



Powercut 650

Portable Plasma Cutting System



Instruction Manual

ESAB Console Item No. 0558003179, PC-650 208/230V 1 PH CONSOLE
ESAB Console Item No. 0558003515, PC-650 208/230V 1 PH CONSOLE (BL)
ESAB Console Item No. 0558005328, PC-650 460V CONSOLE

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

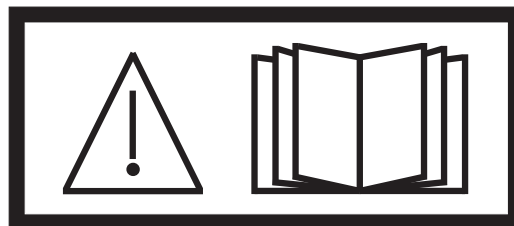
CAUTION

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.



READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

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1.0 Safety Precautions

Users of ESAB welding and plasma cutting equipment have the ultimate responsibility for ensuring that anyone who works on or near the equipment observes all the relevant safety precautions. Safety precautions must meet the requirements that apply to this type of welding or plasma cutting equipment. The following recommendations should be observed in addition to the standard regulations that apply to the workplace.

All work must be carried out by trained personnel well acquainted with the operation of the welding or plasma cutting equipment. Incorrect operation of the equipment may lead to hazardous situations which can result in injury to the operator and damage to the equipment.

1. Anyone who uses welding or plasma cutting equipment must be familiar with:
 - its operation
 - location of emergency stops
 - its function
 - relevant safety precautions
 - welding and / or plasma cutting
2. The operator must ensure that:
 - no unauthorized person stationed within the working area of the equipment when it is started up.
 - no one is unprotected when the arc is struck.
3. The workplace must:
 - be suitable for the purpose
 - be free from drafts
4. Personal safety equipment:
 - Always wear recommended personal safety equipment, such as safety glasses, flame proof clothing, safety gloves.
 - Do not wear loose fitting items, such as scarves, bracelets, rings, etc., which could become trapped or cause burns.
5. General precautions:
 - Make sure the return cable is connected securely.
 - Work on high voltage equipment **may only be carried out by a qualified electrician.**
 - Appropriate fire extinguishing equipment must be clearly marked and close at hand.
 - Lubrication and maintenance **must not** be carried out on the equipment during operation.

WARNING

WELDING AND PLASMA CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING OR CUTTING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.

ELECTRIC SHOCK - Can kill.

- Install and earth (ground) the welding or plasma cutting unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves or wet clothing.
- Insulate yourself from earth and the workpiece.
- Ensure your working stance is safe.

FUMES AND GASES - Can be dangerous to health.

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to take fumes and gases away from your breathing zone and the general area.

ARC RAYS - Can injure eyes and burn skin.

- Protect your eyes and body. Use the correct welding / plasma cutting screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

FIRE HAZARD

- Sparks (spatter) can cause fire. Make sure therefore that there are no inflammable materials nearby.

NOISE - Excessive noise can damage hearing.

- Protect your ears. Use earmuffs or other hearing protection.
- Warn bystanders of the risk.

MALFUNCTION - Call for expert assistance in the event of malfunction.

READ AND UNDERSTAND THE INSTRUCTION MANUAL BEFORE INSTALLING OR OPERATING.

PROTECT YOURSELF AND OTHERS!

Powercut® 650 Cutting Package

- Manually cuts 5/8 inch and severs 3/4 inch - powerful cutting performance
- Economical price - tremendous cutting value for the money
- Compact portable design - goes to the job, easily moved about
- Delivers big machine cutting power in a rugged, lightweight package.
- Arrives ready to cut, with torch connected and front-end parts in place, for the ultimate in operator convenience.
- High frequency starting - starts through paint
- Trigger lock-in for long-cut operator comfort.
- Adjustable output - tailor the current to the material being cut.
- Compact simple torch - easy access, little maintenance
- New quick - connect torch switch plug
- New durable torch cable prevents snagging on fixtures and materials
- Patented XT nozzles - extended shape gives good visibility as well as good consumable life
- Drag or standoff cutting - easy operation with little or no training
- Template following feature - easily duplicates curves or straight lines
- Tolerates poor power lines
- Three-year warranty on Console
- One-year warranty on Torch



The Powercut® 650 comes out of the box ready to go! The torch is attached with parts in place, primary cord is attached and the filter/regulator is installed. Just hook up the air, plug it in and cut.

Specifications

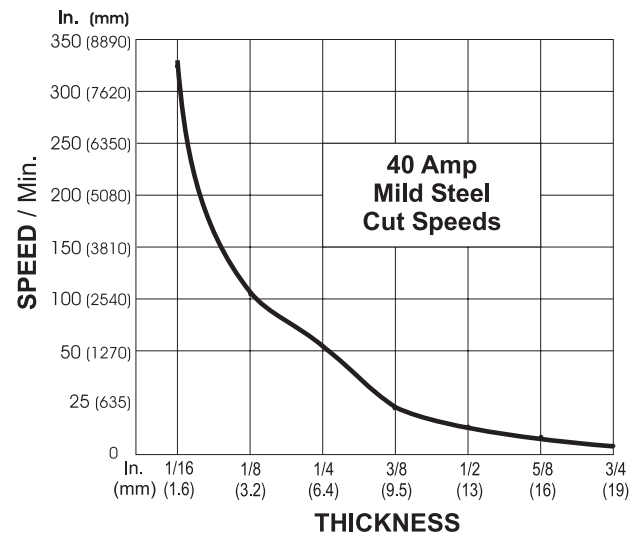
Cuts 5/8 in.; severs 3/4 in.

Output:	..40% duty cycle.....	40A/120V
	60% duty cycle.....	30A/120V
	100% duty cycle.....	22A/120V
Output Current Range.....	10 to 40 Amperes	
Open Circuit Voltage.....	290 Vdc Nominal	
Input @ 40A/120V.....	208/230 vac 1 ph. 50/60 Hz., 35/32 amps	
Input @ 40A/120V.....	460 vac 3 ph. 50/60 Hz., 8/5 amps	
Power factor @ 40A Output.....	76% (1 Phase)	
Efficiency @ 40A Output.....	85% (Typical)	
Air requirements.....	250 cfm at 80 psig	
Dimensions:.....		
Length.....	16.00" (406mm)	
w/ handles.....	25.70" (653mm)	
Height.....	16.38" (416mm)	
Width.....	12.50" (318mm)	
w/ Opt. torch wrap.....	15.50" (394mm)	
Weight (less torch & work cable).....	53 lbs. (24 kg)	

Torch

Uses PT-31XLPC

Instruction Literature, order number.....F15-696
Sales Literature, order number.....PAC-21087



Powercut® 650 / PT-31XLPC Cutting Performance

For a complete list of torch parts, refer to Optional Accessories .

How To Order

The Powercut® 650 comes complete with everything you need: console, 25 ft. PT-31XLPC torch, torch spare parts kit, air filter/regulator, input power cord with plug, 25 ft. work cable with clamp. System arrives fully assembled and ready to cut.

Ordering Information

Powercut® 650 / 25 and 50 ft. PT-31XLPC packages

Powercut® 650,	
208/230 vac 1 ph. 25 ft. PT-31XLPC	0558003180
460 vac 3 ph. 25 ft. PT-31XLPC	0558005329
460 vac 3 ph. 50 ft. PT-31XLPC	0558005330

Optional Accessories

Torch Guide Kits

The Deluxe kit, in a rugged plastic carrying case, includes attachments for circle and straight line cutting on ferrous and non-ferrous metals

Deluxe: 1 3/4" - 42" Radius.....0558003258

Basic: 1 3/4" - 28" Radius.....0558002675

Plasma Flow Measuring Kit

This valuable troubleshooting tool allows measurement of the actual plasma gas flow through the torch..... 19765

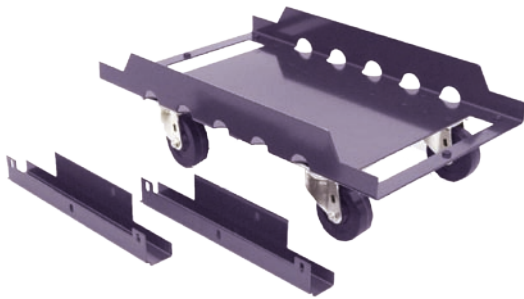
Input Receptacle

230Vac/50Amp, 3 Prong.....674540



Torch Wrap and Spare Parts Kit Holder

This enables operator to store S/P Kit, wrap torch and work cable for easy transport and storage.....0558003398



Wheel Kit

For easy transport of system.....0558003399



Powercut shown with Optional Torch Wrap and Spare Parts Kit Holder installed.

PT-31XLPC Replacement Torch0558003183

Torch comes assembled with Heat Shield, Nozzle, Electrode, and Swirl Baffle.

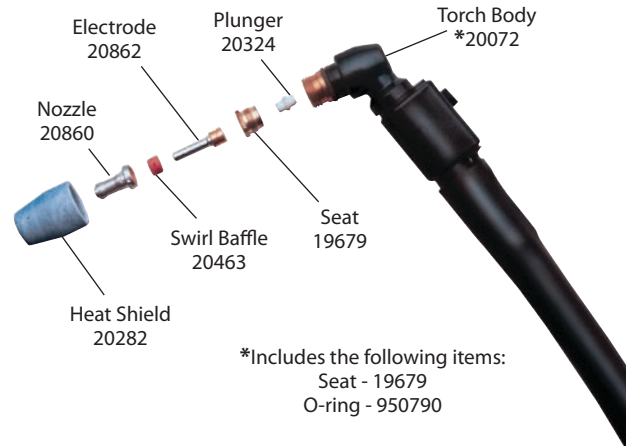
PT-31XLPC Spare Parts Kit (P/N 0558003301) includes:

Heat Shield (1) 20282

Nozzles (3) 20860

Swirl Baffle (1) 20463

Electrodes (2) 20862



Do not use any torch with this power source other than the ESAB brand PT-31XLPC torch. Serious injury may occur if used with any other torch.

2.0 GENERAL

The Powercut 650 is a compact, completely self-contained plasma cutting system. As shipped, the system is fully assembled and ready to cut after being connected to input power and a source of prefiltered compressed air (90-150 psi). The Powercut 650 package uses the PT-31XLPC torch to deliver cutting power for materials up to 5/8-in. thick or for severing up to 3/4-in. thick.

2.1 SCOPE

The purpose of this manual is to provide the operator with all the information required to install and operate the Powercut 650 plasma arc cutting package. Technical reference material is also provided to assist in troubleshooting the cutting package.

3.0 GENERAL

Proper installation can contribute materially to the satisfactory and trouble-free operation of the Powercut 650 cutting package. It is suggested that each step in this section be studied carefully and followed as closely as possible.

3.1 EQUIPMENT REQUIRED

A source of clean, prefiltered dry air that supplies 250 cfh at 80 psig is required for the cutting operation. The air supply should not exceed 150 psig (the maximum inlet pressure rating of the air filter-regulator supplied with the package).

3.2 LOCATION

Adequate ventilation is necessary to provide proper cooling of the Powercut 650 and the amount of dirt, dust, and excessive heat to which the equipment is exposed, should be minimized. There should be at least one foot of clearance between the Powercut 650 power source and wall or any other obstruction to allow freedom of air movement through the power source.

Installing or placing any type of filtering device will restrict the volume of intake air, thereby subjecting the power source internal components to overheating. The warranty is void if any type of filter device is used.

3.3 INSPECTION

- A. Remove the shipping container and all packing material and inspect for evidence of concealed damage which may not have been apparent upon receipt of the Powercut 650. Notify the carrier of any defects or damage at once.
- B. Check container for any loose parts prior to disposing of shipping materials.
- C. Check air louvers and any other openings to ensure that any obstruction is removed.

! WARNING

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 and by unplugging the power cord to the unit when connections are made inside of the power source.

! CAUTION

Be sure that the power source is properly configured for your input power supply. **DO NOT** connect a power source configured for 208/230 V to a 460 V input power supply. Damage to the machine may occur.

3.4 CONNECTIONS

3.4.1 PRIMARY ELECTRICAL INPUT CONNECTIONS (FIGURE 3.1)

A line (wall) disconnect switch with fuses or circuit breakers should be provided at the main power panel (see Fig. 3-1 and Table 3-1 for fuse sizes). The input power cable of the console may be connected directly to the disconnect switch or you may purchase a proper plug and receptacle from a local electrical supplier. If using plug/receptacle combination, see Table 3-1 for recommended input conductors for connecting receptacle to line disconnect switch.

Table 3.1. Recommended Sizes for Input Conductors and Line Fuses

Rated Input			Input & GND Conductor CU/AWG*	Fuse Size Amps
Volts	Amp	Phases		
208	35	1	No. 10	50
230	32	1	No. 10	50
460	8	3	No. 12	15

* 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 above.

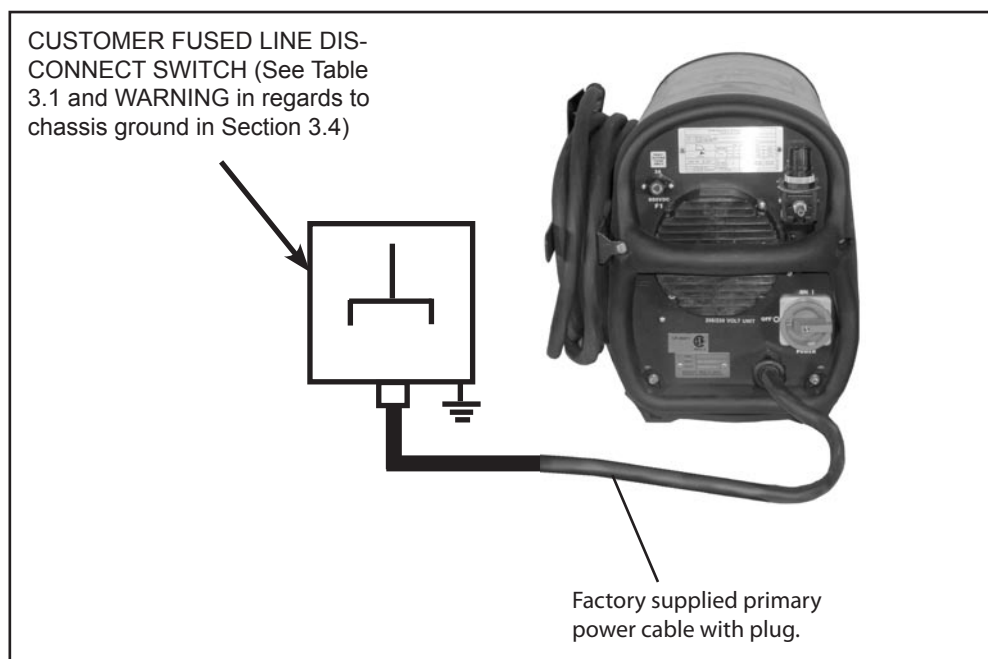


Figure 3.1 Customer Fused Line Disconnect and Receptacle

! WARNING

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 main disconnect switch and that the input power cable is unplugged.

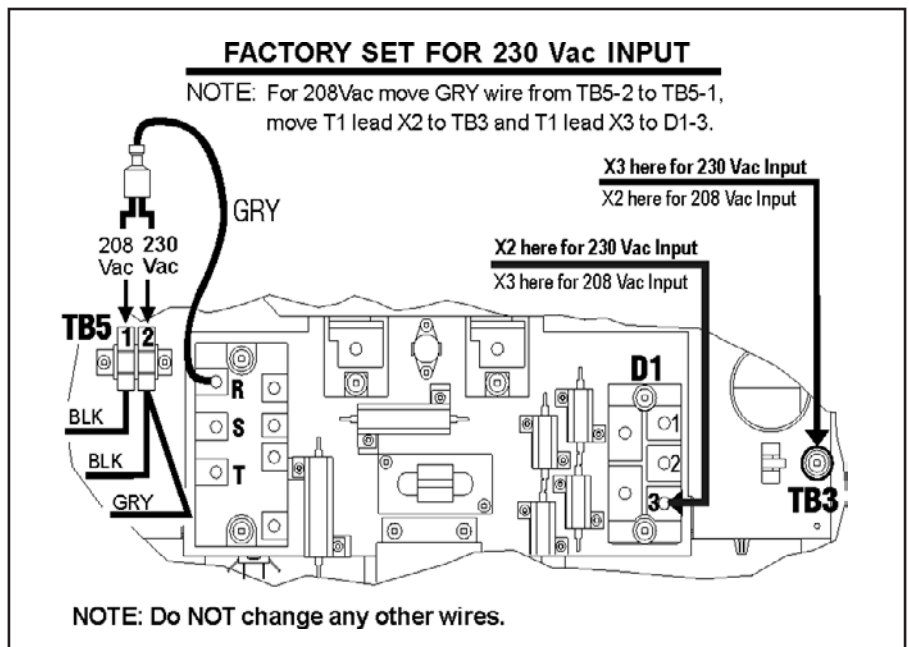
! WARNING

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 and by unplugging the power cord to the unit when reconnecting for 208 Vac input.

3.4.2 CONNECTING POWERCUT 650 FOR 208 vac INPUT

The Powercut 650 power source with 208/230 vac, single phase input capability is factory set for 230 vac input. If using 208 vac input, the Powercut 650 must be reconnected as follows before connecting to 208 vac input power.

1. Unplug the unit from the primary input power.
2. Remove the left side panel by removing the front handle and sliding the cover forward from the aluminum frame rail.
3. Locate the input bridge (IBR) and the two-position terminal block on the left side of the unit towards the rear panel (see Fig. 3.2). Locate the gray wire connected to TB5-2 and to IBR terminal "R". For 208 vac input, disconnect the gray wire from TB5-2 and then firmly connect it to TB5-1.
4. Locate the output bridge (D1) on the left side towards the front panel (see fig. 3.2). Disconnect and swap leads X2 and X3 from the main transformer. For 208 vac input, X2 is connected to TB3 and X3 is connected to terminal 3 of D1. Make sure the connections are firmly tightened.
5. Leave all other wires the same.
6. Reinstall cover by sliding it back into the frame rail. Connect the front handle and connect the Powercut 650 to the 208 vac input power.



**Figure 3.2 Primary Voltage Connection Diagram
208 / 230 vac Input Power Connections**

3.5 SECONDARY CONNECTIONS (REFER TO FIG. 3.3)

1. The Powercut 650 is supplied from the factory with the complete PT-31XLPC torch and the work cable with clamp assembly pre-installed. No further installation is required. For information on torch connections or refitting the torch (see Sec. 5.4).
2. Connect your air supply to the inlet connection of the filter-regulator.
3. Clamp the work cable to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable.

**Figure 3.3 Secondary Connections Diagram**

**WARNING**

Make sure power switch on power source is in OFF position and primary input power is deenergized.

**WARNING**

BE SURE to install the swirl baffle in the torch. Failure to do so would allow the nozzle (tip) to contact the electrode. This contact would permit high voltage to be applied to the nozzle. Your contact with the nozzle or workpiece could then result in serious injury or death by electric shock.

**WARNING**

The PT-31XLPC torch head contains a gas flow check valve that acts in conjunction with the flow switch and circuitry within the power source. This system prevents the torch from being energized with high voltage if the torch switch is accidentally closed when the shield is removed. ALWAYS REPLACE TORCH WITH THE PROPER TORCH MANUFACTURED BY ESAB SINCE IT ALONE CONTAINS ESAB'S PATENTED SAFETY INTERLOCK.

3.6 ASSEMBLING PT-31XLPC CONSUMABLE PARTS

The PT-31XLPC Torch is supplied complete; ready to cut and needs no further assembly. If it becomes necessary to inspect the front end wear parts, see Figure 3.4 for correct assembly order.

Install the electrode, baffle, nozzle, and heat shield as shown in Fig. 3.4. Tighten heat shield snugly but do not overtighten.

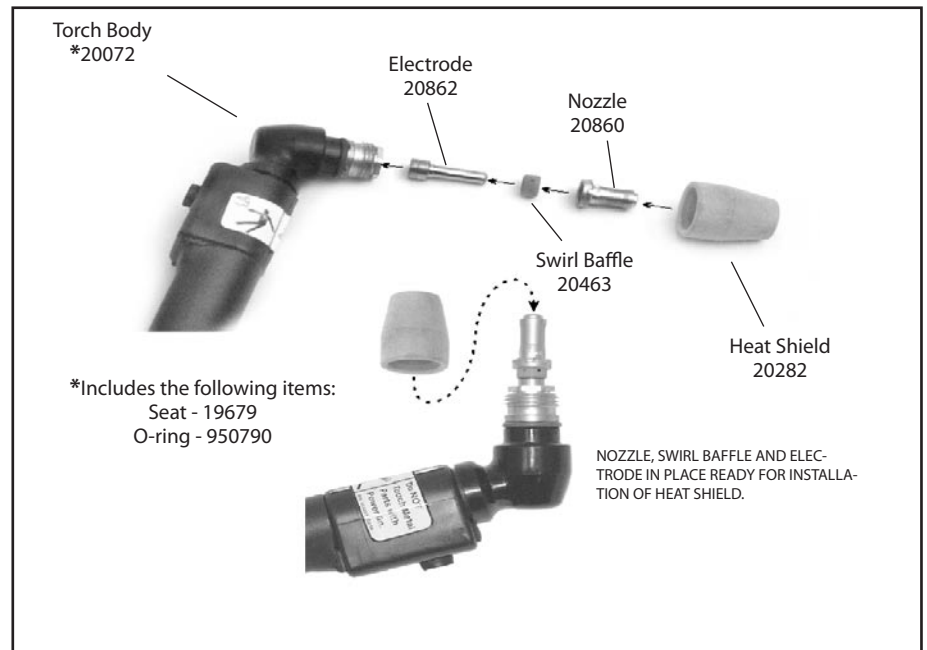


Figure 3.4 Assembly of "XT" Consumable Parts

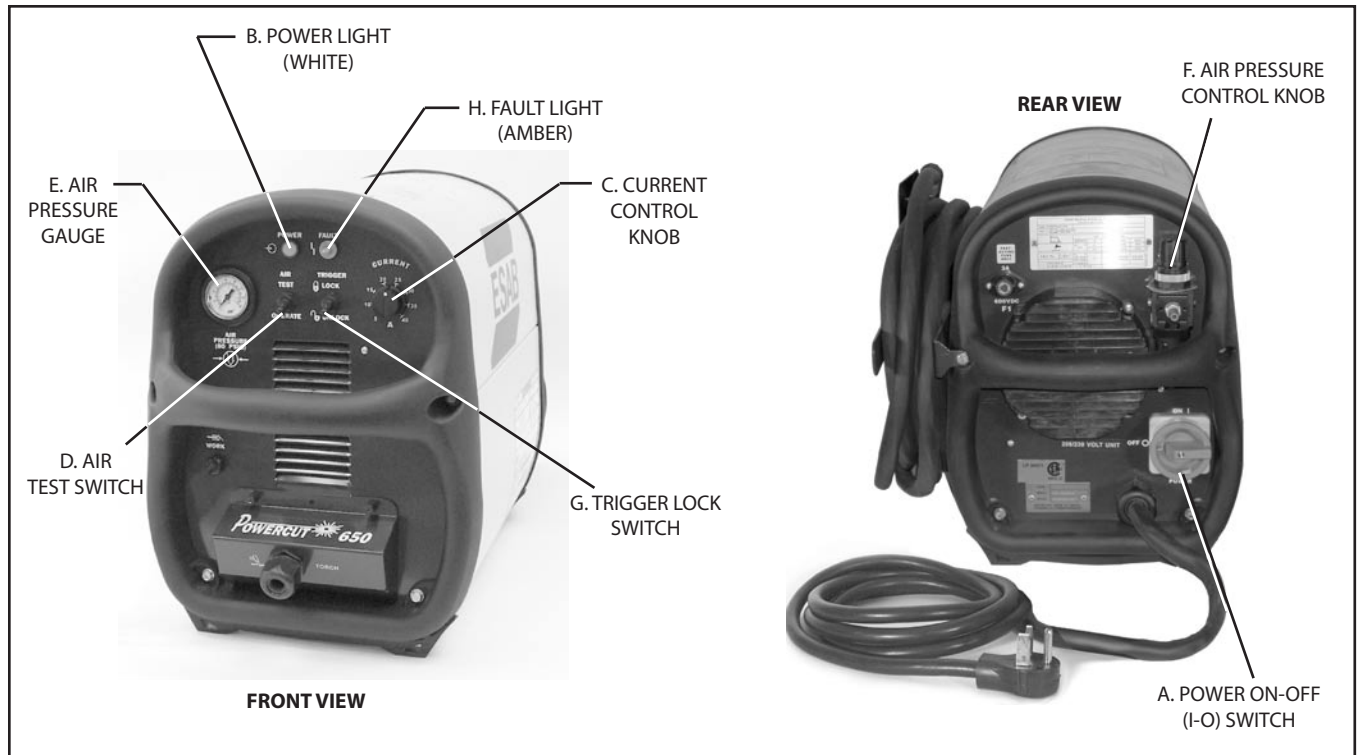


Figure 4.1. Powercut 650 Controls



WARNING

ELECTRIC SHOCK can kill.

- Do NOT operate the unit with the cover removed.
- Do NOT apply power to the unit while holding or carrying the unit.
- Do NOT touch any torch parts forward of the torch handle (nozzle, heat shield, electrode, etc.) with power switch on.



WARNING

ARC RAYS can burn eyes and skin;

NOISE can damage hearing.

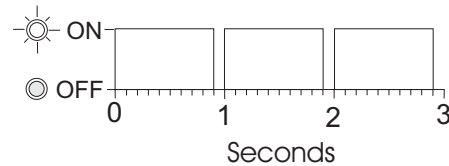
- Wear welding helmet with No. 6 or 7 lens shade.
- Wear eye, ear, and body protection.

4.0 POWERCUT 650 CONTROLS (FIGURE 4.1)

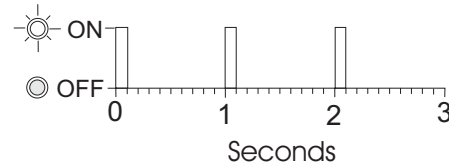
- Power Switch (located on rear panel).** When placed in ON position, the white pilot light will glow indicating control circuit is energized and the cooling fan will run. The Powercut 650 is now in the "READY" mode given a suitable air supply and a properly assembled torch.
- Power Light.** Indicates that the Power Switch is in the ON position.
- Output Current Control.** Adjustable from 10 to 40 amperes to suit cutting conditions.
- Air Check Switch.** When placed in ON position, air filter-regulator can be adjusted to 80 psig before cutting operations. Allow air to flow for a few minutes. This should remove any condensation that may have accumulated during shutdown period. Be sure to place switch in OFF position before starting cutting operations.
- Air Pressure Gauge.** Indicates supply pressure to the unit.
- Air Regulator Control Knob.** Used to adjust the air pressure for the cutting process. Proper operating range for the Powercut 650 is 80 psig.
- Lock-In Switch.** When placed in ON position, permits releasing torch switch button after cutting arc has been initiated. To extinguish arc at end of cut, press and release torch switch button again or pull torch away from work. When placed in OFF position, torch switch must be held closed by the operator during the entire cutting operation and then released at the end of cut.

- H. Fault Light.** Will glow amber under the following conditions and operations will come to a complete stop.

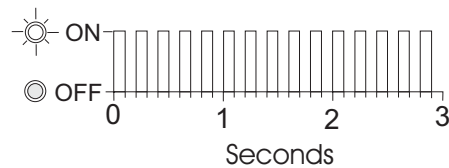
Flow Fault: The fault light will be **mostly on** but will flick off for approx. 1/10th of a second every second. This indicates that the air flow supply is low.



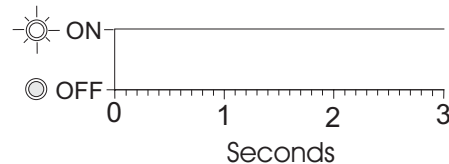
Over Temperature: The fault light will be **mostly off** but will flick on for approx. 1/10th of a second every second. This indicates that the duty cycle has been exceeded. Allow the power source to cool down before returning to operation.



High/Low Line Voltage: The fault light will **rapidly blink on and off** (five times per second). This indicates that the input voltage is outside the "+ or -" 15% range of the input rating.



Over-Current: The fault light will be on **continuously**. This indicates that input current has been exceeded.



All fault signals will remain on for a minimum of 10 seconds. If fault clears, all will reset automatically except for over-current. To clear over-current, the power must be shut off for 5 seconds and then turned back on.

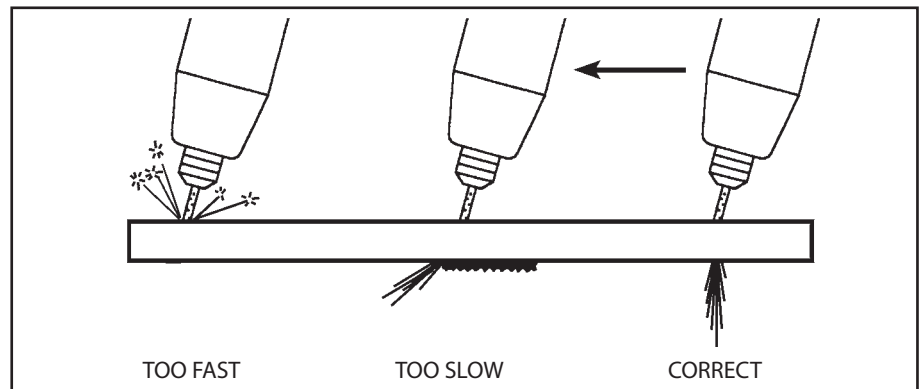


Fig. 4.2 - Effect of Cutting Speed

**WARNING**

Wear the usual protective gloves, clothing, and helmet. Helmet with filter lens shade No. 6 or 7 should provide adequate protection for your eyes.

**WARNING**

Never touch any parts forward of the torch handle (tip, heat shield, electrode, etc.) unless the power switch is in the OFF position.

**WARNING**

Position the Powercut 650 at least 10 feet (3 meters) from the cutting area to protect the unit from sparks and hot slag from the cutting operation.

4.1 CUTTING WITH THE PT-31XLPC

After placing the primary (wall) switch to the ON position and making control and air pressure adjustments as described above, proceed as follows:

1. Touch the tip of the torch to the workpiece (or within 0.020-in. of the workpiece) holding the torch at about 15- 30° angle to avoid damaging the tip.
2. Depress the torch switch. (Air and high frequency should energize.)
3. Two seconds after depressing torch switch, the plasma arc will start cutting. (If using the LOCK-IN mode, torch switch can be released after establishing the cutting arc.)
4. After starting the cut, the tip can be dragged along the workpiece if cutting up to 1/4" thick material. When cutting material greater than 1/4", maintain a 1/8" tip-to-work (standoff) distance.
5. When ending a cut, the torch switch should be released (press and release if using LOCK-IN mode) and lifted off the workpiece just before the end of the cut to minimize double-arcing which can damage the tip. This is to prevent high frequency from reigniting after cutting arc extinguishes.
6. In the postflow mode, the arc can be restarted immediately by depressing the torch switch. The two second preflow will automatically cancel.

4.2 OPERATING TECHNIQUES

1. **Piercing** - Materials (up to 1/8-in. thick) may be pierced with the torch touching the work. When piercing thicker materials (up to 3/16-in. aluminum or 1/4-in. stainless or carbon steel) at an angle, position the torch .020" above the workpiece. Start the cutting arc, then immediately raise the torch to 1/16" stand-off and move the torch along the cut path. This will reduce the chance of spatter from entering the torch and prevent the possibility of welding the tip to the plate. The torch should be angled at about 30° when starting to pierce, and then straightened after accomplishing the pierce.
2. **Grate Cutting** - For rapid restarts, such as grate or heavy mesh cutting, do not release the torch switch. This avoids the 2 second preflow portion of the cutting cycle.

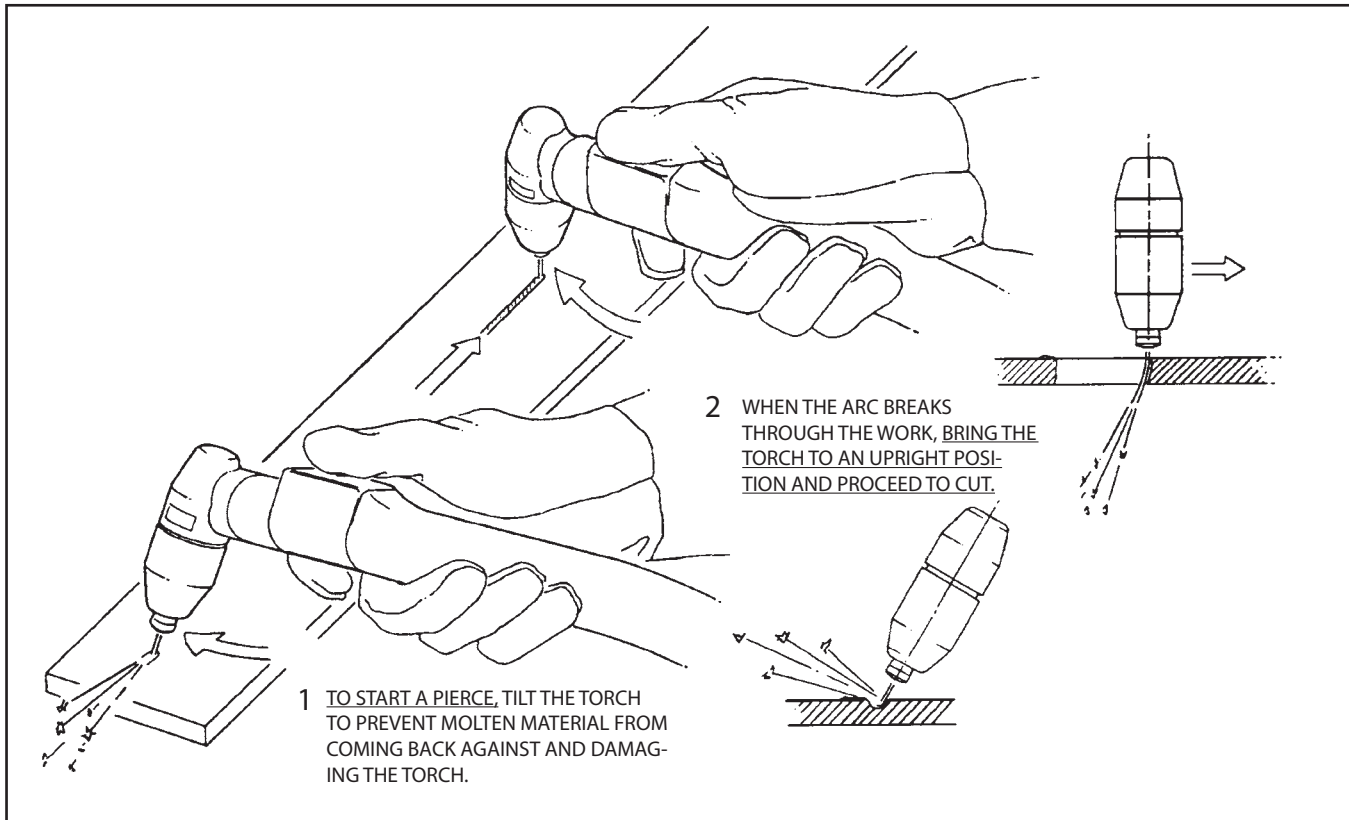


Figure 4.3. Piercing Technique using the PT-31XLPC

Cutting Speed Range — Powercut 650
 (Using Air with XT Consumables 40 A @ 75 psi)
 Nozzle - P/N 20860, Electrode - P/N 20862
 With 1/16" Standoff (Tip to Work Distance)

NOTE: Lower the air pressure to 75 psig on materials $\leq 1/16"$ or when inconsistent arc starting is experienced at 80 psig.

NOTE: The speeds given here are typical for best quality cuts. Your actual speeds may vary depending on material composition, surface condition, operator technique, etc. If cutting speed is too fast, you may lose the cut. With slower speeds excessive dross may accumulate. If speed is too slow, the arc may extinguish. Air cutting typically produces a rough face on stainless steel and aluminum.

Material	Thickness (In.)	Cutting Speed (ipm)
Carbon Steel (AISI 1020)	1/16	330
	1/8	105
	1/4	53
	3/8	22
	1/2	12
	5/8	8
	3/4	4
Stainless Steel (AISI 304)	1/16	320
	1/8	90
	1/4	40
	3/8	20
	1/2	12
	5/8	8
	3/4	3
Aluminum (6061)	1/16	450
	1/8	200
	1/4	70
	3/8	30
	1/2	14
	5/8	11
	3/4	8

4.3 COMMON CUTTING PROBLEMS

Listed below are common cutting problems followed by the probable cause of each. If problems are determined to be caused by the Powercut 650, refer to the maintenance section of this manual. If the problem is not corrected after referring to the maintenance section, contact your ESAB representative.

A. Insufficient Penetration.

1. Cutting speed too fast.
2. Damaged cutting nozzle.
3. Improper air pressure.

B. Main Arc Extinguishes.

1. Cutting speed too slow.

C. Dross Formation. (In some materials and thicknesses, it may be impossible to get dross-free cuts.)

1. Cutting speed too fast or too slow.
2. Improper air pressure.
3. Faulty nozzle or electrode.

D. Double Arcing. (Damaged Nozzle Orifice.)

1. Low air pressure.
2. Damaged cutting nozzle.
3. Loose cutting nozzle.
4. Heavy spatter.

E. Uneven Arc.

1. Damaged cutting nozzle or worn electrode.

F. Unstable Cutting Conditions.

1. Incorrect cutting speed.
2. Loose cable or hose connections.
3. Electrode and/or cutting nozzle in poor condition.

G. Main Arc Does Not Strike.

1. Loose connections.

H. Poor Consumable Life.

1. Improper gas pressure.
2. Contaminated air supply.

! CAUTION

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

! WARNING

Be sure that the wall disconnect switch or wall circuit breaker is open before attempting any inspection or work inside of the Powercut 650.

5.0 INSPECTION AND CLEANING

Frequent inspection and cleaning of the Powercut 650 is recommended for safety and proper operation. Some suggestions for inspecting and cleaning are as follows:

- A. Check work cable to workpiece connection.
- B. Check safety earth ground at workpiece and at power source chassis.
- C. Check heat shield on torch. It should be replaced if damaged.
- D. Check the torch electrode and cutting nozzle for wear on a daily basis. Remove spatter or replace if necessary.
- E. Make sure cable and hoses are not damaged or kinked.
- F. Make sure all fittings and ground connections are tight.
- G. With all input power disconnected, and wearing proper eye and face protection, blow out the inside of the Powercut 650 using low-pressure dry compressed air.

5.1 FLOW SWITCH (FIGURE 5-1)

When excessive contamination is found in the air, the flow switch (FS) should be removed, disassembled and cleaned as follows:

- A. Ensure the system is shut down and there is no trapped air under pressure in the piping.
- B. Remove the piston plug.
- C. Remove the spring (FS-4 only). Use care when handling spring to prevent distortion.
- D. Remove the piston.
- E. Clean all parts with cleaning agent. Ensure cleaning agent does not contain solvents which can degrade polysulfone. Warm water and detergent is recommended for cleaning. Allow all parts to dry thoroughly before reassembly.

Reassemble the flow switch in reverse order.

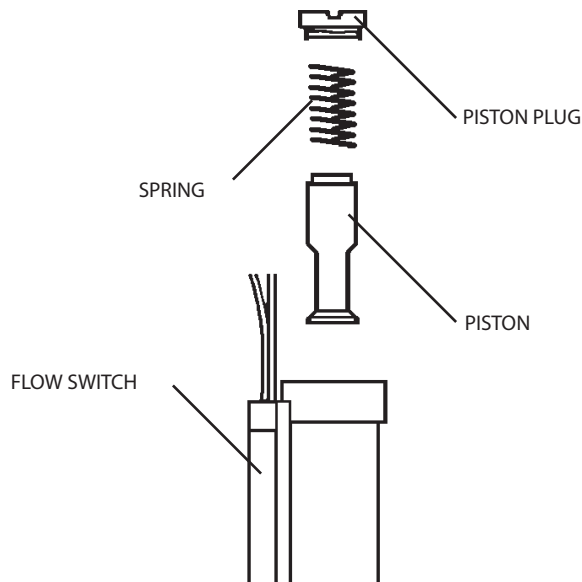


Figure 5-1. Disassembly / Assembly of Flow Switch

5.2 TROUBLESHOOTING

**WARNING**

ELECTRIC SHOCK CAN KILL! Be sure that all primary power to the machine has been externally disconnected. Open the line (wall) disconnect switch or circuit breaker before attempting inspection or work inside of the power source.

**WARNING**

Voltages in plasma cutting equipment are high enough to cause serious injury or possibly death. Be particularly careful around equipment when the covers are removed.

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

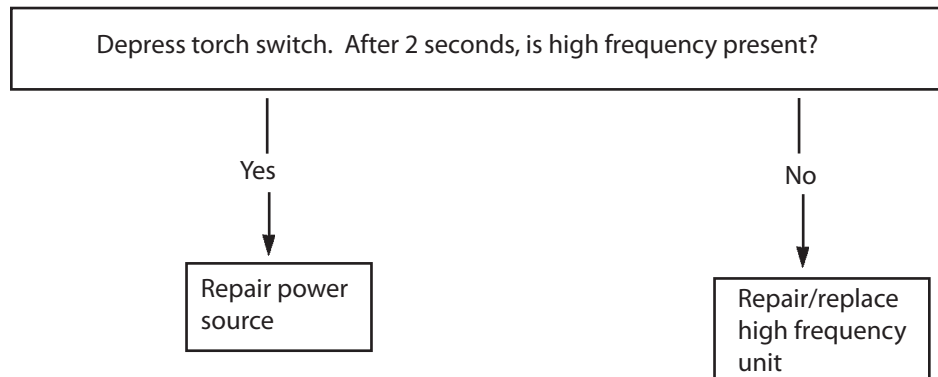
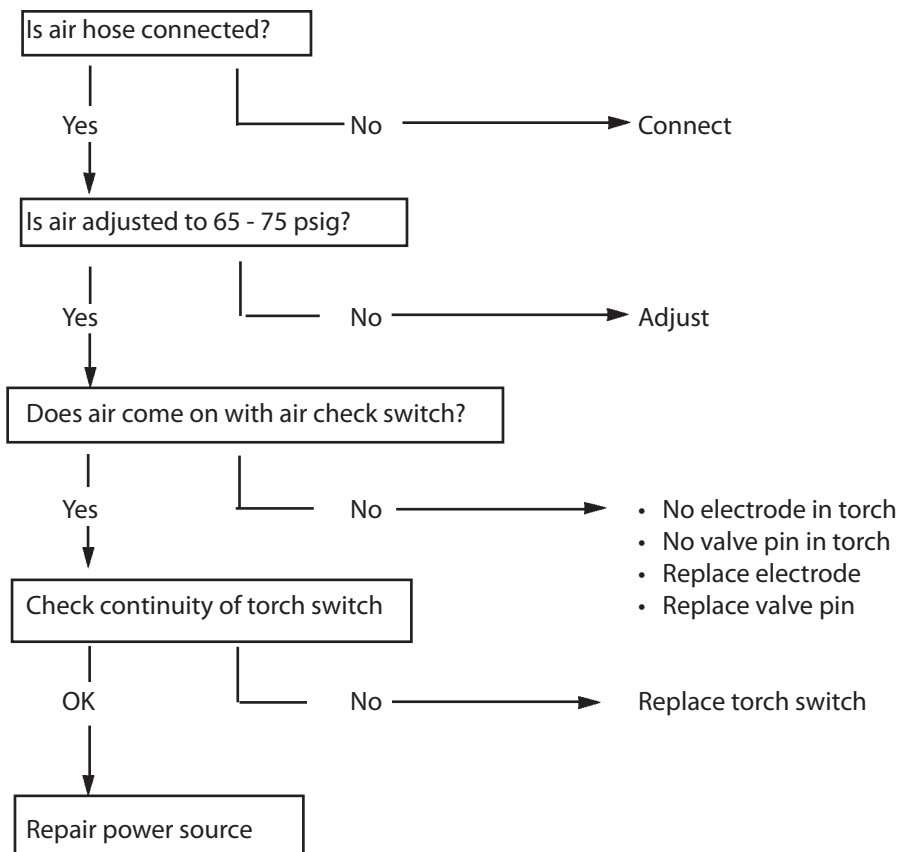
The cause of control malfunctions can be found by referring to the sequence of operations (Figures 5-2 and 5-5) and electrical schematic diagram and checking the various components. A volt-ohmmeter will be necessary for some of these checks.

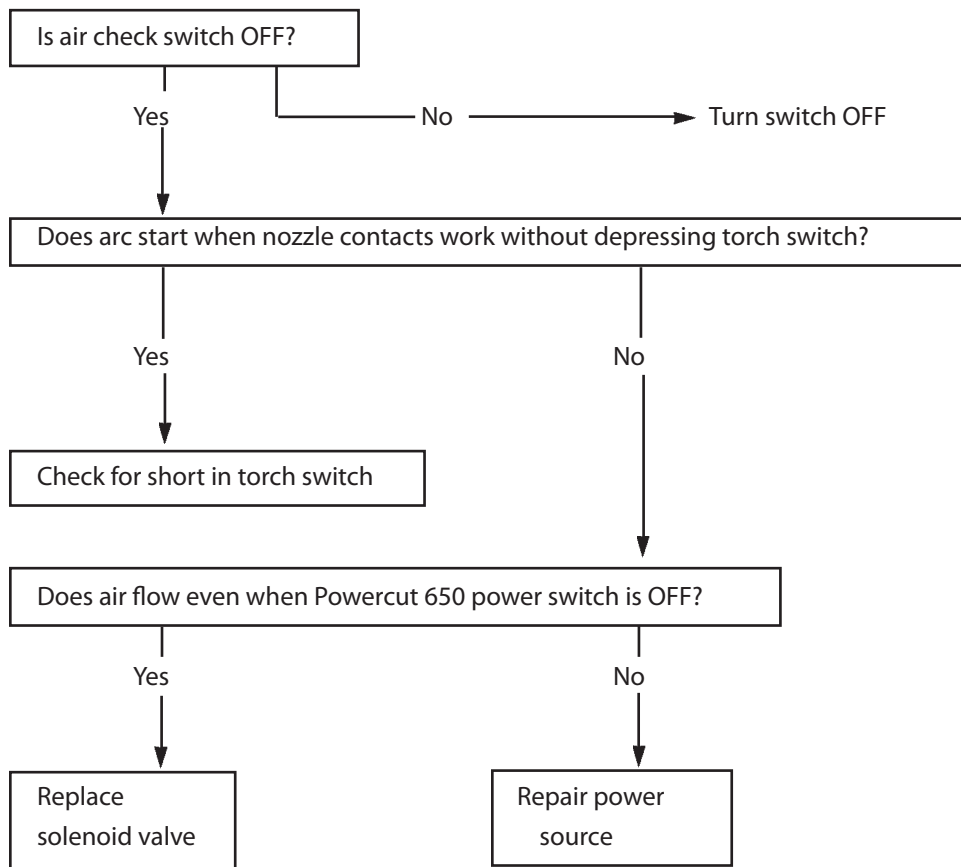
NOTE

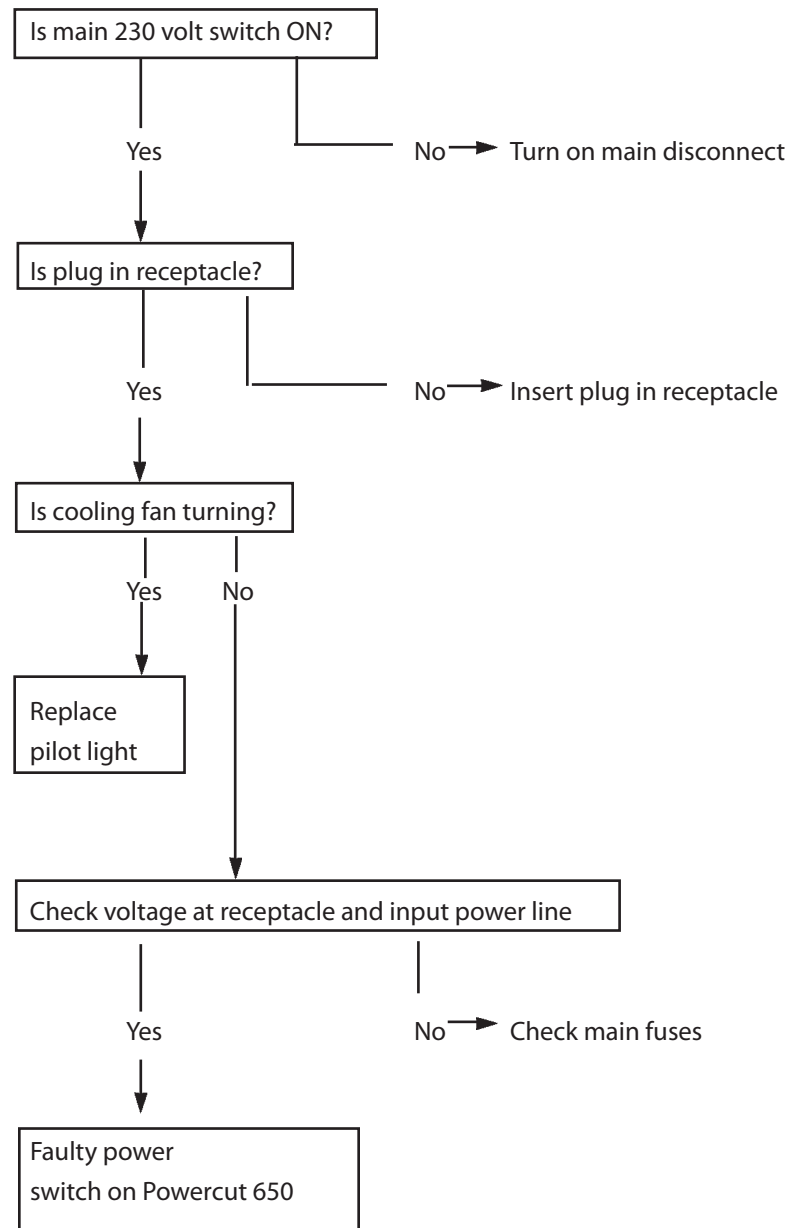
Before checking voltages in the circuit, disconnect the power from the high frequency generator to avoid damaging your voltmeter.

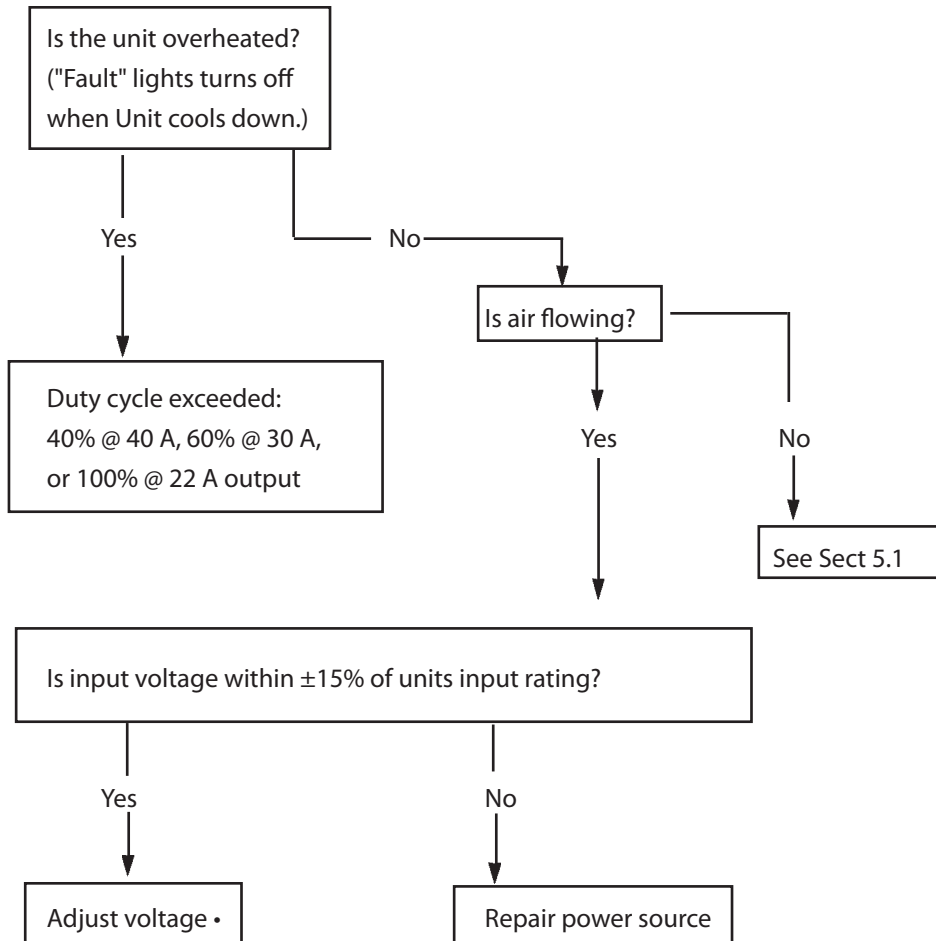
5.3 TROUBLESHOOTING GUIDE**A. Difficult Starting.**

- Change electrode
- Change nozzle
- Check for good, clean connection of work lead to workpiece
- Check air pressure (65 - 75 psig)
- Check torch power cable for continuity

**B. No Air****Figure 5-2. Sequence of Operations**

C. Air does not shut off**Figure 5-3. Sequence of Operations**

D. White "Power" light not energized.**Figure 5-4. Sequence of Operations**

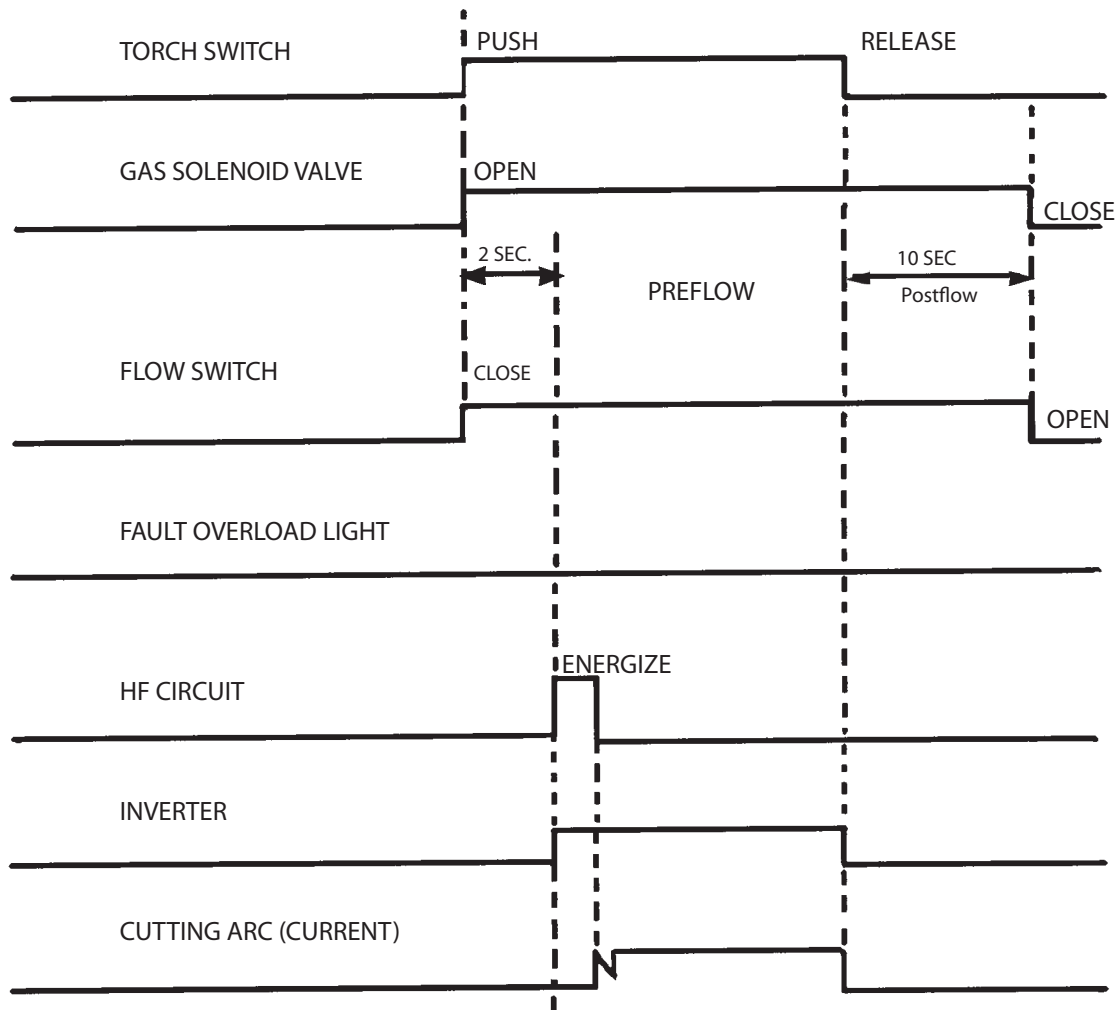
E. Amber "FAULT" light ON.**Figure 5-5. Sequence of Operations**

- Fault light will energize if input voltage goes below or above $\pm 15\%$ of units input rating. The light will not turn OFF even when correct voltage is restored. Reset by placing Powercut 650 power switch OFF and then ON again.

NOTE: When in LOCK-IN mode, the FAULT light will turn on during second "trigger". This does not affect performance. Turn off.

5.4 SEQUENCE OF OPERATION

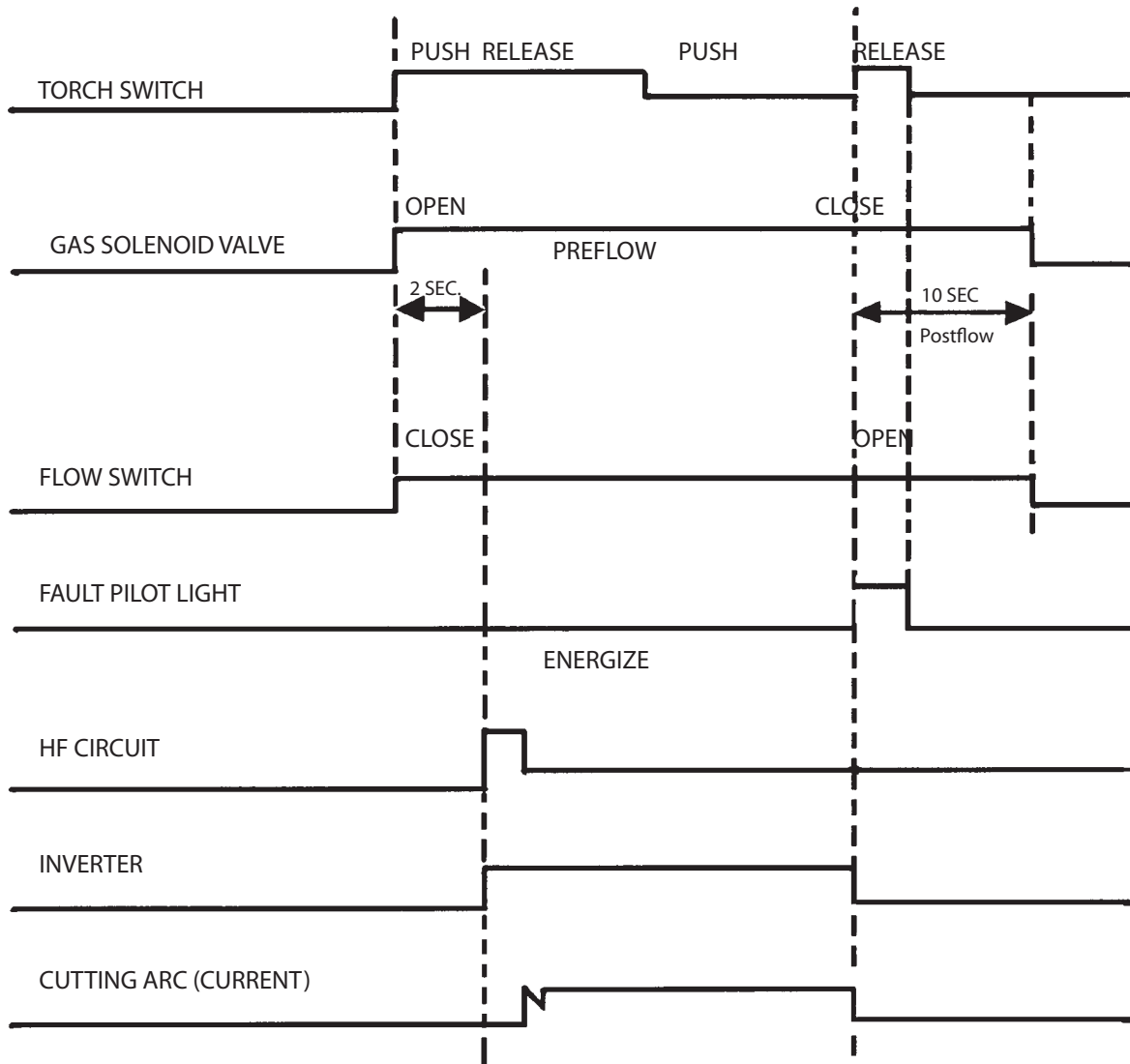
A. LOCK-IN "OFF" position



NOTES:

1. When the torch switch is pushed during postflow period, the postflow and preflow times are canceled, and the HF is energized immediately.
2. When the amber fault pilot light comes on, cutting operation should be stopped. The postflow time starts from the moment the torch switch is released.

B. LOCK-IN "ON" position



NOTES:

1. When the torch switch is pushed during postflow period, the postflow and preflow times are canceled, and the HF is energized immediately.
2. When the amber fault pilot light comes on, cutting operation should be stopped. The postflow time starts from the moment the torch switch is released.
3. FAULT pilot light is on during second "turn-off" trigger only. This does not affect performance in any way.

5.5 RE-FITTING THE PT-31XLPC TORCH

1. For operator safety, the torch connections are located on the output terminal board behind the lower portion of the front panel. Remove access cover to torch connection compartment from the front panel of power source.
2. Thread the power cable and switch lead of the PT-31XLPC through the Strain Relief on the Access Cover. Connect power cable to the torch fitting (left-hand threads) and plug in the switch lead to the torch switch receptacle on the output terminal board. Make sure the power cable connection is wrench-tight. Make sure plug of switch lead is firmly locked in place.
3. Reassemble the access door to the power source. Retighten Strain Relief to secure power cable, but do not overtighten.

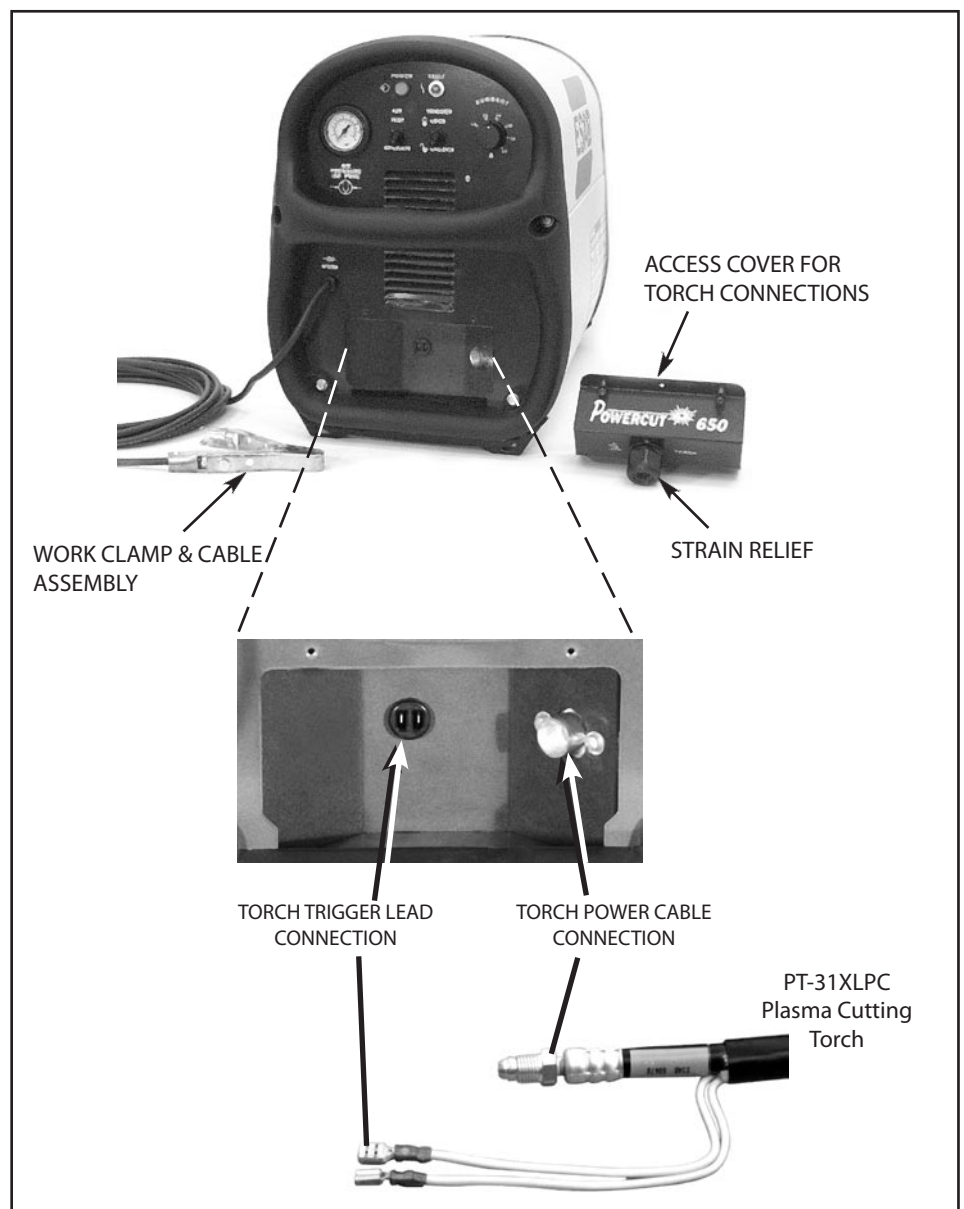


Figure 5-6. PT-31XLPC Torch Connections

NOTE:

Schematics and Wiring Diagrams on 279.4mm x 431.8mm (11" x 17") paper are included inside the back cover of this manual.

6.0 Replacement Parts

6.1 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.

6.2 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.

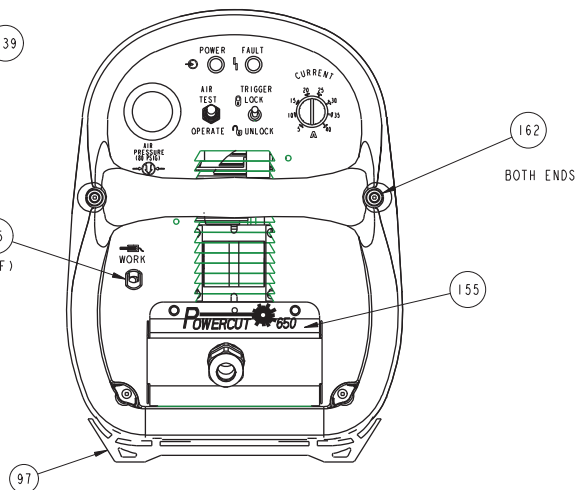
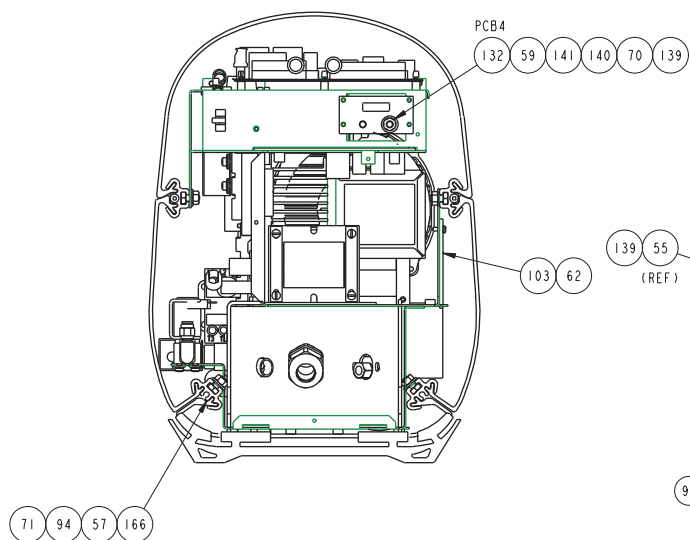
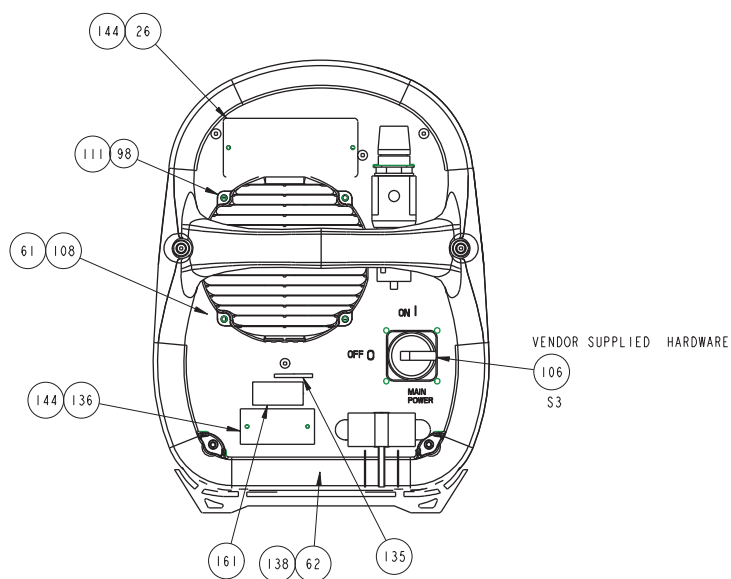
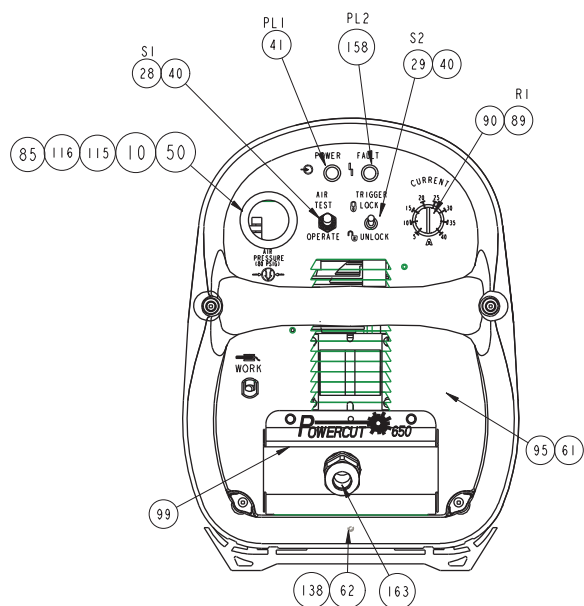
Replacement parts may be ordered from your ESAB Distributor.

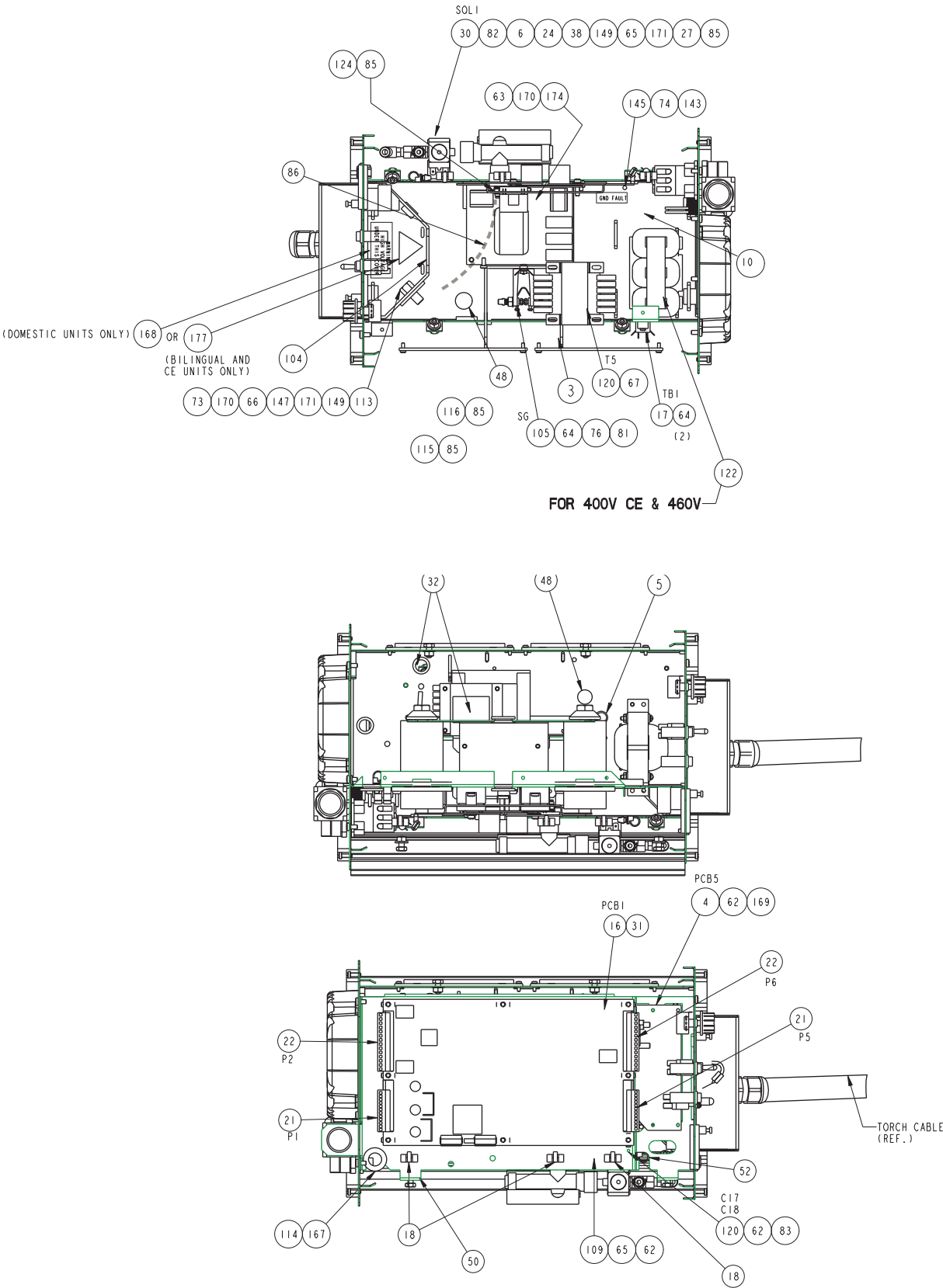
Be sure to indicate any special shipping instructions when ordering replacement parts.

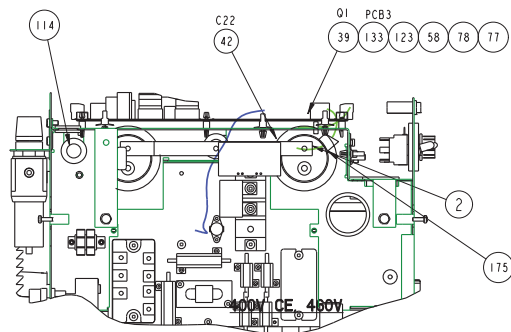
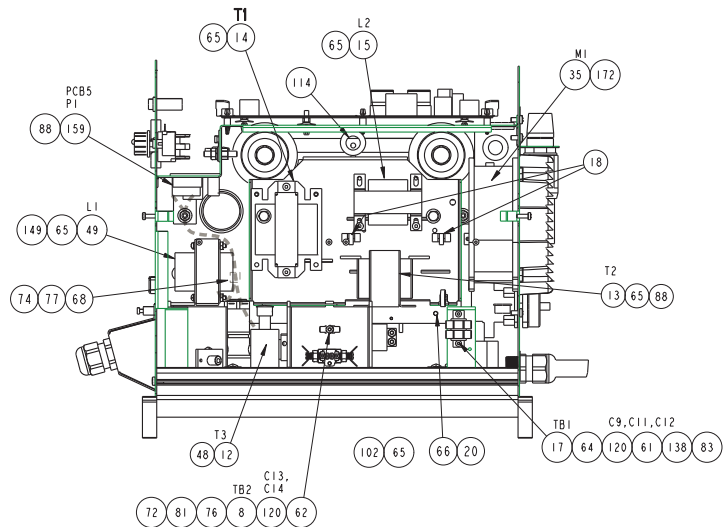
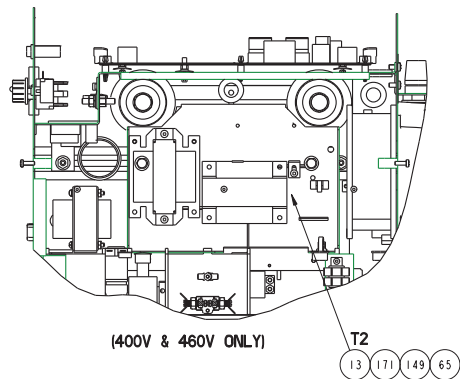
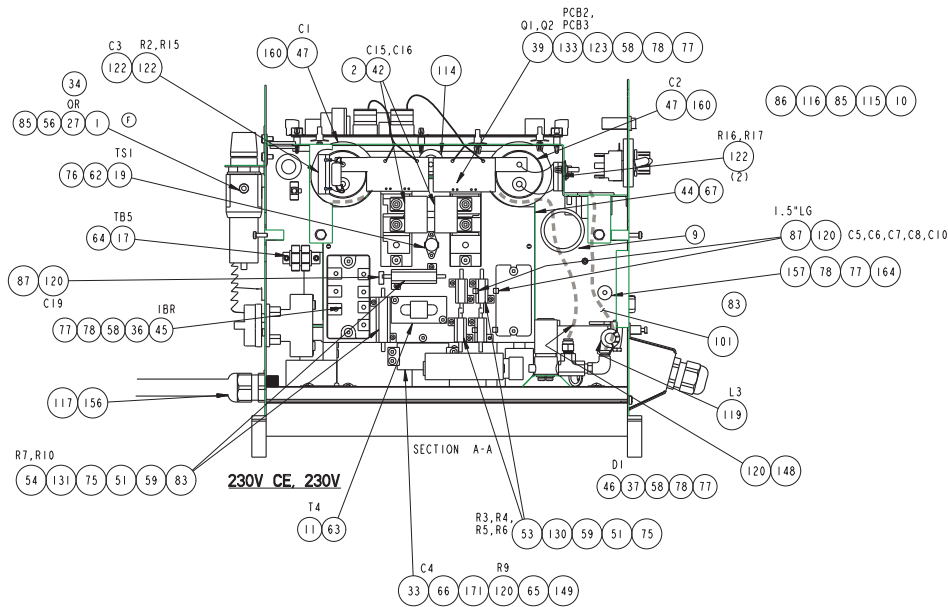
Refer to the Communications Guide located on the back page of this manual for a list of customer service phone numbers.

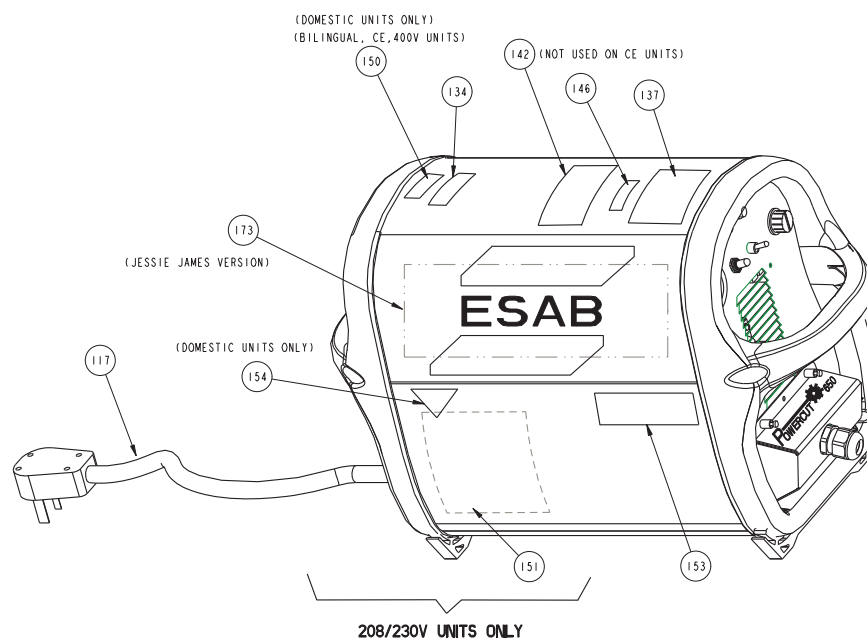
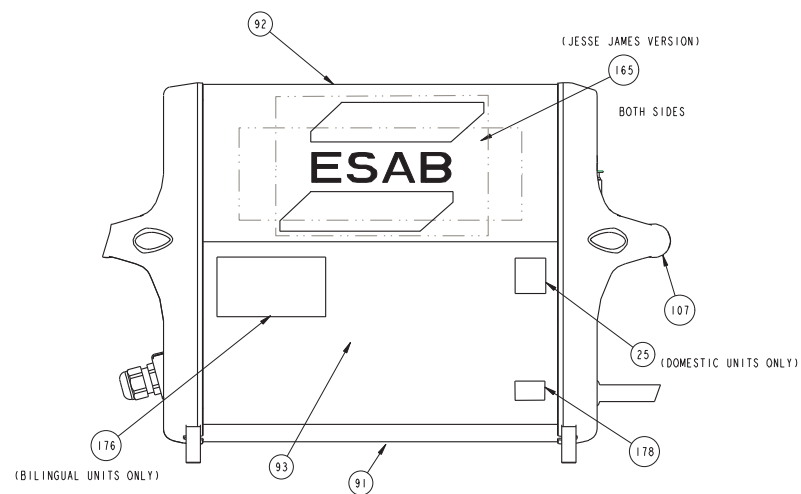
Note

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









SECTION 6

REPLACEMENT PARTS

ITEM NO.	PART OR CODE NO.	SYMBOL (ELEC-AY)	DESCRIPTION
1	0558005394		FILTER REG AIR LINE B07-234-AIKA
2	36404		BUSBAR IGBT
	36425		BUSBAR 500i 400V
3	0558002183		COVER HIGH FREQ KYDEX
4	838131	PCB5	PCB START UP NETWORK
5	13730222		BUSHING SNAP .56
6	22432		TEE STREET 1/8-27 NPT
7			TYWRAP MEDIUM
8	634220	I	TAB
9	673038	2	BUSHING SNAP 1.38 ID X 1.75 MH
10	21711	I	GAUGE 1.50 160PSI WHT CBM STL
11	32958	T4	TRANSFORMER ASSY CURRENT
12	32969	T3	REACTOR ASSY HIGH FREQ
13	35940	T2	XFMR AY CONTROL 208/230V
	32914		XFMR AY CONTROL 400/460/575V
14	35941	T1	XFMR ASSY MAIN 230V & 460V
15	35945	L2	INDUCTOR POWER FACTOR CORRECT
16	38214	PCB1	PCB PLASMA CONTROL UNIVERSAL
17	950487	TB1,5	TERMINAL BLOCK (2 POS 20A)
18	950908		CABLE TIE PUSH MOUNT
19	951085	TS1	SWITCH TERMAL D/T 176 15A 120V
20	182W58		CABLE TIE SCREW MTG.
21	951339	PI,5	PLUG FEMALE PC 12 POS
22	951340	P2-6	PLUG FEMALE PC 14 POS
23	951889		ADAPTOR TAB PUSH ON 90 DEG
24	952086		ELBOW MALE SWIVEL 90 DEG 1/4NPTM
25	0558954034		LABEL CUSTOMER ASSISTANCE
26	955227		LABEL RATING PC-650 208/230
	0558954004		LABEL RATING PC-650 460V 3PH
	0558954005		LABEL RATING PC-650 400V 3PH
27	08030354		ADAPTER 1/4 NPTM 1/4 ID HOSE
28	634518	S1	SWITCH TOGGLE DPDT 2POS 15A 125V Q/D
29	673213	S2	SWITCH TOGGLE SPST 2POS 15A 125V Q/D
30	0558006156	SOL1	VALVE SOL 1/8NPT 24V 60HZ
31	950708		BOARD SUPPORT CIR/LOCK
32	950823		BUSHING SNAP
33	951161	C4	CAPACITOR 20 UF, 400VDC
34	60909075		CLOSURE TAPERED CAPPLUG #4
35	951182	MI	FAN AC AXIAL
36	951191		PAD THERMAL INPUT BRIDGE
37	951192		PAD THERMAL OUTPUT BRIDGE
38	951202	FS	SW FLOW .25GPN SPST
39	0558005445	Q1,2	MODULE DUAL IGBT 100A 600V SEMIKRON
	0558005462	Q1	MODULE DUAL IGBT 150A 1200V SK
40	951474		SWITCH SEAL BLACK
41	951526	PL1	LAMP NEON WHT
42	951940	C15,16	CAPACITOR IGBT 1uf @ 630W VDC
	951917	C22	CAPACITOR 1200VDC 50uf
43			
44	952147		HEATSINK 500I
45	952149	IBR	MODULE INPUT BRIDGE 40 AMP 1600V
46	952150	D1	BRIDGE MODULE OUTPUT 60A @ 600V 100N
47	952185	C1,2	CAPC 1800UF 450VDC W/NUT
48	952207		HOLE PLUG NYLON
49	952606	L1	INDUCTOR OUTPUT
50	993426		GROMMET RUB 1.50ID 1.75GD X .06W
51	10981006		SOLDER SN60 0.062 DIA. WRAP3
52	993837		GROMMET RUB 0.44ID 0.56GD X .06W
53	17721020	R3,4,5,6	RESISTOR 20 OHM, 25 WATT

ITEM NO.	PART OR CODE NO.	SYMBOL (ELEC-AY)	DESCRIPTION
54	17750010	R7,10	RESISTOR 50W 10 OHM 3%
55	23602576		STRAIN RELIEF, (WORK CABLE)
56			PLUG HOLE HEX HD .25-20 X 0.50
57			SCREW MACH. HEX HD .25-20 X 0.05
58			SCREW PHTF #10-24 X .62
59			SCREW PHTF #4-40 X .38
60			SCREW PHTF #4-40 X .50
61			SCREW PHTF #6-32 X .25
62			SCREW PHTF #6-32 X .38
63			SCREW PHTF #6-32 X .50
64			SCREW PHTF #6-32 X .63
65			SCREW PHTF #8-32 X .38
66			SCREW PHTF #8-32 X .50
67			SCREW PHTF #10-24 X .38
68			SCREW PHTF #10-24 X .50
69			SCREW PHTF #10-24 X .63
70			NUT HEX BRASS 1/4-20
71			NUT HEX STLZPC .250-20
72			NUT HEX #6-32
73			NUT HEX #8-32
74			NUT HEX #10-24
75			WASHER LOCK #4
76			WASHER LOCK #6
77			WASHER LOCK #10
78			WASHER FLAT #10
79			WASHER FLAT 1/4
80			WASHER FLAT #4
81			WASHER FLAT #6
82			NPL PIPE **1/8X*0.38L BRS
83			ADH SILICON RBR CLR
84			COMPOUND ELECTRICAL JOINT
85			SEALANT PIPE SS PST
86	90858003		TUBING PLAS .2500DX.040W BLK
87	90860018		TUBING .042ID X .016W BLK #16
88	90861726		TUBING SHRINK .38 ID
89	0558001176	RI	POTENTIOMETER 10K 3W
90	0558001388		KNOB 1.17 DIA 1/4" SHAFT
91	0558001918		PLASMA TUBE BOTTOM COVER 16"
	0558004785		PLASMA TUBE BOTTOM COVER 16" JJ
92	0558001922		PLASMA TUBE TOP COVER 16"
	0558004787		PLASMA TUBE TOP COVER 16" JJ
93	0558001926		PLASMA TUBE SIDE COVER 16"
	0558004786		PLASMA TUBE SIDE COVER 16" JJ
94	0558001930		PLASMA TUBE EXTRUDED BAR 16"
95	0558003086M		PANEL FRONT PC 650 TUBE
	0558005339M		PANEL FRONT PC 650 TUBE (CE)
	0558005378M		PANEL FRONT PC-650 JESSE JAMES
96	997887		HOSE SGL WTR 1/4" 1B-**RL *BK
97	0558002780		FOOT PLASMA TUBE
98	0558005659		FINGER GUARD
99	0558003307M		TORCH COMPARTMENT COVER PC650
	0558005498M		TORCH COMPARTMENT COVER PC650 CE
100	0558003308		BASE ALUMINUM PC650
	0558005341		BASE ALUMINUM PC650 CE
101	0558003309		HEATSINK BRACKET PC650
102	0558003310		TRANSFORMER BRACKET PC650
103	0558003312		COVER KYDEX PC650
104	0558003313		PARTITION TORCH PLUMB PC650
105	0558001180		SPARK GAP ASSEMBLY
106	0558004125	S3	SWITCH POWER DISCONN PC650
	36107		SWITCH POWER DISCONN PC650 600V 63A

SECTION 6

REPLACEMENT PARTS

ITEM NO.	PART OR CODE NO.	SYMBOL (ELEC-AY)	DESCRIPTION
107	0558001916B		PLASMA TUBE END COVER
108	0558003306M		REAR PANEL PC650
	0558005340M		REAR PANEL PC650 CE
109	0558003311M		BRACKET CONTROL BOARD MTG PC650
110			TYWRAP SMALL
111	61325904		SCR #10-24 X 3/4 PAN QUADRX
112	13730583		TERM BUSING .687"
	647134		ADAPT A/I-G* F 1/8NPTM BKHD
114	92W57		GROMMET RUB .63 ID X .88 GD X .06
115	0558006261		ELBOW UNION 90DEG 1/8NPT
116	952083		CONNECTOR MALE 1/8NPTM
117	0558003360		PC-650 CABLE INPUT POWER 10'LG
	37574		CABLE POWER INPUT PC-650 10FT
	0558002799		PC-650 CABLE INPUT POWER 10'LG CE 6MM
	0558001181		CABLE INPUT POWER 10FT 4MM
118	950904		TERMINAL 1L/M .250OTS X 18-22AWG
119	951198	L3	CORE SATURABLE
120	0558003304		KIT WIRE MAIN POWER CUT 650
	0558005316		KIT WIRE MAIN PC-650 400/460V
121	34572		COUPON TEST STEEL 18.0 X 5.5 X .50
122	0558003305		KIT WIRE POWER CUT 650 230V IPH
	0558005345		KIT WIRE POWER CUT 230V IPH CE
	0558005346		KIT WIRE POWER CUT 400V IPH CE
	0558005317		KIT WIRE POWER CUT 460V IPH
123	951190		PAD THERMAL IGBT AL-370-134
124	952172		CONNECTOR MALE 1/4NPTM
125	950906		TERMINAL 1L/F .250TS X 22-18AWG
126	950907		TERMINAL 1L/F .250TS X 14-16AWG
127	634736		CAP SPLICE
128	0558003302		SCHEMATIC POWER CUT 650 208/230V IPH
	0558005343		SCHEMATIC PC-650 230V IPH CE
	0558005314		SCHEMATIC POWER CUT 650 460V IPH
129	0558003303		DIAGRAM WIRING POWER CUT 650 230V IPH
	0558005342		DIAGRAM WIRING PC-650 230V CE
	0558005344		DIAGRAM WIRING PC-650 400V CE
	0558005315		DIAGRAM WIRING POWER CUT 650 400V, 460V
130	951193		PAD THERMAL POWER RESISTOR 25W
131	951194		PAD THERMAL POWER RESISTOR 50W
132	31488	PCB4	PC BOARD SHUNT
133	0558001177	PCB2/PCB3	PC BOARD IGBT DRIVER
	0558001178	PCB3	IGBT DRIVER PCB
134	954707		LABEL WARNING
135	954716		LABEL 208/230 VOLT UNIT
136	13730763		NAMEPLATE CODE SERIAL STOCK
137	2091514		LABEL WARNING
138			WSR LOCK #6 EXT TOOTH
139	.680560		CABLE WORK/GND
140			WASHER LOCK BRONZE 1/4
141			WASHER FLAT BRASS 1/4
142	955264		LABEL S/P KIT PT-31XLPC 40A BILINGUAL
143			WASHER LOCK EXT TOOTH #10
144	65509506		RIVET 1/8 GRIP .251-.312
145	2091558		LABEL GROUND
146	955269		LABEL READ MANUAL
147			SCREW PH #8-32 X .625
148	.950626		CLAMP 1-EAR W/INSERT 13.3 GER
149			WASHER LOCK #8
150	954008		LABEL DANGER HIGH VOLTAGE
	954994		LABEL DANGER HIGH VOLTAGE BILINGUAL
151	954700		LABEL INPUT 200VAC PCM-125
153	954746		LABEL FAULT INDICATOR

ITEM NO.	PART OR CODE NO.	SYMBOL (ELEC-AY)	DESCRIPTION
154	954506		LABEL ISO 9002
155	954981		DECAL PC-650 6.25 X 1.75
	0558954003		DECAL PC-650 CE 6.25 X 1.75
	0558954008		DECAL PC-650 "JJ" 6.25 X 1.75
156	0558003353		STRAIN RELIEF INPUT NPT3/4
157	952208		STANDOFF INSULATING NYLON
158	951754	PL2	LAMP LED YELLOW 12V
159	951009	PCB5 PI	RCPT P/C* * 6POS 10A 300A
160	950518		GROMMET 2.121C 2.5GD X .06W
161	954425		LABEL LR-30071 CSA NRTL /C
	954565		LABEL CE LOGO
162	61325090		SCR 24006 STLZPC 0.250-20 X 1.00
163	0558002581		STRAIN RELIEF NPT1
164	61325910		SCR STZP #10-32 X .38LG
165	13734588		LABEL ESAB
	0558954010		LABEL WCC RHS
166	64302996		WASHER LOCK .250
167	71200434		ADH LOCTITE Q-SET 49550
168	995204		LABEL WARNING ELECTRICAL SHOCK
169	64307860		WSR 52010 STLZPC 0.138
170	64307887		WASHER LOCK EXT TOOTH #8
171	64304887		WASHER FLAT #8
172	05504016		SCR PAN HD M5-0.8 X 16 LG
173	0558954009		LABEL WCC LHS
174	0455803880		EMC PC BOARD
175	951199		CORE SATURABLE
176	0558954085		LABEL WARNING FR 7.0W x 5.06H
177	954509		LABEL SYMBOL CAUTION HIGH VOLTAGE
178	0558954060		LABEL PATENT PLASMA POWER SUPPLY BILINGUAL

REVISION HISTORY

1. The "A" revision of 4/2003 incorporated updates of the schematic diagrams and the replacement parts section. See dneco #'s 023434 & 033078. Various formatting errors have also been corrected.
2. The revision of 7/2003 made various editorial changes to pages 15,17, 19 and 20.
3. The revision of 8/2003 updated torch wrap pictures on page 11.
4. The revision of 01/2005 converted PageMaker file to InDesign. Fonts were changed to Myriad Pro. This was done to allow translations to be done in Spanish and Portuguese. Revision letter stayed at "A" as no changes to content were made.
5. The revision of 02/2005 replaced torch body part number 35553 with 0558000790 (20072) in Section 2 and in Figure 3.4 in Section 3. Package and console information for 460V machines added along with schematic and wiring diagram.
6. Revision "B" - 05/2005 - added Air Line Filter Regulator p/n 0558005394 note in Replacement Parts section per CN #053013. Updated format.
7. Revision "B" - 06/2005 - added ESAB Console item no. 0558003515.
In replacement parts section - Added item 1 page 32 p/n 0558005498M.
Deleted "460 only" reference on item 2 page 33.
8. Revision 08/2005 - Made various updates per D. Smith and in replacement parts section, updated finger guard from: p/n 0558002994 to: p/n 0558005659 per CN-053103.
9. Revision 12/2005 - Updated all rear view pics per D. Smith.
10. Revision 04 / 2006 - Updated entire Replacement Parts subsection per ECN #063058.
11. Revision 12/2007 - Updated Replacement Parts to revision "R" .

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

- A. CUSTOMER SERVICE QUESTIONS:
Telephone: (800)362-7080 / Fax: (800) 634-7548 Hours: 8:00 AM to 7:00 PM EST
Order Entry Product Availability Pricing Order Information Returns
- B. ENGINEERING SERVICE:
Telephone: (843) 664-4416 / Fax : (800) 446-5693 Hours: 7:30 AM to 5:00 PM EST
Warranty Returns Authorized Repair Stations Welding Equipment Troubleshooting
- C. TECHNICAL SERVICE:
Telephone: (800) ESAB-123/ Fax: (843) 664-4452 Hours: 8:00 AM to 5:00 PM EST
Part Numbers Technical Applications 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 Hours: 7:30 AM to 3:30 PM EST
Repair Estimates Repair Status
- F. WELDING EQUIPMENT TRAINING
Telephone: (843)664-4428 / Fax: (843) 679-5864 Hours: 7:30 AM to 4:00 PM EST
Training School Information and Registrations
- G. WELDING PROCESS ASSISTANCE:
Telephone: (800) ESAB-123 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

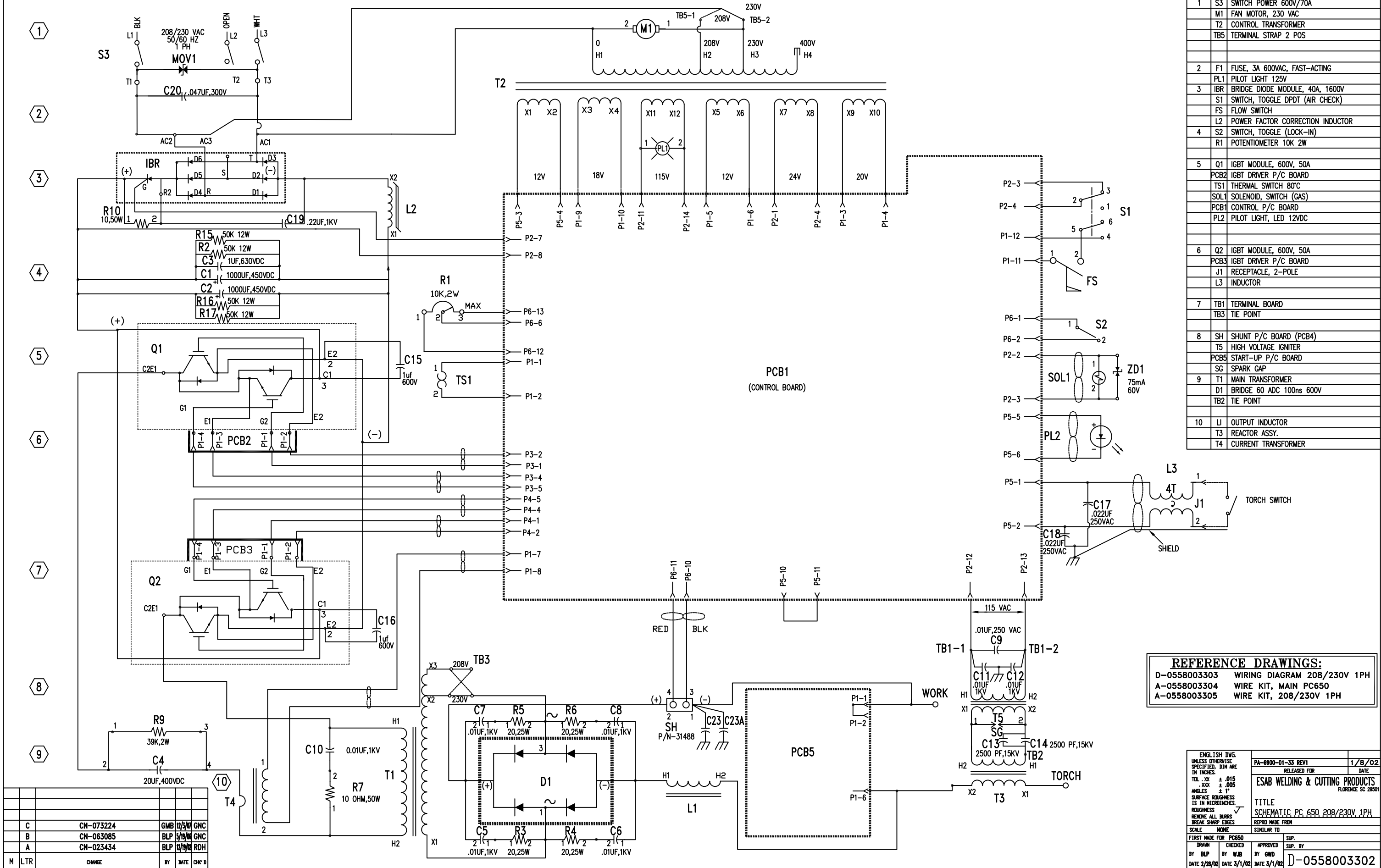
IF YOU DO NOT KNOW WHOM TO CALL

Telephone: (800) ESAB-123
Fax: (843) 664-4462
Hours: 7:30 AM to 5:00 PM EST
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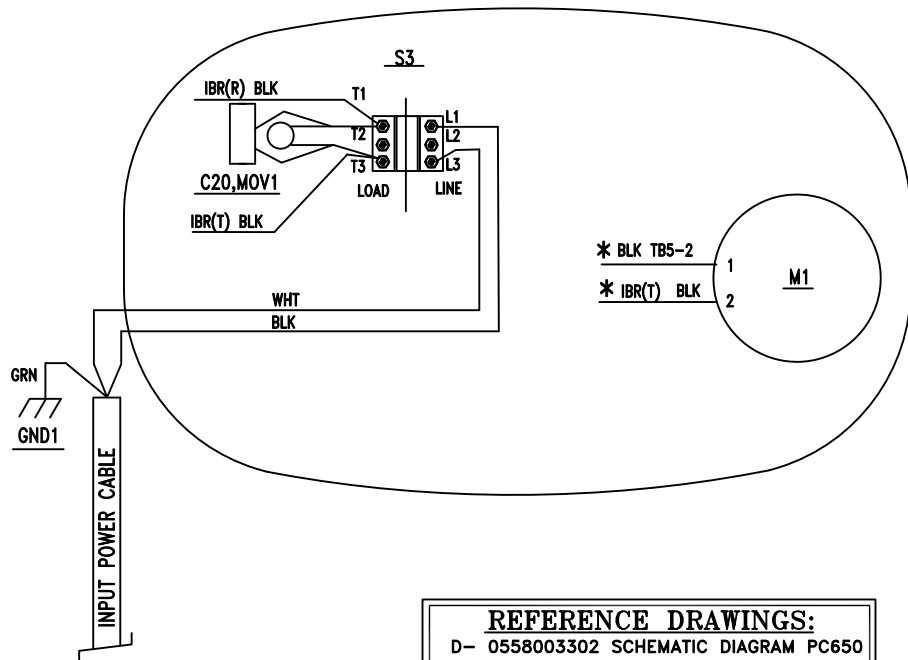
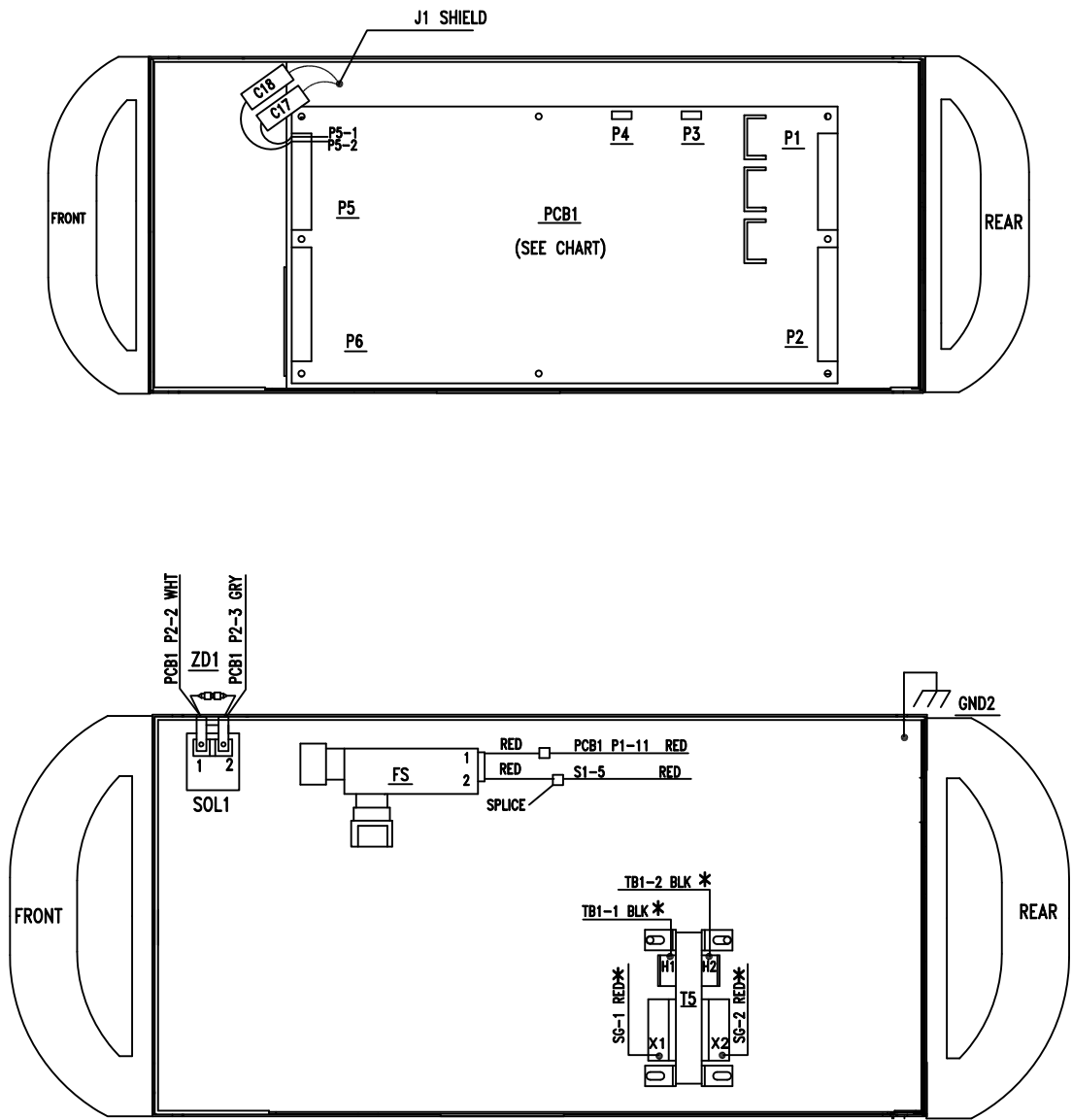
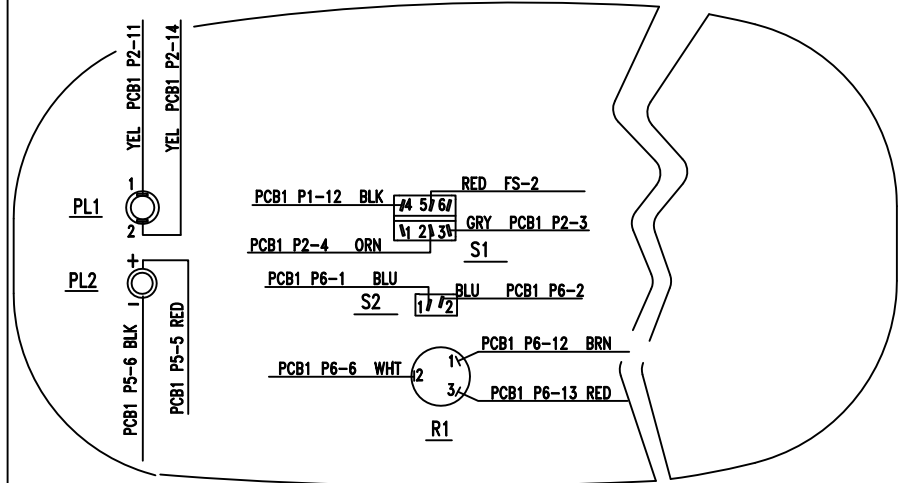
D-0558003302

THIS DRAWING CONTAINS PROPRIETARY INFORMATION OF ESAB WELDING & CUTTING PRODUCTS AND IS LOANED WITH THE EXPRESS AGREEMENT THAT THIS DRAWING (D) WILL NOT BE REPRODUCED OR COPIED. (C) WILL NOT BE USED OTHER THAN IN WORK FOR ESAB WELDING & CUTTING PRODUCTS AND (S) WILL NOT BE DISCLOSED EXCEPT TO EMPLOYEES OF THE PARTY TO WHOM THIS DRAWING IS LOANED AND ON A CONFIDENTIAL BASIS.



D- 0558003303

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BILL OF MATERIALS				
QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY				
SYMBOL	ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION

DETAIL "A" (PCB1)

P1	P2	P5	P6
1 TS1-1 VIO	1 T2-X7 ORN	1 J1-1 CLR (TP)	1 S2-1 BLU
2 TS1-2 VIO	2 SOL1-1 WHT	2 J1-2 BLK (TP)	2 S2-2 BLU
3 T2-X9 BRN	3 SOL1-2 GRY	3 T2-X1 YEL	3 — —
4 T2-X10 BRN	3 S1-3 GRY	4 T2-X2 YEL	4 — —
5 T2-X5 BLU	4 T2-X8 ORN	5 PL2-(+) RED	5 — —
6 T2-X6 BLU	4 S1-2 ORN	6 PL2-(-) BLK	6 — —
7 T4-1 ORN	5 — —	7 — —	7 — —
8 T4-2 ORN	6 — —	8 — —	8 R1-2 WHT
9 T2-X3 WHT	7 IBR-G YEL	9 — —	9 — —
10 T2-X4 WHT	8 IBR(+) BRN	10 PCB1 P5-11 WHT	10 — —
11 FS-1 RED	9 — —	11 PCB1 P5-10 WHT	11 — —
12 S1-4 BLK	10 — —	12 — —	12 PCB4-3 BLK (TP)
	11 T2-X11 VIO		13 PCB4-4 RED (TP)
	11 PL1-1 YEL		14 R1-1 BRN
	12 TB1-1 BLU		15 R1-3 RED
	12 — —		16 — —
	13 TB1-2 BLU		
	14 PL1-2 YEL		
	14 T2-X12 VIO		

REFERENCE DRAWINGS:

D- 0558003302 SCHEMATIC DIAGRAM PC650
A- 0558003304 WIRE KIT, MAIN PC 650
A- 0558003305 WIRE KIT, 230V 1 PH

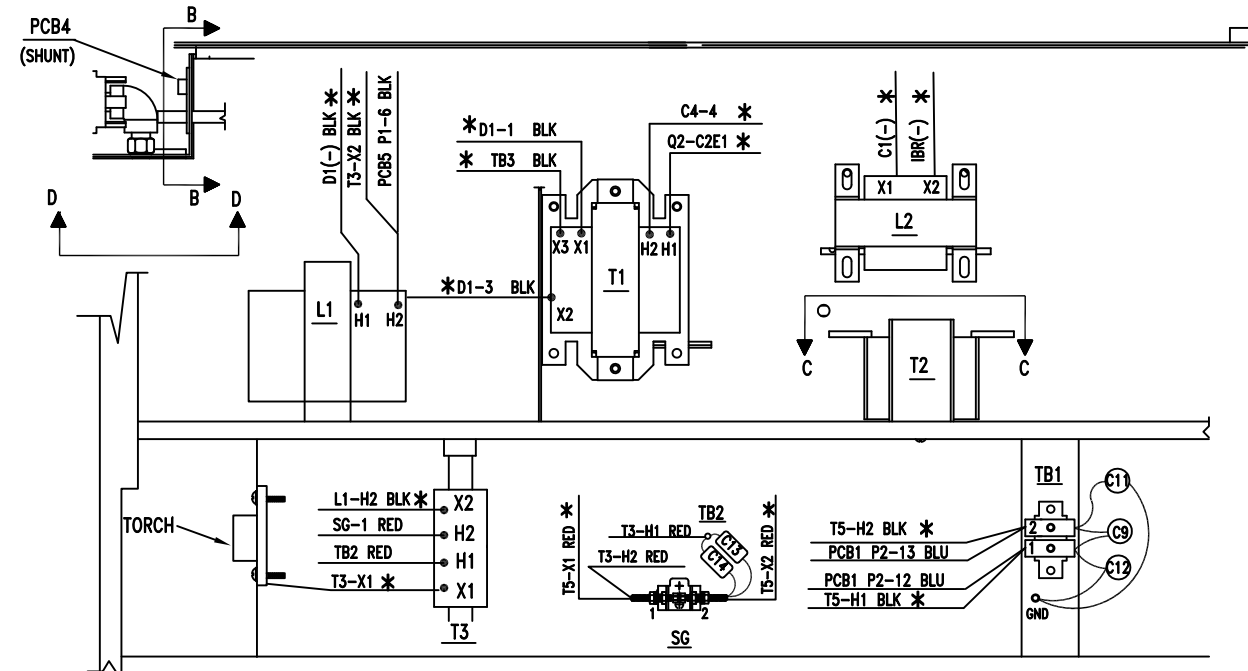
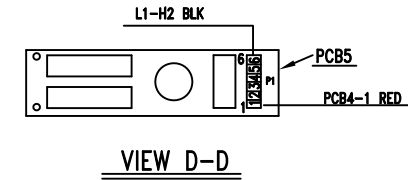
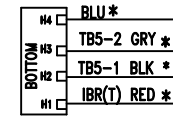
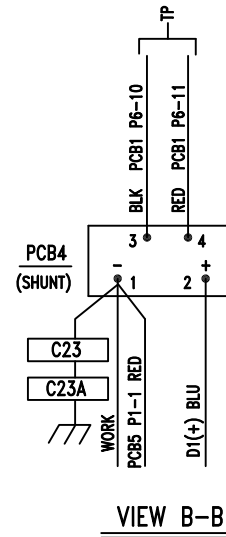
NOTES:
1- * DENOTES SELF LEADS.

SHEET 1 OF 2

C	CN-073224	GMB	12/3/02	GNC	
B	CN-063085	BLP	5/22/02	GNC	
A	CN-023434	BLP	12/1/02	RDH	
M	LTR	CHANGE	BY	DATE	CHK'D

ENGLISH DIMS UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.		PA-6900-01-33 REV1	1/8/02
TOL .XX ±		RELEASED FOR	DATE
ANGLES ±		ESAB WELDING & CUTTING PRODUCTS	
CHAMFERS & C'SINKS ±2°		FLORENCE SC 28501	
SURFACE ROUGHNESS IS IN MICROINCHES.		TITLE	
REMOVE ALL BURRS		DIAGRAM WIRING PC 650 230V 1PH	
BREAK SHARP EDGES		REPRO MADE FROM	
SCALE NONE		SIMILAR TO	
FIRST MADE FOR PC650		SUP.	
DRAWN BY BLP		CHECKED BY WJB	
DATE 2/28/02		APPROVED BY GWD	
		DATE 3/1/02	
		D-0558003303	

THIS DRAWING CONTAINS PROPRIETORIAL INFORMATION OF ESAB WELDING & CUTTING PRODUCTS AND IS LOANED WITH THE EXPRESS AGREEMENT THAT THIS DRAWING (1) WILL NOT BE REPRODUCED OR COPIED, (2) WILL NOT BE USED OTHER THAN IN WORK FOR ESAB WELDING & CUTTING PRODUCTS AND (3) WILL NOT BE DISCLOSED EXCEPT TO EMPLOYEES OF THE PARTY TO WHOM THIS DRAWING IS LOANED AND ON A CONFIDENTIAL BASIS.

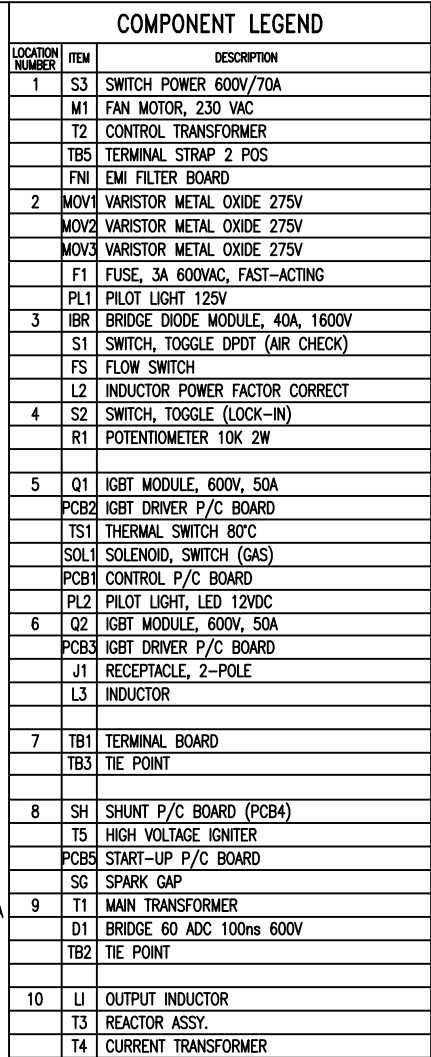


SHEET 2 OF 2

	C	SEE SHEET ONE				
	B	SEE SHEET ONE				
	A	SEE SHEET ONE				
M	LTR	CHANGE	BY	DATE	CHK'D	

ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES. TOL. ± ± ANGLES ± CHAMFERS & C'S KINGS 42° SURFACE ROUGHNESS IS IN MICROINCHES. ✓		PA-6900-01-33 REV1 RELEASED FOR DATE		1/8/02
REMOVE ALL BURRS BREAK SHARP EDGES		ESAB WELDING & CUTTING PRODUCTS FLORENCE SC 29505		
SCALE: NONE		TITLE DIAGRAM WIRING PC. 650 230V. 1PH		
FIRST MADE FOR PC 650		REPROD MADE FROM SIMILAR TO		
DRAWN BY BLP		CHECKED BY W.B		SUP. BY D-0558003303
DATE 2/12/02		APPROVED BY GWD DATE 2/28/02		

THIS DRAWING CONTAINS PROPRIETORIAL INFORMATION OF ESAB WELDING & CUTTING PRODUCTS AND IS LOANED WITH THE EXPRESS AGREEMENT THAT THIS DRAWING (1) WILL NOT BE REPRODUCED OR COPIED, (2) WILL NOT BE USED OTHER THAN IN WORK FOR ESAB WELDING & CUTTING PRODUCTS AND (3) WILL NOT BE DISCLOSED EXCEPT TO EMPLOYEES OF THE PARTY TO WHOM THIS DRAWING IS LOANED AND ON A CONFIDENTIAL BASIS.

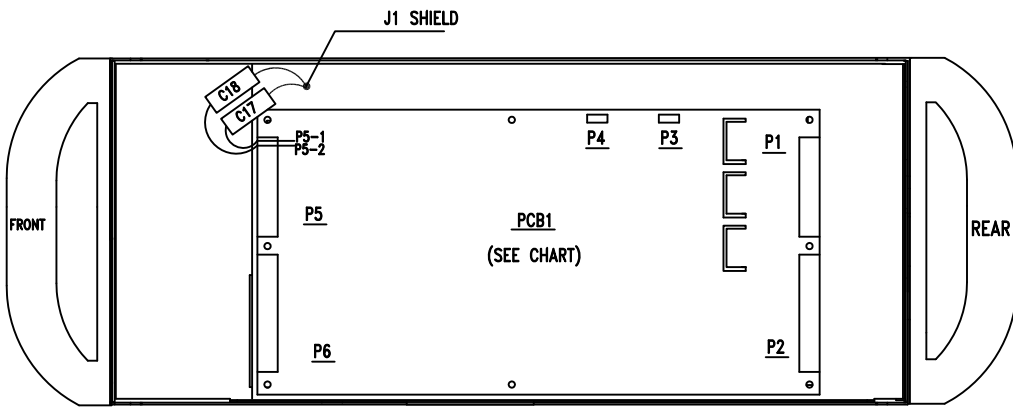


D-0558005342	WIRING DIAG 208/230V 1/3PH CE
A-0558003304	WIRE KIT, MAIN PC650
A-0558005345	WIRE KIT, 208/230V 1PH CE

ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.	PA-8900-04-20	11/16/04
TOL. .XX ± .015 .XXX ± .005 ANGLES ± 1°	RELEASED FOR	DATE
SURFACE ROUGHNESS IS IN MICROINCHES.	ESAB WELDING & CUTTING PRODUCTS FLORENCE SC 29501	
ROUGHNESS REMARK ALL BURRS BREAK SHARP EDGES	TITLE SCHEMPC, 650.208/230V. 1/3PH CE	
SCALE NONE	REPROD MADE FROM	
FIRST MADE FOR PC850 CE	SIMILAR TO	SUP.
DRAWN BY	CHECKED BY	SUP. BY
DATE 1/27/05	DATE 1/28/04	DATE 1/28/04
D-0558005343		

D-0558005342

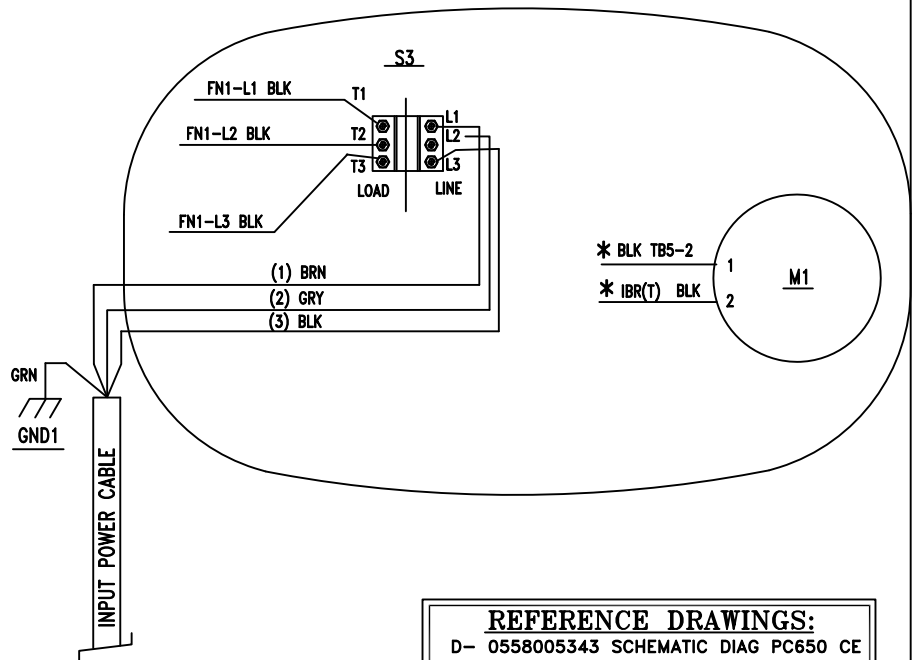
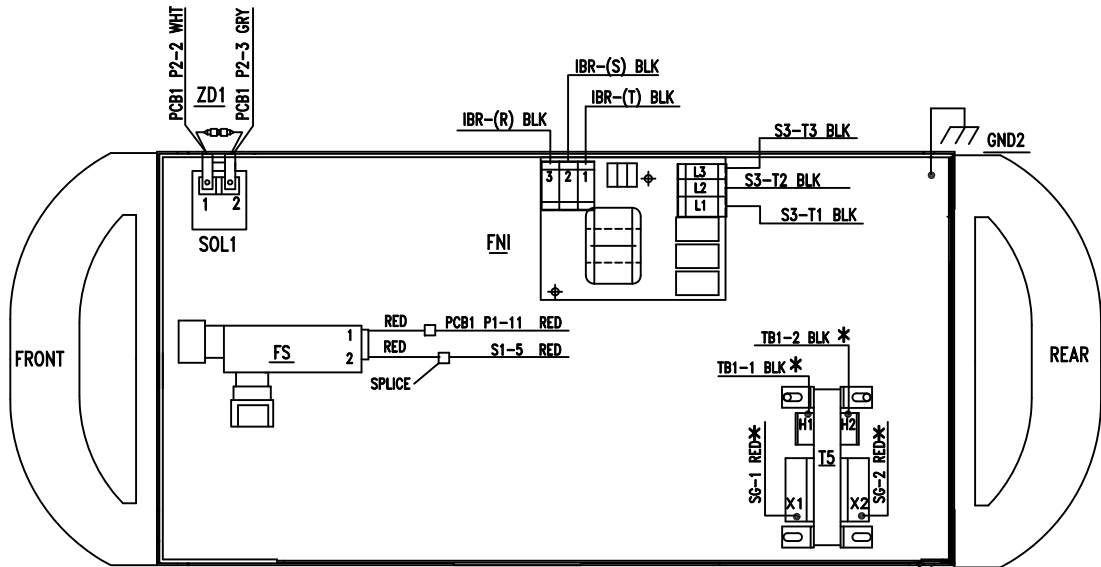
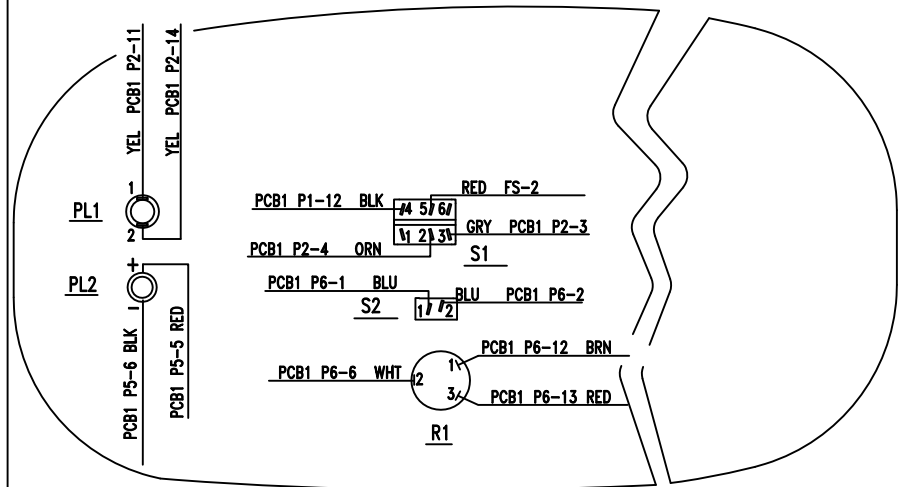
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BILL OF MATERIALS

QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

SYMBOL	ITEM NO.	PART OF CODE NO.	QTY.	DESCRIPTION
DETAIL "A" (PCB1)				
P1		P2	P5	P6
1 TS1-1 VIO	1 T2-X7 ORN	1 J1-1 CLR (TP)	1 S2-1 BLU	
2 TS1-2 VIO	2 SOL1-1 WHT	2 J1-2 BLK (TP)	2 S2-2 BLU	
3 T2-X9 BRN	3 SOL1-2 GRY	3 T2-X1 YEL	3 —	
4 T2-X10 BRN	3 S1-3 GRY	4 T2-X2 YEL	4 —	
5 T2-X5 BLU	4 T2-X8 ORN	5 PL2-(+) RED	5 —	
6 T2-X6 BLU	4 S1-2 ORN	6 PL2-(-) BLK	6 —	
7 T4-1 ORN	5 —	7 —	7 —	
8 T4-2 ORN	6 —	8 —	8 —	
9 T2-X3 WHT	7 IBR-G YEL	9 —	9 —	
10 T2-X4 WHT	8 IBR(+) BRN	10 PCB1 P5-11 WHT	10 —	
11 FS-1 RED	9 —	11 PCB1 P5-10 WHT	11 —	
12 S1-4 BLK	10 —	12 —	12 —	
	11 T2-X11 VIO		13 —	
	11 PL1-1 YEL		14 —	
	12 TB1-1 BLU			
	12 —			
	13 TB1-2 BLU			
	13 —			
	14 PL1-2 YEL			
	14 T2-X12 VIO			



REFERENCE DRAWINGS:

D- 0558005343 SCHEMATIC DIAG PC650 CE
A- 0558003304 WIRE KIT, MAIN PC 650
A- 0558005345 WIRE KIT, 230V 1 PH CE

NOTES:
1- * DENOTES SELF LEADS.

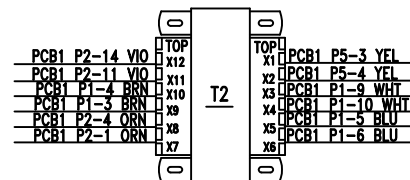
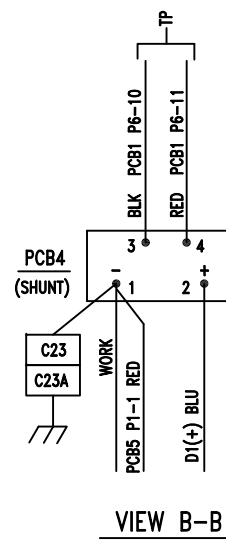
SHEET 1 OF 2

C	CN-073224	GMB	12/3/04	GNC	
B	CN-053043	SMC	4/12/05	RDH	
A	CN-023434	BLP	12/14/04	RDH	
M	LTR	CHANGE	BY	DATE	CHK'D

ENGLISH DIMS UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.	PA-6900-04-20	11/16/04
TOL .XX ±	RELEASED FOR	DATE
XXX ±		
ANGLES ±		
CHAMFERS & C'SINKS ±2°		
SURFACE ROUGHNESS IS IN MICROINCHES.		
REMOVE ALL BURRS		
BREAK SHARP EDGES		
SCALE NONE	SIMILAR TO	D-0558003303
FIRST MADE FOR PC-650 CE	SUP.	
DRAWN BY BLP	CHECKED BY RDH	APPROVED BY RDH
DATE 1/27/04	DATE 1/28/05	DATE 1/28/05
		D-0558005342

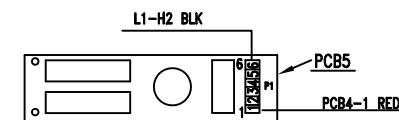
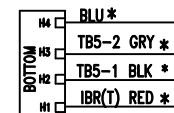
OCT 1995

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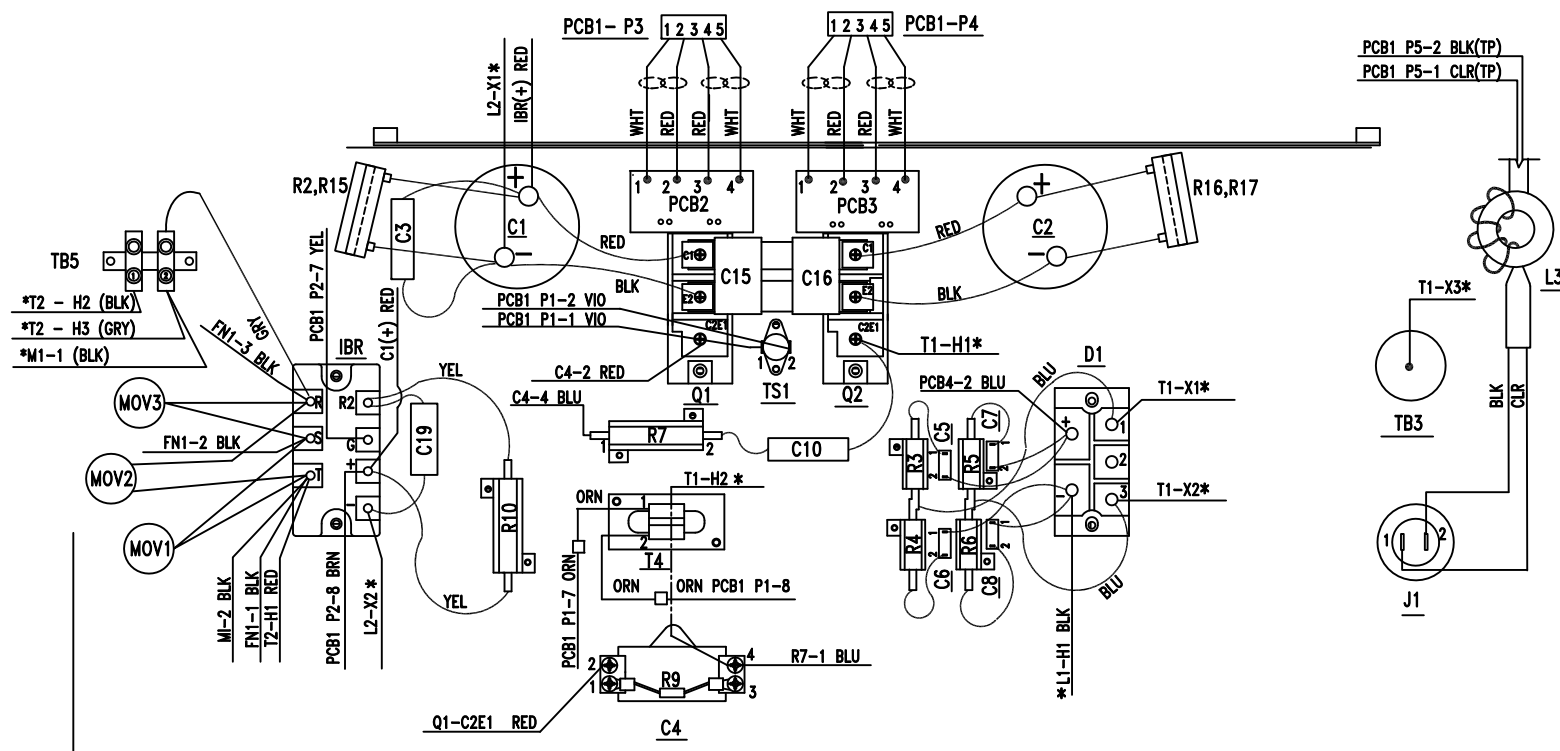


VIEW C-C

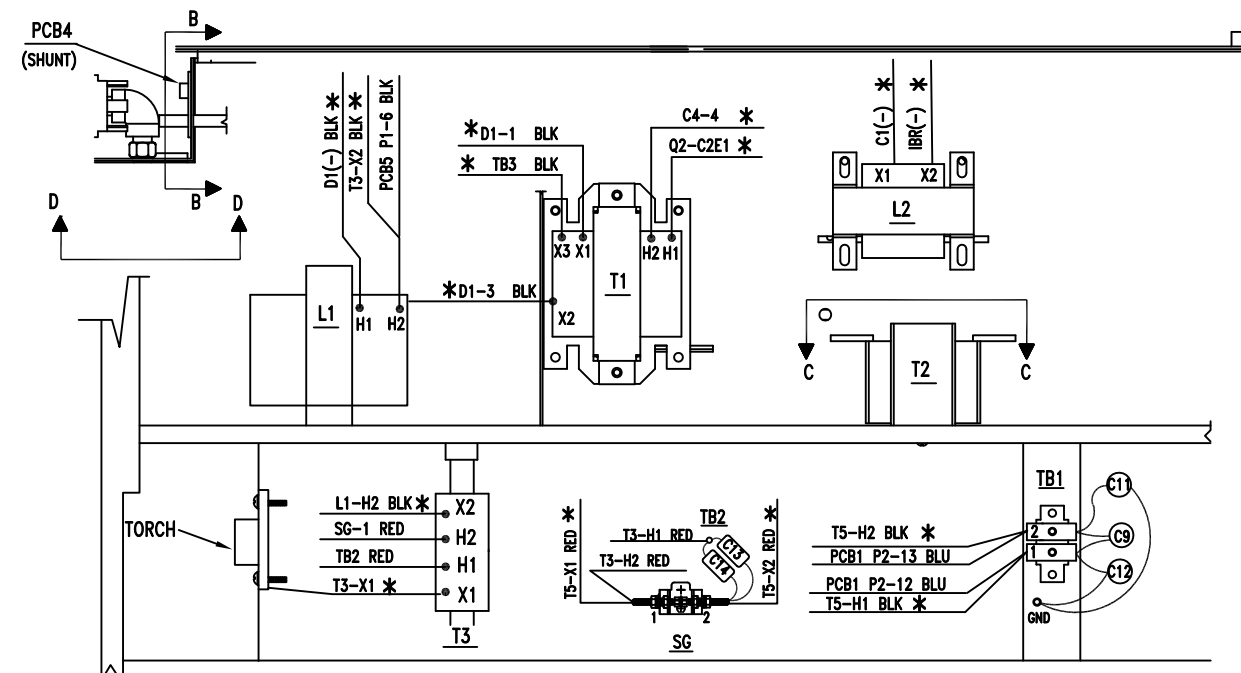
TOP AND BOTTOM



VIEW D-D



LEFT SIDE VIEW



RIGHT SIDE VIEW

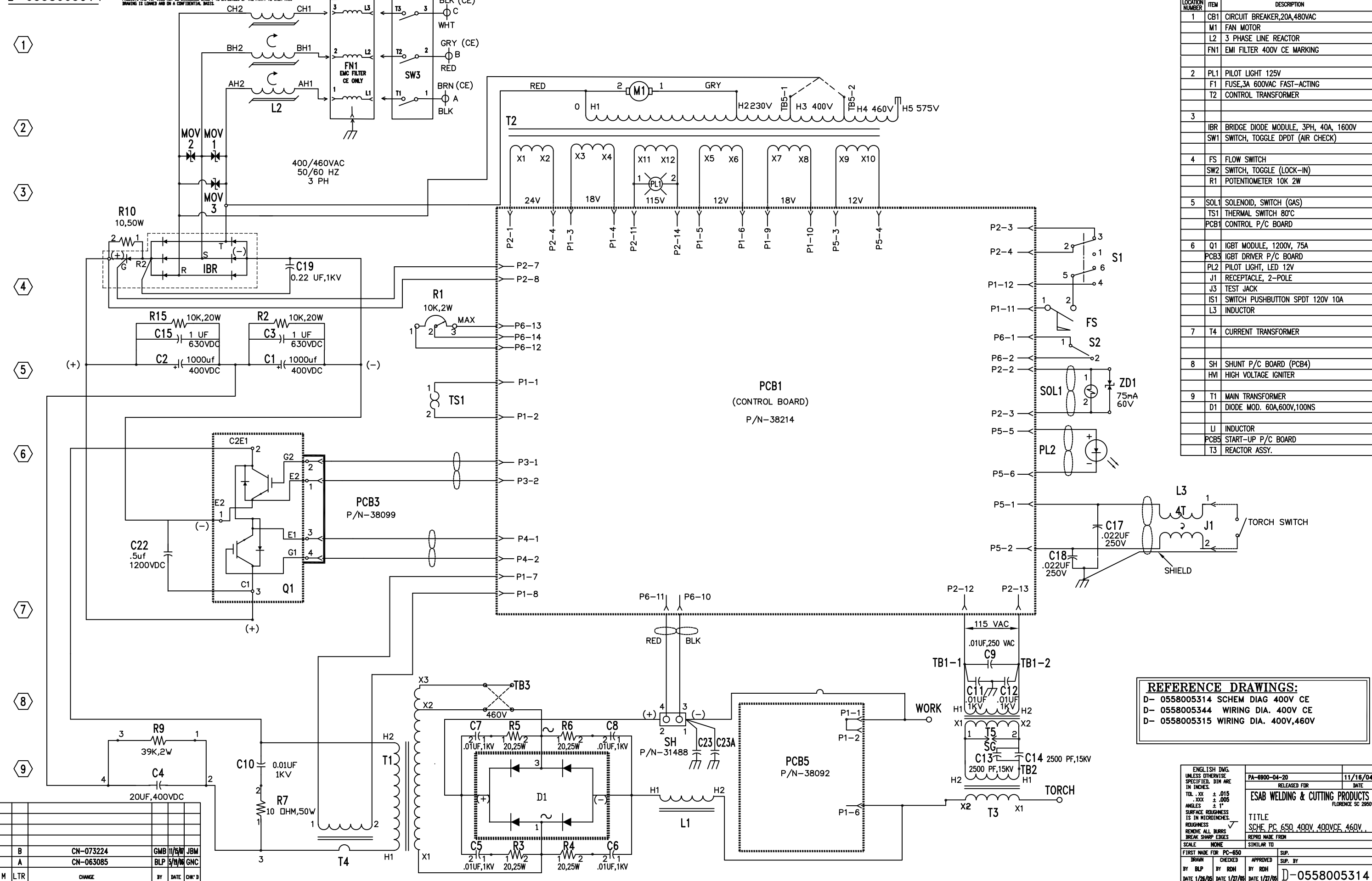
SHEET 2 OF 2

	C	SEE SHEET ONE				
	B	SEE SHEET ONE				
M	LTR	CHANGE	BY	DATE	CHK'D	

ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.	PA-8900-04-20	11/16/04
TOL. .XX ± .XXX ± ANGLES ±	RELEASED FOR	DATE
CHAMFERS & C' SINKS 42° SURFACE ROUGHNESS IS IN MICROINCHES. ✓	ESAB WELDING & CUTTING PRODUCTS FLORENCE SC 29505	
REMOVE ALL BURRS BREAK SHARP EDGES	TITLE DIAG WRG PC-650 230V, 1/3PH CE	
SCALE NONE	REFR. MADE FROM SIMILAR TO D-0558003303	
FIRST MADE FOR PC 850 CE	SUP.	
DRAWN BY BLP	CHECKED BY RDM	APPROVED BY RDM
DATE 1/27/05	DATE 1/28/05	DATE 1/28/05
D-0558005342		

OCT 1988

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COMPONENT LEGEND		
LOCATION NUMBER	ITEM	DESCRIPTION
1	CB1	CIRCUIT BREAKER, 20A, 480VAC
	M1	FAN MOTOR
	L2	3 PHASE LINE REACTOR
	FN1	EMI FILTER 400V CE MARKING
2	PL1	PILOT LIGHT 125V
	F1	FUSE, 3A 600VAC FAST-ACTING
	T2	CONTROL TRANSFORMER
3	IBR	BRIDGE DIODE MODULE, 3PH, 40A, 1600V
	SW1	SWITCH, TOGGLE DPDT (AIR CHECK)
4	FS	FLOW SWITCH
	SW2	SWITCH, TOGGLE (LOCK-IN)
	R1	POTENTIOMETER 10K 2W
5	SOL1	SOLENOID, SWITCH (GAS)
	TS1	THERMAL SWITCH 80°C
	PCB1	CONTROL P/C BOARD
6	Q1	IGBT MODULE, 1200V, 75A
	PCB3	IGBT DRIVER P/C BOARD
	PL2	PILOT LIGHT, LED 12V
	J1	RECEPTACLE, 2-POLE
	J3	TEST JACK
	IS1	SWITCH PUSHBUTTON SPDT 120V 10A
7	L3	INDUCTOR
	T4	CURRENT TRANSFORMER
8	SH	SHUNT P/C BOARD (PCB4)
	HV1	HIGH VOLTAGE IGNITER
9	T1	MAIN TRANSFORMER
	D1	DIODE MOD. 60A, 600V, 100NS
	L1	INDUCTOR
	PCB5	START-UP P/C BOARD
	T3	REACTOR ASSY.

REFERENCE DRAWINGS:	
D-	0558005314 SCHEM DIAG 400V CE
D-	0558005344 WIRING DIA. 400V CE
D-	0558005315 WIRING DIA. 400V,460V

ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES.		PA-6800-04-20		11/16/04	
TOL. $\pm .015$ XXX $\pm .005$ ANGLES $\pm 1^\circ$		RELEASED FOR		DATE	
SURFACE ROUGHNESS IS IN MICROINCHES.		ESAB WELDING & CUTTING PRODUCTS			
ROUGHNESS		FLORENCE SC 2950			
REMOVE ALL BURRS BREAK SHARP EDGES		TITLE			
SCALE NONE		SCHE. PC. 650 400V 400VCE 460V			
FIRST NAME FOR PC-650		REPAIR MADE FROM			
DRAWN BY BLP		CHECKED BY RDH		SUP. BY	
DATE 1/26/06		DATE 1/27/06		DATE 1/27/06	
APPROVED BY RDH		D-0558005314			

D-0558005315

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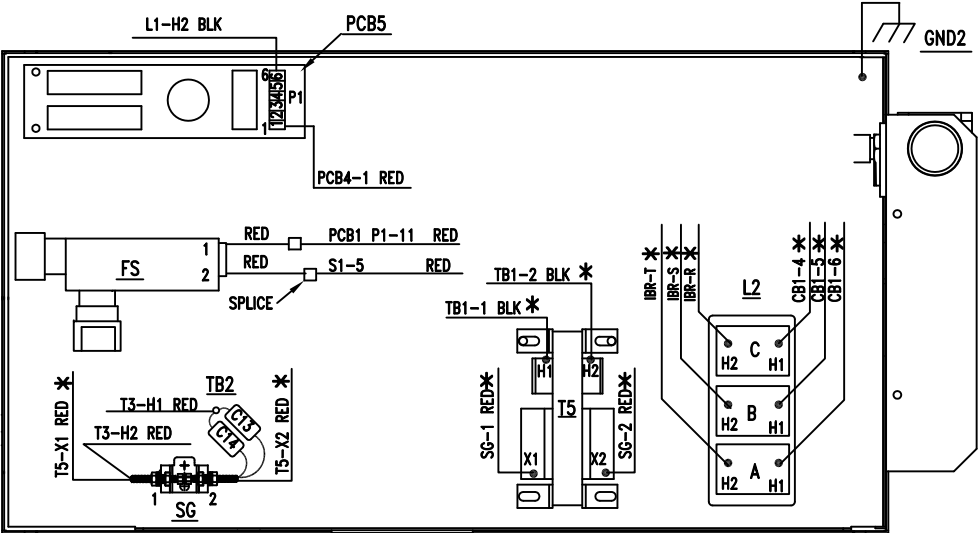
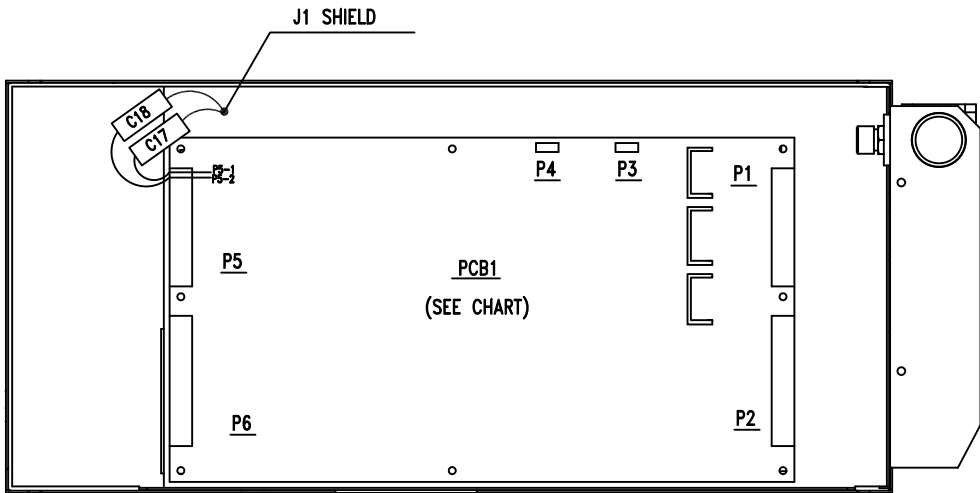
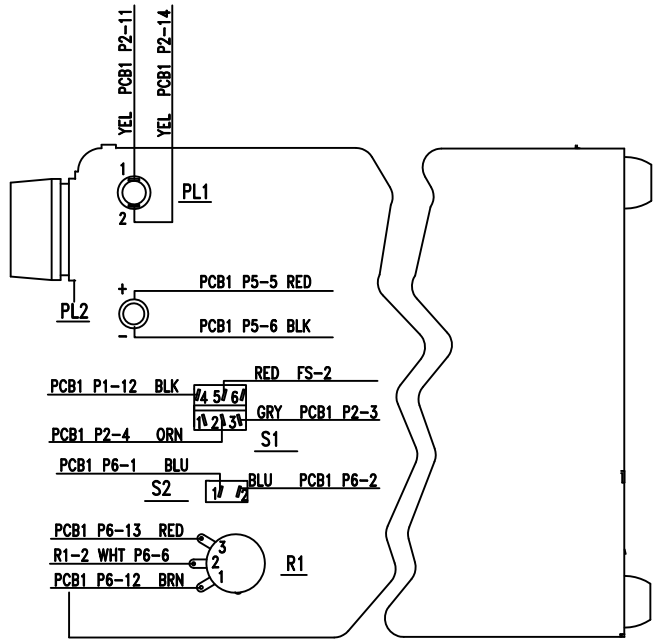
BILL OF MATERIALS

QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

SYMBOL	ITEM NO.	PART OR CODE NO.	QTY.	DESCRIPTION
--------	----------	------------------	------	-------------

DETAIL "A" (PCB1)

P1	P2	P5	P6
1 TS1-1 VIO	1 T2-X7 ORN	1 J1-1 CLR (TP)	1 S2-1 BLU
2 TS1-2 VIO	2 SOL1-1 WHT	2 J1-2 BLK (TP)	2 S2-2 BLU
3 T2-X9 BRN	3 SOL1-2 GRY	3 T2-X1 YEL	3 _____
4 T2-X10 BRN	3 S1-3 GRY	4 T2-X2 YEL	4 _____
5 T2-X5 BLU	4 T2-X8 ORN	5 PL2-(+) RED	5 _____
6 T2-X6 BLU	4 S1-2 ORN	6 PL2-(-) BLK	6 P6-6-WHT R1-2
7 T4-1 ORN	5 _____	PCB1 P6-10BLK	7 _____
8 T4-2 ORN	6 _____	7 _____	8 _____
9 T2-X3 WHT	7 P2-7 IBR-G YEL	8 _____	8 _____
10 T2-X4 WHT	8 P2-8 IBR-+BRN	9 _____	9 _____
11 FS-1 RED	9 _____	10 P5-10 P5-11 WHT	10 PCB4-3 BLK (TP)
12 S1-4 BLK	10 _____	11 P5-11 P5-10 WHT	PCB1 P5-6 BLK
	11 T2-X11 VIO	12 _____	11 PCB4-4 RED (TP)
	12 PL1-1 YEL		12 R1-1 BRN
	13 TB1-1 BLU		13 R1-3 RED
	14 PL1-2 YEL		14 R1-2 WHT
	14 T2-X12 VIO		



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QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

IBR

IBR-R L2C H2 BLK * → R

IBR-S L2B H2 BLK * → S

IBR-T L2A H2 BLK * → T

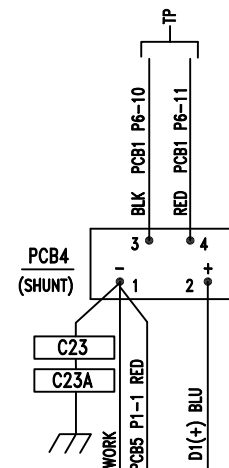


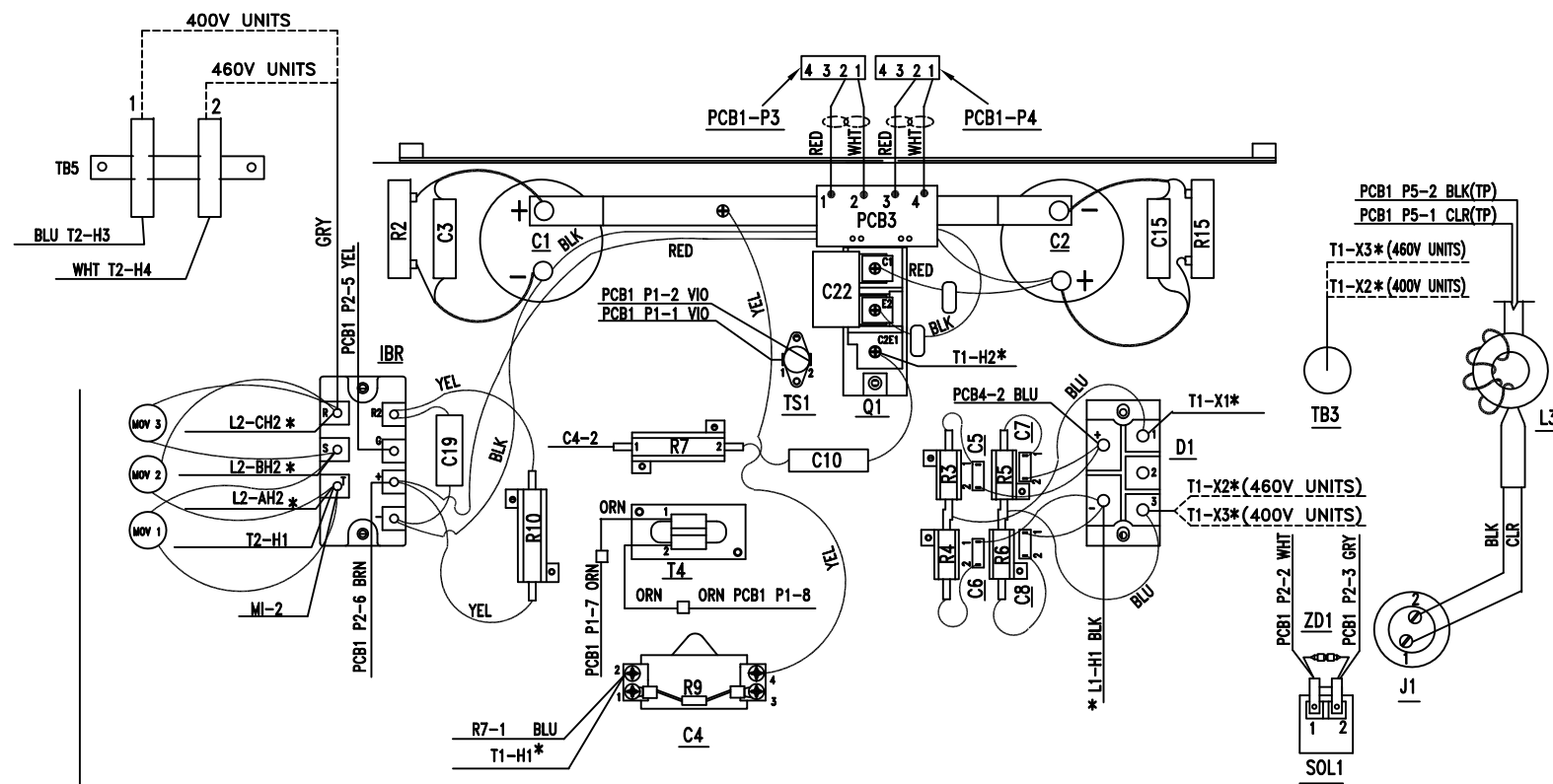
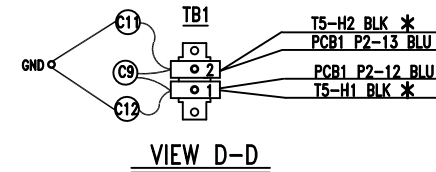
Diagram of a 28-pin connector, rotated 90°. The connector is labeled T2. The pins are numbered 1 through 28. The labels for the pins are:

Pin	Label
1	PCBI P2-14 VIO
2	PCBI P2-11 VIO
3	PCBI P1-4 BRN
4	PCBI P1-3 BRN
5	PCBI P2-2 ORN
6	PCBI P2-1 ORN
7	X7
8	X8
9	X9
10	X10
11	X11
12	X12
13	X1
14	PCBI P5-4 YEL
15	PCBI P1-9 WHI
16	PCBI P1-10 WHI
17	PCBI P1-5 BLU
18	PCBI P1-6 BLU
19	X6
20	X5
21	X4
22	X3
23	X2
24	PCBI P5-3 YEL
25	TOP

DETAIL-C

ROTATED 90°

BOTTOM	H5	CAP ORN *
	H4	WHT TB5-2 *
	H3	BLU TB5-1 *
	H2	GRY M1-1-(SPLICE) *
	H1	IBR(T) RED *



PCB4 (SHUNT)

B

D1-1 BLK *

T3-X2 BLK *

PCB5 P1-6 BLK

*D1-3 (460V UNITS)

*TB3 (460V UNITS)

*D1-3 (460V UNITS)

*TB-3 (460V UNITS)

L1

H1

H2

X3

X1

X2

H1

H2

Q1-C2E1 *

C4-2 *

T1

T2

L1-H2 BLK *

SG-1 RED

TB2 RED

TORCH *

T3-X1 *

T3

D

C12

C11

TB1

D

X7

X12

X1

X6

SHEET 2 OF 2

	B	SEE SHEET 1						
	A	SEE SHEET 1						
M	LTR	CHANGE				BY	DATE	CHK'Y

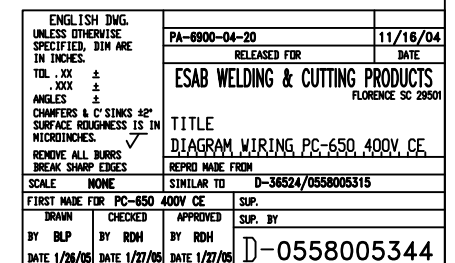
ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES. TOL. XX ± .XXX ± ANGLES CHAMFERS & C'SINKS 42° SURFACE ROUGHNESS 15 IN MICROINCHES. ✓		RELEASED FOR _____ DATE _____ ESAB WELDING & CUTTING PRODUCTS FLORENCE SC 29501	
REMOVE ALL BURRS BREAK SHARP EDGES		TITLE DIAGRAM WIRING PC-650, 400V, 460V REPROD MADE FROM ORIGINAL	
SCALE NONE		SIMILAR TO D-36524	
FIRST MADE FOR PC650 460V		SUP. BY	
DRAWN BY BLP	CHECKED BY DGC	APPROVED BY DGC	
DATE 1/11/05	DATE 1/12/05	DATE 1/12/05	
D-0558005315		D-0558005315	

ACT 1999

THIS DRAWING CONTAINS PROPRIETORIAL INFORMATION OF ESAB WELDING & CUTTING PRODUCTS AND IS LOANED WITH THE EXPRESS AGREEMENT THAT THIS DRAWING (1) WILL NOT BE REPRODUCED OR COPIED, (2) WILL NOT BE USED OTHER THAN IN WORK FOR ESAB WELDING & CUTTING PRODUCTS AND (3) WILL NOT BE DISCLOSED EXCEPT TO EMPLOYEES OF THE PARTY TO WHOM THIS DRAWING IS LOANED AND ON A CONFIDENTIAL BASIS.

QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

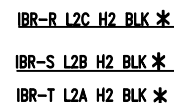
DETAIL "A" (PCB1)											
P1			P2			P5			P6		
1	TS1-1	VIO	1	T2-X7	ORN	1	J1-1	CLR (TP)	1	S2-1	BLU
2	TS1-2	VIO	2	SOL1-1	WHT	2	J1-2	BLK (TP)	2	S2-2	BLU
3	T2-X9	BRN	3	SOL1-2	GRY	3	T2-X1	YEL	3	_____	_____
4	T2-X10	BRN	3	S1-3	GRY	4	T2-X2	YEL	4	_____	_____
5	T2-X5	BLU	4	T2-X8	ORN	5	PL2-(+)	RED	5	_____	_____
6	T2-X6	BLU	4	S1-2	ORN	6	PL2-(-)	BLK	6	P6-6-WHT	R1-2
7	T4-1	ORN	5	_____	_____	PCB1 P6-10BLK			7	_____	_____
8	T4-2	ORN	6	_____	_____	7	_____	_____	8	_____	_____
9	T2-X3	WHT	7	P2-7 IBR-G	YEL	8	_____	_____	8	_____	_____
10	T2-X4	WHT	8	P2-8 IBR-+BRN	_____	9	_____	_____	9	_____	_____
11	FS-1	RED	9	_____	_____	10	P5-10	P5-11 WHT	10	PCB4-3	BLK (TP)
12	S1-4	BLK	10	_____	_____	11	P5-11	P5-10 WHT	11	PCB1 P5-6	BLK (TP)
			11	T2-X11	VIO	12	_____	_____	11	PCB4-4	RED (TP)
			11	PL1-1	YEL				12	R1-1	BRN
			12	TB1-1	BLU				13	R1-3	RED
			12	_____	_____				14	R1-2	WHT
			13	TB1-2	BLU						
			13	_____	_____						
			14	PL1-2	YEL						
			14	T2-X12	VIO						



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QUANTITIES ARE IN U/M ESTIMATED BY INVENTORY

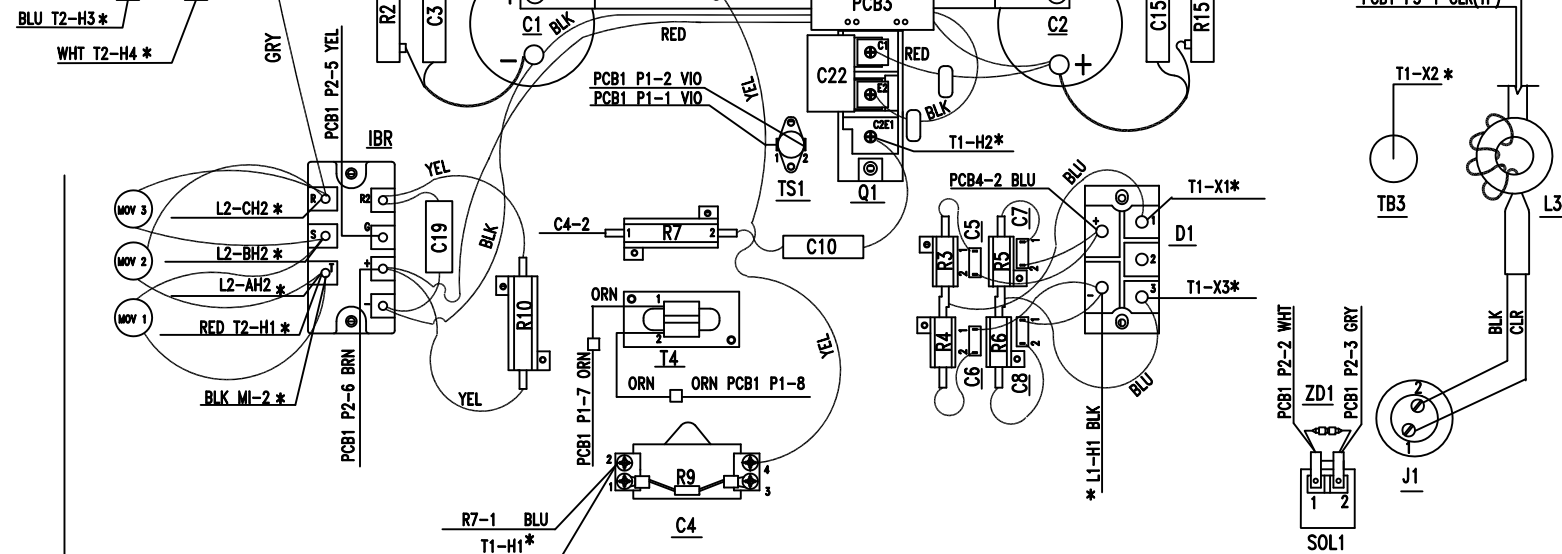
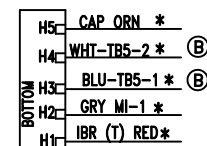
SYMBOL	ITEM NO.	PART OF CODE NO.	QTY.	DESCRIPTION
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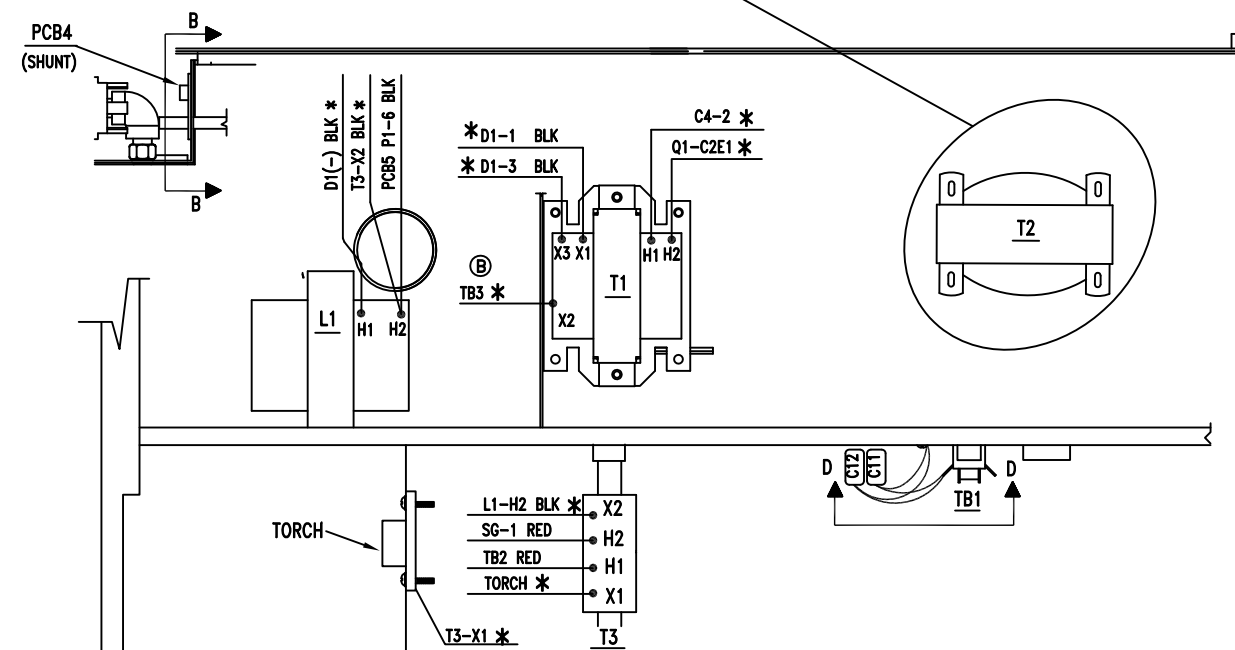
VIEW B-B



ROTATED 90°



LEFT SIDE VIEW



RIGHT SIDE VIEW

SHEET 2 OF 2

	B	SEE SHEET 1			
	A	SEE SHEET 1			
M	LTR	CHANGE	BY	DATE	CHK'

ENGLISH DWG. UNLESS OTHERWISE SPECIFIED, DIM ARE IN INCHES. TOL. .XXX ± .XXX ± ANGLES ± CHAMFERS & CHAMFERS ± IN SURFACE ROUGHNESS IS IN MICROINCHES. ✓ REMOVE ALL BURRS BREAK SHARP EDGES	PA-6900-04-20 RELEASED FOR ESAB WELDING & CUTTING PRODUCT TITLE DIAPHRAGM WIRING PC650 400V CE REPRO MADE FROM SCALE NONE FIRST MADE FOR PC650 400V DRAWN BY BLP DATE 1/26/05 CHECKED BY RDH DATE 1/27/05 APPROVED BY RDH DATE 1/27/05 SUP. BY D-055800534	11/16/05 DATE FLORENCE SC 29
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