



**500  
6045**

# **EXCEL-ARC®**

## **TRANSFORMER-RECTIFIER DC WELDER**

Art # A-06056



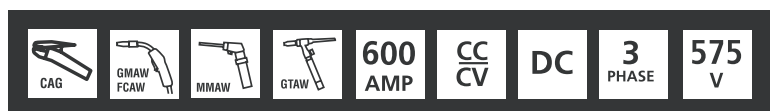
# **Operating Manual**

Version No: 1

Issue Date: August 22, 2005

Manual No.: 430429-451

Operating Features:





**LEADER IN ARC WELDING TECHNOLOGY**

## **We appreciate your business!**

Congratulations on your new Thermal Arc product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry. This product is backed by our extensive warranty and world-wide service network. To locate your nearest distributor or service agency call 1-800-752-7621, or visit us on the web at **[www.Thermalarc.com](http://www.Thermalarc.com)**.

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

## **YOU ARE IN GOOD COMPANY**

### **The Brand of Choice for Contractors and Fabricators Worldwide.**

Thermal Arc is the Global Brand of Arc Welding Products for Thermadyne Industries Inc.

We are a mainline supplier to major welding industry sectors in the USA, Asia Pacific, Europe and emerging global markets including; Manufacturing, Construction, Mining, Automotive, Engineering, Rural and DIY.

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

We are committed to develop technologically advanced products to achieve a safer working environment for industry operators.

## **WARNINGS**

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

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

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Excel-Arc 500 (CC) and 6045 (CV and CC/CV) Transformer-Rectifier DC Welder  
Instruction Manual Number 430429-451 for:

Excel-Arc 500 (CC) Spec Number 100005A-1

Excel-Arc 6045 (CV) Spec Number 100005A-2

Excel-Arc 6045 (CC/CV) Spec Number 100005A-3

Excel-Arc 500 (CC) Spec Number 100005A-5

Excel-Arc 6045 (CV) Spec Number 100005A-6

Excel-Arc 6045 (CC/CV) Spec Number 100005A-7

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Publication Date: August 22, 2005

### **Record the following information for Warranty purposes:**

Where Purchased: \_\_\_\_\_

Purchase Date: \_\_\_\_\_

Equipment Serial #: \_\_\_\_\_

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## SECTION 1: SAFETY INSTRUCTIONS AND WARNINGS



### WARNING

**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.**

### 1.01 Arc Welding Hazards



### WARNING

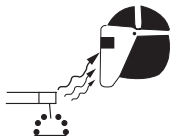
***ELECTRIC SHOCK can kill.***

*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.

## EXCEL-ARC 500, 6045

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.
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.



### WARNING

*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.



### WARNING

*FUMES AND GASES can be hazardous to your health.*

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

1. Keep your head out of the fumes. Do not breath the fumes.
2. If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
3. If ventilation is poor, use an approved air-supplied respirator.
4. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals, consumables, coatings, and cleaners.
5. Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Shielding gases used for welding can displace air causing injury or death. Be sure the breathing air is safe.

Eye protection filter shade selector for welding or cutting (goggles or helmet), from AWS A6.2-73.					
Welding or cutting	Electrode Size	Filter	Welding or cutting	Electrode Size	Filter
Torch soldering		2	<b>Gas metal-arc</b>		
Torch brazing		3 or 4	Non-ferrous base metal	All	11
<b>Oxygen Cutting</b>			Ferrous base metal	All	12
Light	Under 1 in., 25 mm	3 or 4	Gas tungsten arc welding	All	12
Heavy	1 to 6 in., 25-150 mm	4 or 5	(TIG)	All	12
Medium	Over 6 in., 150 mm	5 or 6	Atomic hydrogen welding	All	12
<b>Gas welding</b>			Carbon arc welding	All	12
Light	Under 1/8 in., 3 mm	4 or 5	Plasma arc welding		
Heavy	1/8 to 1/2 in., 3-12 mm	5 or 6	<b>Carbon arc air gouging</b>		
Medium	Over 1/2 in., 12 mm	6 or 8	Light		12
<b>Shielded metal-arc</b>	Under 5/32 in., 4 mm	10	Heavy		14
	5/32 to 1/4 in.,	12	<b>Plasma arc cutting</b>		
	Over 1/4 in., 6.4 mm	14	Light	Under 300 Amp	9
			Heavy	300 to 400 Amp	12
			Medium	Over 400 Amp	14



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.

**WARNING**

*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.

**WARNING**

*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.

**WARNING**

*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 dangerous.*



## WARNING

*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.



## WARNING

*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.



## WARNING

*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.



## WARNING

*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.



## WARNING

*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**


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*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**


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*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 and 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 cable around the body.
4. Keep welding power source and cables as far away from body as practical.

**ABOUT PACEMAKERS:**


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

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**1.02 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.

## 1.03 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.**

#### 1.04 Dangers relatifs au soudage à l'arc



### AVERTISSEMENT

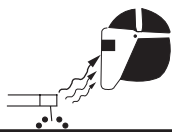
#### **L'ELECTROCUTION PEUT ETRE MORTELLE.**

*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.

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.



**AVERTISSEMENT**

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

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



**AVERTISSEMENT**

*LES VAPEURS ET LES FUMÉES SONT DANGEREUSES POUR LA SANTE.*

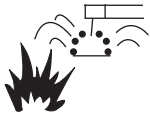
*Le soudage dégage des vapeurs et des fumées dangereuses à respirer.*

SELECTION DES NUANCES DE FILTRES OCULAIRES POUR LA PROTECTION DES YEUX EN COUPAGE ET SOUDAGE (selon AWS à 8.2-73)					
Opération de coupage ou soudage	Dimension d'électrode ou Epiaisseur de métal ou Intensité de courant	Nuance de filtre oculaire	Opération de coupage ou soudage	Dimension d'électrode ou Epiaisseur de métal ou Intensité de courant	Nuance de filtre oculaire
Brassage tendre au chalumeau	toutes conditions	2	Soudage à l'arc sous gaz avec fil plein (GMAW)		
Brassage fort au chalumeau	toutes conditions	3 ou 4	métaux non-ferreux	toutes conditions	11
Oxycoupage			métaux ferreux	toutes conditions	12
mince	moins de 1 po. (25 mm)	2 ou 3	Soudage à l'arc sous gaz avec électrode de tungstène (GTAW)	toutes conditions	12
moyen	de 1 à 6 po. (25 à 150 mm)	4 ou 5	Soudage à l'hydrogène atomique (AHW)	toutes conditions	12
épais	plus de 6 po. (150 mm)	5 ou 6	Soudage à l'arc avec électrode de carbone (CAW)	toutes conditions	12
Soudage aux gaz			Soudage à l'arc Plasma (PAW)	toutes dimensions	12
mince	moins de 1/8 po. (3 mm)	4 ou 5	Gougeage Air-Arc avec électrode de carbone		
moyen	de 1/8 à 1/2 po. (3 à 12 mm)	5 ou 6	mince		12
épais	plus de 1/2 po. (12 mm)	6 ou 8	épais		14
Soudage à l'arc avec électrode enrobées (SMAW)	moins de 5/32 po. (4 mm)	10	Coupage à l'arc Plasma (PAC)		
	5/32 à 1/4 po. (4 à 6.4 mm)	12	mince	moins de 300 amperès	9
	plus de 1/4 po. (6.4 mm)	14	moyen	de 300 à 400 amperès	12
			épais	plus de 400 amperès	14



## EXCEL-ARC 500, 6045

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.
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.



### AVERTISSEMENT

#### 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.*



### AVERTISSEMENT

#### 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.

**AVERTISSEMENT****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.

**AVERTISSEMENT**

**LES MOTEURS PEUVENT ETRE DANGEREUX  
LES GAZ D'ÉCHAPPEMENT DES MOTEURS  
PEUVENT ETRE MORTELS.**

Les moteurs produisent des gaz d'échappement nocifs.

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.

**AVERTISSEMENT**

**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.

**AVERTISSEMENT**

**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.

## EXCEL-ARC 500, 6045

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.



### AVERTISSEMENT

*DES ETINGELLES 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.



### AVERTISSEMENT

*LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT BRULANT 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.

## 1.05 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.



## 1.06 DECLARATION OF CONFORMITY



Manufacturer: Thermadyne Corporation  
Address: 82 Benning Street  
West Lebanon, New Hampshire 03784  
  
USA

The equipment described in this manual conforms to all applicable aspects and regulations of the 'Low Voltage Directive' (European Council Directive 73/23/EEC as amended by Council Directive 93/68/EEC) and to the National legislation for the enforcement of this Directive.

The equipment described in this manual conforms to all applicable aspects and regulations of the "EMC Directive" (European Council Directive 89/336/EEC) and to the National legislation for the enforcement of this Directive.

Serial numbers are unique with each individual piece of equipment and details description, parts used to manufacture a unit and date of manufacture.

### National Standard and Technical Specifications

The product is designed and manufactured to a number of standards and technical requirements. Among them are:

- CSA (Canadian Standards Association) standard C22.2 number 60 for Arc welding equipment.
- UL (Underwriters Laboratory) rating 94VO flammability testing for all printed-circuit boards used.
- CENELEC EN50199 EMC Product Standard for Arc Welding Equipment.
- ISO/IEC 60974-1 (BS 638-PT10) (EN 60 974-1) (EN50192) (EN50078) applicable to plasma cutting equipment and associated accessories.
- For environments with increased hazard of electrical shock, Power Supplies bearing the S mark conform to EN50192 when used in conjunction with hand torches with exposed cutting tips, if equipped with properly installed standoff guides.
- Extensive product design verification is conducted at the manufacturing facility as part of the routine design and manufacturing process. This is to ensure the product is safe, when used according to instructions in this manual and related industry standards, and performs as specified. Rigorous testing is incorporated into the manufacturing process to ensure the manufactured product meets or exceeds all design specifications.

Thermadyne has been manufacturing products for more than 30 years, and will continue to achieve excellence in our area of manufacture.

Manufacturers responsible representative:

Steve Ward  
Operations Director  
Thermadyne Europe  
Europa Building  
Chorley N Industrial Park  
Chorley, Lancashire,  
England PR6 7BX

# EXCEL-ARC 500, 6045

## 1.07 LIMITED WARRANTY

LIMITED WARRANTY: Thermal Arc®, Inc., A Thermadyne Company, hereafter, "Thermal Arc" warrants to customers of its authorized distributors hereafter "Purchaser" 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, INDIRECT OR CONSEQUENTIAL DAMAGES, SUCH AS, BUT NOT LIMITED TO, LOST PROFITS AND BUSINESS 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, strict 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 JUDGEMENT 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.

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.

<b>POWER SUPPLIES</b>	<b>ALL OTHER</b>	<b>LABOR</b>
	<b>POWER SUPPLIES</b>	
MAIN POWER MAGNETICS (STATIC & ROTATING)	3 YEARS	3 YEAR
ORIGINAL MAIN POWER RECTIFIER	3 YEARS	3 YEAR
CONTROL PC BOARD	3 YEARS	3 YEAR
ALL OTHER CIRCUITS AND COMPONENTS INCLUDING BUT NOT LIMITED TO: CONTACTORS, RELAYS, SOLENOIDS, PUMPS, POWER SWITCHING SEMI-CONDUCTORS.	1 YEAR	1 YEAR
ENGINES: ENGINES ARE NOT WARRANTED BY THERMAL ARC, ALTHOUGH MOST ARE WARRANTED BY THE ENGINE MANUFACTURER. SEE THE ENGINE MANUFACTURE'S WARRANTY FOR DETAILS.	1 YEAR	1 YEAR
CONSOLES, CONTROL EQUIPMENT, HEAT EXCHANGES		
ACCESSORY EQUIPMENT		

NOTE: Dragster 85® excluded from this policy. Refer to Dragster 85 warranty in Dragster 85 Owner's Manual.

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 purchaser's notice of any Warranty Claim. 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 Purchaser. All returned goods shall be at the Purchaser's risk and expense. This warranty supersedes all previous Thermal Arc warranties. Thermal Arc® is a Registered Trademark of Thermadyne Industries Inc.

September 27, 2004

## SECTION 2: INTRODUCTION

### 2.01 How To Use This Manual

This Owner's Manual applies to just specification or part numbers listed on page i.

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

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**

*A WARNING gives information regarding possible personal injury.*

#### **CAUTION**

*A CAUTION refers to possible equipment damage.*

#### **NOTE**

*A NOTE offers helpful information concerning certain operating procedures.*

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

Electronic copies of this manual can also be downloaded at no charge in Acrobat PDF format by going to the Thermal Arc web site listed below and clicking on the Literature Library link:

<http://www.thermalarc.com>

### 2.02 Equipment Identification

The unit's identification number (specification or part number), model, and serial number usually appear on a nameplate attached to the control panel. In some cases, the nameplate may be attached to the rear panel. Equipment which does not have a control panel such as gun and cable assemblies is identified only by the specification or part number printed on the shipping container. Record these numbers on the bottom of page 1 for future reference.

### 2.03 Receipt Of Equipment














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


















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





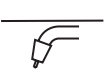
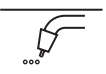
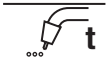






Move the equipment to the installation site before uncrating the unit. Use care to avoid damaging the equipment when using bars, hammers, etc., to uncrate the unit.

## 2.04 Symbol Chart

Note that only some of these symbols will appear on your model.

	On
	Off
	Dangerous Voltage
	Increase/Decrease
	Circuit Breaker
	AC Auxiliary Power
	Fuse
<b>A</b>	Amperage
<b>V</b>	Voltage
<b>Hz</b>	Hertz (cycles/sec)
<b>f</b>	Frequency
<b>-</b>	Negative
<b>+</b>	Positive
	Direct Current (DC)
	Protective Earth (Ground)
	Line
	Line Connection
	Auxiliary Power
<b>115V 15A</b> 	Receptacle Rating- Auxiliary Power

<b>1</b> 	Single Phase
<b>3</b> 	Three Phase
	Three Phase Static Frequency Converter- Transformer-Rectifier
	Remote
<b>X</b>	Duty Cycle
<b>%</b>	Percentage
	Panel/Local
	Shielded Metal Arc Welding (SMAW)
	Gas Metal Arc Welding (GMAW)
	Gas Tungsten Arc Welding (GTAW)
	Air Carbon Arc Cutting (CAC-A)
	Constant Current
	Constant Voltage Or Constant Potential
	High Temperature
	Fault Indication
	Arc Force
	Touch Start (GTAW)
	Variable Inductance
	Voltage Input

	Wire Feed Function
	Wire Feed Towards Workpiece With Output Voltage Off.
	Welding Gun
	Purging Of Gas
	Continuous Weld Mode
	Spot Weld Mode
	Spot Time
	Preflow Time
	Postflow Time
	<b>2 Step Trigger Operation</b> Press to initiate wirefeed and welding, release to stop.
	<b>4 Step Trigger Operation</b> Press and hold for preflow, release to start arc. Press to stop arc, and hold for preflow.
	Burnback Time
	Disturbance In Ground System
<b>IPM</b>	Inches Per Minute
<b>MPM</b>	Meters Per Minute

ART # A-04130

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## **2.05 Description**

### **1. General**

There are three basic units of the EXCEL-ARC®. The EXCEL-ARC® 500 (CC), Part Number 100005A-1 & -5, is a constant-current transformerrectifier type DC welding machine that provides volt-ampere characteristic curves that are basically drooping with a slight slope.

The EXCEL-ARC® 6045 (CV), Part Number 100005A-2 & -6, is a constant-voltage transformerrectifier type DC welding machine that provides volt-ampere characteristic curves that are basically flat.

The EXCEL-ARC® 6045 (CC/CV), Part Number 100005A-3 & -7, is a combination constant-current and constant-voltage transformer-rectifier type DC welding machine that provides volt-ampere characteristic curves for each mode of operation.

Table 2-1 gives input voltage and amperage data for all part numbers covered by this manual.

### **2. Recommended Unit Applications**

1. Gas metal arc welding (MIG)
2. Flux cored arc welding (with or without gas shielding)
3. Submerged arc welding
4. Electro-slag welding
5. Carbon arc gouging
6. SMAW (Stick welding)
7. GTAW (TIG welding)

### **3. Wire Feeder Compatibility**

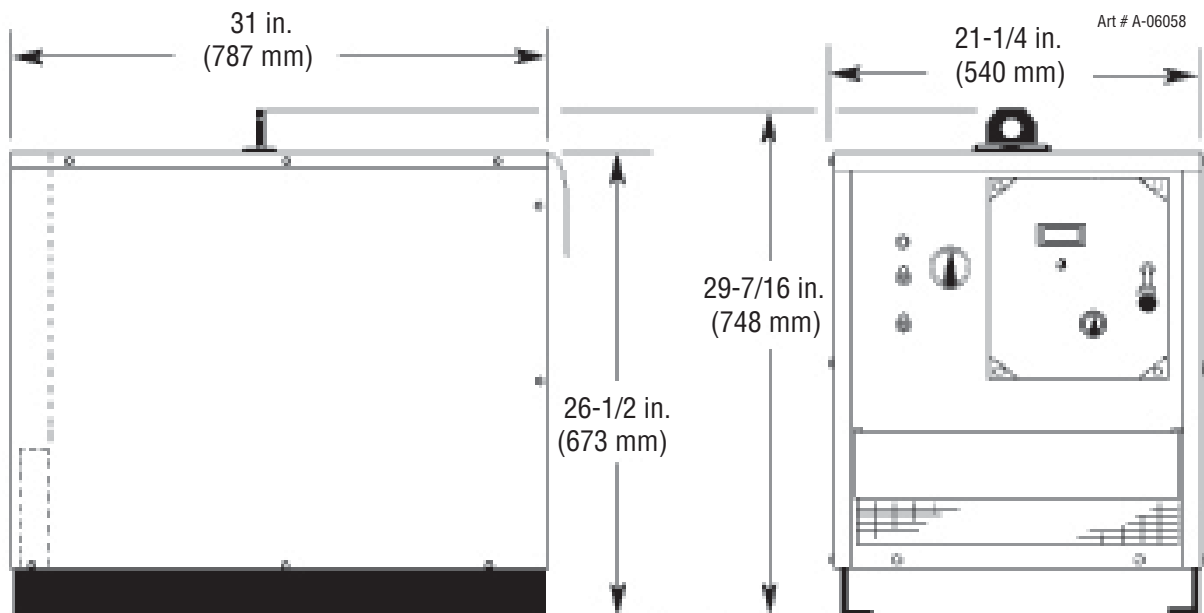
Some models of wire feeders will connect onto this unit with no special preparation. In some cases, however, an interface must be used and in other instances, some rewiring must be accomplished. Complete details for these exceptions will be found in the instruction manual supplied with the wire feeder.

# EXCEL-ARC 500, 6045

## 2.06 Specifications

ITEM	PART NO. 100005A-1 & 100005A-5 EXCEL-ARC® CC	PART NO. 100005A-2 & 100005A-6 EXCEL-ARC® CV	PART NO. 100005A-3 & 100005A-7 EXCEL-ARC® CC/CV	
			CC	CV
Rated Output Amperage	400 Amps	450 Amps	400 Amps	450 Amps
Rated Output Voltage	36 Volts	38 Volts	36 Volts	38 Volts
Rated Duty Cycle	60% Duty	100% Duty	60% Duty	100% Duty
Minimum Output	40 Amps	50 Amps @ 13 Volts	40 Amps	50 Amps @ 13 Volts
Maximum Output	500 Amps	600 Amps @ 40 Volts	500 Amps	600 Amps @ 40 Volts
Rated Input Voltage	200/230/460/575	200/230/460/575	200/230/460/575	
Rated Input Amperage	78/67/33/27	70/60/30/24	70/60/30/24	
Input kW	20 kW	22.5 kW	22.5 kW	
Input kVA	26.3 kVA	30.1 kVA	30.1 kVA	
Input Frequency	60 Hz	60 Hz	60 Hz	
Input Phase	3 Phase	3 Phase	3 Phase	
Maximum Open Circuit Voltage	58	58	58	
Auxiliary Power	1 kVA –115V, 9 A	1 kVA –115V, 9 A	1 kVA –115V, 9 A	
No Load Input Voltage	200/230/460/575	200/230/460/575	200/230/460/575	
No Load Input Amperage	5.6/4.9/2.45/1.9	6.9/6.0/3.0/2.4	6.9/6.0/3.0/2.4	
No Load kW	.9 kW	1.6 kW	1.6 kW	
No Load kVA	1.94 kVA	2.4 kVA	2.4 kVA	
Power Factor	.76	.75	.75	
Efficiency	72%	76%	76%	

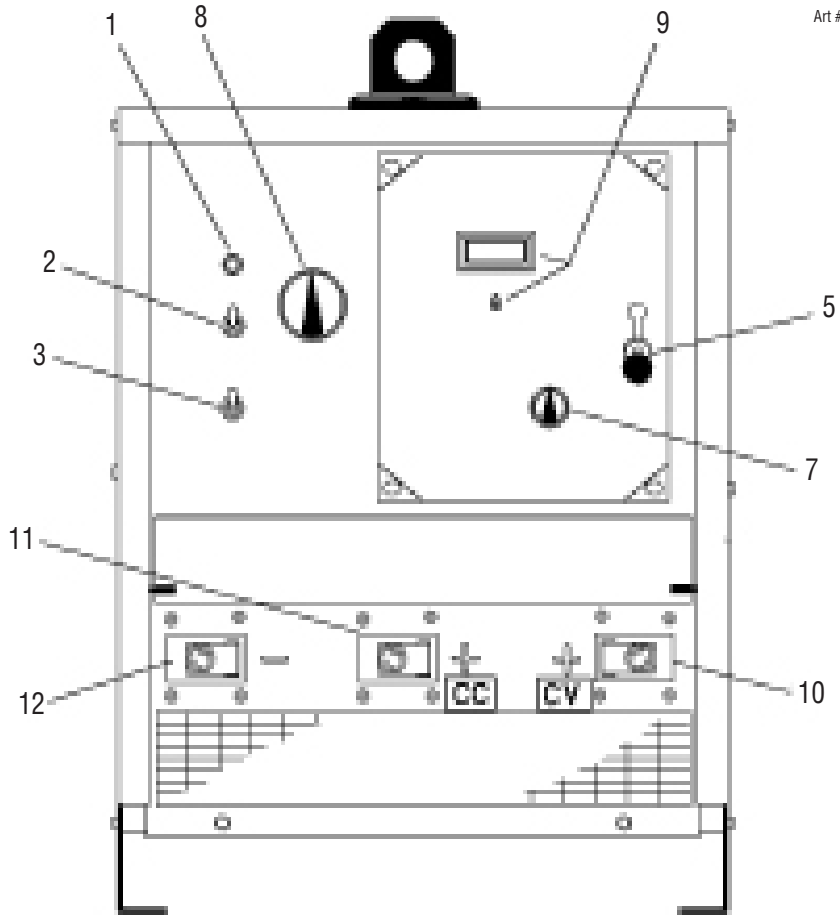
Table 2-1: Volt and Amp Data



Weight (CC/CV) - 510 Lbs. (231 kg)  
 (CC) - 460 Lbs. (209 kg)  
 (CV) - 455 Lbs. (206 kg)

Figure 2-1: Excel-Arc 500 and 6045 Dimensions and Weight

Art # A-06057



NOTE:  
The rear panel rubber guard used on Spec #100005A-3 is not shown for clarity purposes

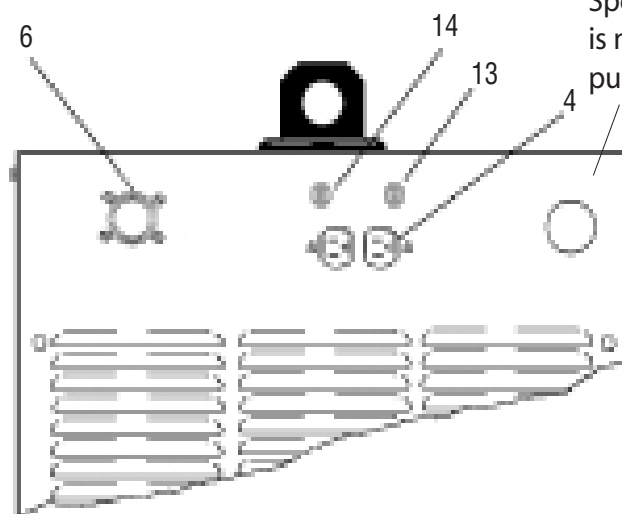


Figure 2-2: Front and Rear Panel



## 2.07 Controls and Outlets

Refer to callouts in Figure 2-2.

- 1. Overload Indicator** (100005A-1, -2, -3, -5, -6, -7): Yellow L.E.D., when lighted, indicates that the machine has shut down as a result of amperage overload or rectifier overtemperature (S2).
- 2. Input Contactor Control** (100005A-1, -2, -3, -5, -6, -7): This toggle switch is the master power switch for the welding machine, and must be in the ON position before any other section will operate. The primary circuit of the control transformer is energized whenever line voltage is present at the input terminals. This switch closes the secondary circuit of the control transformer, energizing the contactor, which energizes the power transformer. Do not use this switch to start or stop arc. Start arc with switch ON, break arc, then turn switch OFF.
- 3. Local/Remote Output Control Volts/Amps Selector Switch** (100005A-1, -2, -3, -5, -6, -7): Selects either the output control (Local) or some remote control device (Remote) to control welding output.
- 4. 115-V AC Receptacles** (100005A-1, -2, -3, -5, -6, -7): Provides auxiliary power for lights, wire feeders, water pumps, etc. — 15 amps maximum.
- 5. CC/CV Selector Switch (CC/CV)** (100005A-3, -7): Selects the welding mode of operation.
- 6. Feeder Control Receptacle Panel (Automatic) (CV units)** (100005A-2, -3, -6, -7): Amphenol (19-pin) connector for a remote voltage control type wire feeder.
- 7. Arc Force Control (CC/CV Units)** (100005A-1, -3, -5, -7): This potentiometer controls short circuit (welding) current to produce an increase in current as the arc length is shortened. The control is present to provide the degree of “hard start” required, and the additional dynamic change for welding tight grooves, etc. Turn clockwise to increase “hard start” characteristics, counterclockwise to obtain a softstart, smooth arc.
- 8. Welding Voltage/Amperes Control (CV Units)** (100005A-2, -3, -6, -7): Adjusts arc welding output and open circuit voltage. On 100005A-1, -3, -5, -7 (CC units): Adjusts the welding current.
- 9. Volt/Amp Meter and Switch (CV Units)** (100005A-2, -3, -6, -7): A single meter with switch that will read DC volts when in the V. position or read DC amps in the A. position.
- 10. Positive Terminal (+) (CV mode)** (100005A-2, -3, -6, -7): Serves as a connection point for the lead to the wire feeder when reverse polarity is desired.
- 11. Positive Terminal (+) (CC mode)** (100005A-1, -3, -5, -7): Serves as a connection point for the lead to the electrode holder lead for SMAW (stick) or arc gouging mode of operation when reverse polarity is desired.
- 12. Negative Terminal (—)**: Serves as a connection point for the lead to the workpiece when reverse polarity is desired.
- 13. Circuit Breaker** — Rated at 15 amps: provides protection to the 115-volt circuit which includes the fan and the 115-volt AC power receptacle.
- 14. Circuit Breaker** — Rated at 10 amps: provides protection to the 24-volt circuit for the wire feeder and automatic equipment.

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### NOTE

*To obtain opposite welding polarity, simply reverse the connections to the positive and negative terminals.*

**2.08 Functional Block Diagram**

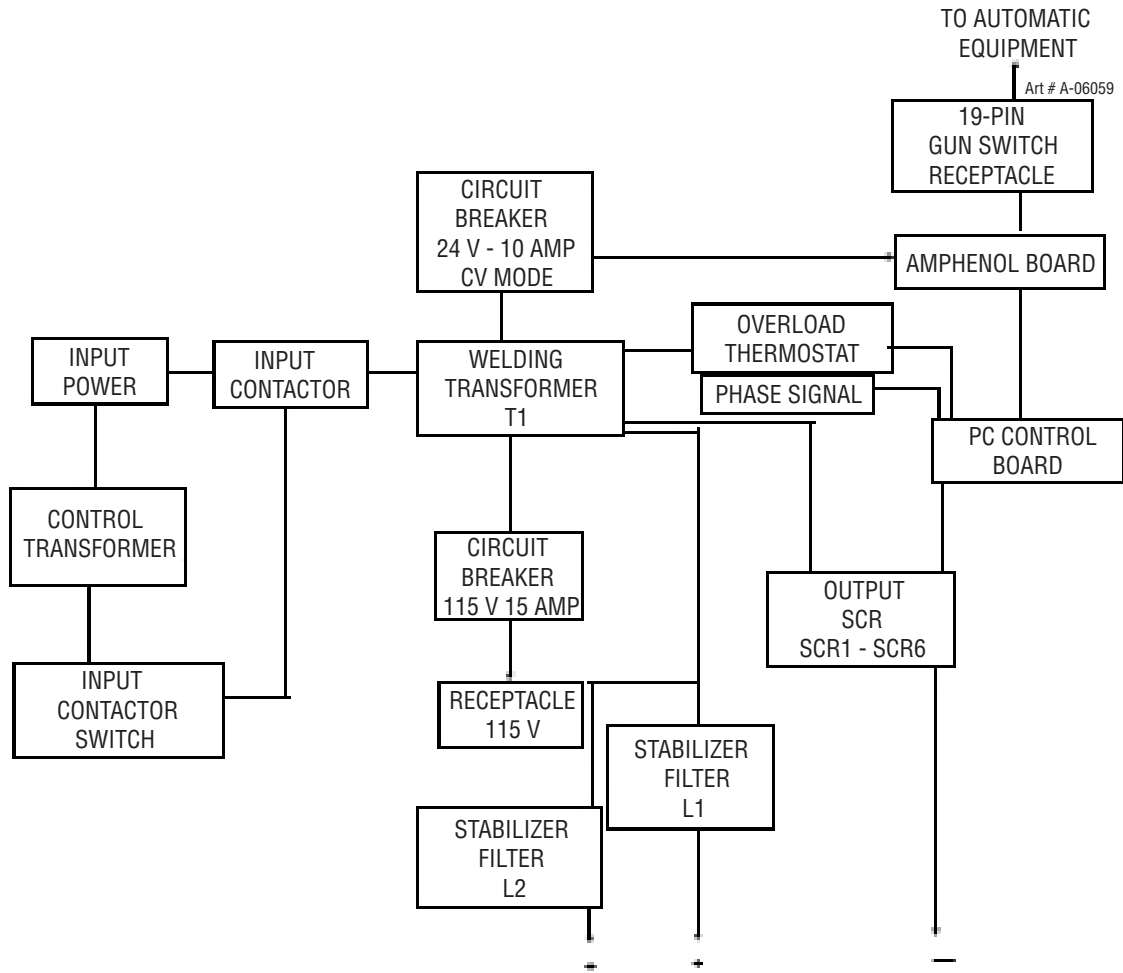


Figure 2-3: Functional Block Diagram for Excel-Arc 500 and 6045

## 2.09 Duty Cycle

Duty cycle is the percentage of each ten-minute period of time that the welding machine may be operated under rated load conditions. For example, a duty cycle of 60% means that the machine can be operated at rated load for an average of 6 minutes of each 10 minute period of operation. During the remaining 4 minutes, the machine must idle to permit proper cooling. Figure 3-3 enables the operator to determine the duty cycle at various welding amperages.

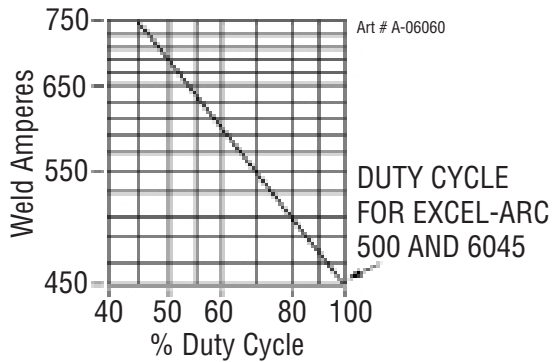


Figure 2-4: Duty Cycle Chart

## 2.10 Volt-Amp Curves

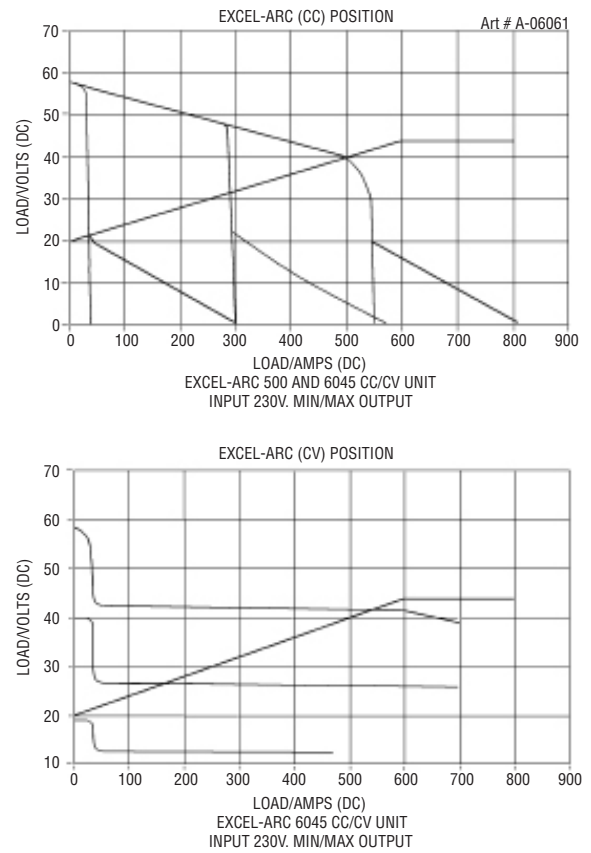


Figure 2-5: Volt/Ampere Characteristic Curves



## SECTION 3: INSTALLATION

### 3.01 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.

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

### 3.02 Grounding

The frame of this welding machine should be grounded for personnel safety, and to assure operation of the overcurrent protection. The grounding method, and the equipment grounding conductor size and type shall conform to local and national codes.

For the National Electrical Code, the equipment grounding conductor shall be green, green with a yellow stripe, or bare.

If flexible power cable is used, use a cable assembly which includes the equipment grounding conductor. If metallic armored cable or conduit is used, the metal sheathing or conduit must be effectively grounded per local and national codes.

Rubber-tire mounted equipment shall be grounded to conform to local and national codes. The grounding assists in providing protection against line voltage electrical shock and static shock. The grounding serves to discharge the static electric charge which tends to build up on rubber-tire mounted equipment. This static charge can cause painful shock and lead to the erroneous conclusion that an electrical fault exists in the equipment.

If a system ground is not available, consult the electrical code enforcement body for instructions. The welding machine should be connected to an adequate driven ground rod, or to a water pipe that enters the ground not more than 10 feet (30 meters) from the machine.

The equipment grounding conductor size is listed in Table 3-1 as a guide, if no local or national code is applicable.

Attach the equipment grounding conductor to the stud provided on the yoke. Determine that the ground wire size is adequate before the machine is operated.

#### **CAUTION**

*Be sure to replace the cabinet top to assure adequate internal ventilation and prevent component failure.*

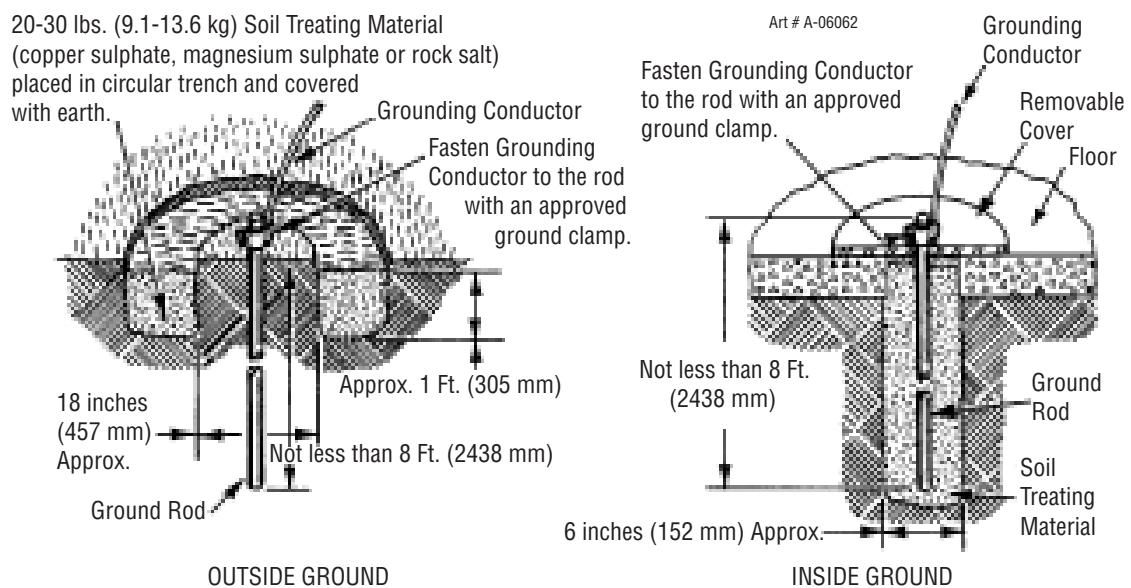


Figure 3-1: Grounding

LINE VOLTS	RATED LOAD AMPS	APPROX. LINE FUSE SIZE	COPPER LINE WIRE SIZE*		COPPER GROUNDING CONDUCTOR MIN. SIZE
			IN CONDUIT	FLEXIBLE CABLE	
200	81	100	No. 4	No. 2	No. 8
230	71	100	No. 6	No. 6	No. 8
460	35.5	40	No. 8	No. 6	No. 10
575	28	40	No. 10	No. 8	No. 10

Table 3-1: Recommended Wire and Fuse Sizes

\* Conductor size shall be modified as required for line voltage drop and ambient temperature. Sizes listed for conduit installation are based on 90° C conductor insulation, designated as FEP, FEPB, RHH, and THHN.

### 3.03 Internal Wiring Check

Refer to the product identification plate (nameplate) on the welding machine's rear panel to determine the power input voltages and frequency at which it will be operated.

Remove left side panel for access to Line Voltage Changeover circuitry. Check line voltage connections against instructions on Voltage Changeover Diagram supplied with this manual. If necessary, rearrange internal wiring and/or link connections.



#### **WARNING**

*ELECTRIC SHOCK CAN KILL. Open the disconnect switch, or breaker, and determine that no voltage is present, before connecting wires between welding machine and power supply.*

#### **CAUTION**

*The method of installation, conductor size, and overcurrent protection shall conform to the requirements of the local electrical code, the National Electrical Code, or other national codes, as applicable. All installation wiring and machine reconnections shall be done by qualified persons.*

### 3.04 Connecting Welding Machine to Line Voltage

The input power should be connected to the unit through a fused disconnect switch, or other suitable disconnecting means furnished by the user. A hole is provided in the rear panel of the machine, near to the input connections, for the entry of the input conductors.

Table 3-1 provides minimal information for selection of line conductors, fuses, and the equipment grounding conductor. This information is from the National Electrical Code NFPA 70-1981 Edition. Install this equipment per the latest edition, available from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.

Connect the three-phase line leads to terminals L1, L2, and L3 on the line contactor inside the welding machine cabinet.

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Place links in proper position based on input voltage value.

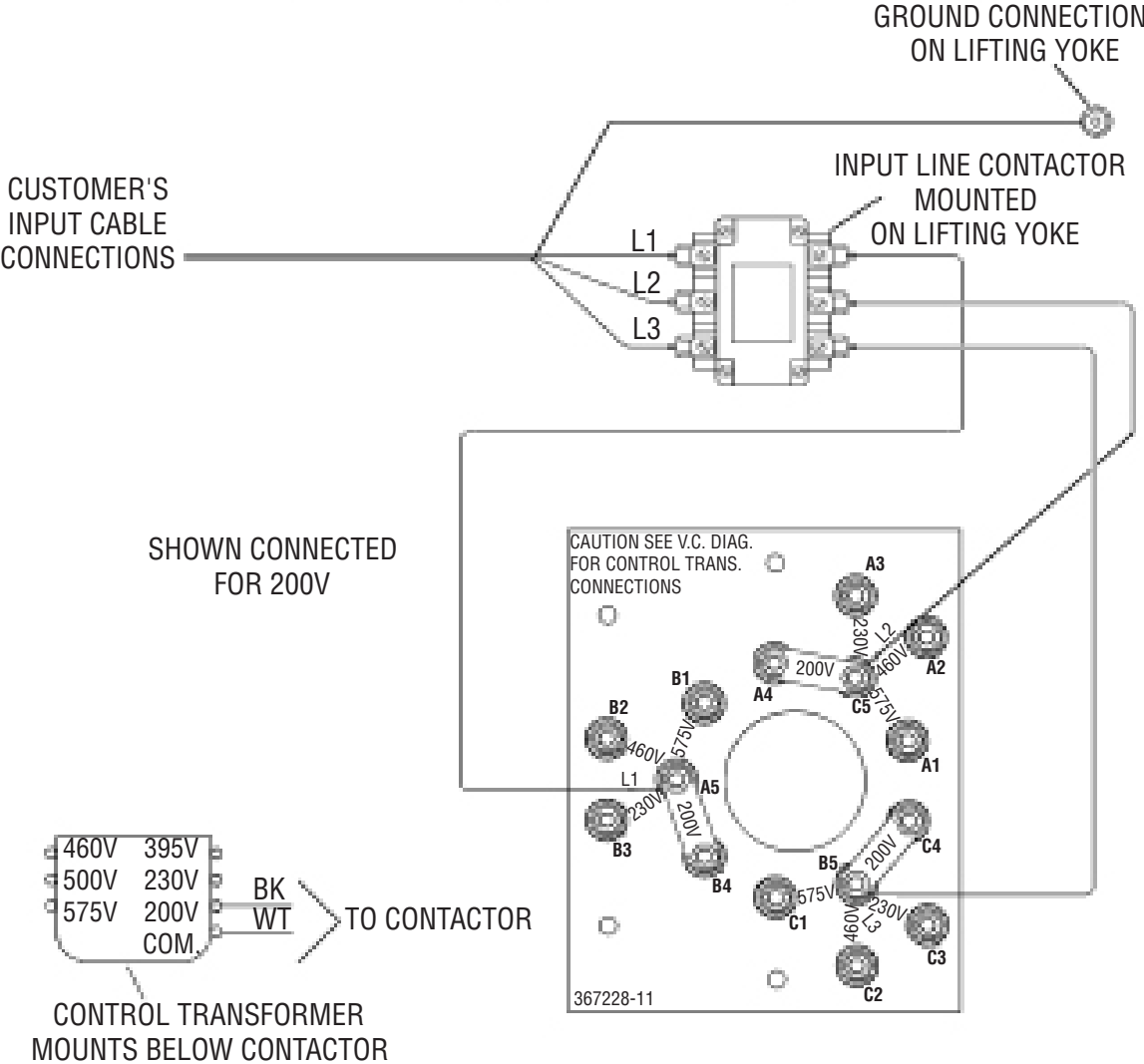


Figure 3-2: Input Voltage Connection & Changeover

**3.05 Welding Leads**

Use Table 3-2 for selection of the proper size copper welding 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	#4	#3	#2
150	#3	#3	#2	#1	#1/0
200	#2	#2	#1	#1/0	#2/0
250	#1	#1	#1/0	#2/0	#3/0
300	#1/0	#1/0	#2/0	#3/0	#4/0
350	#1/0	#1/0	#3/0	#4/0	#4/0
400	#2/0	#2/0	#3/0	#4/0	2 — #2/0
450	#2/0	#2/0	#4/0	2 — #2/0	2 — #3/0
500	#3/0	#3/0	#4/0	2 — #2/0	2 — #3/0

Table 3-2: Length of Lead Circuit

\* For 60% duty cycle

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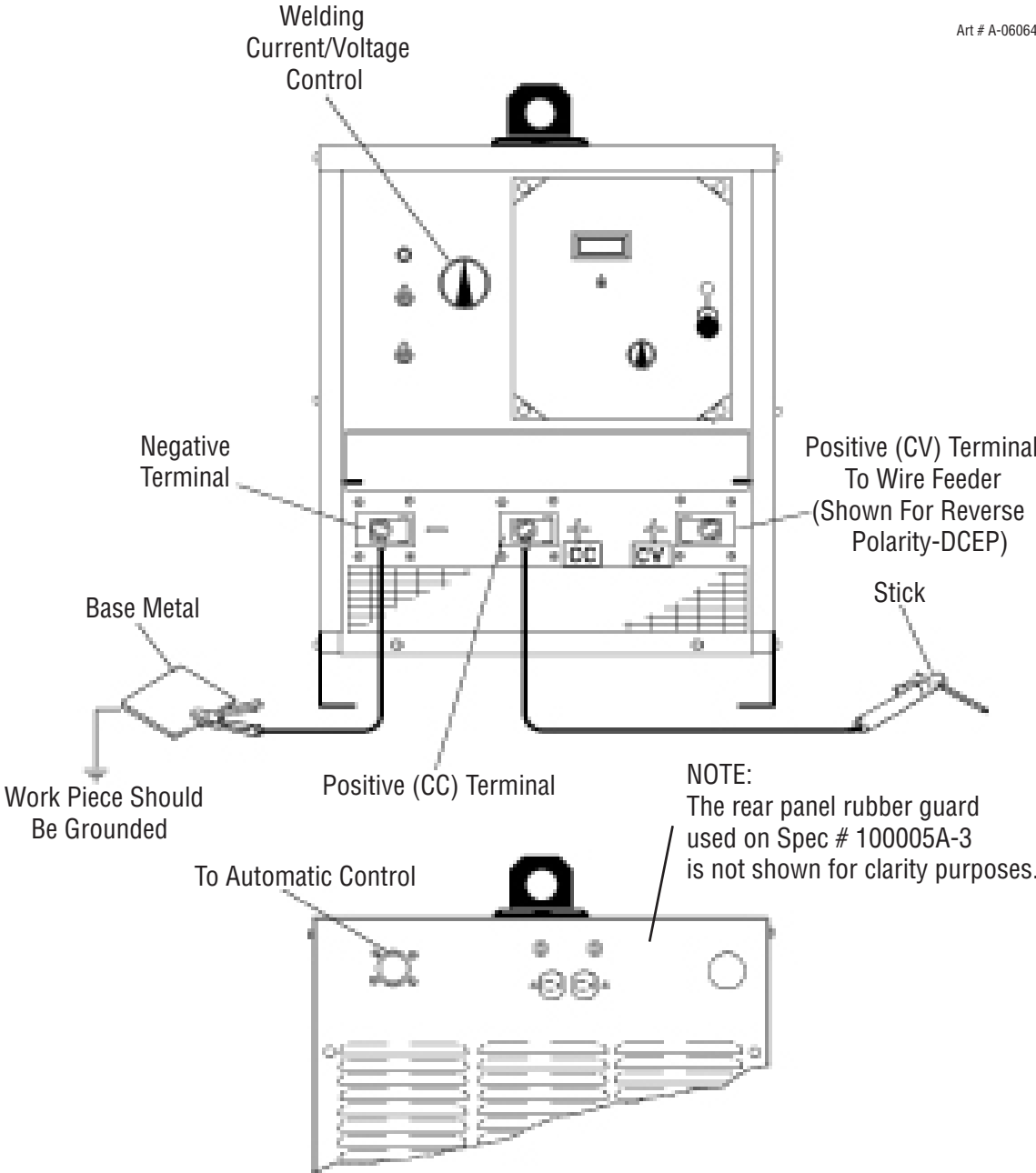
**NOTE**

*Lead size shown is for 90°C cable insulation, 30°C (86°F) ambient, and not over 4.5 volts lead drop.*



3.06 Installation Diagram

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NOTE: To change polarity, reverse connections on power output terminals on power source.

Figure 3-3: Installation Diagram



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## **SECTION 4: OPERATION**

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### **4.01 General**

Before operating this system, be sure that all installation instructions have been accomplished. When operating this system, observe all applicable Safety Warnings listed in this and related system manuals.

The operating instructions in this manual pertain only to the EXCEL-ARC® 500 and 6045 welding machines. Consult operating instructions for components used with this system before operating.

A thermostatically controlled fan motor is standard on this unit. The fan motor starts and stops automatically when a predetermined temperature has been reached.

### **4.02 Preweld Operation**

1. Connect welding leads to terminals on front panel.



#### **WARNING**

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*Disconnect line voltage from the unit before making any connections inside unit. Turn off fused disconnect switch that supplies power to welding machine, and remove its fuse. **ELECTRIC SHOCK can kill!** Do not touch live electrical parts, including the output terminals and electrode.*

---

2. If used, connect remote control wire assembly and gun switch to welding machine. Connect feeder receptacle to wire electrode feeder system.
3. Refer to other manuals for component connections.
4. Set Output Control to desired value.
5. Set the remote/local control switch in the desired mode.

### **4.03 SMAW (Stick) Welding, Carbon Arc Gouging**

(100005A-1, -3, -5, and -7)

Refer to Section 2.06 and Figure 2-1 for controls (numbers in parenthesis refer to callouts on Figure 2-1).

1. On 100005A-3, and -7 set the CC/CV selector switch to CC position.
2. Hold electrode clear of work. Be sure the Remote-Local Switch (3) is set to LOCAL position.
3. Turn Input Contactor Control Switch (2) to ON position.
4. Strike arc. Adjust Welding Output Control (8) if required. Adjust Arc Force Control (7) to desired level.
5. At the conclusion of welding, break arc, and turn Input Contactor Control Switch (2) to OFF position.

### **4.04 Welding, Semiautomatic or Automatic**

Refer to Figure 2-1 for controls.

1. On 100005A-2, -3, -6, and -7 set Remote/Local Output Control Switch (3) to LOCAL.

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#### **NOTE**

*Set Output Control Switch (3) to REMOTE when using a feeder which controls the voltage, and remote voltage control is desired.*

2. On 100005A-3 and -7 set the CC/CV Selector Switch to CV position.
3. Place Input Contactor Control Switch (2) in ON position (Power ON).
4. Inch wire electrode to position over work; see related owner's manuals.
5. Depress gun switch trigger and strike arc.

**4.05 Overload Indicator**

This unit is equipped with an overload indicator - yellow L.E.D. When lighted, indicates that the machine has shutdown as a result of amperage overload or overtemperature.

To reset the overload indicator, release the gun trigger switch. If the indicator light goes out, the indication was due to amperage overload. If the light does not go out, the indication was due to an overtemperature condition. The unit will not weld until the overtemperature condition has dissipated and the light goes out. If the light comes on repeatedly or often, then investigate for the cause of overload or overtemperature and take steps to correct the causes.

Some causes of overload are:

- 1) Gun contact tip shorted to workpiece.
- 2) Diameter of filler wire too large for machine rating can cause overload to trip on weld starts.

Some causes of overtemperature are:

- 1) Exceeding current rating and/or duty cycle rating of machine.
- 2) Blocked or restricted air inlets or outlets to machine.

<b>JP1 - Wire Sharpening:</b>	Jumper in UP position (1-2 shorted)	ON
	Jumper in DOWN position (2-3 shorted)	OFF
Factory setting is wire sharpening ON. <i>NOTE: For wire sharpening to work, "Burnback"</i>		
<b>JP5 - Burnback:</b>	Jumper in UP position (1-2 shorted)	OFF
	Jumper in DOWN position (2-3 shorted)	ON
Factory setting is burnback ON.		
<b>JP7 - MIG Hot Start:</b>	Jumper in UP position (1-2 shorted)	OFF
	Jumper in DOWN position (2-3 shorted)	ON
Factory setting is hot start OFF.		

Table 4-1: Configuration Settings

**4.06 Configuration Settings**

The following settings (Table 4-1) can be made by jumper plug changes on the main control board. Explanation of settings:

1. The wire sharpening feature is used to reduce the size of the ball left on the end of the wire at the completion of a weld. The wire sharpening circuit will reduce the voltage below the value required to maintain an arc, but sufficient to burn off the end of the wire. Arc starting will be improved by reducing the size of the ball left on the wire.

**NOTE**

*In order for this circuit to work properly the MIG gun must be held in place as the trigger is released. If the MIG gun is pulled back as the trigger is being released, the circuit will not have the opportunity to reduce the size of the ball left on the wire.*

2. The burnback feature will maintain contactor closure for approximately .25 seconds after the gun trigger is released. The primary function of this feature is the prevention of wire sticking to the weld puddle upon completion of a weld. This is especially important at higher wire feed speeds with feeders that have a tendency for wire coasting. If wire sharpening is OFF then the arc voltage during the burnback time will be at the preset weld voltage. If wire sharpening is ON then the arc voltage will be reduced to a lower value to reduce the ball on the end of the wire.
3. The hot start feature provides a higher open circuit voltage for the initial arc strike in MIG. The primary purpose of this feature is to provide more energy during the start for larger diameter wires at high wire feed speed. This feature if enabled, is only active for MIG.

## SECTION 5: SERVICE

### 5.01 Replacing SCRs

Replacing an SCR is a critical task but it can be accomplished in the field by following the instructions in the Detailed Troubleshooting section of the Troubleshooting chapter of this manual.

### 5.02 Lubrication

The fan motor incorporates a sleeve bearing and therefore will need periodic lubrication. The following table will furnish a recommended guide to the frequency of this lubrication.

Type of Duty	Lubrication Interval
Light (up to 6 hrs./day)	Every 12 months
Moderate (7 to 15 hrs./day)	Every 6 months
Heavy (16 to 24 hrs./day)	Every 3 months

Table 5-1: Lubrication

#### **NOTE**

*Apply 1-12 drops of 20W non-detergent oil at each end of bearing.*

### 5.03 Inspection and Cleaning

For uninterrupted, satisfactory service from this welding machine, it is necessary to keep the machine clean, dry, and well ventilated. At least every three months, or more often as necessary, wipe and blow out all dirt from the machine's internal components, with air pressure of not over 25 psi (172 kPa). Be sure to wipe the fan blades clean.

Check and tighten all electrical connections as necessary to eliminate unnecessary losses and to avoid subsequent trouble from overheating or open circuits. Check for broken wiring or damaged insulation on wiring.

#### **CAUTION**

*The flow of air through the welding machine is carefully directed by baffles. Never operate the welding machine with any of the side or top panels removed or open, as serious damage to the rectifiers might result.*

## 5.04 Troubleshooting Guide

### General:

(Also refer to Troubleshooting in wire feeder and gun manuals.)

#### 1. Welding machine will not start.

- A. *Power switch OFF.*
  - 1) Place power switch in ON position.
- B. *Power lines dead.*
  - 1) Check voltage.
- C. *Broken power lead.*
  - 1) Repair.
- D. *Wrong line voltage.*
  - 1) Check power supply.
- E. *Incorrect input power connections at welding machine.*
  - 1) Check connections against wiring diagram.
- F. *Open circuit to power switch or control transformer.*
  - 1) Repair. Check for broken wire or loose connections at terminals.
- G. *Fuse on control transformer blown.*
  - 1) Remedy cause. Replace fuse.

#### 2. Line contactor fails to close.

- A. *Defective NVR coil.*
  - 1) Replace.
- B. *Mechanical obstruction on contactor.*
  - 1) Remove.
- C. *Broken leads at line contactor.*
  - 1) Repair.

#### 3. Contactor chatters.

- A. *Line leads too small.*
  - 1) Use larger leads.
- B. *Low line voltage.*
  - 1) Check line voltage.

#### 4. Contactor operates and blows link fuses.

- A. *Wrong line voltage.*
  - 1) Check nameplate of welding machine for line voltage to use; check line voltage.
- B. *Links on voltage changeover board incorrectly connected.*
  - 1) Check Voltage Changeover diagrams for link positions; connect links correctly. See Diagrams chapter.
- C. *Line fuse too small.*
  - 1) Install proper size fuse.
- D. *SCR failure or shorted flyback diode.*
  - 1) Refer to Detailed Troubleshooting Instructions.
- E. *Short circuit in primary connections.*
  - 1) Remove short circuit.
- F. *Transformer failed.*
  - 1) Repair or replace.

#### 5. Unit delivers welding current but soon shuts down (Thermal overload trips).

- A. *Welding machine overloaded.*
  - 1) Reduce load, overload can be carried only for a short time.
- B. *Duty cycle too high.*
  - 1) Do not operate continually at overload currents.
- C. *Power leads too long or too small in cross section.*
  - 1) Replace with larger diameter cable.
- D. *Ambient temperature too high.*
  - 1) Operate at reduced loads when temperature exceeds 104° F (40° C).
- E. *Ventilation blocked.*
  - 1) Check air intake and exhaust openings to be unobstructed.
- F. *Fan not operating after machine is loaded down.*
  - 1) Check fan thermostat. Check bearings, disconnect leads and apply motor nameplate voltage to test.

**6. Solid-state contactor operates, but welding machine will not deliver welding current, and open circuit voltage is present at the output when gun switch is depressed.**

*A. No ground connections at work.*

1) Make connections.

*B. Welding cables not connected.*

1) Make connections.

**7. Voltage/amps dial does not control welding voltage.**

*A. Potentiometer burned out.*

1) Replace.

*B. Loose connections in voltage control circuit.*

1) Check connections.

*C. Control circuit board failure.*

1) Replace control board.

**8. Fan not operating (also see causes and remedies under "Welding machine will not start").**

---

**NOTE**

*Fan will not operate until rectifier heats up.*

*A. Motor failed.*

1) Replace or repair.

*B. Broken lead or connection to fan motor.*

1) Repair wiring.

*C. Blown circuit breaker on rear panel of welding machine.*

1) Reset circuit breaker. 115-volt receptacle may be overloaded.

**9. Operator gets shock when welding machine case, ground cable, work, or work table is touched.**

*A. Case of welding machine not grounded.*

1) Ground welding machine case.

*B. Work table and work not grounded.*

1) Ground work and work table to plant ground.

**10. Abnormal current fluctuation, voltage nearly constant.**

*A. Irregular wire feed speed.*

1) See welding head manual.

*B. Inadequate shielding of arc by flux or gas.*

1) Increase shielding by trial and error. See welding head manual.

*C. Wire feed rate too slow.*

1) Increase wire feed. See wire burn-off rate charts.

*D. Too much shielding gas.*

1) Decrease by trial and error. See welding head manual.

*E. Loose cable connections.*

1) Check for overheated connections and tighten.

*F. Welding contact tube (tip) on wire feeder makes poor contact with electrode.*

1) Check contact tube hole size and replace with proper tube.

**11. Contactor fails to open.**

*A. Contactor contacts sticking.*

1) Clean contacts.

**12. Very noticeable, rough, sputtering arc. Loss of control and burnback. Minor starting problems.**

*A. Control circuit board failure.*

1) Replace Control P.C. Board.

## 5.05 Detailed Troubleshooting Instructions

The first step in troubleshooting this power source should be to eliminate any external equipment or conditions as the source of the problem. The following can be used as a general guideline for troubleshooting:

- Are any cables frayed or damaged or connections loose?
- Is the gun liner worn or plugged?
- Are the drive rolls tight?
- Does the wire feed smoothly, is the gun cable kinked?
- Check for worn contact tubes (tips)?
- Is the machine set correctly, or has a setting been changed?

- Is the shielding gas flow correct?
- Is the line voltage correct for the machine, blown fuses?
- Is the air flow in and around the machine unobstructed?

Once external conditions have been eliminated as the source of the problem the following guide can be used for specific checks on the machine. As in the case of all electrical equipment, loose connections can often be the cause of malfunction. Examine the machine for any loose or broken connections internally especially connections to the control circuit board. To gain access to the control board, remove the control panel from the front panel of the power source.

### 1. Control Board 830267:

All readings taken at nominal line voltage with maximum OCV on the machine.

Test Point	Expected Reading	Remark
R192 to TP19	17 VAC	AC voltage input to board
R193 to TP19	17 VAC	AC voltage input to board
R194 to TP19	17 VAC	AC voltage input to board
R195 to TP19	17 VAC	AC voltage input to board
R196 to TP19	17 VAC	AC voltage input to board
R197 to TP19	17 VAC	AC voltage input to board
TP16 to TP19	+18 VDC	Power Supply
TP17 to TP19	-15 VDC	Power Supply
TP18 to TP19	+15 VDC	Power Supply
TP11 to TP19	+10 VDC	Reference voltage
TP1 to TP19	0 VDC (for no Arc established)	Arc Established signal for 1>30 Amps TP1 = +14 VDC
TP2 to TP19	+5.4 VDC for CV	Vfb = Varc/10
	+6.2 VDC for CC	
TP3 to TP19	+8.8 VDC for CV	Firing angle control signal
	+13.5 VDC for CC	
TP4 to TP19	0 VDC (for gun switch on)	Gun Switch signal
TP6 to TP19	0 VDC	IFB = 1V per 100 Amps
TP7 to TP19	-9.56 VDC	Negative reference voltage
TP8 to TP19	+4.4 VDC for CV	SCR gate signal
	+11.65 VDC for CC	
TP9 to TP19	+4.4 VDC for CV	SCR gate signal
	+11.65 VDC for CC	
TP10 to TP19	+4.4 VDC for CV	SCR gate signal
	+11.65 VDC for CC	
TP12 to TP19	+14.6 VDC	SCR gate signal
TP13 to TP19	+14.6 VDC	SCR gate signal
TP14 to TP19	+14.6 VDC	SCR gate signal

Table 5-2: Test Points



**2. SCR Malfunction:**

A failed or defective SCR will normally result in one of two situations.

1. SCR shorted: Normally results in blown line fuse and shorted output on the machine. To isolate which SCR has failed it will be necessary to disconnect the transformer leads from the SCR heatsinks and check each SCR individually with a VOM.
2. SCR open: Normally results in a reduction in output voltage and/or an erratic or unstable arc. The same effect will be caused by the lack of a gate drive signal to an SCR. Check all gate leads from the control board and suppressor board to the SCRs. The following table gives typical values for open circuit voltage with one or more SCRs not firing.

**NOTE**

*For CV machines disconnect cable #103 from the capacitor bank assembly and insulate the lug to prevent it from touching chassis, prior to measuring open circuit voltage. These values were recorded at nominal line voltage with voltage/current control set to maximum.*

	CC Mode	CV Mode
All SCRs firing	61 VDC	48 VDC
1 SCR not firing	55 VDC	46 VDC
2 SCR not firing	48 VDC	43 VDC
3 SCR not firing	41 VDC	39 VDC

Table 5-3: SCRs

The best way to isolate the particular SCR which is malfunctioning is as follows. Refer to Connection Diagram while inspecting the unit. On the output rectifier there are gate leads coming off of the SCRs. Each of these leads are connected to a quick-disconnect terminal on the suppressor board. Turn the voltage control pot to maximum. Disconnect one lead to one SCR and observe the OCV. If the OCV drops to a lower value, this indicates that this particular SCR is working properly. *Reconnect this lead* and do the same thing with the remaining leads until you discover which disconnection does *not* cause the OCV to drop to a lower level. This is the malfunctioning SCR. See Mounting Procedures for SCRs which follows.

**3. Mounting Procedure for SCRs:**

1. Thoroughly clean heat sink surface to eliminate any dirt or contamination.
2. Apply a thin coat of Alcoa #2 compound to cleaned surface. Alcoa #2 is available from Thermal Arc, part number 903870.
3. Positively locate the SCR in place in the heat sink. A small spring pin in the extruded heat sink will locate the SCR.
4. Place the clamp in position with the bolts through the holes in the heat sink, and proceed in following manner.
5. Tighten the nuts evenly until finger tight.
6. Tighten each bolt in 1/4 turn increments using correct size hex key.
7. Place the Force Indicator Gauge (903878) firmly against the springs as shown. Be sure both ends and the center are in firm contact with the springs. The gauge notch location will indicate the spring deflection or force. Correct mounting force is indicated as shown below.
8. Spring deflection over 2-1/4 inches of spring is .037"-.002" for all clamps.
9. All clamps to be set at 4° mark. This corresponds to the VE3000-VE2500 section on the gauge label.

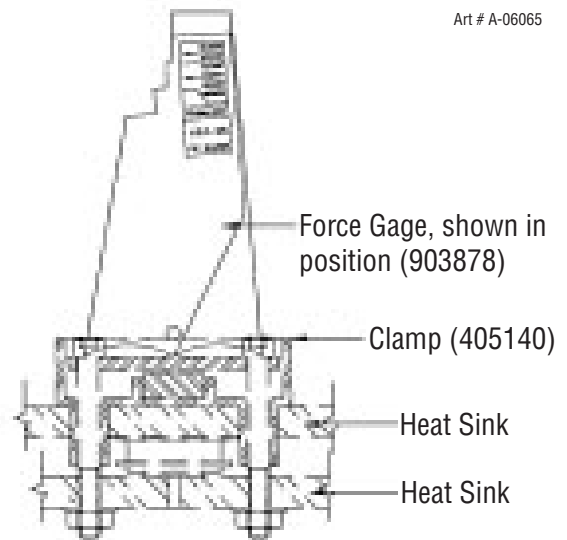


Figure 5-1: SCR with Force Gauge Shown in Position

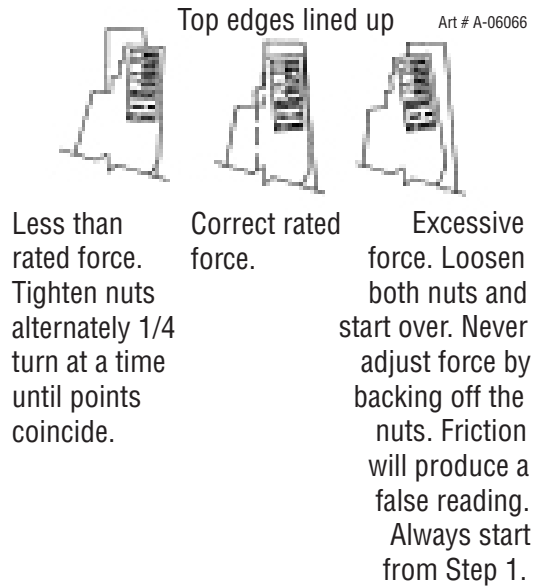
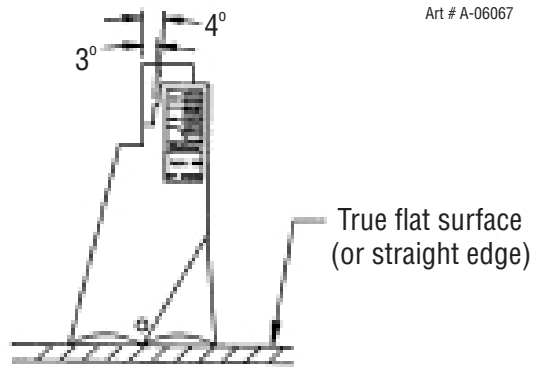


Figure 5-2: Adjusting Nuts to Correct Force Gauge

To Calibrate Force Gauge:

If the gauge is suspected of being out of calibration due to wear or damage, check it on a flat surface as shown below.



If the calibration edges do not line up, calibrate the gauge by filing the bottom contact points.

Figure 5-3: Force Gauge Calibration

---

## SECTION 6: PARTS LIST

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### 6.01 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.

### 6.02 How To Use This Parts List

The Parts List is a combination of an illustration 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 other parts. 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.

	<b>Part Number</b>	<b>Application Code</b>
Excel-Arc 500 (CC)	100005A-1	A
Excel-Arc 6045 (CV)	100005A-2	B
Excel-Arc 6045 (CC/CV)	100005A-3	C
Excel-Arc 500 (CC)	100005A-5	D
Excel-Arc 6045 (CV)	100005A-6	E
Excel-Arc 6045 (CC/CV)	100005A-7	F

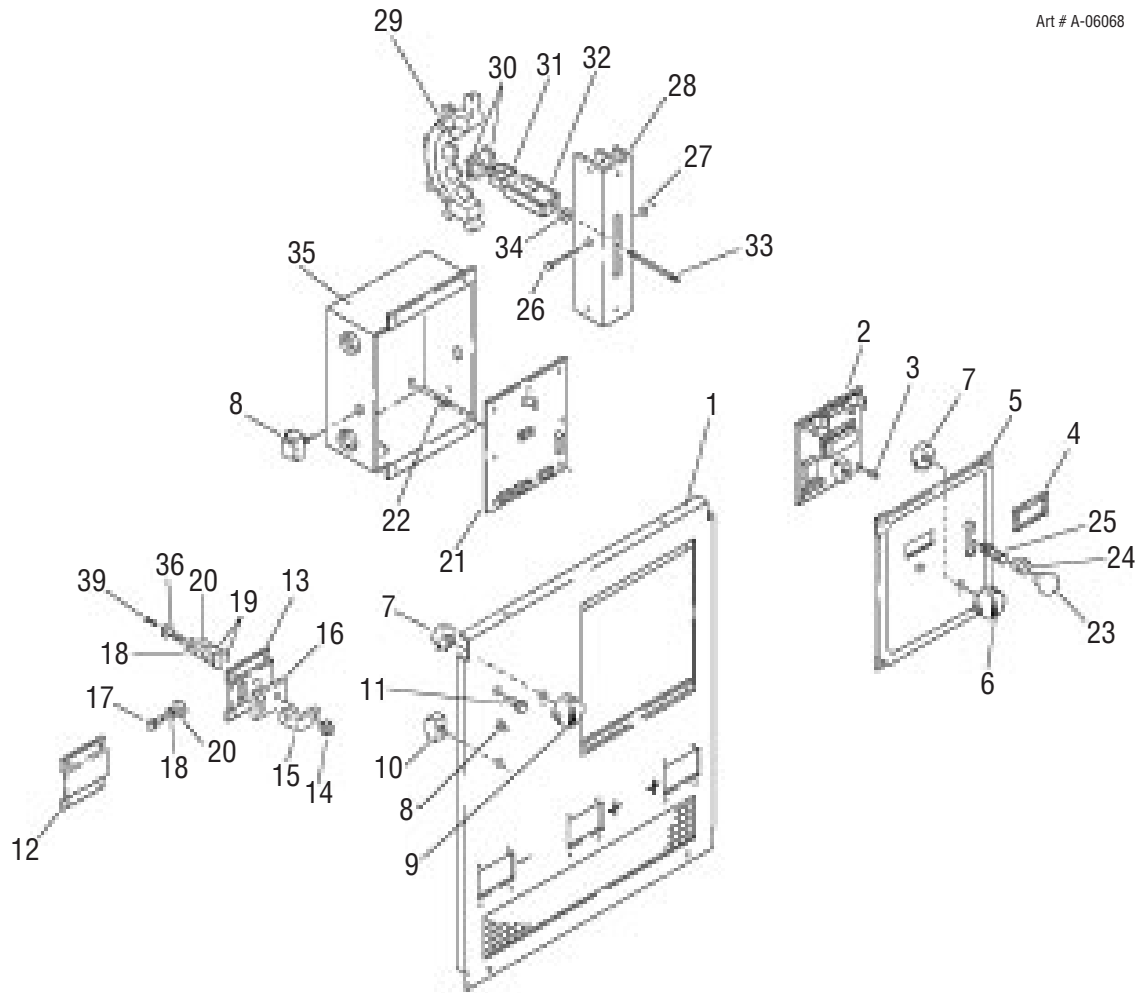


Figure 6-1: Parts 1

<b>Item No</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty per Assy</b>	<b>Application Code</b>
	100005A-1	Excel-Arc Welder® - 500 CC, 60 Hz	1	A
	100005A-2	Excel-Arc Welder® - 6045 CV, 60 Hz	1	B
	100005A-3	Excel-Arc Welder® - 6045 CC/CV, 60 Hz	1	C
	100005A-5	Excel-Arc Welder® - 500 CC, 60 Hz	1	D
	100005A-6	Excel-Arc Welder® - 6045 CV, 60 Hz	1	E
	100005A-7	Excel-Arc Welder® - 6045 CC/CV, 60 Hz	1	F
1	830698-1	. Panel - Control	1	All
2	204212	. Board - PC, Digital Display	1	BCEF
3	204600-2	. Spacer	4	BCEF
4	409000-1	. Bezel - Meter	1	BCEF
5	204053-11	. Panel - Control Module	1	AD
	204053-8	. Panel - Control Module	1	BE
	830207	. Panel - Control Module	1	CF
6	406806-3	. Knob - Control	1	ACDF
7	401428-8	. Potentiometer - Volt/Amp Ctl, Arc Force	2	ACDF
	401428-8	. Potentiometer - Volt/Amp Ctl, Arc Force	1	BE
8	405365-1	. Switch - Toggle, ON/OFF	2	All
9	408850-5	. Knob - Black	1	All
10	402682	. Switch - Toggle, RMT/LC1	1	All
11	830710-1	. Light - Indicator	1	All
12	204052-6	. Panel - Output, Blank	1	ABDE
13	204052-5	. Panel - Output, Terminal	2	ABDE
	204052-5	. Panel - Output, Terminal	3	CF
14	400614-1	. Nut - 1/2-13, Hex, Flanged	2	ABDE
	400614-1	. Nut - 1/2-13, Hex, Flanged	3	CF
15	5CW-974	. Bus - Cable Stud	2	ABDE
	5CW-974	. Bus - Cable Stud	3	CF
16	5CW-975	. Bushing - Insulator	2	ABDE
	5CW-975	. Bushing - Insulator	3	CF
17	No Number	. Screw -1/2-13 x 3/4, HHC, ST.	2	ABDE
	No Number	. Screw -1/2-13 x 3/4, HHC, ST.	3	CF
18	No Number	. Washer - LK, Std, ST. 1/2	4	ABDE
	No Number	. Washer - LK, Std, ST. 1/2	6	CF
19	5CW-976A	. Washer - Insulator Stud	4	ABDE
	5CW-976A	. Washer - Insulator Stud	6	CF
20	No Number	. Washer - FL, ST. 1/2	4	ABDE
	No Number	. Washer - FL, ST. 1/2	6	CF

Table 6-1: Parts List for Figure 6-1

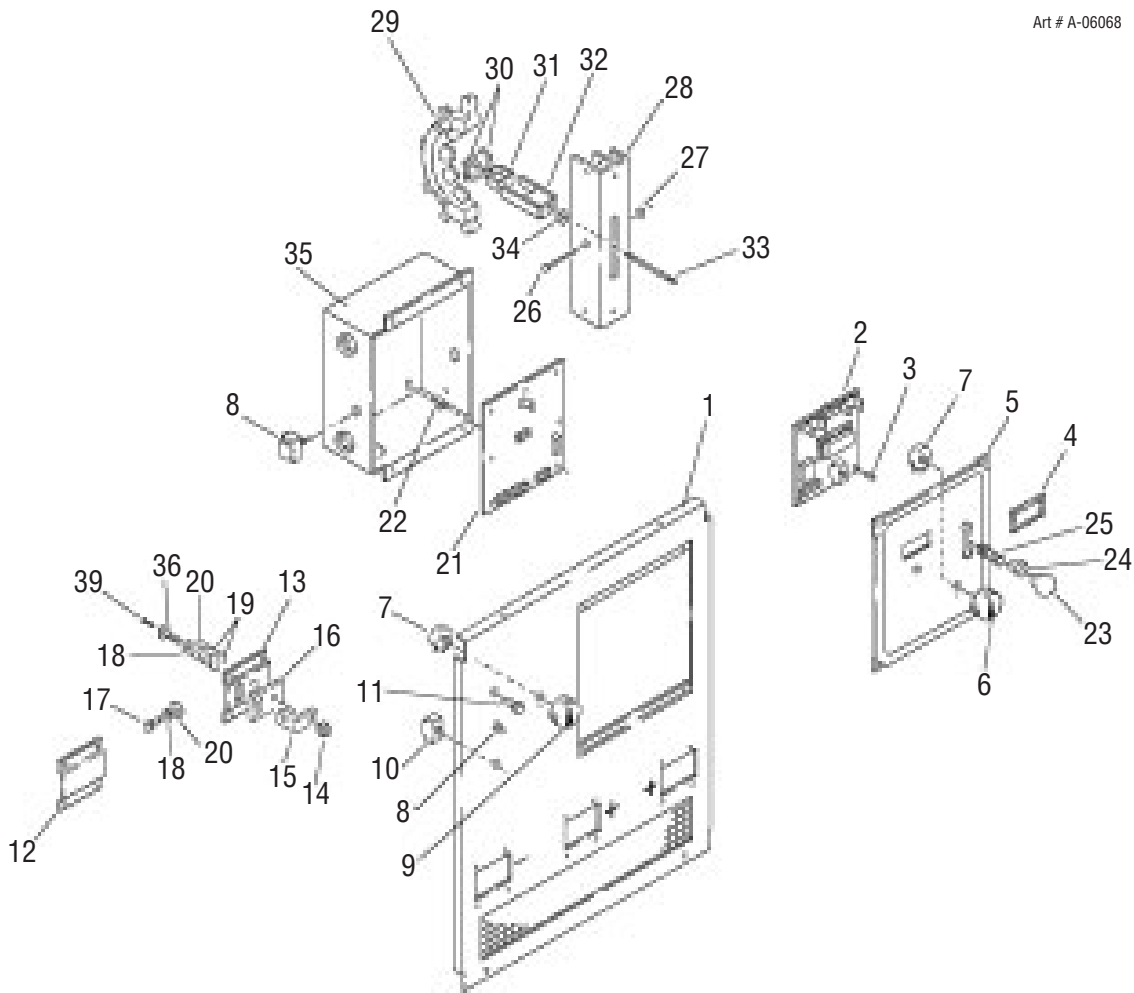


Figure 6-1: Parts 1 (continued)

<b>Item No</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty per Assy</b>	<b>Application Code</b>
21	830627	. Board - PC, Control	1	All
22	171086-1	. Stand-off - PC Board	8	All
23	W-9956	. Knob - Switch, Range	1	CF
24	367880	. Sleeve - Sw.	1	CF
25	400562-24	. Spring - Compression	1	CF
	367260-1	. Switch - Range	1	CF
26	405478	. . Rivet	1	CF
27	W-11291-3	. . Nut - Speed, Push on	1	CF
28	410602-1	. . Bracket	1	CF
29	410589	. . Contact - Stationary	1	CF
30	12RT-238	. . Contact - Movable	2	CF
31	410541	. . Spring	1	CF
32	910061	. . Guide	1	CF
33	W-9549-21	. . Rod - Threaded, 1/4 Dia.	1	CF
34	No Number	. . Nut - 1/4-20 SCR, MH, Hex, ST	1	CF
35	830040-1	. . Box - Control Board	1	All
—	204247-1	. Cable - Ribbon, Meter	1	BCEF
36	351505	. Screw -1/2-13 x 1-3/4, HHC, ST.	2	ABDE
	351505	. Screw -1/2-13 x 1-3/4, HHC, ST.	3	CF
37	. Delete			
38	. Delete			
39	No Number	. Screw -#6-32 x 1/4 Rd. Hd. MH. ST.	2	ABDE
		. Screw -#6-32 x 1/4 Rd. Hd. MH. ST.	3	CF

Table 6-1 (continued): Parts List for Figure 6-1

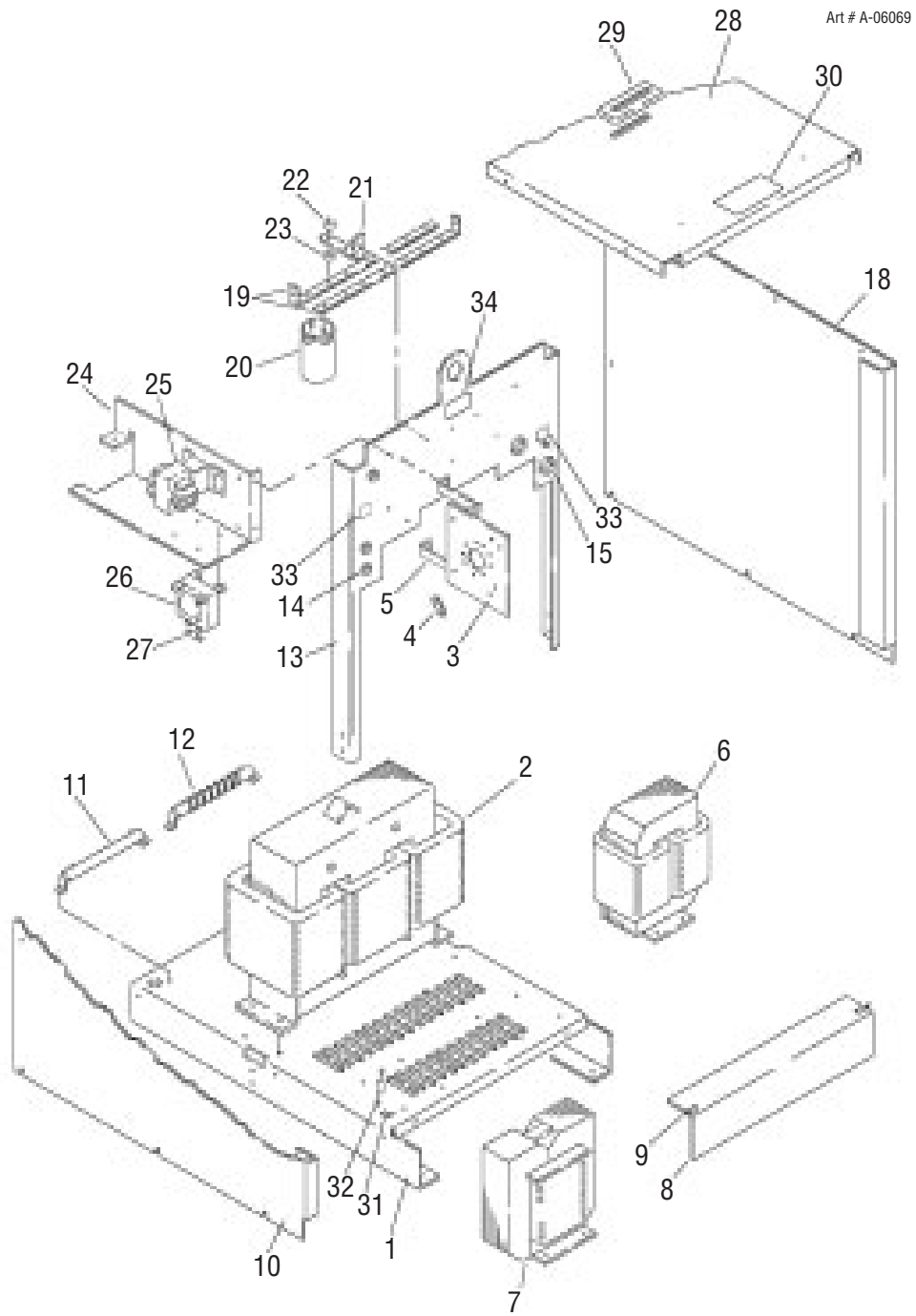


Figure 6-2: Parts 2



<b>Item No</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty per Assy</b>	<b>Application Code</b>
1	204054-1	. Base - Welder	1	All
2	204124	. Transformer - Power	1	BCEF
	830313	. Transformer - Power	1	AD
3	367228-11	. . Board - Voltage Changeover	1	All
4	CW-811	. Link - Voltage Changeover	3	All
5	204301-1	. Bracket - Mtg.	2	All
6	204194	. Choke -Filter, CC	1	ACDF
7	204193	. Choke -Filter, CV	1	BCEF
8	204061-2	. Door	1	All
9	203453	. Hinge - Door	2	All
10	830038-1	. Panel - Side, Left	1	ABC
	830038-5	. Panel - Side, Left	1	DEF
11	406358-4	. Resistor - Fixed, 175 W	1	BCEF
12	406358-1	. Resistor - 25 Ohm, 175 W	1	All
13	204060-1	. Yoke - Lifting	1	All
14	402037-33	. Grommet - Rubber	2	All
15	402037-11	. Grommet - Rubber	3	All
16	. Deleted			
17	. Deleted			
18	830037-1	. Panel - Side, Right	1	ABC
	830037-5	. Panel - Side, Right	1	DEF
	204099-1	. Capacitor - Assembly	1	BCEF
19	204152	. . Bus - Capacitor	2	BCEF
20	405278-15	. . Capacitor	5	BCEF
21	204301-1	. . Bracket - Mtg.	2	BCEF
22	409870	. . Washer - Insulating	4	BCEF
23	409869	. . Bushing - Insulating	4	BCEF
24	830039-1	. Box - Contactor	1	All
25	405402	. Contactor	1	All
26	406392-2	. Transformer - Control	1	All
27	W-11166-11	. Fuse - 1/2 Amp	1	All
28	830036-1	. Panel - Top	1	ABC
	830036-4	. Panel - Top	1	DEF
29	12CW-2170	. Boot -Lifting Eye	1	All
30	204036	. Label - Precautionary	1	All
31	402900	. Terminal - Quick Connect	2	ABDE
	402900	. Terminal - Quick Connect	3	CF

Table 6-2: Parts List for Figure 6-2



<b>Item No</b>	<b>Part Number</b>	<b>Description</b>	<b>Qty per Assy</b>	<b>Application Code</b>
32	368705-36	. Capacitor - W/Leads	2	ABDE
	368705-36	. Capacitor - W/Leads	3	CF
—	Not Illustrated			
33	830116	. Label - Frame Ground	2	All
34	408891	. Label - Warning	1	All
—	Not Illustrated			
—	204204	. Label - Voltage Changeover	1	All
—	406484	. Label - Fuse	1	All

Table 6-2 (continued): Parts List for Figure 6-2

Art # A-06070

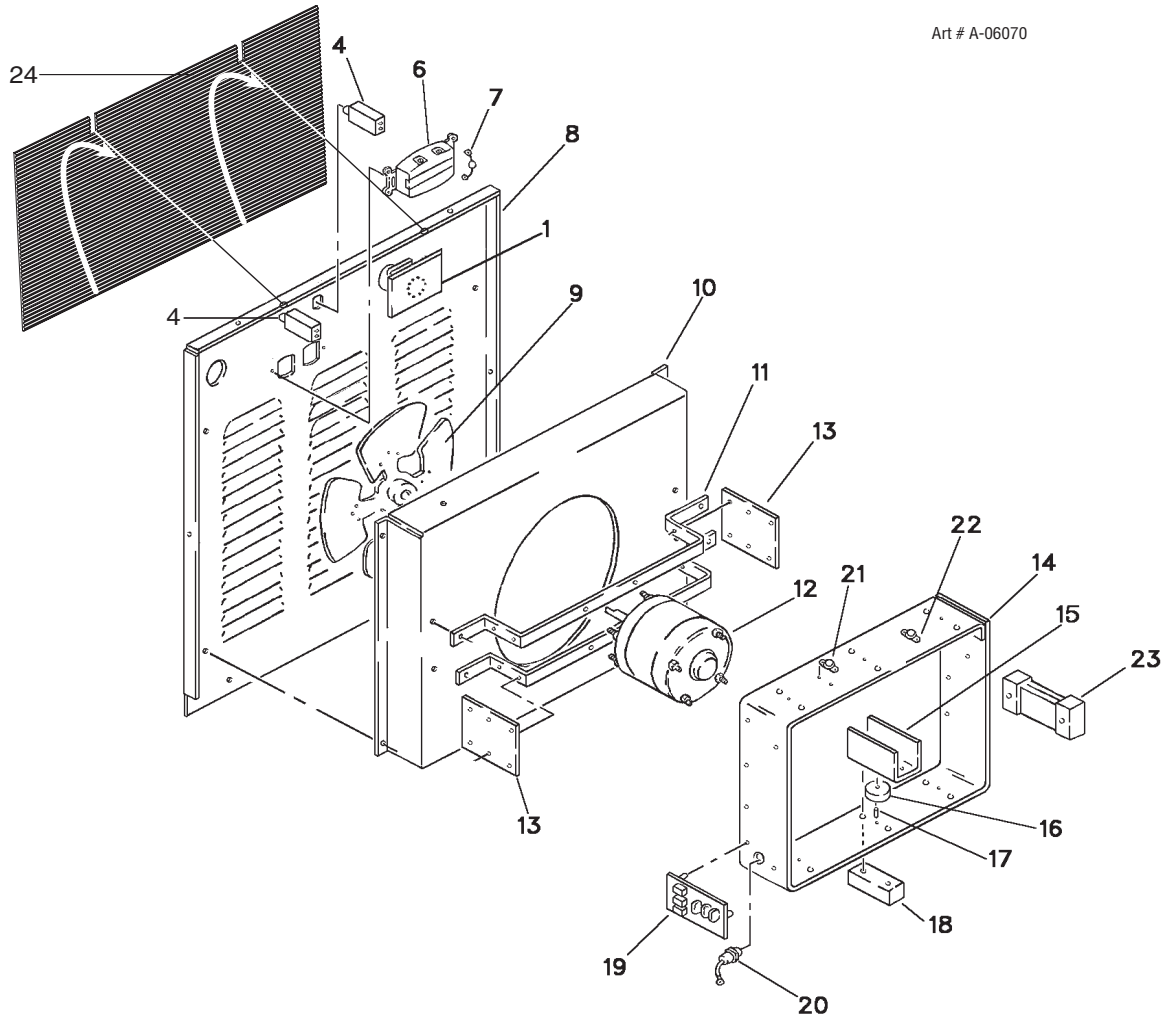


Figure 6-3: Parts 3

Item No	Part Number	Description	Qty per Assy	Application Code
1	830173-2	. Board P.C. - Amphenol	1	BCEF
2		. Deleted		
3		. Deleted		
4	203627-7	. Breaker - Circuit, 10 A	1	AD
	203627-1	. Breaker - Circuit, 10 A	2	BCEF
5	. Delete			
6	402670	. Receptacle - 115 V.	1	All
7	366826-1	. Suppressor - Assembly	1	All
8	830212-1	. Panel - Rear	1	All
9	8RT-609	. Blade - Fan	1	All
10	369650-1	. Shroud - Fan	1	All
11	369640-1	. Bracket - Mtg. Fan	2	All
12	12TW-595-	. Motor - Fan	1	All
13	369641	. Insulator - Mtg.	2	All
14	369639	. Heat Sink - Rectifier	1	All
15	369642	. Heat Sink - SCR	6	All
16	405139	. Rectifier - Silicon	6	All
17	16DA-954-1	. Pin -Spring	6	All
18	405140-1	. Clamp - Mtg.	6	All
19	204210	. Board - Suppressor	2	All
20	402832-3	. Diode - Flyback	1	All
21	404044-6	. Thermostat - Fan	1	All
22	404044-3	. Thermostat - Overload	1	All
23	367732	. Shunt	1	All
24	11574253	. Guard, Rubber	1	C
—	204038-1	. Cable - Ribbon, Amphenol	1	BCEF
—	903914-1	. Cap - Protective	1	BCEF
—	903914-2	. Cap - Protective	1	BCEF
—	403091-14	. Plug - Hole	1	All
—	170919-2	. Plug - Hole	1	AD
—	Not Illustrated			

Table 6-3: Parts List for Figure 6-3



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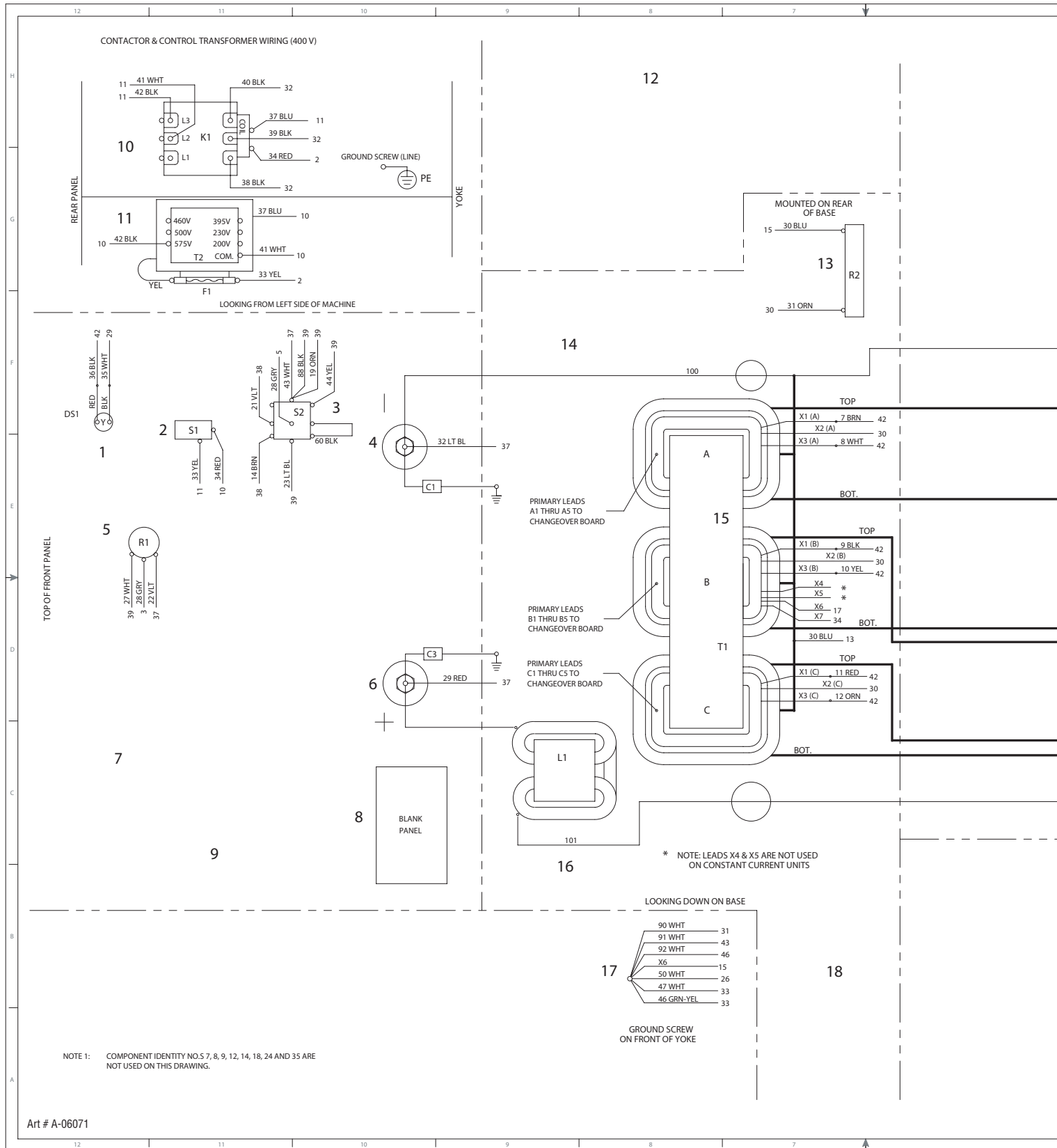
**APPENDIX 1: GENERAL INFORMATION**

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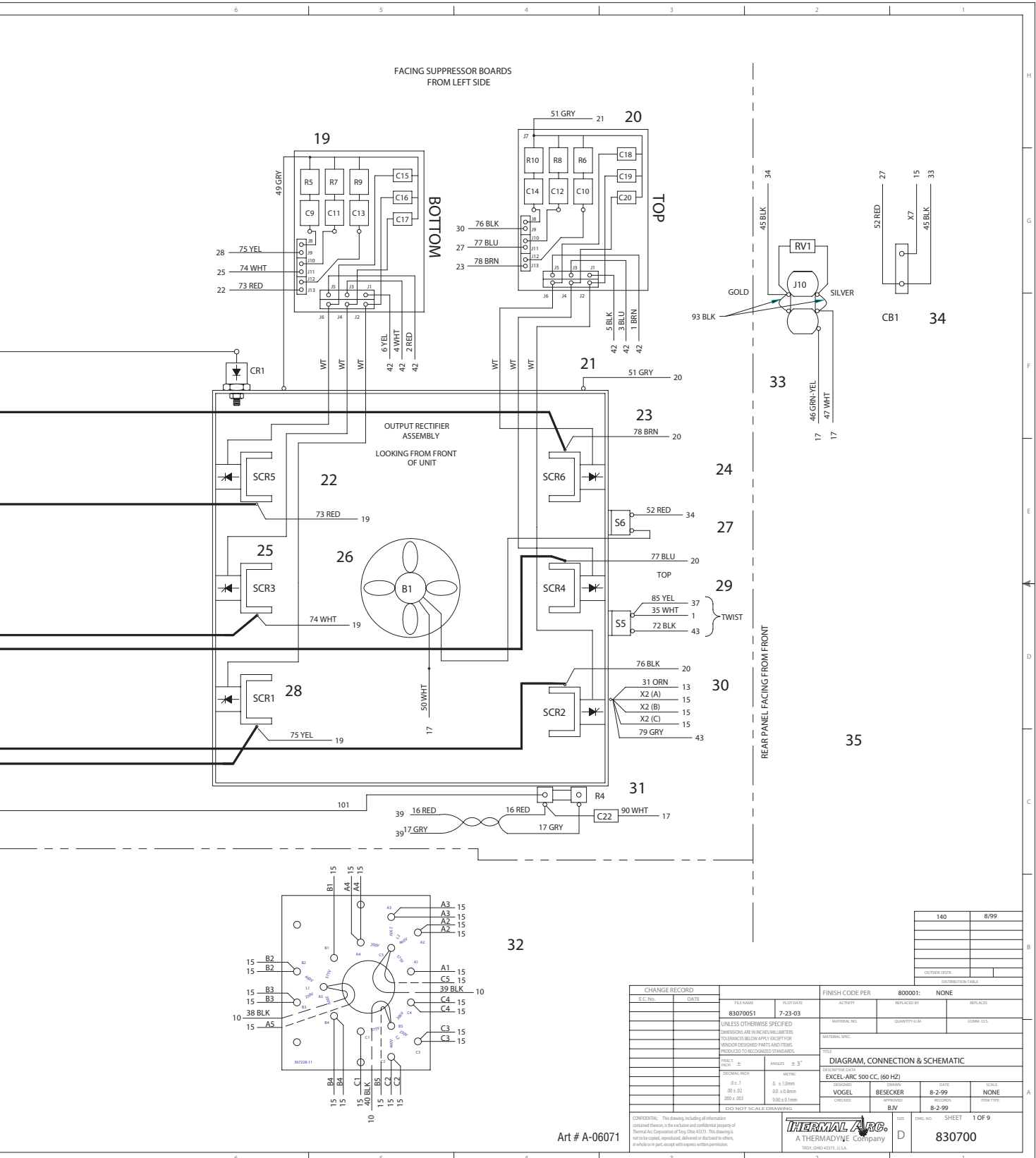
- Note the model and specification number shown on the equipment nameplate.
- Locate these numbers in the model and specification number columns below.
- Use only those diagrams and instructions that are applicable.

<b>MODEL NO.</b>	<b>PART NUMBER</b>	<b>CONNECTION DIAGRAM</b>	<b>SCHEMATIC DIAGRAM</b>	<b>VOLTAGE CHANGEOVER DIAGRAM</b>
<b>EXCEL-ARC® 500</b>	100005A-1	830700 Sheet 1 & 2	830700 Sheet 3	204203
	100005A-5			
<b>EXCEL-ARC® 6045</b>	100005A-2	830700 Sheet 4 & 5	830700 Sheet 6	204203
	100005A-6			
	100005A-3	830700 Sheet 7 & 8	830700 Sheet 9	204203
100005A-7				

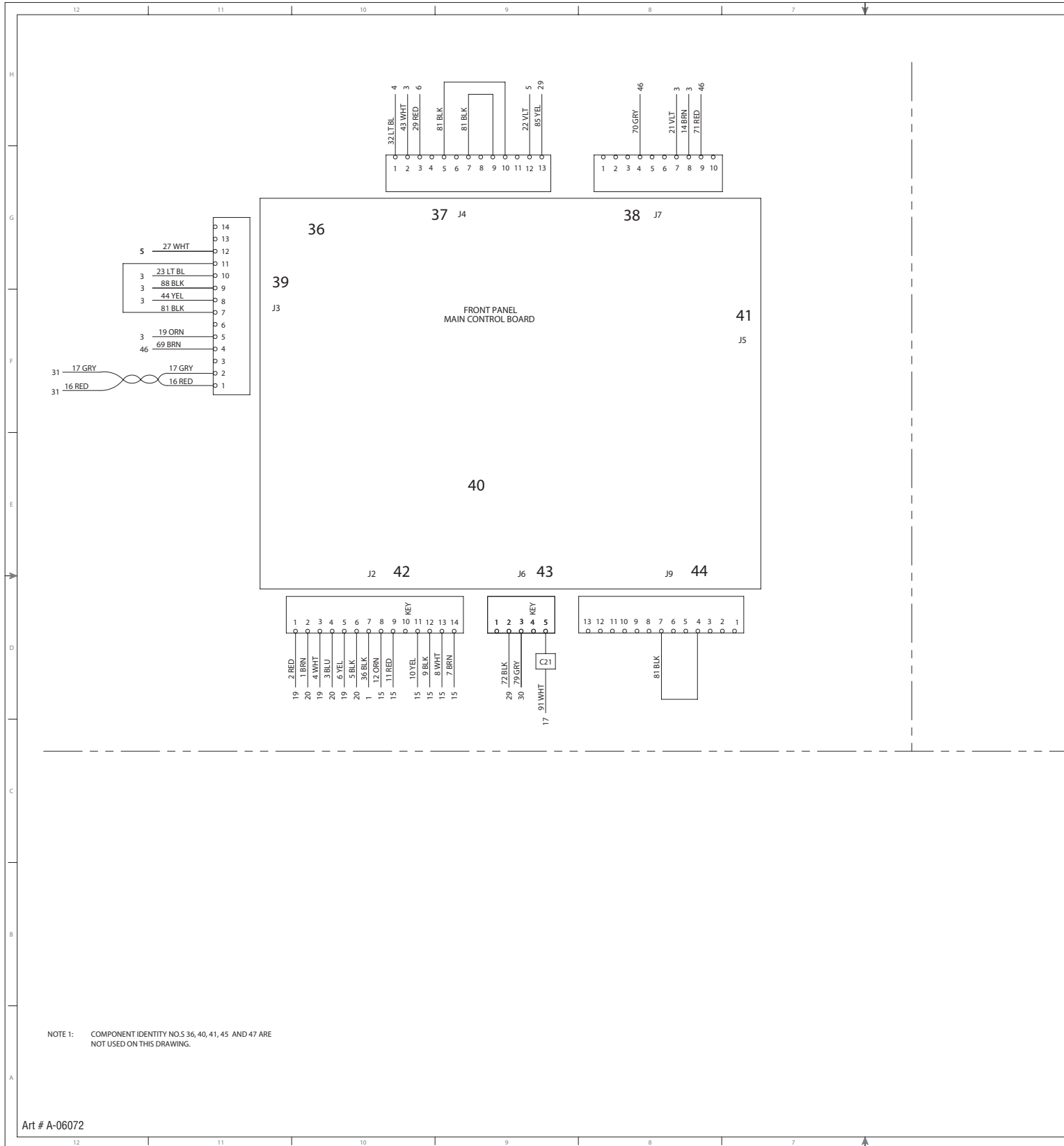
**APPENDIX 2: EXCEL-ARC 500 CONNECTION DIAGRAM (1 OF 2)  
(100005A-1, 100005A-5)**





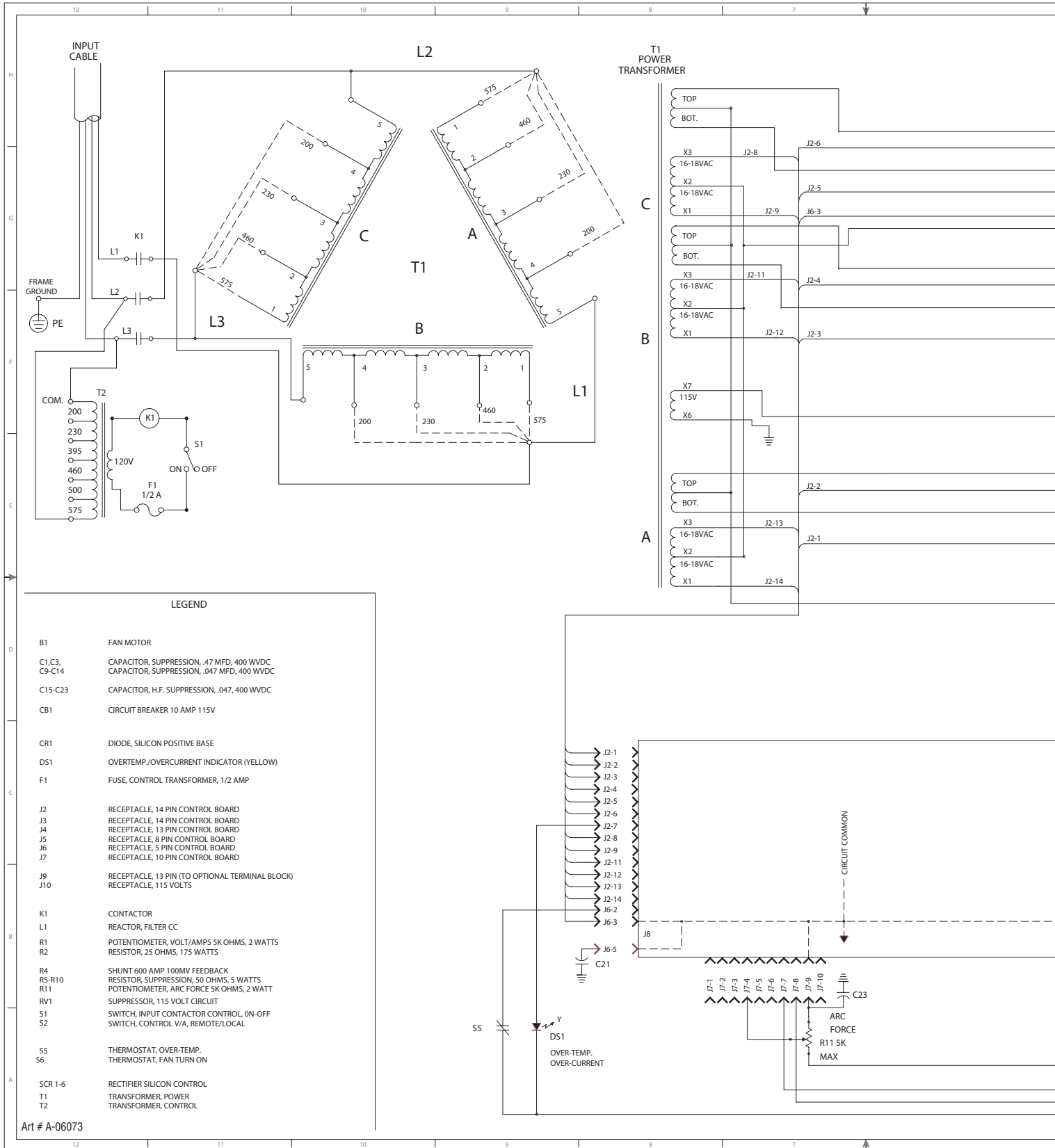


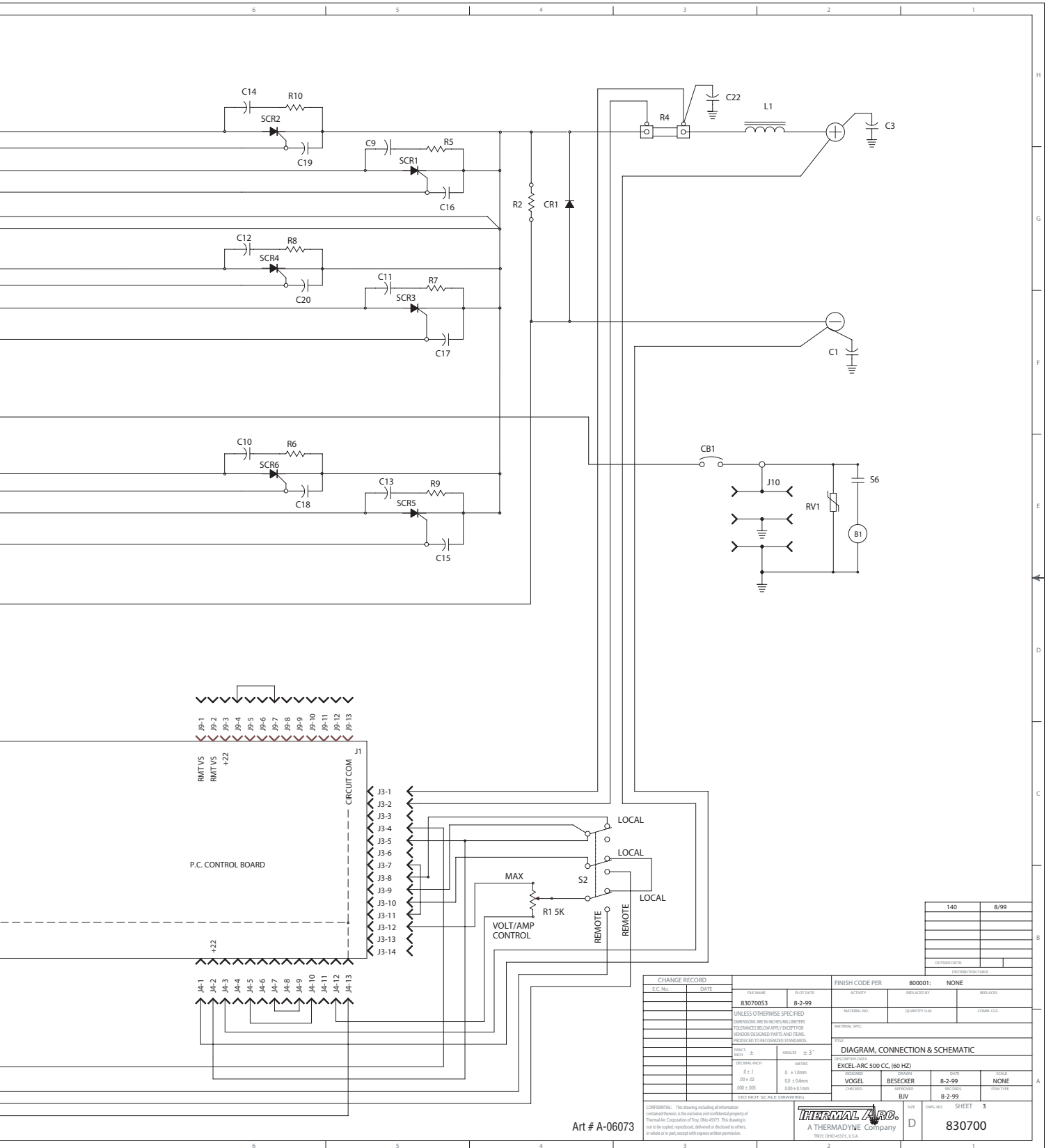
**APPENDIX 2: EXCEL-ARC 500 CONNECTION DIAGRAM (2 OF 2)  
(100005A-1, 100005A-5)**





# APPENDIX 3: EXCEL-ARC 500 SCHEMATIC DIAGRAM (100005A-1, 100005A-5)

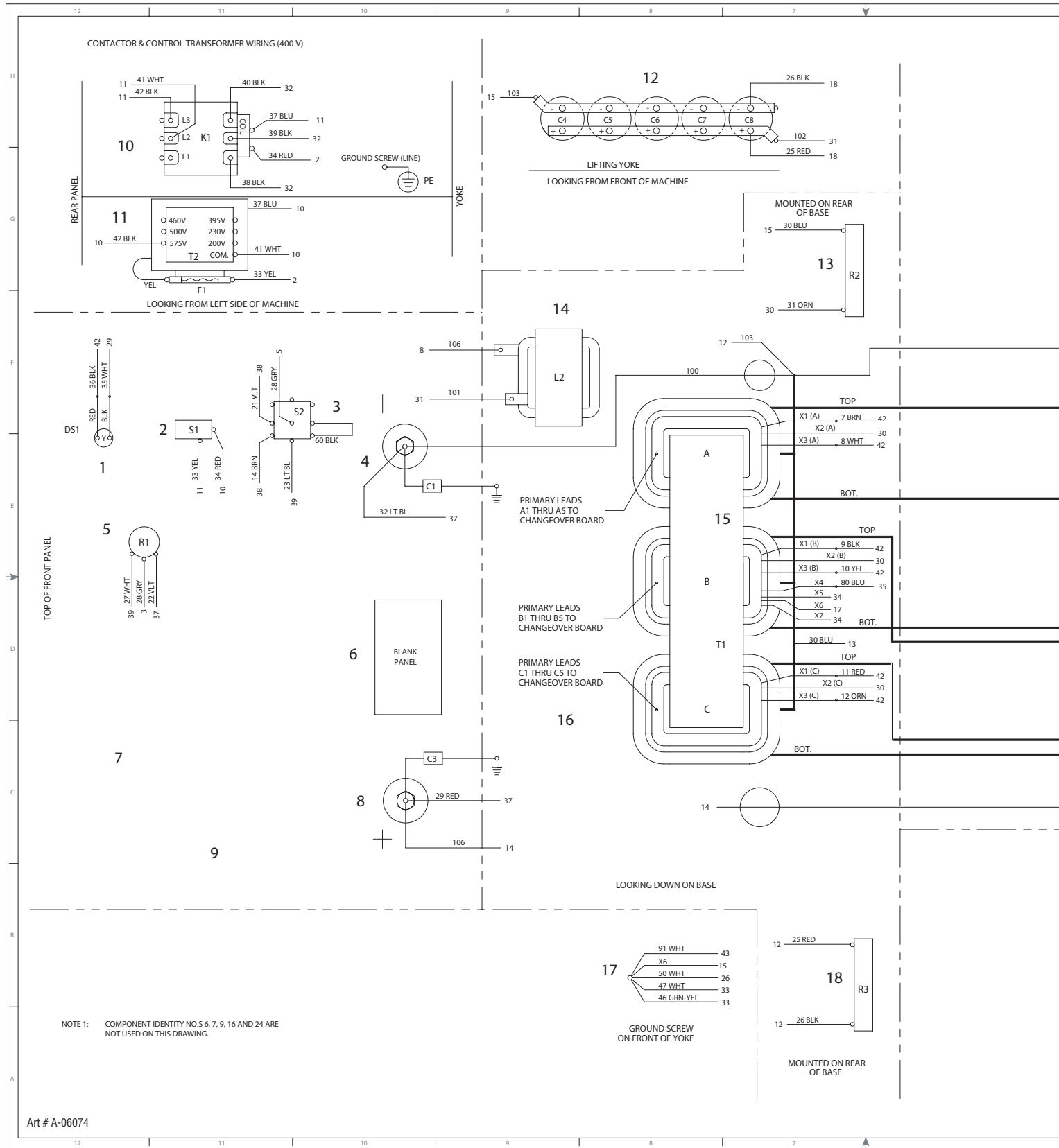




Art # A-06073

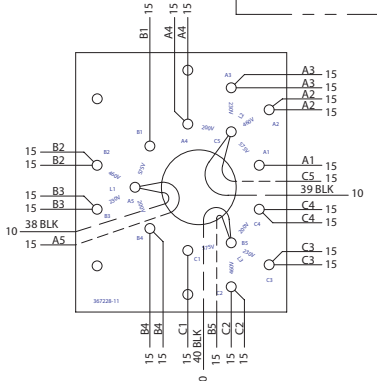
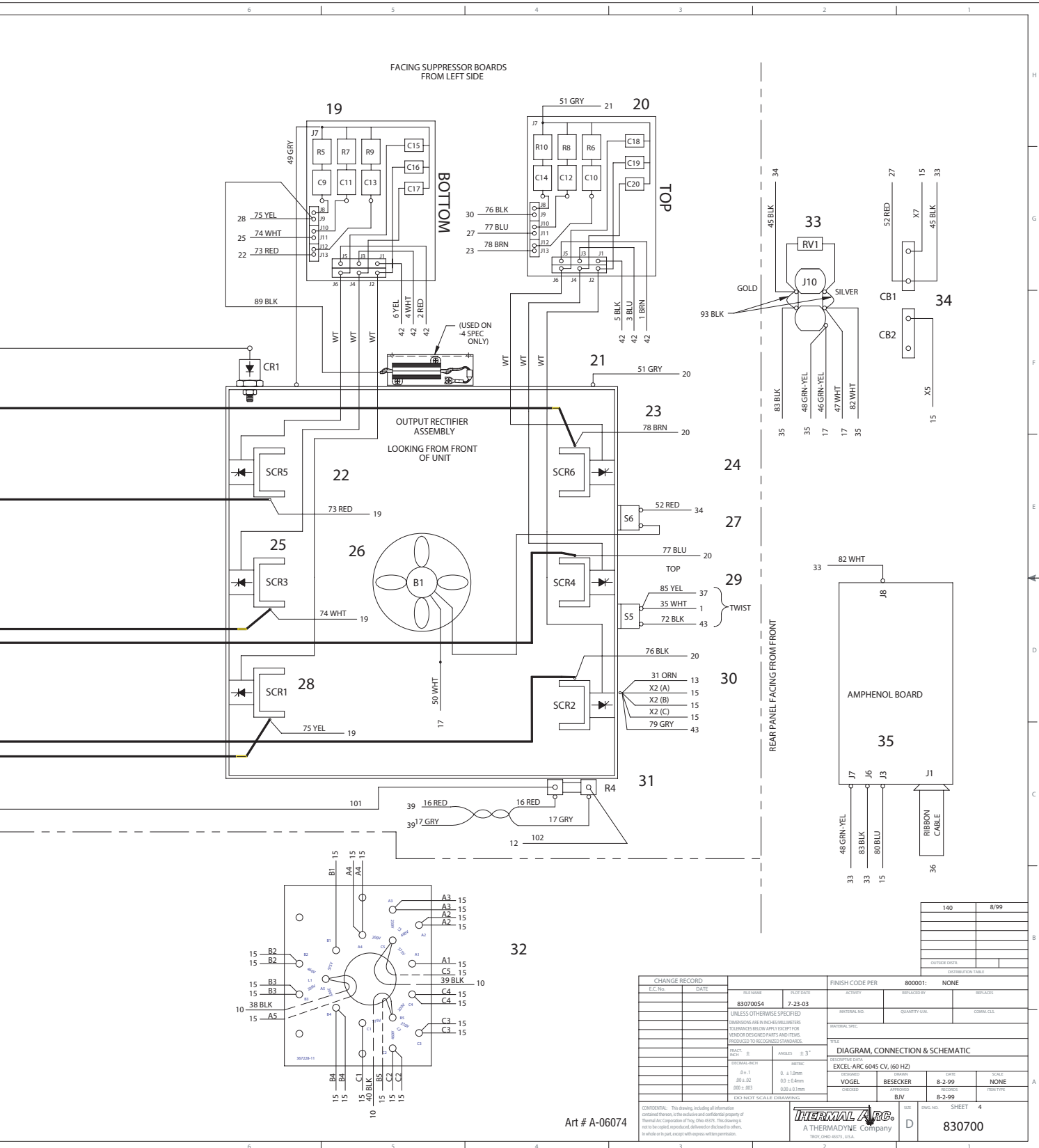
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E.E. No.	DATE	ACTIVITY	800001: NONE
83070053	8-2-99	REPLACED BY	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES/MILLIMETERS TOLERANCES BELOW APPLY EXCEPT FOR THREADS, DIMENSIONS AND TITLES PRODUCED TO RECOGNIZED STANDARDS		MATERIAL NO.	QUANTITY
FRACTION ±		TITLE	
DECIMAL ±		EXCEL-ARC 500 C.C. (60 HZ)	
ANGLES ± 3°		DESIGNED BY	DATE
ORIGINAL SIZE	METRIC	VOGEL	8-2-99
0.1	0.125mm	CHECKED BY	NONE
0.01	0.125mm	APPROVED BY	8-2-99
0.001	0.125mm	DATE	
END VIEW SCALE DRAWINGS		SIZE	SHEET 3
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		DESIGNED BY	BJV
		CHECKED BY	
		APPROVED BY	
		DATE	
		SIZE	D
		DRWG. NO.	830700

**APPENDIX 4: EXCEL-ARC 6045 CONNECTION DIAGRAM (1 OF 2)  
(100005A-2, 100005A-6)**



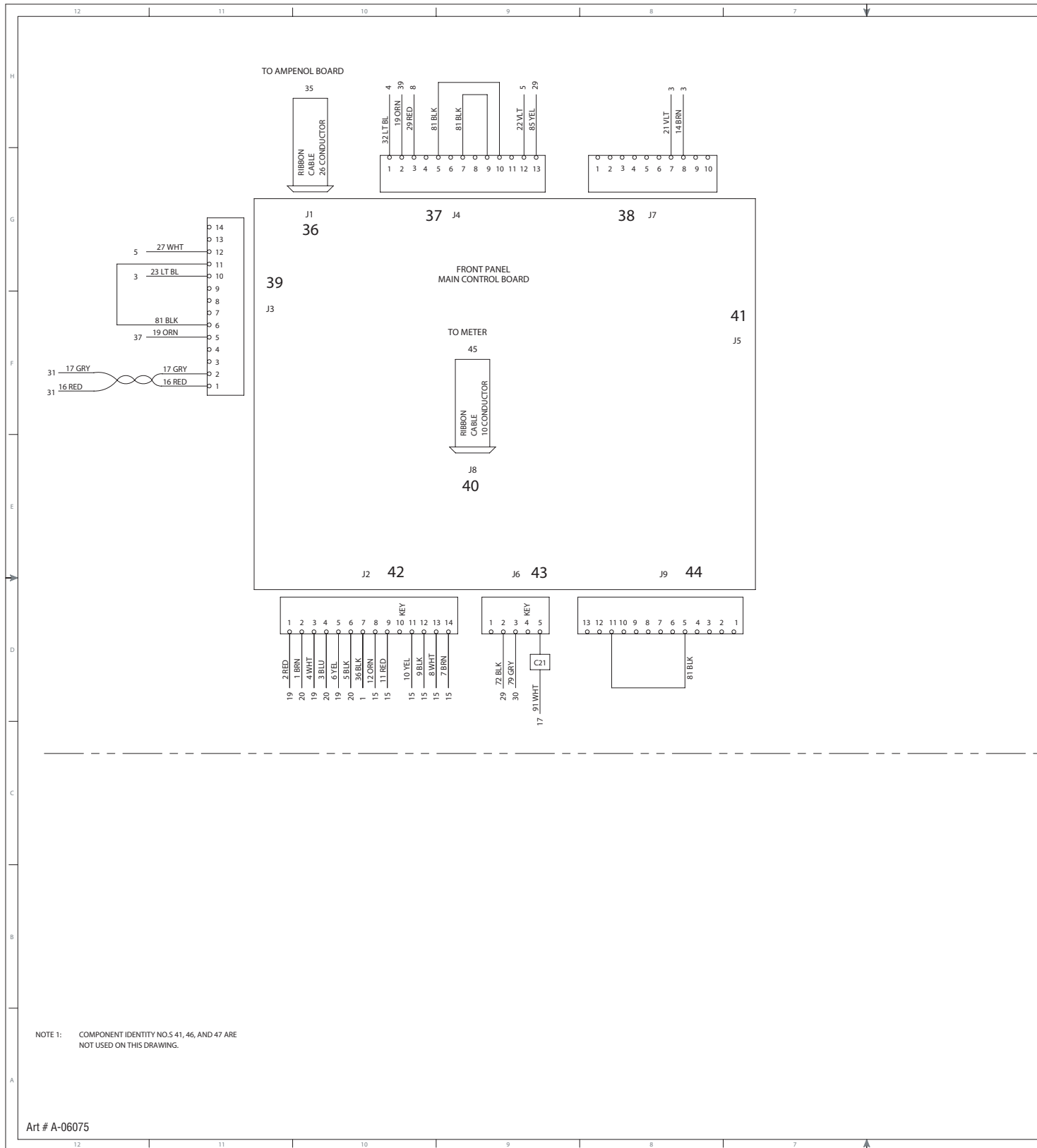
NOTE 1: COMPONENT IDENTITY NO.S 6, 7, 9, 16 AND 24 ARE NOT USED ON THIS DRAWING.

Art # A-06074



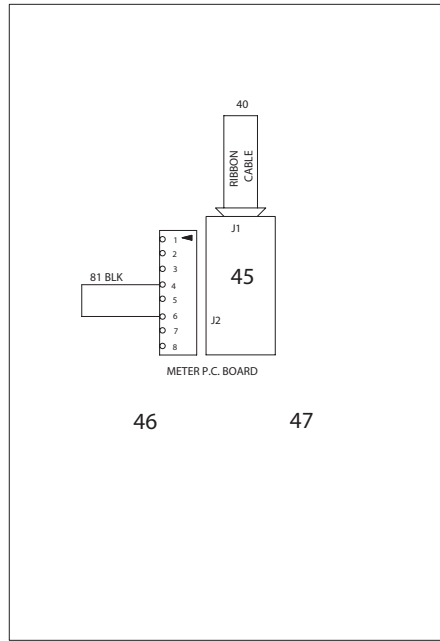
CHANGE RECORD		FINISH CODE PER 800001: NONE	
E.C. No.	DATE	FILE NAME	PILOT DATE
		83070054	7-23-03
UNLESS OTHERWISE SPECIFIED			
DIMENSIONS ARE IN DECIMAL UNITS			
TOLERANCES BELOW APPLY EXCEPT FOR			
HORIZONTAL DIMENSIONS AND HOLE			
DIA. DIMENSIONS UNLESS OTHERWISE SPECIFIED			
TITLE			
DIAGRAM, CONNECTION & SCHEMATIC			
DESIGNER'S DATA			
DESIGNED BY	VOGEL	CHECKED BY	BESECKER
DATE	8-2-99	SCALE	NONE
DISTRIBUTION TABLE			
140		8/99	
OUTSIDE DATA			
DISTRIBUTION TABLE			
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Art # A-06074		 A THERMADYNE Company TROY, OHIO 45373, U.S.A.	
SHEET 4		830700	

**APPENDIX 4: EXCEL-ARC 6045 CONNECTION DIAGRAM (2 OF 2)  
(10005A-2, 10005A-6)**





FACING REAR OF INSERT PANEL



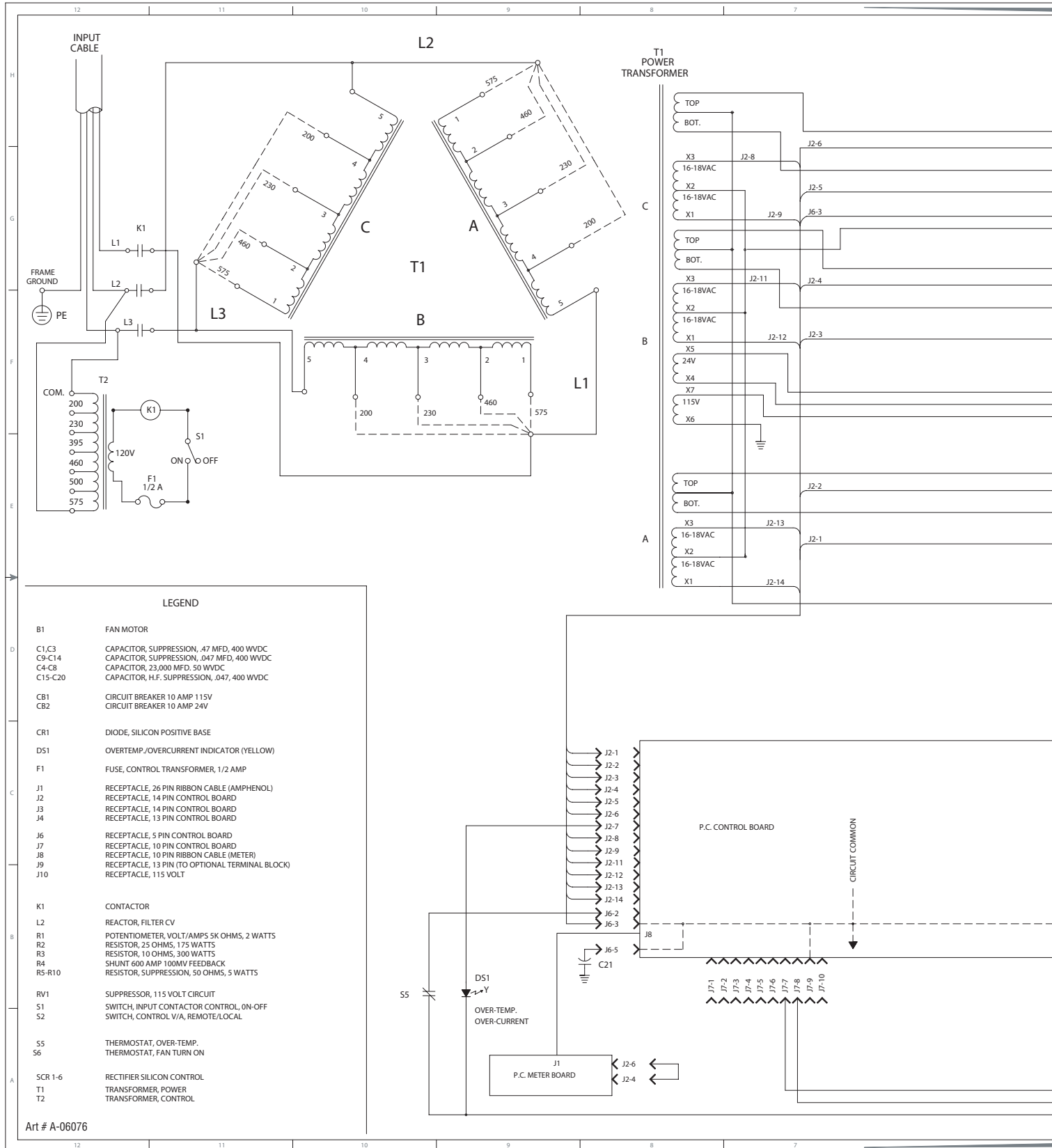
140	8/99

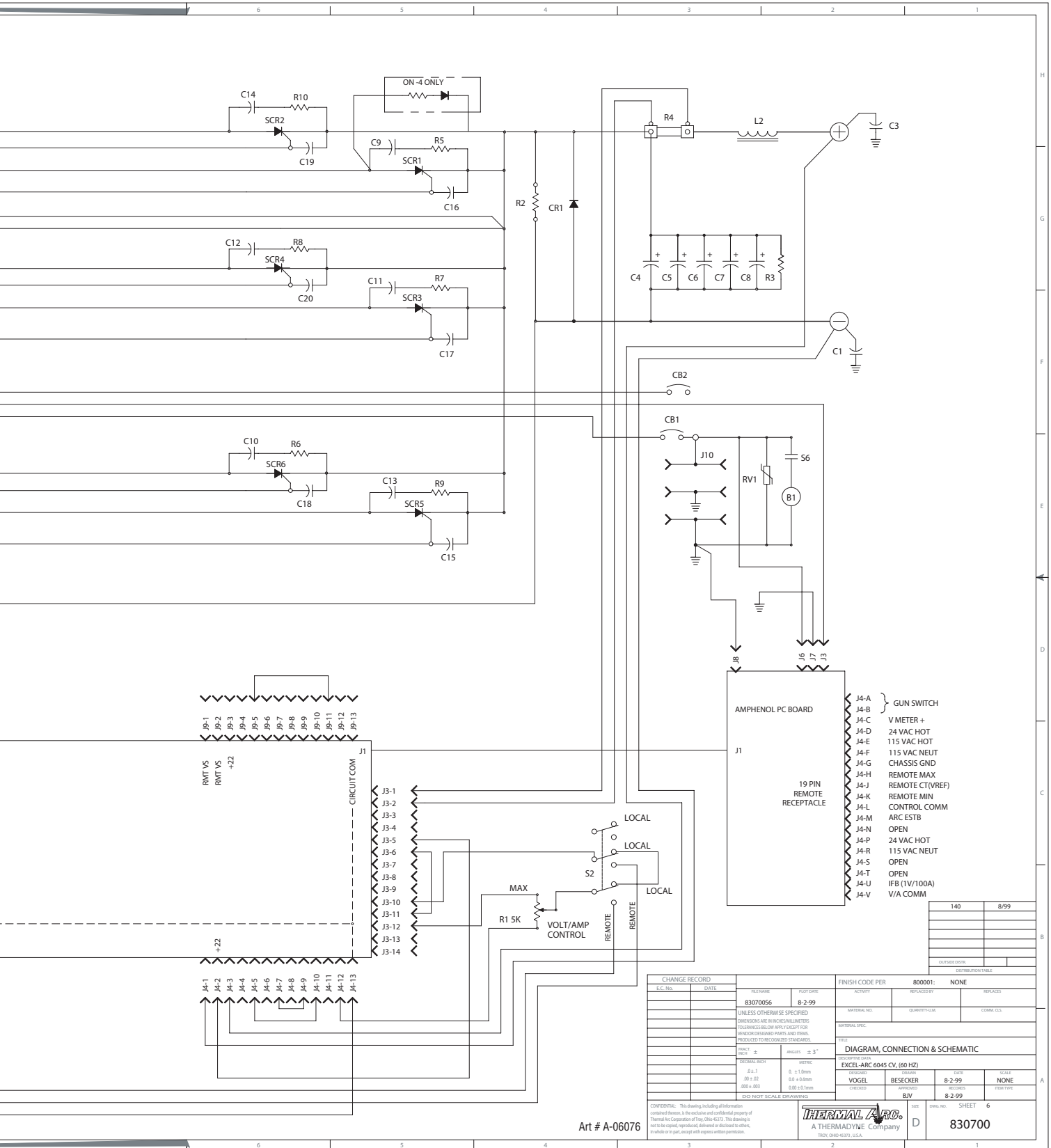
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		83070055	8-2-99		
UNLESS OTHERWISE SPECIFIED					
DIMENSIONS ARE IN INCHES/MILLIMETERS					
DIMENSIONS BELOW APPLY EXCEPT FOR					
VENDOR DESIGNED PARTS AND ITEMS					
ENCLOSURE TO BE CONSIDERED STANDARD					
DRAWING TITLE					
DIAGRAM, CONNECTION & SCHEMATIC					
DESCRIPTIVE DATA					
EXCEL-ARC 6045 CV (60 HZ)					
DESIGNED BY		CHECKED BY		DATE	
VOGEL		BESECKER		8-2-99	
SCALE		NONE		ITEM TYPE	
CHECKED BY		BIV		8-2-99	
DRAWING NO. SHEET 5					
830700					

Art # A-06075



**APPENDIX 4: EXCEL-ARC 6045 SCHEMATIC DIAGRAM  
(100005A-2, 100005A-6)**



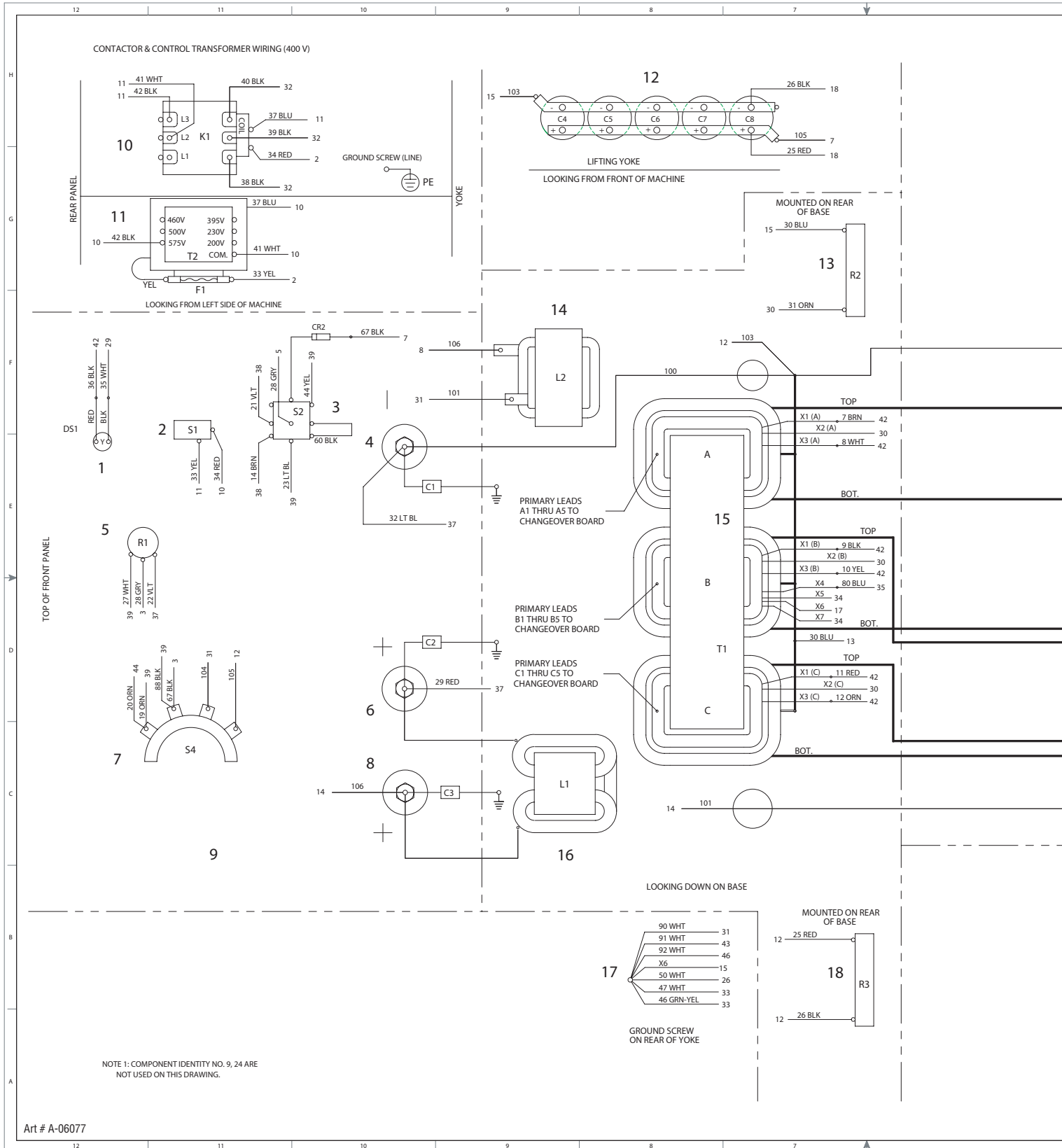


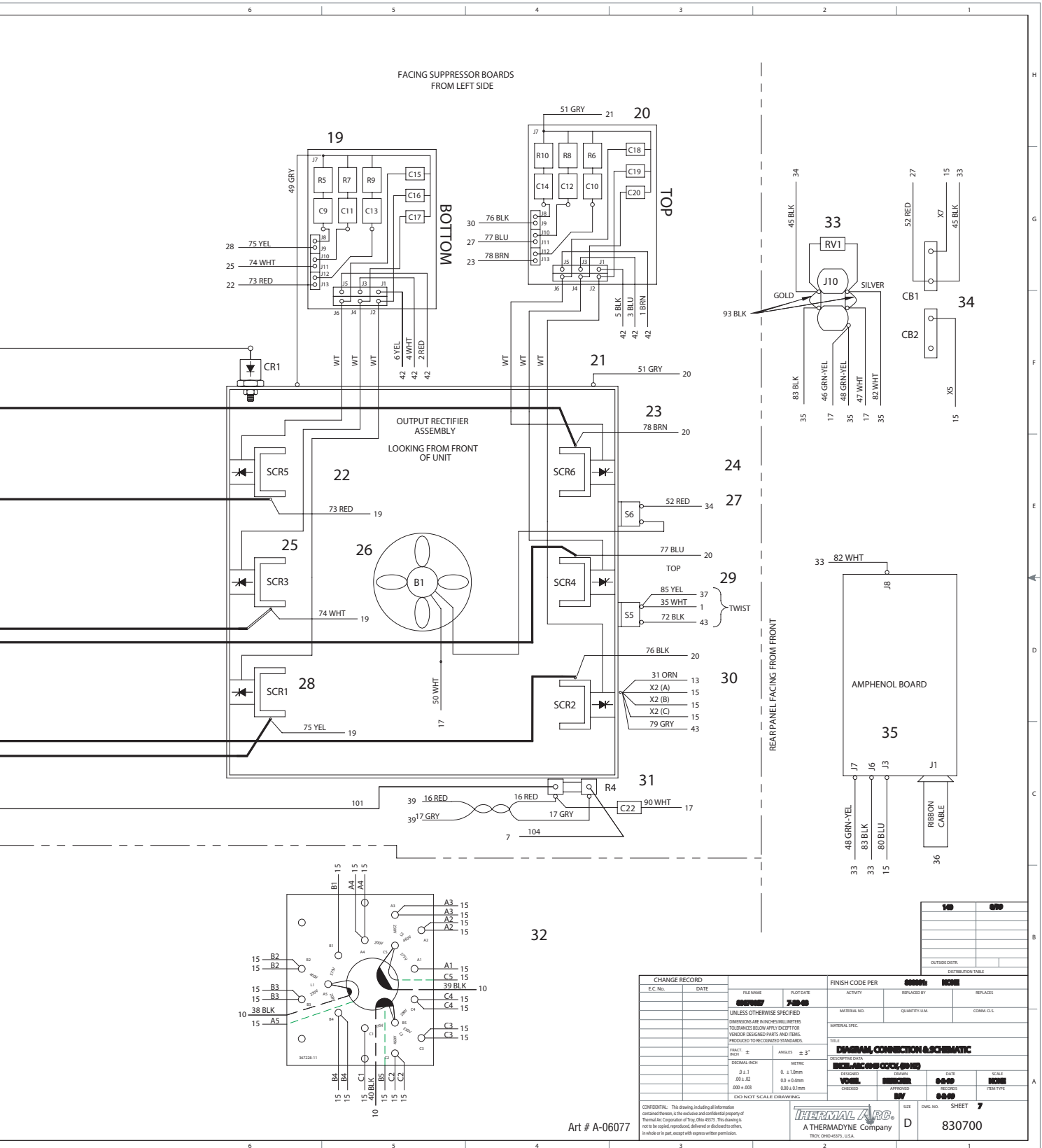
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UNLESS OTHERWISE SPECIFIED					
DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED					
TOLERANCES BELOW ARE EXCEPT FOR REMOVED OR CHANGED PARTS AND ITEMS, UNLESS OTHERWISE SPECIFIED					
FRONT VIEW ±		MATERIAL SPEC.			
TYPICAL DIMS		TITLE			
Ø ± .3		DIAGRAM, CONNECTION & SCHEMATIC			
.00 ± .02		DESCRIPTIVE DATA			
.000 ± .005		EXCEL-ARC 6045 (V, 60 HZ)			
		MATERIAL		DATE	SCALE
		VOGEL		8-2-99	NONE
		BESECKER		REVISED	ITEM TYPE
		CHECKED		8-2-99	
		APPROVED			
		BY			
		DATE			
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Art # A-06076

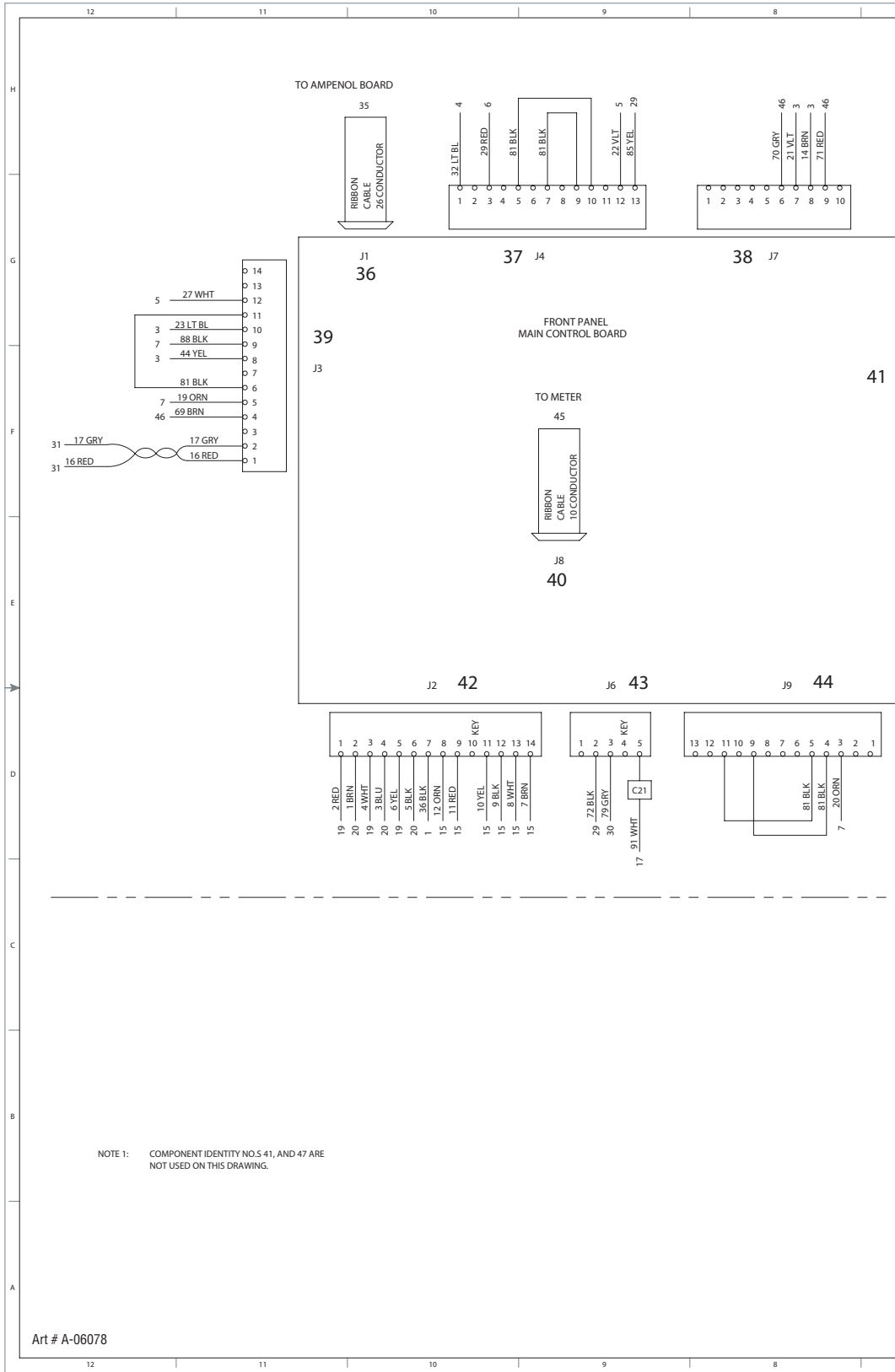


**APPENDIX 4: EXCEL-ARC 6045 CONNECTION DIAGRAM (1 OF 2)  
(100005A-3, 100005A-7)**



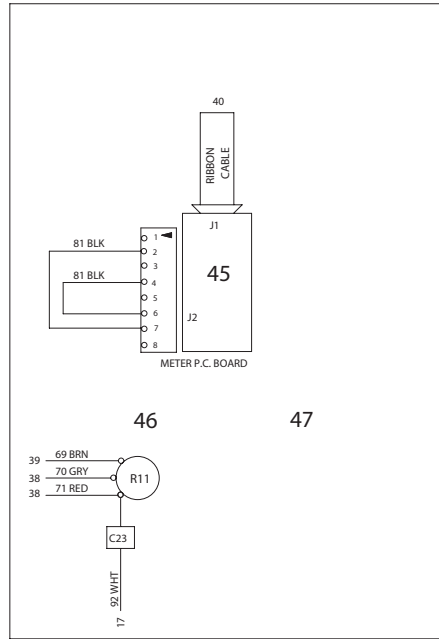


# APPENDIX 5: EXCEL-ARC 6045 CONNECTION DIAGRAM (2 OF 2) (10005A-3, 10005A-7)



6 5 4 3 2 1

FACING REAR OF INSERT PANEL



H  
G  
F  
E  
D  
C  
B  
A

140	8/99

CHANGE RECORD		FINISH CODE PER		800001: NONE	
E.C. No.	DATE	ACTIVITY	REPLACED BY	REPLACES	
		830700SB	B-2-99		
UNLESS OTHERWISE SPECIFIED		MATERIAL NO.	QUANTITY U.S.M.	COMM. CLS.	
DIMENSIONS ARE IN INCHES (MILLIMETERS)		MATERIAL SPEC.			
TOLERANCES BELOW APPLY EXCEPT FOR		TITLE			
VENDOR DESIGNED PARTS AND ITEMS		DIAGRAM, CONNECTION & SCHEMATIC			
PRECEDENCE TO RECORDS DIMENSIONS.		DESCRIPTIVE DATA			
FRAC'T. ±	ANGLES ± 3'	EXCEL-ARC 6045 CC/CV, (60 HZ)			
DECIMAL INCH	METRIC	DESIGNED BY	DRAWN	DATE	SCALE
0 ± 1	0. ± 1.0mm	VOGEL	BESECKER	B-2-99	NONE
00 ± .02	0.0 ± 0.5mm	CHECKED	APPROVED	REVISIONS	ITEM TYPE
200 ± .003	0.00 ± 0.1mm		BJV	B-2-99	
EDED NOT SCALE DRAWING		SIZE			
		D			
		DWG. NO. SHEET 8			
		830700			

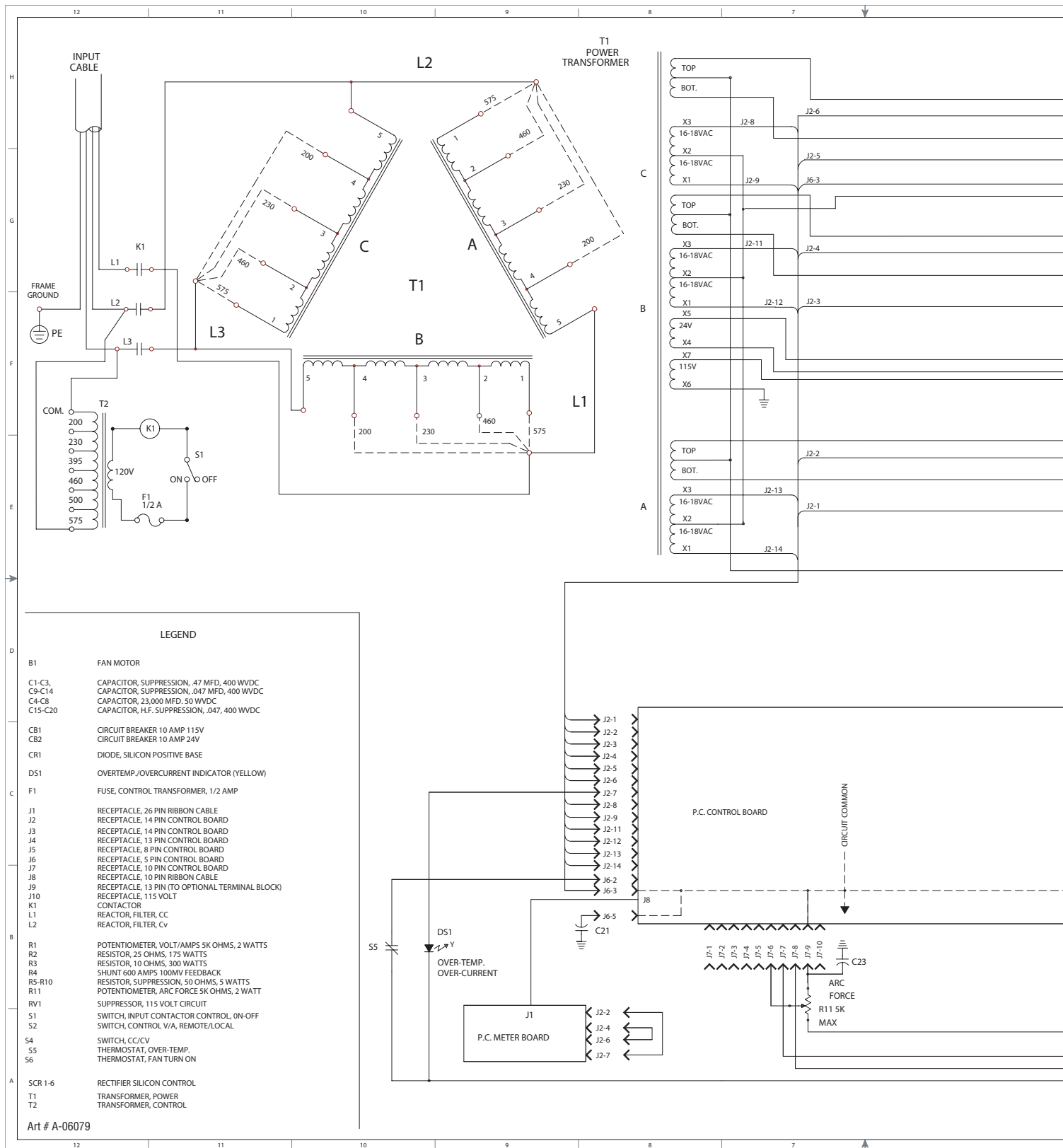
Art # A-06078

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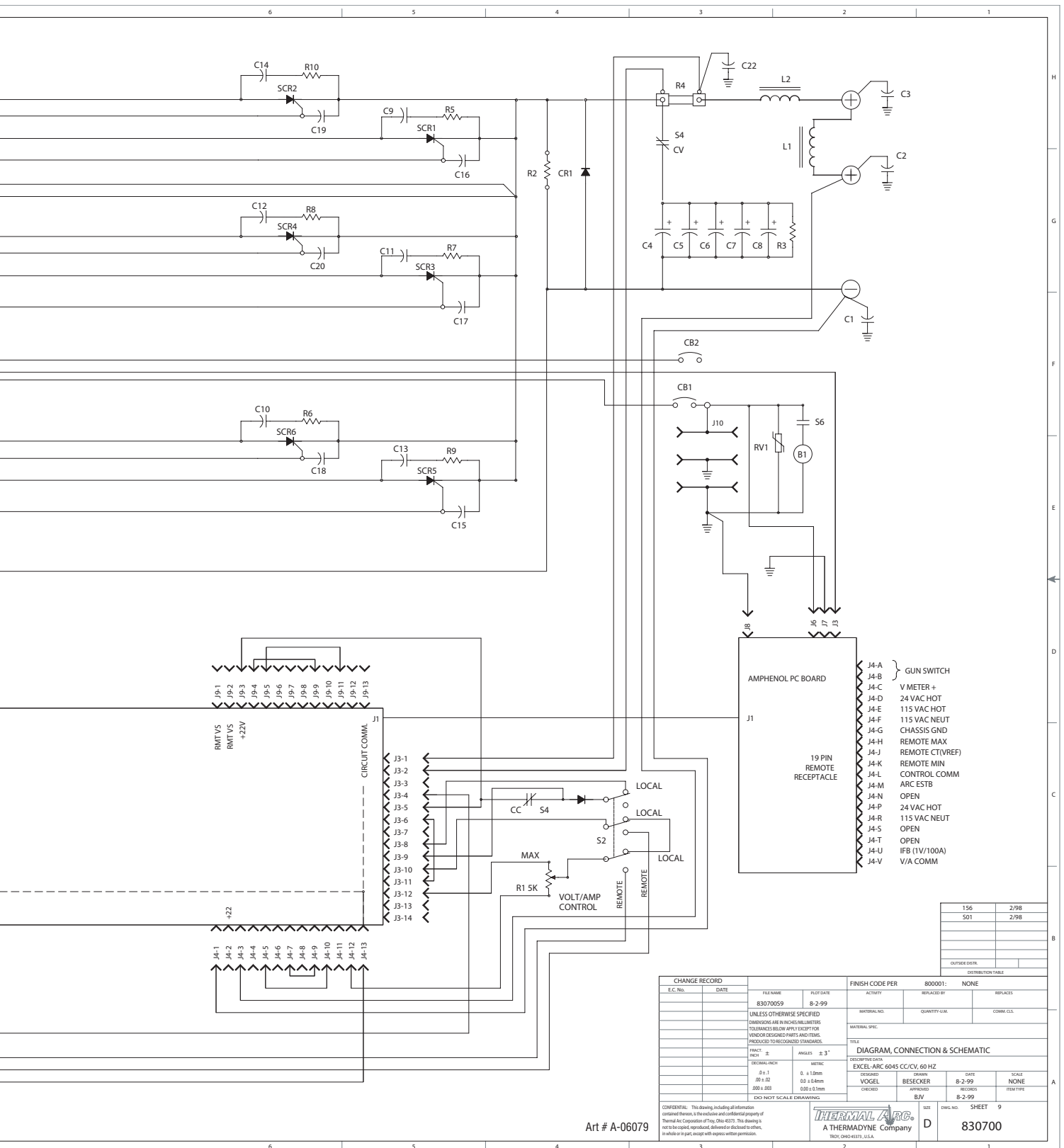


6 5 4 3 2 1

# APPENDIX 5: EXCEL-ARC 6045 SCHEMATIC DIAGRAM (100005A-3, 100005A-7)







156	2/98
501	2/98
OUTSIDE DATA	
DISTRIBUTION TABLE	

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83070059	8-2-99				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES UNLESS NOTED TOLERANCES ARE AS SHOWN EXCEPT FOR VENDOR DESIGNED PARTS AND ITEMS PRECEDENCE TO INCONSISTENT DIMENSIONS:					
FRAC: 1/16"		ANGLES: ± 3°			
DECIMAL DEC:	INCH:	METRIC:			
0.1	0.001	0.1 ± 0.2mm			
.001 ± .02		0.0 ± 0.4mm			
.002 ± .003		0.00 ± 0.1mm			
END VIEW SCALE DRAWINGS					
CONFIDENTIAL: This drawing, including all information contained therein, is the exclusive and confidential property of Thermal Arc Corporation of Pro, Ohio 43173. This drawing is not to be copied, reproduced, delivered or disclosed to others, in whole or in part, except with express written permission.		 A THERMADYNE Company THERMADYNE, U.S.A.		DATE: 8-2-99 SCALE: NONE DRAWN: BESECKER CHECKED: BVV REVISIONS: 1 ITEM TYPE:	
Art # A-06079		Dwg. No. 830700		SHEET 9	

# APPENDIX 6: EXCEL-ARC 500 & 6045 VOLTAGE CHANGEOVER DIAGRAM (ALL)

