

# PLASMA ARC CUTTING PACKAGES

## TABLE OF CONTENTS

<b>1 DIRECTIVE.....</b>	<b>2</b>
<b>2 SAFETY.....</b>	<b>2</b>
<b>3 INTRODUCTION.....</b>	<b>4</b>
<b>3.1 Equipment.....</b>	<b>4</b>
<b>4 TECHNICAL DATA.....</b>	<b>5</b>
<b>5 INSTALLATION.....</b>	<b>5</b>
<b>5.1 Mains and Workpiece Connection.....</b>	<b>6</b>
<b>6 OPERATION.....</b>	<b>7</b>
<b>6.1 Connection and Control Devices.....</b>	<b>8</b>
<b>6.2 PT - 31 Torch and “XT” Consumables.....</b>	<b>8</b>
<b>6.3 Cutting with PT - 31 XL.....</b>	<b>9</b>
<b>6.4 Common Cutting Problems.....</b>	<b>10</b>
<b>7 MAINTENANCE.....</b>	<b>11</b>
<b>7.1 Check-up and Cleaning.....</b>	<b>11</b>
<b>8 FAULT-TRACKING/TROUBLESHOOTING.....</b>	<b>12</b>
<b>8.1 Troubleshooting guide.....</b>	<b>12</b>
<b>8.2 Sequence of operation.....</b>	<b>16</b>
<b>9 ORDERING SPARE PARTS.....</b>	<b>17</b>
<b>9.1 Detail pictures.....</b>	<b>17</b>
<b>9.2 Spare Part List.....</b>	<b>18</b>
<b>10 ACCESSORIES.....</b>	<b>18</b>
<b>DIAGRAM.....</b>	<b>19</b>

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## 1 DIRECTIVE

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### DECLARATION OF CONFORMITY

ESAB Welding Equipment AB, S-695 81 Laxå, Sweden, declares that plasma cutting equipment Origocut-35i from serial Nr. 604 onwards conforms to standard IEC/EN 60974-1, IEC/EN 60974-10, in accordance with the requirement of directive (73/23/EEC) and appendix (93/68/EEC) and standard EN 60974-10 in accordance with the requirements of directive (89/336/EEC) and appendix (93/68/EEC).

Laxå, 01-03-2006

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SWEDEN

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## 2 SAFETY

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Users of ESAB welding 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 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 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 the plasma cutting equipment must be familiar with:
  - its operation
  - location of emergency stops
  - its function
  - relevant safety precautions
  - plasma cutting
2. The operator must ensure that:
  - no unauthorized 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 draughts
4. Personal safety equipment
  - always wear recommended personal safety equipment, such as safety glasses, flame-proof clothing, safety gloves
5. General precautions
  - make sure the return cable is connected securely
  - work on high voltage equipment **may only be carried 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 MANUFACTURER'S HAZARD DATA.

### ELECTRIC SHOCK - Can kill

- Install and earth the welding/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/cutting screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens and curtains.

### FIRE HAZARD

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

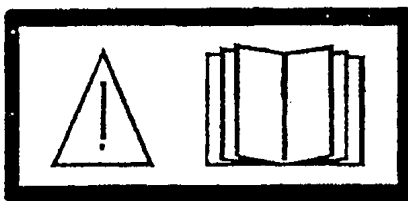
### NOISE - Excessive noise can damage hearing.

- 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!

Read and understand the instruction manual before installing and operating



**WARNING!** Do not use the power source for thawing frozen pipes.

**Note! This product is solely intended for plasma cutting**

### 3 INTRODUCTION

The OrigoCut-35i 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 5-10 bar (torch setted at 118 lt/min @ 5.2 bar). The OrigoCut-35i package uses the PT-31XL torch with 35 Amp consumables to deliver cutting power for materials up to 9 mm thick or for severing up to 12 mm thick. Refer to the following paragraphs for descriptions of the OrigoCut-35i packages available as well as performance specifications. **Do not use any torch with this power source other than the ESAB brand PT-31XL torch. Serious injury may occur if used with any other torch.**

See below for ESAB's accessories for the cutting torch.

#### 3.1 Equipment

##### List 3.1.1 OrigoCut-35i Cutting Packages

Each OrigoCut-35i Plasma Arc Cutting Package P/N 0558005920 includes:

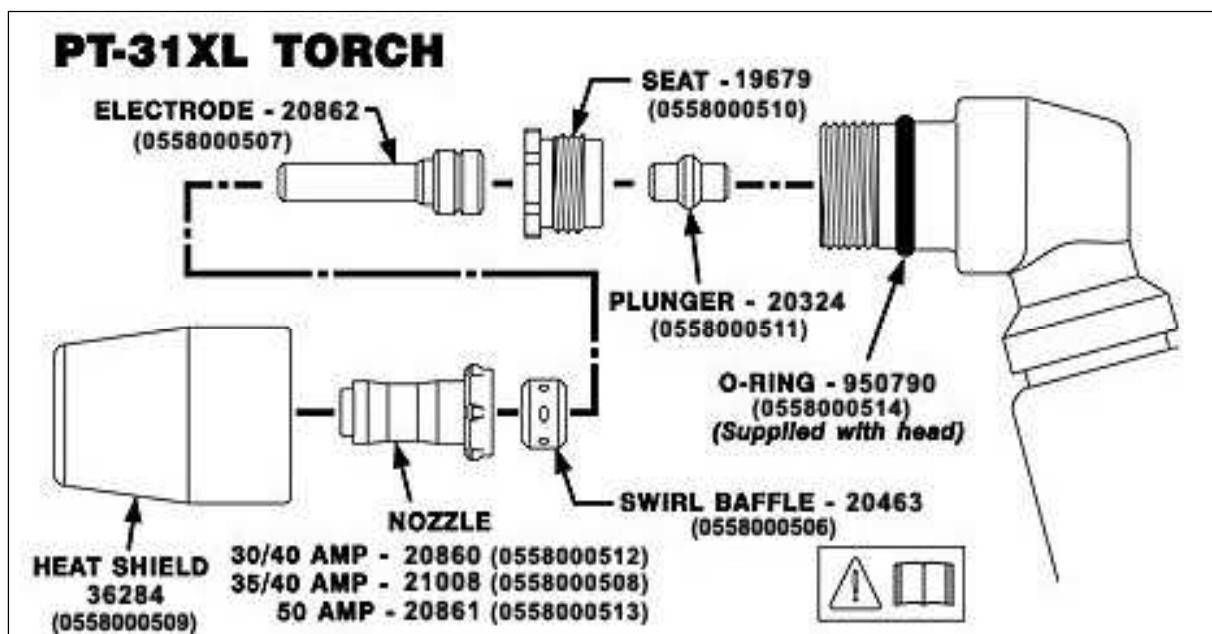
- N°1 Power Source OrigoCut-35i.
- N°1 PT-31XL\* Torch assembly with 4,5 m service lines.
- N°1 earth cable 5 m length.
- N°1 Torch Spare Parts Kit , see list below.

##### List 3.1.2 PT-31XL\* Spare Parts Kit P/N 0558003462 Contents

- |                                    |            |
|------------------------------------|------------|
| N° 3 35/40A Nozzle, P/N (21008)    | 0558000508 |
| N° 2 Electrode, P/N (20862)        | 0558000507 |
| N° 1 Swirl Baffle, P/N (20463)     | 0558000506 |
| N° 1 Long Heat Shield, P/N (36284) | 0558000509 |

\*PT-31XL Torch Assembly P/N 0558001466 is supplied with the nozzle, electrode, swirl baffle and heat shield assembled.

(Part numbers in brackets could be found on the explosion drawings inside the torch spare part kit box.)  
Fig. 3.1.2 PT - 31 spare part list and consumables



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## 4 TECHNICAL DATA

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### 4.1 SPECIFICATIONS

Rated Output	35% Duty Cycle*	35A @ 94V dc
	60% Duty Cycle*	27A @ 91V dc
	100% Duty Cycle*	21A @ 88V dc
Output Current Range		15 to 35 Amperes
Open Circuit Voltage		270 V dc Nominal
Rated Primary Input I <sub>max</sub> @ 35A 94 Vdc Output	230 Vac 50/60 Hz, 1- Phase	26 Ampere
Power factor @ 35 A Output		0,8
Current Capacity	PT-31XL	35 A dc SP
Air Requirements	PT-31 XL	118 lt/min @ 5.2 bar
Dimensions of OrigoCut-35i	Length	430 mm
	Height	290 mm
	Width	150 mm
Weight (less torch)		7,5 kg
Insulation class: F		Protection class: IP 21S

#### \* 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 product.

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## 5 INSTALLATION

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**The installation must be executed by a professional.**



#### **WARNING!**

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.

### 5.1 Mains and workpiece connection

Fig. 5.1.1 - Mains connection

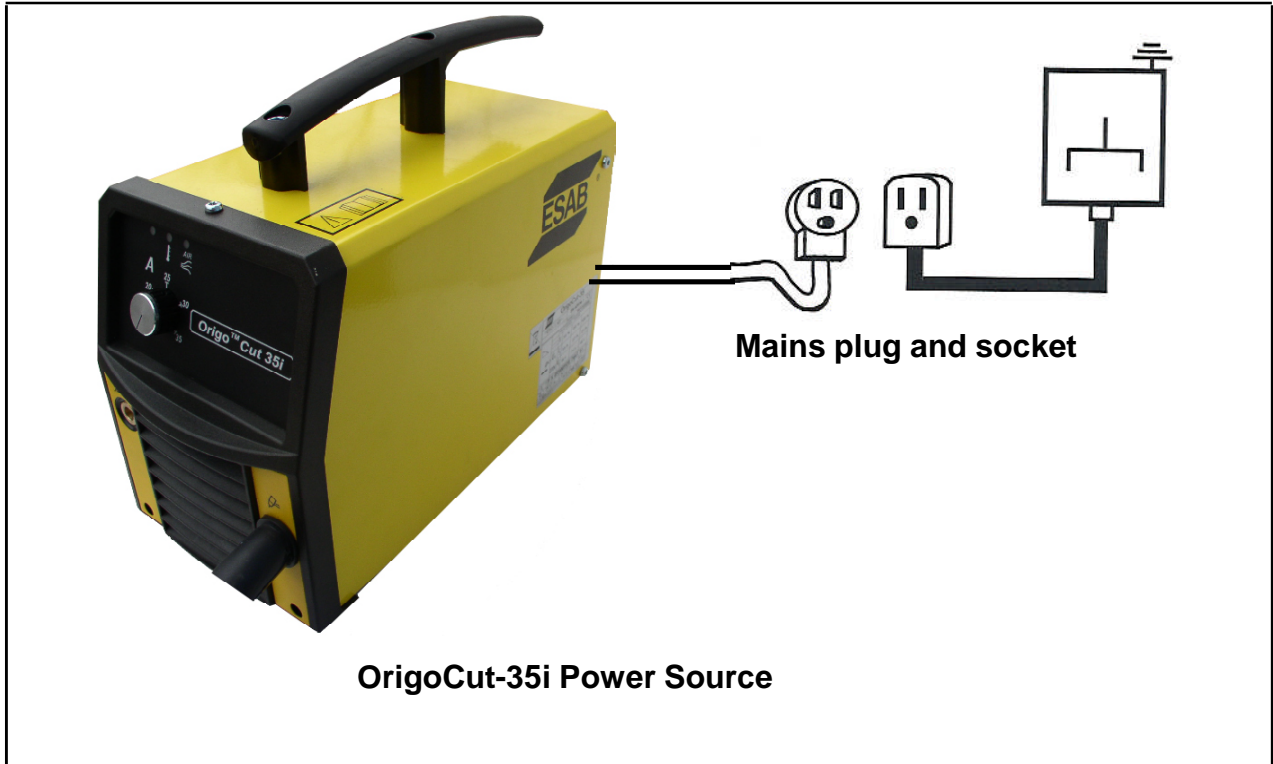
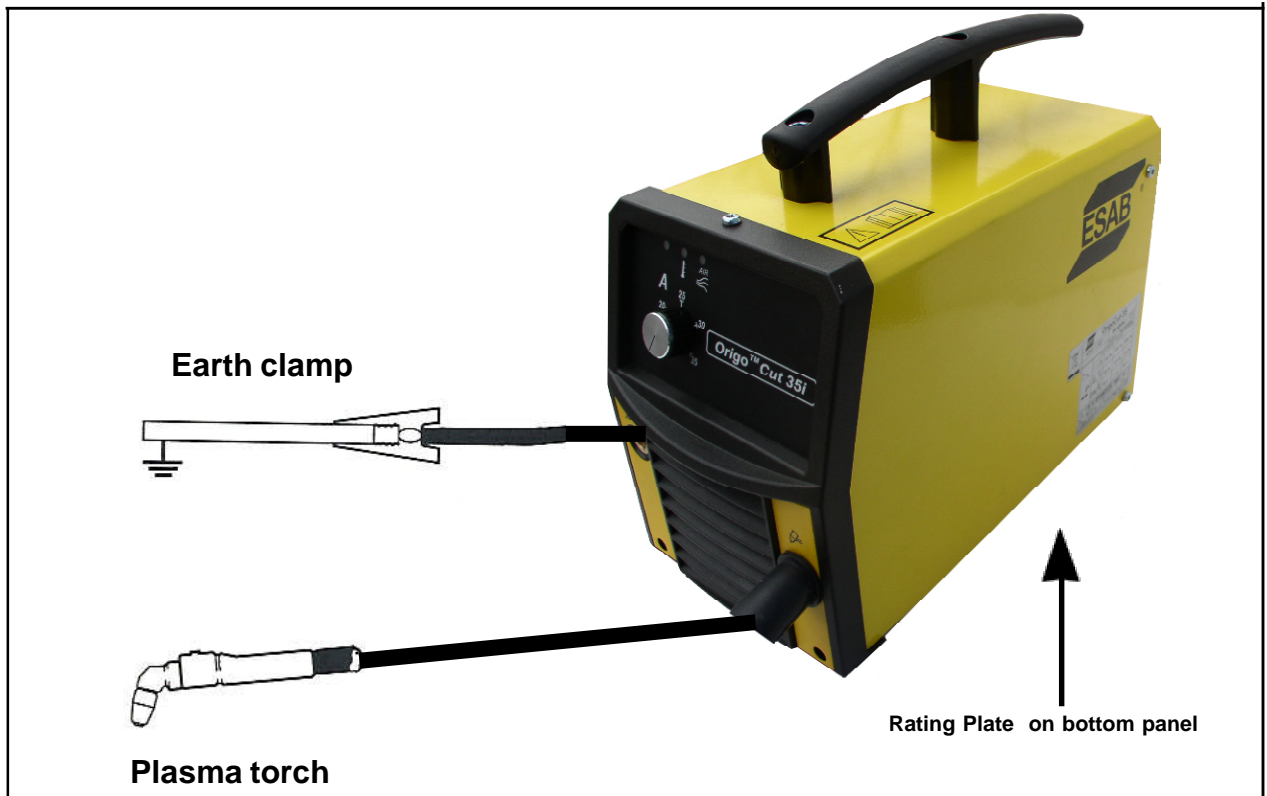


Fig. 5.1.2 - Workpiece connection



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## 6 OPERATION

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*General safety regulations for the handling of the equipment can be found on page 2 and 3. Read through before you start using the equipment!*

### **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 proper lens shade.
- Wear eye, ear, and body protection.



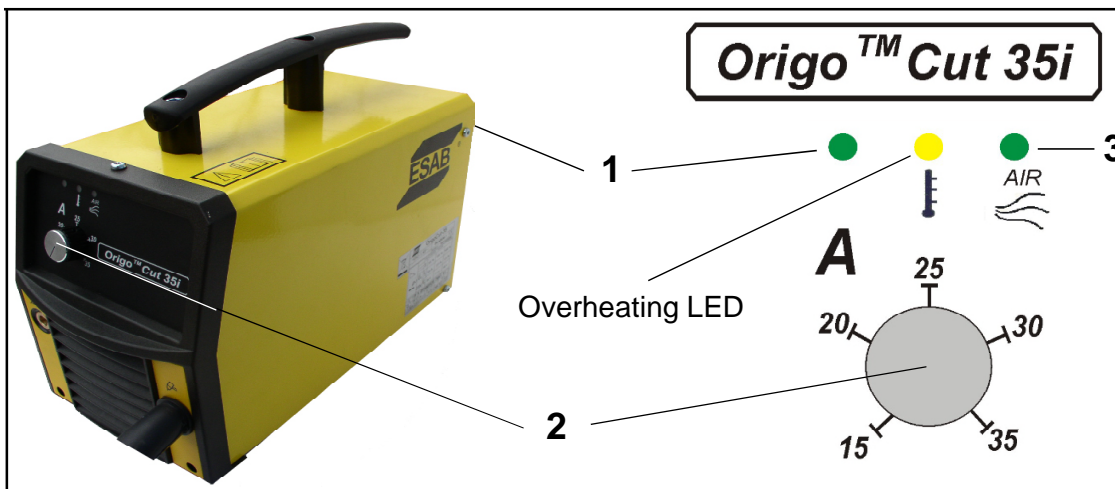
### **WARNING**

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

### **CAUTION**

**Position the OrigoCut-35i (at least) 3 meters from the cutting area. Sparks and hot slag from the cutting operation can damage the unit.**

## 6.1 Connection and control devices



### OrigoCut-35i CONTROLS and FRONT PANEL

1. **Power Switch (located on rear panel).** When placed in ON position, the green LED will glow indicating control circuit is energized and the cooling fan will run.
2. **Output Current Control.** Adjustable from 20 to 35 amperes to suit cutting conditions.
3. **Air pressure.** Not adjustable by the user. Setted at optimum efficiency by the manufacturer. While flowing, the green LED will light up.

## 6.2 PT - 31 Torch and “XT” Consumables



When assembling or replacing “XT” consumables, make sure power switch on power source is in OFF position and primary input power is deenergized. The PT-31 torch of OrigoCut-35i is originally assembled and tested.



The PT-31 XL 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 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.**



### 6.3 Cutting with PT - 31 torch

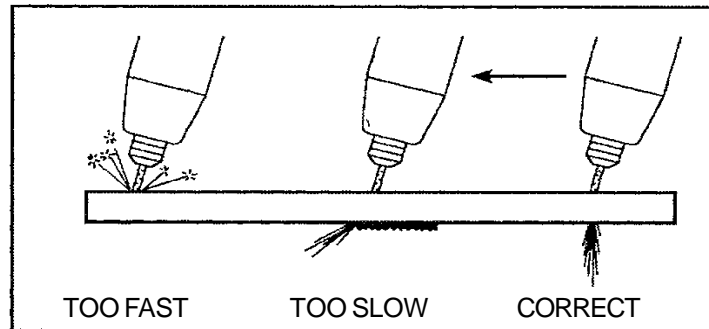


Wear the usual protective gloves, clothing and helmet. Helmet with filter lens shade No. 6 or 7 should provide adequate protection for your eyes.

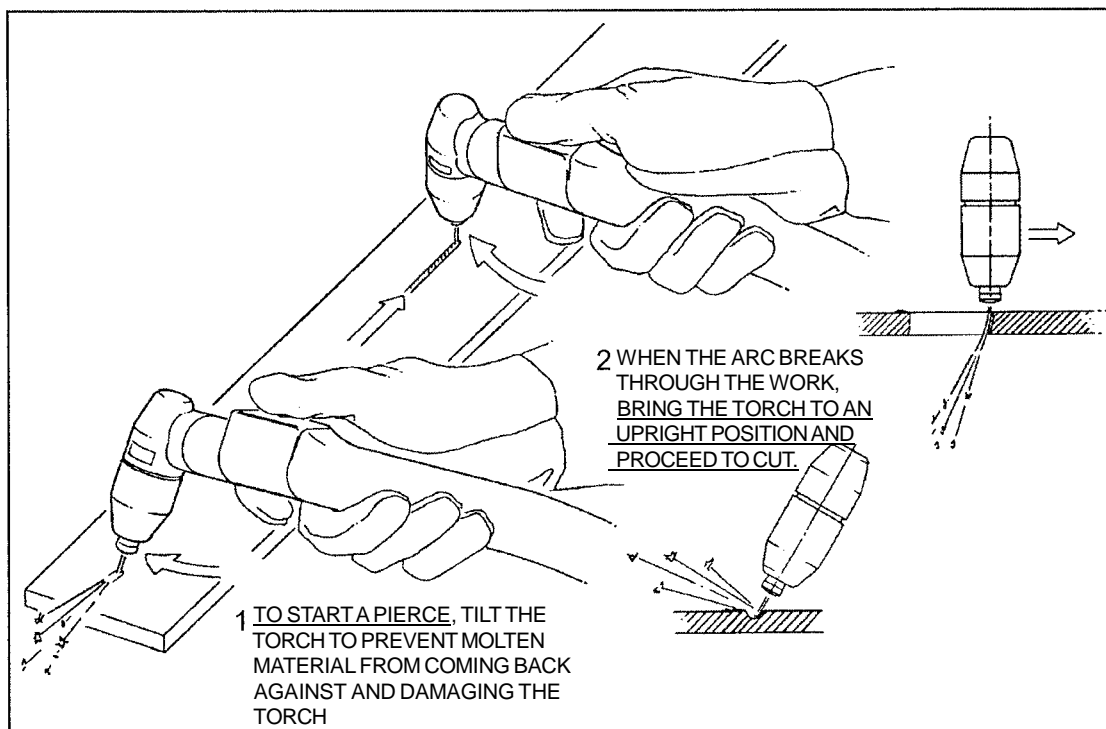


Never touch any parts forward of the torch handle (tip, heat shield, electrode, etc.) unless the power switch is in the OFF position.

**Caution:** Do not depress the torch switch unless the torch nozzle is touching or within 1 mm (1/32-in.) of the workpiece.



Tab. 6.3.1 Effect of cutting speed



Tab. 6.3.2 Piercing Technique using PT - 31 XL

## **6.4 COMMON CUTTING PROBLEMS**

Listed below are common cutting problems followed by the probable cause of each. If problems are determined to be caused by OrigoCut-35i, 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.**

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 Arching.** (Damaged nozzle orifice)

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

### **E. Uneven Arc.**

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.** (Loose connections)

### **H. Poor Consumable Life.**

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

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## 7 MAINTENANCE

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*Regular maintenance is important for safe, reliable operation.*

**Note:**

*All warranty undertakings given by the supplier cease to apply if the customer attempts to rectify any faults on the machine during the warranty period.*



**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.**



**Be sure that the wall disconnect switch or wall circuit breaker is open before attempting any inspection or work inside of the OrigoCut-35i.**

### 7.1 CHECK - UP AND CLEANING



**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 OrigoCut-35i.**

Frequent inspection and cleaning of the OrigoCut-35i is recommended for safety and proper operation. Some suggestions for inspecting and cleaning are as follows:

- A. Check work cable to work piece connection.
- B. Check safety earth ground at work piece 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.

## 8 FAULT-TRACING / TROUBLESHOOTING

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



**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.**

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. Those indications do not invalidate all other safety regulations and restrictions expressed in other sections of this manual.



**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.**

### NOTE

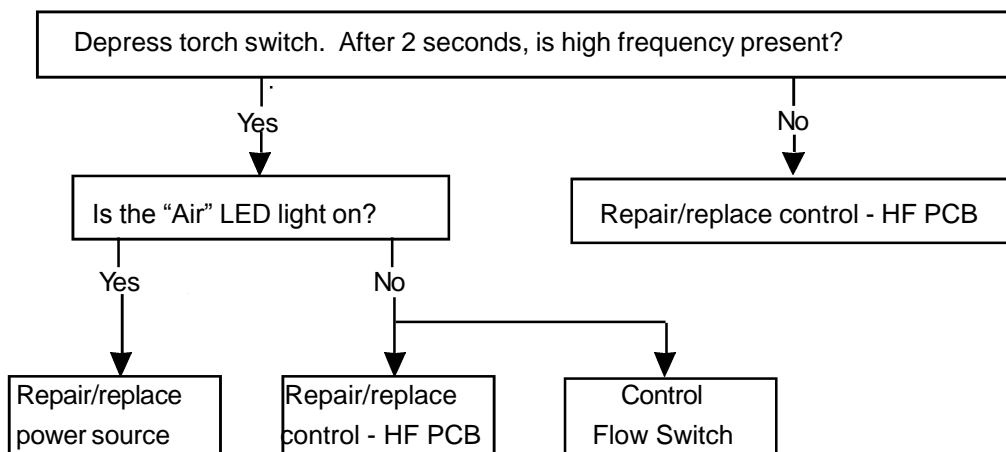
Before checking voltages in the circuit, disconnect the power from the high frequency generator to avoid damaging your voltmeter.

### 8.1 TROUBLESHOOTING GUIDE

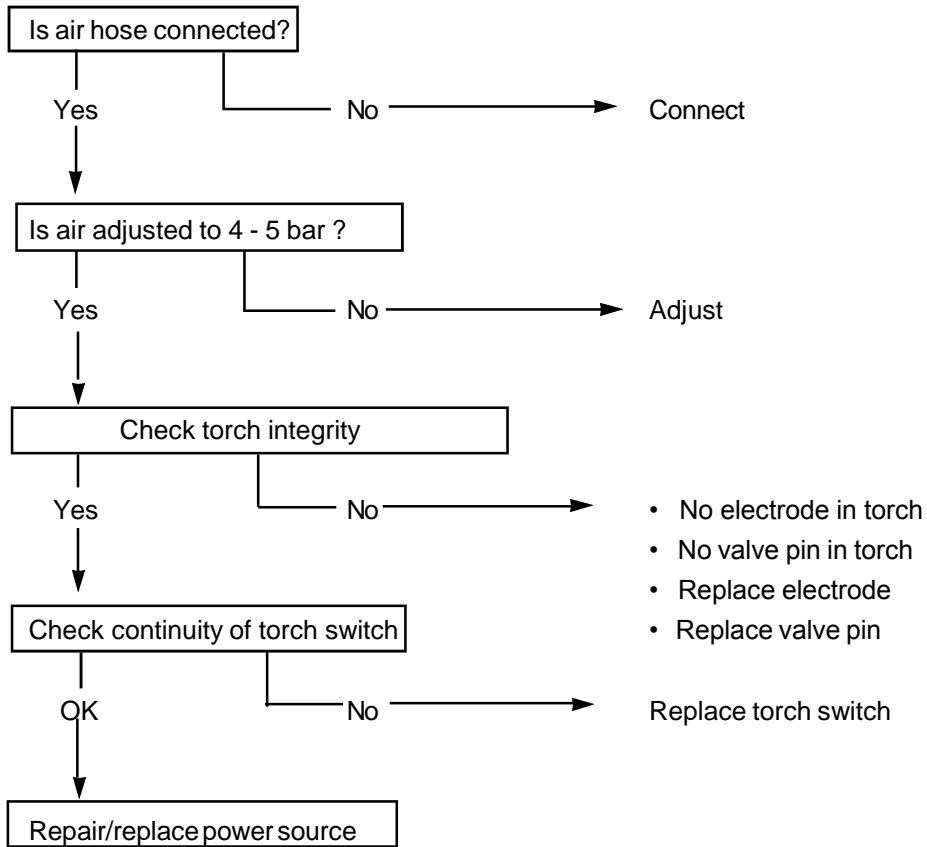
**Any remedy that requires an intervention inside the machine must be executed by an authorized service center.**

#### A. Difficult Starting.

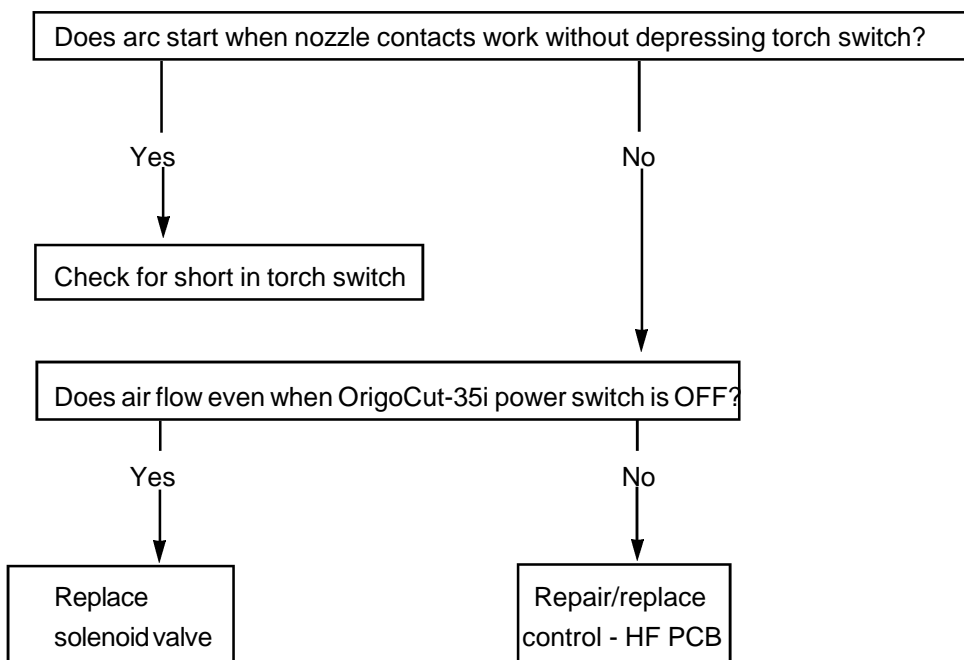
- Change electrode
- Change nozzle
- Check for good, clean connection of work lead to workpiece
- Check air pressure (5 - 5,2 bar)
- Check torch power cable for continuity



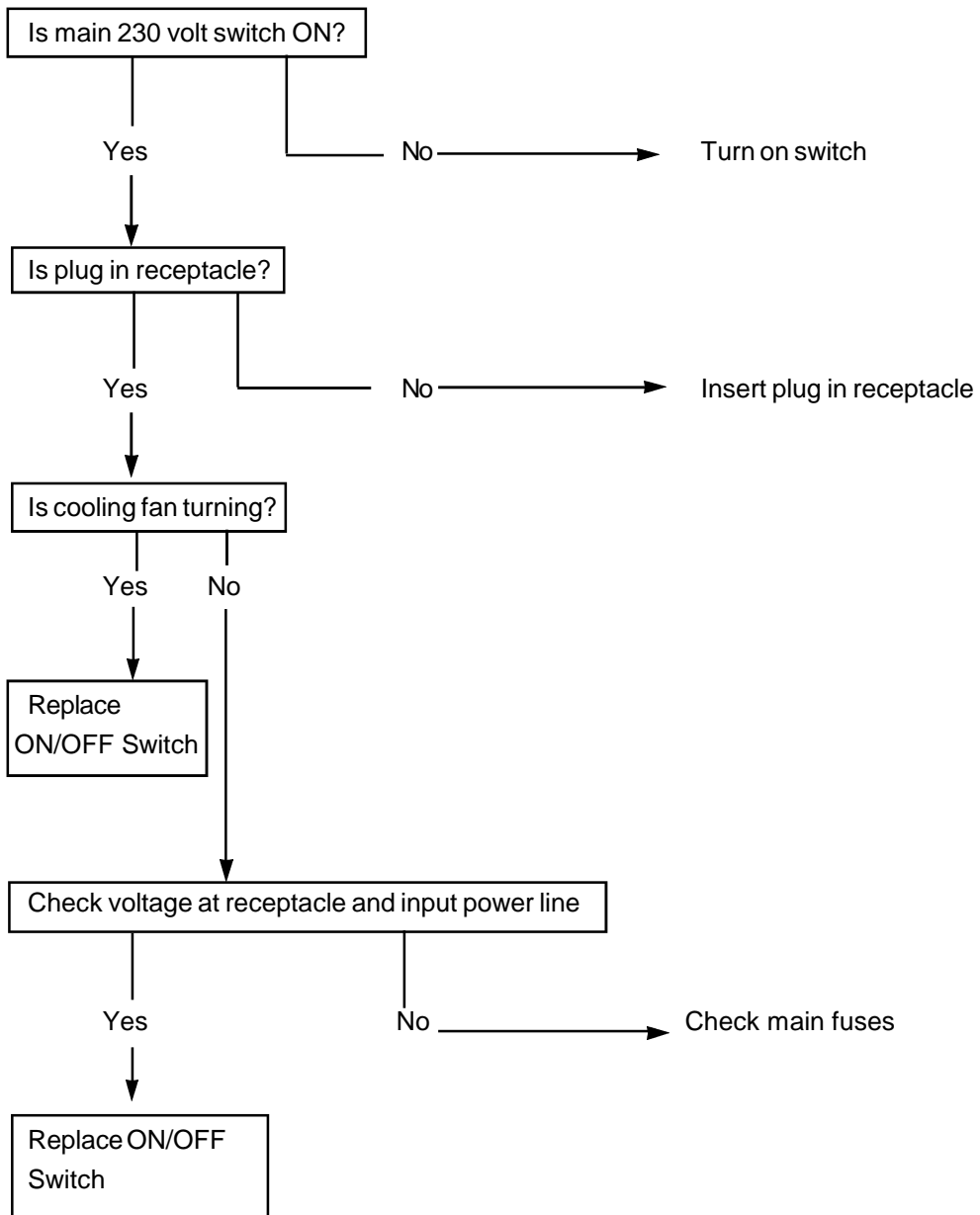
**B. No Air**



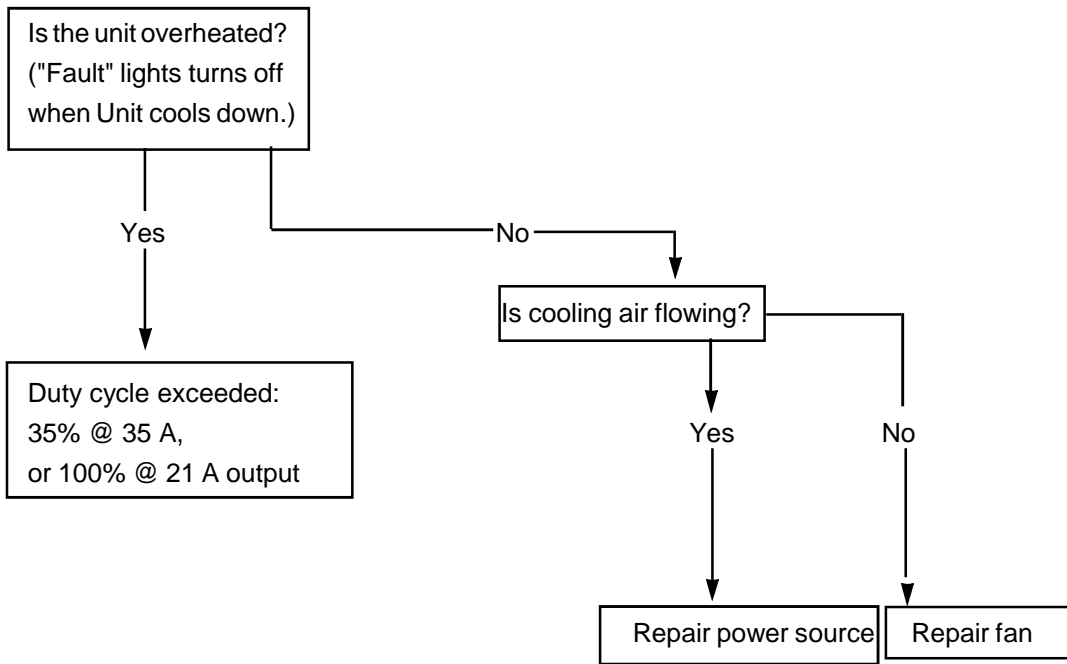
**C. Air does not shut off**



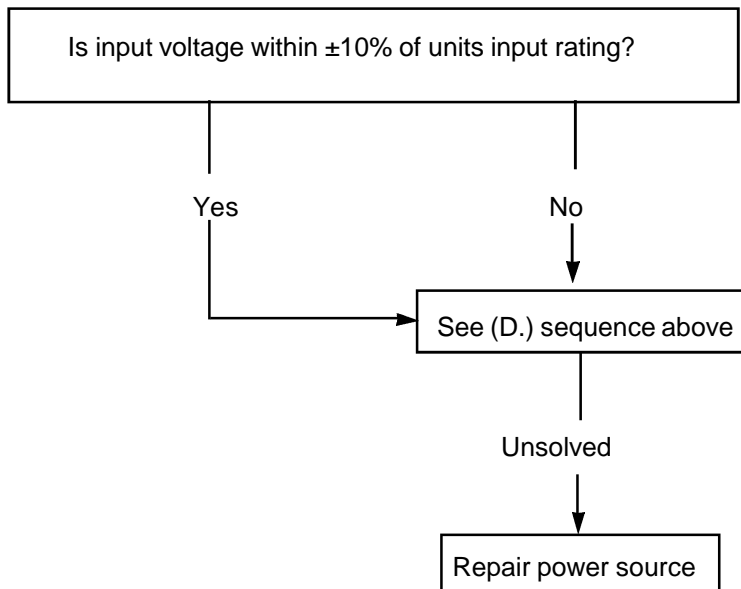
**D. ON/OFF Switch light not energized.**



**E. Temperature LED light ON.**

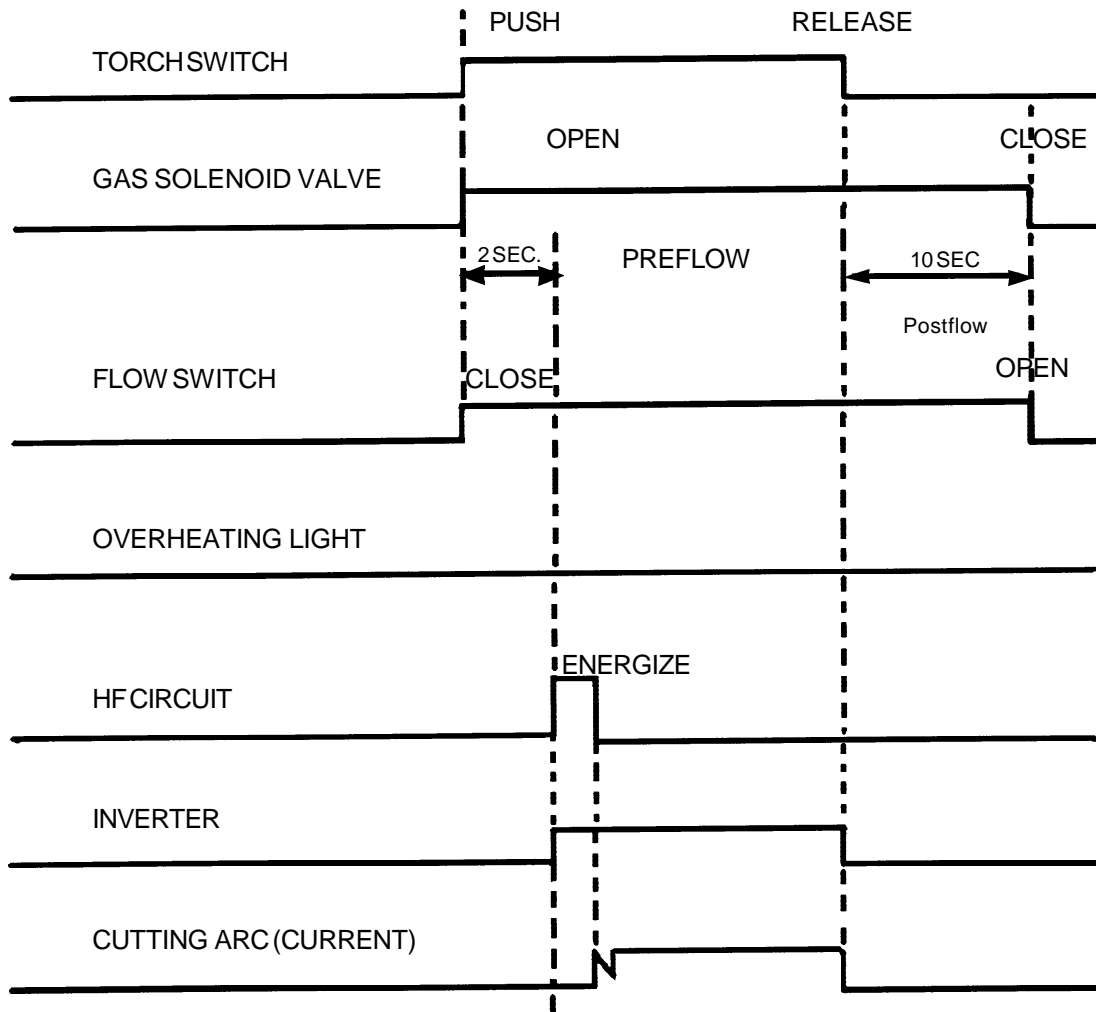


**F. No current output**



## 8.2 SEQUENCE OF OPERATION

### A. LOCK-IN "OFF" position



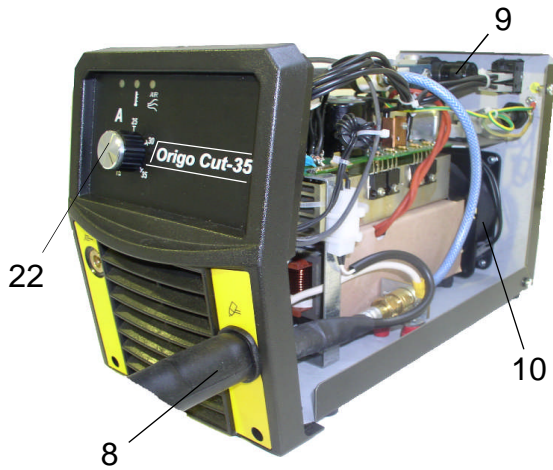
#### NOTES:

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 air flow LED comes off, cutting operation should be stopped. The postflow time starts from the moment the torch switch is released.

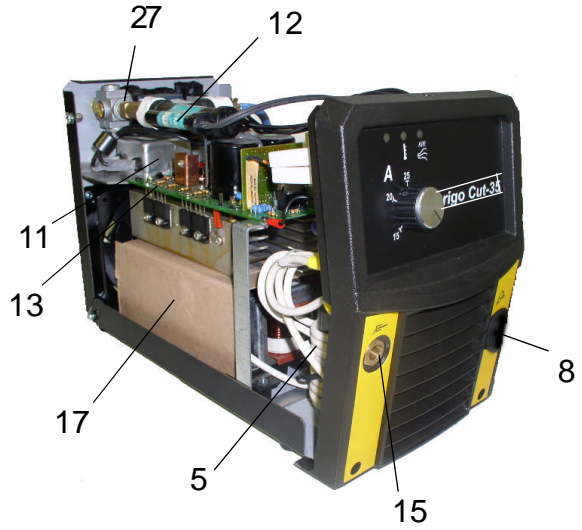


9 - ORDERING SPARE PARTS

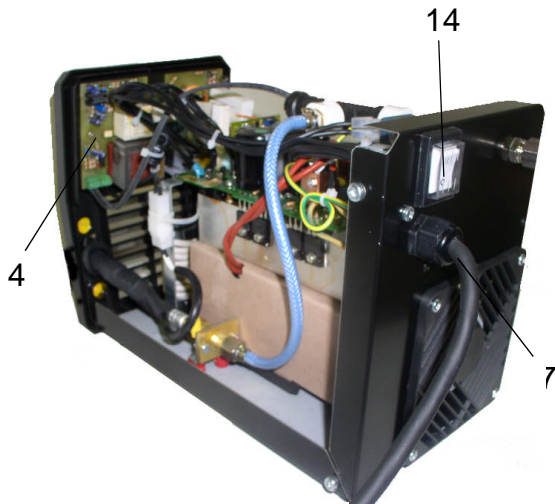
9.1 - Detail pictures



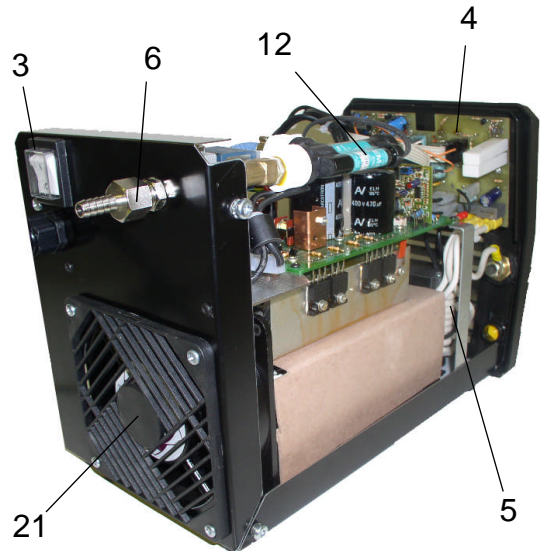
**Front A**



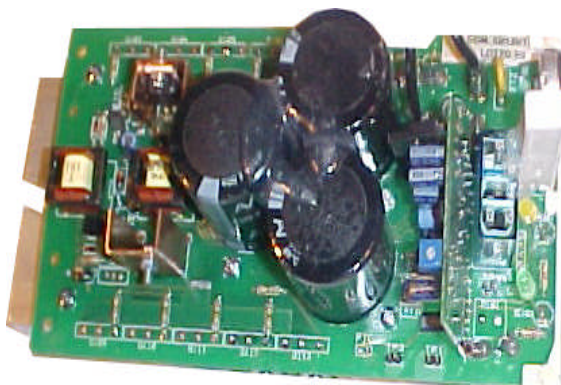
**Front B**



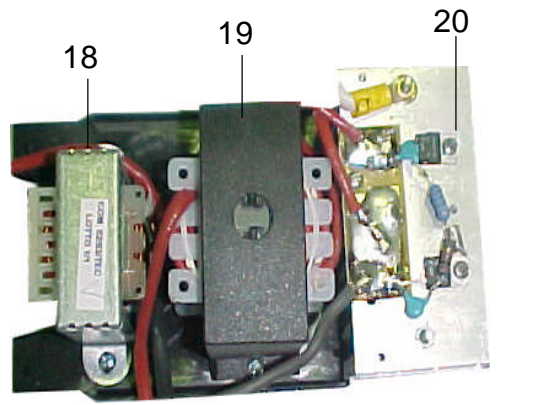
**Rear A**



**Rear B**



**13 - INVERTER PCB**



**17 - BOTTOM PLATE**

## 9.2 - Spare Part List

**OrigoCut-35i is designed and tested in accordance with the international and European standards IEC/EN 60974-1 and 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.**

Spare parts are ordered through your nearest ESAB representative, see back cover. When ordering spare parts, please state machine type, and number as well as designation and spare part number as shown in the spare part list.

This will simplify dispatch and ensure you get the right part. Nevertheless, ***any replacement of parts inside the machine must be executed by an authorized service center.***

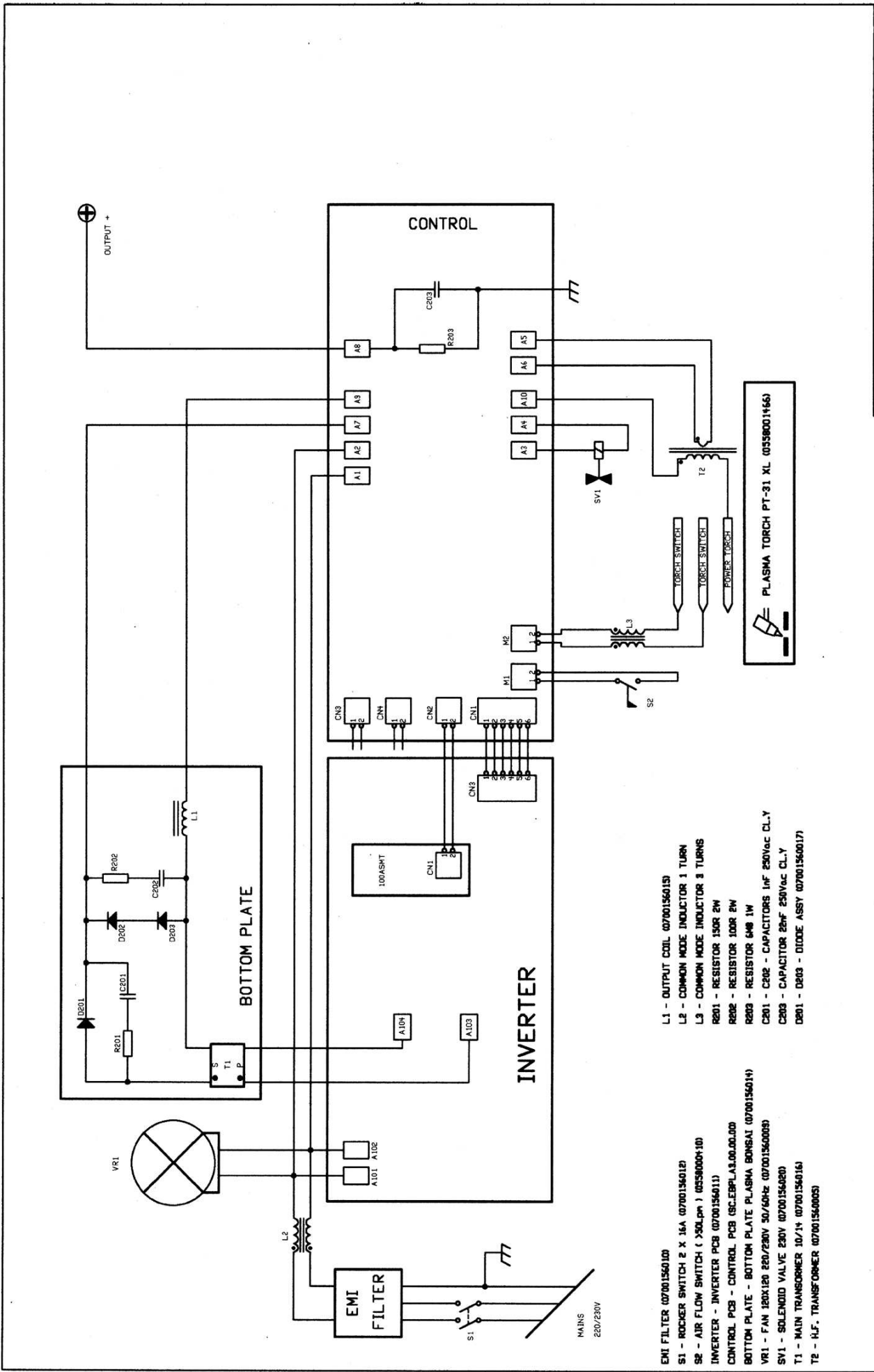
ITEM NO.	PART NO.	DESCRIPTION
1	0459173001	UPPER CASE (LID)
2	0459119001	HANDLE
3	0700156021	TRANSPARENT SWITCH COVER
4	0700156022	CONTROL/HF PCB
5	0700156023	HF GENERATOR
6	0700156006	AIR NIPPLE 1/8" Dia. 8mm, L=20mm
7	0700156007	POWER CABLE 3x1,5 sqmm, L=2,5m
8	0558001466	PT - 31 XL TORCH Ass.ly
9	0700156008	PRESSURE GAUGE
10	0700156009	FAN
11	0700156010	EMC FILTER
12	0558000410	FLOW SWITCH P/N 951202
13	0700156011	INVERTER PCB
14	0700156012	ON/OFF SWITCH
15	0700156013	EARTH CABLE W/CLAMP, L=5m
16	0459172001	PLASTIC FRONT PANEL
17	0700156014	BOTTOM PLATE
18	0700156015	CHOKE (INDUCTANCE)
19	0700156016	TRANSFORMER
20	0700156017	HEAT SINK WITH DIODES
21	0700156024	VENTILATION GRID
22	0700156019	KNOB Dia. 25mm
23	0700156025	Multilanguage user manual
24	0700156020	SOLENOID VALVE

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## 10 ACCESSORIES

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For plasma torch PT - 31 accessories, please see section [3.1 Equipment](#), page 4.



- EMI FILTER (0700156010)
- S1 - ROCKER SWITCH 2 X 16A (0700156012)
- SE - AIR FLOW SWITCH ( X50LPM ) (0559000410)
- INVERTER - INVERTER PCB (0700156011)
- CONTROL PCB - CONTROL PCB (SC.EBPLA3.00.00.00)
- BOTTOM PLATE - BOTTOM PLATE PLASMA BONSAL (0700156014)
- VR1 - FAN 120X120 220/230V 30/60Hz (0700156009)
- SV1 - SOLENOID VALVE 230V (0700156080)
- T1 - MAIN TRANSFORMER 10/14 (0700156016)
- T2 - H.F. TRANSFORMER (0700156005)
- L1 - OUTPUT COIL (0700156019)
- L2 - COMMON MODE INDUCTOR 1 TURN
- L3 - COMMON MODE INDUCTOR 3 TURNS
- R801 - RESISTOR 150K 2W
- R802 - RESISTOR 100K 2W
- R803 - RESISTOR 64K 1W
- C801 - CAPACITOR 1uF 250Vdc CL.Y
- C802 - CAPACITOR 22uF 250Vdc CL.Y
- D801 - D803 - DIODE ASSY (0700156007)

ORIG/OCUT-35i	CE	Size	REV
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Sheet	1 of 1		
Draft:	FARINA ANGELO-HARCO	Approved:	CURLETTO CARLO