravity (H₂O=1):** N/A**Evaporation Rate (Butyl Acetate=1):** N/A**Vapor Density (AIR=1):** N/A**Melting Point:** N/A**Vapor Pressure (mm Hg.):** N/A

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): N/A**Flammable Limits:** N/A**LEL:** N/A**UEL:** N/A**Extinguishing Media:** Dry chemical, carbon dioxide, water spray or foam**Special Fire Fighting Procedures:** N/A**Unusual Fire and Explosion Hazards:** N/A

SECTION V

REACTIVITY DATA (Battery Case)

Stability: Stable**Conditions to Avoid:** N/A**Incompatibility (Material to Avoid):** N/A**Hazardous Decomposition of By-Products:** N/A**Hazardous Polymerization:** will not occur

SECTION VI

HEALTH HAZARD DATA

Route(s) of Entry: No applicable under normal use

Health Hazards (acute and chronic): Internal components contain lead. Repeated or prolonged exposure to lead can result in lead poisoning. Lead accumulates in the bone and body organs and is eliminated from the body slowly. (Ref: 29 CFR 1910.1025)

Carcinogenicity: N/A

IARC Monographs: Group 2B carcinogen

OSHA Regulated: 29CFR1910.1025

Medical Conditions Generally Aggravated by Exposure: Pregnant women and children must be protected from lead exposure.

Signs and Symptoms of Exposure:

Short term: Skin and eye irritation, headache, nausea, vomiting, abdominal spasms, fatigue, weight loss, anemia, pain in legs, arms, and joints.

Long term: CNS damage, kidney disfunctions and potential reproductive hazard. Symptoms of lead exposure can be confirmed by the presence of elevated levels of lead in blood.

Emergency and First Aid Procedures: Not applicable under normal use. If lead exposure is suspected, seek medical attention.

SECTION VII

PRECAUTIONS FOR SAFE HANDLING AND USE - Not Applicable

Steps to be Taken in Case Material is Released or Spilled: Avoid contact with internal components. (See Section VI Health Hazards: Lead)

Waste Disposal Method: Lead acid batteries are completely recycable. For information on returning batteries to East Penn for recycle, call (610) 682-6361.

Precautions to be Taken in Handling and Storing: N/A **Other Precautions:** N/A

SECTION VIII

CONTROL MEASURES - not applicable under normal use

Respiratory Protection (Specific Type): For specific information see 29CFR 1910.1025, Lead Exposure

Ventilation: Local exhaust:
Mechanical (general):
Special:
Other:

Protective Gloves: N/A

Eye Protection: N/A

Other Protective Clothing or Equipment: N/A

Work/Hygienic Practices: Always practice good personal hygiene habits and safe work practices.

TRANSPORTATION

NOTE:

Shipping Name: Battery, dry

Identification Number: N/A, non-assigned

Hazard Class: N/A. This article is not applicable to 49CFR 172.101 Hazardous Materials and not subject to Parts 170-189 of this sub chapter.

U.S. Postal Service Regulations: unrestricted



**- Material Safety Data Sheet -
BATTERY WET, FILLED WITH ACID
8 UN2794 PGIII**

SECTION I

Manufacturer's Name:
East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536

Date Prepared: Revised April 1994

Telephone Number for Information: (610) 682-6361

Emergency Telephone Number: CHEMTREC: 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II

HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Lead, CAS #7439921	0.05 mg/m ³	0.15 mg/m ³	N/A	43-70
Sulfuric Acid, CAS #7664939	1.00 mg/m ³	1.00 mg/m ³	N/A	20-44
Antimony, CAS #7440360	0.50 mg/m ³	0.50 mg/m ³	N/A	0-4

SECTION III

PHYSICAL/CHEMICAL CHARACTERISTICS (Sulfuric Acid)

Appearance and Odor: clear, odorless, colorless	Solubility in Water: completely
Boiling Point: approximately 235°F	Specific Gravity (H₂O=1): 1.220-1.325
Evaporation Rate (Butyl Acetate=1): less than 1.0	Vapor Density (AIR=1): N/A
Melting Point: N/A	Vapor Pressure (mm Hg.): 13

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): non-flammable	Flammable Limits: *hydrogen gas
Extinguishing Media: Class ABC extinguisher, CO ₂ and/or Halon	LEL: 4% UEL: 74%

Special Fire Fighting Procedures: Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors in a fire situation are corrosive. Wear special respiratory protection (SCBA) and clothing.

Unusual Fire and Explosion Hazards: *Hydrogen gas, which may explode if ignited, is produced by this battery, especially when charging. Use adequate ventilation, avoid open flames, sparks, or other sources of ignition.

SECTION V

REACTIVITY DATA (Battery Case)

Stability: Stable **Condition to Avoid:** Cases decompose at 160-410°C (322-770°F)

Incompatibility (Materials to Avoid): Strong oxidizing agents such as hot nitric acid, etc.

Hazardous Decomposition of By-Products: Combustion can produce carbon dioxide (CO₂) and carbon monoxide (CO).

Hazardous Polymerization: will not occur **Conditions to Avoid:** not applicable

SECTION VI

HEALTH HAZARD DATA (Sulfuric Acid)

Route(s) of Entry: Inhalation, skin contact, and ingestion

Health Hazards (Acute and Chronic): Short term exposure: Sulfuric acid may cause irritation of eyes, nose, and throat. Prolonged contact may cause severe burns.

Long term exposure: Repeated contact causes irritation and skin burns. Repeated exposure to mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat, and bronchial tubes.

TARGET ORGAN: respiratory system, eyes, skin, & teeth

Carcinogenicity: N/A

Signs and Symptoms of Exposure: Acid contact may cause irritation of eyes, nose and throat. Breathing of mist may produce respiratory difficulty. Contact with eyes and skin causes irritation and skin burns. Sulfuric acid is a **CORROSIVE** chemical.

Medical Conditions Generally Aggravated by Exposure: Pulmonary edema, bronchitis, emphysema, dental erosion, and traceobronchitis

Emergency and First Aid Procedures:

- 1) Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention.
- 2) If swallowed, give large volumes of water. **DO NOT** induce vomiting, obtain medical treatment.
- 3) Eyewash and shower stations should be made available.

SECTION VII

PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: **SULFURIC ACID:** Dilute spill cautiously with five to six volumes of water and gradually neutralize with sodium bicarbonate, soda ash or lime. When exposure level is not known, wear NIOSH approved positive pressure self-contained breathing apparatus. (Reference DOT UN2796)

Waste Disposal Method: Lead-acid batteries are completely recyclable. For information on returning batteries to East Penn for recycling, call (610) 682-6361.

Precautions to be Taken in Handling and Storing: Store away from reactive material as defined in Section V, Reactivity Data.

Other Precautions: Sodium bicarbonate, soda ash, sand, or lime should be kept in same general area for emergency use. See Section IV on generation of hydrogen gas. If battery case is broken, avoid direct contact with internal components.

SECTION VIII

CONTROL MEASURES

Respiratory Protection (Specific Type): Acid gas respirator required when PEL is exceeded or employee witnesses respiratory irritation. (See Section VI, Health Hazard Data).

Ventilation: Must be provided when charging in an enclosed area. 29CFR1910.178(g) and .305(j)(7)

Mechanical (general): acceptable at 1 to 4 air exchanges/hour or to maintain air concentrations below the PEL.

Local exhaust: preferred

Special:

Other: local building/fire codes may require explosion proof fans and equipment

Protective Gloves: acid resistant (for example, rubber)

Eye Protection: preferred

Other Protective Clothing or Equipment: acid resistant aprons, boots, and protective clothing

Work/Hygienic Practices: Good personal hygiene and work practices are mandatory.



- Material Safety Data Sheet - BATTERY FLUID ACID 8 UN2796 PGII

SECTION I

Manufacturer's Name:

East Penn Manufacturing Co. Inc.
Deka Road, Lyon Station, PA 19536

Date Prepared: Revised April 1994

Telephone Number for Information: (610) 682-6361

Emergency Telephone Number: CHEMTREC: 1-800-424-9300,
In Washington D.C. or outside continental U.S., call 1-202-483-7616

SECTION II

HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components Specific Chemical Identity (Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	Percent
Sulfuric Acid, CAS #7664939	1.00 mg/m ³	1.00 mg/m ³	N/A	30

SECTION III

PHYSICAL/CHEMICAL CHARACTERISTICS (Sulfuric Acid)

Appearance and Odor: clear, odorless, colorless
Boiling Point: approximately 235°F
Evaporation Rate (Butyl Acetate=1): less than 1.0
Melting Point: N/A

Solubility in Water: completely
Specific Gravity (H₂O=1): 1.220-1.325
Vapor Density (AIR=1): N/A
Vapor Pressure (mm Hg.): 13

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): non-flammable
Extinguishing Media: N/A

Flammable Limits: N/A
LEL: UEL:

Special Fire Fighting Procedures: Sulfuric acid will not burn but is capable of igniting finely combustible material on contact. Combustibles may be smothered by dry chemical extinguishing media.

Unusual Fire and Explosion Hazards: NFPA ratings: H=3, F=0, R=2

SECTION V

REACTIVITY DATA (Battery Case)

Stability: Stable Condition to Avoid: Contact with metal may release explosive hydrogen gas.

Incompatibility (Materials to Avoid): Strong alkali materials, carbides, chlorates, nitrates, and pierates, organic acid, acetates, anhydrites.

Hazardous Decomposition of By-Products: Thermal decomposition or combustion may produce a sulfur trioxide and/or sulfur dioxide.

Hazardous Polymerization: will not occur

SECTION VI

HEALTH HAZARD DATA (Sulfuric Acid)

Route(s) of Entry: Inhalation, skin contact, and ingestion **Carcinogenicity:** N/A

Signs and Symptoms of Exposure: Acid contact may cause irritation of eyes, nose and throat. Breathing of mist may produce respiratory difficulty. Contact with eyes and skin causes irritation and skin burns. Sulfuric acid is a **CORROSIVE** chemical.

Medical Conditions Generally Aggravated by Exposure: Pulmonary edema, bronchitis, emphysema, dental erosion, and traceobronchitis

Health Hazards (Acute and Chronic):

Short term exposure: Sulfuric acid may cause irritation of eyes, nose, and throat. Prolonged contact may cause severe burns.

Long term exposure: Repeated contact causes irritation and skin burns. Repeated exposure to mist may cause erosion of teeth, chronic eye irritation and/or chronic inflammation of the nose, throat, and bronchial tubes.

TARGET ORGAN: respiratory system, eyes, skin, & teeth

Emergency and First Aid Procedures:

- 1) Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention.
- 2) If swallowed, give large volumes of water. **DO NOT** induce vomiting, obtain medical treatment.
- 3) Eyewash and shower stations should be made available.

SECTION VII

PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Dilute spill cautiously with five to six volumes of water and gradually neutralize with sodium bicarbonate, soda ash, or lime. When exposure level is not known, wear NIOSH approved positive pressure self-contained breathing apparatus. (Reference DOT UN2796)

Waste Disposal Method: Neutralize and dispose in accordance with local, state, and federal regulations.

Precautions to be Taken in Handling and Storing: Store away from reactive material as defined in Section V, Reactivity Data.

Other Precautions: Sodium bicarbonate, soda ash, sand, or lime should be kept in same general area for emergency use.

SECTION VIII

CONTROL MEASURES

Respiratory Protection (Specific Type): Acid gas respirator required when PEL is exceeded or employee witnesses respiratory irritation. (See Section VI, Health Hazard Data).

Ventilation: When PEL is exceeded.

Mechanical (general):

Local exhaust: preferred

Special:

Other: Adequate ventilation to maintain exposure concentrations below the PEL.

Protective Gloves: acid resistant (for example, rubber)

Eye Protection: Mandatory during handling and transfer of acid (recommend chemical goggles).

Other Protective Clothing or Equipment: acid resistant aprons, boots, protective clothing, and face shield

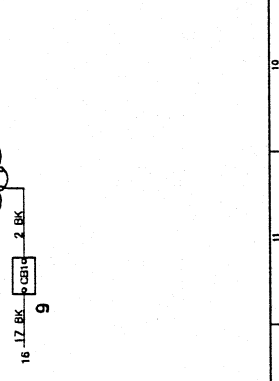
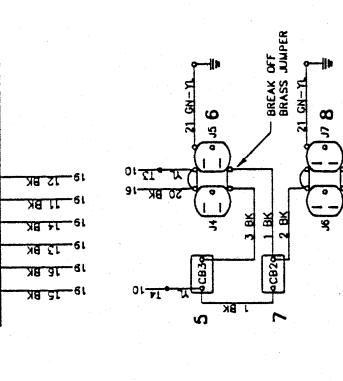
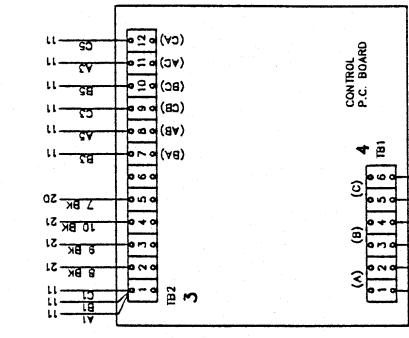
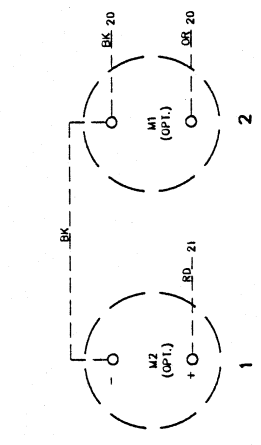
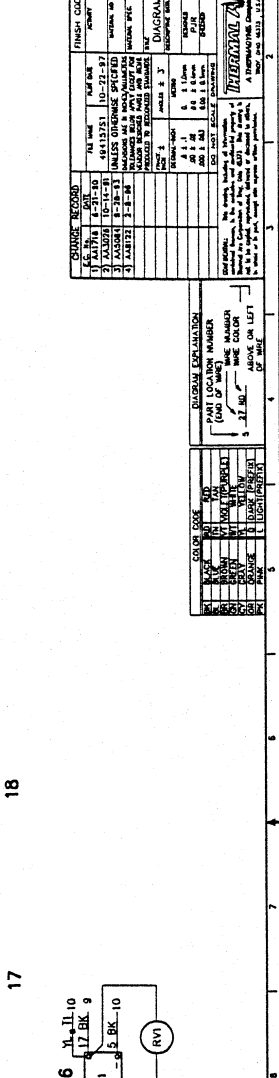
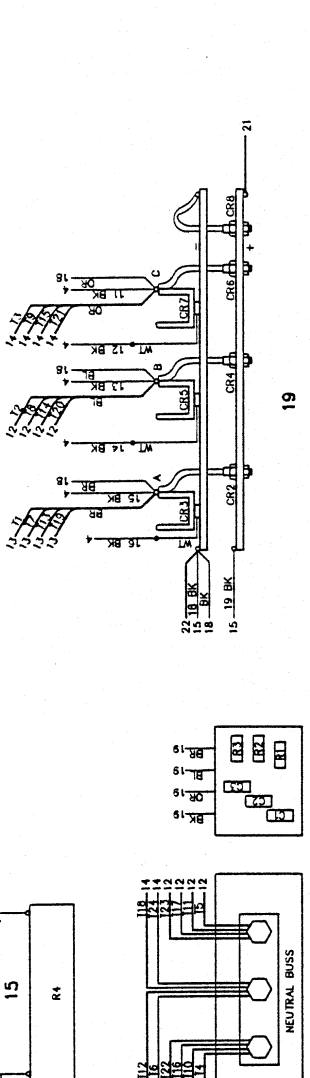
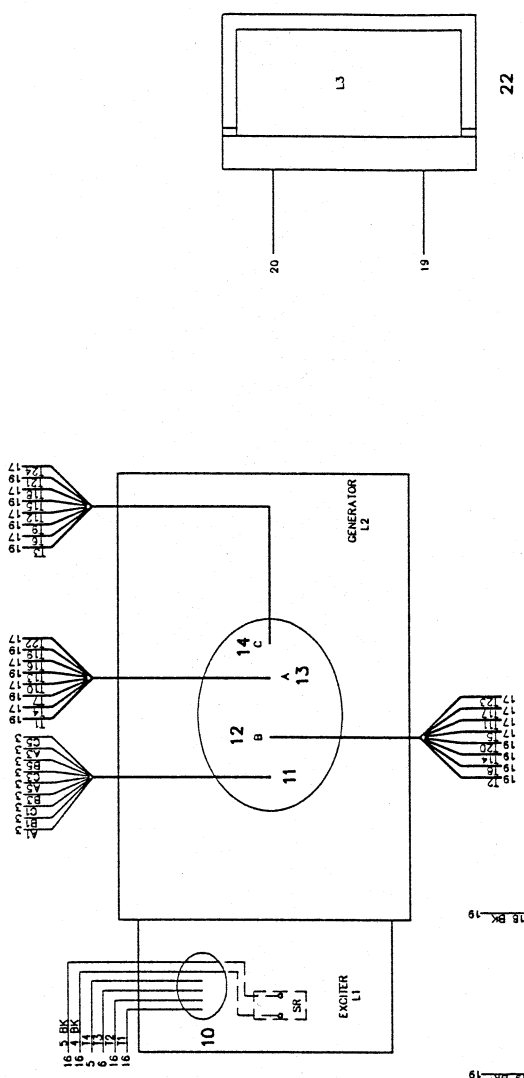
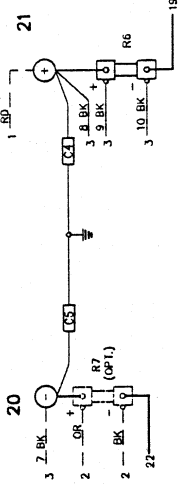
Protective Gloves: acid resistant (for example, rubber)

Work/Hygienic Practices: Good personal hygiene and work practices are mandatory.

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 NUMBER	SPECIFICATION NUMBER	CONNECTION DIAGRAM	CONTROL BOX DIAGRAM	ENGINE DIAGRAM
Mega-Arc 5040DD	6436A-1	494157	494699	494157
	6436B-1	494157	494699	494157



CHANGE RECORD		FINISH CODE PER RECORD		REVISION	
NO.	DATE	BY	REASON	NO.	DATE
1	10-10-57	WJ	REVISION	1	10-10-57
2	10-10-57	WJ	REVISION	2	10-10-57
3	10-10-57	WJ	REVISION	3	10-10-57
4	10-10-57	WJ	REVISION	4	10-10-57
5	10-10-57	WJ	REVISION	5	10-10-57

DIAGRAM CONNECTION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

REVISION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

REVISION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

REVISION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

REVISION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
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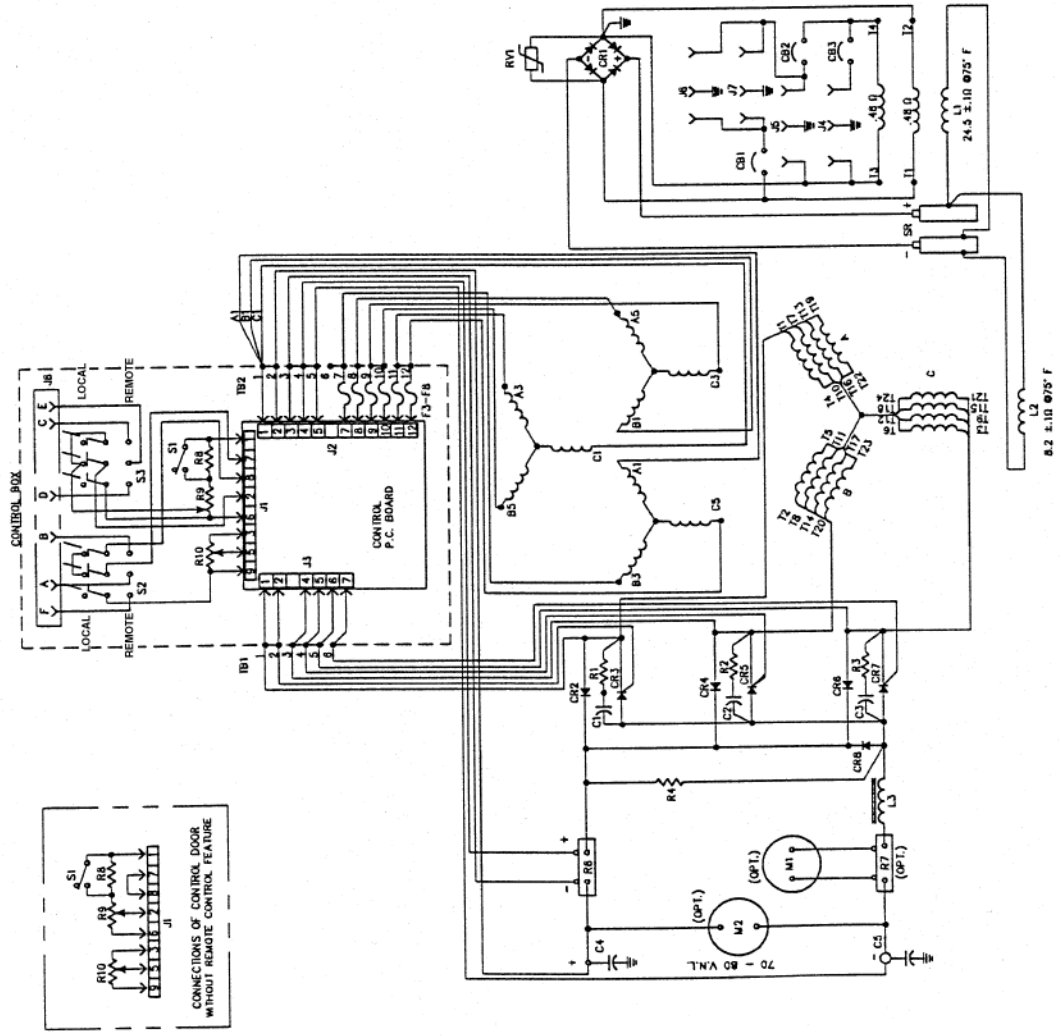
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NO.	DATE	BY	REASON
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4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

REVISION		REVISION	
NO.	DATE	BY	REASON
1	10-10-57	WJ	REVISION
2	10-10-57	WJ	REVISION
3	10-10-57	WJ	REVISION
4	10-10-57	WJ	REVISION
5	10-10-57	WJ	REVISION

- C1,2,3 SHUNTER CAPACITORS, 0.47 MFD, 400VDC
 C4,5 NOISE SUPPRESSION CAPACITORS
 C81,2,3 CIRCUIT BREAKERS, 15AMP
 CR1 FIELD RECTIFIER BRIDGE
 CR4,5,6,8 POWER DIODES
 CR5,7,9 POWER SCK
 CR10 WELDER, OUTPUT RECTIFIER
 FS-F8 CIRCUIT BOARD FUSES
 J1,2,3 CIRCUIT BOARD CONNECTORS
 J4,5 115V. AUX. POWER OUTLET
 J6,7 220V. AUX. POWER OUTLET
 L1 ELECTRIC FUSE, AMPHENTAL, 8 PN
 L2 EXCITER
 L3 GENERATOR
 L4 FILTER CHOKE
 M1 AMMETER (OPT1)
 M2 VOLTMETER (OPT1)
 R1,2,3 SHUNTER RESISTORS, 50 OHMS, 5 WATT
 R4 PRELOAD RESISTOR, 50 OHM, 175 WATT
 R6 FEEDBACK SHUNT
 R7 METER SHUNT (OPT1)
 R8 LOW RANGE RESISTOR
 R9 CURRENT TRANSFORMER
 R10 ARC FORCE POTENTIOMETER
 R11 SUPPRESSOR
 S1 RANGE SWITCH
 S2 SWITCH, TPDI, CONTACTOR CONTROL
 S3 SWITCH, TPDI, CURRENT CONTROL
 S4 SWITCH, TPDI, STABILITY CONTROL
 TB1,2 TERMINAL STRIP TO CONTROL BOX

THEORY OF OPERATION

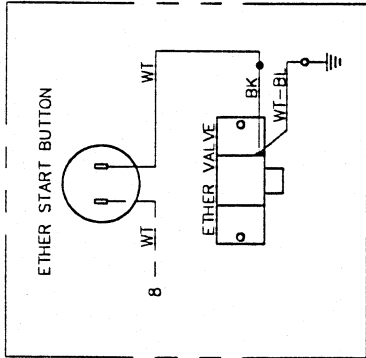
THE AUXILIARY GENERATOR (EXCITER) IS SELF-EXCITED. THE DIODE BRIDGE RECTIFIER (CR1) RECEIVES THE AC VOLTAGE OUTPUT OF THE AUXILIARY GENERATOR FOR THE RECTIFYING FIELDS. THE AUXILIARY GENERATOR SUPPLIES POWER TO THE 115V. AND 220V RECEPTACLES.
 THE OUTPUT OF THE 3 PHASE WELDING GENERATOR IS RECTIFIED TO DC POWER BY THE WELDER OUTPUT RECTIFIER (CR5) WITH THE OUTPUT STABILIZED BY THE STABILITY REACTOR (L3). CURRENT CONTROL IS PROVIDED BY PHASE ANGLE FIRING OF SCR'S IN THE OUTPUT RECTIFIER BRIDGE (CR10).



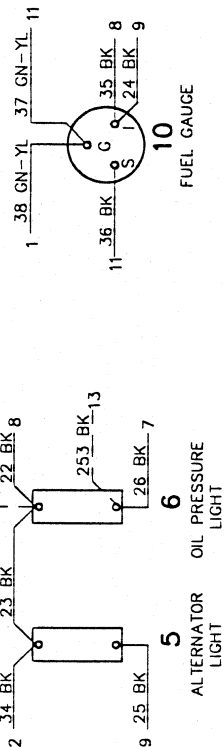
NOTE: FOR RESISTANCE AT OTHER TEMPERATURES, ASSUME .24W PER DEGREE F.

FIGURE	REVISION	DATE	BY	REASON
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2	1	10-28-57	WELDER	WELDER
3	1	10-28-57	WELDER	WELDER
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60	1	10-28-57	WELDER	WELDER
61	1	10-28-57	WELDER	WELDER
62	1	10-28-57	WELDER	WELDER
63	1	10-28-57	WELDER	WELDER
64	1	10-28-57	WELDER	WELDER
65	1	10-28-57	WELDER	WELDER
66	1	10-28-57	WELDER	WELDER
67	1	10-28-57	WELDER	WELDER
68	1	10-28-57	WELDER	WELDER
69	1	10-28-57	WELDER	WELDER
70	1	10-28-57	WELDER	WELDER
71	1	10-28-57	WELDER	WELDER
72	1	10-28-57	WELDER	WELDER
73	1	10-28-57	WELDER	WELDER
74	1	10-28-57	WELDER	WELDER
75	1	10-28-57	WELDER	WELDER
76	1	10-28-57	WELDER	WELDER
77	1	10-28-57	WELDER	WELDER
78	1	10-28-57	WELDER	WELDER
79	1	10-28-57	WELDER	WELDER
80	1	10-28-57	WELDER	WELDER
81	1	10-28-57	WELDER	WELDER
82	1	10-28-57	WELDER	WELDER
83	1	10-28-57	WELDER	WELDER
84	1	10-28-57	WELDER	WELDER
85	1	10-28-57	WELDER	WELDER
86	1	10-28-57	WELDER	WELDER
87	1	10-28-57	WELDER	WELDER
88	1	10-28-57	WELDER	WELDER
89	1	10-28-57	WELDER	WELDER
90	1	10-28-57	WELDER	WELDER
91	1	10-28-57	WELDER	WELDER
92	1	10-28-57	WELDER	WELDER
93	1	10-28-57	WELDER	WELDER
94	1	10-28-57	WELDER	WELDER
95	1	10-28-57	WELDER	WELDER
96	1	10-28-57	WELDER	WELDER
97	1	10-28-57	WELDER	WELDER
98	1	10-28-57	WELDER	WELDER
99	1	10-28-57	WELDER	WELDER
100	1	10-28-57	WELDER	WELDER

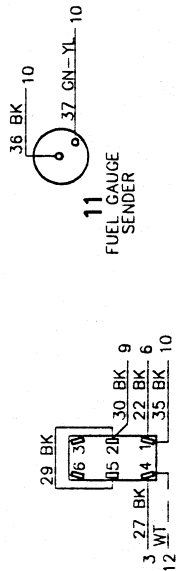
KIT, COLD WEATHER START (OPTIONAL)



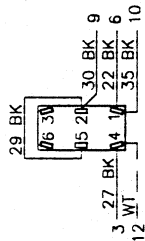
12



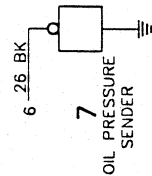
FUEL GAUGE



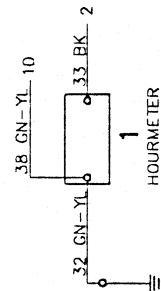
FUEL GAUGE SENDER



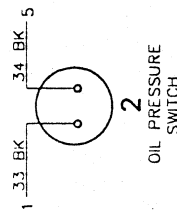
IGNITION SWITCH



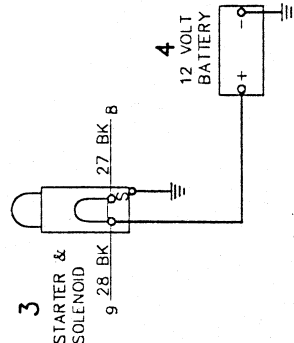
OIL PRESSURE SENDER



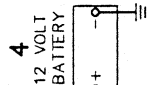
HOURMETER



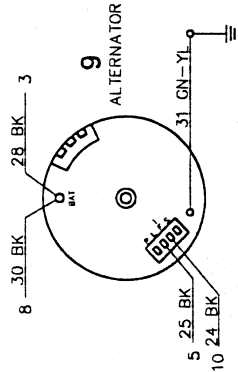
OIL PRESSURE SWITCH



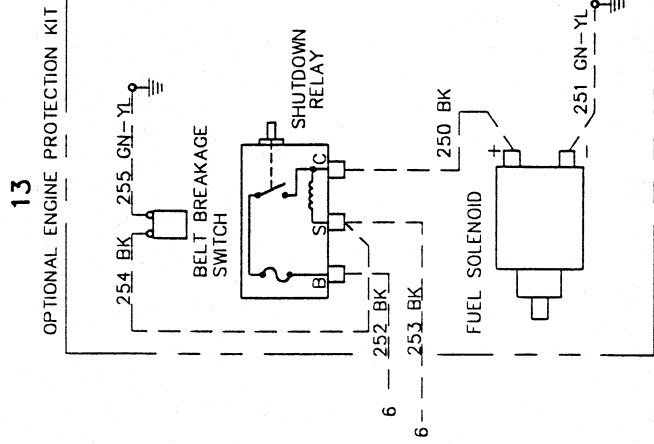
STARTER & SOLENOID



12 VOLT BATTERY



ALTERNATOR



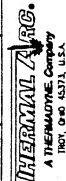
OPTIONAL ENGINE PROTECTION KIT

COLOR CODE		DIAGRAM EXPLANATION	
BK	BLACK	RD	RED
BL	BLUE	TN	TAN
BR	BROWN	VT	VIOLET(PURPLE)
GN	GREEN	WT	WHITE
GY	GRAY	YL	YELLOW
OR	ORANGE	D	DARK (PREFIX)
PK	PINK	L	LIGHT(PREFIX)

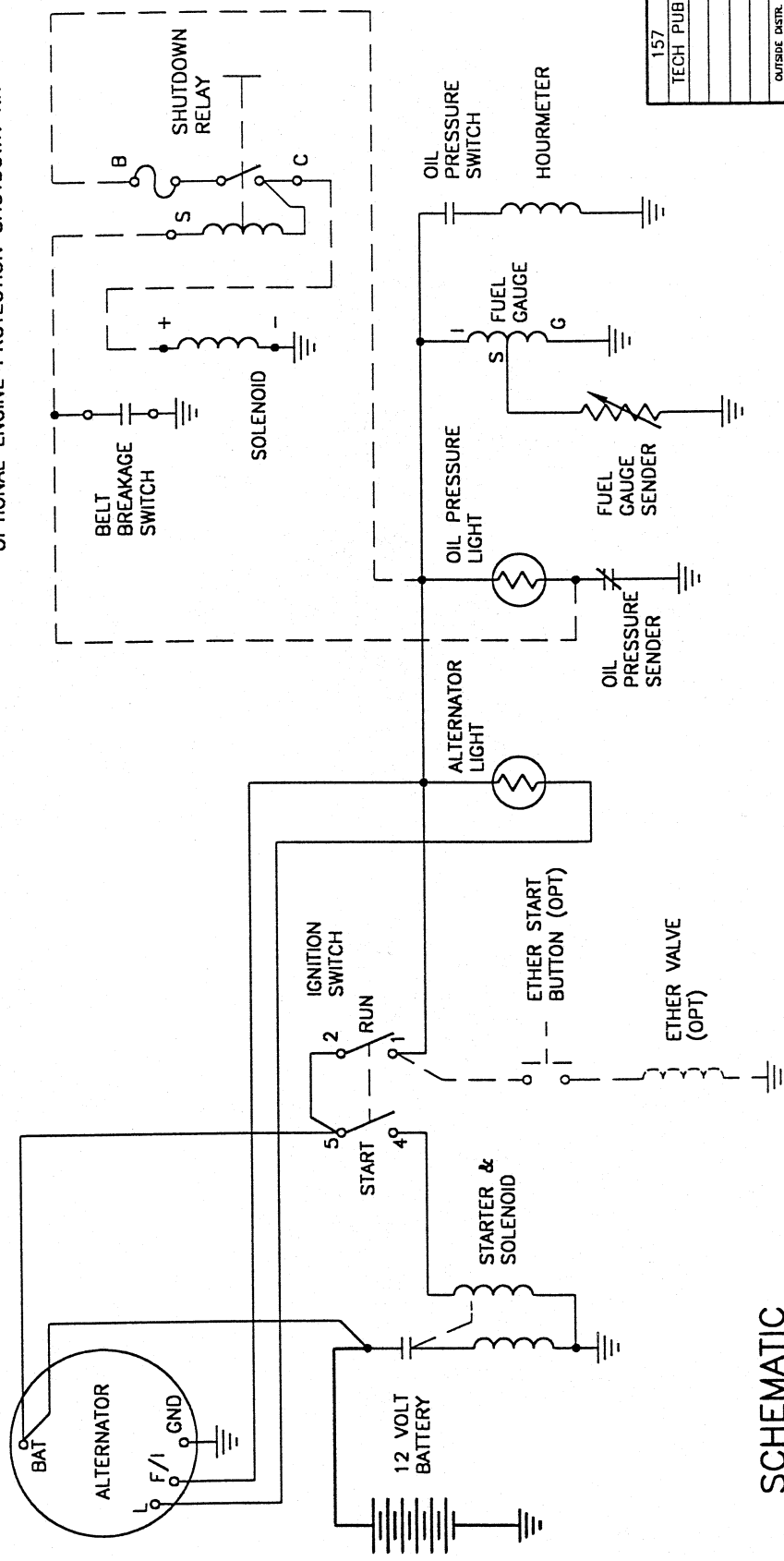
PART LOCATION NUMBER (END OF WIRE)		WIRE NUMBER	
5	27 RD	27	RD
5	27 RD	27	RD

WIRE COLOR ABOVE OR LEFT OF WIRE

157	TECH PUB	OUTSIDE DATA	DATE	1-24-90	SCALE	FULL	FOR TYPE	4-14-90
FINISH CODE PER 800001: NONE		REVISED #	QUANTITY-USA	COMB. CLE				
M		FILE NAME	494157S3	10-22-97				
UNLESS OTHERWISE SPECIFIED								
DIMENSIONS ARE IN INCHES/MILLIMETERS								
TOLERANCES BELOW APPLY EXCEPT FOR								
FRACTIONS								
DECIMALS								
DO NOT SCALE DRAWING								
TITLES								
DEUTZ ENGINE								
JIC								
PJR								
OECAD								
DATE								
1-24-90								
4-14-90								
SHEET 3								
494157								



OPTIONAL ENGINE PROTECTION SHUTDOWN KIT

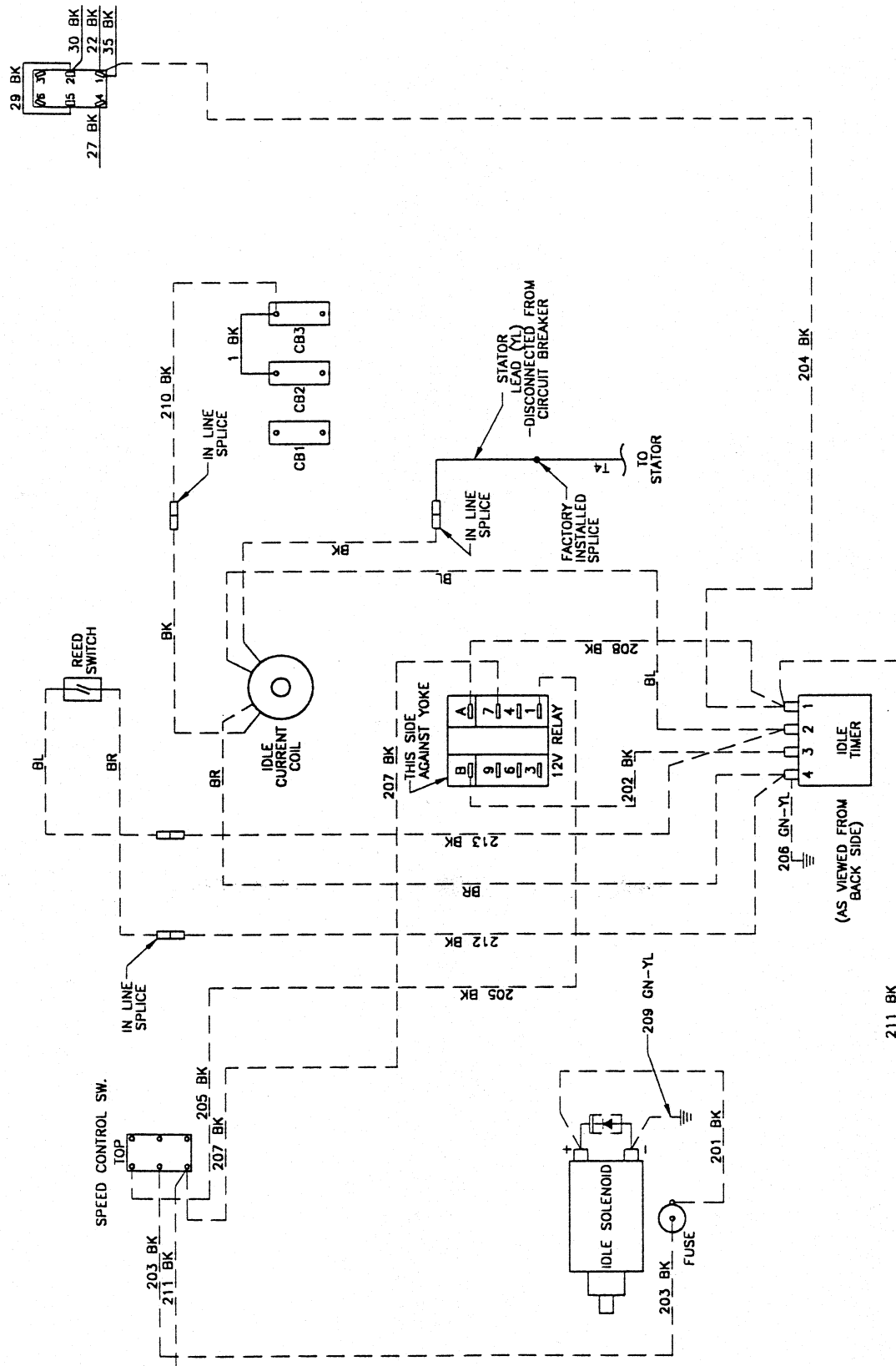


SCHEMATIC

CHANGE RECORD		FILE NAME	494157S4	10-22-97	FINISH CODE PER 80001: NONE
E.C. No.	DATE	ACTIVITY	REPLACED BY	QUANTITY-U.M.	COMM. DLS.
1) AA4737	5-17-93				
2) AA4923					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES/MILLIMETERS TOLERANCES BELOW APPLY EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRODUCED TO RECOGNIZED STANDARDS.					
FRACTIONAL		DECIMAL-INCH		METRIC	
1/16		0.0625		1.6	
1/8		0.125		3.2	
3/16		0.1875		4.8	
1/4		0.25		6.4	
5/16		0.3125		8.0	
3/8		0.375		9.6	
7/16		0.4375		11.2	
1/2		0.5		12.8	
9/16		0.5625		14.4	
5/8		0.625		16.0	
11/16		0.6875		17.6	
3/4		0.75		19.2	
13/16		0.8125		20.8	
7/8		0.875		22.4	
15/16		0.9375		24.0	
1		1.0		25.6	
1 1/16		1.0625		27.2	
1 1/8		1.125		28.8	
1 1/4		1.1875		30.4	
1 3/8		1.25		32.0	
1 1/2		1.3125		33.6	
1 5/8		1.375		35.2	
1 3/4		1.4375		36.8	
1 7/8		1.5		38.4	
2		1.5625		40.0	
2 1/16		1.625		41.6	
2 1/8		1.6875		43.2	
2 1/4		1.75		44.8	
2 3/8		1.8125		46.4	
2 1/2		1.875		48.0	
2 5/8		1.9375		49.6	
2 3/4		2.0		51.2	
2 7/8		2.0625		52.8	
3		2.125		54.4	
3 1/16		2.1875		56.0	
3 1/8		2.25		57.6	
3 1/4		2.3125		59.2	
3 3/8		2.375		60.8	
3 1/2		2.4375		62.4	
3 5/8		2.5		64.0	
3 3/4		2.5625		65.6	
3 7/8		2.625		67.2	
4		2.6875		68.8	
4 1/16		2.75		70.4	
4 1/8		2.8125		72.0	
4 1/4		2.875		73.6	
4 3/8		2.9375		75.2	
4 1/2		3.0		76.8	
4 5/8		3.0625		78.4	
4 3/4		3.125		80.0	
4 7/8		3.1875		81.6	
5		3.25		83.2	
5 1/16		3.3125		84.8	
5 1/8		3.375		86.4	
5 1/4		3.4375		88.0	
5 3/8		3.5		89.6	
5 1/2		3.5625		91.2	
5 5/8		3.625		92.8	
5 3/4		3.6875		94.4	
5 7/8		3.75		96.0	
6		3.8125		97.6	
6 1/16		3.875		99.2	
6 1/8		3.9375		100.8	
6 1/4		4.0		102.4	
6 3/8		4.0625		104.0	
6 1/2		4.125		105.6	
6 5/8		4.1875		107.2	
6 3/4		4.25		108.8	
6 7/8		4.3125		110.4	
7		4.375		112.0	
7 1/16		4.4375		113.6	
7 1/8		4.5		115.2	
7 1/4		4.5625		116.8	
7 3/8		4.625		118.4	
7 1/2		4.6875		120.0	
7 5/8		4.75		121.6	
7 3/4		4.8125		123.2	
7 7/8		4.875		124.8	
8		4.9375		126.4	
8 1/16		5.0		128.0	
8 1/8		5.0625		129.6	
8 1/4		5.125		131.2	
8 3/8		5.1875		132.8	
8 1/2		5.25		134.4	
8 5/8		5.3125		136.0	
8 3/4		5.375		137.6	
8 7/8		5.4375		139.2	
9		5.5		140.8	
9 1/16		5.5625		142.4	
9 1/8		5.625		144.0	
9 1/4		5.6875		145.6	
9 3/8		5.75		147.2	
9 1/2		5.8125		148.8	
9 5/8		5.875		150.4	
9 3/4		5.9375		152.0	
9 7/8		6.0		153.6	
10		6.0625		155.2	
10 1/16		6.125		156.8	
10 1/8		6.1875		158.4	
10 1/4		6.25		160.0	
10 3/8		6.3125		161.6	
10 1/2		6.375		163.2	
10 5/8		6.4375		164.8	
10 3/4		6.5		166.4	
10 7/8		6.5625		168.0	
11		6.625		169.6	
11 1/16		6.6875		171.2	
11 1/8		6.75		172.8	
11 1/4		6.8125		174.4	
11 3/8		6.875		176.0	
11 1/2		6.9375		177.6	
11 5/8		7.0		179.2	
11 3/4		7.0625		180.8	
11 7/8		7.125		182.4	
12		7.1875		184.0	
12 1/16		7.25		185.6	
12 1/8		7.3125		187.2	
12 1/4		7.375		188.8	
12 3/8		7.4375		190.4	
12 1/2		7.5		192.0	
12 5/8		7.5625		193.6	
12 3/4		7.625		195.2	
12 7/8		7.6875		196.8	
13		7.75		198.4	
13 1/16		7.8125		200.0	
13 1/8		7.875		201.6	
13 1/4		7.9375		203.2	
13 3/8		8.0		204.8	
13 1/2		8.0625		206.4	
13 5/8		8.125		208.0	
13 3/4		8.1875		209.6	
13 7/8		8.25		211.2	
14		8.3125		212.8	
14 1/16		8.375		214.4	
14 1/8		8.4375		216.0	
14 1/4		8.5		217.6	
14 3/8		8.5625		219.2	
14 1/2		8.625		220.8	
14 5/8		8.6875		222.4	
14 3/4		8.75		224.0	
14 7/8		8.8125		225.6	
15		8.875		227.2	
15 1/16		8.9375		228.8	
15 1/8		9.0		230.4	
15 1/4		9.0625		232.0	
15 3/8		9.125		233.6	
15 1/2		9.1875		235.2	
15 5/8		9.25		236.8	
15 3/4		9.3125		238.4	
15 7/8		9.375		240.0	
16		9.4375		241.6	
16 1/16		9.5		243.2	
16 1/8		9.5625		244.8	
16 1/4		9.625		246.4	
16 3/8		9.6875		248.0	
16 1/2		9.75		249.6	
16 5/8		9.8125		251.2	
16 3/4		9.875		252.8	
16 7/8		9.9375		254.4	
17		10.0		256.0	
17 1/16		10.0625		257.6	
17 1/8		10.125		259.2	
17 1/4		10.1875		260.8	
17 3/8		10.25		262.4	
17 1/2		10.3125		264.0	
17 5/8		10.375		265.6	
17 3/4		10.4375		267.2	
17 7/8		10.5		268.8	
18		10.5625		270.4	
18 1/16		10.625		272.0	
18 1/8		10.6875		273.6	
18 1/4		10.75		275.2	
18 3/8		10.8125		276.8	
18 1/2		10.875		278.4	
18 5/8		10.9375		280.0	
18 3/4		11.0		281.6	
18 7/8		11.0625		283.2	
19		11.125		284.8	
19 1/16		11.1875		286.4	
19 1/8		11.25		288.0	
19 1/4		11.3125		289.6	
19 3/8		11.375		291.2	
19 1/2		11.4375		292.8	
19 5/8		11.5		294.4	
19 3/4		11.5625		296.0	
19 7/8		11.625		297.6	
20		11.6875		299.2	
20 1/16		11.75		300.8	
20 1/8		11.8125		302.4	
20 1/4		11.875		304.0	
20 3/8		11.9375		305.6	
20 1/2		12.0		307.2	
20 5/8		12.0625		308.8	
20 3/4		12.125		310.4	
20 7/8		12.1875		312.0	
21		12.25		313.6	
21 1/16		12.3125		315.2	
21 1/8		12.375		316.8	
21 1/4		12.4375		318.4	
21 3/8		12.5		320.0	
21 1/2		12.5625		321.6	
21 5/8		12.625		323.2	
21 3/4		12.6875		324.8	
21 7/8		12.75		326.4	
22		12.8125		328.0	
22 1/16		12.875		329.6	
22 1/8		12.9375		331.2	
22 1/4		13.0		332.8	
22 3/8		13.0625		334.4	
22 1/2		13.125		336.0	
22 5/8		13.1875		337.6	
22 3/4		13.25		339.2	
22 7/8		13.3125		340.8	
23		13.375		342.4	
23 1/16		13.4375		344.0	
23 1/8		13.5		345.6	
23 1/4		13.5625		347.2	
23 3/8		13.625		348.8	
23 1/2		13.6875		350.4	
23 5/8		13.75		352.0	
23 3/4		13.8125		353.6	
23 7/8		13.875		355.2	
24		13.9375		356.8	
24 1/16		14.0		358.4	
24 1/8		14.0625		360.0	
24 1/4		14.125		361.6	
24 3/8		14.1875		363.2	
24 1/2		14.25		364.8	
24 5/8		14.3125		366.4	
24 3/4		14.375		368.0	
24 7/8		14.4375		369.6	
25		14.5		371.2	
25 1/16		14.5625		372.8	
25 1/8		14.625		374.4	
25 1/4		14.6875		376.0	
25 3/8		14.75		377.6	
25 1/2					

IGNITION
SWITCH

SEE 494157 SHEET 3



COLOR CODE				DIAGRAM EXPLANATION	
BK	BLACK	RD	RED	[PART LOCATION NUMBER (END OF WIRE)	WIRE NUMBER WIRE COLOR 5 27 RD ABOVE OR LEFT
BL	BLUE	TR	TRN		
BR	BROWN	VT	VIOLET (PURPLE)		
GR	GREEN	WT	WHITE		
GY	GRAY	YL	YELLOW		
OR	ORANGE	GRN	GREEN		

CHANGE RECORD		FINISH CODE PER 800001: NONE		DISTRIBUTION TABLE	
C.C. NO.	DATE	FILE NAME	PLOT DATE	ACTIVITY	REPLACED BY
1)	10/29/87	494157S5	10-22-87		
		UNLESS OTHERWISE SPECIFIED			
		DIMENSIONS ARE IN INCHES/MILLIMETERS			
		TELEGRAMS BELOW APPLY EXCEPT FOR			
		TELEGRAMS BELOW APPLY EXCEPT FOR			
		PRODUCED TO RECOMMENDED STANDARDS			
		TOLERANCES UNLESS OTHERWISE SPECIFIED			
		FRACTIONS			
		ANGLES $\pm 3^\circ$			
		DECIMAL-INCH			
		.01 $\pm .0005$			
		.001 $\pm .0005$			
		.0001 $\pm .0005$			
		DO NOT SCALE DRAWING			
		THIS DRAWING, INCLUDING ALL INFORMATION			
		CONTAINED THEREIN, IS THE SOLE AND EXCLUSIVE PROPERTY			
		OF THERMAL AIR CORPORATION OF TROY, NEW YORK 12180			
		ALL RIGHTS, INCLUDING PATENT, COPYRIGHT, AND TRADE SECRET			
		RESERVED. NO PART OF THIS DRAWING IS TO BE REPRODUCED			
		OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC			
		OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY			
		ANY INFORMATION SYSTEM, WITHOUT PERMISSION IN WRITING			
		FROM THERMAL AIR CORPORATION OF TROY, NEW YORK 12180			
		THERMAL AIR CORPORATION			
		AEROMATICS COMPANY			
		SHEET 5			
		494157			

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 MANUFACTURER'S 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.

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