F. After starting the cut, the torch should be maintained at a 5-15° forward angle. This angle is especially useful in helping to create a "drop" cut. When not using the stand-off guide, the nozzle should be held approximately 1/8" - 1/4" (3.2 mm - 6.4 mm) from the work.

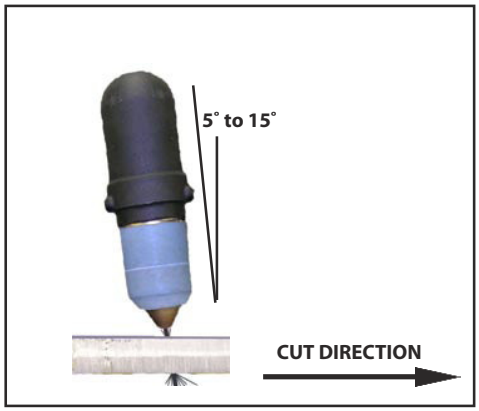


Figure 4-4a. Proper Torch Angle

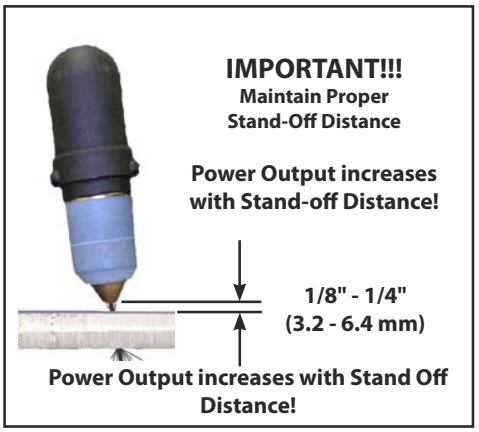


Figure 4-4b. Stand-off vs. Power Output

G. When ending a cut, the torch switch should be released (press and release if using TRIGGER LOCK feature) and the torch lifted off the workpiece immediately upon completion of the cut. This is to prevent the pilot arc from re-igniting after cutting arc extinguishes and causing damage to the nozzle (double arcing).

H. For rapid re-starts, such as grate or heavy mesh cutting, do not release the torch switch. In the postflow mode, the arc can be re-started immediately by depressing the torch switch. This avoids the 2-second preflow portion of the cutting cycle.

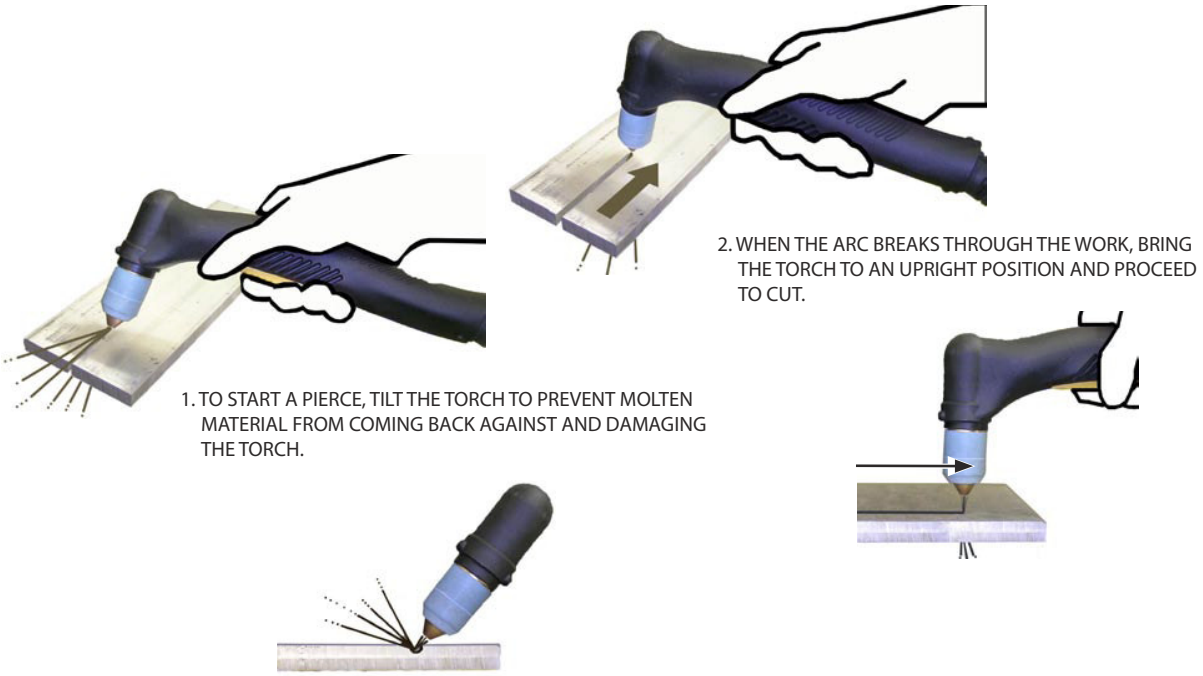


Figure 4-5. Piercing Technique using the PT-38

WARNING

DRAG CUTTING, EVEN WITH LOWER CURRENT LEVELS MAY SIGNIFICANTLY REDUCE THE LIFE OF TORCH CONSUMABLES. ATTEMPTING TO DRAG CUT WITH HIGHER CURRENTS GREATER THAN 40 AMPS MAY CAUSE IMMEDIATE CATASTROPHIC CONSUMABLE DAMAGE.

4.2.1 PT-38 Stand-off Guide

Drag Cutting with the PT-38 Torch.

If drag cutting is desired, attach ESAB's stand-off guide by removing the standard heat shield and installing the threaded heat shield with stand-off guide.

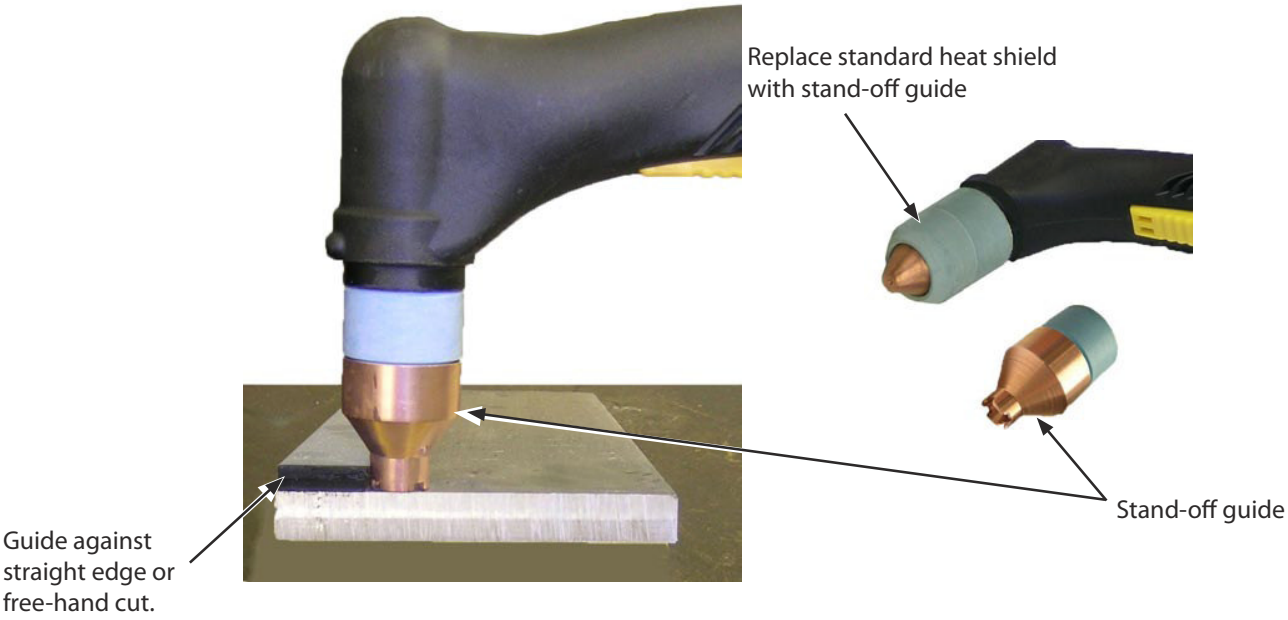
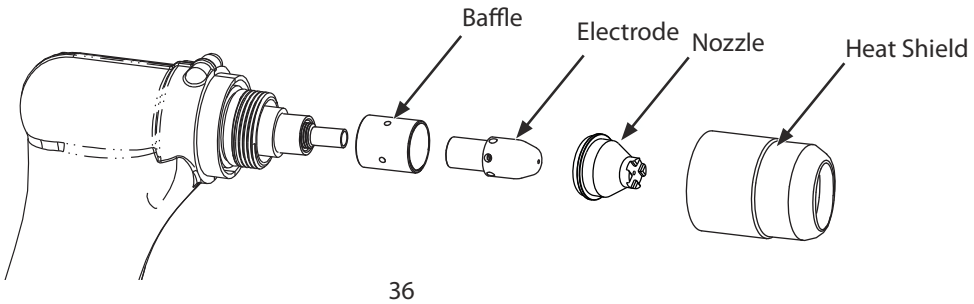


Figure 4-6. Installation and Operation of Stand-off Guide (PT-38 ONLY)

For thin material, under 3/8" (9 mm), insert ESAB's 40 amp nozzle, low current baffle and standard heat shield; set current level to 40 amps and begin cutting.



WARNING MAKE SURE POWER SWITCH ON POWERCUT IS IN OFF POSITION BEFORE WORKING ON THE TORCH.

WARNING THE PT-38 TORCH HEAD ACTS IN CONJUNCTION WITH THE CIRCUITRY WITHIN THE POWER SOURCE TO PREVENT 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 SAFETY INTERLOCK.

CAUTION REPLACE ELECTRODE BEFORE WEAR BECOMES DEEPER THAN .060" INCH (1.5 MM)

4.3 Electrode Wear

If the electrode has a pit which is more than .06" (1.5mm) deep at its center, it must be replaced. This is done by unscrewing the electrode in a counter-clockwise direction from the piston. If the electrode is used beyond this recommended wear limit, damage to the torch and power source may occur. Nozzle life is also greatly reduced when using the electrode below the recommended limit.

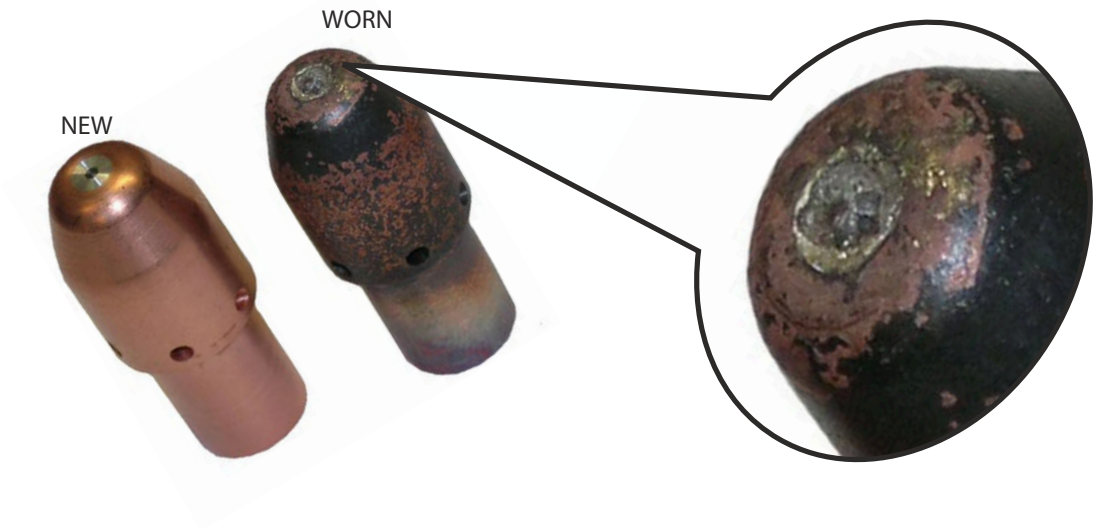


Figure 4-8. Electrode Wear Limit

For in depth instructions refer to torch manual for complete maintenance and operation.

SECTION 4 OPERATION

Powercut-1300/1600

MECHANIZED PLASMARC CUTTING PACKAGE

WARNING **USE THE ESAB PT-37 PLASMARC TORCH WITH MECHANIZED CONSOLES. USE OF TORCHES NOT DESIGNED FOR USE WITH THIS CONSOLE COULD CREATE AN ELECTRIC SHOCK HAZARD.**

2.0 General

The Powercut-1300/1600 is a compact, 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 compressed air (90 - 150 psi / 6.2 - 10.3 bar). The Powercut package uses the heavy-duty PT-37 (Mechanized Plasma) torch to deliver cutting power for severing materials up to 1-1/2 inch (38 mm) thick on the PC-1300 and 1-3/4 inch (45 mm) thick on the PC-1600. Refer to the following pages for descriptions of the Powercut packages available as well as performance specifications.

2.1 Scope

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

2.2 Powercut-1300/1600 Mechanized Plasma

The Powercut-1300/1600 plasma cutting package combines the newly redesigned Powercut-1300/1600 console and PT-38 torch. The PT-37 plasma cutting torch is designed to provide increased performance and longer consumable life resulting in higher production rates at lower costs.

Specifications: Powercut-1300

Cuts 1-1/4 in. (32 mm); severs 1-1/2 in. (38 mm)
1 ph. Input.....208/230 vac, 1 ph, 50/60 Hz, 74/63 A
1 ph. Output.....70 amps @ 60% duty cycle

3 ph. Input.....208/230 vac, 3 ph, 50/60 Hz, 39/31 A
.....230/460 vac, 3 ph, 50/60 Hz, 31/20 A
.....400 vac, 3ph, 50/60 Hz, 26 A
.....575 vac, 3ph, 50/60 Hz, 18 A
3 ph. Output.....70 amps @ 100% duty cycle

Dimensions .....W = 12.7" (322 mm)
..... H = 14.9" (379 mm)
..... D = 27.8" (706 mm)
Weight .....90 lbs. (40.8 kg)
Air Requirements .....500 cfh @ 90 psig (236 l/min @ 6.2 bars)

Specifications: Powercut-1600

Cuts 1-1/2 in. (38 mm); severs 1-3/4 in. (45 mm)
1 ph. Input.....230 vac, 1 ph, 50/60 Hz, 82A
1 ph. Output.....90 amps @ 40% duty cycle

3 ph. Input.....208/230 vac, 3 ph, 50/60 Hz, 47/41 A
.....230/460 vac, 3 ph, 50/60 Hz, 41/25 A
.....400 vac, 3ph, 50/60 Hz, 28 A
.....575 vac, 3ph, 50/60 Hz, 20 A
3 ph. Output.....90 amps @ 40% duty cycle

Dimensions .....W = 12.7" (322 mm)
..... H = 14.9" (379 mm)
..... D = 27.8" (706 mm)
Weight .....90 lbs. (40.8 kg)
Air Requirements .....500 cfh @ 90 psig (236 l/min @ 6.2 bars)

2.3 Package Ordering Information

The components that are included in the Powercut-1300/1600 mechanized packages may be purchased separately by using the appropriate P/N when placing orders. Individual part numbers are listed below:

Available Packages:

Powercut-1300:

208-230/460 V CNC **PT-37** with rack 25 ft (7.6 m)..... 0558008172
208-230/460 V CNC **PT-37** w/o rack 25 ft (7.6 m)..... 0558008170
208-230/460 V CNC **PT-37** with rack 50 ft (15.2 m)..... 0558008173
208-230/460 V CNC **PT-37** w/o rack 50 ft (15.2 m)..... 0558008171
208-230/460 V Hand Switch **PT-37** with rack 25 ft (7.6 m)..... 0558008178
208-230/460 V Hand Switch **PT-37** with rack 50 ft (15.2 m)..... 0558008179
208-230/460 V CNC **PT-38** 25 ft (7.6m)..... 0558008182
208-230/460 V CNC **PT-38** 50 ft (15.2m)..... 0558008183

Powercut-1600:

208-230/460 V CNC **PT-37** with rack 25 ft (7.6 m)..... 0558008176
208-230/460 V CNC **PT-37** w/o rack 25 ft (7.6 m)..... 0558008174
208-230/460 V CNC **PT-37** with rack 50 ft (15.2 m)..... 0558008177
208-230/460 V CNC **PT-37** w/o rack 50 ft (15.2 m)..... 0558008175
208-230/460 V CNC **PT-38** 25 ft (7.6m)..... 0558008184
208-230/460 V CNC **PT-38** 50 ft (15.2m)..... 0558008185
208-230/460 V Hand Switch **PT-37** with rack 25 ft (7.6 m)..... 0558008180
208-230/460 V Hand Switch **PT-37** with rack 50 ft (15.2 m)..... 0558008181

Available Consoles:

Powercut-1300:

208-230/460 V Mechanized Console 0558007881
400 V CE Mechanized Console 0558007882

Powercut-1600:

208-230/460 V Mechanized Console 0558007883
400 V CE Mechanized Console 0558007884

PT-37 Torches:

PT-37 Torch with rack 4.5' (1.4 m) 0558004860
PT-37 Torch with rack 17' (5.2 m) 0558004861
PT-37 Torch with rack 25' (7.6 m) 0558004862
PT-37 Torch with rack 50' (15.2 m) 0558004863

PT-37 Torch w/o rack 4.5' (1.4 m) 0558004894
PT-37 Torch w/o rack 17' (5.2 m) 0558004895
PT-37 Torch w/o rack 25' (7.6 m) 0558004896
PT-37 Torch w/o rack 50' (15.2 m) 0558004897

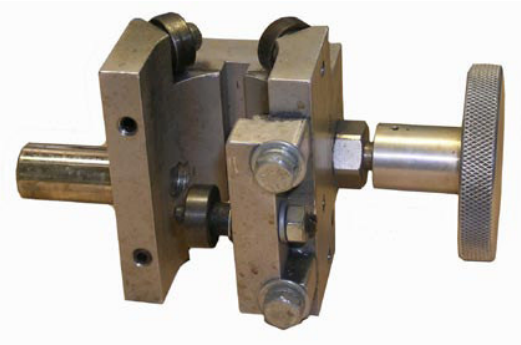
WARNING **DO NOT USE OXYGEN WITH THIS TORCH! A HAZARDOUS FIRE MAY RESULT.**

2.4 PT-37 Torch Data

Powercut-1300/1600 mechanized plasma cutting packages use the PT-37 torch. For dimensions and breakdown of parts, refer to torch manual.

2.5 Optional Accessories:

Torch Holder Assembly..... 0558005926



Remote Hand Control Switch with 25 ft. (7.6m) lead for PT-37.....
..... 0558008349

Gas Flow Measuring Kit:
This valuable troubleshooting tool allows measurement of the actual air gas flow through the torch..... 19765("CE" units - 0558000739)

Powercut-1300/1600 Water Separator:
Improves air quality by removing water.....0558007897

Powercut-1300/1600 Mechanized Conversion kit:
Adds mechanized capability to an existing manual machine .....
.....0558007885

WARNING

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.

3.0 Installation

3.1 General

Proper installation is important for satisfactory and trouble-free operation of the Powercut cutting package. It is suggested that each step in this section be studied carefully and followed closely.

3.2 Equipment Required

A source of clean, dry air that supplies 500 cfh (236 l/m) at 90 psig (6.2 bar) is required for the cutting operation. The air supply should not exceed 150 psig (10.3 bar) (the maximum inlet pressure rating of the air filter-regulator supplied with the package).

3.3 Location

Adequate ventilation is necessary to provide proper cooling of the Powercut. 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 power source and wall or any other obstruction to allow freedom of air movement through the power source.

3.4 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. 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

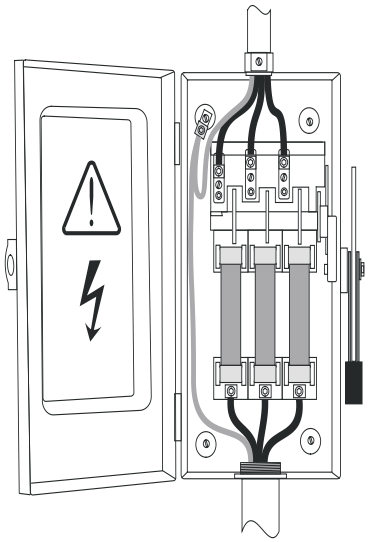
ELECTRIC SHOCK CAN KILL! PRECAUTIONARY MEASURES SHOULD BE TAKEN TO PROVIDE MAXIMUM PROTECTION AGAINST ELECTRICAL SHOCK. BE SURE THAT ALL POWER IS OFF BY OPENING THE LINE (WALL) DISCONNECT SWITCH AND BY UNPLUGGING THE POWER CORD TO THE UNIT WHEN CONNECTIONS ARE MADE INSIDE OF THE POWER SOURCE.

3.5 Primary Input Connections

The Powercut-1300/1600 consoles are equipped with approximately 10 ft. of 4-conductor input power cable for 3 phase connection. If single-phase connection is desired, cap the unused wire on the input power cable per chart below. When operating this machine from a single-phase source, it must be connected to a dedicated 100 amp feed. Due to the higher input current requirements, the duty cycle of the machine is lower than in three-phase operation. Single-phase duty cycle is 60% for PC-1300 and 40% for PC-1600.

STANDARD UNITS (NON-CE)				CE UNITS (EUROPE)		
PHASE	3	1		PHASE	3	1
L1	Black	Black		L1	Brown	Brown
L2	Red	-		L2	Black	-
L3	White	White		L3	Gray	Gray
GND	Green	Green		GND	Green/Yel	Green/Yel

PRIMARY INPUT POWER CABLE



CUSTOMER FUSED LINE DISCONNECT SWITCH (See Table 3-1)

Figure 3-1. Input Connections

WARNING

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

WARNING

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

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.

Before connecting to input power, make sure there is a line (wall) disconnect switch with fuses or circuit breakers at the main power panel. You may either use the factory-installed input power cable (4/c, type SO (90 °C), 10 ft (3.1 m) length) or provide your own input power leads. If you choose to provide your own, make sure they are insulated copper conductors. You must have two (single-phase) or three (three-phase) power leads and one ground wire. The wires may be heavy rubber covered cable or may be run in a solid or flexible conduit. Refer to Table 3-2 for recommended input conductors and line fuse sizes.

Table 3-1. (Powercut-1300/1600)
Recommended Sizes For Input Conductors and Line Fuses

PowerCut-1300				
Input Requirements			Input & Gnd Conductors	Line Fuse
Volts	Phase	Amps	Cu / Awg	Amps
208	1	74	6	100
208	3	39	6	60
230	1	63	6	100
230	3	31	6	50
400	3	26	6 mm^2	40
460	3	20	10	30
575	3	18	10	30

PowerCut-1600				
Input Requirements			Input & Gnd Conductors	Line Fuse
Volts	Phase	Amps	Cu / Awg	Amps
208	3	47	6	70
230	1	82	6	100
230	3	41	6	60
400	3	28	6 mm^2	40
460	3	25	10	40
575	3	20	10	30

3.5.1 INPUT VOLTAGE CHANGEOVER - 230/460 VOLTAGE UNITS ONLY

208 - 230 or 460 Mode

To simplify the use of the Powercut-1300/1600 with different input voltages, it has been equipped with a 230/460 volt selector switch located on the rear panel of the unit. Switching between 230 and 460 voltages can be done by using a flathead screwdriver. You will hear two clicks when switching between 230 and 460 positions. Do not allow switch to remain in the center position. This switch should never be changed when machine power is on. Damage could result.

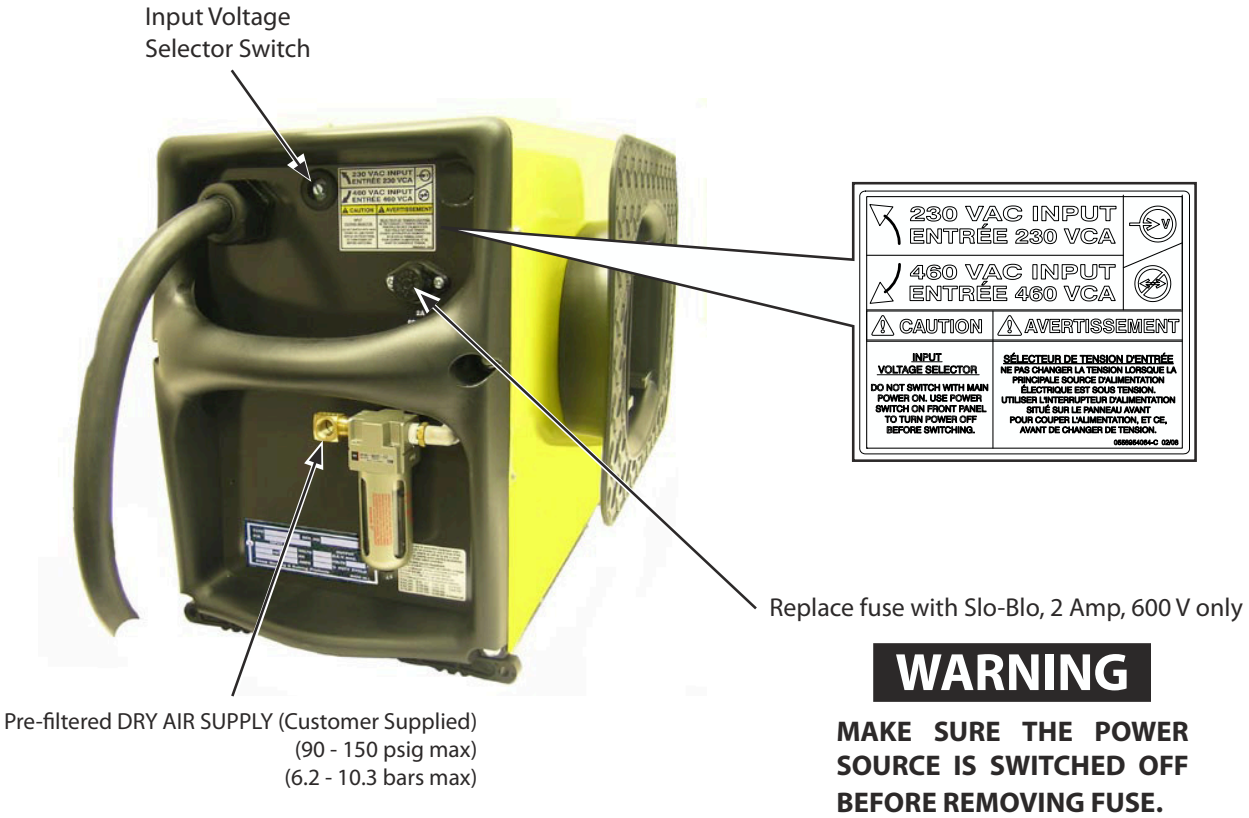
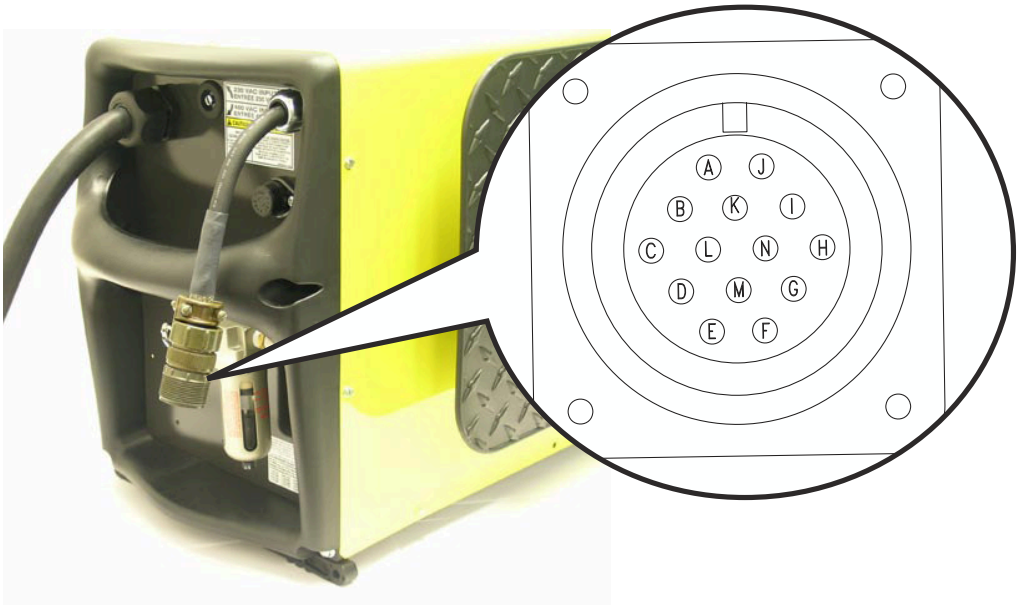


Figure 3-2. Input Connections / Fuse Replacement

3.5.2 INPUT AIR CONNECTION

Connect your air supply to the inlet connection of the filter-regulator.

3.6 CNC Interface Connection (Mechanized)



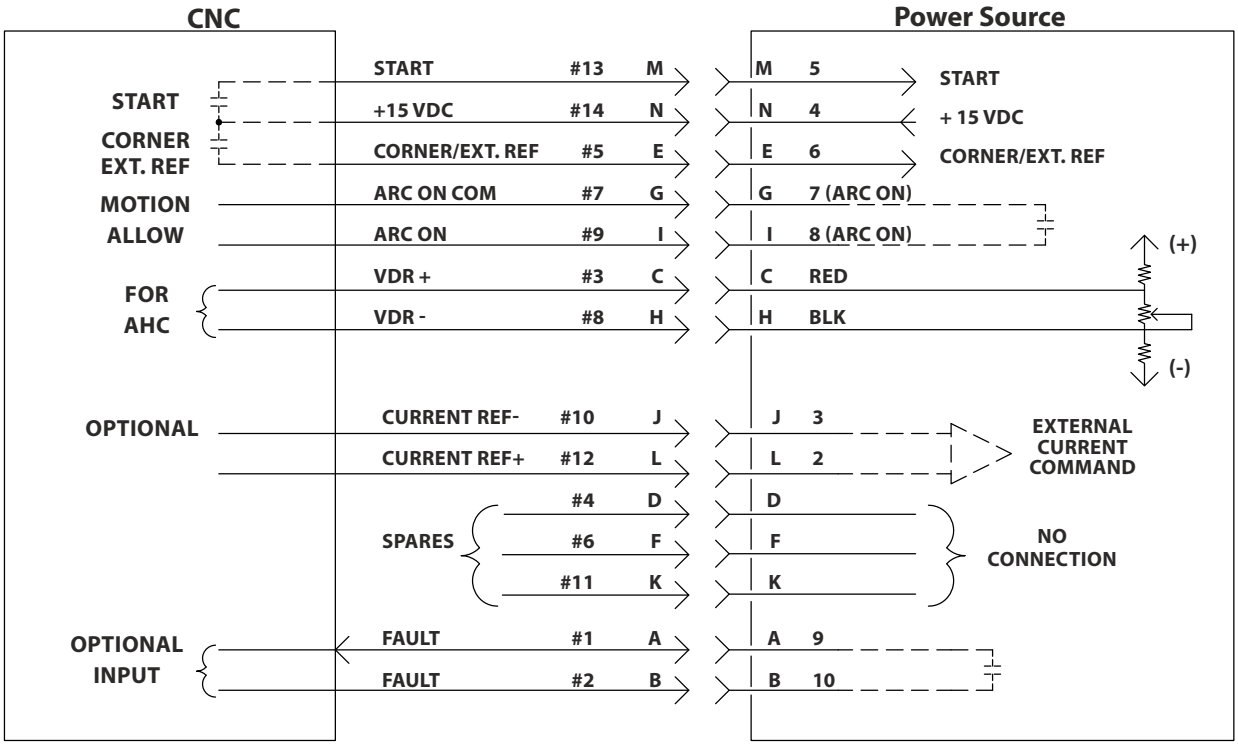
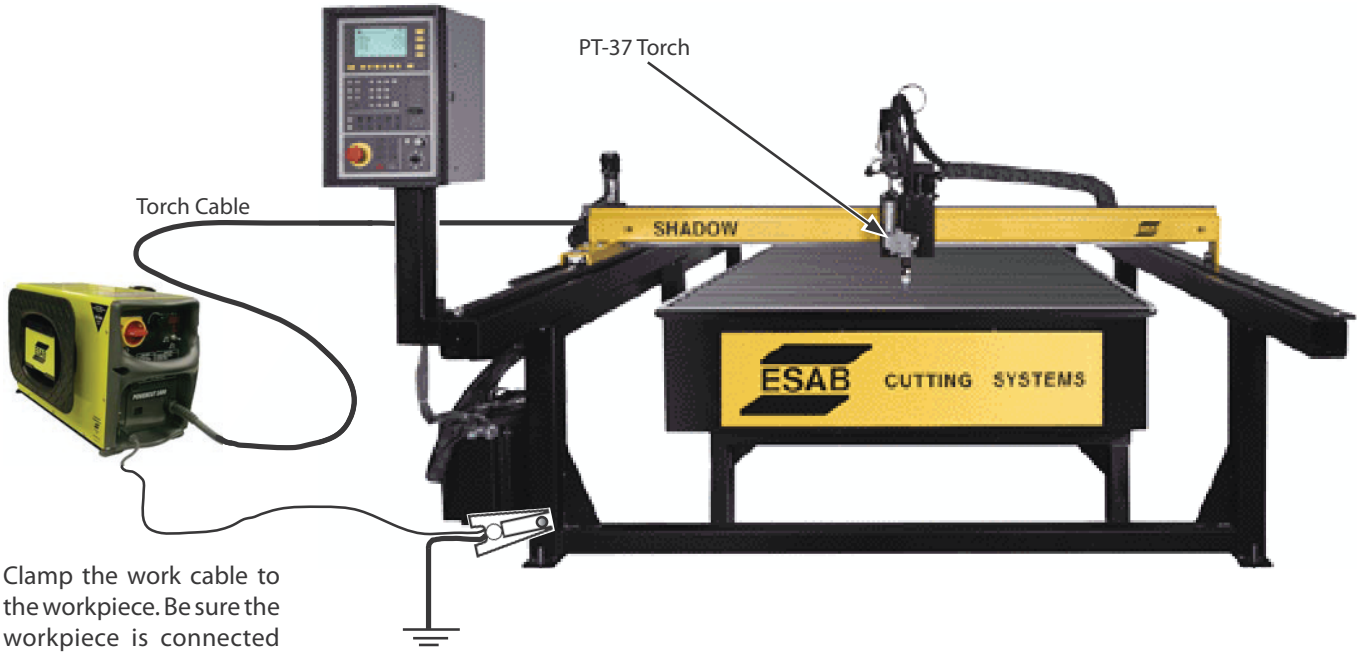


Figure 3-3. Mechanical Cutting Interface Diagram
CNC Interface Connection

3.7 SECONDARY OUTPUT CONNECTIONS FOR MECHANIZED Cutting



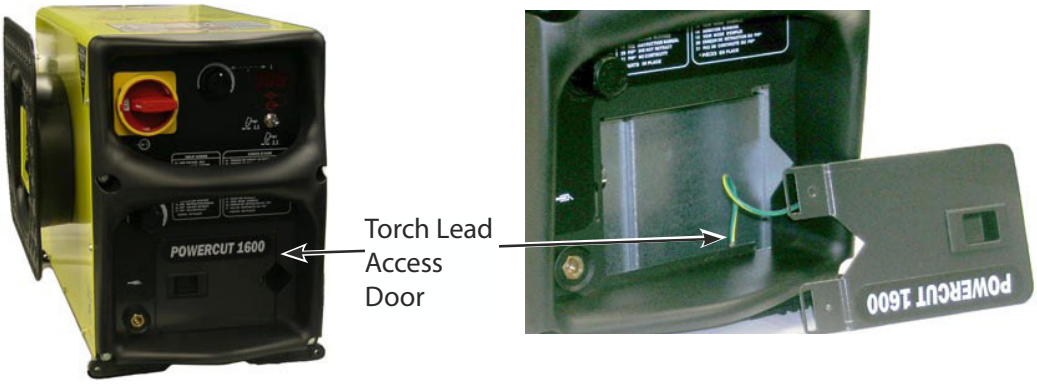
Clamp the work cable to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable.

Figure 3-4. Powercut Interconnection Diagram

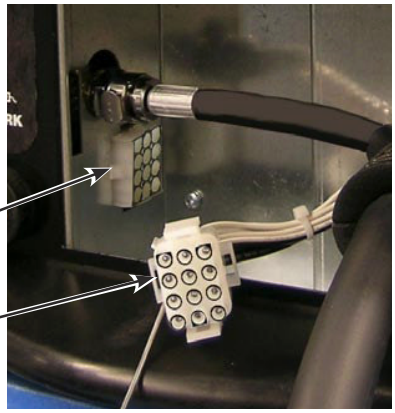
WARNING **MAKE SURE POWER SWITCH ON CONSOLE IS IN OFF POSITION AND PRIMARY INPUT POWER IS DE-ENERGIZED.**

3.8 PT-37 Torch Lead Installation

1. Open torch lead access door on the front panel of the Powercut-1300/1600.



2. Connect the power cable male receptacle to the female receptacle. Check orientation of the sockets so as to ensure a correct fit.



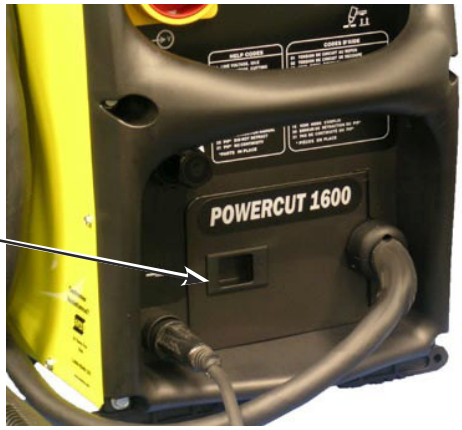
3. Connect the air hose to the quick-connect fitting. Place the strain relief in the square cutout in the front of the console. Line up the groove of the strain relief with the half square cutout area.

4. Insert work cable into plug on the front of the console and turn clockwise until secure.

5. Replace torch lead access door. Refer to the data in the cut data tables, Section 4, Operation, for torch cutting parameters.

Work Cable

Torch Lead Access Door



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.**

4.0 Operation

4.1 Powercut-1300/1600 Controls

A. **Power Switch.** Turn knob clockwise to "ON" position for normal operation. Turn knob counterclockwise to switch "OFF".

B. **Pressure Regulator.** Regulates cut gas pressure.

C. **Output Current Control.** Adjustable from 20 to 70 amperes on Powercut-1300. Adjustable from 20 to 90 amperes on Powercut-1600. For settings refer to cut data charts in the torch manual.

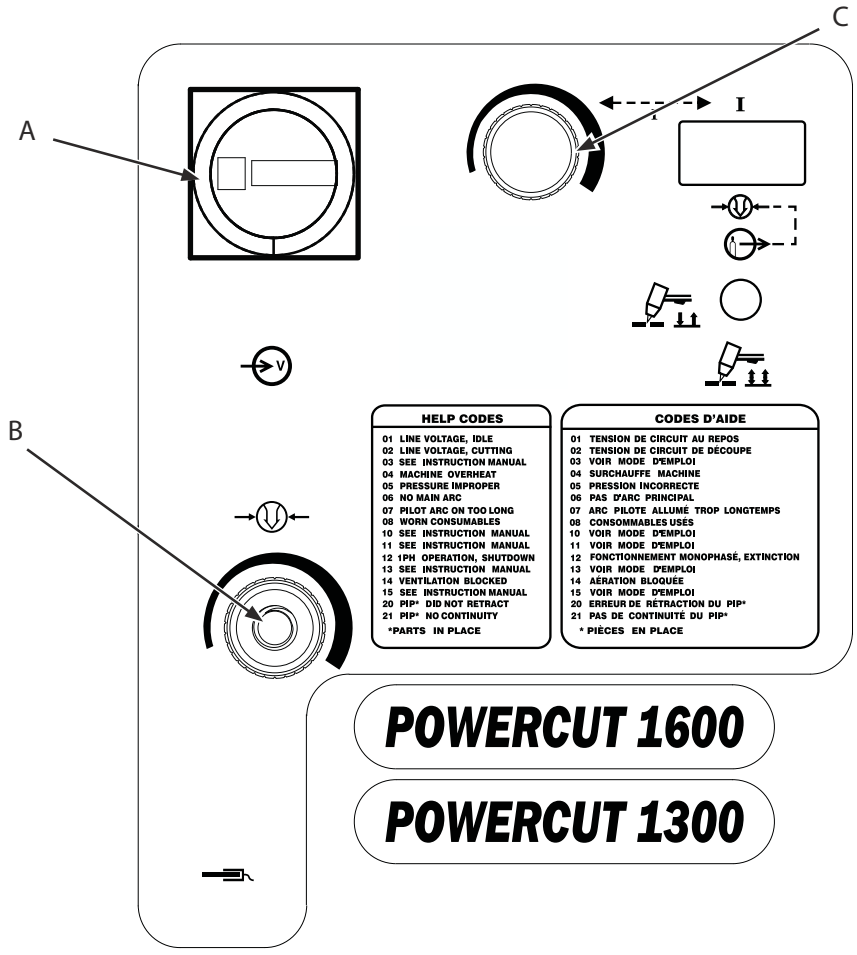


Figure 4-1. Powercut 1300/1600 Controls

D. Torch Trigger / Gas Test Switch

Note:

The torch trigger positions are converted to mechanized logic on the mechanized consoles.

Cutting modes:

Normal Pilot Arc (CENTER position) **-** The pilot arc will not re-strike automatically. Requires a new start signal. This setting is recommended for standard plate cutting.

Continuous Pilot Arc (DOWN position) - The pilot arc will re-strike automatically. Examples for usage of this setting are expanded metal and grate cutting.

Test Mode:

Gas Test Switch (UP position) - The display screen will indicate air pressure reading and the air filter-regulator can be adjusted to desired pressure 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 **Normal Pilot Arc** (CENTER position) or **Continuous Pilot Arc** (DOWN position) before starting cutting operations.

E. Display Screen: Displays current settings during normal operation.

1. Power-up Indication: When unit is initially switched on the Model, PIP (Parts in Place), Software version will be briefly displayed. Display will then show Current Setting.

2. Gas Test: When unit is in the "GAS TEST" mode the display will indicate air pressure setting in psi/bar.

3. Fault Indication: Should a fault condition exist in normal operation, the display will show a code number. Refer to the "Help Code" menu on the front panel (non-"CE" units only) or in Section 4.1.F and in Troubleshooting Section 6.1.

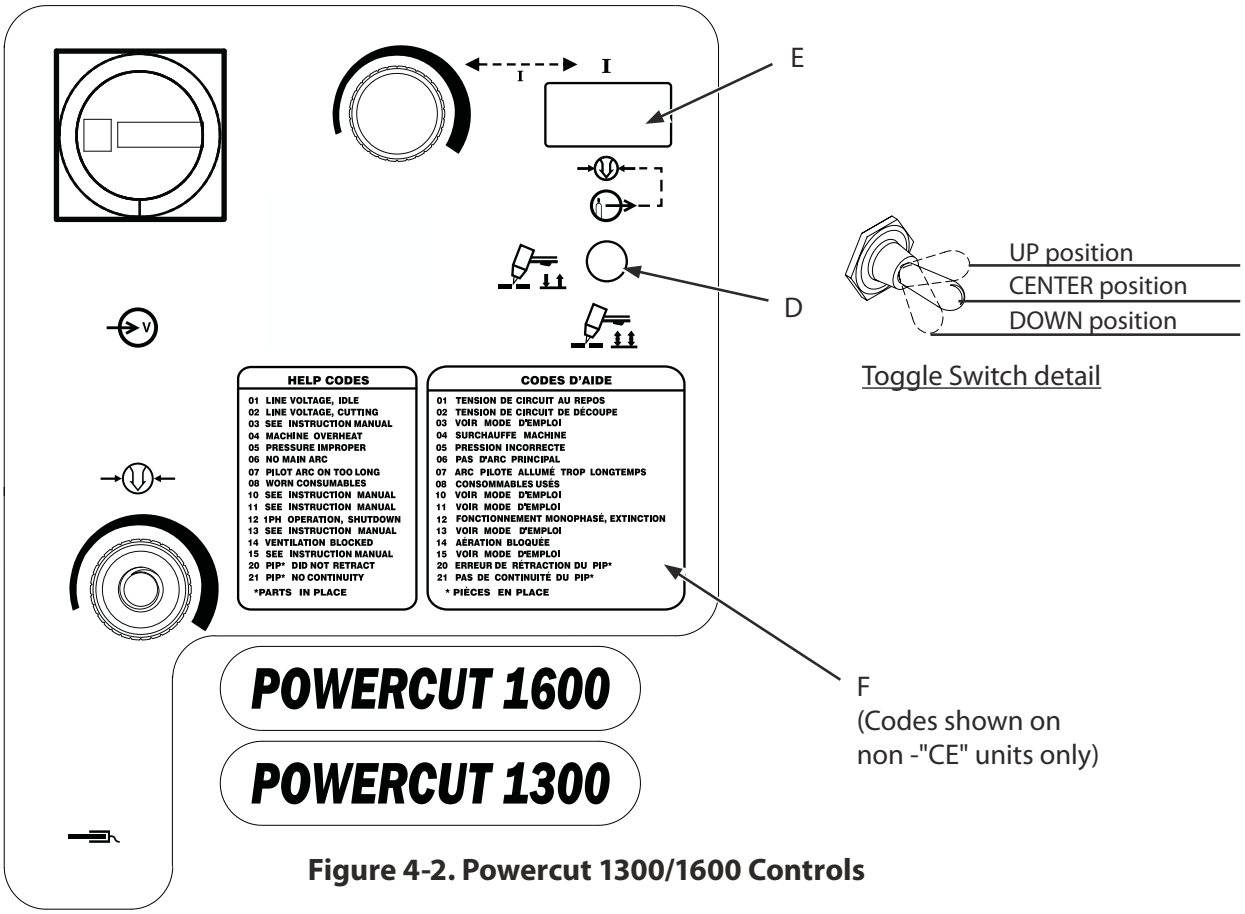


Figure 4-2. Powercut 1300/1600 Controls

Note:

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.

F. Help Codes (See Section 6, Troubleshooting):

1. Line voltage, idle +/- 15 % - line voltage has fluctuated +/- 15 %.
2. Line voltage, cutting +/- 20 % - line voltage has fluctuated +/- 20 %.
3. Control bias, +/- 15 V bias split - Control transformer supplying insuffient voltage to the control circuit.
4. Thermal switch - Switch opens due to excessive heat within the unit.
5. Pressure - Insuffient air pressure being supplied.
6. Fail to fire - Arc failed to transfer to workpiece.
7. Pilot Arc timeout (~ 5 seconds) - Cutting process did not begin within the 5 second limit.
8. Torch error - Improper assembly of torch consumables.
10. Feedback improper - current sensor may be disconnected.
11. Primary over-current - Converter failure.
12. Single phase operation, shutdown - Exceeded single phase duty cycle rating.
13. OCV (open circuit voltage) failure - Voltage or current not detected when test (PIP) is performed.
14. Ambient temperature - Make sure adequate air flow is around all sides of unit. Check air louvers and any other openings to ensure that any obstruction is removed.
15. Bus charger failure - Primary bus not up to voltage.
20. PIP (Parts in place) no retract - Piston did not retract when air applied.
21. PIP (Parts in place) no continuity - Piston did not drop back in place when air was removed.

WARNING **MAKE SURE POWER SWITCH ON POWERCUT IS IN OFF POSITION BEFORE WORKING ON THE TORCH.**

WARNING **THE PT-37 TORCH HEAD ACTS IN CONJUNCTION WITH THE CIRCUITRY WITHIN THE POWER SOURCE TO PREVENT 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 SAFETY INTERLOCK.**

4.2 Cutting with the Powercut-1300/1600 using the PT-37 torch

A. For in depth instructions refer to torch manual for complete maintenance and operation.

B. Periodically check torch head assembly. Replace if worn or damaged.

C. Torch cable should be inspected periodically. If there are any cuts through the protective sheath or wire insulation, replace the cable.

CAUTION **REPLACE ELECTRODE BEFORE WEAR BECOMES DEEPER THAN .060" INCH (1.5 MM)**

4.3 Electrode Wear

If the electrode has a pit which is more than .06" (1.5mm) deep at its center, it must be replaced. This is done by unscrewing the electrode in a counter-clockwise direction from the piston. If the electrode is used beyond this recommended wear limit, damage to the torch and power source may occur. Nozzle life is also greatly reduced when using the electrode below the recommended limit.

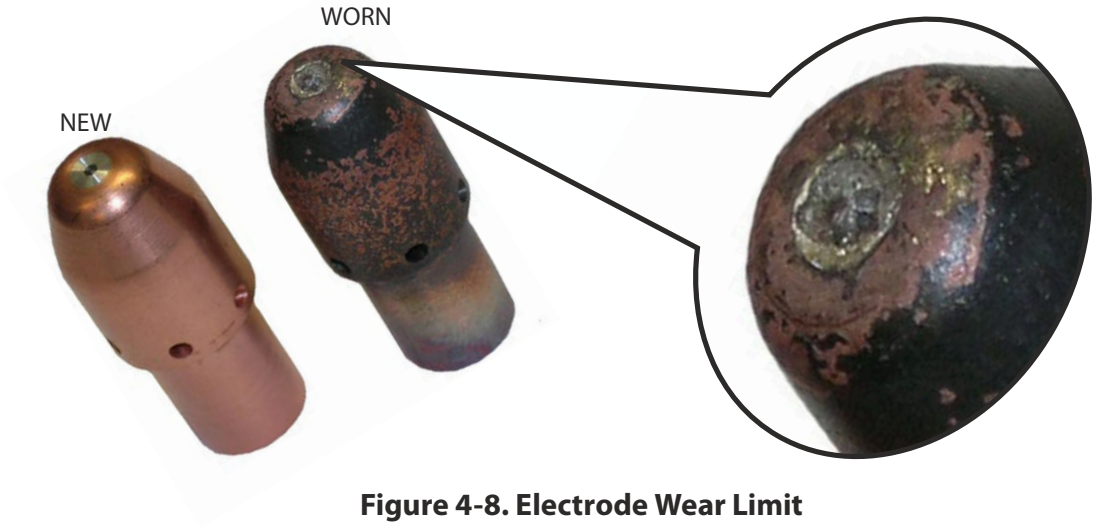


Figure 4-8. Electrode Wear Limit

Powercut-1300/1600

MAINTENANCE
TROUBLESHOOTING
SCHEMATIC DIAGRAMS
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.**

5.0 General

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.

5.1 Inspection and Cleaning

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

A. Check work cable for secured connection to workpiece.
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 plugs, 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 using low-pressure dry compressed air.

WARNING **WATER OR OIL OCCASIONALLY ACCUMULATES IN COMPRESSED AIR LINES. BE SURE TO DIRECT THE FIRST BLAST OF AIR AWAY FROM THE EQUIPMENT TO AVOID DAMAGE TO THE POWERCUT.**

H. Occasionally, bleed all water from the filter beneath the air filter-regulator.

5.2 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, refer to the maintenance section of this manual. If the problem is not corrected after referring to the maintenance section, contact your ESAB distributor.

A. Insufficient Penetration.
1. Current too low.
2. Cutting speed too fast.
3. Damaged cutting nozzle.
4. Improper air pressure.
5. Low air flow rate.

B. Main Arc Extinguishes.
1. Cutting speed too slow.
2. Worn electrode.

C. Dross Formation. (In some materials and thicknesses, it may be impossible to get dross-free cuts.)
1. Current too low.
2. Cutting speed too fast or too slow.
3. Improper air pressure.
4. Faulty nozzle or electrode.
5. Low air flow rate.

D. Double Arcing. (Damaged Nozzle Orifice.)
1. Low air pressure.
2. Damaged cutting nozzle.
3. Loose cutting nozzle.
4. Heavy spatter accumulation on nozzle.

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. Worn electrode.
2. Loose connections.
3. Work cable not attached.

H. Poor Consumable Life.
1. Improper gas pressure.
2. Contaminated air supply.
3. Low air flow rate.

5.3 IGBT Handling

Since IGBT gates are insulated from any other conducting region, care should be taken to prevent static build up, which could possibly damage gate oxides. All IGBT modules are shipped from the factory with conductive foam contacting the gate and emitter sense pins.

Always ground parts touching gate pins during installation. In general, standard ESD precautions application to FETs should be followed.

Other handling precautions that should also be observed are as follows:

- Use grounded work station with grounded floors and grounded wrist straps when handling devices.
- Use a 100Ω resistor in series with the gate when performing curve tracer tests.
- Never install devices into systems with power connected to the system.

5.4 Module Replacement

When mounting modules on a heatsink, certain precautions should be taken to prevent any damage against a sudden torque. If a sudden torque ("one-sided tightening") is applied at only one mounting terminal the ceramic insulation plate or silicon chip inside the module may get damaged.

The mounting screws are to be fastened in the order shown in Figure 5-1. Also, care must be taken to achieve maximum contact (i.e. minimum contact thermal resistance) for the best heat dissipation.

Application of a thermal compound / pad on the contact surface improves its thermal conductivity. Use Dow-340 Heat Sink Compound or equivalent. See Replacement Parts section for the required pad.

A torque wrench should be used. Tighten mounting and terminal screws per Torque Requirements shown in Subsection 7.3. If device is over-torqued, the device can be damaged like the above "one-sided tightening".

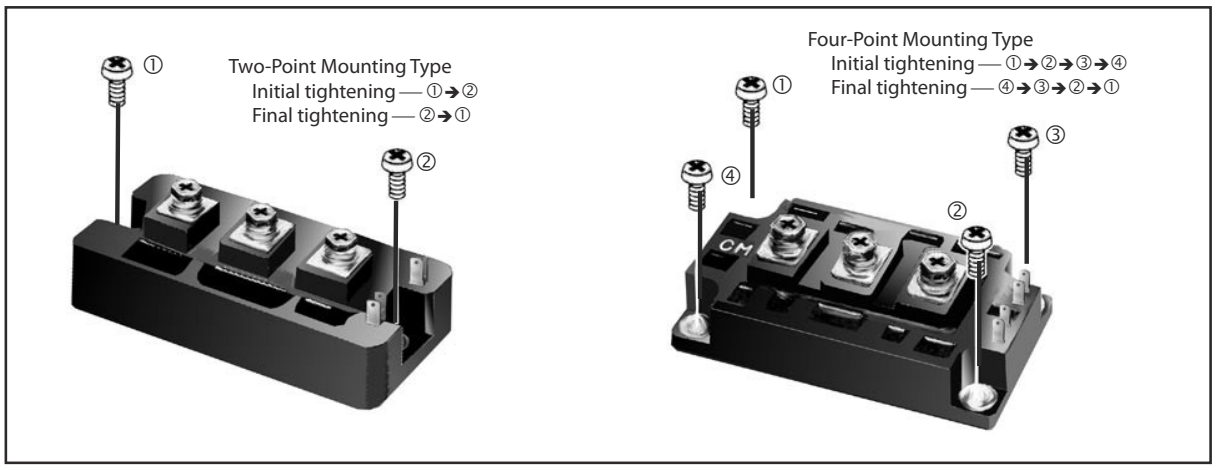


Figure 5-1 Screw Fastening Order

SECTION 5 MAINTENANCE

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.

6.0 Troubleshooting

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 and electrical schematic diagram and checking the various components. A volt-ohmmeter will be necessary for some of these checks.

SECTION 6 TROUBLESHOOTING

6.1 List of Help Codes

Code	Error	Cause	Solution
1	Line voltage, idle +/- 15 %	Supply line voltage either dropped or exceeded nominal input setting.	Check voltage supply.
2	Line voltage, cutting +/- 20 %	Supply line voltage either dropped or exceeded nominal input setting during a cut.	Check voltage supply.
3	Control bias, +/- 15 V bias split	Control transformer not supplying the proper voltage to the control circuit	Check transformer and control board. Send unit to an Authorized Repair Station for repair.
4	Thermal switch	Switch open - unit overheated.	Allow unit to cool down, check for adequate ventilation.
5	Pressure	Air pressure is outside of proper range.	Check air supply and pressure setting.
6	Fail to fire	Arc did not transfer. Arc will repeatedly "pop" out 3 consecutive times.	Check/replace consumables.
7	Pilot Arc time out (~ 5 seconds)	Pilot arc exceeded 5 second limit .	Transfer within 5 second limit. Check ground cable.
8	Torch error	Electrode in contact with nozzle (failed to separate).	Check/replace consumables. If problem persists replace/repair torch.
10	Feedback improper	Primarily seen if current sensor is unplugged.	Check cable and connection between current sensor board and control board. Send unit to an Authorized Repair Station for repair.
11	Primary over-current	Converter failure.	Send unit to an Authorized Repair Station for repair.
12	Single phase operation, shutdown	Exceeded single phase duty cycle rating.	Operate within proper duty cycle rating.
13	OCV (open circuit voltage) failure	Voltage or current not detected when test (PIP) is performed.	Send unit to an Authorized Repair Station for repair.
14	Cabinet temperature	Too high, outside of operating limits.	Check ventilation around unit. Check air louvers and any other openings to ensure that any obstruction is removed.
15	Bus charger failure	Primary bus not up to voltage.	Check bus charger. Send unit to an Authorized Repair Station for repair.
20	PIP (Parts in place) no retract	Piston did not retract when air applied.	Check/clean consumables. Check air supply.
21	PIP (Parts in place) no continuity	Piston did not drop back in place when air was removed.	Check/clean consumables. Ensure proper installation of consumables.

7.0 Replacement Parts

7.1 General

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

7.2 Ordering

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

Replacement parts may be ordered from your ESAB Distributor.

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

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

Note

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

	Model # P/N	DESCRIPTION	SCHEMATIC DIAGRAM	WIRING DIAGRAM
1	0558007220	PC-1300 230/460v	0558007542	0558007543
2	0558007230	PC-1600 230/460v	0558007542	0558007543
3	0558007220F	PC-1300 230/460v BL	0558007542	0558007543
4	0558007230F	PC-1600 230/460v BL	0558007542	0558007543
5	0558007881	PC-1300 Mech 230/460v	0558007542	0558007543
6	0558007883	PC-1600 Mech 230/460v	0558007542	0558007543
7	0558008320	PC-1300 460v	0558008326	0558008327
8	0558008323	PC-1600 460v	0558008326	0558008327
9	0558007227	PC-1300 575v BL	0558007544	0558007545
10	0558007237	PC-1600 575v BL	0558007544	0558007545
11	0558007634	PC-1300 400v	0558007546	0558007547
12	0558007636	PC-1600 400v	0558007546	0558007547
13	0558007224	PC-1300 400v CE	0558007546	0558007547
14	0558007234	PC-1600 400v CE	0558007546	0558007547
15	0558007882	PC-1300 Mech 400v CE	0558007546	0558007547
16	0558007884	PC-1600 Mech 400v CE	0558007546	0558007547

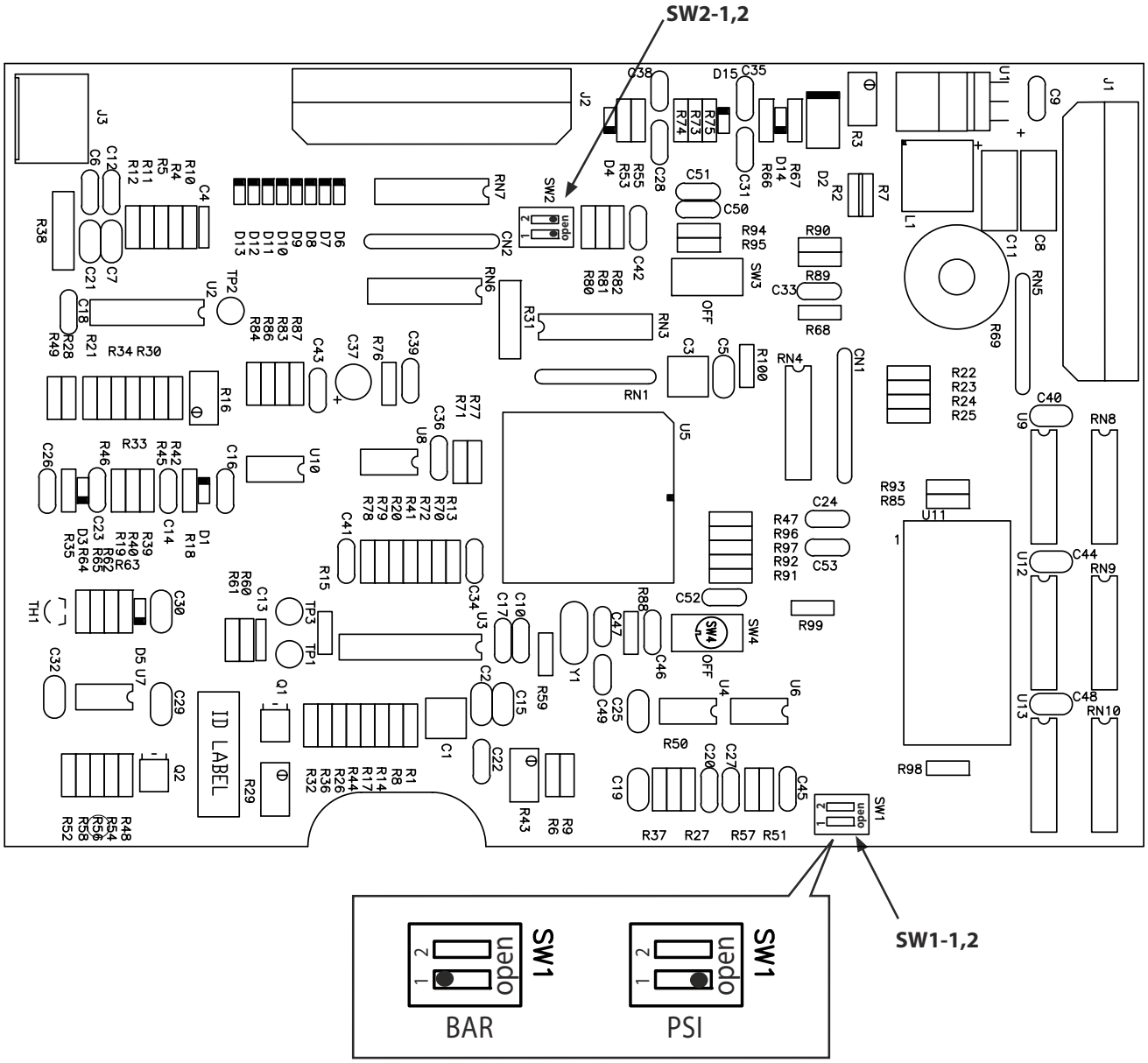
7.3 Torque Recommendations

RECOMMENDED TORQUES (IN/LBS ±10%)		
SYMBOL / DESCRIPTION	**MOUNT**	**TERMINAL**
BR101	36	44
Q101,102	36	36
Q103	25	36
D101,102	28	22
C101-104	-	25
R2,5,7,10,12,14,15	6	-
SW1	22	35
SW2	6	25 / 18
K1 (PC-1600 230/460V)	18	40
K1 (All Others)	18	18
TS1,2	12	-
HEATSINK	28	-
M1	18	-
WORK	44	44
BUSSBAR DIODE (-)	-	44
PCB2	14	-
PCB2 - TB1,2,3,4,7	-	44
PCB2 - TB8, J18, PI	-	25
PCB7	18	7
P3,20,21	-	2.5
P1,44	-	4.5
SHEETMETAL EXTRUDED	28	-
SHEETMETAL PLAIN	14	-
END CAP / HANDLE	44	-
TORCH WRAP	12	-

7.4 Selecting Air Pressure Units of Measure

1. Set SW1-1 dip switch for desired air pressure units of measure.
   - PSI - "OPEN"
   - BAR - Not Open
2. SW1-2 is not used.
3. Verify SW2 - 1,2 dip switches are in the "open" position for proper operation.

CONTROL/DISPLAY BOARD ASSEMBLY
P/N 0558038317



NOTES

REVISION HISTORY

1. Preliminary release of this manual is 05/2007.
2. Released FOR BETA USE ONLY 06/2007.
3. Released FOR BETA USE ONLY 09/2007.
4. Released FOR BETA USE ONLY 04/2008.
5. Official release 07/2008.
6. 08/2008 - minor changes, updated replacement parts and schematics, CN #083140.

ESAB Welding & Cutting Products, Florence, SC Welding Equipment
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