653 cvcc

DC Welding Power Source

Instruction Manual

This manual provides complete instructions for the following power sources starting with Serial No. M0RI603036, January 1996:

ESAB ITEM NO. 37830 - 653cvcc - 230/460/575 vac, 3 ph., 60 Hz
ESAB ITEM NO. 37832 - 653cvcc - 220/400 vac, 3 ph., 50 Hz CE

F15-572-H **02/2006**

BE SURE THIS INFORMATION REACHES THE OPERATOR.
YOU CAN GET EXTRA COPIES THROUGH YOUR SUPPLIER.

CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding and cutting equipment, we urge you to read our booklet, "Precautions and Safe Practices for Arc Welding, Cutting, and Gouging," Form 52-529. Do NOT permit untrained persons to install, operate, or maintain this equipment. Do NOT attempt to install or operate this equipment until you have read and fully understand these instructions. If you do not fully understand these instructions, contact your supplier for further information. Be sure to read the Safety Precautions before installing or operating this equipment.

USER RESPONSIBILITY

This equipment will perform in conformity with the description thereof contained in this manual and accompanying labels and/or inserts when installed, operated, maintained and repaired in accordance with the instructions provided. This equipment must be checked periodically. Malfunctioning or poorly maintained equipment should not be used. Parts that are broken, missing, worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, the manufacturer recommends that a telephone or written request for service advice be made to the Authorized Distributor from whom it was purchased.

This equipment or any of its parts should not be altered without the prior written approval of the manufacturer. The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, faulty maintenance, damage, improper repair or alteration by anyone other than the manufacturer or a service facility designated by the manufacturer.

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1.0 Safety Precautions

WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information section. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well as all other manuals, material safety data sheets, labels, etc. Failure to observe Safety Precautions can result in injury or death.

PROTECT YOURSELF AND OTHERS -- Some welding, cutting, and gouging processes are noisy and require ear protection. The arc, like the sun, emits ultraviolet (UV) and other radiation and can injure skin and eyes. Hot metal can cause burns. Training in the proper use of the processes and equipment is essential to prevent accidents. Therefore:

1. Always wear safety glasses with side shields in any work area, even if welding helmets, face shields, and goggles are also required.
2. Use a face shield fitted with the correct filter and cover plates to protect your eyes, face, neck, and ears from sparks and rays of the arc when operating or observing operations. Warn bystanders not to watch the arc and not to expose themselves to the rays of the electric-arc or hot metal.
3. Wear flameproof gauntlet type gloves, heavy long-sleeve shirt, cuffless trousers, high-topped shoes, and a welding helmet or cap for hair protection, to protect against arc rays and hot sparks or hot metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.
4. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned, and open pockets eliminated from the front of clothing.
5. Protect other personnel from arc rays and hot sparks with a suitable non-flammable partition or curtains.
6. Use goggles over safety glasses when chipping slag or grinding. Chipped slag may be hot and can fly far. Bystanders should also wear goggles over safety glasses.

1.1 Safety - English

FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

1. Remove all combustible materials well away from the work area or cover the materials with a protective non-flammable covering. Combustible materials include wood, cloth, sawdust, liquid and gas fuels, solvents, paints and coatings, paper, etc.
2. Hot sparks or hot metal can fall through cracks or crevices in floors or wall openings and cause a hidden smoldering fire or fires on the floor below. Make certain that such openings are protected from hot sparks and metal."
3. Do not weld, cut or perform other hot work until the workpiece has been completely cleaned so that there are no substances on the workpiece which might produce flammable or toxic vapors. Do not do hot work on closed containers. They may explode.
4. Have fire extinguishing equipment handy for instant use, such as a garden hose, water pail, sand bucket, or portable fire extinguisher. Be sure you are trained in its use.
5. Do not use equipment beyond its ratings. For example, overloaded welding cable can overheat and create a fire hazard.
6. After completing operations, inspect the work area to make certain there are no hot sparks or hot metal which could cause a later fire. Use fire watchers when necessary.
7. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

ELECTRICAL SHOCK -- Contact with live electrical parts and ground can cause severe injury or death. DO NOT use AC welding current in damp areas, if movement is confined, or if there is danger of falling.

1. Be sure the power source frame (chassis) is connected to the ground system of the input power.

2. Connect the workpiece to a good electrical ground.

3. Connect the work cable to the workpiece. A poor or missing connection can expose you or others to a fatal shock.

4. Use well-maintained equipment. Replace worn or damaged cables.

5. Keep everything dry, including clothing, work area, cables, torch/electrode holder, and power source.

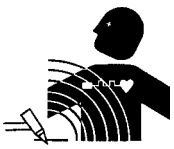
6. Make sure that all parts of your body are insulated from work and from ground.

7. Do not stand directly on metal or the earth while working in tight quarters or a damp area; stand on dry boards or an insulating platform and wear rubber-soled shoes.

8. Put on dry, hole-free gloves before turning on the power.

9. Turn off the power before removing your gloves.

10. Refer to ANSI/ASC Standard Z49.1 (listed on next page) for specific grounding recommendations. Do not mistake the work lead for a ground cable.



ELECTRIC AND MAGNETIC FIELDS — May be dangerous. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and cutting current creates EMF around welding cables and welding machines. Therefore:

1. Welders having pacemakers should consult their physician before welding. EMF may interfere with some pacemakers.

2. Exposure to EMF may have other health effects which are unknown.

3. Welders should use the following procedures to minimize exposure to EMF:

   A. Route the electrode and work cables together. Secure them with tape when possible.

   B. Never coil the torch or work cable around your body.

   C. Do not place your body between the torch and work cables. Route cables on the same side of your body.

   D. Connect the work cable to the workpiece as close as possible to the area being welded.

   E. Keep welding power source and cables as far away from your body as possible.

FUMES AND GASES -- Fumes and gases, can cause discomfort or harm, particularly in confined spaces. Do not breathe fumes and gases. Shielding gases can cause asphyxiation. Therefore:

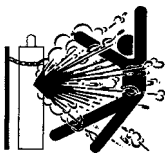
1. Always provide adequate ventilation in the work area by natural or mechanical means. Do not weld, cut, or gouge on materials such as galvanized steel, stainless steel, copper, zinc, lead, beryllium, or cadmium unless positive mechanical ventilation is provided. Do not breathe fumes from these materials.

2. Do not operate near degreasing and spraying operations. The heat or arc rays can react with chlorinated hydrocarbon vapors to form phosgene, a highly toxic gas, and other irritant gases.

3. If you develop momentary eye, nose, or throat irritation while operating, this is an indication that ventilation is not adequate. Stop work and take necessary steps to improve ventilation in the work area. Do not continue to operate if physical discomfort persists.

4. Refer to ANSI/ASC Standard Z49.1 (see listing below) for specific ventilation recommendations.

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



CYLINDER HANDLING -- Cylinders, if mishandled, can rupture and violently release gas. Sudden rupture of cylinder, valve, or relief device can injure or kill. Therefore:

1. Use the proper gas for the process and use the proper pressure reducing regulator designed to operate from the compressed gas cylinder. Do not use adaptors. Maintain hoses and fittings in good condition. Follow manufacturer's operating instructions for mounting regulator to a compressed gas cylinder.

2. Always secure cylinders in an upright position by chain or strap to suitable hand trucks, undercarriages, benches, walls, post, or racks. Never secure cylinders to work tables or fixtures where they may become part of an electrical circuit.

3. When not in use, keep cylinder valves closed. Have valve protection cap in place if regulator is not connected. Secure and move cylinders by using suitable hand trucks. Avoid rough handling of cylinders.

4. Locate cylinders away from heat, sparks, and flames. Never strike an arc on a cylinder.

5. For additional information, refer to CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", which is available from Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

EQUIPMENT MAINTENANCE -- Faulty or improperly maintained equipment can cause injury or death. Therefore:

1. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are qualified to perform such work.

2. Before performing any maintenance work inside a power source, disconnect the power source from the incoming electrical power.

3. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in faulty condition.

4. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.

5. Keep all safety devices and cabinet covers in position and in good repair.

6. Use equipment only for its intended purpose. Do not modify it in any manner.

ADDITIONAL SAFETY INFORMATION -- For more information on safe practices for electric arc welding and cutting equipment, ask your supplier for a copy of "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, are recommended to you:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"

2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"

3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"

4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

5. AWS C5.5 - "Recommended Practices for Gas Tungsten Arc Welding“

6. AWS C5.6 - "Recommended Practices for Gas Metal Arc Welding"“

7. AWS SP - "Safe Practices" - Reprint, Welding Handbook.

8. ANSI/AWS F4.1, "Recommended Safe Practices for Welding and Cutting of Containers That Have Held Hazardous Substances."

MEANING OF SYMBOLS - As used throughout this manual: Means Attention! Be Alert! Your safety is involved.

Means immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.

Means potential hazards which could result in personal injury or loss of life.

Means hazards which could result in minor personal injury.

1.2 Safety - Spanish

ADVERTENCIA: Estas Precauciones de Seguridad son para su protección. Ellas hacen resumen de información proveniente de las referencias listadas en la sección "Información Adicional Sobre La Seguridad". Antes de hacer cualquier instalación o procedimiento de operación , asegúrese de leer y seguir las precauciones de seguridad listadas a continuación así como también todo manual, hoja de datos de seguridad del material, calcomanias, etc. El no observar las Precauciones de Seguridad puede resultar en daño a la persona o muerte.

PROTEJASE USTED Y A LOS DEMAS-- Algunos procesos de soldadura, corte y ranurado son ruidosos y requiren protección para los oídos. El arco, como el sol , emite rayos ultravioleta (UV) y otras radiaciones que pueden dañar la piel y los ojos. El metal caliente causa quemaduras. EL entrenamiento en el uso propio de los equipos y sus procesos es esencial para prevenir accidentes. Por lo tanto:

1. Utilice gafas de seguridad con protección a los lados siempre que esté en el área de trabajo, aún cuando esté usando careta de soldar, protector para su cara u otro tipo de protección.
2. Use una careta que tenga el filtro correcto y lente para proteger sus ojos, cara, cuello, y oídos de las chispas y rayos del arco cuando se esté operando y observando las operaciones. Alerte a todas las personas cercanas de no mirar el arco y no exponerse a los rayos del arco eléctrico o el metal fundido.
3. Use guantes de cuero a prueba de fuego, camisa pesada de mangas largas, pantalón de ruedo liso, zapato alto al tobillo, y careta de soldar con capucha para el pelo, para proteger el cuerpo de los rayos y chispas calientes provenientes del metal fundido. En ocaciones un delantal a prueba de fuego es necesario para protegerse del calor radiado y las chispas.
4. Chispas y partículas de metal caliente puede alojarse en las mangas enrolladas de la camisa , el ruedo del pantalón o los bolsillos. Mangas y cuellos deberán mantenerse abotonados, bolsillos al frente de la camisa deberán ser cerrados o eliminados.
5. Proteja a otras personas de los rayos del arco y chispas calientes con una cortina adecuada no-flamable como división.
6. Use careta protectora además de sus gafas de seguridad cuando esté removiendo escoria o puliendo. La escoria puede estar caliente y desprenderse con velocidad. Personas cercanas deberán usar gafas de seguridad y careta protectora.

FUEGO Y EXPLOSIONES -- El calor de las flamas y el arco pueden ocacionar fuegos. Escoria caliente y las chispas pueden causar fuegos y explosiones. Por lo tanto:

1. Remueva todo material combustible lejos del área de trabajo o cubra los materiales con una cobija a prueba de fuego. Materiales combustibles incluyen madera, ropa, líquidos y gases flamables, solventes, pinturas, papel, etc.
2. Chispas y partículas de metal pueden introducirse en las grietas y agujeros de pisos y paredes causando fuegos escondidos en otros niveles o espacios. Asegúrese de que toda grieta y agujero esté cubierto para proteger lugares adyacentes contra fuegos.
3. No corte, suelde o haga cualquier otro trabajo relacionado hasta que la pieza de trabajo esté totalmente limpia y libre de substancias que puedan producir gases inflamables o vapores tóxicos. No trabaje dentro o fuera de contenedores o tanques cerrados. Estos pueden explotar si contienen vapores inflamables.
4. Tenga siempre a la mano equipo extintor de fuego para uso instantáneo, como por ejemplo una manguera con agua, cubeta con agua, cubeta con arena, o extintor portátil. Asegúrese que usted esta entrenado para su uso.
5. No use el equipo fuera de su rango de operación. Por ejemplo, el calor causado por cable sobrecarga en los cables de soldar pueden ocasionar un fuego.
6. Después de termirar la operación del equipo, inspeccione el área de trabajo para cerciorarse de que las chispas o metal caliente ocasionen un fuego más tarde. Tenga personal asignado para vigilar si es necesario.
7. Para información adicional , haga referencia a la publicación NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible a través de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

CHOQUE ELECTRICO -- El contacto con las partes eléctricas energizadas y tierra puede causar daño severo o muerte. NO use soldadura de corriente alterna (AC) en áreas húmedas, de movimiento confinado en lugares estrechos o si hay posibilidad de caer al suelo.

1. Asegúrese de que el chasis de la fuente de poder esté conectado a tierra através del sistema de electricidad primario.
2. Conecte la pieza de trabajo a un buen sistema de tierra física.
3. Conecte el cable de retorno a la pieza de trabajo. Cables y conductores expuestos o con malas conexiones pueden exponer al operador u otras personas a un choque eléctrico fatal.
4. Use el equipo solamente si está en buenas condiciones. Reemplaze cables rotos, dañados o con conductores expuestos.
5. Mantenga todo seco, incluyendo su ropa, el área de trabajo, los cables, antorchas, pinza del electrodo, y la fuente de poder.
6. Asegúrese que todas las partes de su cuerpo están insuladas de ambos, la pieza de trabajo y tierra.
7. No se pare directamente sobre metal o tierra mientras trabaja en lugares estrechos o áreas húmedas; trabaje sobre un pedazo de madera seco o una plataforma insulada y use zapatos con suela de goma.
8. Use guantes secos y sin agujeros antes de energizar el equipo.
9. Apage el equipo antes de quitarse sus guantes.
10. Use como referencia la publicación ANSI/ASC Standard Z49.1 (listado en la próxima página) para recomendaciones específicas de como conectar el equipo a tierra. No confunda el cable de soldar a la pieza de trabajo con el cable a tierra.

CAMPOS ELECTRICOS Y MAGNETICOS - Son peligrosos. La corriente eléctrica fluye através de cualquier conductor causando a nivel local Campos Eléctricos y Magnéticos (EMF). Las corrientes en el área de corte y soldadura, crean EMF alrrededor de los cables de soldar y las maquinas. Por lo tanto:

1. Soldadores u Operadores que use marca-pasos para el corazón deberán consultar a su médico antes de soldar. El Campo Electromagnético (EMF) puede interferir con algunos marca-pasos.

2. Exponerse a campos electromagnéticos (EMF) puede causar otros efectos de salud aún desconocidos.

3. Los soldadores deberán usar los siguientes procedimientos para minimizar exponerse al EMF:

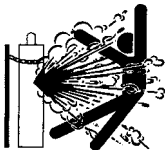
   A. Mantenga el electrodo y el cable a la pieza de trabajo juntos, hasta llegar a la pieza que usted quiere soldar. Asegúrelos uno junto al otro con cinta adhesiva cuando sea posible.
   B. Nunca envuelva los cables de soldar alrededor de su cuerpo.
   C. Nunca ubique su cuerpo entre la antorcha y el cable, a la pieza de trabajo. Mantega los cables a un sólo lado de su cuerpo.
   D. Conecte el cable de trabajo a la pieza de trabajo lo más cercano posible al área de la soldadura.
   E. Mantenga la fuente de poder y los cables de soldar lo más lejos posible de su cuerpo.

HUMO Y GASES -- El humo y los gases, pueden causar malestar o daño, particularmente en espacios sin ventilación. No inhale el humo o gases. El gas de protección puede causar falta de oxígeno.

Por lo tanto:

1. Siempre provea ventilación adecuada en el área de trabajo por medio natural o mecánico. No solde, corte, o ranure materiales con hierro galvanizado, acero inoxidable, cobre, zinc, plomo, berílio, o cadmio a menos que provea ventilación mecánica positiva . No respire los gases producidos por estos materiales.
2. No opere cerca de lugares donde se aplique substancias químicas en aerosol. El calor de los rayos del arco pueden reaccionar con los vapores de hidrocarburo clorinado para formar un fosfógeno, o gas tóxico, y otros irritant es.
3. Si momentáneamente desarrolla inrritación de ojos, nariz o garganta mientras est á operando, es indicación de que la ventilación no es apropiada. Pare de trabajar y tome las medidas necesarias para mejorar la ventilación en el área de trabajo. No continúe operando si el malestar físico persiste.
4. Haga referencia a la publicación ANSI/ASC Standard Z49.1 (Vea la lista a continuación) para recomendaciones específicas en la ventilación.

5. ADVERTENCIA-- Este producto cuando se utiliza para soldaduras o cortes, produce humos o gases, los cuales contienen químicos conocidos por el Estado de California de causar defectos en el nacimiento, o en algunos casos, Cancer. (California Health & Safety Code §25249.5 et seq.)



MANEJO DE CILINDROS-- Los cilindros, si no son manejados correctamente, pueden romperse y liberar violentamente gases. Rotura repentina del cilindro, válvula, o válvula de escape puede causar daño o muerte. Por lo tanto:

1. Utilize el gas apropiado para el proceso y utilize un regulador diseñado para operar y reducir la presión del cilindro de gas . No utilice adaptadores. Mantenga las mangueras y las conexiones en buenas condiciones. Observe las instrucciones de operación del manufacturero para montar el regulador en el cilindro de gas comprimido.

2. Asegure siempre los cilindros en posición vertical y amárrelos con una correa o cadena adecuada para asegurar el cilindro al carro, transportes, tablilleros, paredes, postes, o armazón. Nunca asegure los cilindros a la mesa de trabajo o las piezas que son parte del circuito de soldadura . Este puede ser parte del circuito elélectrico.

3. Cuando el cilindro no está en uso, mantenga la válvula del cilindro cerrada. Ponga el capote de protección sobre la válvula si el regulador no está conectado. Asegure y mueva los cilindros utilizando un carro o transporte adecuado. Evite el manejo brusco de los

MANTENIMIENTO DEL EQUIPO -- Equipo defectuoso o mal mantenido puede causar daño o muerte. Por lo tanto:

1. Siempre tenga personal cualificado para efectuar la instalación, diagnóstico, y mantenimiento del equipo. No ejecute ningún trabajo eléctrico a menos que usted esté cualificado para hacer el trabajo.
2. Antes de dar mantenimiento en el interior de la fuente de poder, desconecte la fuente de poder del suministro de electricidad primaria.
3. Mantenga los cables, cable a tierra, conexciones, cable primario, y cualquier otra fuente de poder en buen estado operacional. No opere ningún equipo en malas condiciones.
4. No abuse del equipo y sus accesorios. Mantenga el equipo lejos de cosas que generen calor como hornos, también lugares húmedos como charcos de agua , aceite o grasa, atmósferas corrosivas y las inclemencias del tiempo.
5. Mantenga todos los artículos de seguridad y coverturas del equipo en su posición y en buenas condiciones.
6. Use el equipo sólo para el propósito que fue diseñado. No modifique el equipo en ninguna manera.

INFORMACION ADICIONAL DE SEGURIDAD -- Para más información sobre las prácticas de seguridad de los equipos de arco eléctrico para soldar y cortar, pregunte a su suplidor por una copia de "Precautions and Safe Practices for Arc Welding, Cutting and Gouging-Form 52-529.

Las siguientes publicaciones, disponibles através de la American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126, son recomendadas para usted:

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"

2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"

3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"

4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

SIGNIFICADO DE LOS SIMBOLOS -- Según usted avanza en la lectura de este folleto: Los Símbolos Significan ¡Atención! ¡Esté Alerta! Se trata de su seguridad.

Significa riesgo inmediato que, de no ser evadido, puede resultar inmediatamente en serio daño personal o la muerte.

Significa el riesgo de un peligro potencial que puede resultar en serio daño personal o la muerte.

Significa el posible riesgo que puede resultar en menores daños a la persona.

1.3 Safety - French

AVERTISSEMENT : Ces règles de sécurité ont pour but d'assurer votre protection. Ils récapitulent les informations de précaution provenant des références dans la section des Informations de sécurité supplémentaires. Avant de procéder à l'installation ou d'utiliser l'unité, assurez-vous de lire et de suivre les précautions de sécurité ci-dessous, dans les manuels, les fiches d'information sur la sécurité du matériel et sur les étiquettes, etc. Tout défaut d'observer ces précautions de sécurité peut entraîner des blessures graves ou mortelles.

PROTÉGEZ-VOUS -- Les processus de soudage, de coupage et de gougeage produisent un niveau de bruit élevé et exige l'emploi d'une protection auditive. L'arc, tout comme le soleil, émet des rayons ultraviolets en plus d'autre rayons qui peuvent causer des blessures à la peau et les yeux. Le métal incandescent peut causer des brûlures. Une formation reliée à l'usage des processus et de l'équipement est essentielle pour prévenir les accidents. Par conséquent:

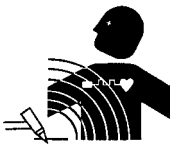
1. Portez des lunettes protectrices munies d'écrans latéraux lorsque vous êtes dans l'aire de travail, même si vous devez porter un casque de soudeur, un écran facial ou des lunettes étanches.
2. Portez un écran facial muni de verres filtrants et de plaques protectrices appropriées afin de protéger vos yeux, votre visage, votre cou et vos oreilles des étincelles et des rayons de l'arc lors d'une opération ou lorsque vous observez une opération. Avertissez les personnes se trouvant à proximité de ne pas regarder l'arc et de ne pas s'exposer aux rayons de l'arc électrique ou le métal incandescent.
3. Portez des gants ignifugiés à crispin, une chemise épaisse à manches longues, des pantalons sans rebord et des chaussures montantes afin de vous protéger des rayons de l'arc, des étincelles et du métal incandescent, en plus d'un casque de soudeur ou casquette pour protéger vos cheveux. Il est également recommandé de porter un tablier ininflammable afin de vous protéger des étincelles et de la chaleur par rayonnement.
4. Les étincelles et les projections de métal incandescent risquent de se loger dans les manches retroussées, les rebords de pantalons ou les poches. Il est recommandé de garder boutonnés le col et les manches et de porter des vêtements sans poches en avant.
5. Protégez toute personne se trouvant à proximité des étincelles et des rayons de l'arc à l'aide d'un rideau ou d'une cloison ininflammable.
6. Portez des lunettes étanches par dessus vos lunettes de sécurité lors des opérations d'écaillage ou de meulage du laitier. Les écailles de laitier incandescent peuvent être projetées à des distances considérables. Les personnes se trouvant à proximité doivent également porter des lunettes étanches par dessus leur lunettes de sécurité.

INCENDIES ET EXPLOSIONS -- La chaleur provenant des flammes ou de l'arc peut provoquer un incendie. Le laitier incandescent ou les étincelles peuvent également provoquer un incendie ou une explosion. Par conséquent :

1. Éloignez suffisamment tous les matériaux combustibles de l'aire de travail et recouvrez les matériaux avec un revêtement protecteur ininflammable. Les matériaux combustibles incluent le bois, les vêtements, la sciure, le gaz et les liquides combustibles, les solvants, les peintures et les revêtements, le papier, etc.
2. Les étincelles et les projections de métal incandescent peuvent tomber dans les fissures dans les planchers ou dans les ouvertures des murs et déclencher un incendie couvant à l'étage inférieur Assurez-vous que ces ouvertures sont bien protégées des étincelles et du métal incandescent.
3. N'exécutez pas de soudure, de coupe ou autre travail à chaud avant d'avoir complètement nettoyé la surface de la pièce à traiter de façon à ce qu'il n'ait aucune substance présente qui pourrait produire des vapeurs inflammables ou toxiques. N'exécutez pas de travail à chaud sur des contenants fermés car ces derniers pourraient exploser.
4. Assurez-vous qu'un équipement d'extinction d'incendie est disponible et prêt à servir, tel qu'un tuyau d'arrosage, un seau d'eau, un seau de sable ou un extincteur portatif. Assurez-vous d'être bien instruit par rapport à l'usage de cet équipement.
5. Assurez-vous de ne pas excéder la capacité de l'équipement. Par exemple, un câble de soudage surchargé peut surchauffer et provoquer un incendie.
6. Une fois les opérations terminées, inspectez l'aire de travail pour assurer qu'aucune étincelle ou projection de métal incandescent ne risque de provoquer un incendie ultérieurement. Employez des guetteurs d'incendie au besoin.
7. Pour obtenir des informations supplémentaires, consultez le NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes", disponible au National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

CHOC ÉLECTRIQUE -- Le contact avec des pièces électriques ou les pièces de mise à la terre sous tension peut causer des blessures graves ou mortelles. NE PAS utiliser un courant de soudage c.a. dans un endroit humide, en espace restreint ou si un danger de chute se pose.

1. Assurez-vous que le châssis de la source d'alimentation est branché au système de mise à la terre de l'alimentation d'entrée.
2. Branchez la pièce à traiter à une bonne mise de terre électrique.
3. Branchez le câble de masse à la pièce à traiter et assurez une bonne connexion afin d'éviter le risque de choc électrique mortel.
4. Utilisez toujours un équipement correctement entretenu. Remplacez les câbles usés ou endommagés.
5. Veillez à garder votre environnement sec, incluant les vêtements, l'aire de travail, les câbles, le porte-électrode/torche et la source d'alimentation.
6. Assurez-vous que tout votre corps est bien isolé de la pièce à traiter et des pièces de la mise à la terre.
7. Si vous devez effectuer votre travail dans un espace restreint ou humide, ne tenez vous pas directement sur le métal ou sur la terre; tenez-vous sur des planches sèches ou une plate-forme isolée et portez des chaussures à semelles de caoutchouc.
8. Avant de mettre l'équipement sous tension, isolez vos mains avec des gants secs et sans trous.
9. Mettez l'équipement hors tension avant d'enlever vos gants.
10. Consultez ANSI/ASC Standard Z49.1 (listé à la page suivante) pour des recommandations spécifiques concernant les procédures de mise à la terre. Ne pas confondre le câble de masse avec le câble de mise à la terre.



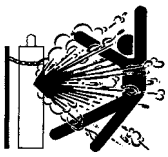
CHAMPS ÉLECTRIQUES ET MAGNÉTIQUES — comportent un risque de danger. Le courant électrique qui passe dans n'importe quel conducteur produit des champs électriques et magnétiques localisés. Le soudage et le courant de coupage créent des champs électriques et magnétiques autour des câbles de soudage et l'équipement. Par conséquent :

1. Un soudeur ayant un stimulateur cardiaque doit consulter son médecin avant d'entreprendre une opération de soudage. Les champs électriques et magnétiques peuvent causer des ennuis pour certains stimulateurs cardiaques.
2. L'exposition à des champs électriques et magnétiques peut avoir des effets néfastes inconnus pour la santé.
3. Les soudeurs doivent suivre les procédures suivantes pour minimiser l'exposition aux champs électriques et magnétiques :
   A. Acheminez l'électrode et les câbles de masse ensemble. Fixez-les à l'aide d'une bande adhésive lorsque possible.
   B. Ne jamais enrouler la torche ou le câble de masse autour de votre corps.
   C. Ne jamais vous placer entre la torche et les câbles de masse. Acheminez tous les câbles sur le même côté de votre corps.
   D. Branchez le câble de masse à la pièce à traiter le plus près possible de la section à souder.
   E. Veillez à garder la source d'alimentation pour le soudage et les câbles à une distance appropriée de votre corps.

LES VAPEURS ET LES GAZ -- peuvent causer un malaise ou des dommages corporels, plus particulièrement dans les espaces restreints. Ne respirez pas les vapeurs et les gaz. Le gaz de protection risque de causer l'asphyxie. Par conséquent :

1. Assurez en permanence une ventilation adéquate dans l'aire de travail en maintenant une ventilation naturelle ou à l'aide de moyens mécanique. N'effectuez jamais de travaux de soudage, de coupage ou de gougeage sur des matériaux tels que l'acier galvanisé, l'acier inoxydable, le cuivre, le zinc, le plomb, le berylliym ou le cadmium en l'absence de moyens mécaniques de ventilation efficaces. Ne respirez pas les vapeurs de ces matériaux.
2. N'effectuez jamais de travaux à proximité d'une opération de dégraissage ou de pulvérisation. Lorsque la chaleur
   ou le rayonnement de l'arc entre en contact avec les vapeurs d'hydrocarbure chloré, ceci peut déclencher la formation de phosgène ou d'autres gaz irritants, tous extrêmement toxiques.
3. Une irritation momentanée des yeux, du nez ou de la gorge au cours d'une opération indique que la ventilation n'est pas adéquate. Cessez votre travail afin de prendre les mesures nécessaires pour améliorer la ventilation dans l'aire de travail. Ne poursuivez pas l'opération si le malaise persiste.
4. Consultez ANSI/ASC Standard Z49.1 (à la page suivante) pour des recommandations spécifiques concernant la ventilation.

5. AVERTISSEMENT : Ce produit, lorsqu'il est utilisé dans une opération de soudage ou de coupage, dégage des vapeurs ou des gaz contenant des chimiques considéres par l'état de la Californie comme étant une cause des malformations congénitales et dans certains cas, du cancer. (California Health & Safety Code §25249.5 et seq.)



MANIPULATION DES CYLINDRES -- La manipulation d'un cylindre, sans observer les précautions nécessaires, peut produire des fissures et un échappement dangereux des gaz. Une brisure soudaine du cylindre, de la soupape ou du dispositif de surpression peut causer des blessures graves ou mortelles. Par conséquent :

1. Utilisez toujours le gaz prévu pour une opération et le détendeur approprié conçu pour utilisation sur les cylindres de gaz comprimé. N'utilisez jamais d'adaptateur. Maintenez en bon état les tuyaux et les raccords. Observez les instructions d'opération du fabricant pour assembler le détendeur sur un cylindre de gaz comprimé.
2. Fixez les cylindres dans une position verticale, à l'aide d'une chaîne ou une sangle, sur un chariot manuel, un châssis de roulement, un banc, un mur, une colonne ou un support convenable. Ne fixez jamais un cylindre à un poste de travail ou toute autre dispositif faisant partie d'un circuit électrique.
3. Lorsque les cylindres ne servent pas, gardez les soupapes fermées. Si le détendeur n'est pas branché, assurez-vous que le bouchon de protection de la soupape est bien en place. Fixez et déplacez les cylindres à l'aide d'un chariot manuel approprié. Toujours manipuler les cylindres avec soin.
4. Placez les cylindres à une distance appropriée de toute source de chaleur, des étincelles et des flammes. Ne jamais amorcer l'arc sur un cylindre.
5. Pour de l'information supplémentaire, consultez CGA Standard P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders", mis à votre disposition par le Compressed Gas Association, 1235 Jefferson Davis Highway, Arlington, VA 22202.

ENTRETIEN DE L'ÉQUIPEMENT -- Un équipement entretenu de façon défectueuse ou inadéquate peut causer des blessures graves ou mortelles. Par conséquent :

1. Efforcez-vous de toujours confier les tâches d'installation, de dépannage et d'entretien à un personnel qualifié. N'effectuez aucune réparation électrique à moins d'être qualifié à cet effet.
2. Avant de procéder à une tâche d'entretien à l'intérieur de la source d'alimentation, débranchez l'alimentation électrique.
3. Maintenez les câbles, les fils de mise à la terre, les branchements, le cordon d'alimentation et la source d'alimentation en bon état. N'utilisez jamais un équipement s'il présente une défectuosité quelconque.
4. N'utilisez pas l'équipement de façon abusive. Gardez l'équipement à l'écart de toute source de chaleur, notamment des fours, de l'humidité, des flaques d'eau, de l'huile ou de la graisse, des atmosphères corrosives et des intempéries.
5. Laissez en place tous les dispositifs de sécurité et tous les panneaux de la console et maintenez-les en bon état.
6. Utilisez l'équipement conformément à son usage prévu et n'effectuez aucune modification.

INFORMATIONS SUPPLÉMENTAIRES RELATIVES À LA SÉCURITÉ -- Pour obtenir de l'information supplémentaire sur les règles de sécurité à observer pour l'équipement de soudage à l'arc électrique et le coupage, demandez un exemplaire du livret "Precautions and Safe Practices for Arc Welding, Cutting and Gouging", Form 52-529.

Les publications suivantes sont également recommandées et mises à votre disposition par l'American Welding Society, 550 N.W. LeJuene Road, Miami, FL 33126 :

1. ANSI/ASC Z49.1 - "Safety in Welding and Cutting"
2. AWS C5.1 - "Recommended Practices for Plasma Arc Welding"
3. AWS C5.2 - "Recommended Practices for Plasma Arc Cutting"
4. AWS C5.3 - "Recommended Practices for Air Carbon Arc Gouging and Cutting"

SIGNIFICATION DES SYMBOLES
Ce symbole, utilisé partout dans ce manuel, signifie "Attention" ! Soyez vigilant ! Votre sécurité est en jeu.

Signifie un danger immédiat. La situation peut entraîner des blessures graves ou mortelles.

Signifie un danger potentiel qui peut entraîner des blessures graves ou mortelles.

Signifie un danger qui peut entraîner des blessures corporelles mineures.

ESAB 653cvcc

- *Multi-process, three phase power sources designed for heavy duty industrial DC welding applications*
- *Use for Mig, flux cored wire, submerged arc and stick electrode welding or air carbon arc gouging*
- *Compatible with 42v wire feeders: MobileMaster IV, 2E, 4HD, 4HD Dual and with 115v wire feeders/ controls: Mig 35, Digimig, Digimig Dual, Digimatic II, UEC-8, DuraDrive 4-30 and DuraDrive 4-48*
- *115 vac outlet for water circulator or tools*
- *Control electronics are protected from dirt and dust in an easy-access compartment*
- *Optional wire feed adaptor kits for Miller and Lincoln wire feeders*

Ordering Information

ESAB Power Sources

653cvcc, 230/460/575 vac, 3 ph, 60 Hz 37830
653cvcc, 220/400 (380-415) vac, 3 ph, 50 Hz CE 37832

ESAB 653cvcc Migmaster Packages

The following package includes an ESAB DC power source, wire feeder, 8 ft. (2.4m) control cable, 8 ft. (2.4m) gas hose, .035/.045 in. (.9/1.2mm) feed roll, - 15 ft. (4.5m) GunMaster gas-cooled gun, 15ft. work cable with clamp, 15 ft. wire feeder weld cable and R-33-FM-580 regulator with adjustable flowmeter.

Migmaster 653cvcc, Mig 4HD, GM-400cc,
230/460/575 vac 36234

Options & Accessories

HC-3B Hand Control, 30 ft. (9.1m) cable
(requires 0558001436) 33838
Mini Boom for Mig 4HD (requires Swivel Post) 34322
Swivel Post, use with Mig 4HD or Mig 2E wire feeders 36172
Auto Fan™ Kit 36707
TR-29 Truck Kit 37924
Remote Control Kit 0558001436
Miller Wire Feeder Adaptor Kit (24 vac only) 0558001415
Lincoln Wire Feeder Adaptor Kit 0558001416
Work Cable with Clamp (15 ft.) 0558001440
Feeder Cable with Lug (15 ft.) 0558001441

Shown with optional DuraDrive 4®-48 wire feeder, GM-400 Mig welding torch, TR-29 Truck kit, 15 ft. work cable and welding wire

Specifications

Rated DC Output* @ 100% duty cycle,
50/60 Hz, cv or cc 653cvcc ..... 650 amps @ 44 vdc
Rated DC Output* @ 60% duty cycle,
50/60 Hz, cv or cc 653cvcc ..... 750 amps @ 44 vdc
Open Circuit Voltage, 50/60 Hz 653cvcc ..... 54 vdc (cv)/59 vdc (cc)
Primary Input Voltage & Current @ rated 100% duty cycle load
653cvcc, 230/460 vac, 60 Hz, 3 ph ..... 108/54 amps
653cvcc, 230/460/575 vac, 60 Hz, 3 ph ..... 108/54/43 amps
653cvcc, 220/400 (380-415) vac, 50 Hz, 3 ph .....
..... 102/56 (59-54) amps
Power Factor @ rated load 83%
Auxiliary Output Power (receptacle) ..... 115 vac, 50/60 Hz, 10 amps
W x L x H ..... 18.75 in. (46 cm) x 32.5 in. (83 cm) x 25 in. (64 cm)
Net Weight,** 60 Hz 653cvcc ..... 493 lb. (224 kg)
Shipping Weight** (approximate), 60 Hz 653cvcc ..... 503 lb. (229 kg)

** For 208 vac, 60 Hz and 380 vac, 50 Hz service, derate output current rating 10%.*
*** For 50 Hz models, add 40 lb. (18kg)*

2.1 GENERAL

This manual provides information to familiarize the operator with the design, installation and operation of the 653cvcc model power source. DO NOT attempt to install or operate this equipment until you have read and fully understand these instructions. The information presented here should be given careful consideration to ensure optimum performance of this equipment.

2.2 RECEIVING-HANDLING

Upon receipt, remove all packing material and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading and freight bill will be furnished by the carrier on request.

When requesting information concerning this equipment, it is essential that the Item number, Serial number and Model number of the equipment be supplied.

2.3 DESCRIPTION

The 653cvcc is a multi-process power sources designed for Mig and spray transfer (GMAW), flux core (FCAW), and stick (SMAW) welding as well as submerged arc welding (SAW) and air carbon arc cutting/gouging (CAC-A) applications. Table 2-1 outlines the electrical and physical specifications of the available models.

Table 2-1. Specifications for 653cvcc

OPEN CIRCUIT VOLTAGE (U_0)				54 vdc (cv)/59 vdc (cc)	
RATED OUTPUT	DUTY CYCLE			60%	100%
	Current (I_2)			750 A	650 A (60Hz)/600 A (50Hz)
	Voltage (U_2)			44 V	44 V
RATED INPUT	3 Phase	60 Hz	Volts (U_1)	Current (I_1) Flat	Current (I_1) Flat
			230 V	124 A	108 A
			460 V	62 A	54 A
			575 V	50 A	43 A
		50 Hz	220 V	127 A	102 A
			400 V	70 A	56 A
Power Factor at Rated Output				83%	
Welding Range				750 A/44 V - 50 A/14 V	
Auxiliary Power				115 V ac @ 10 A, 60 Hz	
PHYSICAL SPECIFICATIONS				60 Hz.	50 Hz.
Height (without lift eye)				25.0" (62.2 cm)	
Width				18.8" (48.3 cm)	
Depth				32.5" (81.9 cm)	
Net Weight				493 lbs (224 kg)	528 lbs (240 kg)
Shipping Weight				503 lbs (228 kg)	538 lbs (244 kg)

NOTE: The 653cvcc may also operate from a 200 (208)-volt a.c. primary input using the 230-volt changeover connections. However, when connected to this source (200-volt), the output voltage is derated 10%.

2.3.1 Power Source

The power source is a constant current/constant potential, Silicon Controlled Rectifier (SCR), three-phase, star-connected transformer/rectifier type dc unit with solid state contactor and control circuitry. It provides the volt-ampere characteristics desired for conventional MIG, flux core and submerged arc welding in the CV mode or stick welding and arc gouging in the CC mode.

2.3.2 Volt-Ampere Characteristics

The curves shown in Figure 2-1 represent the volt-ampere static characteristics for the power source. The slant of these curves is referred to as the "slope" and is generally defined as the "voltage drop per 100 amperes of current use". These curves show the output voltage available at any given output current from the minimum to the maximum setting of the voltage control. Because the volt-ampere slope is fixed, it is possible to select welding conditions by estimating the open-circuit voltage required for the load current when operating in the CV mode.

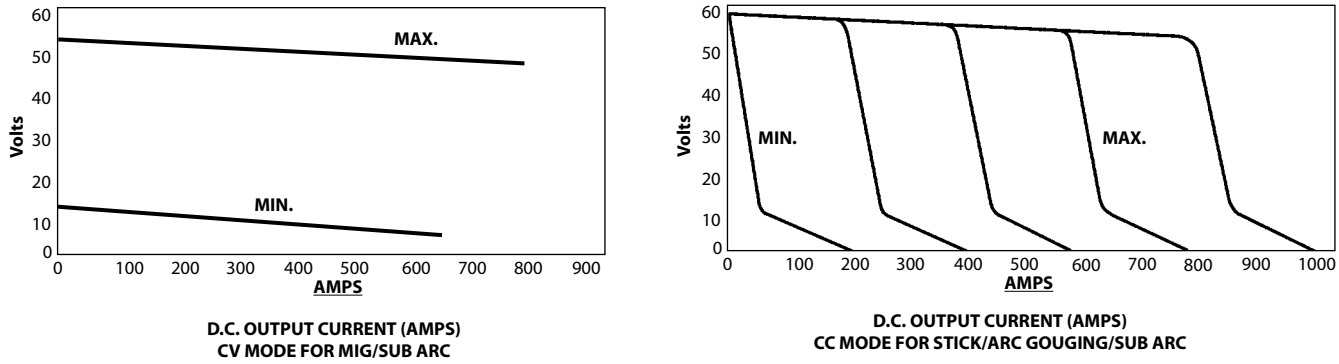


Figure 2-1. Volt-Ampere Curves

2.4 OPTIONAL ACCESSORIES

2.4.1 TR-29 Truck Kit (Item No. 37924)

This truck kit provides complete mobility of the power source. The kit consists of castors, rear cylinder rack and wheels, gas cylinder bracket, cylinder chain, and pull handle.

2.4.2 Swivel Mount Kit (Item No. 36172)

This kit allows ESAB wire feeders with swivel base mounts to be mounted to the top of the power source on an insulated swivel mount. This allows the feeder to freely rotate, relieving potential wire feed problems while increasing the working area of the torch.

2.5 SAFETY

Before the equipment is put into operation, the safety section at the front of this manual should be read completely. This will help avoid possible injury due to misuse or improper installation.

The definitions relating to the:

DANGER
WARNING
CAUTION

safety notations are described at the end of the Safety Section in the front of this manual — **read them and their specific text references carefully.**

SECTION 3 INSTALLATION

3.1 LOCATION

A proper installation site is necessary for the power source to provide dependable service. A proper installation site permits freedom of air movement through the unit while minimizing exposure to dust, dirt, moisture, and corrosive vapors. A minimum of 18 inches (46 cm) is required between the side and rear panels of the power source and the nearest obstruction. The selected site should also allow easy removal of the power source outer enclosure for maintenance. See Table 2-1 for overall dimensions of the unit.

3.2 RECEIVING, UNPACKING AND PLACEMENT

A. Immediately upon receipt of the power source, inspect for damage which may have occurred in transit. Notify the carrier of any defects or damage.

B. Remove the power source from the container. Remove all packing materials. Check the container for any loose parts.

C. Check air passages at front and rear of cabinet, making sure that no packing materials that may obstruct air flow through the power source.

D. Install the lifting ring furnished with the power sources into the top of the unit.

CAUTION **For lifting purposes and for keeping dust, moisture, and other foreign material from entering the power source, the lifting eyebolt must be fully tightened with a tool.**

E. After selecting an installation site, place the power source in the desired location. The unit may be lifted either by using the lifting ring or by forklift truck. If a forklift is used for lifting the unit, be sure that the lift forks are long enough to extend completely under the base.

CAUTION **Do not use filters on this unit as they would restrict the volume of intake air required for proper cooling. Output ratings on this unit are based on an unobstructed supply of cooling air drawn over its internal components. Warranty is void if any type of filtering device is used.**

3.3 PRIMARY (INPUT) ELECTRICAL CONNECTION

This power source is a three-phase unit and must be connected to a three-phase power supply. It is recommended that the unit be operated on a dedicated circuit to prevent impairment of performance due to an overloaded circuit.

WARNING

ELECTRIC SHOCK CAN KILL! BEFORE MAKING ELECTRICAL INPUT CONNECTIONS TO THE POWER SOURCE, "MACHINERY LOCKOUT PROCEDURES" SHOULD BE EMPLOYED. IF THE CONNECTIONS ARE TO BE MADE FROM A LINE DISCONNECT SWITCH, PLACE THE SWITCH IN THE OFF POSITION AND PADLOCK IT TO PREVENT INADVERTENT TRIPPING . IF THE CONNECTION IS MADE FROM A FUSEBOX, REMOVE THE CORRESPONDING FUSES AND PADLOCK THE BOX COVER. IF IT IS NOT POSSIBLE TO USE PADLOCKS, ATTACH A RED TAG TO THE LINE DISCONNECT SWITCH (OR FUSE BOX) WARNING OTHERS THAT THE CIRCUIT IS BEING WORKED ON.

A. The primary power leads must be insulated copper conductors. Three power leads and one ground wire are required. Either rubber covered cable or conduit (flexible or solid) may be used. Table 3-1 provides recommended input conductors and line fuse sizes.

B. Remove the top cover. Identify primary power connections, TB3, and the ground lug located on the A-Frame bracket. Refer to figure 3.1.

Table 3-1. Recommended Sizes for Input Conductors and Line Fuses

Rated Input @ 100% Duty Cycle		Input & GND Conductor * CU / AWG	Fuse Size Amps
Volts	Amps		
220	68	No. 6	100
230	66	No. 6	100
400	37	No. 8	60
460	33	No. 8	60
575	26	No. 10	50

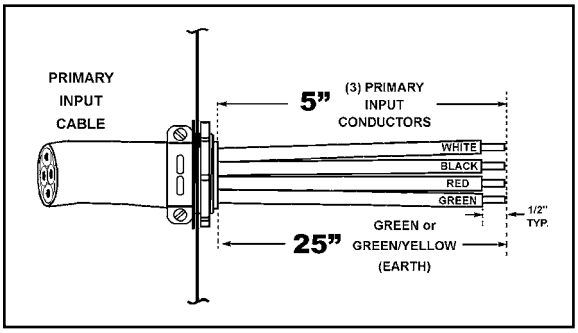
* Sized per National Code for 80 °C rated copper conductors @ 30° C ambient. Not more than three conductors in raceway or cable. Local codes should be followed if they specify sizes other than those listed

WARNING **THE CHASSIS MUST BE CONNECTED TO AN APPROVED ELECTRICAL GROUND. FAILURE TO DO SO MAY RESULT IN ELECTRICAL SHOCK, SEVERE BURNS OR DEATH.**

C. Thread the properly stripped input and ground conductors through the large strain relief in the rear panel of the power source. Connect the three input conductors to the three input terminals on TB3 (see figure 2-1). To connect the ground conductor, thread the ground wire through the ground fault switch bracket and connect to the ground lug provided on the A-Frame.

D. Check all connections for proper tightness. Ensure all connections are correct and well-insulated.

Recommended Cable Strip Lengths



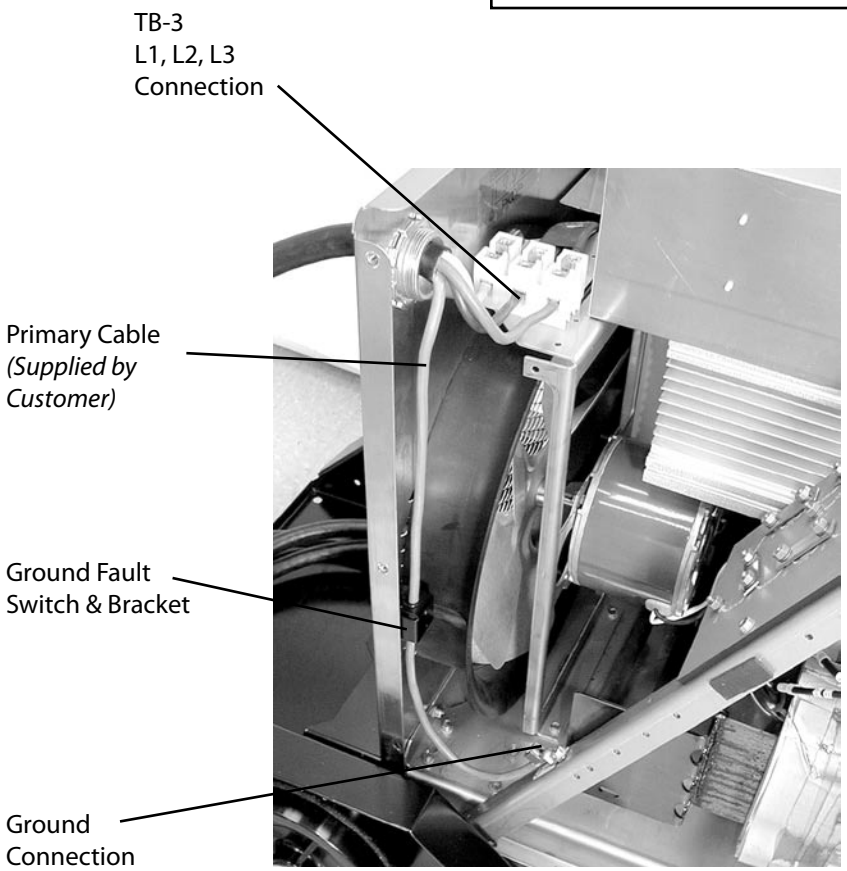


Figure 3-1. Connecting Primary Power Leads

E. Figures 3-2, 3-3 & 3-4 illustrate the input voltage terminal board and the input voltage link connections. The particular voltages from which this power source may be operated are stated on the rating plate. The voltage links were factory set for highest voltage stated on the rating plate. If the power source is to be operated on another stated input voltage, the links must be reset for that particular input voltage. Always verify the input voltage and check the link arrangement regardless of factory setting. The voltage links are set up by reconfiguring the copper link bars to the voltage designations for the desired voltage.

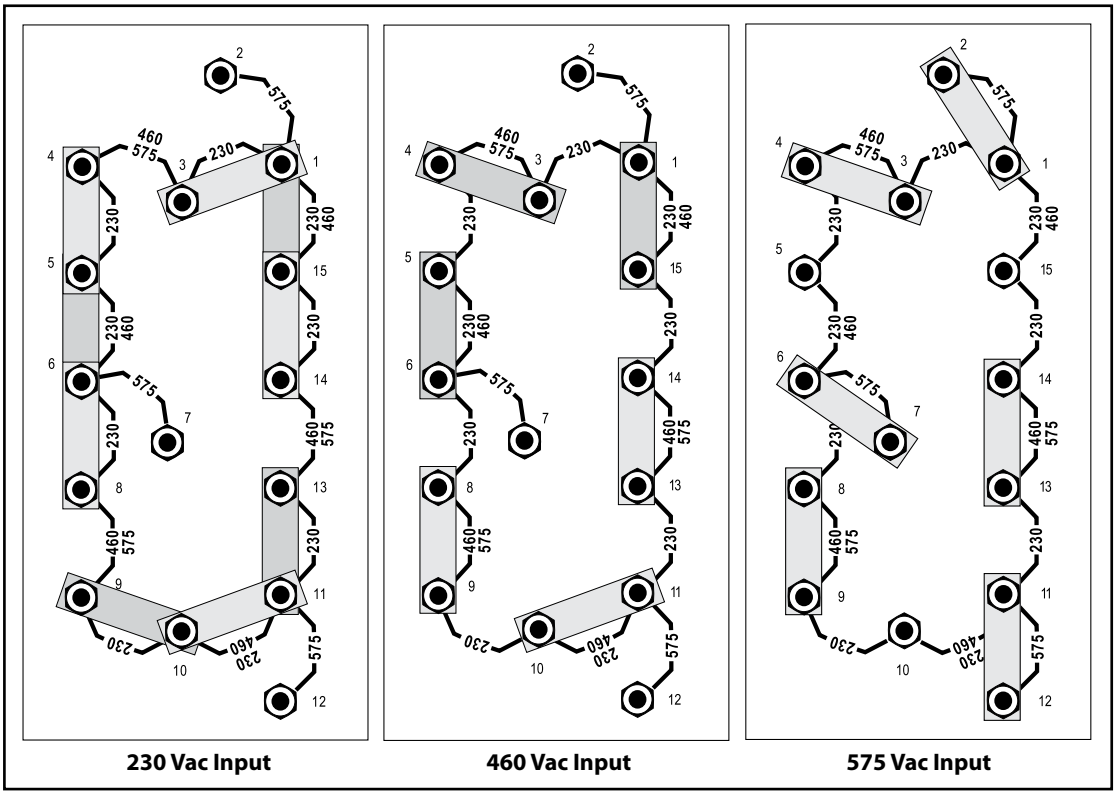


Figure 3-2. Input Terminal Board Configuration for 230/460/575 Model (factory supplied in the 575 configuration)

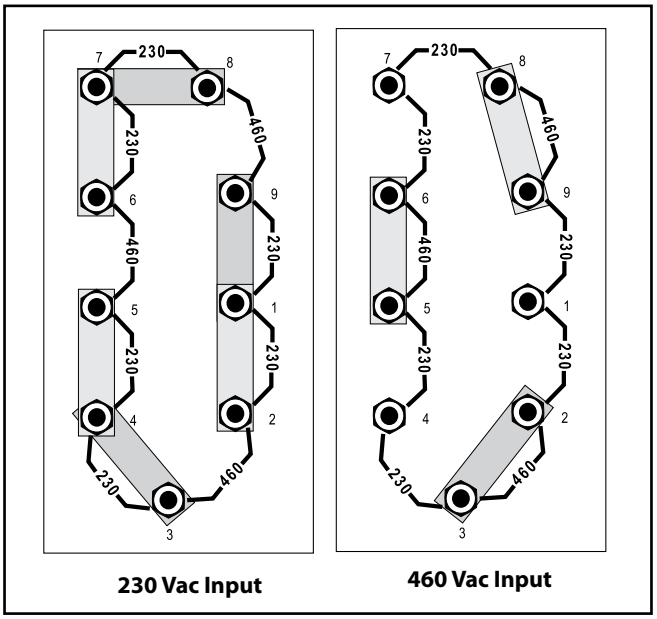


Figure 3-3. Input Terminal Board Configuration 230/460 Model (factory supplied in the 460 configuration)

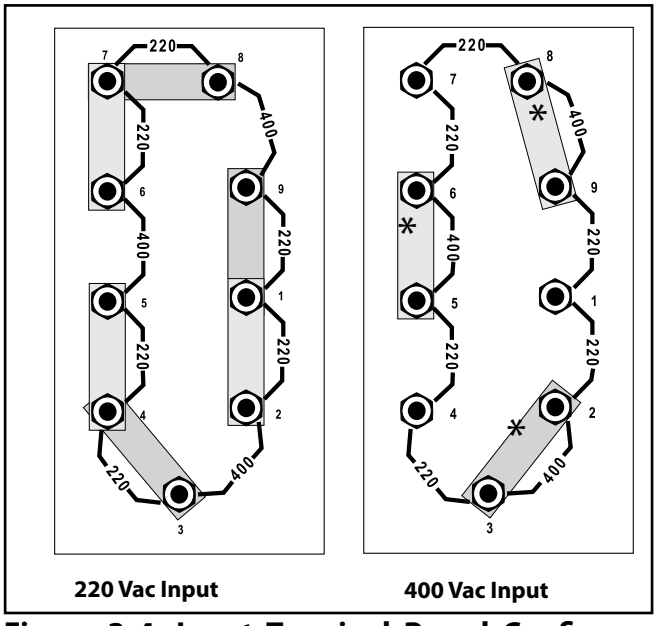


Figure 3-4. Input Terminal Board Configuration 220/400 Model (factory supplied in the 400 configuration)

3.4 OUTPUT WELDING CONNECTIONS (SECONDARY)

WARNING **BEFORE MAKING ANY CONNECTIONS TO THE POWER SOURCE OUTPUT TERMINALS, MAKE SURE THAT ALL PRIMARY INPUT POWER TO THE MACHINE IS OFF.**

The output connections are located on the front panel (Figure 3-5). The negative connection is located at the bottom right corner and the positive (high inductance and low inductance) connections are located at the bottom left corner. Table 3-2 provides the recommended cable output sizes.

Table 3-2. Output Cable Sizes (Secondary)

Welding Current	Total Length (Feet) of Cable in Weld Circuit*				
	50	100	150	20	250
100	6	4	3	2	1/0
150	4	3	1	1/0	2/0
200	3	1	1/0	2/0	3/0
250	2	1/0	2/0	3/0	4/0
300	1	2/0	3/0	4/0	4/0
400	2/0	3/0	4/0	4/0	2-2/0
500	3/0	3/0	4/0	2-2/0	2-3/0

* Total cable length includes work and electrode cables. Cable size is based on direct current, insulated copper conductors, 100-percent duty cycle and a voltage drop of 4 or less volts. The welding cable insulator must have a voltage rating that is high enough to withstand the open circuit voltage of the power source.

3.5 CONTROL CONNECTIONS

The wire feeder receptacle and 115 VAC Auxiliary control are mounted on a removable plate. This plate may be exchanged for different applications.

Optional Available Plates:
- Blank (P/N 37902M)
- Terminal Block for Lincoln - 24vac & 115vac feeders - (P/N 0558001416)
- Miller 14 pin Receptacle for 24vac feeders only - (P/N 0558001415)

Refer to Figure 3-5.

3.5.1 Wire Feeder Control

The Wire feeder control cable connection is provided by a 19-pin receptacle (J1) located on the left-hand side of the power source front panel. This receptacle will operate all ESAB wire feeders with 19 pin control cables including the Mig 2E, Mig 4HD, Mig 4HD Dual, Mig 5XL, Mig 28A, Mig 35, Digimig, Digimig Dual as well as the UEC-8, Digimatic II and Analog Interface mechanized controls.

3.5.2 Remote Control (Optional)

This function is provided by an optional 14-pin receptacle (J2) located on the front panel directly below connector J1. It receives a mating plug from a Hand Control Assembly (optional). This receptacle is operative only if the panel remote switch on the power source front panel is in the "Remote" position.

3.5.3 Auxiliary 115 V AC Receptacle

A 115 Vac receptacle is provided to supply power to accessories such as a water cooler, heated CO_2 regulator, or small hand tools. The receptacle is rated 115 Vac / 10 amps.

3.5.4 42V Circuit Breaker (CB1)

The 42V resettable circuit breaker (CB1) protects the 42 volt wire feeder/control circuitry against over current. (Table 6-2 provides troubleshooting information).

3.5.5 115V Circuit Breaker (CB2)

The 115V resettable circuit breaker (CB2) protects the 115 volt auxiliary receptacle and wire feeder/control circuitry against over current. (Table 6-2 provides troubleshooting information).

3.5.6 External Grounding Conductor Protection

This feature will de-energize the power source output if current flow is detected in the external ground conductor. When this happens, the Fault light on the front control panel will illuminate. It will remain lit until the fault is corrected or the power source power switch (S1) is turned off.

653CVCC

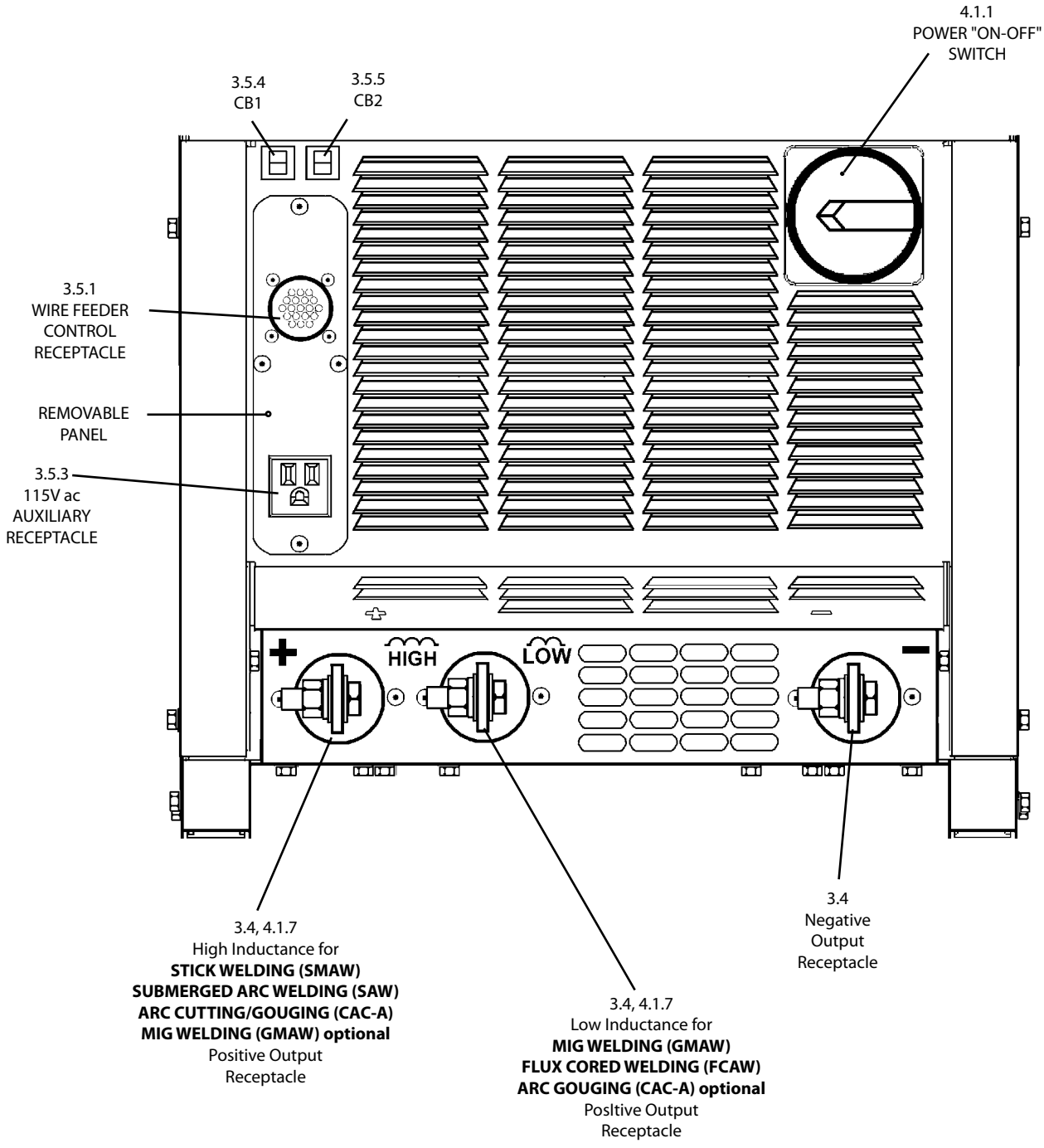


Figure 3-5. Connection Diagram

CAUTION

Never operate the power source with the cover removed. In addition to the safety hazards, improper cooling may cause damage to the components. Keep side panels closed when unit is energized. Welding helmet, gloves, and other personal protection should always be worn when welding.

4.1 CONTROLS (See Figure 4-1)

4.1.1 Power Switch (ON-OFF)/(I-O)

The power switch is located on the front panel of the power source. In the "off" ("O") position, the unit is shut down; however, power is still present in the unit. To fully shut down the power source, power must be disconnected at the line disconnect switch or the fuse box.

With the switch in the "on" ("I") position, power is provided to the main transformer and the low voltage control circuitry.

4.1.1.1 Power Indicator

This white light will indicate that the power switch is in the "on" position and power has been applied to the main transformer and low voltage circuitry.

4.1.1.2 Fault Indicator

This red light will indicate that current was flowing through the external ground conductor. It will also illuminate if a short occurs (momentary or permanent) between the +12 volt J1-E; the +10 volt (J2-E) and either the chassis ground or the negative terminal of the power source. The power source output terminals are de-energized and the fault must be corrected before resuming operation.

4.1.2 Output Panel/Remote Switch

With this switch in the "Panel" position, output voltage is controlled by adjusting the voltage potentiometer on the front panel to the desired output. In the "Remote" position, output is controlled using an optional remote voltage control via receptacle J2.

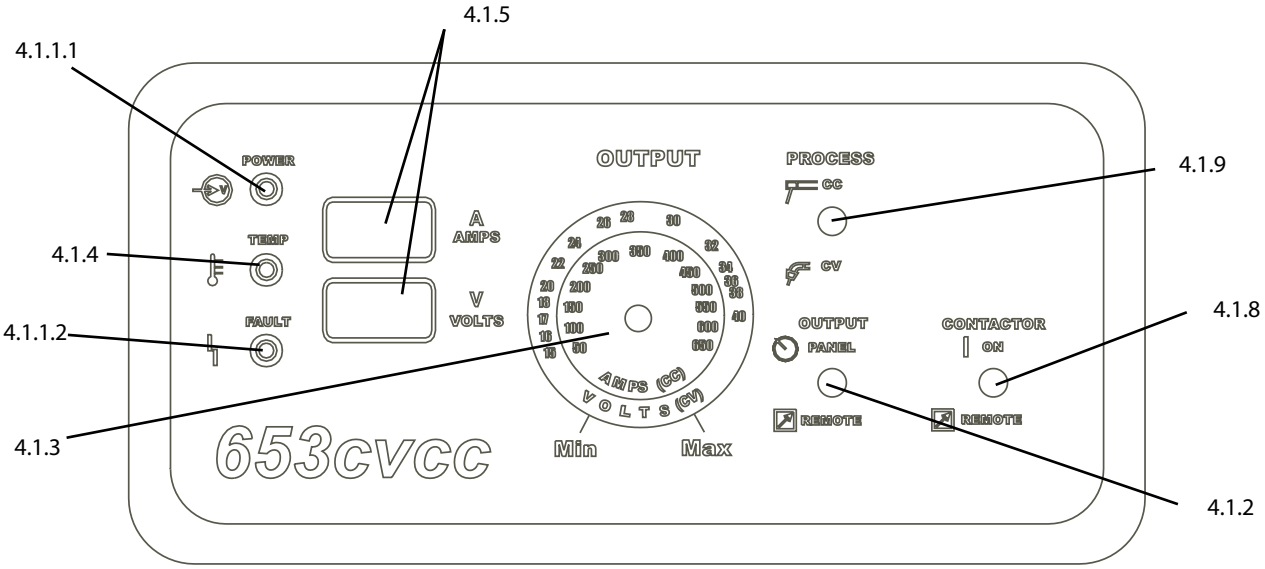


Figure 4-1. Control Locations

4.1.3 Output Voltage/Current Control
This control allows the operator to adjust the output voltage in the CV mode and output current in the CC mode. Placing the Panel/Remote switch in the "Remote" position disables the output control on the front panel. Calibration marks are to provide a rough guide in setting voltage and current.

4.1.4 Over Temperature Indicator (Temp.)
This amber light will indicate when an internal overheating condition has occurred and one of the thermal switches has opened. User control of the solid state contactor will be interrupted and power source output will shut down to protect critical components. Once cooled to a safe temperature, the thermal switch will automatically reset and output control will be restored.

4.1.5 Voltmeter and Ammeter
A digital voltmeter and ammeter provides an accurate indication of dc output voltage and current.

4.1.6 Over Current Protection
The 653cvcc incorporates automatic over current protection. If an over current condition occurs, the automatic circuitry will "fold back" the output current to a level that will prevent damage to the power source. The power source will remain in this low current "fold back" mode until the arc is broken, the torch trigger is released or the contactor switch is reset.

4.1.7 High & Low Inductance Receptacles
The 653cvcc provides high and low inductance output connections (see figure 3-5). Both are positive output terminals. The high inductance terminal slows the power source dynamic response. This means the output current will build at a slower rate compared to the low inductance terminals. The welding process and application will determine which terminal should be used. The chart below provides suggested terminal connections.

Process Switch	CC		CV	
Inductance	High	Low	High	Low
Mig Solid Wire (GMAW)	X		X [1]	X
Flux Cored (FCAW)	X			X
Sub Arc (SAW)	X		X [2]	X
Arc Gouging (CAC-A)	X	X [3]	X	

1. Small diameter wires (<1/16-inch) with argon mixtures.
2. <3/32-inch diameter wires.
3. Fast dynamic response (optional setting only).

4.1.8 Contactor, On/Remote Switch
The Contactor Control switch is located on the front panel of the power source. In the "on" position, the solid state contactor is energized and output power is available at the output terminals. The "Remote" position allows the solid state contactor to be controlled from a remote Mig wire feeder or mechanized sub arc control.

4.1.9 Process Switch (CC-CV)
The process switch allows for selection of the output characteristics of the power source depending on the welding process being used. The CV position produces a "Flat" volt-amp characteristic and is mostly used for the Mig (GMAW) and Submerged Arc (SAW) welding processes and occasionally with Air Carbon Arc Cutting (CAC-A). The CC position produces a "Drooping" characteristic most popular for Stick (SMAW), CAC-A and sometimes SAW.

4.2 SEQUENCE OF OPERATION

Prior to performing the steps below, open the wall disconnect switch or remove the fuse from the fuse box to electrically isolate the power source.

WARNING

ELECTRIC SHOCK CAN KILL! "MACHINERY LOCKOUT PROCEDURES" SHOULD BE EMPLOYED. IF IT IS NOT POSSIBLE TO USE PADLOCKS, ATTACH A RED TAG TO THE LINE DISCONNECT SWITCH (OR FUSE BOX) WARNING OTHERS THAT THE CIRCUIT IS BEING WORKED ON.

4.2.1 General Procedures for the CV-MIG (GMAW), SUB ARC (SAW) and CC-STICK (SMAW), SUB ARC (SAW) Processes

A. Make the secondary output connections to the positive and negative output receptacles. See paragraph 3.4 and figure 3-5.

B. Make the control connections. Refer to the appropriate wire feeder, mechanized control, and/or torch instruction booklets for additional process requirements or control connections.

C. If primary input connections have been made to the power switch, and on the input terminal board to match the incoming voltage, close the main wall disconnect switch or reinstall fuses in the fuse box.

4.2.2 Specific Procedures for the CV-MIG (GMAW) and SUB ARC (SAW) Processes

A. Set the Output Panel/Remote switch to the desired setting.

B. Set the Process switch to the CV position.

C. Set the contactor switch to "Remote".

WARNING

ELECTRIC SHOCK CAN KILL! WHEN THE CONTACTOR SWITCH IS IN THE "ON" POSITION, OUTPUT POWER WILL BE PRESENT THROUGHOUT THE WELDING CIRCUIT; ie. CABLES, WIRE FEEDER, WIRE SPOOL, DRIVE STAND, GUN, AND ELECTRODE. BE SURE ALL ARE CLEAR OF THE WORKPIECE OR ARCING WILL RESULT.

D. Set the power switch on the rear panel to the "on" ("I") position. The fan will run for 30 seconds and stop automatically if welding current does not exceed 100 amps. The fan will automatically turn off after 6 minutes when the contactor is "off" and the welding current is below 100 amps.

E. To preset the approximate welding voltage, place the Contactor switch to the "on" position. This will energize the power source output, allowing the voltage to be preset using the Output Voltage/Current Control dial and observing the voltmeter.

F. After setting the desired voltage condition, turn the contactor switch back to the "remote" position. This position requires a remote start control in order to start the welding sequence.

NOTE:

A PCB and resistor pack discharges capacitor voltage to eliminate the electrode "sparking" or "arcing" potential.

G. Begin welding. Observe the voltmeter, ammeter, and the weld. Readjust the voltage and wire feed speed settings as necessary to obtain a satisfactory weld.

H. When welding is completed, release torch switch. (This action will de-energize the power source solid state contactor and remove dc power from the output terminals.)

4.2.3 Specific Procedures for the CC-Stick Welding (SMAW) and Arc Gouging (CAC-A) Processes

A. Place the Output Panel/Remote switch into PANEL position if output current is regulated from the Output Voltage/Current dial on the panel, or in REMOTE position if output current is regulated from the optional Hand Control.

B. Set the Output Voltage/Current Control to provide the approximate desired welding current using the control knob as the reference. Example - set knob to "5" for approximately 450 amps output.

C. Set the Contactor switch to the ON position -- this will energize the solid-state contactor and all associated circuitry up to the output terminals.

D. Place the Process Control switch in the CC position.

E. Commence welding by touch or scratch starting the electrode.

5.1 General

CAUTION

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

WARNING

BE SURE THAT THE BRANCH CIRCUIT OR MAIN DISCONNECT SWITCH IS OFF, OR ELECTRICAL INPUT FUSES ARE REMOVED, BEFORE ATTEMPTING ANY INSPECTION OR WORK INSIDE THE POWER SOURCE. PLACING THE POWER SWITCH IN THE OFF POSITION DOES NOT REMOVE ALL POWER FROM INSIDE THE POWER SOURCE.

5.2 Cleaning

Periodically, remove the cover from the power source and blow accumulated dust and dirt from the air passages and interior components by using clean, dry low pressure air. The frequency of cleaning required depends upon the environment in which the power source is used.

It is imperative that all air passages be kept as clean as possible in order to allow adequate air flow to provide proper cooling.

After cleaning with low pressure air, check for and tighten any loose hardware, including all electrical connections. Check for frayed and/or cracked insulation on all power cables and replace if necessary.

WARNING

FAILURE TO REPLACE WORN OR DAMAGED CABLES MAY RESULT IN A BARE CABLE TOUCHING A GROUNDED OBJECT. THE RESULTING ELECTRICAL ARC MAY INJURE UNPROTECTED EYES AND WILL PRESENT A SERIOUS FIRE HAZARD. BODY CONTACT WITH A BARE CABLE, CONNECTOR, OR CONDUCTOR MAY RESULT IN SEVERE ELECTRICAL SHOCK, CAUSING SERIOUS BURNS OR DEATH.

5.3 Inspection and Service

Keep the power source dry, free of oil and grease, and protected at all times from damage by hot metal and sparks.

5.3.1 Fan Motor

Keep the fan motor free of accumulated dust and lint.

5.3.2 Transformer

Other than periodically cleaning the dust and dirt from the transformer, no maintenance is required. Ensure that only clean, dry, low pressure air is used.

5.3.3 Wire Feeder and Control Circuits

These circuits are protected by two 10 amp circuit breakers mounted in the front panel. If these open, the contactor and wire feeder will not operate.

5.3.4 Over Temperature Protection

If the power source reaches an abnormally high internal temperature, the thermal protection will deenergize the contactor circuit, shutting down the power source but leaving the cooling fan on. After the power source has cooled to a safe level, the thermal protection will automatically reset. While de-energized, the contactor and wire feeder cannot be operated.

5.3.5 Digital Voltmeter/Ammeter Calibration

To verify the accuracy of the digital volt/ammeter combination, the following calibration procedure can be performed periodically:

1. Place the Panel/Remote switch in Panel position.
2. Disconnect cables from the output terminals and then connect an accurate DC voltmeter to the output terminals.
3. Place the Contactor switch in the On position.
4. With the primary input power on, turn the Voltage control knob until you get 25V on the DC voltmeter. Compare the reading with the reading on the digital voltmeter on the front panel.
5. If there is a difference in the voltage readings, open front control panel by removing the two mounting screws from the upper corners, remove meter board from its four mounting posts, and adjust the trimpot (R13) on the meter board with a small screwdriver until the digital meter reading matches the DC voltmeter reading. When satisfied, reassemble meter board and front control panel.

6.1 General

WARNING **DISCONNECT PRIMARY POWER AT WALL SWITCH, OR CIRCUIT BREAKER, BEFORE ATTEMPTING INSPECTION OR WORK INSIDE THE POWER SOURCE.**

If the power source is operating improperly, the following troubleshooting information may be used to locate the source of the trouble.

Check the problem against the symptoms in the following troubleshooting guide (Table 6-2.) The remedy for the problem may be quite simple. If the cause cannot be quickly located, open up the unit and perform a simple visual inspection of all the components and wiring. Check for proper terminal connections, loose or burned wiring or components, blown fuses, bulged or leaking capacitors, or any other sign of damage or discoloration.

6.2 Testing and Replacing Bridge Assembly Components

The SCRs used in the power source are devices which allow current to flow in only one direction. The SCRs are designed to provide long trouble-free operation; however, should a failure occur, they may require replacement.

A. Testing SCRs.

1. Remove top and right side panel from the power source.
2. Locate the main rectifier assembly containing the SCRs.
3. Electrically isolate main bridge assembly by disconnecting resistor R5.
4. With the ohmmeter on RX1 scale, place the positive lead on the anode (end of SCR with screw threads) and the negative lead on the cathode (positive output terminal on the front panel). The meter should read minimum of 20 meg ohms.
5. Reverse leads and check each SCR. All readings should again show high resistance. The SCRs are bad if they show low resistance in either direction.
6. Check the gate circuit on the SCRs by installing a jumper from the gate lead to the anode of the SCR. The meter should read less than 5 ohms. Remove the jumper from the gate. The meter reading should increase (30-50 ohms).

IMPORTANT

When replacing SCR's, make sure mounting surfaces are clean. Using Alcoa No. 2 EJC Electrical Joint Compound or an equivalent, apply a thin coat to the SCR mounting surface and positively locate in place on the heatsinks. Place the clamp in position with the bolts through the holes in the heatsinks and proceed as follows:

WARNING **ELECTRICAL SERVICE AND REPAIR SHOULD BE ATTEMPTED ONLY BY A TRAINED ELECTRICIAN.**

1. Tighten the bolts evenly until finger tight noting that the nuts are not rotating.
2. Tighten the bolts 3/4 turn plus an 1/8 turn using a socket wrench on the bolt heads and rotating only in 1/4 turn increments plus 1/8 turn alternating between the bolts noting that the nuts are not rotating.

Table 6-1. PCB Voltage Tests*

FROM	TO	READING
P8-5	OTB+	+10 V dc
P8-7	OTB+	0-10 V dc**
P6-6 (SCR1) P6-5 (SCR2) P6-4 (SCR3) P6-3 (SCR4) P6-2 (SCR5) P6-1 (SCR6)	OTB+	.3 V dc with contactor on

* Refer to Schematic Diagram
** Varies with VCP (R1)

NOTE:

All voltage readings are taken with the front access panel open and the power switch "ON".

Table 6-2. Troubleshooting Guide

CONDITION	ACTION
Unit Inoperative	A. No input power. Check main line (user's) switch fuses — replace if needed. B. Poor or improper input (terminal board) connections. C. Defective on/off switch — replace. D. Thermal light on. Main transformer overheating. Also check for proper cooling, proper primary hookup, or shorted turn on secondary. E. Thermal light on. Fan motor not operating — check motor and leads. F. External Ground Conductor fault indicator "ON". - Check for cause and correct. Turn power switch "OFF" then "ON" to reset. G. Loss of primary phase. Check that LED on control PCB is not lit. If lit, find & replace defective fuse.
No Output — Fan Running	A. Poor or improper electrical input — check input connections on TB. B. Poor connections at output terminals/work station — check, tighten or replace. C. Main transformer overheating — thermal switches tripped due to restricted cooling air. Temperature light on front panel will be lit. Let unit cool down. D. PC board defective or loose PC board connector(s) — if loose, reinsert; if defective, replace.
Limited Output or Low Open-Circuit Voltage	A. Input voltage jumper links on terminal board improperly set — check for proper voltage. B. Poor output connections. Take apart, clean, and tighten securely. C. Panel-Remote switch in Remote position and remote voltage pot disabled. D. Over current condition had occurred. Unit is in "fold back" mode. See Section 4.1.6.
Erratic Weld Current	A. Welding cable size too small — use correct cables. B. Loose welding cable connection (will usually get hot) — tighten connections. C. Improper wire feeder setup. D. Defective SCR in bridge rectifier. E. PC board defective — replace.
High Output, No Voltage Control	A. PC board defective or loose — reset and/or replace board.
No 115 Volt ac Output	A. Circuit breaker tripped. Check 115V CB2 — Reset.
Line Fuse Blows When Power Source is First Turned On	A. Shorted SCR in Main Bridge — replace. B. Shorted capacitor in Capacitor Bank.
Wire Feeder is Inoperative	A. Loose feeder control cable — Check and tighten all connections. B. A Circuit Breaker tripped — Check 42V CB1 and 115V CB2 — Reset.

NOTE:
Schematics and Wiring Diagrams on 11″ x 17″
paper are included
inside the back cover of this manual.

7.0 Replacement Parts

7.1 General

Always provide the serial number of the unit on which the parts will be used. The serial number is stamped on the unit nameplate.

7.2 Ordering

To ensure proper operation, it is recommended that only genuine ESAB parts and products be used with this equipment. The use of non-ESAB parts may void your warranty.

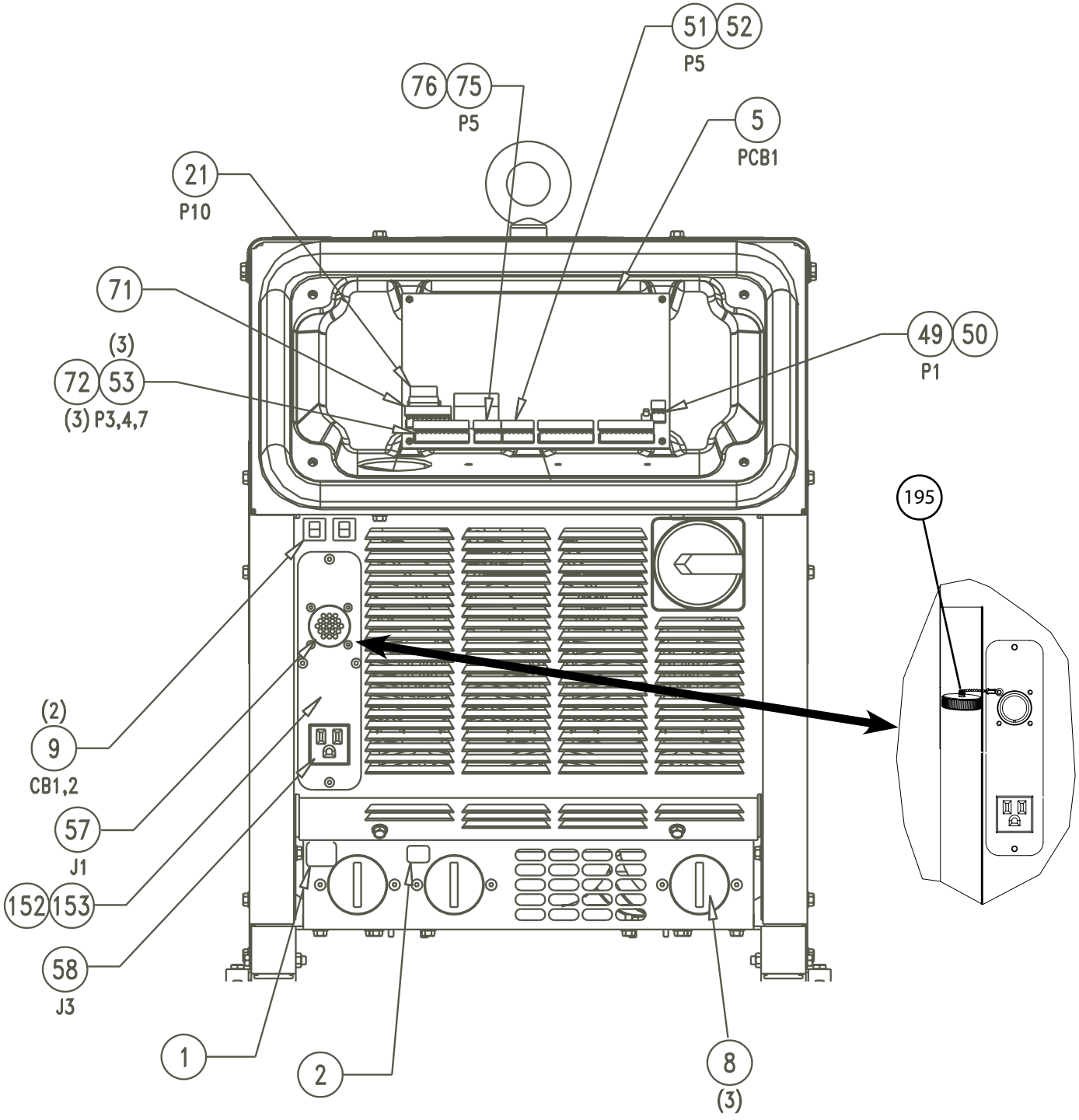
Replacement parts may be ordered from your ESAB Distributor.

Be sure to indicate any special shipping instructions when ordering replacement parts.

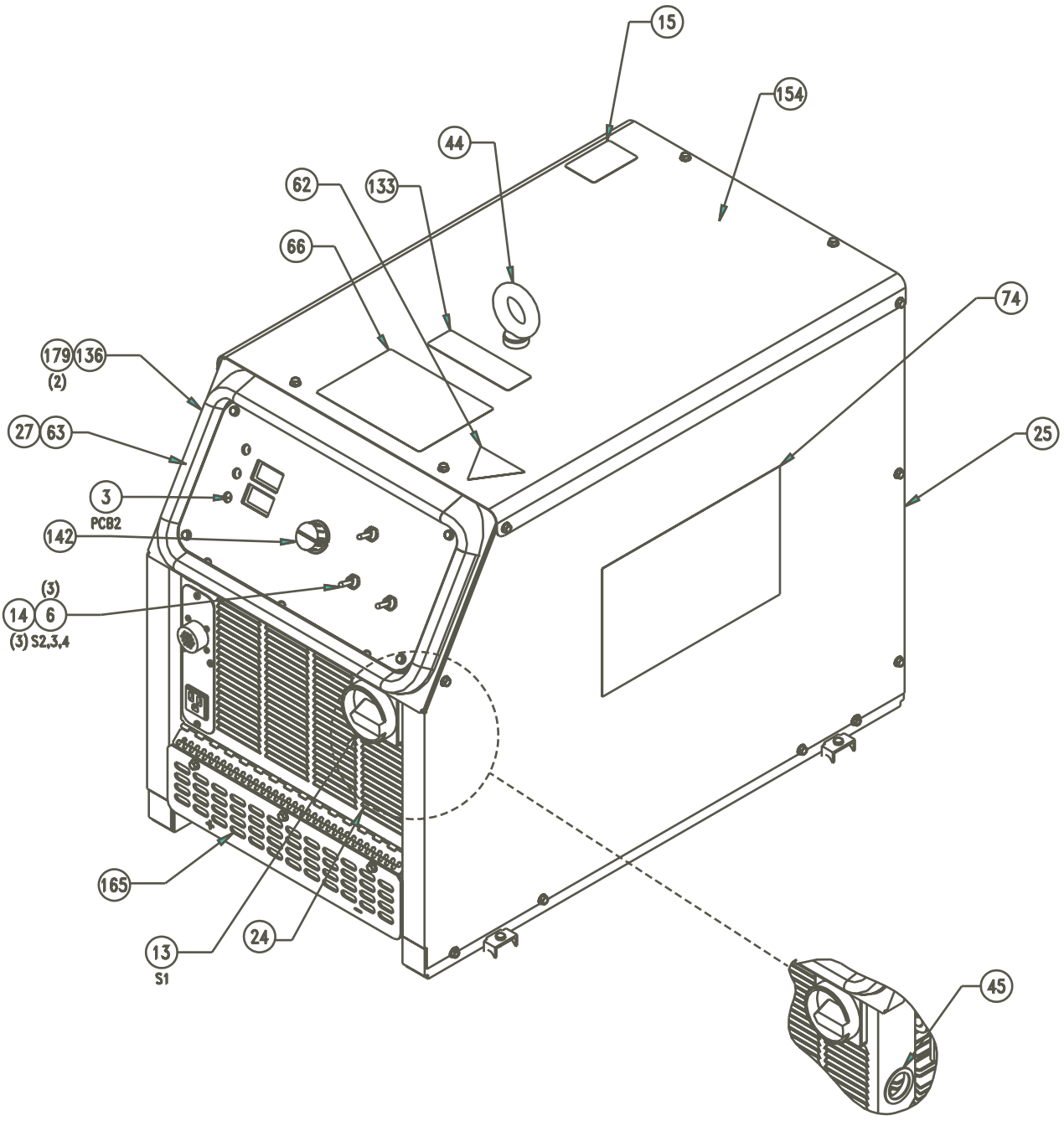
Refer to the Communications Guide located on the back page of this manual for a list of customer service phone numbers.

Note

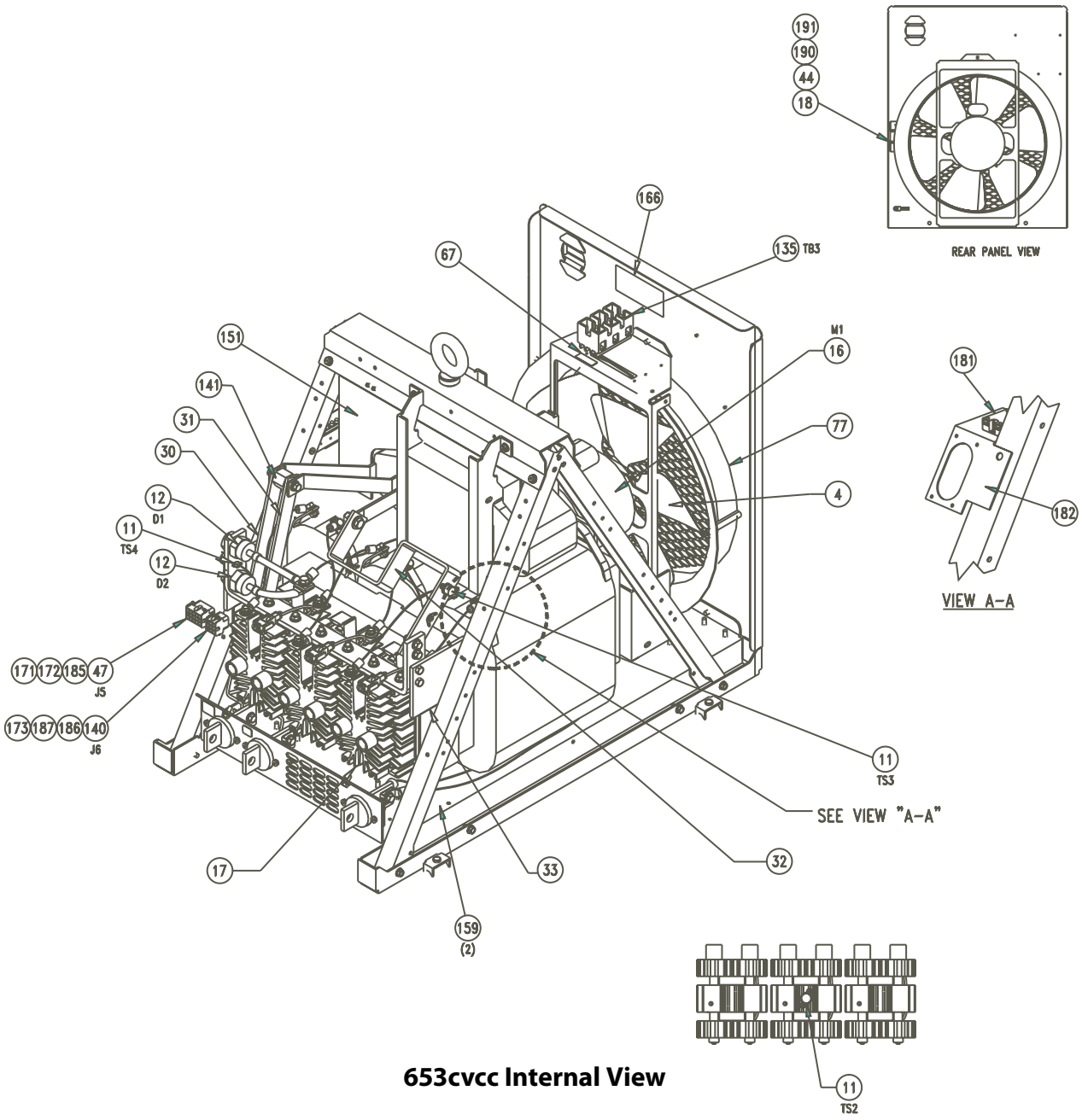
Bill of material items that have blank part numbers are provided for customer information only.
Hardware items should be available through local sources.



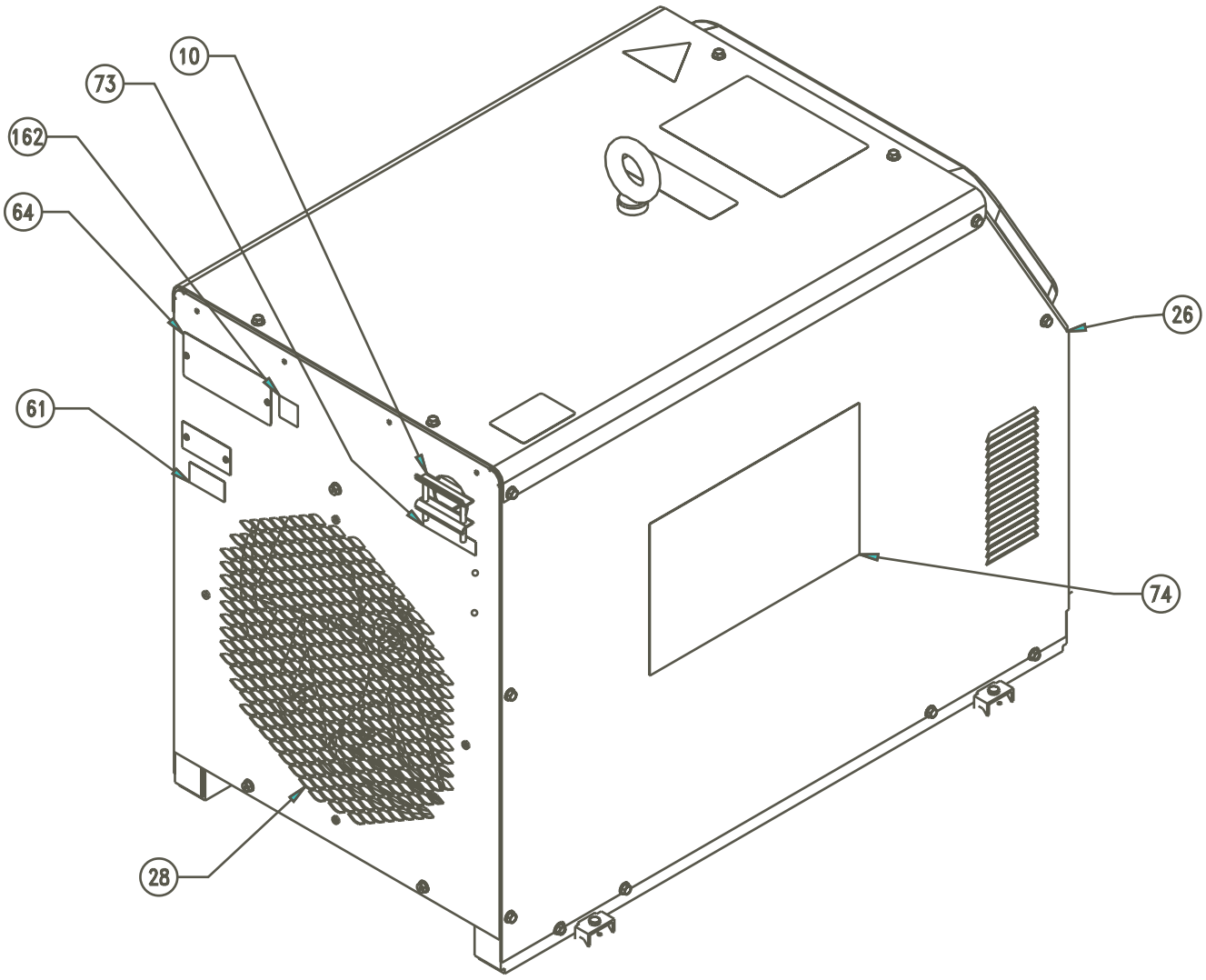
653cvcc Front Panel View



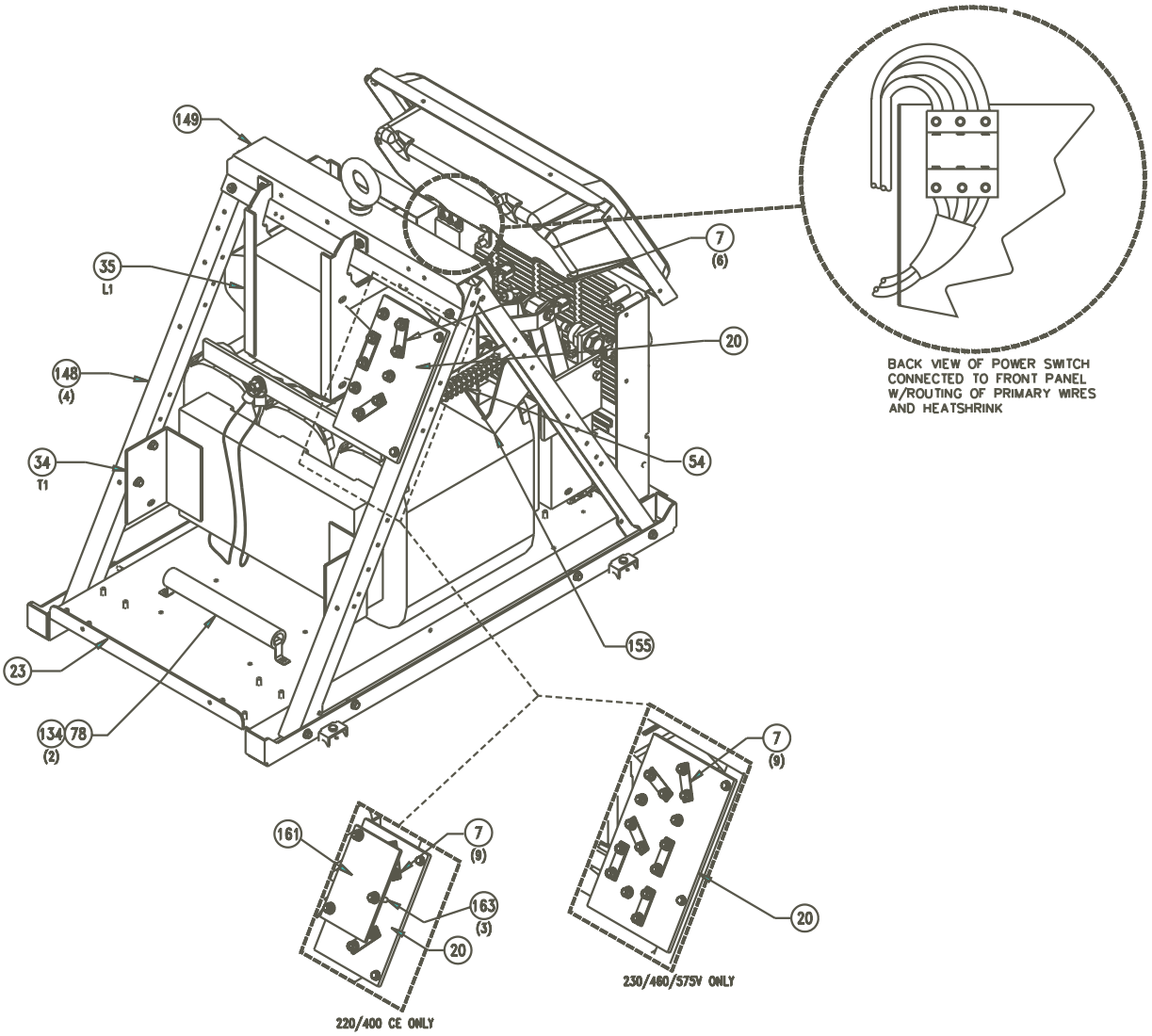
653cvcc Front Isometric View



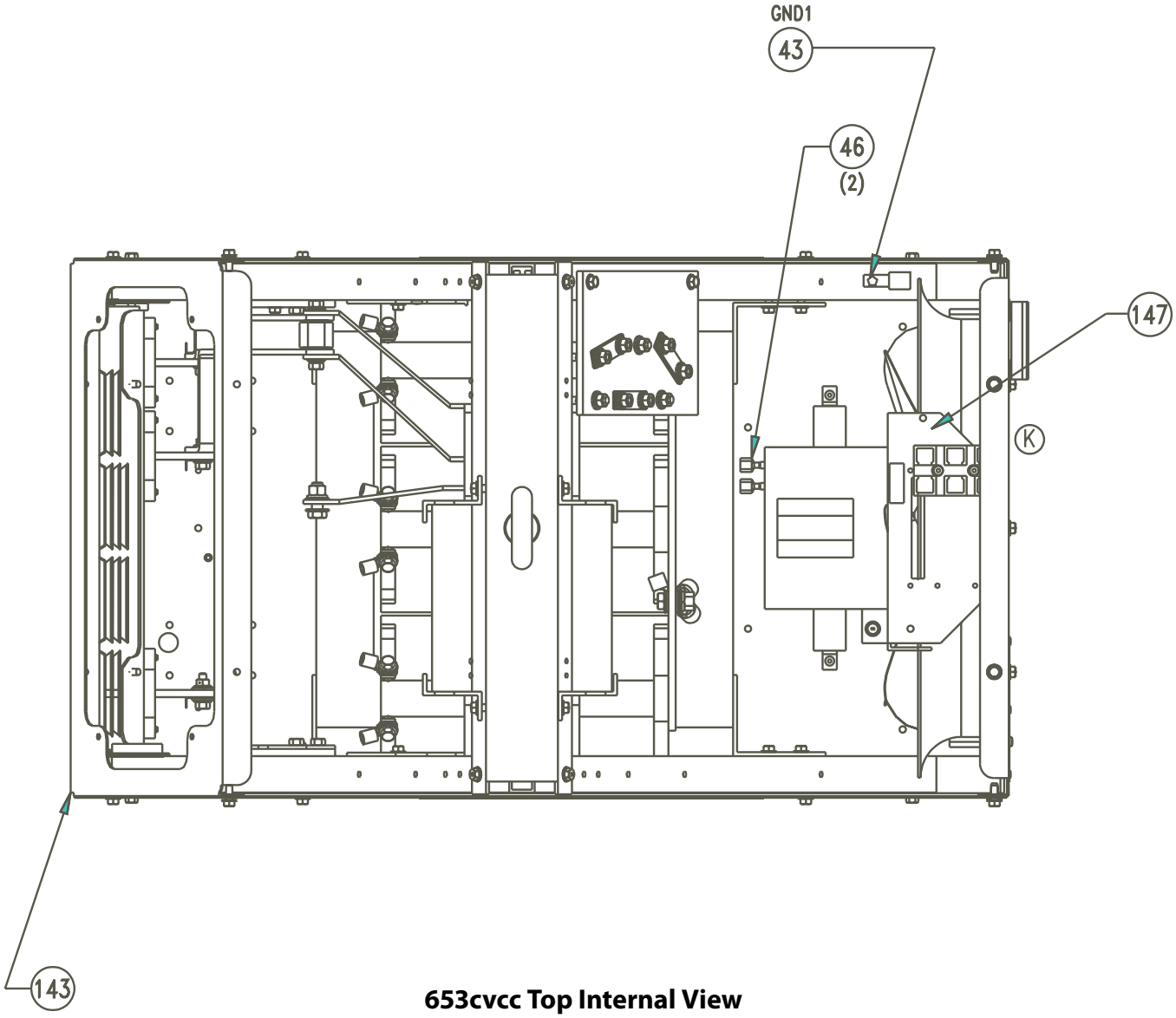
653cvcc Internal View



653cvcc Rear Isometric View



653cvcc Internal View



653cvcc Top Internal View

Bill of Materials
653cvcc DC Welding Power Source

ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION	SYMBOL
1	954838	1	LABEL SUBARC STICK	
2	954839	1	LABEL MIG	
3	36121	1	PCB DIGITAL METER	PCB2
4	36173	1	BLADE FAN 14"	
5	38130	1	PCB CONTROL	PCB1
6	634515	3	SW TGGL SPDT 2 POS 15A 125V	S2,3,4
7	672065	6	STRAP TERMINAL, VOLTAGE CHANGELINE	
8	678025	3	TERM AY OUTPUT	
9	950122	2	CKT BREAKER 10A 32VDC 250VAC	CB1,2
10	950219	1	RELIEF STRAIN 2.00	
11	950711	3	SW THERMAL 194FT	S2,3,4
12	950768	2	DIODE FWD 300V 300A	D1,2
13	950945	1	SW PWR DISC 100A 600V	S1
14	951474	3	SW SEAL BLACK	
15	954008	1	LABEL DANGER HIGH VOLTAGE	
16	2062334	1	MOTOR FAN 1/3 HP 1625RPM	M1
17	0558001024	3	SCR ASSY	
18	34149	1	CLIP ANNEALED	
20	36110	1	BOARD INPUT TERMINAL 230/460V/575	
21	36092	1	CABLE DIGITAL METER PCB	P10
23	37861M	1	BASE	
24	37862M	1	PANEL FRONT BOTTOM	
25	0558001369	1	PANEL RIGHT SIDE ENV	
26	0558001370	1	PANEL LEFT SIDE ENV	
27	0558001378	1	CONTROL PANEL BLACK	
28	37867M	1	PANEL REAR	
30	37869	1	HIGH TAP INDUCTOR BUSBAR	
31	37870	1	LOW TAP INDUCTOR BUSBAR	
32	37871	1	SHUNT	
33	37872	2	INSULATOR KYDEX	
34	37890	1	XFMR MAIN 230/460/575V	T1
35	0558006887	1	INDUCTOR	L1
36	37907	1	SCHEMATIC DIAG 653 CVCC	
37	37908	1	WIRING DIAG SEC 653 CVCC	
38	0558001044	1	WIRING DIAG PRI 3 PH AFRAME	
43	647361	1	TERMINAL LUG	
44	672786	1	BOLT EYE .75-10 X 2.00	
45	950167	1	GROMMET RUB 1.12 ID X 1.50 GD X .06 W	
46	950905	1	TERM IL/M .250 TS X 14-16 AWG	
47	951504	1	PLUG HOUSING 15 POS	J5
48	0558001013	1	CAP HOUSING 2 POSITION	
49	952067	1	CONNECTOR 20 AWG 3 PIN	P1
50	952068	1	MTA-156 COVER 3 PIN	
51	952070	1	CONNECTOR 20 AWG 7 PIN	P5
52	952071	1	MTA-156 COVER 7 PIN	
53	952072	3	CONNECTOR 20 AWG 12 PIN	P3,4,7
54	952073	1	TERM BLOCK 12 POS	
57	952209	1	PANEL RECEPTACLE 19 PIN F	J1

Bill of Materials
653cvcc DC Welding Power Source (Cont'd)

ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION	SYMBOL
58	952219	1	OUTLET 110V SQUARE	J3
61	954425	1	LABEL LR-30071 CSA NRTL/C	
62	954506	1	LABEL ISO 9002	
63	954868	1	OVERLAY 653 CVCC BLK	
64	954846	1	LABEL RATING 653 CVCC 230/460/575	
65	954830	1	LABEL SCHEMATIC 653	
66	2091514	1	LABEL WARNING WELD AND CUT	
67	2091558	1	LABEL GND BILK .50 X 1.38	
69	13730632	1	POT LIN 10K 2W .88L	
71	13731781	1	MTA-156 COVER 10 PIN	
72	13732431	3	MTA-156 COVER 12 PIN	
73	13732733	1	LABEL FOR INSTALL USSE COP WIRE	
74	13734588	1	LOGO ESAB CLEAR	
75	13735311	1	CONNECTOR 20 AWG 6 PIN	P6
76	13735312	1	MTA-156 COVER 6 PIN	
77	13735508	1	SHROUD FAN	
78	17300016	1	RES RW FIXD ST 300W 10% 16.00	
79	22993477	1	RUBBER .188 X .500	
133	99512240	1	LABEL CAUTION LIFT EYE	
134	99512558	1	BRACKET RESISTOR #18	
135	0558001010	1	TERMINAL BLOCK 3 POS	TB3
136	0558001033	1	BOX PCB BLACK	
137	0558001012	3	PLUG HOUSING 2 POS	
138	0558001014	3	SEAL WIRE 2 POS	
139	0558001015	3	SEAL INTER	
140	0558001016	1	CAP 9 POS	J6
141	0558001018	1	INSULATOR STAND OFF	
142	0558001019	1	KNOB 1.57 DIA	
143	0558001032M	1	PANEL FRONT TOP	
147	36043GY	1	BRACKET FAN	
148	36048M	4	LEG AFRAME	
149	36049M	1	BAIL LIFTING	
152	37902M	1	BLANKING PLATE	
153	37901M	1	19 AND 110V PANEL	
154	0558001371	1	PANEL TOP ENV	
155	37899	1	LOWER BAFFLE	
156	13792157		LAMP WHITE 48V	PL1
157	951754	1	LAMP LED YEL 12V	PL2
158	952610	1	LAMP LED RED 12V	PL3
161	38100	1	CE FILTER ASSY	FN1
162	954565	1	LABEL CE	
163	952223	3	STAND OFF 1/4-20 X .75	
164	0558001337		HINGE ACCESS	
166	954864	1	LABEL THREE PHASE	
171	0558001407	2	SEAL WIRE 15 POS	
172	0558001408	1	SEAL INTER 15 POS	
173	0558001406	1	SEAL WIRE 9 POS	
181	952938	1	RELAY SOLID STATE 660V 10	

Bill of Materials
653cvcc DC Welding Power Source (Cont'd)

ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION	SYMBOL
182	0558003579	1	BRACKET MOUNTING	
185	950466	1	CAP HOUSING 15 POS	
186	2062348	1	PLUG HOUSING 9 POS	
187	0558001409	1	CONNECTION INTERFACE SEAL 9	
188	950125	1	CONTACT PIN	
189	952609	1	CONN RECEPT 16 PIN TAFA	P10
193	0558002417	1	BRACKET - GROUND FAULT	
194	13730222	2	BUSHING - GROUND FAULT	
195	0558005656	1	CAP METAL PROTECTION	

NOTES

REVISION HISTORY

The "A" edition of this booklet includes a rewrite of the primary electrical connection.

The "B" edition of this booklet includes:

- Schematic and Wiring Diagrams
- Additional replacement parts

The "C" edition updated part numbers, edited graphics on pages 10 and 12 and removed references to 353cvcc Parts.

The "D" edition updated complete parts list.

The "E" edition covers the reinstallation of a Ground Fault Switch and Bracket and Ground Connection.

The "F" edition of this manual provides modifications requiring an updated display PCB, timer module, an additional PCB, mounting brackets, resistor pack and associated wiring mounted to the "A" frame support near the output rectifier bridge. These modifications are for a "fan on demand" feature. These modifications will affect serial no.'s M0RI603036 and above. Replacement Parts listings have also been updated.See dneco# 023279 & service bulletin 03_01_001.

The "G" edition of this manual updated Section 2, Front Panel showing control locations. Section 3.1 has been reconfigured to resemble the 353 & 453 manuals. Minor editorial changes have also been made. Front cover picture also updated.

The “H” revision updates the format and front cover picture (no records of the “G” revision being released, “E” revision was currently on the web & “G” was in the folder but apparently never released). Added p/n 0558005656, item 195, metal cap protection and illustration to replacement parts.

The “H” revision of 02/2006 made editorial change to reference Lincoln & Miller feeders in section 3.5.

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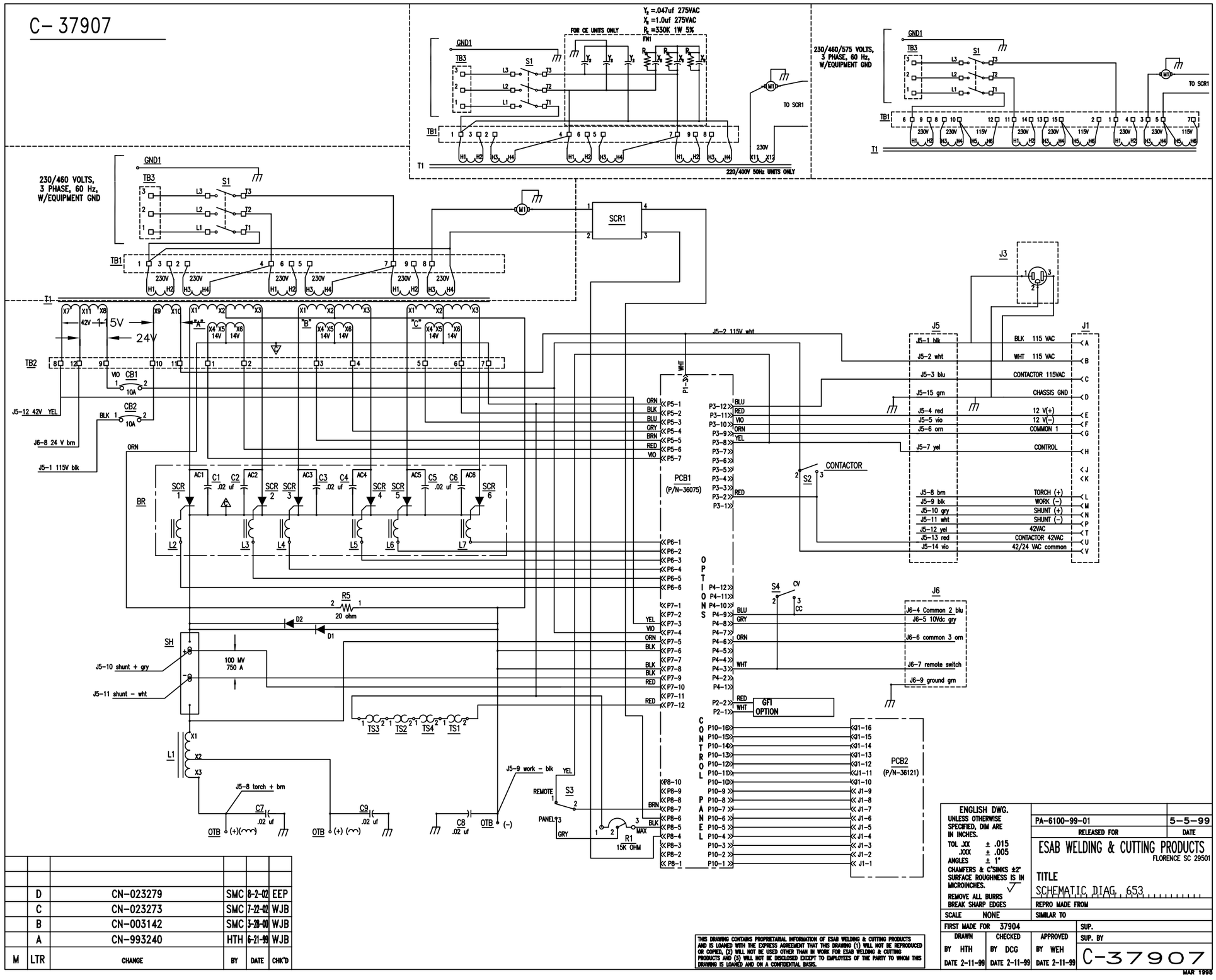

	D	CN-023279	SMC	8-2-02	EEP
	C	CN-023273	SMC	7-22-02	WJB
	B	CN-003142	SMC	3-28-00	WJB
	A	CN-993240	HTH	6-21-99	WJB
M	LTR	CHANGE	BY	DATE	CHK'D

ENGLISH DWG.
UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.
TOL .XX ± .015
.XXX ± .005
ANGLES ± 1°
CHAMFERS & C'SINKS ±2°
SURFACE ROUGHNESS IS IN MICROINCHES. ✓
REMOVE ALL BURRS
BREAK SHARP EDGES

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TITLE
SCHEMATIC DIAG, 653

REPRO MADE FROM
SIMILAR TO

SCALE NONE
FIRST MADE FOR 37904
SUP.
SUP. BY

DRAWN	CHECKED	APPROVED
BY HTH	BY DCG	BY WEH
DATE 2-11-99	DATE 2-11-99	DATE 2-11-99

C-37907

MAR 1998

D-37908

BILL OF MATERIALS

QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

SYMBOL	ITEM NO.	PART OF CODE NO.	QTY.	DESCRIPTION

T1-CX3 · PCB1-P6-2 RED · T1-BX3 · PCB1-P6-4 WHT · T1-AX3 · PCB1-P6-6 BLU · SHUNT · C5 · C6 · C3 · C4 · C1 · C2 · SCR5 · SCR6 · SCR3 · SCR4 · SCR1 · SCR2

PCB1-P6-1 RED · T1-CX1 · PCB1-P6-3 WHT · T1-BX1 · TS1 IS ON UNDER SIDE OF CENTER HEATSINK · PCB1-P6-5 BLU · T1-AX1

R5 · TB2-7 ORN

M1 · 220/400V 50Hz UNITS ONLY · 230/460V 60Hz UNITS ONLY · SCR1 · BLU · BLK

T1 · H4 · H2 · H3 · H1 · 'C' · 'B' · 'A'

X12 · X11 · X6 · X5 · X4 · X3 · X2 · X1 · TB2-6 · TB2-7 · TB2-5 · SCR 5 · SCR 6 · TB2-4 · TB2-7 · TB2-3 · SCR 3 · SCR 4 · TB2-12 · TB2-11 · TB2-10 · TB2-9 · TB2-8 · TB2-2 · TB2-7 · TB2-1 · SCR 1 · SCR 2

PCB1-P2-2 RED · PCB1-P2-1 WHT · EGCP OPTION

GND1 · TB3 · BLK · T3 BLK · T2 BLK · T1 BLK · S1 · TB1 · FN1 USED ON CE UNITS ONLY

TS4-1 WHT · TS3-2 GRY · TS2

TB2 · 12 J6-8 BRN · 11 J5-2 WHT · 10 CB2-2 BLK · 9 CB1-1 VIO · 8 J5-12 YEL · 7 · 6 PCB1-P5-2 BLK · 5 PCB1-P5-3 BLU · 4 PCB1-P5-4 GRY · 3 PCB1-P5-5 BRN · 2 PCB1-P5-6 RED · 1 PCB1-P5-7 VIO

R5-2 ORN · TS3-1 ORN

ALL COLORED WIRES THIS SIDE

OTB − · J5-9 WORK BLK · PCB1 P7-6 BLK · PCB1 P7-8 BLK · C8 · D1 · D2

TS4 · TS1-1 BLK · TS2-2 WHT

OTB + LOW IND. · C9

TS4-2 BLK · PCB1-P7-12 RED

OTB + HIGH IND. · C7 · J5-8 BRN

L1 · X2 · X1 · X3

SHUNT · J5-11 SHUNT (−) WHT · PCB1-P7-9 BLK (PART OF SH. PR.) · (−)

TB2-7 ORN · ORN · TS2-1 GRY · TS3 · R1-1 ORN · PCB1 P7-5 ORN · (+) · PCB1-P7-10 RED (PART OF SH. PR.) · J5-10 SHUNT (+) GRY

PCB1 · P1 · P2 · P3 · P4 · P5 · P6 · P7 · P8 · P9 · P10

PCB1-P7-4 VIO · CB1-2 VIO · S2 · PCB1-P4-9 BLU · J6-4 BLU · PCB1-P4-3 WHT · J6-7 WHT · J5-13 RED · PCB1-P3-2 RED · S4

S3 · J5-7 YEL · PCB1-P3-8 YEL · PCB1-P8-7 BRN

REAR VIEW

GRY · PCB1-P8-5 BLK · MAX · R1 · PCB1-P5-1 ORN · SHUNT BUS ORN

PCB1-P10 RIBBON · J1 · PCB2

TB2-10 BLK · CB2 · TB2-9 VIO · CB1 · J5-1 BLK · S2-2 VIO · J5-14 VIO

J5 · GROUND GRN · CB1-2 VIO · PCB1-P7-3 YEL · TB2-8 YEL · OTB (+) BRN · WORK (−) BLK · PCB1-P3-9 ORN · PCB1-P3-10 VIO · S2-3 RED · SHUNT (+) GRY · SHUNT (−) WHT · S3-1 YEL · PCB1-P3-11 RED · CB2-1 BLK · PCB1-P3-12 · TB2-11 WHT · PCB1-P1-3 WHT

P5 · J1-U RED · J1-V VIO · J1-N GRY · J1-P WHT · J1-H YEL · J1-L BRN · J1-E RED · J1-F VIO · J1-A BLK · J3-1 BLK · J3-B WHT · J3-3 WHT · J3-C BLU · GND GRN · J1-T YEL · J1-M BLK · J1-G ORN

P5-15 GRN · J1 · P5-6 ORN · P5-7 YEL · P5-14 VIO · P5-12 YEL · P5-13 RED · P5-8 BRN · P5-9 BLK · P5-1 BLK · P5-5 VIO · P5-4 RED · GROUND GRN · P5-3 BLU · P5-11 WHT · P5-2 WHT · P5-10 GRY · GROUND GRN · P5-1 BLK · J3 · P5-2 WHT

PCB1

P1	P2	P3	P4	P5	P6	P7	P8	P10
1	1 GFI-1 BLK	1	1	1 R1-1 ORN	1 SCR-6 RED	1	1	1-16 PCB2-J1 RIBBON
2	2 GFI-2 RED	2 S2-3 RED	2	2 TB2-6 BLK	2 SCR-5 RED	2	2	
3 J5-2 WHT	TWISTED PAIR	3	3 S4-2 WHT	3 TB2-5 BLU	3 SCR-4 WHT	3 J5-12 YEL	3	
		4	4	4 TB2-4 GRY	4 SCR-3 WHT	4 S2-2 VIO	4 SCR1-3 RED	
		5	5	5 TB2-3 BRN	5 SCR-2 BLU	5 SHUNT BUS ORN	5 R1-3 BLK	
		6	6 J6-6 ORN	6 TB2-2 RED	6 SCR-1 BLU	6 OTB (−) BLK	6 SCR1-4 GRY	
		7	7	7 TB2-1 VIO		7	7 S3-2 BRN	
		8 S3-1 YEL	8 J6-5 GRY			8 OTB(−) BLK	8	
		9 J5-6 ORN	9 S4-3-BLU		TWISTED PAIR	9 SH(−) BLK	9	
		10 J5-5 VIO	10			10 SH(+) RED	10	
		11 J5-4 RED	11			11		
		12 J5-3 BLU	12			12 TS1-2 RED		

TB2-12 BRN · J6 · S4-2 WHT · GROUND GRN · PCB1-P4-8 GRY · S4-3 BLU · PCB1-P4-6 ORN

NOTES:
1. ✱ = SELF LEADS

M	LTR	CHANGE	BY	DATE	CHK'D
	C	CN-023279	SMC	8-5-02	WJB
	B	CN-003142	SMC	3-26-98	WJB
	A	CN-993149	HTH	5-26-99	WJB

ENGLISH DWG. UNLESS OTHERVISE SPECIFIED, DIM ARE IN INCHES. TOL. .XX ±, .XXX ±, ANGLES ±. CHAMFERS & C'SINKS 42°. SURFACE ROUGHNESS IS IN MICROINCHES. REMOVE ALL BURRS BREAK SHARP EDGES

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DRAWN	CHECKED	APPROVED	SUP.
BY HTH	BY DCG	BY WH	SUP. BY
DATE 3/2/99	DATE 3/2/99	DATE 3/2/99	

D-37908

OCT 1998