



PowerCutTM 400 PT-39



Instruction manual



DECLARATION OF CONFORMITY

According to

The Low Voltage Directive 2006/95/EC, entering into force 16 January 2007 The EMC Directive 2004/108/EC, entering into force 20 July 2007

Type of equipment

Plasma Cutting Power Source

Type designationPowerCutTM 400, from serial number 248 xxx xxxx (2012 w.48)

Brand name or trade mark

ESAB

Manufacturer or his authorized representative established within the EEA: Name, address, phone, website:

ESAB AB

Lindholmsallén 9 Box 8004, 402 77 GÖTEBORG, Sweden

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The following harmonized standards, in force within the EEA, has been used in the design:

EN 60974-1, Arc welding equipment - Part 1: Welding power sources

EN 60974-10, Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements

Additional information:

Restrictive use, Class A equipment, intended for use in locations other than residential.

By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorized representative established within EEA, that the equipment in question complies with the safety requirements stated above.

Date

2012-11-21

Signature

Position

Managing Director Equipment & Automation

Jerker Funnemark Clarification



DECLARATION OF CONFORMITY

According to

The Low Voltage Directive 2006/95/EC, entering into force 16 January 2007

Type of equipment Plasma Cutting Torch

Type designation PT-39

Brand name or trade mark ESAB

Manufacturer or his authorised representatives established within the EEA: Name, address, telephone no., website: ESAB AB Lindholmsallén 9

Box 8004, 402 77 Göteborg, SWEDEN
Phone: +46 31 509 000, Website: www.esab.com

The following harmonised standard in force within the EEA has been used in the design: EN 60974-7, Arc welding equipment – Part 7: Torches

Additional information:

Restrictive use. These torches are used with Class A type of equipment, intended for use in locations other than residential.

By signing this document, the undersigned declares as manufacturer, or the manufacturer's authorised representative established within EEA, that the equipment in question complies with the safety requirements stated above.

Date

21-nov-2012

Signature

Jerker Funnemark Clarification **Position**

Managing Director Equipment and Automation

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1 SAFETY

Users of ESAB 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 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 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 the equipment must be familiar with:
 - its operation
 - location of emergency stops
 - its function
 - · relevant safety precautions
 - · welding and cutting
- 2. The operator must ensure that:
 - no unauthorised person is 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



Arc welding and cutting can be injurious to yourself and others. Take precautions when welding and cutting. Ask for your employer's safety practices which should be based on manufacturers' hazard data.

ELECTRIC SHOCK - Can kill

- Install and earth the 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 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!



WARNING

Do not use the power source for thawing frozen pipes.



CAUTION

Class A equipment is not intended for use in residential locations where the electrical power is provided by the public low-voltage supply system. There may be potential difficulties in ensuring electromagnetic compatibility of class A equipment in those locations, due to conducted as well as radiated disturbances.





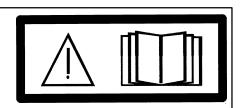
CAUTION

This product is solely intended for plasma cutting.



CAUTION

Read and understand the instruction manual before installing or operating.







Dispose of electronic equipment at the recycling facility!

In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical and/or electronic equipment that has reached the end of its life must be disposed of at a recycling facility.

As the person responsible for the equipment, it is your responsibility to obtain information on approved collection stations.

For further information contact the nearest ESAB dealer.

ESAB can provide you with all necessary cutting protection and accessories.

2 INTRODUCTION

The **PowerCut 400** is a complete system for manual plasma cutting. It delivers cutting power for severing materials up to 13 mm thickness.

2.1 Equipment

The power source is supplied with:

- power cable, 3 m
- instruction manual
- return cable with clamp
- plasma cutting torch PT-39, 4.6 m, supplied as indicated on page 28
- wear part kit for PT-39.

3 TECHNICAL DATA

F	PowerCut 400
Mains voltage range	90 - 280 V , 1 ~, 50/60 Hz
Setting range, rated value	110 V: 15 – 25 A 230 V: 15 – 30 A
Permitted load 25 % duty cycle 110 V 60 % duty cycle 110 V 20 % duty cycle 230V 60 % duty cycle 230 V	25 A 19 A 30 A 18 A
Power factor at maximum current	0.99
Efficiency at maximum current	75 %
Open-circuit voltage U ₀	250 V
Operating temperature	-10 to 40 °C
Transportation temperature	-20 to 55 °C
Sound pressure at no load	< 43 db (A)
Nominal flow rate	189 l/min at 4.8 bar
Dimensions, I x w x h	465 x 160 x 340 mm
Weight including torch and return cable	14.5 kg
Insulation class transformer	Н
Enclosure class	IP 23



Duty cycle

The duty cycle refers to the time as a percentage of a ten-minute period that you can weld or cut at a certain load without overloading. The duty cycle is valid for 40°C.

Enclosure class

The **IP** code indicates the enclosure class, i. e. the degree of protection against penetration by solid objects or water. Equipment marked **IP23** is designed for indoor and outdoor use.

4 INSTALLATION

The installation must be carried out by a professional.

Correct installation is very important for trouble-free operation and good cutting results. Carefully read and follow each step in this chapter.



WARNING

ELECTRIC SHOCKS CAN KILL Take precautionary measures against electric shocks. Ensure that all power supplies are disconnected – switch off the switch at the wall socket and pull out the equipment's power cable from the socket before making any electrical connections in the power source.



WARNING

It is very important that the chassis is connected to the approved electric protective earth, to prevent electric shocks and electrical accidents. Ensure that protective earth is not connected to any phase conductors by mistake.



WARNING

Poor connections or failure to connect the return cable to the workpiece can result in fatal electric shock.



WARNING

Air filter devices may not be used — installation or mounting of any form of air filter device obstructs the cold air flow and causes a risk of overheating. The warranty is invalidated if any type of air filter is used.





WARNING

Do NOT start the equipment with the cover removed.

Do NOT connect the power source with the main switch in ON position or when you are holding it or carrying it.

Do NOT touch any of the torch's parts when the power supply is on.



CAUTION

This product is intended for industrial use. In a domestic environment this product may cause radio interference. It is the user's responsibility to take adequate precautions.



CAUTION

Place the power source at least 3 metres from the cutting area as sparks and slag spray can damage the power source

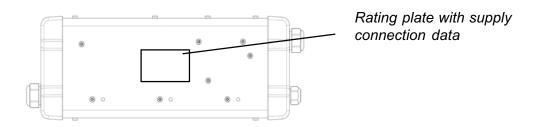
4.1 Delivery check and location

- Remove the packaging. Inspect the equipment for damage that was not immediately apparent upon reception of the delivery. Immediately report any damage to the delivery company.
- 2. Check for any loose parts in the packaging. Check that the air ducts in the cover's rear panel are not blocked by packaging material that can prevent the air flow through the power source.
 - The power source has a carrying handle and can be lifted easily.
- Position the power source so that its cooling air inlets and outlets are not obstructed. Minimum permitted distance to wall or other obstruction is 1 m.
- 4. An air source that gives clean and dry air, at least 189 l/m at 4.8 bar, is required for cutting. The cutting air pressure must not exceed 6 bar, which is the maximum inlet pressure for the filter regulator that is included in the delivery.



4.2 Primary power supply

Make sure that the power source is connected to the correct supply voltage and that it is protected by the correct fuse rating. A protective earth connection must be made in accordance with regulations.





Make sure the power source is switched off before removing the fuse.

Recommended fuse sizes and minimum cable area

	Powercut 400	
Mains voltage	110 V 1~	230 V 1~
Mains cable area	3G2.5	3G2.5
Phase current I _{1eff}	16 A	9 A
Fuse, anti-surge	32 A	16 A

NOTE! The mains cable areas and fuse sizes as shown above are in accordance with Swedish regulations. Use the power source in accordance with the relevant national regulations.

Supply from power generators

The power source can be supplied from different types of generators. However, some generators may not provide sufficient power for cutting. Generators with AVR, equivalent or better type of regulation with a min rated power of 6 kW are recommended to supply the power source within it's full capacity.

Start with generator:

- 1) Start the generator
- 2) Turn on the power source by mains switch ON

Stop with generator

- 3) Turn off the power source by mains switch OFF
- 4) Stop the generator

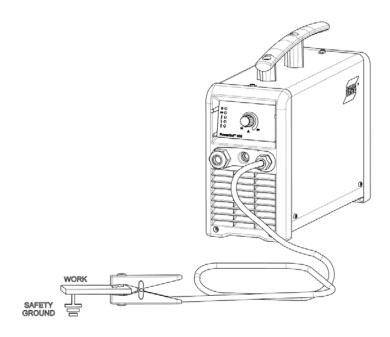


4.3 Input air connection

Connect your air supply to the inlet connection of the filter. Any cylinder of compressed air or air from a compressor may be used. The air must be free from polluting particles. A pressure regulator is provided to ensure the correct air flow rate on the torch. It is set from factory at 4.8 bar.

4.4 Connection for return cable

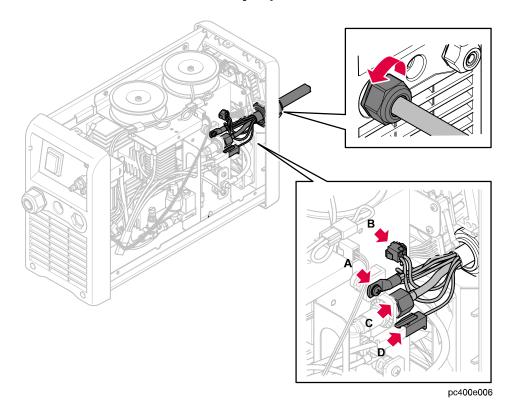
Clamp the return cable to the workpiece. Be sure the workpiece is connected to an approved earth ground with a properly sized ground cable.





4.5 Connection of torch

The installation must be carried out by a professional.



- A Torch power cable, violet
- B Torch trigger cables, black
- C Air hose to quick-connect fitting
- D Torch pilot cable, red

The power source is equipped with a quick-disconnect solution for connecting and disconnecting the torch.

- 1. Turn off the main switch, disconnect the power cable and the air supply.
- 2. Open the little left side panel by unscrewing 2 screws.
- 3. Insert the torch end with cable receptacle and air hose through the hole in the front of the power source.
- 4. Connect the violet torch power cable by tightening 1 screw.
- 5. Connect the 2 black torch trigger cables.
- 6. Connect the red torch pilot cable.
- 7. Connect the air hose to the fitting.
- 8. Close the little left side panel.
- 9. Connect the power cable and turn on the main switch.



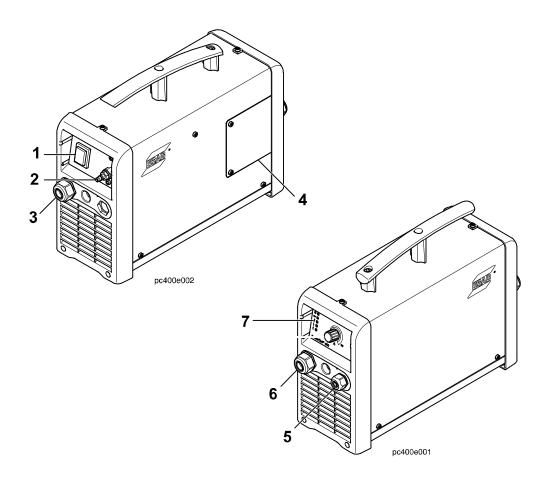
5 OPERATION

General safety regulations for handling the equipment can be found on page 6. Read through before you start using the equipment!

5.1 Connections

- 1 Power switch ON/OFF
- 2 Connection for air
- 3 Power cable
- 4 Side panel

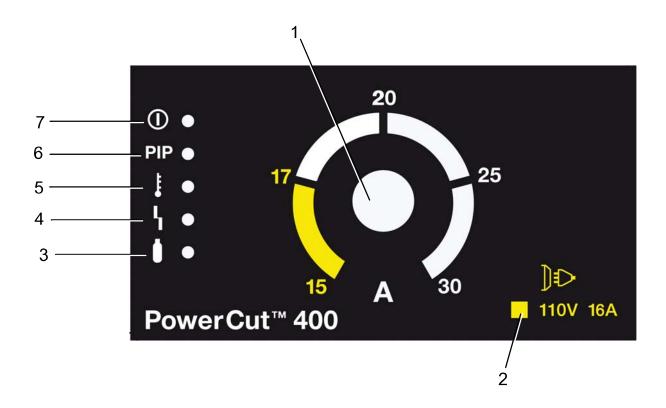
- 5 Connection for return cable
- 6 Connection for torch
- 7 Control devices, see chapter 5.2





5.2 Control devices

- 1 Knob for setting of current 5 Over temperature indicator, yellow
- 2 Primary input voltage/Circuit breaker key 6 Parts In Place (PIP), yellow
- 3 Air pressure indicator, yellow 7 Power ON indicator, green
- 4 Fault indicator, yellow



1 Output current control

Output current control can vary the cutting current from 15A to 30A. Adjusting the current will affect the power consumed by the machine, the thickness of material that can be cut, and the quality of a cut at a given speed. Special care should be taken to keep the cutting current below 17A when powering the machine from 110V mains supply with a 16A circuit breaker.

2 Primary Input Voltage/Circuit Breaker Key

The symbol explains the yellow field on the output current control. Max output current for 110 V and 32A circuit breaker is 25A.

3 Air Pressure Indicator

The yellow LED indicates that the air pressure is too low.

4 Fault Indicator

The flashing yellow LED indicates that the safety switch for the cover is activated and the power is automatically turned off.



5 Over Temperature Indicator

When the yellow LED is lit, the working temperature has exceeded the normal values. It is turned off when the temperature is normal.

6 Parts in Place (PIP)

When the yellow LED is lit, it indicates that there is a parts-in-place error. This means that no nozzle was detected, or that the electrode is not retracting properly. Turn off the power. Check that the components are properly assembled, that they are free from excessive damage, and that the electrode can slide back and forth with comfortable pressure from one finger. Once the source of the error has been corrected, turn on the power again.

7 Power ON Indicator

When the green LED is lit, it indicates that the power is on.

5.2.1 Symbol key

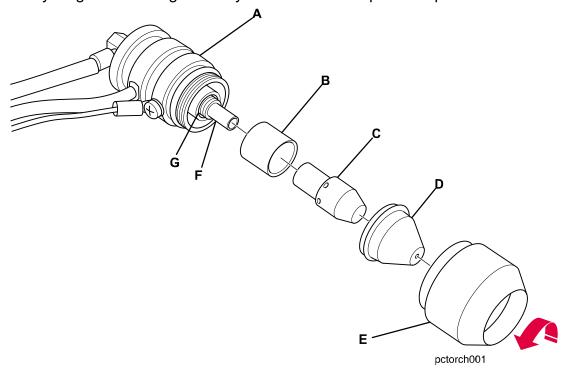
	Power	i	Air
ŀ	Temperature	L 1	Fault
PIP	Parts in Place		Power supply
$\triangle \square$	Read the manual		



5.3 Installing consumables for the torch

Proper use of the torch within rated operating conditions (especially arc current and gas flow rate) and correct installation of consumable parts can prevent unnecessary torch damage.

- 1. Tighten electrode and retaining/shield cup fully at each consumable change or inspection.
- 2. Check consumable tightness at the beginning of each work period, even if everything was working normally at the end of the previous period.



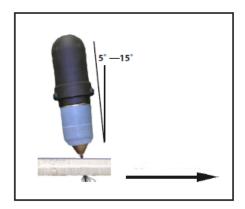
- A Torch body assembly
- B Baffle
- C Electrode
- D Nozzle
- E Retaining/Shield cup
- F Piston
- G Electrode/Torch body seat

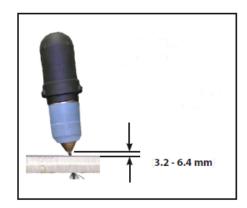
See wear parts on page 27.



5.4 Cutting

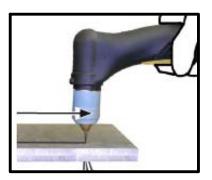
- 1. Set the switch (wall socket or similar) to on.
- 2. Check that the compressor is connected to the power source.
- 3. Set the power switch to I (On).
- 4. After starting the cut, the torch should be maintained at a 5 15° forward angle. This angle is especially useful in helping to create a "drop" cut. The torch can be operated with the nozzle dragging on the plate or with up to 6.35 mm standoff. The ideal standoff is 3.2 mm. Standoff guides are available to simplify maintaining the gap, see wear parts on page 27.





- 5. Depress the torch switch. Air should flow from the torch nozzle.
- 6. Two seconds after depressing the torch switch, the pilot arc should start. The main arc should immediately follow, allowing the cut to begin.
- 7. To start a cut, tilt the torch to prevent molten material from splashing back and damaging the torch. When the arc breaks through the workpiece, bring the torch to an upright position and proceed to cut.





- 8. When ending a cut, the torch switch should be released and the torch lifted off the workpiece immediately upon completion of the cut. This is to prevent the pilot arc from re-igniting after the cutting arc has extinguished and causing damage to the nozzle (double arcing).
- 9. For rapid re-starts on machines that support grate cutting mode, do not release the torch switch. The torch will automatically return to pilot arc mode after each cut and transfer back to main arc, when the torch is positioned over the next working surface. When working without grate cutting mode, simply release and re-press the trigger during the postflow to restart the arc without a delay for preflow.



Speed

Typically, manual plasma cutting speeds are limited by the sever speed. This indicates the maximum speed you will be able to move the torch along the cut while still penetrating the work piece. However, for applications that require a cleaner cut, it may be important to cut closer to the quality speed.

If the cut is made too quickly, significant quantities of molten metal can form dross on the underside of the cut. While most slag formed from carbon steel will easily chip off, it can be a nuisance. Quality speeds are selected to keep dross formation to a minimum.

On page 26 data shows the maximum cutting speeds possible for the power source at 15 - 30A. Quality cut speed recommendations are also listed for steel.

Note that when the torch is used at its limits, the quality of the cut suffers.

6 MAINTENANCE

Regular maintenance is important to get the optimal performance and lifetime.

Only those persons who have appropriate electrical knowledge (authorized personnel) may remove the safety plates.



WARNING

Ensure that the mains voltage supply to the power source has been disconnected externally. Switch off the switch at the wall socket before inspecting or working in the power source.



WARNING

Water or oil can collect in the compressed air lines. Always direct the first stream of air away from the equipment, to prevent damage.



CAUTION

All guarantee undertakings from the supplier cease to apply if the customer attempts any work to rectify any faults in the product during the guarantee period.

If the equipment does not work correctly, stop work immediately and determine the cause of the problem. Maintenance work may only be carried out by persons with the applicable knowledge. Electrical work may only be carried out by authorised electricians. Never allow persons other than those with the applicable knowledge to check, clean or repair the equipment. Use only ESAB original spare and wear parts.



6.1 Inspection and cleaning

The following points on the power source should be checked and/or cleaned regularly.

- 1. Check the return cable connection to the work piece.
- 2. Check that the protective earth from the work piece is securely connected to the power source chassis earth.
- 3. Check the torch heat shield. Replace it if it is damaged.
- 4. Check the electrode and the nozzle for wear daily. Remove any splash, replace the electrode and nozzle as necessary. If the electrode has pitting which is more than 3.2 mm deep at its centre, it must be replaced. 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.
- 5. Check that the cables or hoses are not damaged or bent.
- 6. Check that all plugs and connections and ground terminals are firmly connected.
- Ensure that all incoming power supplies are disconnected. Use goggles and face mask and blow clean the power source internally using dry compressed air at low pressure.

7 TROUBLESHOOTING



WARNING

ELECTRIC SHOCKS CAN KILL! Ensure that the mains voltage supply to the power source has been disconnected externally. Switch off the switch at the mains socket before inspecting or working in the power source.



WARNING

Plasma cutting equipment uses extremely high voltages that can cause severe injury or even death. Observe extreme caution when working with the covers removed.

Try these recommended checks and inspections before sending for an authorized service technician.

Type of fault	Corrective action
Insufficient penetration	 Current too low Cutting speed too fast Damaged cutting nozzle Improper air pressure Low air flow rate
Main arc extinguishes.	Cutting speed too slow Worn electrode



Type of fault	Corrective action
Dross formation (In some materials and thicknesses it may be impossible to get dross-free cuts.)	 Current too low Cutting speed too fast or too slow Improper air pressure Faulty nozzle or electrode Low air flow rate
Double arcing (Damaged nozzle orifice)	 Low air pressure Damaged cutting nozzle Loose cutting nozzle Heavy spatter accumulation on nozzle
Uneven arc	Damaged cutting nozzle or worn electrode
Unstable cutting conditions	 Incorrect cutting speed Loose cable or hose connections Electrode and/or cutting nozzle in poor condition
Main arc does not strike.	Worn electrodeLoose connectionsWork cable not attached
Poor consumable life	Improper gas pressureContaminated air supplyLow air flow rate

7.1 Troubleshooting guide

Problem	Cause	Solution
The ON/OFF switch is in position 1, but the green LED (power) does not light up.	There is no power present.Tripped circuit breaker	Check the power supply.Check the breaker.
The power source is on, but the yellow AIR PRESSURE LED remains lit.	The air pressure is low.No air is present	 Check that the air filter is not blocked. Increase the air pressure. Check if air is supplied.
The power source is on, but the yellow OVER TEMPERATURE LED remains lit.	 The power source is still overheated. It will cool down sooner with the fan on. The thermal switch is faulty. 	 Switch on the power source and wait a few minutes before working again. Call authorized service technicians.
The power source is on, the orange FAULT LED remains lit.	The power source is not enabled. A safety switch, cover, has been activated.	 Check if the consumables are in place and properly tightened. Check that the side panel has been correctly closed (torch connector inspection side).
The power source is on, the yellow PIP LED remains lit.	There is a parts-in-place error.	Check if the consumables are in place and properly tightened.



Problem	Cause	Solution
The thermal switch trips during cutting.	 The power required by the power source has exceeded the power available from the incoming line voltage. Another appliance is working on the same line. 	 Reduce the cutting current with the command on the front panel or reduce the cutting time. Reduce the length of the connecting cable or increase the cable section. Do not connect other appliances to the same line.
The arc does not strike or the arc disappears during cutting.	 The wear parts of the torch are worn. The generator is overheated. There is not sufficient air pressure. There is low voltage on the incoming line. 	 Check the torch and fit spare parts if necessary. See if the yellow OVER TEMPERATURE LED on the front panel is lit. Wait until the power source cools down. See if the yellow AIR PRESSURE LED on the front panel is lit. Increase the air pressure. Check whether the air filter is blocked and replace it if necessary. Check the incoming line. If an extension is being used, ensure that the cable section is adequate.
The pilot is working but there is not sufficient current for cutting.	Bad contact of the earth clamp Bad connection of the positive pole at the torch cable	 Check that the earth clamp has a good contact with the piece to be cut. Check the connection of the positive pole at output to the socket, even on the inside.
The cut is not perpendicular.	Worn electrode or nozzle	Replace the electrode and the nozzle.



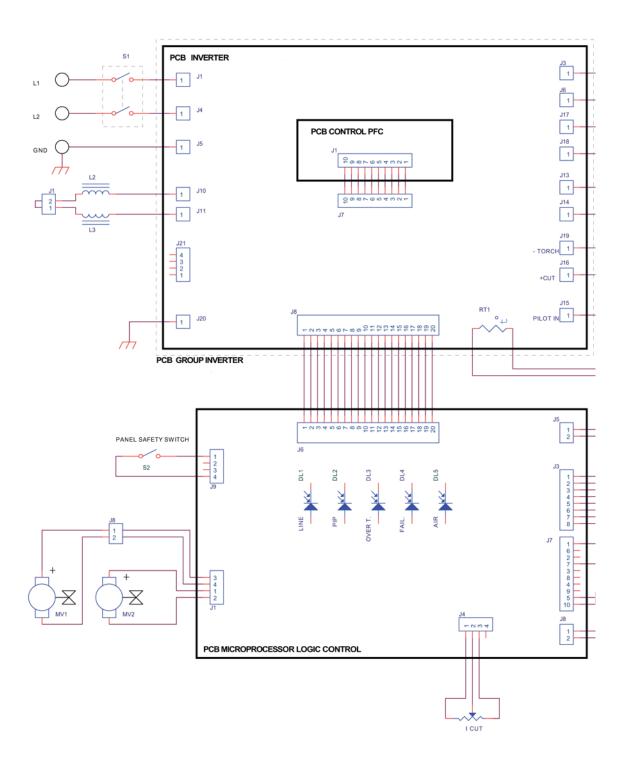
8 ORDERING SPARE PARTS

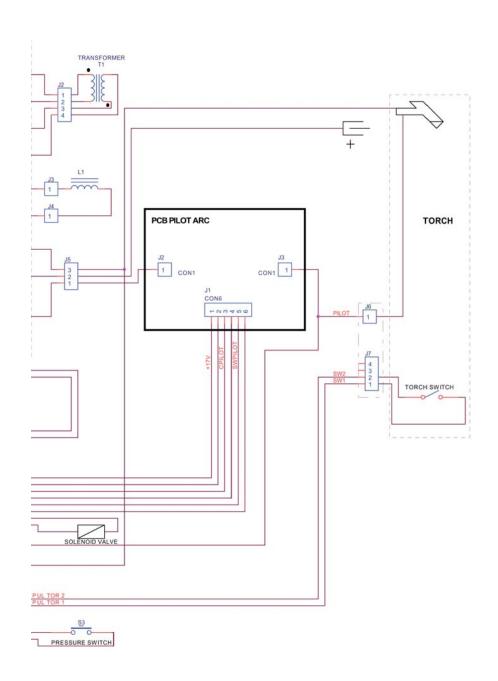
Repair and electrical work should be performed by an authorised ESAB service technician. Use only ESAB original spare and wear parts.

PowerCut 400 is designed and tested in accordance with the international and European standards **EN 60974-1**, **EN 60974-10**. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the said standard.

PT-39 is designed and tested in accordance with the international and European standard EN 60974-7. It is the obligation of the service unit which has carried out the service or repair work to make sure that the product still conforms to the said standard.

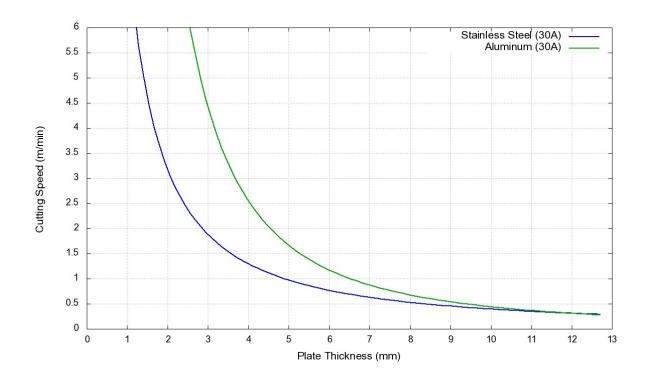
Spare parts may be ordered through your nearest ESAB dealer, see the last page of this publication.



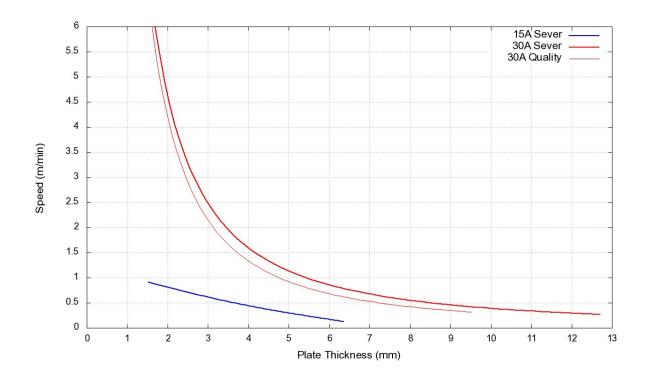


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Stainless Steel and Aluminium Cut Speeds

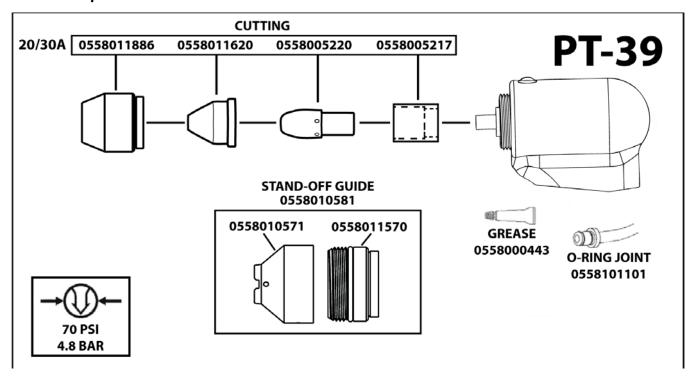


Carbon Steel Cut Speeds



Wear parts

Wear parts



Wear parts kit PT-39

Qty	Ordering no.	Denomination	Notes
	0558 010 586	Wear parts kit consisting of:	30 Amp for PowerCut 400
3	0558 005 220	Electrode	
1	0558 005 217	Gas baffle	30 - 80 Amp
4	0558 011 620	Nozzle	30 Amp
1	0558 011 886	Retaining cup	
1	0558 010 581	Standoff guide assy	
3		O-ring	.301ID .070W Nitrile
1		Grease silicon dow	DC-111 (1/4 Oz)

PowerCut[™] 400 PT-39

Order number



Ordering no.	Denomination	Туре	Notes
0700 210 880	Power source for plasma cutting incl torch (4.6m), return cable and wear part kit	PowerCut™ 400	90V-280V,1-ph
0558 010 576	Torch	PT-39	4.6 m

Technical documentation is available on the Internet at www.esab.com

NOTES

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