



USE AND MAINTENANCE MANUAL

POWER SOURCES FOR PLASMA CUTTING

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Genesis 60

SELCO s.r.l.
 Via Palladio, 19
 35010 ONARA DI TOMBOLO (Padova) Italy
 Tel. 0499413111
 Fax 0499413311

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1.0 WARNINGS - PRECAUTIONS- GENERAL ADVICE

1.1 SAFETY

Prior to performing any operation on the machine, make sure that you have thoroughly read and understood the contents of this manual.

Do not perform modifications or maintenance operations which are not prescribed. For any doubt or problem regarding the use of the machine, even if not described herein, consult qualified personnel or **SELCO s.r.l.**, which is always at your disposal.

SELCO s.r.l. cannot be held responsible for damage to persons or property caused by the operator's failure to read or apply the contents of this manual.

1.1.1 Symbols



Imminent danger of serious bodily harm and dangerous behaviours that may lead to serious bodily harm.



Important advice to be followed in order to avoid minor injuries or damage to property.



The notes preceded by this symbol are mainly technical and facilitate operations.

1.1.2 Operator and other persons' protection

The welding (cutting) process is a noxious source of radiations, noise, heat and gas emissions. The persons fitted with vital electronic devices (pacemakers) should consult a doctor before attending any arc welding or plasma arc cutting operation.

Personal protection:

- Do not wear contact lenses!!!
- Keep a first aid kit ready for use.



Do not underestimate any burning or injury.

- Wear protective clothing to protect your skin from the arc rays, sparks or incandescent metal, and a helmet or a welding cap.
- Wear masks with side face guards and suitable protection filter (at least NR10 or above) for the eyes.
- Use headphones if dangerous noise levels are reached during the welding.

Always wear safety goggles with side guards, especially during the manual or mechanical removal of welding (cutting) slags.

If you feel an electric shock, interrupt the welding (cutting) operations immediately.

Other persons' protection:

- Put up a fire-retardant partition to protect the surrounding area from rays, sparks and incandescent slags.
- Advise any person in the vicinity not to stare at the arc or at the incandescent metal and to get an adequate protection.

- If the noise level exceeds the limits prescribed by the law, delimit the work area and make sure that anyone getting near it is protected with headphones or ear-phones.

1.1.3 Fire/explosion prevention

The welding (cutting) process may cause fires and/or explosions.

- Compressed gas cylinders are dangerous; consult the supplier before handling them.

Protect them from:

- direct exposure to sun rays;
- flames;
- sudden changes in temperature;
- very low temperatures.

Compressed gas cylinders must be fixed to the walls or to other supports, in order to prevent them from falling.

- Clear the work area and the surrounding area from any inflammable or combustible materials or objects.
- Position a fire-fighting device or material near the work area.
- Do not perform welding or cutting operations on closed containers or pipes.
- If said containers or pipes have been opened, emptied and carefully cleaned, the welding (cutting) operation must in any case be performed with great care.
- Do not weld (cut) in places where explosive powders, gases or vapours are present.
- Do not perform welding (cutting) operations on or near containers under pressure.

1.1.4 Protection against fumes and gases

Fumes, gases and powders produced during the welding (cutting) process can be noxious for your health.



Important: do not use oxygen for the ventilation

- Provide for proper ventilation, either natural or forced, in the work area.
- In case of welding (cutting) in extremely small places the work of the operator carrying out the welding should be supervised by a colleague standing outside.
- Position gas cylinders outdoors or in places with good ventilation.
- Do not perform welding (cutting) operations near degreasing or painting stations.



Do not perform welding (cutting) operations on painted plates

1.1.5 Positioning the power source

Keep to the following rules:

- Easy access to the equipment controls and connections must be provided.
- Do not position the equipment in reduced spaces.
- Do not place the generator on surfaces with inclination exceeding 15° with respect to the horizontal plane.

1.1.6 Installing the apparatus

- Comply with the local safety regulations for the installation and carry out the maintenance service of the machine according to the constructor's directions.

- Any maintenance operation must be performed by qualified personnel only.
- The connection (series or parallel) of the SELCO generators is prohibited.
- Before operating inside the generator, disconnect the power supply.
- Carry out the routine maintenance on the equipment.
- Make sure that the supply mains and the earthing are sufficient and adequate.
- The earth cable must be connected as near as possible to the area of welding (cutting).
- Take the precautions relevant to the protection degree of the power source.
- Before welding (cutting), check the condition of the electric cables and of the torch, and if they are damaged repair or change them.
- Neither get on the material to be welded (cut), nor lean against it.



The operator must not touch two torches or two electrode holders at the same time.

1.1.7 Precautions against risks connected with the use of compressed air

Connect the air supply to the coupling provided, making sure pressure is at least 6 bars (0.6 MPa) with a minimum flow rate of 200 l/min. If the air supply comes from pressure reducer of a compressor or a central system, the reducer must be set to the maximum outlet pressure that must not, however, exceed 8 bars (0.8 MPa). If the air supply comes from a compressed air canister it must be equipped with a pressure regulator.



A compressed air canister must never be directly coupled to the machine pressure reducer. Pressure might exceed the capacity of the reducer which might consequently explode.

1.2 ELECTROMAGNETIC COMPATIBILITY (EMC)

1.2.1 General information

This device is built in compliance with the indications contained in the harmonized standard EN50199, which the operator must refer to for the use of this apparatus.



Install and use the apparatus keeping to the instructions given in this manual.



This device must be used for professional application only, in industrial environments. It is important to remember that it may be difficult to ensure the electromagnetic compatibility in other environments.

1.2.2 Installation, use and area examination

- The user is responsible for the installation and use of the equipment according to the manufacturer's instructions.
If any electromagnetic disturbance is noticed, the user must solve the problem, if necessary with the manufacturer's technical assistance.
- In any case electromagnetic disturbances must be reduced until they are not a nuisance any longer.

- Before installing this apparatus, the user must evaluate the potential electromagnetic problems that may arise in the surrounding area, considering in particular the health conditions of the persons in the vicinity, for example of persons with pacemakers or hearing aids.

1.2.3 Emission reduction methods

MAINS POWER SUPPLY



This device must be connected to the supply mains according to the manufacturer's instructions.

In case of interference, it may be necessary to take further precautions like the filtering of the mains power supply. It is also necessary to consider the possibility to shield the power supply cable.

MAINTENANCE

This device needs routine maintenance according to the manufacturer's instructions.

When the equipment is working, all the access and operating doors and covers must be closed and fixed.

This device must not be modified in any way.

WELDING AND CUTTING CABLES

The welding (cutting) cables must be kept as short as possible, positioned near one another and laid at or approximately at ground level.

EQUIPOTENTIAL CONNECTION

The earth connection of all the metal components in the welding (cutting) installation and near it must be taken in consideration.

However, the metal components connected to the workpiece will increase the risk of electric shock for the operator, if he touches said metal components and the electrode at the same time.

Therefore, the operator must be insulated from all the earthed metal components.

The equipotential connection must be made according to the national regulations.

EARTHING THE WORKPIECE

When the workpiece is not earthed for electrical safety reasons or due to its size and position, the earthing of the workpiece may reduce the emissions. It is important to remember that the earthing of the workpiece should neither increase the risk of accidents for the operators, nor damage other electric equipment.

The earthing must be made according to the national regulations.

SHIELDING

The selective shielding of other cables and equipment present in the surrounding area may reduce the problems due to interference. The shielding of the entire welding (cutting) installation can be taken in consideration for special applications.

1.3 RISK ANALYSIS

Risks posed by the machine	Solutions adopted to prevent them
Risk of wrong installation.	A manual with the instructions for use has been produced for this purpose.
Electrical risks.	Application of the EN 60974-1, EN 50192, EN 50078 Standards.
Risks connected with electromagnetic disturbances produced by the welding power source and induced on the welding power source.	Application of the EN 50199 Standard.

2.0 INTRODUCTION

Genesis 60 is a user-friendly, compact generator for plasma cutting.

Genesis 60 uses compressed air as its only gas source, which can be supplied from a normal compressor or from a suitably sized centralized plant. It is able to carry out, cheaply, cuts of a high quality up to a thickness of 20 mm in carbon steel, while still keeping its weight and size very limited.

This optimum performance-to-weight ratio is made possible thanks to the use, in common with all the Genesis range, of inverter technology.

The current is thus stable, and unaffected by variations in the supply voltage, in the height of the cutting arc, in the progression speed and in the thickness of the metal to be cut. The Genesis 60 is equipped with an automatic circuit for the reignition of the pilot arc, that allows metal grill structures to be cut in the best way.

There are safety systems that cut off the power circuit when the operator comes into contact with live parts of the machine, as well as controls to reduce the wear on the electrode and nozzle at the moment of striking the cutting arc.


The ignition of the pilot arc takes place without the use of high frequency, with an increase in the working life of the parts of the torch subject to wear, and reduction in the mains interference.

The generator is equipped with:

- one torch fitting,
- an earth socket,
- front panel,
- rear panel.

2.1 CONTROLS

2.1.1 Front control panel FP121 (Fig.1)

* **L1 : Voltage warning light**  **green led.**

Comes on with the start switch (Fig.2) "I1" in position "I" and indicates that the plant is on and there is voltage.

* **Power output light**  **red led.**


Comes on as soon as the cutting process starts, and goes off as soon as it is finished.

* **L3: torch cap alarm**  **green led.**

Means that the torch cap has not been properly tightened. The generator has no power output.

* **L4: compressed air alarm**  **green led.**

Means that the pressure of compressed air is below 3 bar, too low for proper functioning. The generator has no power output.

* **L5: Thermal safety device warning light**  **yellow led.**

Indicates that the safety devices like thermal cutout. With "L5" on, the power source remains connected to the supply mains, but does not supply output power. "L5" remains on until the fault has been removed and in any case until the inner temperatures are not within the normal values; in this case it is necessary to leave the power source on to exploit the operating ventilator and reduce the time when it is not active.

* **E1: Encoder for setting the cutting current**

Allows you to continuously adjust the cutting current. This current stays unchanged during cutting when the supply and cutting conditions vary within the allowed ranges.



The **T1** VOLT-AMP reading selection key permits display of either the welding voltage or current on **DISPLAY "D1"**.

If **LED "V"** is on, the last voltage reading taken during the last cutting operation is displayed. If you do not begin cutting within 5 sec. the system automatically switches to A, displaying the set current. Vice versa if you begin cutting within 5 sec., the voltage is displayed during the entire cutting operation after which the reading remains displayed for a further 5 seconds.

If **LED "A"** is lit up on display D1, the set or cutting current is displayed if the operation is in progress. The display is maintained for 5 seconds after the end of the operation.



T2: gas test pushbutton.

Allows impurities to be removed from the compressed air circuit and preliminary capacity and pressure settings to be made with no power output.

* **D1** displays the set current, cutting current and cutting voltage or the letters GEN (at switch-on) and ERR (blinking in the event of an alarm).

* **D2** displays the air pressure value for the cutting process. At switch-on it displays the software version. In the event of an alarm, it displays the alarm code in blinking mode:

- 01 IIC error
- 02 torch cap open
- 03 air pressure too low
- I1 overtemperature
- I2 power supply voltage too low
- I3 power supply voltage too high

In the event of an alarm, the operating conditions are restored only if the cause is removed and for alarms I1, I2 and I3 button T1 must also be pressed to activate initial reset of the generator.

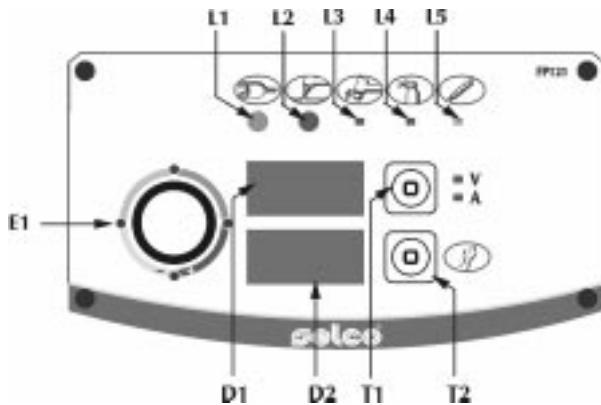


Fig. 1

2.1.2 Rear control panel (Fig. 2)

* I1: Off/On switch

Turns on the electric power to the machine. It has two positions, "O" off, and "I" on.



* When I1 is in the on "I" position, the generator is operational, but has voltage output only if L2 is on.



* The machine is connected to the mains supply even if the I1 switch is in the "O" position, and therefore there are electrically live parts inside it. Carefully follow the instructions given in this manual.

* 1 : Supply cable.

* F1 : air filter (pressure regulator)

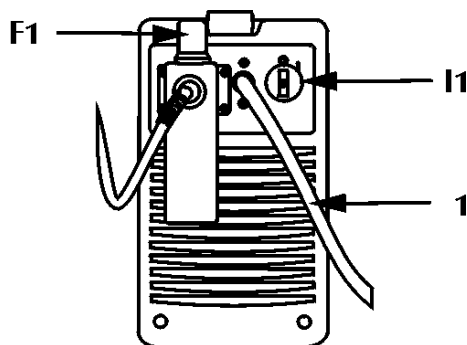


Fig. 2

3.0 TECHNICAL DATA

3.1 IDENTIFICATION

The data plate stamped on the metal structure, see ch. 10.0 complies with the IEC 974-1 and EN 60974-1 international standards and contains the following information:

* Manufacturer's name and address.

* SELCO trademark

* (Type) Model

* (N°) Serial number

* () The power source for plasma cutting comprises a frequency converter followed by a transformer and rectifier that transforms input voltage into direct current.

* (EN 60974-1, EN 50192) Safety standard applied.

* (OUTPUT) Output current and voltage ranges available.

* () Direct current.

* (x) Duty factor, that is, 10 minute time percentage during which the welding can be carried out at a given current without any overheating.

* (I2) Rated cut current.

* (U2) Conventional load voltage.

* (U0) Rated no-load voltage.

* () Plasma cutting

* () 3input phases.

* (I.C.L. H) Insulation class H.

* (COOLING A. F.) Forced ventilation cooling.

* (IP 23) Casing protection degree in compliance with the EN 60529 Standard:

IP2X Casing protected against access to dangerous components with fingers and against the introduction of foreign matters with diameter 12,5 mm.

IPX3 Casing protected against rain falling at 60° on the vertical line.

* (U1) Rated power supply voltage.

* (50/60 Hz) Power supply rated frequency.

* (I1) Rated power supply current.

* () Generator suitable for installation in places where major risks of electric shocks are present.

* () In compliance with the European regulations in force.

3.2 Technical characteristics

TECHNICAL CHARACT.	GENESIS 60
Power supply voltage	3x400 V (440V) 50/60 Hz
Delayed fuse	16 A
Rated power	8.32 KW
Cutting current (x=60%)	60 A
(x=100%)	50 A
Cutting voltage (x=60%)	124 V
No-load voltage	260 V
Pilot arc current	22 A
Operating pressure	5 bar
Flow rate	180 l/min
Protection class	IP 23
Insulation class	H
Construction regulations	EN 60974-1; EN 50199 EN 50078; EN 50192
Dimensions (LXPXH)	180x430x300 mm
Weight	19 Kg

Above data are referred to environment al 40°C

4.0 TRANSPORT - UNLOADING



Never underestimate the weight of the equipment, see 3.0 (TECHNICAL DATA).



Never make the cargo pass or leave it suspended over people or things.



Neither let the equipment or the single unit fall, nor put it down with force.

Once it has been removed from the packing, the power source is supplied with an extendible belt which can be used to move it in the hand or on the shoulder.

5.0 INSTALLATION

5.1 GENERAL RULES

Choose an adequate installation area by following the criteria provided in Section "1.0 WARNINGS-PRECAUTIONS-GENERAL ADVICE".

Do not position the power source and the equipment on surfaces with inclination exceeding 15° with respect to the horizontal plane.

Protect the installation from heavy rain and sun. The machine protection degree (IP 23) is effective against water that falls down in a direction forming an angle up to 60° with the vertical line.

5.2 ELECTRIC CONNECTION TO THE SUPPLY MAINS

The equipment is provided with a single electric connection with a 5m cable positioned in the rear part of the power source.

Size table of the power source input cables and fuses:

POWER SOURCE	GENESIS 60 3x400 V
Rated voltage	400 V \pm 15%
Voltage range	340 - 460 V
Delayed fuses	16 A 500 V
Power supply cable	4x4 mm ²

POWER SOURCE	GENESIS 60 3x440 V
Rated voltage	440 V \pm 15%
Voltage range	374 - 506 V
Delayed fuses	16 A 500 V
Power supply cable	4x4 mm ²



The electrical system must be made by skilled technicians with the specific professional and technical qualifications and in compliance with the regulations in force in the country where the equipment is installed.



The welding power source supply cable is provided with a yellow/green wire that must ALWAYS be earthed. This yellow/green wire must NEVER be used with other voltage conductors.

* Verify the existence of the earthing in the used plant and the good condition of the socket/s

* Install only plugs that are homologated according to the safety regulations.

5.3 CONNECTING THE EQUIPMENT COMPONENTS



Keep to the safety regulations contained in section 1.0 WARNINGS-PRECAUTIONS-GENERAL ADVICE.



Connect the components carefully, in order to avoid power losses.

5.4 SETTING UP

1. Place the generator in a dry, clean place with suitable ventilation.

2. Connect up the compressed air supply with a 1/4 inch to the air inlet P1 in the filter unit F1 (Fig.2). The pressure must ensure at least 5 bars with a flow rate of at least 180 litres a minute.

Securely connect the earth cable connector to the generator as shown in figure 4.

3. Position the earthing clamp onto the piece to be cut, ensuring that it makes a good electric connection (Fig. 4).

4. Check that all the components of the torch are present and correctly fitted and connect the torch fitting to the connector on the generator as shown in figure 3.

Insert the male fitting (torch side) into the corresponding female fitting (machine side). Align the locating tooth (A) on the housing and insert the ring nut (B) which must be compatible. To permit screw-tightening of the ring nut (B), the tool provided (D) must be first inserted and pressed into the hole (C) in order to release the anti-rotation lock. This operation must be performed until the ring nut has been completely tightened. To disconnect the torch, first release the anti-rotation lock by inserting the tool provided (D) into the hole (C).

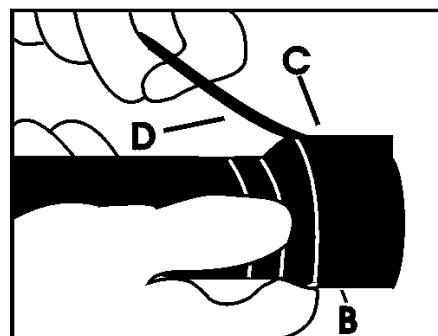
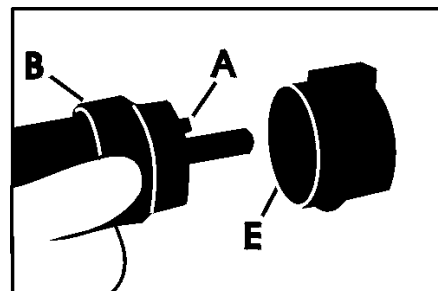


Fig. 3

5. Switch on the system, ensuring the LED's are working correctly and some display.

If operating faults occur in the generator it will be inhibited until normal operating conditions are restored. Press the gas test pushbutton (T2 in Fig 1) in order to remove residual impurities from the compressed air circuit, then lift and turn the knob to adjust the pressure (F1 Fig.2) until the display D2 shows a pressure reading of 5 bars (carry out the operation keeping the gas test button pressed down, so as to make the adjustment with air circulating in the piping).

6. Set the value of the cutting current with the potentiometer, keeping in mind the thickness to be dealt with.

7. Press for a moment the torch button so as to generate the pilot arc; release the control, checking the machine is correctly operating with the display panel. It is advisable not to keep the arc lit to no purpose without making contact, so as to prevent wear on the electrode and the nozzle. If you continue to use it like this the apparatus itself will turn off the pilot light after about 6 seconds.

In the case where a fault is found during the above phases, check the LED's, the display and if necessary consult the chapter "Possible electrical faults" in the manual.

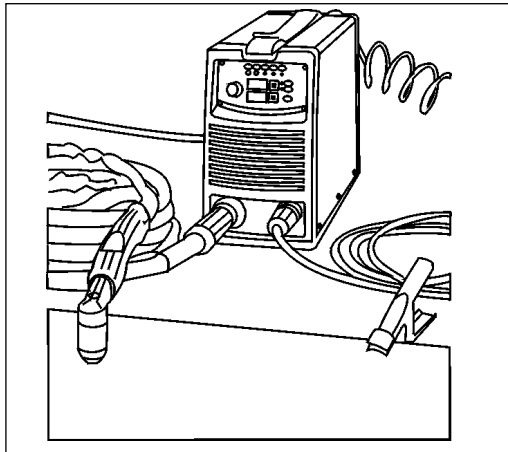


Fig. 4

6.0 PROBLEMS - CAUSES

6.1 POSSIBLE CUTTING DEFECTS

DEFECT	CAUSE
Insufficient penetration	<ul style="list-style-type: none"> - Cutting speed too high - Current set too low - Earth clamp with inefficient contact - Thickness of piece excessive
The cutting arc goes out	<ul style="list-style-type: none"> - Electrode, nozzle or diffuser worn - Air pressure too high - Cutting speed too low - Insufficient air flow - Defective pressure switch - Supply voltage too low

Substantial burr formation	<ul style="list-style-type: none"> - Inadequate air pressure - Cutting speed too low - Nozzle eroded
Nozzle overheating	<ul style="list-style-type: none"> - Electrode eroded - Insufficient air quantity

6.2 POSSIBLE ELECTRICAL FAULTS

DEFECT	CAUSE
Apparatus fails to come on (Yellow LED L1 off)	- Incorrect mains supply
Pilot arc fails to ignite (with yellow LED L1 on)	- Break in the contacts of the torch button (check the connection of the torch attachment is working after having cut off the power supply)
Pilot arc fails to ignite (with yellow LED L1 and red LED L2 on)	<ul style="list-style-type: none"> - Torch parts subject to wear out of action - Air pressure too high - Possible problems in control circuits
Fails to transfer from pilot arc to cutting arc	<ul style="list-style-type: none"> - Possible problems in control circuits - Arc sensors faulty (board 15.14.260)
Lack of power output	<ul style="list-style-type: none"> - Protective devices triggered (see chapter on "Functions of controls") - Possible problems in control circuits

See chapter 2.1 for problems that generate an alarm code.

If you have any doubts or problems, do not hesitate to consult your nearest Selco technical service centre.

7.0 ROUTINE MAINTENANCE

Prevent metal powder from accumulating near the aeration fins and over them.



Disconnect the power supply before every operation!

Carry out the following periodic controls on the power source:

- * Clean the power source inside by means of low-pressure compressed air and soft bristle brushes.
- * Check the electric connections and all the connection cables.



For the maintenance or replacement of plasma torch components, and/or earth cables:

- * **Disconnect the power supply before every operation.**
- * **Check the temperature of the components and make sure that they are not overheated.**
- * **Always use gloves in compliance with the safety standards.**
- * **Use suitable spanners and tools.**
- * **For torch maintenance, keep carefully to the directions shown under instructions for use of the torch enclosed with this manual.**

Tighten the components with care, in order to avoid:

- heating;
- false contacts;
- gas leaks;
- mechanical damage.

Make sure that there is no dirt or metallic powder in the cooling pipes and in the contact joints.

8.0 THEORETICAL OUTLINE OF PLASMA CUTTING

A gas assumes the plasma state when it is brought to an extremely high temperature and ionizes wholly or partly, thus becoming electrically conductive.

Although the plasma exists in every electric arc, by the term "plasma arc" we refer specifically to a torch for welding or cutting that uses an electric arc, made to pass through the constricting neck of a suitable nozzle, to heat a gas coming out of this, so as to take it to the plasma state.

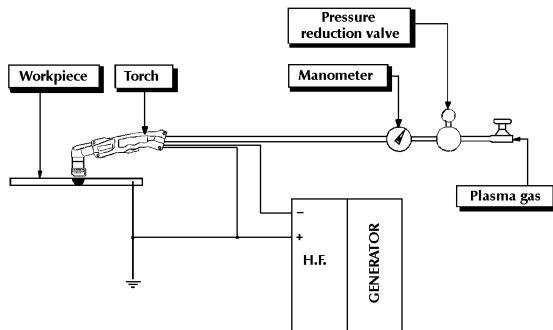


Fig. 5 Manual plasma cutting plant

8.1 Plasma cutting torch

Initially, for plasma cutting, a torch was used with a front end structure as in Fig.6 and two types of gas: a first one for the formation of the plasma (A) that passes between the electrode (1) and nozzle (2) and is forced to exit in an ionized form through the hole, and a second one (B), that acts to cool the torch and further thins out the dimensions of the plasma arc, which at its centre (C), easily manages to reach the temperature of 10.000°C.

With new types of torch and with medium-low power levels (processes that use less than 150A for cutting), today it is possible to use only compressed air as the cutting gas, as well as the cooling gas: the complete process thus becomes much cheaper (Fig.7).

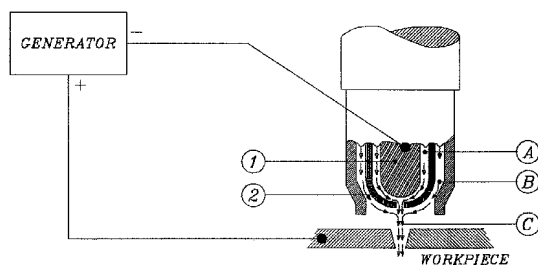


Fig. 6 Functional diagram of a first-generation torch

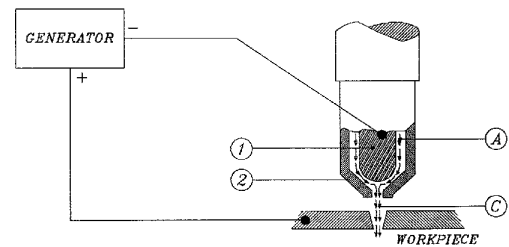


Fig. 7 Functional diagram of an up-to-date torch for small and medium power

8.1.1 Plasma cutting process

The cutting action is obtained when the plasma arc, made very hot and highly concentrated by the design of the torch, transfers onto the conductive piece to be cut, closing the electrical circuit with the generator. The material is first melted at a high temperature of the arc, and then removed by the high exit velocity of the ionized gas from the nozzle.

The arc can have two different states: that of the transferred arc, when the current passes through the piece to be cut, that of the pilot arc or non-transferred arc, when this is sustained between the electrode and the nozzle.

8.1.2 Characteristics of a generator for plasma cutting

A generator for plasma cutting carries out the following operations:

- ignites the pilot arc (for this you can use either a discharge of high frequency between electrode and nozzle, or special torches with retractable electrode);
- supplies the current and voltage to the pilot arc necessary to sustain it;
- checks the transition from the pilot arc to the cutting arc;
- supplies the current required for cutting to the cutting arc;
- oversees all the operations and suitably controls the air valve and alarms.

The piece to be cut is connected to the positive pole of the cutting circuit, as is the nozzle, while the electrode is connected to the negative pole.

The above-mentioned process allows cutting of all conductive materials, and thus also the non-ferrous metals for which cutting by an oxyacetylene process is impossible.

9.0 CUTTING SPECIFICATIONS

In plasma cutting, the thickness of the material to be cut, the speed of cutting and the current supplied by the generator have values which are related to each other; these depend on the type and quality of the material, type of torch as well as the type and condition of the electrode and nozzle, distance between nozzle and piece, pressure and impurity of the compressed air, cut quality required, temperature of the piece to be cut, etc.

In the diagrams as in Fig.8 and Fig.9, we can see that the thickness to be cut is inversely proportional to the cutting speed, and that both these values can be increased with an increase in current.

MILD STEEL

Thickness (mm)	Current (A)	Speed (mm/min)
1	20	1500
2	20	600
3	20	400
4	20	300
1	30	3000
2	30	1200
3	30	750
4	30	500
1	40	5000*
2	40	2000
3	40	1700
4	40	1200
1	50	7800
2	50	3700*
3	50	2500*
4	50	1800
8	50	700
10	50	600
15	50	250
1	60	10500
2	60	6000
3	60	3000
4	60	2500*
8	60	1000*
10	60	800*
15	60	400*
20	60	200

1	50	10100
2	50	5000*
3	50	3000*
4	50	2000
6	50	1200
8	50	950
10	50	700
1	60	14000
2	60	10000
3	60	4800
4	60	3000*
6	60	1900*
8	60	1600*
10	60	1400*
15	60	600

* High quality cut

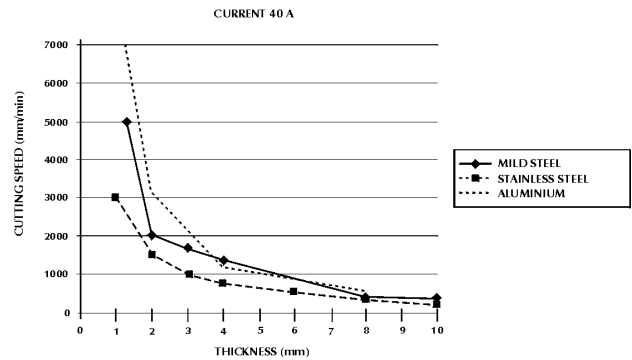


Fig. 8

STAINLESS STEEL

Thickness (mm)	Current (A)	Speed (mm/min)
1	30	1700
2	30	700
1	40	3000*
2	40	1400
3	40	1000
1	50	6400
2	50	2400*
3	50	1500
4	50	1200
6	50	850
8	50	700
10	50	450
15	50	250
1	60	10500
2	60	6000
3	60	3000*
4	60	1700*
6	60	1200*
8	60	900*
10	60	750*
15	60	350
20	60	200

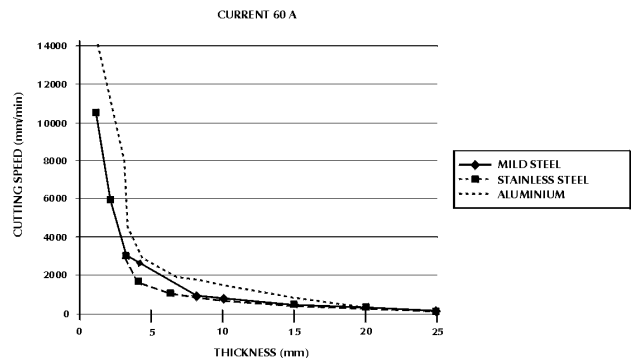


Fig. 9

ALUMINIUM

Thickness (mm)	Current (A)	Speed (mm/min)
1	20	2400
1	30	4000*
2	30	1500
3	30	1200
1	40	6700*
2	40	3200*
3	40	2200
4	40	1100

10.0 NOMINAL DATA

SELCO S.R.L. Via Palladio, 19 - ONARA (PADOVA) - ITALY Telefono +39 049941 3111 Fax: +39 049941 3301			
Type GENESIS 60			
EN 60974-1		EN 60974-1	
22A/109V - 60A/124V			
Δ	X	60%	100%
$\frac{U_1}{V}$	I_2	60A	50A
270	U_2	124V	120V
$\frac{D}{3-}$	U_1	V	I_1
	400		12.6A
COOLING A.F.	50/60 Hz	P_1	8.32KW
I.C.L.	H	IP 23	CE S
N°			

SELCO S.R.L. Via Palladio, 19 - ONARA (PADOVA) - ITALY Telefono +39 049941 3111 Fax: +39 049941 3301			
Type GENESIS 60			
EN 60974-1		EN 60974-1	
22A/109V - 60A/124V			
Δ	X	60%	100%
$\frac{U_1}{V}$	I_2	60A	50A
262	U_2	124V	120V
$\frac{D}{3-}$	U_1	V	I_1
	440		11.5A
COOLING A.F.	50/60 Hz	P_1	8.30KW
I.C.L.	H	IP 23	CE S
N°			

A-90 TORCH

1.0 TECHNICAL DETAILS

Principle of operation	Ignition of pilot arc with high frequency
Version	Monogas (air or nitrogen)
Protection device	"External nozzle not screwed" signal
Current (x = 60%) (x = 100%)	90A 70A
Pilot arc current	22 ÷ 29A
Pressure	5 ÷ 5.5 bars
Air quantity	180 litres/min

2.0 INSTALLATION

Turn off the generator.

Connect the torch attachment to the corresponding coupling on the generator by completely screwing on the locking ring.

3.0 SETTING UP FOR USE

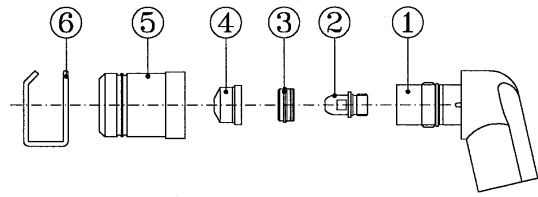


Fig.1 Torch body assembly

Before starting work, it is necessary to carry out the following checks and work:

- 1) Check that the generator is turned off.
- 2) Check that all the parts of the torch are working. For the various parts that make up the torch body (Fig.1), the sequence of correct assembly is 1-2-3-4-5-6.
- 3) To fit the electrode (No.2), use the key, taking care to avoid excessive tightening that could damage the thread of the components.
The electrode must be unscrewed only after the post-cutting air flow is finished, and therefore with the electrode itself cooled.
- 4) Check that the air diffuser, or "swirl-bush" (No.3) is working correctly, which must always show access holes free of obstruction; the use of a defective air diffuser would cause overheating, with consequent damage to the components of the torch body.
- 5) The diameter of the hole in the tip (No.4) is chosen according to table 1.
Never use a tip with a hole diameter less than that recommended; this could cause overheating with consequent damage to the torch body.
- 6) With the spare parts assembled, check that by screwing the outer nozzle (No. 5) to the torch body the corresponding alarm on the generator is cut off; finally check that by unscrewing the nozzle the alarm is triggered; these checks should be carried out with the generator on, taking care not to press the torch button.
- 7) With manual cutting, the standard spacing spring (No.6) is used, and on request a spacer with 4 feet is available, for cutting with template (see detail 024 of the exploded drawing of parts).
- 8) The compressed air used must be filtered and maintained at a high level of purity; humid air, oil and other contaminative agents must be removed, by making use of suitable driers and anti- oil filters.

Thus the torch is set up for the cutting operation.

In any case it is necessary to also follow what is shown in the instruction manual for the generator, above all in the paragraphs "General precautions", "Connecting up" and "Normal maintenance".

Tip diameter	Range of current usable
Tip Ø 1.1	40 ÷ 60A
Tip Ø 1.4	50 ÷ 80A
Tip Ø 1.7	70 ÷ 90A

Table 1 Choice of appropriate tip

4.0 USING THE TORCH

4.1 Inclination and speed of the torch during cutting

The torch is generally held perpendicular to the workpiece during all the cutting phases; obviously, whenever it is required to carry out chamfering or inclined cutting, the torch must be tilted to a suitable inclination.

The speed must be adjusted so that the outflow of the arc below the workpiece is perpendicular (5-10 degrees of slope are acceptable).

A slow speed start is advisable to prevent spray of material which could damage the tip.

4.1.1 Puncturing

In some cases it is necessary to puncture a hole in the material using plasma cutting. In this way, the wear on the parts which are subject to deterioration will be increased, and it becomes very important to try to work to avoid the return of spray, which can be dangerous, especially with sheet metal over 10 mm. thick. We suggest starting with the torch inclined sideways, so as to point the spray outside the cutting area, avoiding damage and overheating of the torch body.



Immediately remove any material accumulated on the tip or on the ceramic hood.

Caution: plasma cutting is a process with a high thermal element, which takes both the piece to be cut and the end parts of the torch to extremely high temperatures.

4.1.2 Circular cutting

For the preparation of flanges and opening holes, it is possible to use a pair of compasses, equipped with rotating heads and movement on wheels. The centering is simplified by the presence of three different guides, one magnetic, one pointed, and one passing through the central hole.

4.1.3 Practical advice

We advise igniting the pilot arc away from the workpiece, and then moving near until the cutting arc is struck; striking a cutting arc repeatedly and directly by contact with the workpiece creates an increase in temperature of the torch body.

Avoid turning off the generator before the end of the post-cut cooling flow, to avoid overheating of the components of the torch.

5.0 MAINTENANCE AND INSPECTION

Wear on the electrode is not only determined by the cutting time and the current, but also by the number of start-ups.

It is advisable to replace the electrode before the tungsten insert in the point is completely worn out.

The tip, that is always of a size suggested under table 1, has an average life similar to that of an electrode, and is replaced when an irregular hole is present which is larger than the nominal one (this can cause slanted cuts of poor quality).

Electrode and tip are replaced simultaneously to prolong their active life.

Working with electrode and tip which are too spoiled can cause damage to the torch body.

It is important to pay special attention to the fitting of the electrode and tip in order not to irreparably damage the torch.



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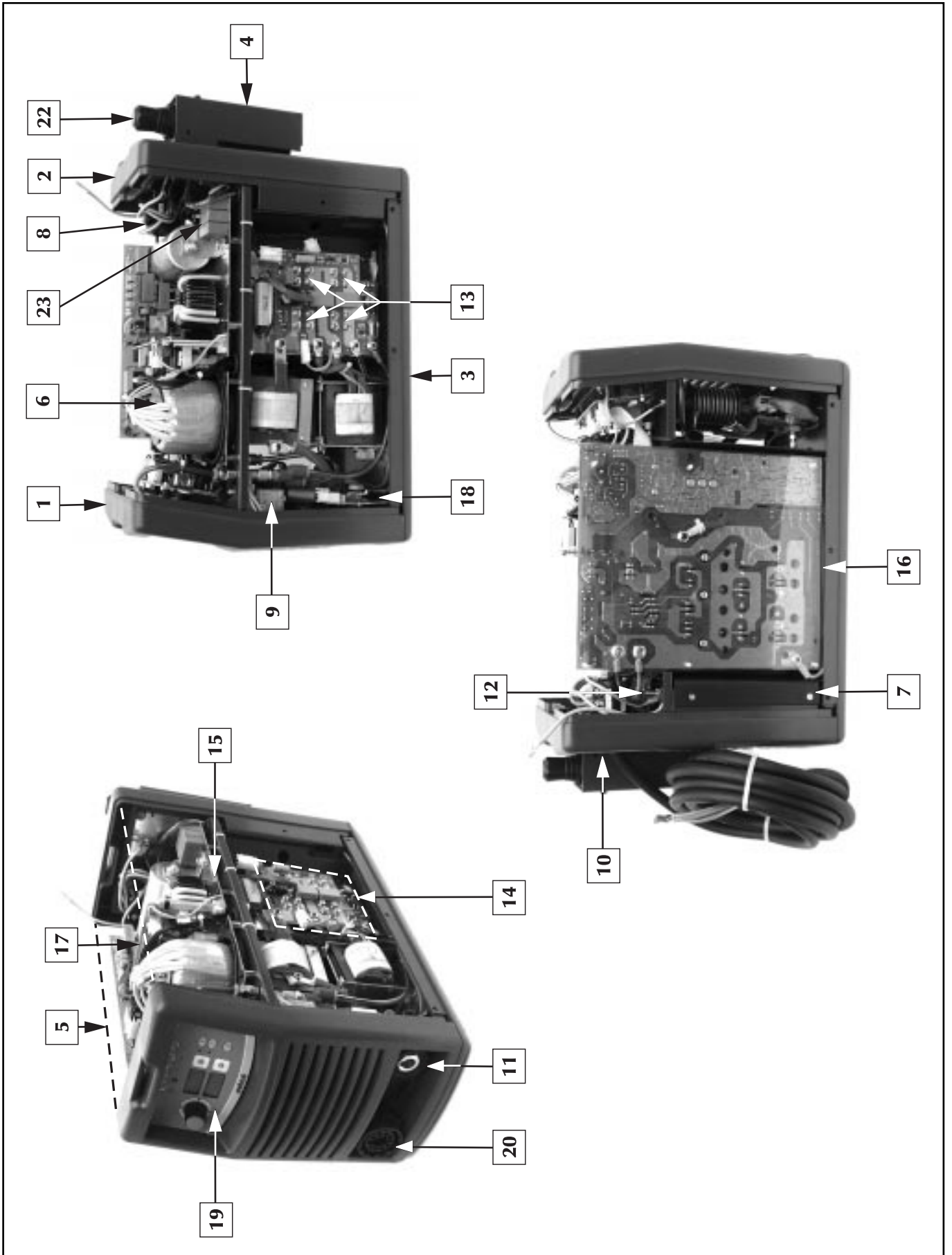
SPARE PARTS TABLES

ERSATZTEILTAFELN

VUES DES PIÈCES DÉTACHÉES

TABLAS DES REPUESTOS

Genesis 60



ITALIANO

POS.	DESCRIZIONE	CODICE
1	Pannello plastico frontale	01.04.26201
2	Pannello plastico posteriore	01.05.220
3	Fondo plastico	01.06.100
4	Supporto per filtro regolatore	01.14.227
5	Cofano serigrafato	03.07.060
6	Trasformatore	05.11.260
7	Ventilatore	07.10.014
8	Interruttore	09.01.008
9	Elettrovalvola	09.05.001
10	Manopola	09.11.009
11	Presa fissa	10.13.020
12	Ponte diodi	14.10.161
13	Diodi	14.05.078
14	Kit scheda arco pilota	15.18.014
15	Scheda ingresso	15.14.266
16	Gruppo inverter primario	14.60.063
17	Scheda H.F.	15.14.192
18	Scheda filtro	15.14.264
19	Pannello comandi FP121	15.22.121
20	Attacco centralizzato	19.06.007
21	Cinghia	21.06.004
22	Filtro regolatore	24.02.010
23	Varistore	11.26.006

ENGLISH

POS.	DESCRIPTION	CODE
1	Pastic front panel	01.04.26201
2	Plastic back panel	01.05.220
3	Bottom	01.06.100
4	Filter regulator holder	01.14.227
5	Silk-screen panel	03.07.060
6	Transformer	05.11.260
7	Fan	07.10.014
8	Switch	09.01.008
9	Solenoid valve	09.05.001
10	Knob	09.11.009
11	Fixed socket	10.13.020
12	Diode jumper	14.10.161
13	Diodes	14.05.078
14	Pilot arc p.c. board kit	15.18.014
15	Inlet board	15.14.266
16	Primary inverter unit	14.60.063
17	H.F. card	15.14.192
18	Filter card	15.14.264
19	Control panel FP121	15.22.121
20	Connector	19.06.007
21	Belt	21.06.004
22	Filter regulator	24.02.010
23	Varistor	11.26.006

DEUTSCH

POS.	BESCHREIBUNG	CODE
1	Stirnseitiges Plastikpaneel	01.04.26201
2	Hinterteil Plastikpaneel	01.05.220
3	Bodenteil	01.06.100
4	Filterregler-halter	01.14.227
5	Siebdruck seitenteil	03.07.060
6	Trafo	05.11.260
7	Ventilator	07.10.014
8	Schalter	09.01.008
9	Elektroventil	09.05.001
10	Ballengriff	09.11.009
11	Fixen Griff	10.13.020
12	Diodenbrücke	14.10.161
13	Diode	14.05.078
14	Kit Platine arc pilote	15.18.014
15	Eingangsplatine	15.14.266
16	Einheit Primärinverter	14.60.063
17	H.F.-Karte	15.14.192
18	Filterkarte	15.14.264
19	Bediennungsfeld FP121	15.22.121
20	Zentralanschluss	19.06.007
21	Riemen	21.06.004
22	Filterregler	24.02.010
23	Varistor	11.26.006

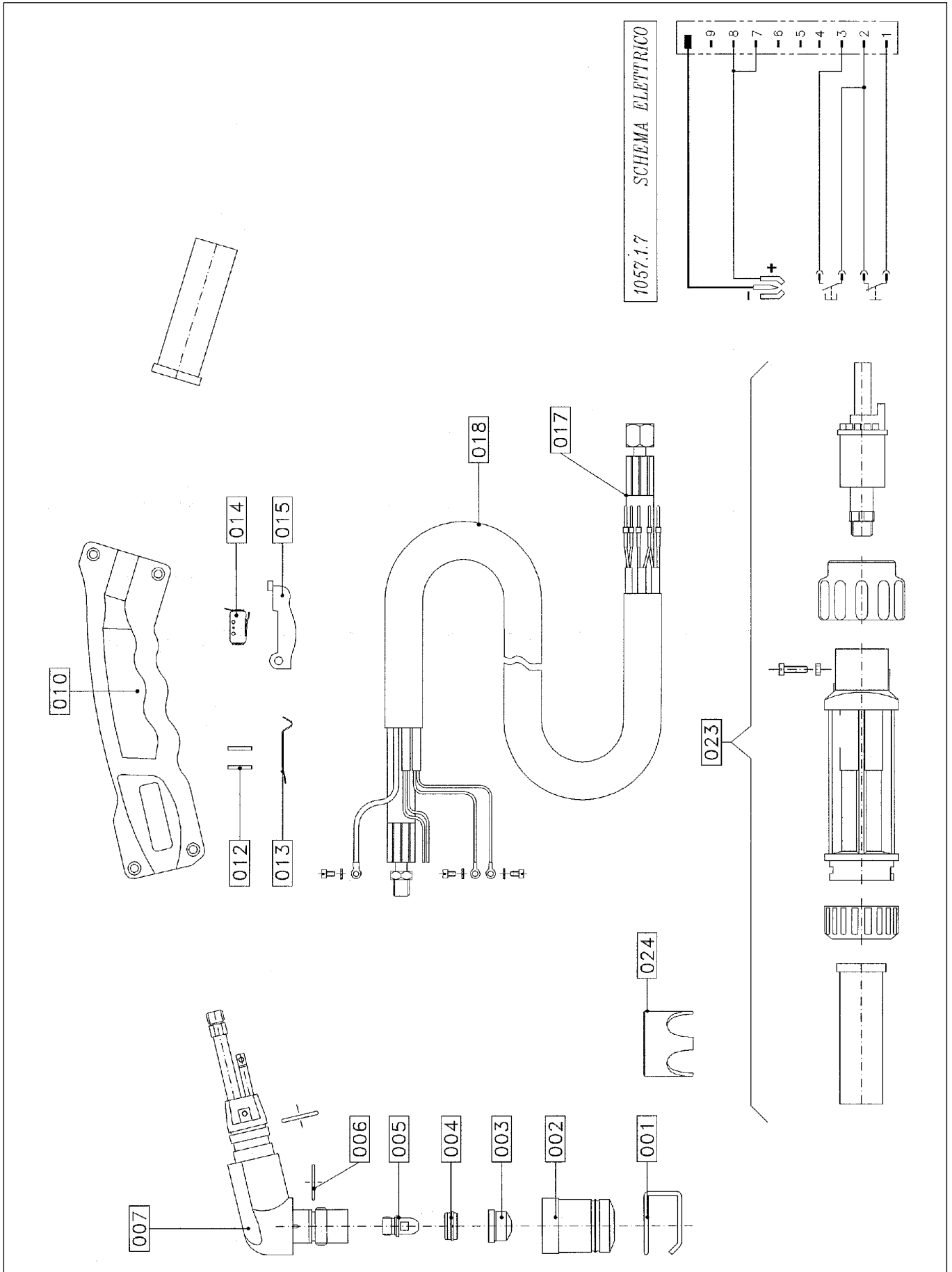
FRANÇAIS

POS.	DESCRIPTION	CODE
1	Panneau avant plastique	01.04.26201
2	Panneau arriere plastique	01.05.220
3	Fond	01.06.100
4	Support filtre regulateur	01.14.227
5	Panneau avec serigraphie	03.07.060
6	Transformateur	05.11.260
7	Ventilateur	07.10.014
8	Interrupteur	09.01.008
9	Soupape electrique	09.05.001
10	Bouton	09.11.009
11	Prise inamovible	10.13.020
12	Pontet diodes	14.10.161
13	Diode	14.05.078
14	Kit Pilotbogenplatine	15.18.014
15	Platine entree	15.14.266
16	Groupe inverseur primaire	14.60.063
17	Carte H.F.	15.14.192
18	Carte filtre	15.14.264
19	Panneau de reglage FP121	15.22.121
20	Connecteur	19.06.007
21	Courroie	21.06.004
22	Filtre regulateur	24.02.010
23	Varistance	11.26.006

ESPAÑOL

POS.	DESCRIPCION	CODIGO
1	Panel frontal plástico	01.04.26201
2	Panel posterior plástico	01.05.220
3	Fondo	01.06.100
4	Soporte filtro regulador	01.14.227
5	Panel con serigrafia	03.07.060
6	Transformador	05.11.260
7	Ventilador	07.10.014
8	Interruptor	09.01.008
9	Electrovalvula	09.05.001
10	Botón	09.11.009
11	Enchufe fijo	10.13.020
12	Puente diodos	14.10.161
13	Diodo	14.05.078
14	Kit tarjeta arco piloto	15.18.014
15	Tarjeta ingreso	15.14.266
16	Grupo inersor primario	14.60.063
17	Tarjeta H.F.	15.14.192
18	Tarjeta filtro	15.14.264
19	Panel de control FP121	15.22.121
20	Conectro	19.06.007
21	Correa	21.06.004
22	Filtro regulador	24.02.010
23	Varistor	11.26.006





ITALIANO

POS.DESCRIZIONE	CODICE
000 Torcia plasma A-90 mt.6	81.20.018
001 Distanziale a molla CV11	82.23.104
002 Ugello esterno PC109	82.23.091
003 Tip diametro 1.1 PD101-11	82.23.065
Tip diametro 1.4 PD101-14	82.23.066
Tip diametro 1.7 PD101-17	82.23.067
004 Diffusore aria marrone PE101	82.23.082
005 Elettrodo PR101	82.23.050
006 Guarnizione OR EA131	82.23.123
007 Corpo torcia A-90 PF109	82.23.012
010 Impugnatura nera TP10	82.23.132
012 Spinetta macro EA185	82.23.140
013 Molla micro BX13	82.23.142
014 Macro BX1	82.23.141
015 Pulsante BW100	82.23.143
017 Cavo aria corrente M6 PH109	82.23.163
018 Guaina protezione M6 PQ11	82.23.150
023 Attacco maschio centralizzato	19.06.002
024 Distanziale a 4 piedi CV14	82.23.106

ENGLISH

POS.DESCRPTION	CODE
000 A-90 plasma torch, 6 metre	81.20.018
001 Spring spacer CV11	82.23.104
002 External nozzle PC109	82.23.091
003 Tip, 1.1 diameter PD101-11	82.23.065
Tip, 1.4 diameter PD101-14	82.23.066
Tip, 1.7 diameter PD101-17	82.23.067
004 Air diffuser, brown PE101	82.23.082
005 Electrode PR101	82.23.050
006 Seal OR EA131	82.23.123
007 Torch body A-90 PF109	82.23.012
010 Handgrip, black TP10	82.23.132
012 Micro pin EA185	82.23.140
013 Micro spring BX13	82.23.142
014 Micro BX1	82.23.141
015 Push button BW100	82.23.143
017 Air flow tube M6 PH109	82.23.163
018 Protective sheath M6 PQ11	82.23.150
023 Male coupling, centralised	19.06.002
024 Spacer with 4 feet CV14	82.23.106

DEUTSCH

POS.BESCHREIBUNG	CODE
000 Plasmabrenner A-90 - 6 m	81.20.018
001 Feder-Distanzstück CV11	82.23.104
002 Äußere Düse PC109	82.23.091
003 Tip Durchmesser 1.1 PD101-11	82.23.065
Tip Durchmesser 1.4 PD101-14	82.23.066
Tip Durchmesser 1.7 PD101-17	82.23.067
004 Luftverteiler, braun PE101	82.23.082
005 Elektrode PR101	82.23.050
006 O-Dichtung EA131	82.23.123
007 Brennerkörper A-90 PF109	82.23.012
010 Griff schwarz TP10	82.23.132
012 Stift für Mikroschalter EA185	82.23.140
013 Feder für Mikroschalter BX13	82.23.142
014 Mikroschalter BX1	82.23.141
015 Druckknopf BW100	82.23.143
017 Luft-Strom-Kabel M6 PH109	82.23.163
018 Schutzmantel M6 PQ11	82.23.150
023 Zentralisierter Steckanschluß	19.06.002
024 4-füßiges Distanzstück CV14	82.23.106

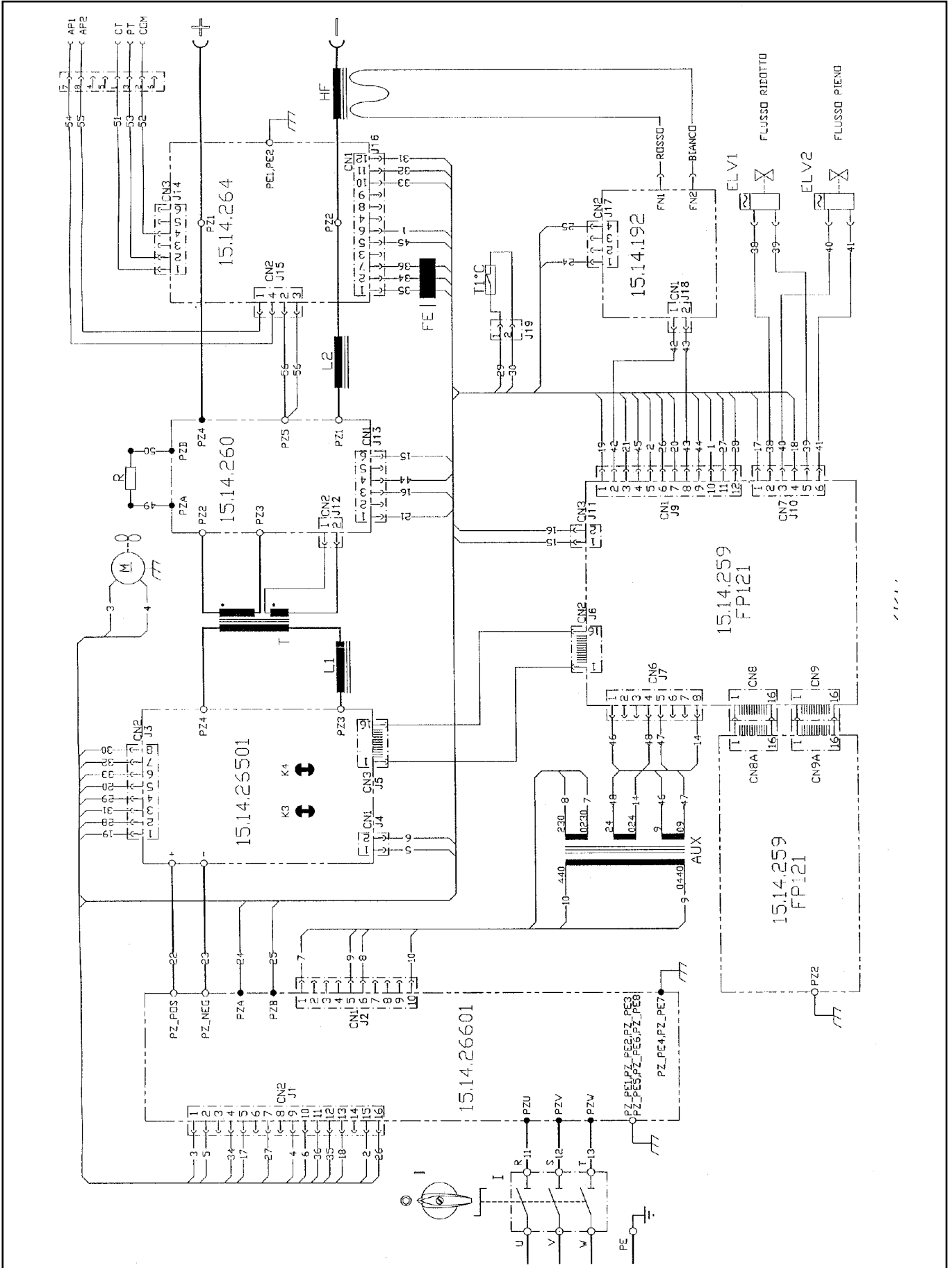
FRANÇAIS

POS.DESCRPTION	CODE
000 Torche plasma A-90 6 m	81.20.018
001 Entretoise à ressort CV11	82.23.104
002 Buse externe PC109	82.23.091
003 Tip diamètre 1.1 PD101-11	82.23.065
Tip diamètre 1.4 PD101-14	82.23.066
Tip diamètre 1.7 PD101-17	82.23.067
004 Diffuseur air marron PE101	82.23.082
005 Electrode PR101	82.23.050
006 Joint OR EA131	82.23.123
007 Torche A-90 PA109	82.23.012
010 Poignée noire TP10	82.23.132
012 Cheville micro EA185	82.23.140
013 Ressort micro BX13	82.23.142
014 Micro BX1	82.23.141
015 Touche BW100	82.23.143
017 Câble air courant M6 PH109	82.23.163
018 Gaine de protection M6 PQ11	82.23.150
023 Fixation mâle centralisée	19.06.002
024 Entretoise à 4 pieds CV14	82.23.106

ESPAÑOL

POS.DESCRIPCION	CODIGO
000 Portaelectrodo plasma A-90 m.6	81.20.018
001 Distanciadador de resorte CV11	82.23.104
002 Inyector externo PC109	82.23.091
003 Tip diámetro 1.1 PD101-11	82.23.065
Tip diámetro 1.4 PD101-14	82.23.066
Tip diámetro 1.7 PD101-17	82.23.067
004 Difuso aire marrón PE101	82.23.082
005 Electrodo PR101	82.23.050
006 Guarnición OR EA131	82.23.123
007 Cuerpo portaelectrodo A-90 PF109	82.23.012
010 Empuñadura negra TP10	82.23.132
012 Clavija micro EA185	82.23.140
013 Resorte micro BX13	82.23.142
014 Micro BX1	82.23.141
015 Pulsador BW100	82.23.143
017 Cable aire corriente M6 PH109	82.23.163
018 Vaina protección M6 PQ11	82.23.150
023 Enchufe macho centralizado	19.06.002
024 Distanciadador de 4 pies CV14	82.23.106





DICHIARAZIONE DI CONFORMITÀ
CONFORMITY CERTIFICATE
KONFORMITÄTSERKLÄRUNG
DECLARATION DE CONFORMITE
DECLARACIÓN DE CONFORMIDAD

CE-97

La ditta/ Company/ Die Firma /L'entreprise / La firma
SELCO S.R.L. - Via Palladio, 19 - 35010 ONARA (Padova) - ITALY,

dichiara che l'apparecchio tipo
hereby declares that the apparatus type
erklärt, daß das Gerät Typ
déclare que l'appareil type
declara que el aparato tipo

Genesis 60 S/N.....

è conforme alle direttive:
conforms to the standards:
den folgenden Richtlinien entspricht:
est conforme aux directives:
es conforme a las directivas:

73/23/CEE
89/336/CEE
92/31/CEE
93/68/CEE

e che sono state applicate le norme:
and that the regulations have been duly applied:
und daß folgende Normen angewendet wurden:
et que les normes ci-contre ont été appliquées:
y que se han aplicado las normas:

EN 50078
EN 50192
EN 50199
EN 60974-1

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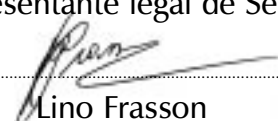
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Rappresentante Legale Selco
Selco's legal representative
Rechtlicher Vertreter von Selco
Représentant légal Selco
Representante legal de Selco

Onara (Padova).
li /dated/den / le /


Lino Frasson