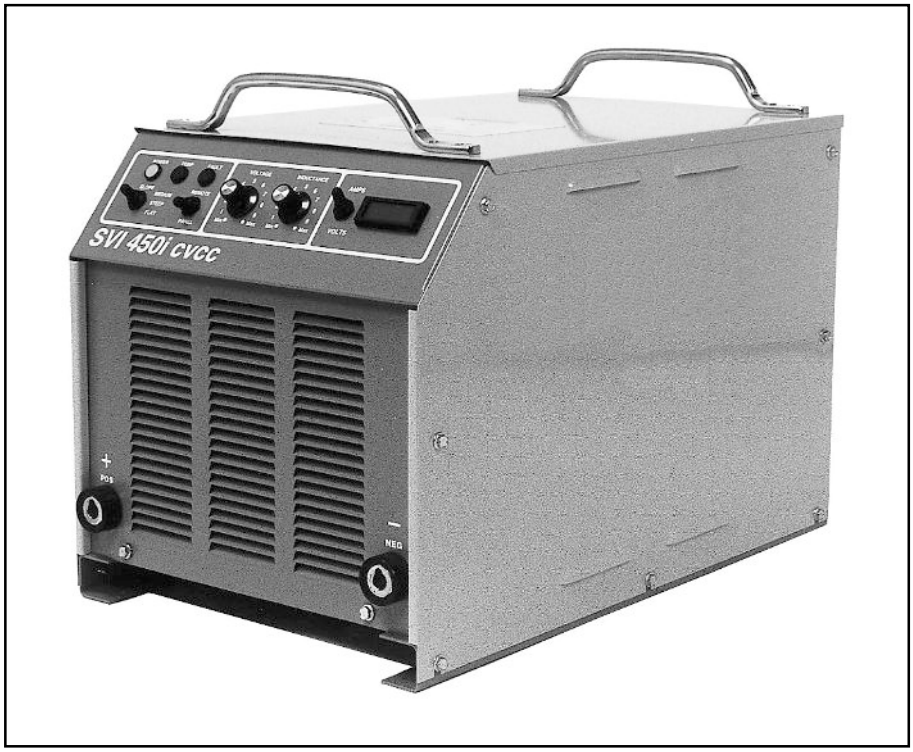
F15-071-D
December, 2003

INSTRUCTION MANUAL

SVI 450i cvcc
Power Source



This manual provides installation and operation / maintenance and troubleshooting instructions for the following units:

ESAB P/N 31950 - 208/230/460 V ac, 1 or 3 Phase, 60 Hz
ESAB P/N 31955 - 575 V ac, 3 Phase, 60 Hz (Refer to Supplement F-15-072.)
ESAB P/N 31960 - 220/380/415 V ac, 3 Phase, 50 Hz (Refer to Supplement F-15-073.)
L-TEC P/N 35618 - 220/380/415 V ac, 3 Phase, 50 Hz (Refer to Supplement F-15-073.)

CAUTION

These INSTRUCTIONS are for experienced operators. If you are not fully familiar with the principles of operation and safe practices for arc welding 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.

Be sure this information reaches the operator.
You can get extra copies through your supplier.

ESAB Welding &
Cutting Products

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. Defective 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 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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SAFETY PRECAUTIONS

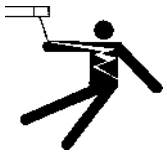
WARNING: These Safety Precautions are for your protection. They summarize precautionary information from the references listed in Additional Safety Information paragraph. Before performing any installation or operating procedures, be sure to read and follow the safety precautions listed below as well 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-sleeved 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.

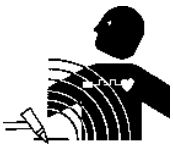
FIRES AND EXPLOSIONS -- Heat from flames and arcs can start fires. Hot slag or sparks can also cause fires and explosions. Therefore:

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 can cause severe injury or death. Do NOT use AC output in damp areas, if movement is confined, or if danger of falling exists. Put on dry, hole-free gloves before turning on the power. Also:

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 the operator 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. Fix water leaks immediately.
6. Make sure that you are well insulated, especially when standing on metal or working in tight quarters or in a damp area. Wear rubber-soled shoes and stand on a dry board or insulating platform.
7. Turn off the power before removing your gloves.
8. Refer to ANSI/ASC Standard Z49.1 (see listing below) 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.

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."

This symbol appearing throughout this manual means **Attention! Be Alert! Your safety is involved.**

The following definitions apply to DANGER, WARNING, CAUTION found throughout this manual:

DANGER Used to call attention to immediate hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.

WARNING Used to call attention to potential hazards which could result in personal injury or loss of life.

CAUTION Used to call attention to hazards which could result in minor personal injury.

1.1 INTRODUCTION

The SVI 450i cvcc is a high performance constant voltage (cv)/constant current (cc) 450-ampere industrial inverter power source that is designed with adjustable output (voltage or current), slope, and inductance. Exclusive power MOSFET inverter technology combined with solid state electronics provides state-of-the-art, multi-process welding performance including MIG (short arc, spray arc, cored wire), Stick, TIG, and air carbon arc gouging. The SVI 450i cvcc offers all this versatility and performance in one compact power source.

The power source is designed to operate in the cv mode for outstanding MIG short arc performance as well as MIG spray-arc and cored wire welding. It is compatible with ESAB's full line of digital and conventional wire feeders for unmatched accuracy and performance.

The constant current mode for Stick, TIG (scratch-start), and air carbon arc gouging applications is provided by connecting one of the remote control devices and selecting the cc process mode.

The power source's electronic output (voltage or current) adjustment provides full-range regulation either locally from the front panel or from a remote control. A convenient panel-mounted digital meter provides selectable output voltage or current readings for welding accuracy. The panel-mounted 3-step slope selector and variable inductance control allows the operator to select the optimum cv slope/curve characteristic and/or inductance condition required for your MIG welding application. Refer to table 1-1 for specifications.

1.2 OPTIONAL ACCESSORIES

A. To avoid duplication of MIG accessories which may or may not be required for the various MIG systems, please refer to the individual wire feeder or control instruction booklets provided for your system.

B. For applicable Stick/TIG accessories, refer to figure 2-3 and/or the following:

1. TC-2B Torch Controls (30 ft lg), P/N 33839
2. FC-5B Foot Control (30 ft lg), P/N 33646
3. FC-5B EHD (Extra Heavy Duty) Foot Control (30 ft lg), P/N 33841
4. HC-3B Hand Control (30 ft lg), P/N 33838
5. HC-4B Hand Control w/Arc Force (30 ft lg), P/N 33840
6. Ultra-Pulse 450i Mig Pulse Pendant Control, P/N 34946. Easy to use synergic pulse control automatically provides precise parameters for pulsed MIG welding. Must be used with Mig 4HD wire feeder. (Control cable (8 ft lg) included.)
7. Cart, P/N 31700. Provides complete mobility for power source, wire feeder, gas cylinder(s)/ water cooler (vertical).

Table 1-1. SVI 450i cvcc Specifications

Input Voltage	208 V ac, 1 or 3 phase, 60 Hz	230 V ac, 1 or 3 phase, 60 Hz	460 V ac, 3 phase, 60 Hz
Input Current @ Rated Load	80 A	65 A	40 A
Open Circuit Voltage	72 V dc		
Rated Output @ 60% Duty Cycle	450 A @ 38 V dc, 3 phase 275 A @ 31 V dc, 1 phase	450 A @ 38 V dc, 3 phase 275 A @ 31 V dc, 1 phase	450 A @ 38 V dc, 3 phase 275 A @ 31 V dc, 1 phase
Dimensions			
width length height	15.25" (385 mm) 24.25" (616 mm) 15.75" (400 mm) + 2" (51 mm) for handle		
Shipping Weight **Net Weight**	172 lbs (78 kg) 161 lbs (74 kg)		

2.1 GENERAL

Proper installation will contribute to safe, satisfactory, and trouble-free operation of the welding setup. It is suggested that each step in this section be studied carefully and followed as closely as possible.

2.2 UNPACKING AND PLACEMENT

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

B. After removing the components from the shipping container(s), check the container(s) for any loose parts. Remove all packing materials.

C. Check air passages of power source for any packing materials that may obstruct air flow through the power source.

D. If the equipment is not to be installed immediately, store it in a clean, dry, well-ventilated area.

E. The location of the power source should be carefully selected to ensure satisfactory and dependable service. Choose a location relatively close to a properly fused supply of electrical power.

F. The power source components are maintained at proper operating temperatures by forced air drawn through the cabinet by the fan unit on the rear panel. For this reason, it is important to locate the power source in an open area where air can circulate freely at the front and rear openings. If space is at a premium, leave at least 1 foot of clearance between the rear of the power source and wall or other obstruction. The area around the power source should be relatively free of dust, fumes, and excessive heat. It is also desirable to locate the power source so the cover can be removed easily for cleaning and maintenance.

2.3 INPUT POWER CONNECTIONS

The SVI 450i power source must be connected to a "clean-unloaded" supply power line. An unloaded line is essential for good performance and lessens the chance of nuisance (fault) tripping or damage due to transients caused by other equipment loads such as resistance welders, punch presses, large electric motors, etc.

If nuisance tripping caused by transients becomes a problem, ESAB has a "primary line conditioner" (P/N 15983) which may be added to filter out transient voltages . Contact your distributor for details. Please note that the conditioner will not correct for sustained line voltages which exceed the limits of its rated voltage inputs.

The power source is designed to provide line voltage compensation within 10 percent of the rated 208/230/460-volt input to maintain its rated output and protect its power electronics. If these limits are exceeded, serious damage to the power source could occur. Therefore, prior to installation, it is suggested that the proposed line circuit be checked with a meter at two or three different time periods of the day to make sure the power load does not exceed the power source's input limits. If input power cannot be maintained within the 10 percent limits, consult your local power company or call ESAB for possible solutions.

Electric shock can kill! Precautionary measures should be taken to provide maximum protection against electrical shock. Be sure that all power is off by opening the line (wall) disconnect switch when primary electrical connections are made to the power source. To be doubly safe, check your input leads with a voltmeter to make sure all power is off.

A. A line (wall) disconnect switch, with fuses or circuit breakers, should be provided at the main power panel (see Figure 2-1). The customer may either use the factory-supplied input power cable (No. 6 AWG, 4/c, type SO (90 °C), 12-ft lg) or provide his own input power leads. The primary power leads should be insulated copper conductors and include two (1 phase) or three (3 phase) power leads and one ground wire. The wires may be heavy rubber-covered cable or run in a solid or flexible conduit. Refer to table 2-1 for recommended input conductors and line fuse sizes.

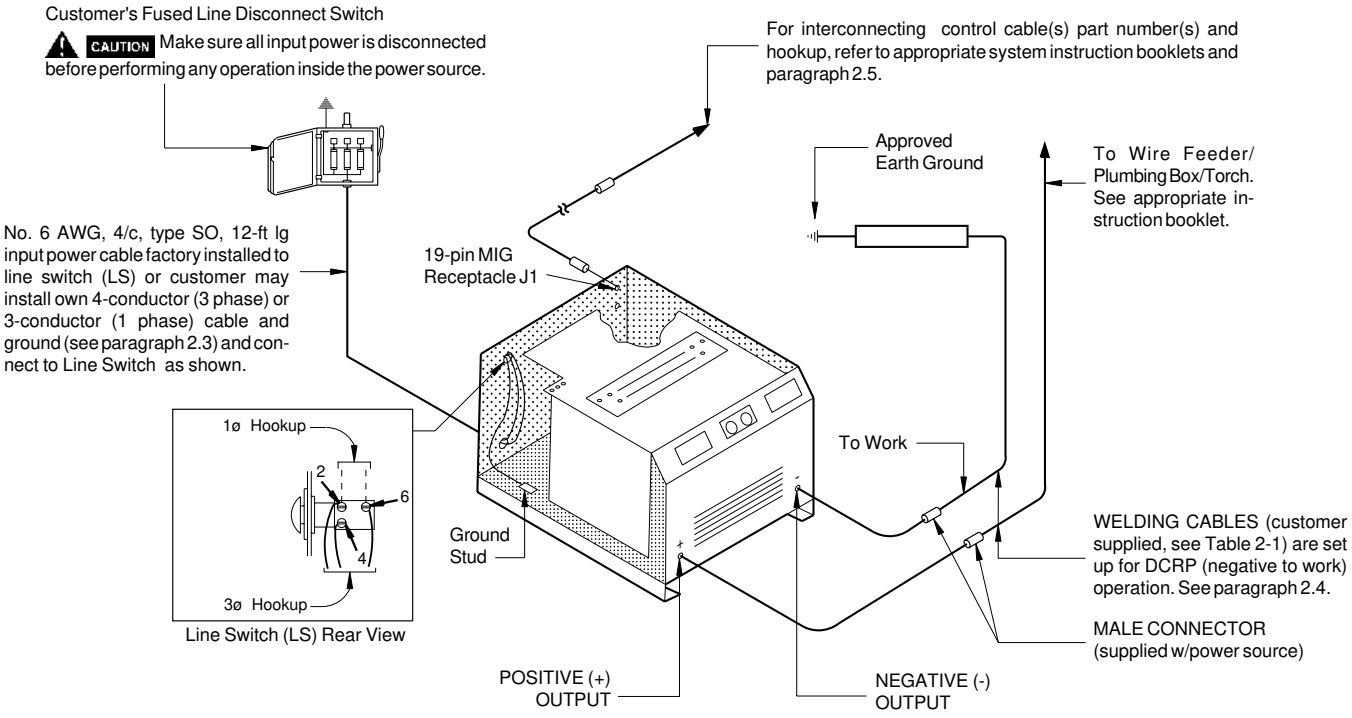


Figure 2-1. Input Power and MIG Interconnection Diagram

Table 2-1. Recommended Sizes for Input Conductors and Line Fuses

Rated Load		Input & Gnd. Conductor*	Time-Delay Fuse Size
Volts	Amps	CU/AWG	Amps
208	80	6	90
230	65	6	80
460	40	8	60

* Sizes per National Electric Code for 90 °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 above.

B. As shipped, the power source is set up for 460-volt input power. If using 208- or 230-volt input, two links on the input terminal board (located inside the power source) must be repositioned as marked on the plate (see Figure 2-2). The input terminal board connections will be visible after removing the top cover.

C. The factory-supplied input power cable is connected to the power source ON-OFF switch. However, if customers wish to connect their own input power leads, proceed as follows: With the top cover and left side panel removed, thread the input conductor cable from the wall disconnect switch through the strain relief hole in the rear panel. Connect the primary leads to the Line Switch (LS) for either single- or 3-phase input and the ground lead (green) to the stud on the base of the unit as shown in figure 2-1. After making sure the connections are secured, tighten the strain relief coupling to secure the input cable.

WARNING

It is of the utmost importance that the chassis be connected to an approved electrical ground to prevent accidental shock. Take care not to connect the ground wire to any of the primary leads.

D. Recheck all connections to make sure they are tight, well insulated, and properly connected.

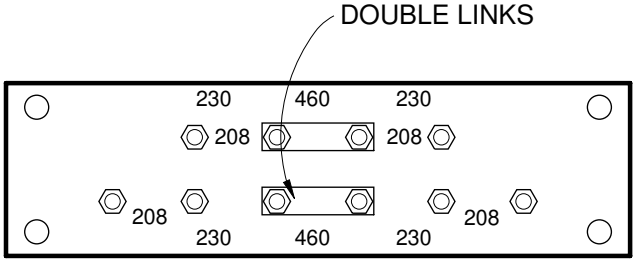


Figure 2-2. Input Voltage Terminal Board (TB) Connections

2.4 OUTPUT WELDING CONNECTIONS

DANGER

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

A. **MIG Setup (see Figure 2-1).** This power source is designed to provide MIG welding operating characteristics only when the J2 control receptacle is "vacant" (meaning no accessories are plugged in) or, if the remote HC-3B or HC-4B hand control is plugged in. The process switch must be set in the CV-MIG position for conventional wire feeders or in the DIGITAL-MIG (center) position for Digimig/Digimatic controls. Additionally, proper operation of the power source depends on the use of copper output cables that are insulated, of adequate size, in good condition, and properly connected to the machine using the jack plug connectors provided with the power source. It is recommended that only 4/0 welding output cable be used, regardless of length and current, and that these cables be kept as short as possible. (Total length including work and electrode leads should not exceed 100 feet. Beyond this distance, there will be performance deterioration. Consult with the factory if you have an application of this nature.)

Pay particular attention to high resistance in the welding circuit; specifically, the work cable/circuit and water-cooled torch cable. It is recommended that the power source/wire feeder and workpiece be placed as close together as possible to limit resistance in the welding circuit. High resistance in the welding circuit can cause performance deterioration (loss of "heat" input, popping of weld puddle, bushy arcs, etc.). Ensure the work cable is large enough, kept as short as possible, properly insulated, securely connected to the workpiece, and that all connections are clean and tightly secured. If a separate work circuit is used (such as in mechanical fixturing, shipbuilding, robot fixturing, etc.), make sure the work circuit is secure and presents a low resistance path to the flow of welding current. Also, the power cable on a water-cooled torch is normally subject to gradual deterioration and increased resistance due to corrosion. This leads to poor performance as described above.

To ensure good torch performance, periodically replace the water-cooled power cable.

The welding output receptacles are located on the front panel; one negative (-) and one positive (+) receptacle. Two male plug connectors (P/N 950693) are supplied with the power source for attachment to customer supplied 4/0 welding cables (see Table 2-1 and Figure 2-1). This power source is designed for conventional and digital MIG applications using Direct Current Reverse Polarity (DCRP) setup. In a DCRP setup, the torch or electrode is positive (+), and the workpiece is negative (-).

B. **Stick/Scratch-Start TIG/ Arc Gouging Setup (see Figure 2-3).** These processes require constant current (cc) type curve characteristics for proper operation. These characteristics are only provided when one of the remote accessories (FC-5B, TC-2B) is plugged into the J2 receptacle or when the remote HC-3B or HC-4B hand control is connected to J2 and its process switch is set in the CC-TIG/Stick position. Select the desired welding mode, accessories, and polarity as shown in figure 2-3. The output cables may be connected for DCRP or DCSP; meaning that for a DCRP setup, the electrode holder/torch is POS (+) and the work is NEG (-); whereas for a DCSP setup, the electrode holder/torch is NEG (-) and the work is POS (+).

WARNING

Regardless of your secondary welding cable setup (DCRP or DCSP), in order to prevent electrical shock, it is necessary that you connect the workpiece to an approved electrical (earth) ground. The work cable lead is not a ground lead. It is used to complete the welding circuit between the power source and the workpiece. This connection (at the workpiece) must be made to a clean, exposed metal surface that is free of paint, rust, mill scale, etc. A separate connection is required to ground the workpiece to an approved earth ground. The work cable should be the same rating as the torch/electrode cable lead.

Proper operation of the power source depends to a great extent on the use of copper output cables that are insulated, adequately sized, in good condition and properly connected to the machine using the jack plug connectors provided. It is recommended that the output cables be kept as short as possible, placed close together, and be of adequate current carrying capacity. The resistance

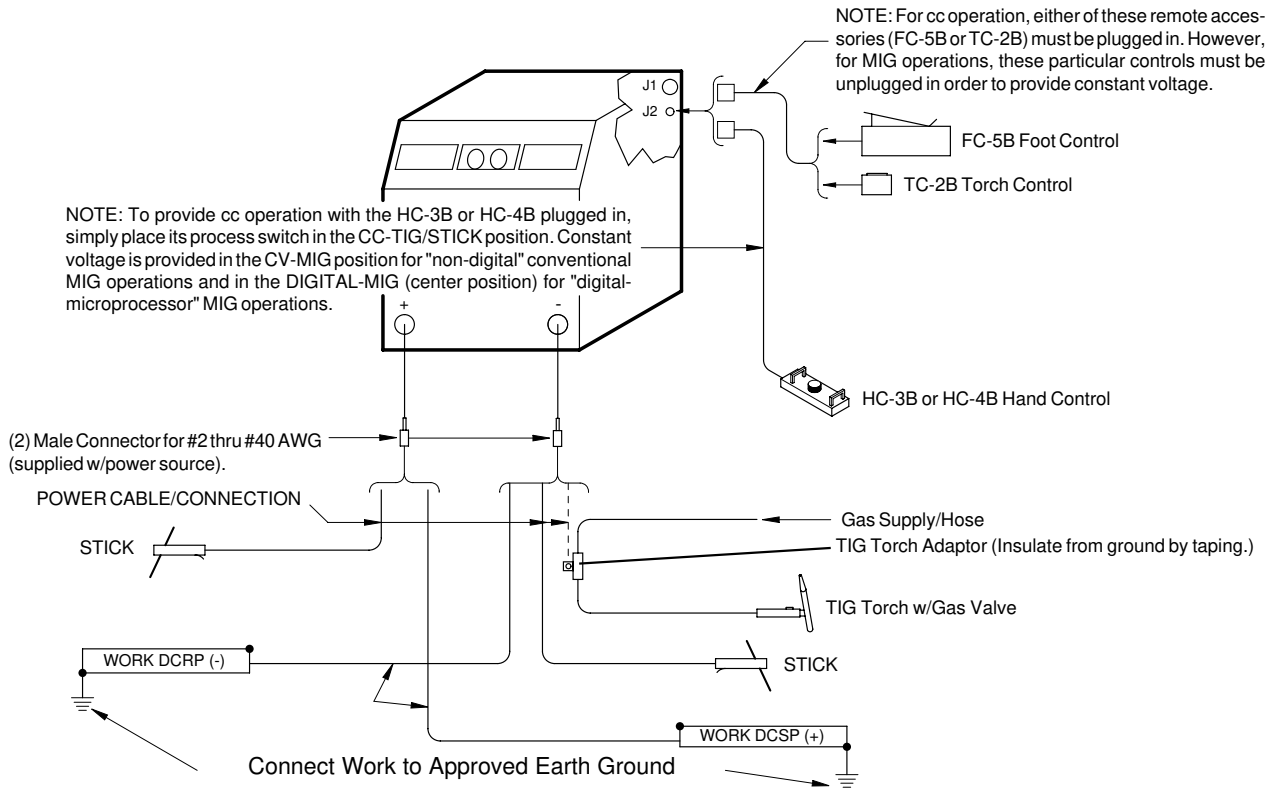


Figure 2-3. Stick/Scratch-Start TIG/Carbon Arc Gouging Interconnection Diagram

of the output cables and connections cause a voltage drop which is added to the voltage of the arc. Excessive cable resistance can reduce the maximum current output of the power source. Refer to table 2-2 to select the recommended output cable size.

Table 2-2. Recommended Welding Cable Sizes

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

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

** Cam-Lock jack plug connectors will not accept smaller than No. 2 gauge cable. Also, remember that for MIG-Pulse conditions we recommend only 4/0 cable be used due to pulse-peak currents.

2.5 MIG CONTROL (J1) INTERCONNECTION

IMPORTANT

In order to provide MIG welding (cv) operating characteristics, make sure that the J2 Remote Control receptacle is either "vacant" (meaning no remote accessories are plugged-in) or, if the HC-3B or HC-4B hand control is plugged in, its process switch must be set in the CV-MIG position for conventional non-digital wire feeders or in the DIGITAL-MIG (center) position for digital-microprocessor type feeder/controls.

Please note that all control cable functions for MIG operations must be connected through control receptacle J1 (19-pin amphenol) on the rear panel (see Figure 2-1). Additionally, if remote voltage control for "non-digital" conventional feeder/controls (only) is desired, you can also plug in the HC-3B or HC-4B hand control accessory to Remote Control receptacle J2 to provide this function (see paragraph 2.6).

To make the control interconnections for various MIG equipment controls, select from the appropriate cable assemblies listed on table 2-3.

Table 2-3. Control Interconnection Cables

Cable Lengths	Wire Feeders		
	Mig 35	Mig 2E and Mig 4HD	Digimig, Digimig Dual, and Digimatic II
6-ft (1.8 m)	P/N 31829	--	P/N 30686
30-ft (9.1 m)	P/N 31830	P/N 34378	P/N 30780
60-ft (18.3 m)	P/N 31831	P/N 34377	P/N 30781

2.6 ADDITIONAL REMOTE CONTROL (J2) INTERCONNECTION

A. For non-digital conventional MIG operations. This 8-pin remote control receptacle (J2) can be used to provide full-range remote voltage regulation from the HC-3B or HC-4B hand control. Note that the power source's Panel/Remote switch must be set to REMOTE to provide this feature. When connected, the HC-3B's or HC-4B's process switch must be set to its CV-MIG position to provide constant voltage (cv) operation and voltage regulation from its potentiometer. Also remember that the contactor switch is nonfunctional for this process — contactor control is provided by the torch switch through receptacle J1.

B. For Stick, TIG, or Arc Gouging operations (see Figure 2-3). These processes require constant current (cc) characteristics for proper operation, and this is only provided when one of the remote control accessories (FC-5B or TC-2B) is connected to receptacle J2, or when the HC-3B or HC-4B hand control is connected to J2 and its process switch is set in the CC-TIG/STICK position. Note that the power source's Panel/Remote switch must be set to REMOTE to provide current regulation and/or contactor control at the welding location. When the FC-5B foot or TC-2B torch accessory is connected, full-range current regulation and contactor control are available from the remote accessory.

When the HC-3B hand control is connected, the process switch must placed in the CC-TIG/STICK position to set up the power source for constant current operation. Remote current regulation is provided from the CURRENT potentiometer. The CONTACTOR control switch must be placed in the ON position to provide welding power to the torch/electrode.

If the HC-4B hand control is connected, you must place its Process switch in the CC position to set up the power source for constant current operation. Remote current regulation (up to full range) is provided from the CURRENT control potentiometer. The CONTACTOR control switch must be placed in the ON position to provide welding output current to the torch/electrode. The HC-4B also incorporates two additional control features; a TIG/Stick selector and an Arc Force potentiometer that functionally operates in the STICK mode. The TIG and Stick modes provide the same cc type volt-ampere curve characteristic; however, the slope of the STICK curves can be further adjusted by regulating the Arc Force control pot. The lower Arc Force settings provide less short circuit current and a softer, more stable arc; whereas the high settings provide more short circuit current and a forceful, more penetrating arc.

3.1 INTRODUCTION

This section is intended to familiarize personnel with the operational procedures applicable to the SVI 450i cvcc power source. Information contained in this section should be read carefully before operation of the power source.

WARNING

Never, under any circumstances, operate the power source with the cover or side panels removed. In addition to the safety hazard, improper cooling may cause damage to internal components. Also make sure you are adequately protected before welding. Welding helmet, gloves, safety glasses, and ear protection should always be worn.

3.2 DUTY CYCLE

Duty cycle is defined as the ratio of load time to total time. Standard current ratings are based on a 10-minute cycle. The SVI 450i cvcc power source has a 60% duty cycle rating which allows 450 amperes @ 38 V dc (see Figure 3-1). The 60% duty cycle rating means that the 450-ampere rated load can be applied for a total of 6 minutes and shut off for a total of 4 minutes in a 10-minute period. If the welding current is decreased, the duty cycle can be increased. Conversely, if the welding current is increased, the duty cycle must be decreased.

3.3 VOLT-AMPERE (SLOPE) CHARACTERISTICS

The curves shown in figure 3-2 represent the volt-ampere static characteristics for the power supply in the MIG (cv) and TIG (cc) modes. The slant of these curves is referred to as the 'slope' and is generally defined as the 'voltage drop per 100 amperes of current rise.' These curves show the output voltage available at any given output current between the minimum and maximum settings of the voltage/current control. Typical curves are shown for other settings between the minimum and maximum curves. Because the volt-ampere slope is fixed, it is possible to select optimum welding conditions by approximating the open-circuit voltage required for a particular load current.

If you require greater slope (shown as dotted curves at maximum setting) for your MIG welding applications, you may change the slope switch position located on the front panel. The static volt-ampere slope is not affected by the inductor rheostat setting. For welding aluminum or stainless steel, the steeper slope settings are recommended.

Important Digimig/Digimatic *Operational Note*

All ESAB microprocessor-type wire feeder/controls are designed to provide good arc starts with power supplies that utilize a FLAT-SLOPE volt-ampere curve characteristic. Since this power supply also allows you to select a MEDIUM or STEEP slope characteristic, you may have to readjust the microprocessor's factory-set "starting" characteristics to provide the best arc-starts possible using the "steeper" volt-ampere curves. The procedures required to recalibrate the microprocessor "hot-start" characteristics are provided in all of the appropriate Digimig/Digimatic instruction booklets.

3.4 POWER SOURCE WELDING CONTROLS

A. On-Off Line Switch (LS). Placed in the ON position, this switch (located on the rear panel) provides primary input power to start the cooling fan motor and energize the secondary control circuitry. Power light (PL1) on the front panel should illuminate.

B. Digital Voltmeter/Ammeter (DPM) and Selector (SW2). This instrument provides direct digital reading of open-circuit or welding, or welding current depending on the position of the VOLT/AMP selector switch.

C. Troubleshooting Lights.

1. **Temperature (PL2).** This will light if components in the power source overheat. The contactor will then deenergize. Allow the power source to cool with the line switch in the ON position (the fan will help cool the power source) before continuing welding operations when light goes off.

2. **Fault (PL3).** This light functions as a visual detector for two specific fault conditions: overcurrent or over/undervoltage indication. In either case, if a fault is detected in the inverter bridge, the contactor will deenergize and the power source will stop welding. If an overcurrent condition caused the problem, the fault light will energize and remain "steady-on." Do not attempt to restart welding (refer to Section 5). If an over or undervoltage condition occurs, the fault light will flash. Since this can often be caused by a transient, retry the torch switch to resume welding. If tripping continues, stop and refer to section 5.

D. Voltage Control Potentiometer (VCP). This control sets and regulates the desired amount of welding voltage required for your operation. The panel-faced dial surrounding the control knob provides a convenient reference for resetting prior welding conditions. Note that the Panel/ Remote switch must be in the PANEL position when this control (VCP) is used.

E. Panel/Remote Control Switch (SW1). This switch determines the location from which welding voltage will be regulated. In the PANEL position, full-range voltage is controlled by setting the Voltage Control Potentiometer (VCP) on the power supply — if desired, this position may be used for non-digital (conventional) wire feeder voltage control. In the REMOTE position, full range voltage control is regulated either from the J1 receptacle for mechanized controls or digital-microprocessor type (Digimig/Digimatic) feeder controls, or from the J2 receptacle for non-digital (conventional) feeder controls using the remote accessory hand or torch controls.

The REMOTE position is also required to provide full range "current" control from the J2 receptacle using the remote accessory hand, foot or torch controls for the Stick/TIG/Gouging processes.

F. Slope Control Switch (SW3). This 3-position switch sets the slope of the volt-ampere curve characteristic in the MIG (cv) mode — this control feature is bypassed in the TIG/Stick (cc) mode. Slope positions (top-to-bottom) are as shown in table 3-1.

Table 3-1. Slope Positions

Switch Position	Process/Material	Slope
MEDIUM	Short Arc/MS/AL	3 V/100 A
STEEP	Short Arc/MS,AL,SS	6 V/100 A
FLAT	Spray Arc	1 V/100 A

G. Inductance Control Potentiometer (ICP). This control allows the operator to set and regulate the desired amount of inductance required for standard MIG short arc welding operations. Variable control allows the operator to fine tune the inductance needed to make the weld puddle more fluid and minimize the weld spatter produced during MIG short arc applications. When short arc welding stainless steel, high values of inductance should be used with A1025 helium rich shielding gas. This potentiometer should be set to minimum for all pulse and standard spray arc welding applications.

H. Digital MIG Control Receptacle (J1). This 19-pin remote control receptacle receives a mating connector from the MIG/Digimig wire feeder or other mechanized MIG controls (see Figure 2-1).

I. TIG/Stick Control Receptacle (J2). This 8-pin remote control receptacle, located on the rear panel, receives a mating connector from the remote control accessories (see Figure 2-3).

J. Reset Circuit Breaker (CB). A 10-ampere circuit breaker (on the rear panel) provides protection to the 115-volt control circuit. If an overload occurs, the breaker will trip and suspend all operation. To restore service, depress the breaker button to reset the circuit.

K. Auxiliary 115 Volt Receptacle (J3). This receptacle supplies 5 amperes of 115-volt power for auxiliary equipment.

L. Welding Output Receptacles. Two output receptacles are located on the front panel — one negative (-) and one positive (+). Refer to figures 2-1 and 2-3.

3.5 SEQUENCE OF OPERATION

Never, under any circumstances, operate the power source with the cover or side panels removed. In addition to the safety hazard, improper cooling may cause damage to internal components. Also make sure you are adequately protected before welding. Welding helmet, gloves, safety glasses, and ear protection should always be worn.

A. MIG Welding

1. Make all secondary output connections to the power source output receptacles as described in section 2 (see Figure 2-2) and as shown in the appropriate wire feeder and/or control instruction booklets.

2. Make the necessary control connections to receptacle J1 as described in section 2 (see Figure 2-2) and J2, if necessary. Make sure that FC-5B

or TC-2B is unplugged from J2, or if HC-3B or HC-4B is plugged in, the process switch is in the DIGITAL-MIG (center) position.

3. After the primary input connections have been made in accordance with section 2, close the main wall disconnect switch or circuit breaker.

4. Place the power source ON-OFF line switch (on rear panel) to the ON position. This will start the cooling fan and apply power to the control circuitry as indicated by the illuminated POWER pilot light on the front panel.

5. Set the Voltage Control Potentiometer (VCP) for the approximate desired welding voltage depending on the position of the Panel-Remote voltage control switch (see step 6).

6. Set the Panel-Remote switch (SW-1) to the desired position from which full-range welding voltage will be regulated — PANEL position for operation from the power supply front panel (typical for non-digital conventional MIG feeders), or REMOTE position for operation from remote wire feeders/controls for digital-microprocessor MIG equipment, or for conventional MIG using the HC-3B or HC-4B hand control.

7. Set the variable inductance control (on the front panel) to provide the amount of inductance desired for MIG short arc welding. **For MIG spray arc and pulsed MIG welding, this control should be set at MINIMUM.**

8. Set the Slope Control Switch (SW3) to provide the desired slope characteristic (FLAT, MEDIUM or STEEP) required for your MIG process/material and feeder/control.

9. For remaining wire feeder or control operations, refer to the appropriate instruction booklet supplied for your particular system.

Operational Note For Digimig Series Wire Feeders
Due to the high open-circuit voltage of this power supply, it is possible that some Digimig controls may "abort" if the torch switch is energized for 2 seconds without striking a welding arc. This will most likely occur if you use the torch switch to thread new wire in the torch liner or for wire inching operations. (It will not occur if you use the recommended cold wire inching controls, provided on the feeder, for these functions.) If an "abort" does occur, simply "reset" the control as described in the appropriate wire feeder instruction booklet.

B. Stick/Scratch-Start TIG Welding

1. Depending on the process being used, make all secondary output connections to the power source output receptacles (see Figure 2-3).

2. Connect appropriate control accessories to receptacle J2 (see Figure 2-3).

3. After the primary input connections have been made, **close the main wall disconnect switch or circuit breaker.**

4. Place the power source ON-OFF line switch (on the rear panel) to the ON position. This will start the cooling fan and apply power to the control circuitry as indicated by the illuminated POWER pilot light on the front panel.

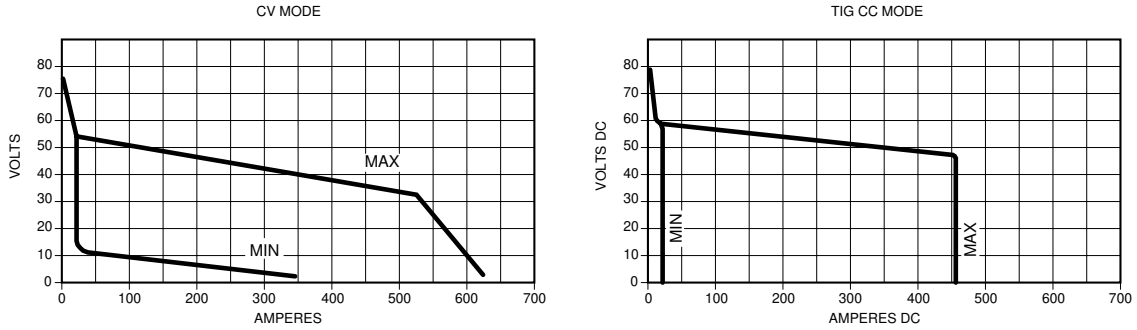
Ensure the contactor control switch on the TC-2B torch control, HC-3B or HC-4B hand control, or the Stick control pendant is in its OFF position (until you're ready to weld); otherwise, the electrode will be energized and may cause a short or electrical shock.

5. The variable inductance control need not be set for these processes because it is isolated from this circuit.

6. Full range current control is provided and regulated by the potentiometer on the selected remote controls. If the HC-3B or HC-4B is connected, ensure it is set for CC-TIG/STICK operation.

7. To establish the welding arc, position the torch/electrode near the workpiece. Close the remote torch/foot control or turn the pendant on. This will energize the solid-state contactor and provide welding power to the torch/electrode. Commence welding by touch or scratch starting.

8. If necessary, readjust the remote current potentiometer until the exact condition desired is obtained.



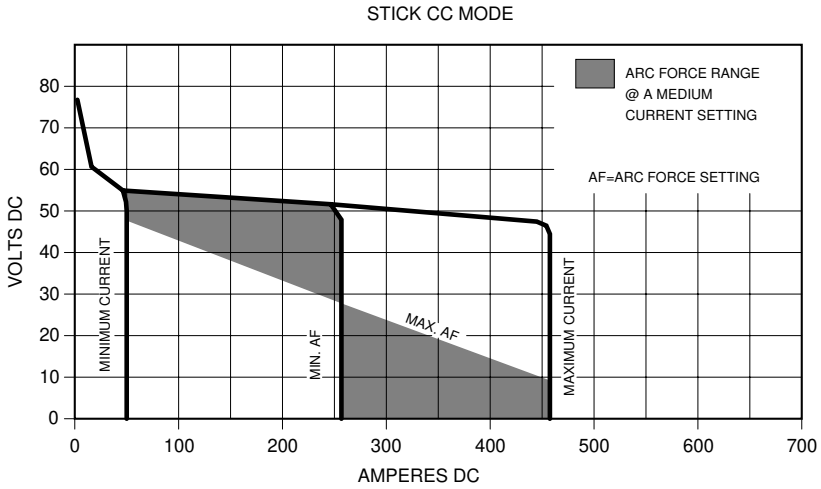


Figure 3-1. Volt-Ampere Curves

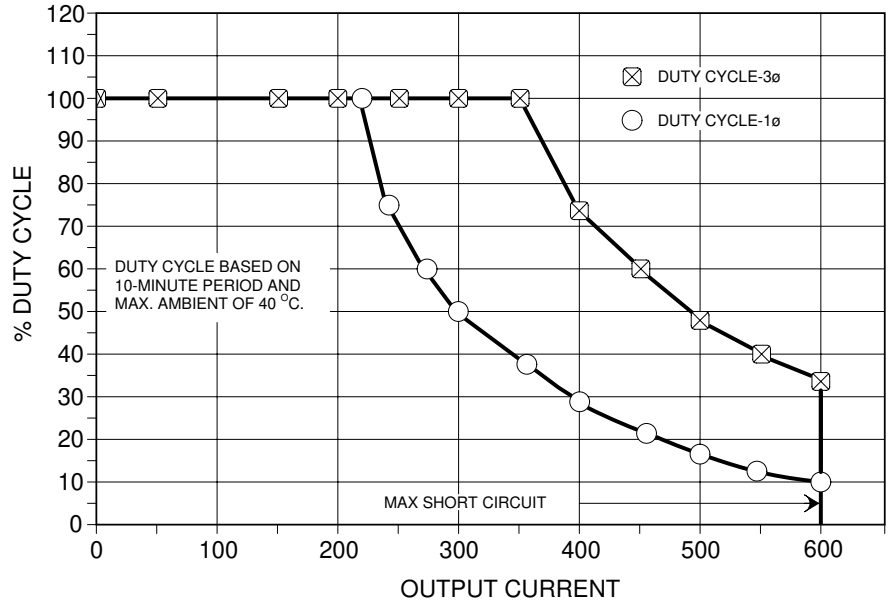


Figure 3-2. Duty Cycle Rating Chart

4.1 GENERAL

If the 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 equipment. Use only recommended replacement parts.

Electric shock can kill! Ensure the wall disconnect switch or circuit breaker is open before attempting any inspection or work on the inside of the power source. Always wear safety goggles with side shields when blowing out the power source with low pressure air.

4.2 CLEANING

Since there are no moving parts (other than the fan) in the power source, maintenance consists mainly of keeping the interior of the cabinet clean. Periodically, remove the cover from the cabinet and, wearing proper eye protection, blow accumulated dust and dirt from the air passages and the interior components using clean low pressure air. It is imperative that the air passages to the interior of the unit be kept free of dirt accumulation to ensure adequate circulation of cooling air; especially, over the rectifier bridge plates. The length of time between cleaning will depend on the location of the unit and the amount of dust in the atmosphere.

4.3 LUBRICATION

Fan motors with oil tubes located on the side of the motor require lubrication after 1 year of service. Motors without oil tubes are permanently lubricated for life and should not require any attention.

5.1 TROUBLESHOOTING

DANGER

Electric shock can kill! Ensure all primary power to the power source has been externally disconnected. Open wall disconnect switch or circuit breaker before attempting inspection of work inside of the power source.

WARNING

Capacitors can explode causing personal injury. To avoid injury, carefully read and do the following:

The subject warning concerns the four power filtering capacitors mounted behind Power Board No. 1 and No. 2. (For location, see figure 6-3.)

This potential hazard exists when the side panels are removed and power is ON. This should only occur when troubleshooting the power source.

Safe troubleshooting practice requires a systematic procedure as follows:

1. **Disconnect primary input power to power source.**
2. **Remove panels and perform visual inspection for obvious problems; loose wiring and plug connections, damaged or discolored components, etc.**
3. **Perform resistance checks described in the following tables.**
4. **With input power deenergized and side panels removed, locate the Input Bridge Module (IBR) (see Figures 5-1 and 6-5). Using the existing wiring diagram (Figure 5-5), disconnect and tape the large gray leads attached to terminals IBR (+) and IBR (-). This will prevent high voltage input to power boards No. 1 and No. 2, eliminating the potential hazard while performing the low voltage checks in step 5.**

NOTE

High voltage checks, listed in the following tables, must be performed with the side panels installed and IBR leads connected. To distinguish the high voltage checks (from low voltage) we have indicated these readings with the H.V. symbol.

5. **Apply input power to the power source, and perform the low voltage checks described in the following tables.**
6. **After the low voltage checks are completed, disconnect input power to power source and reconnect IBR (+) and (-) leads to module, and reinstall the unit's side panels.**
7. **With the side panels in place, reapply input power to the power source and perform high voltage checks (designated by H.V.) listed in the following tables.**

A. Wire Feeder or Control

If it is determined that the wire feeder is operating improperly, refer to the troubleshooting information located in the instruction booklet.

B. Power Source

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

Check the problem using the following troubleshooting guide (Figure 5-1). The potential problems are listed in "most probable" order, and the remedy may be quite simple. If the cause cannot be located quickly, open the power source and perform a simple visual inspection of all components and wiring. Check for secure terminal and plug connections, loose or burned wiring or components, bulged or leaking capacitors, or any other sign of damage or discoloration. Always follow this general rule — Do not replace a printed circuit (PC) board until you have made all of the checks listed in the following guide. Always put the power switch in its OFF position before removing or installing a PC board. Take great care not to grasp or pull on components when removing a PC board and always place a removed board on a static-free surface. If a PC board is found to be the problem, check with your ESAB supplier for a replacement. Provide the distributor with the part number of the board, as well as the serial number of the power source. **Do not attempt to repair the board yourself. Warranty on a PC board will be null and void if repaired by customer or any unauthorized repair shop.**

Table 5-1. Troubleshooting Guide (Sheet 1 of 2)

PROBLEM	POSSIBLE CAUSE	CIRCUIT CHECKS
Unit inoperative - fan does not run	Incorrect primary condition or blown line fuse	Check incoming power to unit
	Incorrect linkages on voltage changeover board	Check links on voltage changeover terminal board
	Defective Line Switch (LS)	Perform continuity check on Line Switch
Blows input line fuses	Defective Input Bridge (IBR)	See IBR Troubleshooting
	Incorrect linkages on voltage changeover board	Check links on voltage changeover terminal board
	Defective PB1/PB2	See PB1/PB2 Troubleshooting
No open circuit voltage	115 V ac circuit breaker tripped	Check circuit breaker and reset if tripped
	MIG mode operation 1. Stick pendant/control plugged into J2	Check J2 and disconnect pendant/foot control
	2. No contactor signal from wire feeder/control	Check MIG contactor signal - see ICB troubleshooting
	STICK mode operation 1. No contactor signal from pendant/control	Check STICK contactor signal - see ICB troubleshooting
No open circuit voltage	Defective SCR1/R1	See SCR1 troubleshooting
	Missing bias voltage to Inverter Control Board (ICB)	See ICB troubleshooting
	False thermal indication to ICB	See ICB troubleshooting
	Defective ICB	Replace ICB
Excessive open circuit voltage	Defective resistor/capacitor across Output Bridge (OBR)	Check components R4, C7, R5, C8
Thermal overload	Exceeding duty cycle rating	See duty cycle rating chart
	Exceeding max. rated ambient temperature	40 °C (104 °F)
Flashing fault indicator	Input voltage not within +15% and -10% of rated requirements	Check incoming voltage to unit - all three phases
	Excessive line impedance	Check voltage TB-1 (+) to TB-4(-). See IBR troubleshooting
	Defective Inverter Control Board (ICB)	Replace ICB

Table 5-1. Troubleshooting Guide (Sheet 2 of 2)

PROBLEM	POSSIBLE CAUSE	CIRCUIT CHECKS
Flashing fault indicator	Input voltage not within +15% and -10% of rated requirements	Check incoming voltage to unit - all three phases
	Excessive line impedance	Check voltage TB-1 (+) to TB-4(-). See IBR troubleshooting
	Defective Inverter Control Board (ICB)	Replace ICB
Continuous fault indicator	Defective PB1/PB2	See PB1/PB2 troubleshooting
	Defective Output Bridge Module (OBR1-4)	See OBR troubleshooting
	CT1/CT2 lead open	Disconnect P4 connector to inverter control and make continuity check P4-1 to P4-2/P4-4 to P4-5
	Missing shunt signal to Inverter Control Board (ICB)	See ICB troubleshooting
	Defective ICB	Replace ICB
Low welding output	Single-phase operation	Check incoming power to unit - all three phases
	Incorrect slope setting for application	Reference VA curves and change slope according to required output (volts and amps)
	Excessive welding cable length	Recommend max cable length (work and torch) of 100 ft
	Welding cable size too small	Recommend 4/0 cable for MIG applications
	High resistance torch power cable	Replace torch if defective/use torch with voltage pickup lead
	Inverter Control Board (ICB) calibration	See ICB troubleshooting
	Defective ICB	Replace ICB
Excessive welding output	Missing arc voltage feedback to Inverter Control Board (ICB)	See ICB troubleshooting
	ICB calibration	See ICB troubleshooting
	Defective ICB	See ICB troubleshooting
Volt/Amp Meter blank or reads incorrect	Missing +5 V at Inverter Control Board (ICB)	See ICB troubleshooting
	Shunt calibration	Check millivolt drop across shunt - should read 10±0.3 mV per 100 amps output
	Defective ICB	Replace ICB
	Defective meter	Replace meter

C. Power Boards, PB1/PB2, Troubleshooting (See Figures 5-1 and 5-2)

Make sure input power is disconnected (OFF) and voltage between T1 and T2 is zero.

Resistance Checks

(+)Probe	(-)Probe	Measurement
Drain-1	Source-1	5k ohms nominal*
Source-1	Drain-1	diode forward drop**
Gate-1	Source-1	1k ohms nominal*
Drain-2	Source-2	5k ohms nominal*
Source-2	Drain-2	diode forward drop**
Gate-2	Source-2	1k ohms nominal*

* Using meter high impedance diode scale.
** Using meter low impedance diode scale.

Voltage Checks (T.S. deenergized)

(+) Probe	(-) Probe	Measurement
TB-1(+)	TB-3(-)	324 V dc H.V.
TB-2(+)	TB-4(-)	325 V dc H.V.
Gate-1	Source-1	-12 V dc
Gate-2	Source-2	-12 V dc
P1-1	P1-3	24 V ac
P1-1	P1-2	12 V ac
P1-2	P1-3	12 V ac
P1-8	P1-10	24 V ac
P1-8	P1-9	12 V ac
P1-9	P1-10	12 V ac

D. Input Bridge, IBR, Troubleshooting (See Figure 5-1)

Resistance Checks

(+) Probe	(-) Probe	Measurement
IBR-1,2,3	IBR (+)	diode forward drop**
IBR (+)	IBR-1,2,3	open*
IBR (-)	IBR-1,2,3	diode forward drop**
IBR-1,2,3	IBR (-)	open *

Voltage Checks

*Using meter high impedance diode scale.
**Using meter low impedance diode scale.

TB-1(+)	375-290 V dc @ 230 V ac (+15%/-10%) H.V.
TB-4(-)	750-580 V dc @ 460 V ac (+15%/-10%) H.V.

E. Output Bridge, OBR, Troubleshooting (See Figure 5-2)

Resistance Checks

(+) Probe	(-) Probe	Measurement
Anode-1	Cathode	diode forward drop**
Anode-2	Cathode	diode forward drop**
Cathode	Anode-1	open*
Cathode	Anode-2	open*

*Using meter high impedance diode scale.
**Using meter low impedance diode scale.

NOTE

If any of the above readings are incorrect, remove the busbars and check modules OBR1-4 individually. Replace modules which are defective.

F. SCR1 Troubleshooting (See Figure 5-1)

Resistance Checks

SCR1-A	SCR1-K	5 ohms	If reads open, then replace R1
			If reads short, then replace SCR-1
SCR1-G	SCR1-K	diode forward drop	(low impedance using diode scale) Gate Lead from Inverter Control should be disconnected

Voltage Checks

SCR1-G	SCR1-K	0 V dc	Torch switch deenergized
		0.6 V dc	Torch switch energized - if missing, check Inverter Control

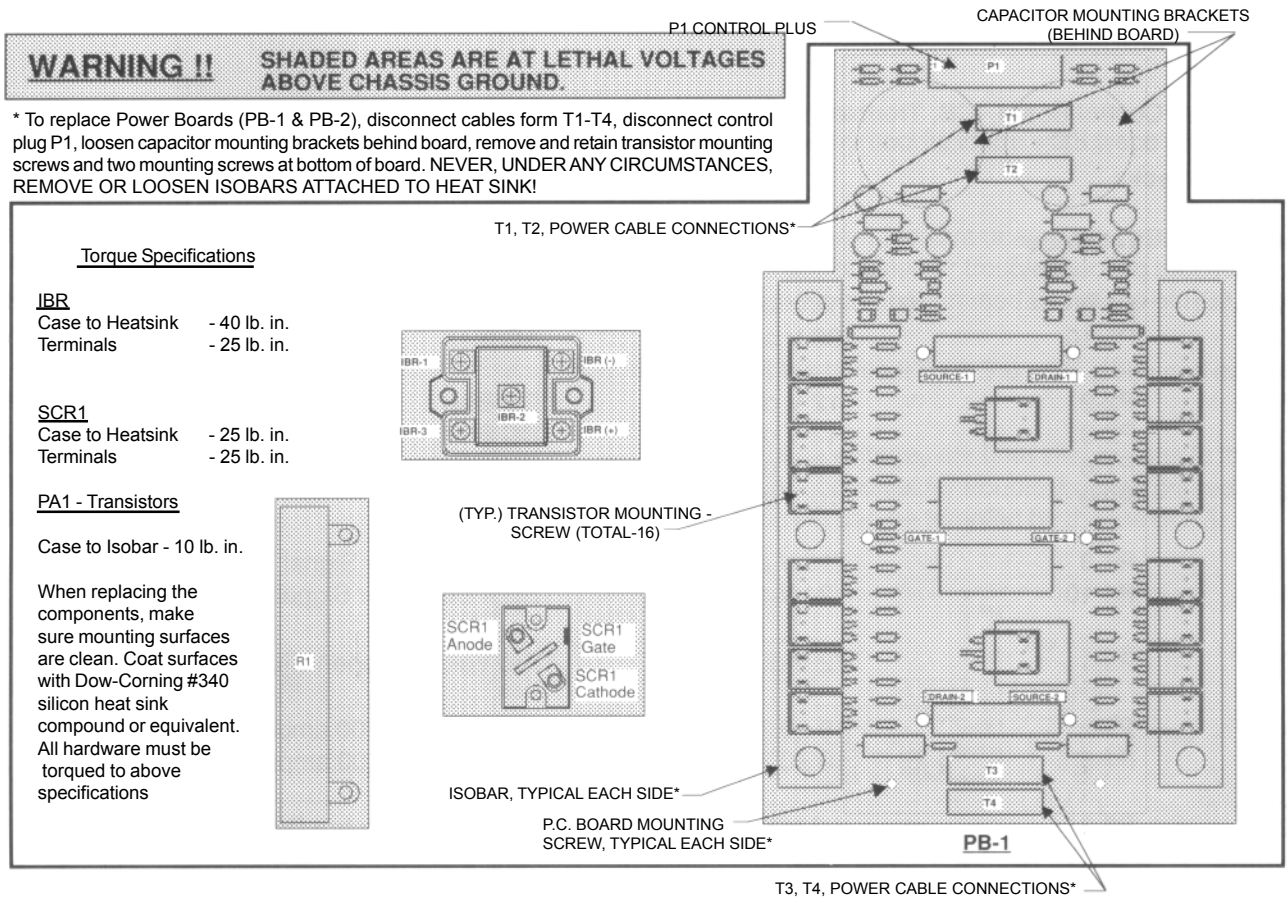


Figure 5-1. Left Side Power/Control Components (PB-1, SCR1, IBR, R1)

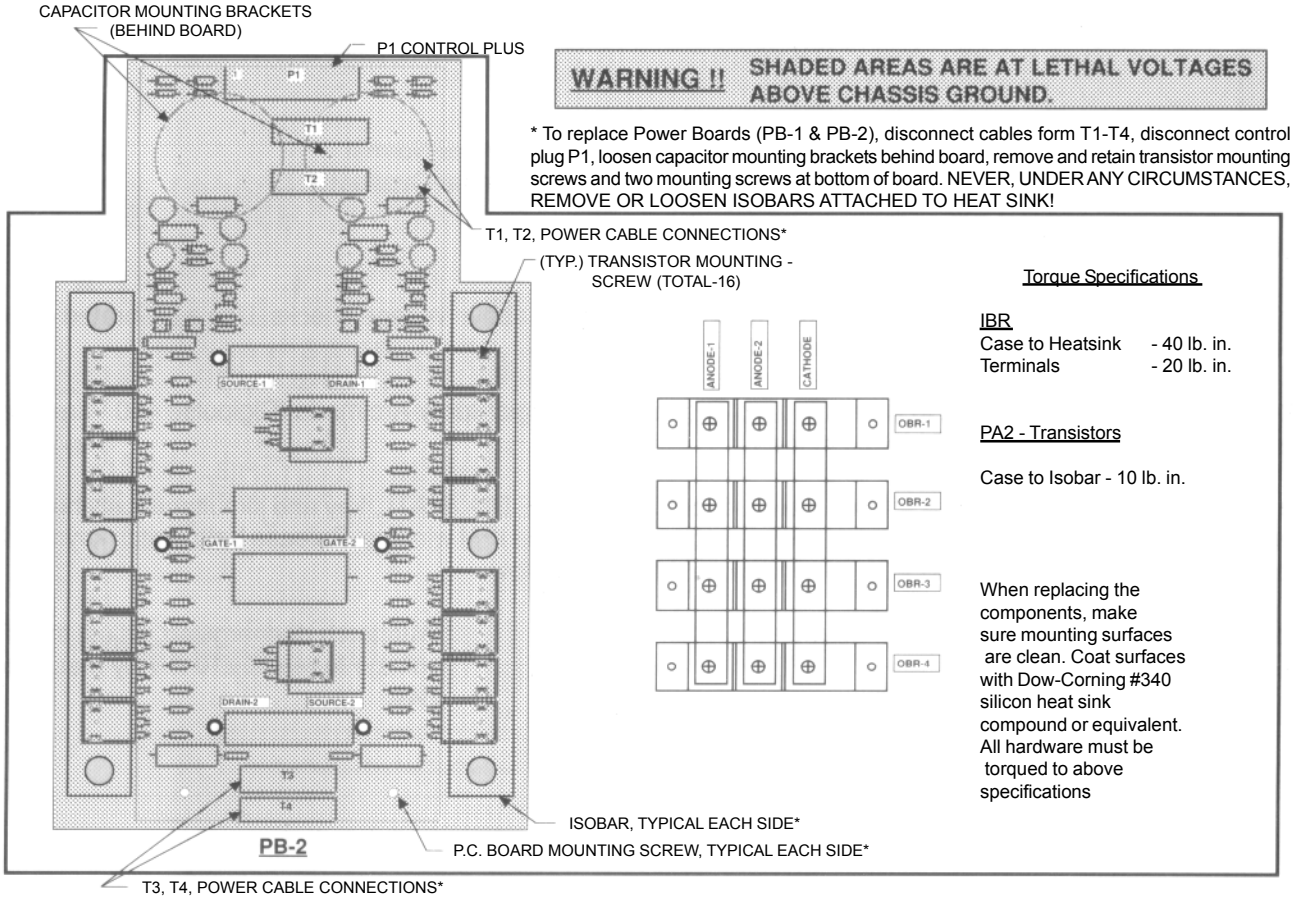


Figure 5-2. Right Side Power/Control Components (PB-2, OBR-1,2,3,4)

G. Inverter Control Board, ICB, Troubleshooting (See Figure 5-3)

Voltage Checks

(+) Probe	(-) Probe	Measurements	
P5-8	P5-9	18 V ac	AC Bias
P5-8	P5-10	36 V ac	AC Bias
P5-6	P2-9	12 V dc	DC Bias
P5-5	P2-9	-12 V dc	DC Bias
P5-3	P1-6	5 V dc	Digital Meter Bias
P5-1	P2-9	10 V dc	DC Bias
P4-7	P4-8	115 V ac	MIG Contactor Signal
P4-9	P4-10	24 V ac	Stick Contactor Signal
P2-10	P3-1	72 V dc	Arc Voltage - open circuit H.V.
P1-1	P1-2	10 ±0.3 mV	Shunt Signal/100 amps
P1-4	P1-5	10 ±0.3 mV	Meter Signal/100 amps
P3-3	P2-2	12 V dc	MIG Mode Select
		0 V dc	Stick Mode Select
P3-9	P3-10	0 V dc	Thermal-Normal
		12 V dc	Thermal-Overload
P2-5	P2-2	0 V dc	Steep Slope
		5 V dc	Medium Slope
		12 V dc	Flat Slope

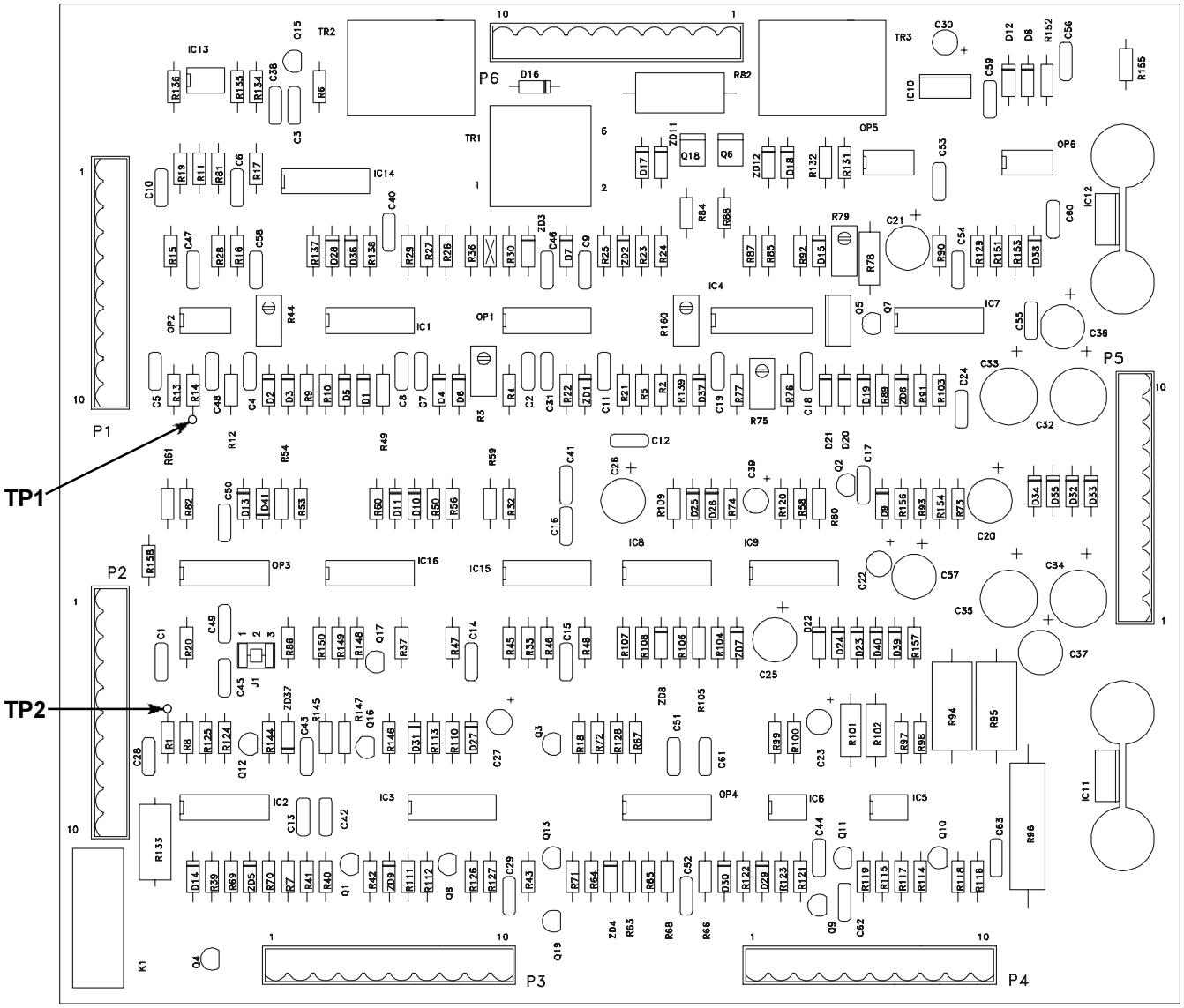


Figure 5-3. Inverter Control Board (ICB) (Top View Layout)

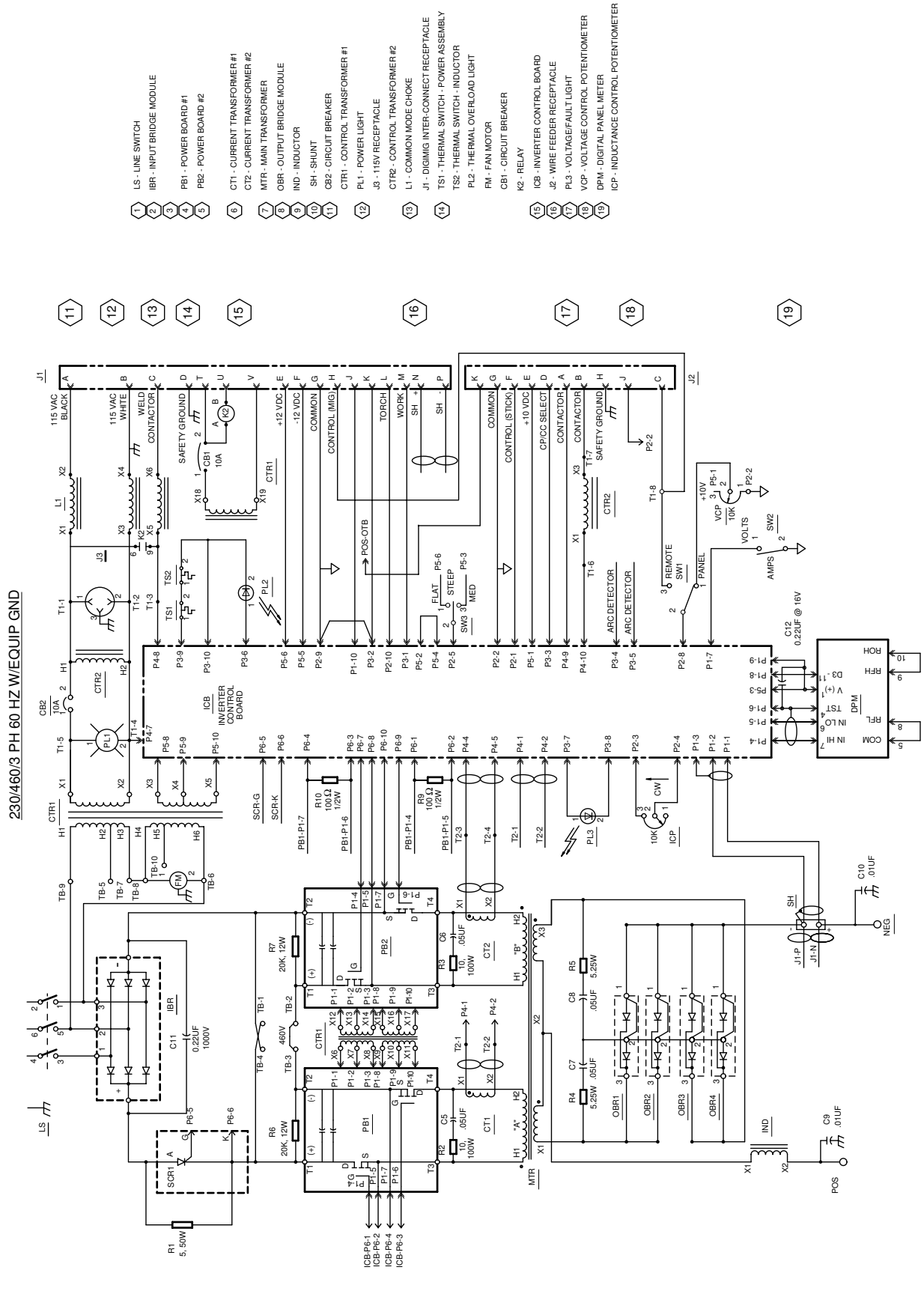


Figure 5-4. SVI 450i Schematic Diagram - 230/460 V, 3 Phase, 60 Hz

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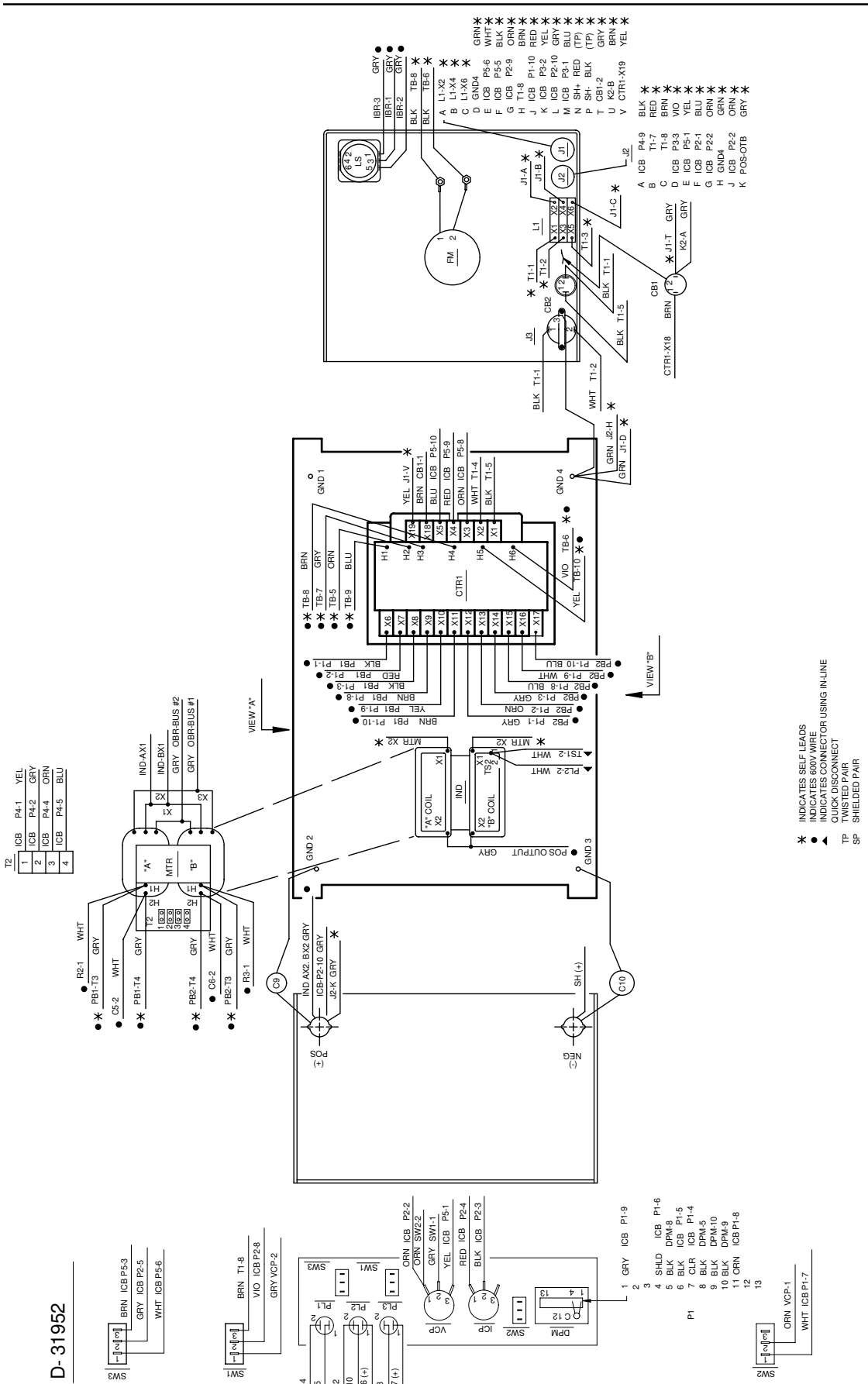

Figure 5-5. SVI 450i Wiring Diagram - 230/460 V, 3 Phase, 60 Hz (Sheet 1 of 2)

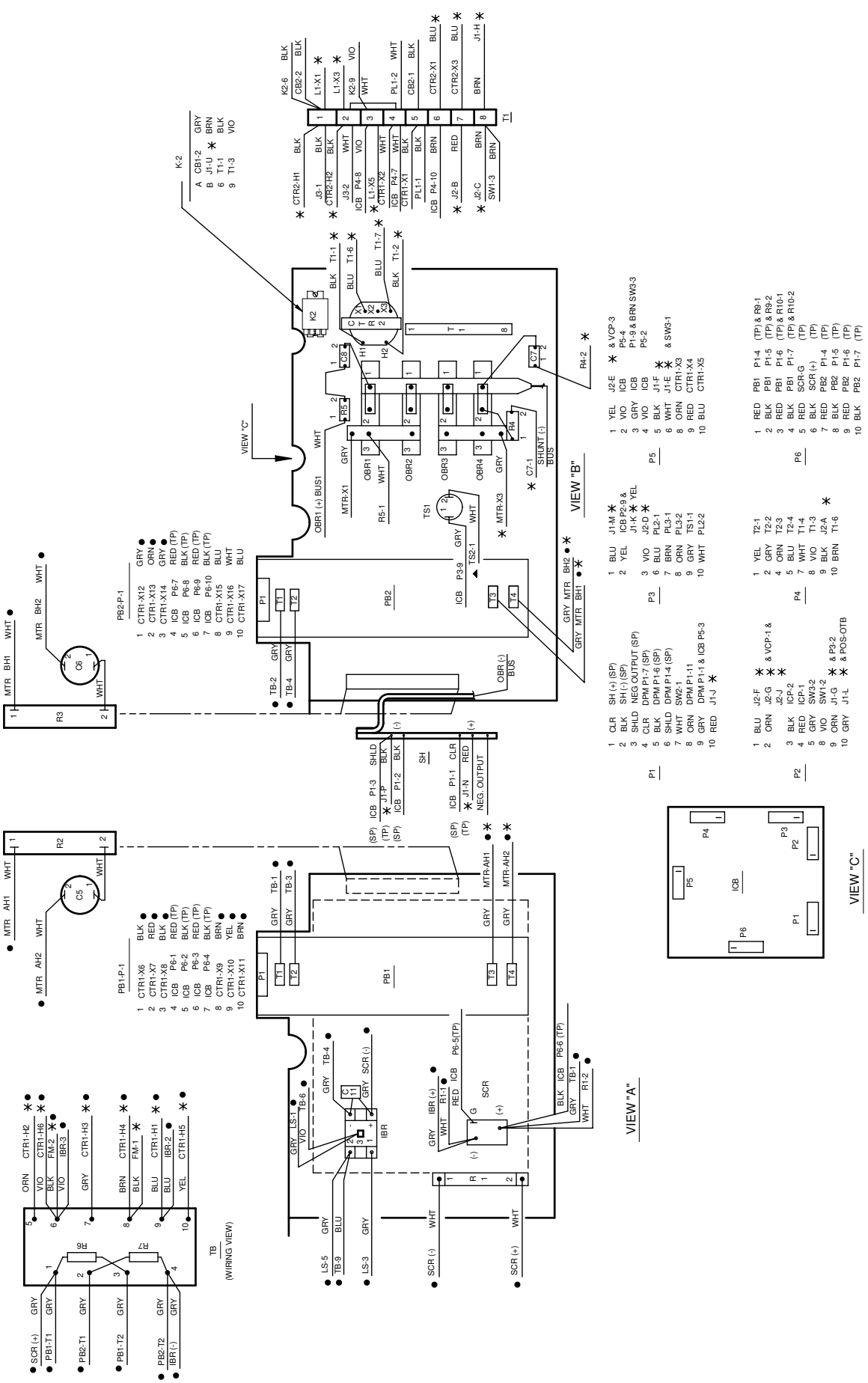

Figure 5-5. SVI 450i Wiring Diagram - 230/460 V, 3 Phase, 60 Hz (Sheet 2 of 2)

6.1 GENERAL

Replacement Parts are illustrated in figures 6-1 thru 6-6. When ordering replacement parts, order by part number and part name, as illustrated on the figure. DO NOT ORDER BY PART NUMBER ALONE.

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

6.2 ORDERING

To assure 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 or from:

ESAB Welding & Cutting Products
Attn: Customer Service Dept.
PO Box 100545, Ebenezer Road
Florence, SC, 29501-0545

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

To order parts by phone, contact ESAB at 1-803-664-5540 or 4460. Orders may also be faxed to 1-800-634-7548. Be sure to indicate any special shipping instructions when ordering replacement parts.

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

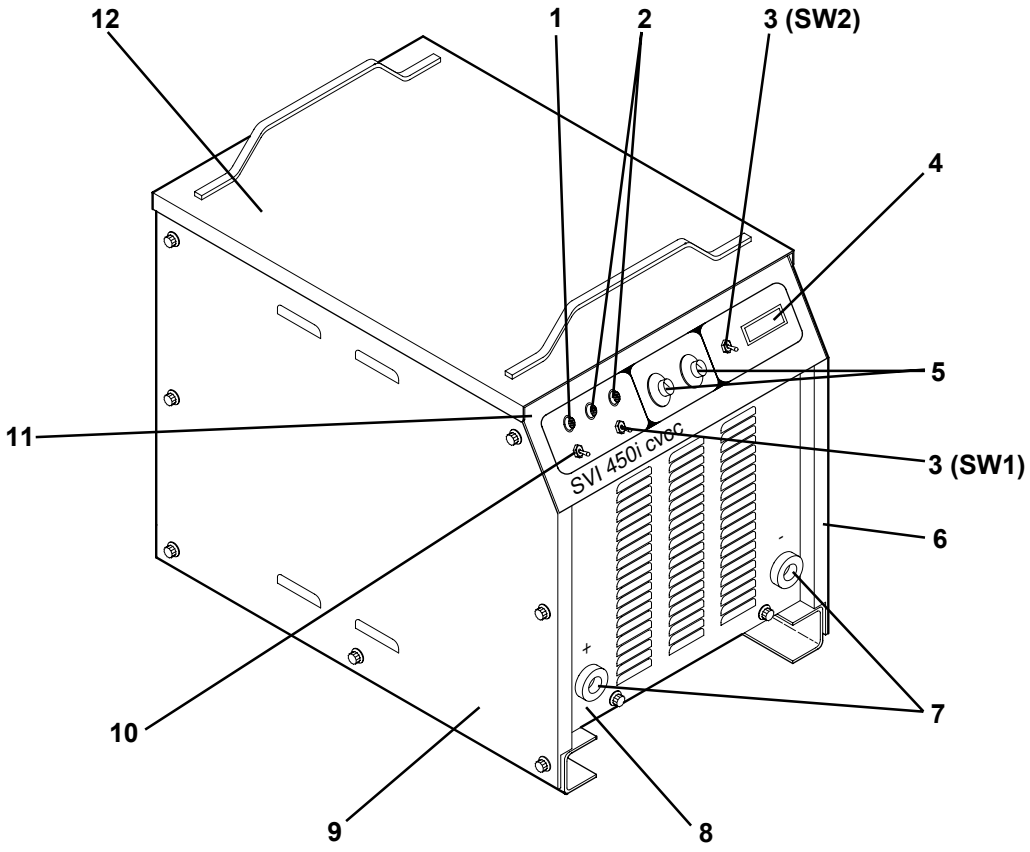

Figure 6-1. SVI 450i cvcc (Front View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	951526	LAMP, WHITE	PL1
2	2	951032	LAMP, RED	PL2, PL3
3	2	634515	SWITCH, TOGGLE, SPDT	SW1, SW2
4	1	951795	METER, DIGITAL	DPM
5	2	2062018	POTENTIOMETER, TRIM	ICP, VCP
	2	13730611	KNOB (P/O ITEM NO. 5)	
6	1	31129YL	PANEL, RIGHT SIDE	
7	2	13733935	CONNECTOR, FEMALE	
8	1	32059GY	PANEL, FRONT, SILKSCREENED	
9	1	31128YL	PANEL, LEFT SIDE	
10	1	672831	SWITCH, TOGGLE, SPDT	SW3
11	1	32057GY	PANEL, CONTROL, SILKSCREENED	
12	1	31130YL	PANEL, TOP	

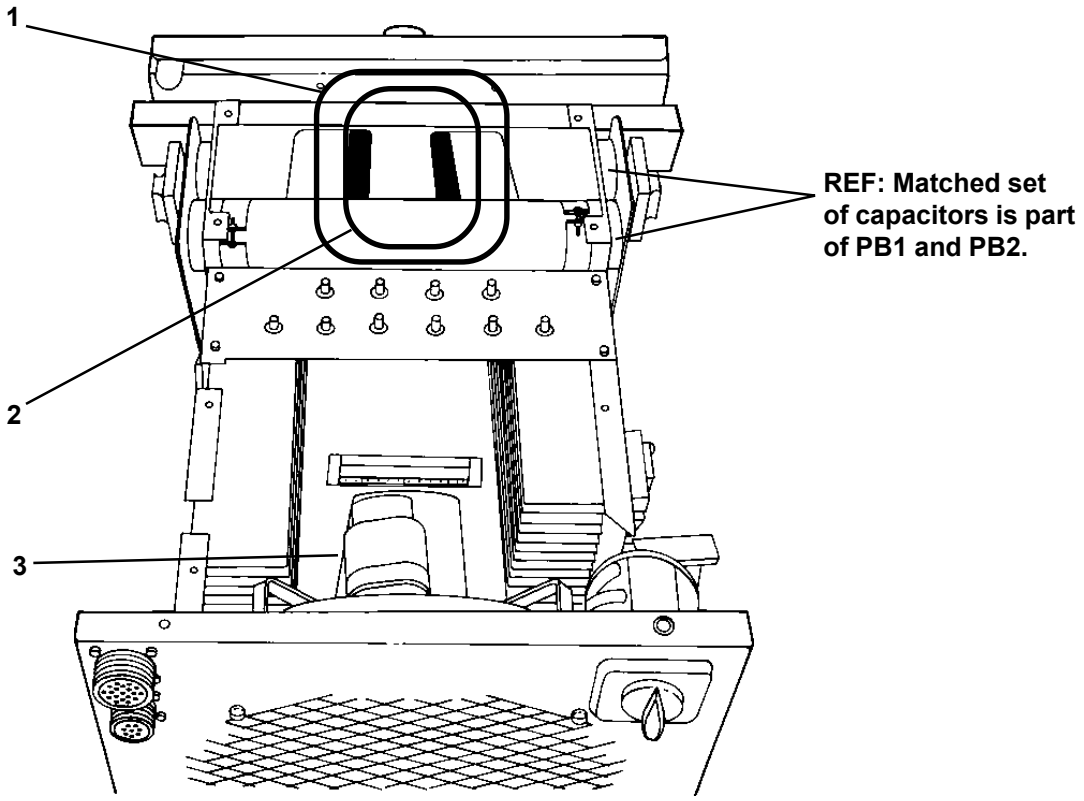

Figure 6-2. SVI 450i cvcc (Top View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	31135	INDUCTOR (MOUNTED ON FRONT PART OF CHASSIS BASE)	IND
2	1	31133	TRANSFORMER, MAIN (MOUNTED ON TOP OF INDUCTOR)	MTR
3	1	31134	TRANSFORMER, CONTROL (MOUNTED ON CHASSIS BASE UNDER FAN MOTOR)	CTR1

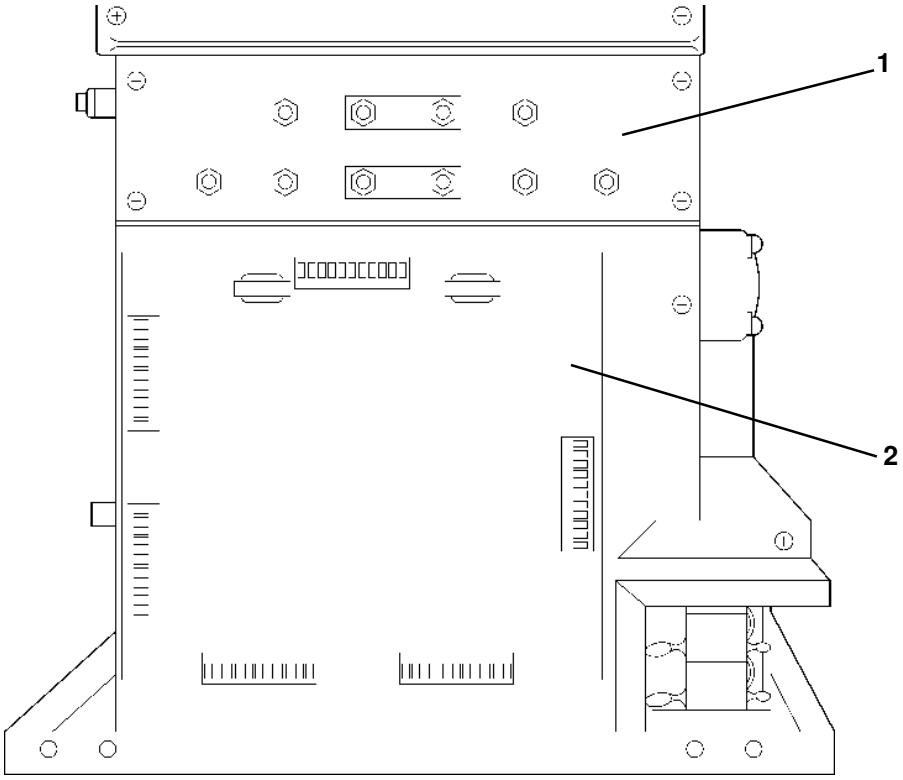

Figure 6-3. SVI 450i cvcc (Top View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	31143	TERMINAL BOARD, SCREEN PRINTED	TB
2	1	38082	PC BOARD ASSY, CONTROL	ICB

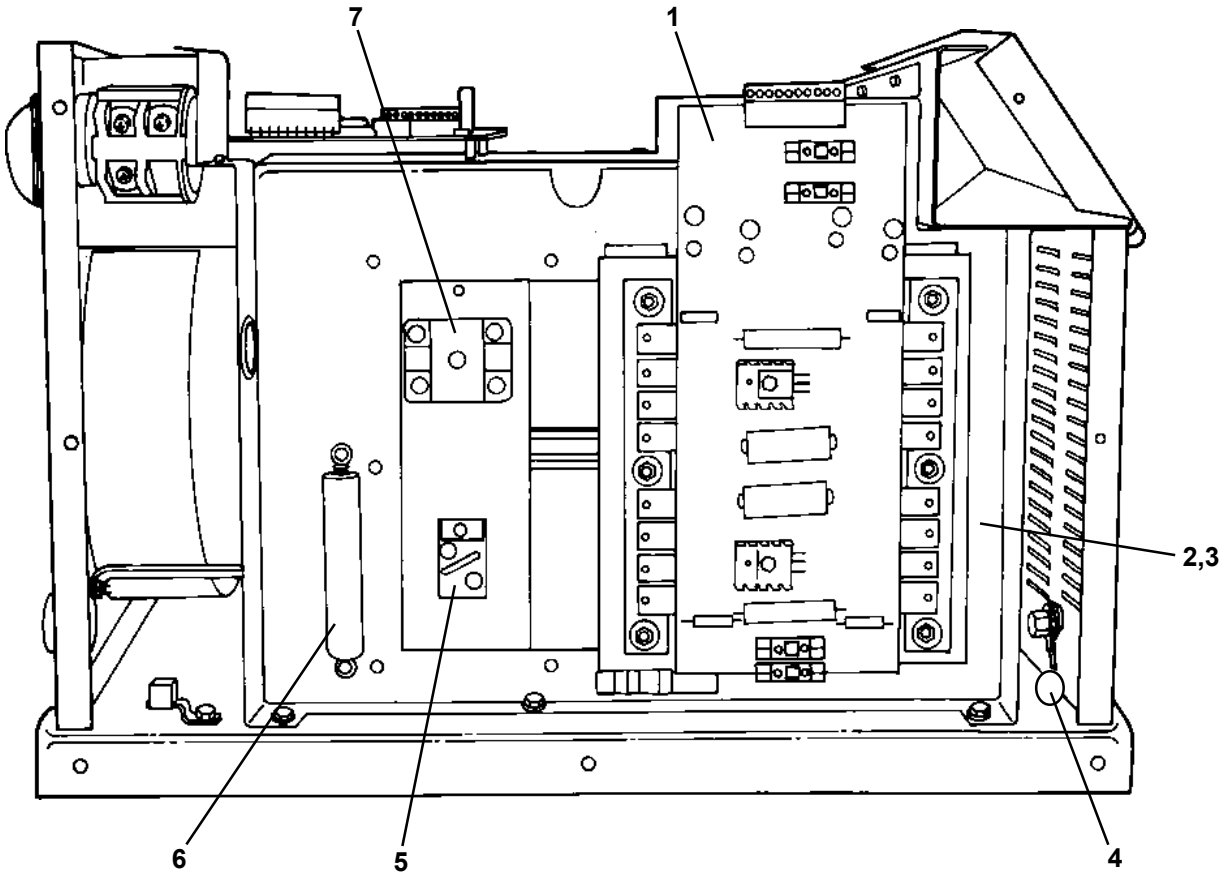

Figure 6-4. SVI 450i cvcc (Left Side View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	674991	PC BOARD ASSY, POWER	PB1
2	1	17282010	RESISTOR, 10 OHM, 100 W	R2
3	1	950516	CAPACITOR, 0.05 µF, 600 V	C5
4	1	950702	CAPACITOR, 0.01 µF, 125 V	C9
5	1	951023	MODULE, SCR	SCR1
6	1	17250005	RESISTOR, 5 OHM, 50 W	R1
7	1	951022	INPUT BRIDGE MODULE	IBR

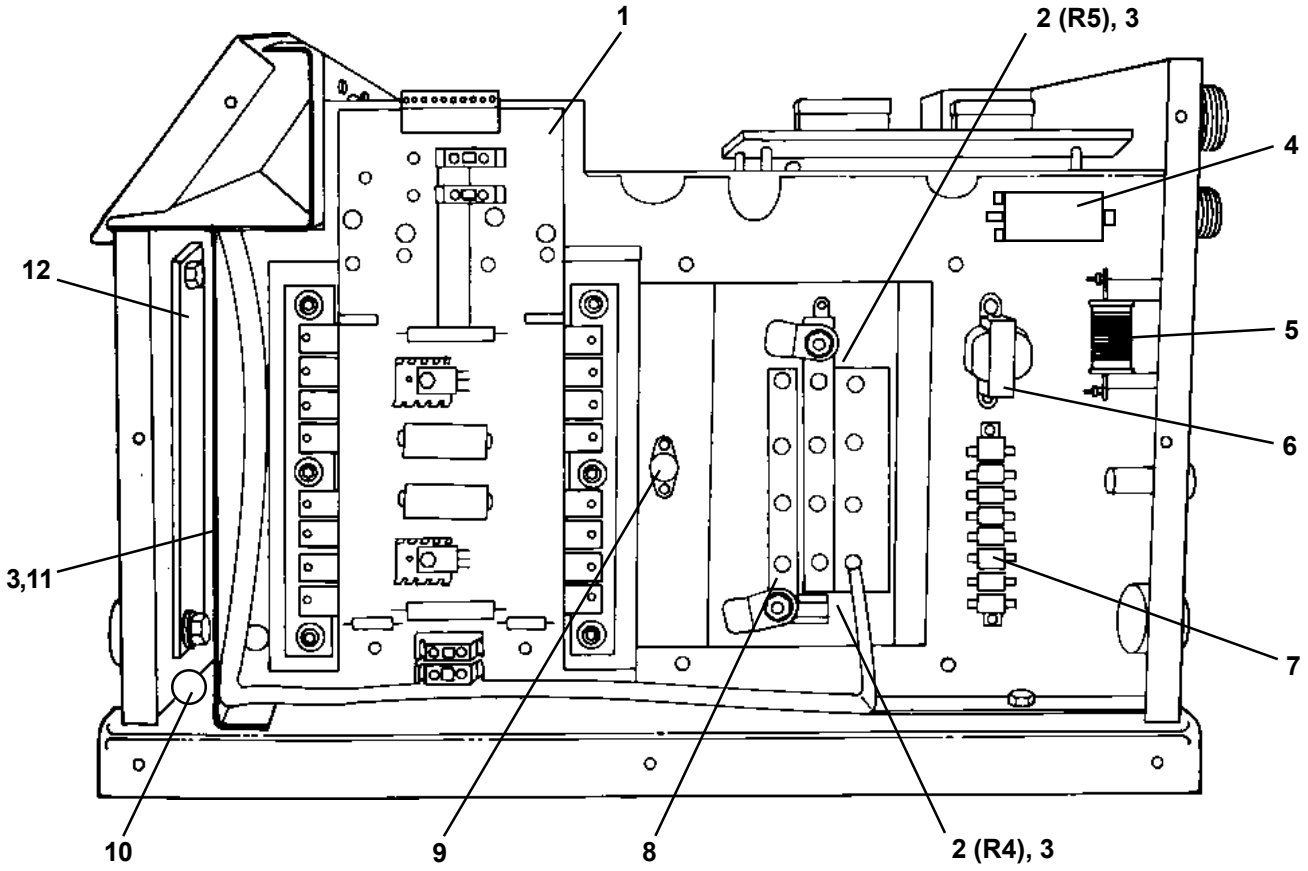

Figure 6-5. SVI 450i cvcc (Right Side View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	674991	PC BOARD ASSY, POWER	PB2
2	2	17725005	RESISTOR, 5 OHM, 25 W	R4,5
3	3	950516	CAPACITOR, 0.05 µF, 600 V	C8
4	1	13735102	RELAY, 42 V, 3-POLE	K2
5	1	33938	CHOKE, COMMON MODE	L1
6	1	993717	TRANSFORMER	CTR2
7	1	635686	TERMINAL STRIP, 8-POSITION	T1
8	4	951184	DIODE, OUTPUT	OBR1-4
9	1	951085	SWITCH, THERMAL, 80 °C	TS1
10	1	950702	CAPACITOR, 0.01 µF, 100 W	C10
11	1	17282010	RESISTOR, 10 OHM, 100 W	R3
12	1	31132	SHUNT	SH

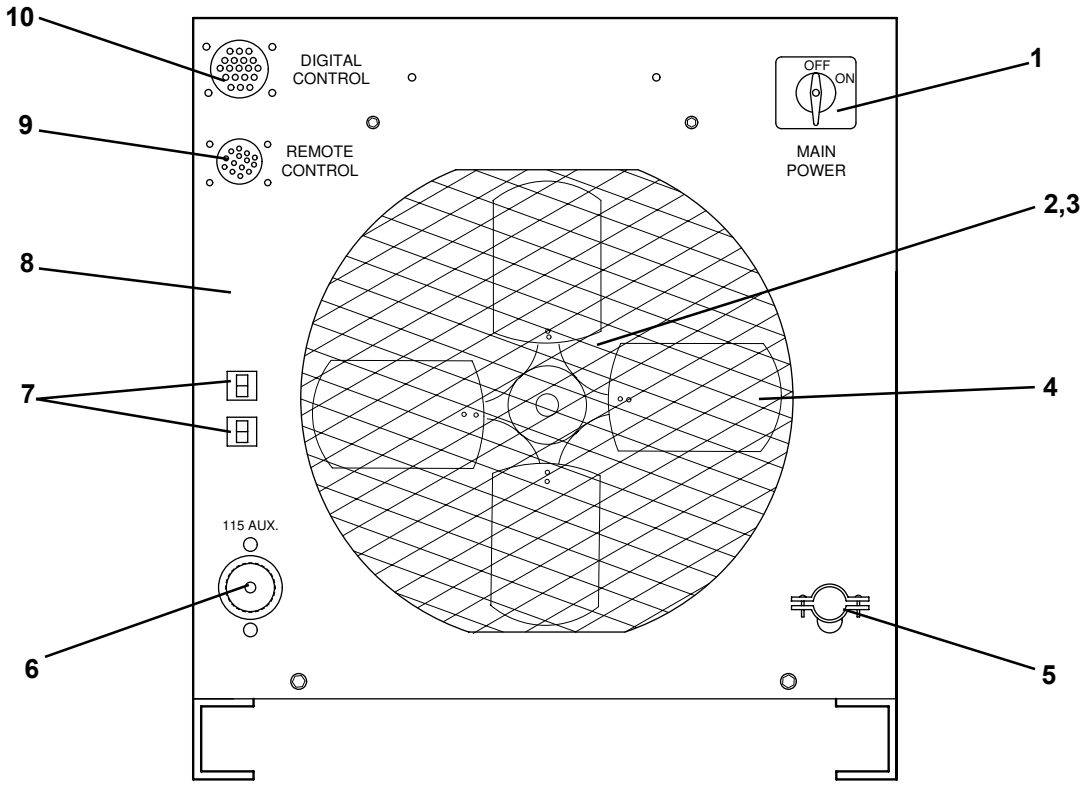

Figure 6-6. SVI 450i cvcc (Rear View)

ITEM NO.	QTY REQ.	PART NO.	DESCRIPTION	CIRCUIT SYMBOL
1	1	950822	SWITCH, ROTOR, 3PST	LS
2	1	680970	MOTOR, FAN	FM
3	1	679384GY	SHROUD, FAN	
4	1	950592	BLADE, FAN	
5	1	97W63	CONNECTOR, CABLE GRIP	
6	1	952219	RECEPTACLE, 125 V, 15 A	J3
7	2	950122	CIRCUIT BREAKER, 10 A	CB1,2
8	1	31126GY	REAR PANEL	
9	1	951476	RECEPTACLE, 14-PIN	J2
10	1	951475	RECEPTACLE, 19-PIN	J1

ESAB Welding & Cutting Products, Florence, SC Welding Equipment
COMMUNICATION GUIDE - CUSTOMER SERVICES

A. CUSTOMER SERVICE QUESTIONS:
Order Entry | Product Availability | Pricing | Delivery
Order Changes | Saleable Goods Returns | Shipping Information

Eastern Distribution Center
Telephone: (800)362-7080 / Fax: (800) 634-7548

Central Distribution Center
Telephone: (800)783-5360 / Fax: (800) 783-5362

Western Distribution Center
Telephone: (800) 235-4012/ Fax: (888) 586-4670

B. ENGINEERING SERVICE: Telephone: (843) 664-4416 / Fax : (800) 446-5693
Welding Equipment Troubleshooting — Hours: 7:30 AM to 5:00 PM EST
Warranty Returns | Authorized Repair Stations

C. TECHNICAL SERVICE: Telephone: (800) ESAB-123/ Fax: (843) 664-4452
Part Numbers | Technical Applications — Hours: 8:00 AM to 5:00 PM EST
Performance Features | Technical Specifications | Equipment Recommendations

D. LITERATURE REQUESTS: Telephone: (843) 664-5562 / Fax: (843) 664-5548
Hours: 7:30 AM to 4:00 PM EST

E. WELDING EQUIPMENT REPAIRS: Telephone: (843) 664-4487 / Fax: (843) 664-5557
Repair Estimates | Repair Status — Hours: 7:30 AM to 3:30 PM EST

F. WELDING EQUIPMENT TRAINING:
Telephone: (843)664-4428 / Fax: (843) 679-5864
Training School Information and Registrations — Hours: 7:30 AM to 4:00 PM EST

G. WELDING PROCESS ASSISTANCE:
Telephone: (800) ESAB-123 / Fax: (843) 664-4454 — Hours: 7:30 AM to 4:00 PM EST

H. TECHNICAL ASST. CONSUMABLES:
Telephone : (800) 933-7070 — Hours: 7:30 AM to 5:00 PM EST

IF YOU DO NOT KNOW WHOM TO CALL

Telephone: (800) ESAB-123/ Fax: (843) 664-4452/ Web:http://www.esab.com

Hours: 7:30 AM to 5:00 PM EST

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