SHARK 75 - 105

EN *Operator's manual*

READ CAREFULLY

PLASMATECH
CEA PLASMA CUTTING DIVISION

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Introduction

Thank you for buying our product.
In order to get the best performance out of the machine and ensure the maximum lifespan of its parts, the use and maintenance instructions contained in this manual must be read and strictly complied with, as well as **the safety instructions contained in the relevant folder**. If repairs to the machine are required, we recommend that our clients contact our service centre workshops, as they have the necessary equipment and personnel that are specifically trained and constantly updated.
All our machines and equipment are constantly developed and so changes may be made in terms of their construction and features.

Description

After significant investments and resources put into research, these inverter generators, with new technology torches, make a significant increase in the quality and speed of the cutting process possible. This quality takes the form of precise outlines, edges without burrs, a limited thermally altered zone, and a sufficiently square edge.
Our **SHARK** systems are an efficient solution when it comes to cutting any metal and perforated plates. The inverter's electronic control, precision, and flexibility make it possible to determine the most correct parameters, in order to ensure high quality cutting specifically related to the thickness and type of material to be cut.
Thanks to the new **SK** torches for manual cutting, and **SKM** for automated CNC cutting, the **SHARK** models make it possible to make cuts without using high frequencies to ignite the arc, thereby reducing disturbance of the external environment.
Our powerful **SHARK** generators, with a professional, high flow rate, air system, guarantee perfect cuts.
The salient technical characteristics that are common to all machines, are as follows:

- Three-phase power supply.
- Stability of cutting parameters, despite power supply fluctuations.
- Automatically resetting protective devices against undervoltages and overvoltages on the electricity mains.
- Trip switches to protect against overloading.
- Reduced energy consumption.
- Electronic control for excellent cut quality.
- Professional, high flow rate air system.
- Torch with pilot arc.
- Centralised torch connection.
- Electrical protective device on the torch to guarantee the operator's safety.
- Capacity to cut meshes and perforated plates.
- Capacity for contact cutting with currents less than 50A, without using slides or other spacers.
- Air filter and regulator unit with automatic expulsion of impurities, complete with pressure gauge for measuring the air pressure at the machine intake.
- Innovative, functional design, with an inclined front panel, making it clearly visible from any angle, for easy reading and setting of parameters.
- Metal loadbearing structure, with front panels on impact-resistant fibre, and commands protected against accidental impacts.
- Strong handle built into the frame.

- IP23S protection level and electronic parts protected against dust, thanks to the innovative “tunnel” ventilation system, which allows the unit to be used in the most problematic working environments.
- Smart Start Transfer function, for better control over the initial cutting phase. Innovative electronic circuit that allows optimum, gradual transferring of the pilot arc to the main arc, while the cutting arc is being ignited, ensuring immediate stability of the plasma flow and longer duration of consumables used for the torch.
- Smart End Cutting function, for better control over the final cutting phase. Once cutting has been completed, the current reaches an optimum value, which allows definitive detachment of the pieces. In addition to reducing the noise when cutting ends, this device means that the operator does not have to separate the pieces manually, thereby ruining the final portion of the cut surface.

SK and SKM torches

The **SK** and **SKM** torches, used with the SHARK machines, are the result of research done over the last decade, aimed at improving the performance of the plasma beam, in order to increase control and thermal energy.
More specifically, the **SK 75-125** and **SKM 75-125** torches are characterised by High Performance Cutting (HPC) technology, which makes it possible to increase the quantity and speed of the air, enhance concentration of the plasma beam, and stabilise the cutting arc, which allows:
- High cutting speeds.
- Optimum quality and cleanliness of the cutting surfaces.
- High concentration of the Plasma beam.
- Absence of burrs.
- Reduction of the thermally altered zone.
- Longer lifespan for consumables.
- Piercing of plating more quickly.
- Gouging (only for the SHARK 105 machine) to remove material with the help of a plasma beam.

All **SK** and **SKM** torches are fitted with a coaxial cable that ensures great flexibility, combined with significant strength and resistance to crushing.
The **High Performance Cutting - HPC** technology, makes it possible to generate radial and vortex gas flows about the arc’s axis, thereby creating a Plasma beam at very high temperature that pierces and vaporises the surface being worked more efficiently.
This technology also makes it possible to avoid double arcs from forming - two arcs in series between the cathode and the workpiece’s surfaces - which is mainly responsible for damaging the nozzle and instability of the arc - ensuring execution of very high quality cuts, along with longer duration of consumables.

Vortex gas flows and collimation of the beam
The new **SK torches**, equipped with **High Performance Cutting**, increase the density of the Plasma beam’s energy, while reducing the width of the arc’s area of action, producing a narrower cut path, at less of an angle, easily removing molten material. This results in a better quality cut that has neat surrounding without burrs, a limited extent of the thermally altered zone, and a sufficiently squared edge.
The main advantages include:
- Better cut quality.
- Higher cutting speed.
- Narrower cuts.
- Long duration of consumables.

CS - Original spare parts

CS is our guarantee mark for all PlasmaTECH consumables. The **CS** mark is to be found on all original spare parts for SK and SKM torches, used for the SHARK machines.
The presence of the **CS** mark on all consumables, is a guarantee for those buying a cutting machine, that the machine’s declared performance levels will be delivered.
The geometric shapes, quality of the materials used, and precision of the machining and coupling of the same, resulting from years of experience, form the basis for developing the SK and SKM torches, and use of the same with our cutting generators. We highly recommend the use of original spare parts marked **CS**. In addition to compromising optimum function of the machine, using pirate parts could result in overheating and fluctuations in electrical voltages, which is turn can cause:
- Overheating and damaging of the torch.
- Malfunctions and faults on the generator.
- Worsening of cut quality.
- Lessening of machine safety.

In light of the above, using any parts other than **CS** not only causes the warranty on the machine to be null and void, but it also means that CEA PlasmaTECH cannot be held responsible in case of any accidents.

Usage limits (IEC 60974-1)

The use of plasma equipment for cutting is typically discontinuous as it consists of periods of effective operation (cutting) and rest periods (while the piece is being positioned, etc.). The size of the equipment is suitable for safe use of max. nominal current I_2 for a working time that is 40% of the total time of use. The regulations in effect stipulate that 10 minutes is the maximum total time of use. For the work cycle, 40% of that time is considered. Any excess of the permitted work cycle triggers a thermal circuit breaker which protects the internal components of the equipment against dangerous overheating. When the thermal circuit breaker is triggered, the yellow LED on the front of the equipment is lit (Pos. 3, Fig. B). After a few minutes the overheat cutoff resets itself automatically and the yellow LED goes off, indicating that the equipment is once again ready for use. This equipment is built to have a protection level of IP 23 S, which means:
- That it is protected against the penetration of solid foreign bodies with diameters in excess of Ø 12 mm.
- That it is protected against water spray hitting the surface with an angle of incidence up to 60°.
- That the equipment has been tested for withstanding harmful effects due to water getting in when the moving parts on the equipment are moving.

SHARK 75 technical characteristics

The powerful, compact SHARK 75 model is a plasma unit that satisfies the needs of medium / light metalwork most fully.
The cuts are always precise and ensure high cutting standards in any situation.
High quality and cutting speed thanks to the SK 75 torch, with (HPC) High Performance Cutting technology, which ensures a concentrated, powerful plasma beam.
Further particular features of this machine include:

- SK 75 torch with (HPC) High Performance Cutting technology and coaxial cable.
- Powerful, compact and light-weight, only 22,8 kg.
- High productivity thanks to high cutting quality and speed.
- Lower operating costs due to the long lifespan of consumables.
- "Energy Saving" function that starts ventilation of the generator only when necessary.
- Electrical protective device on the torch to guarantee the operator's safety.
- The possibility of automated CNC cutting, using the SHARK 75-M version, fitted with a straight SKM 75 torch.

The technical data for this equipment is summarized in the table 1.

Table 1

Model		**SHARK 75**
Three-phase power supply 50/60 Hz	V	400
Mains supply: Z_{max}	Ω	0,107
Power input @ I_2 Max	kVA	11
Delayed fuse (I_2 @ 100%)	A	16
Power factor / cosφ		0,87 / 0,99
Efficiency degree	η	0,85
Open circuit voltage (peak)	V	300
Current range	A	20 ÷ 70
Duty cycle @ 100% (40°C)	A	55
Duty cycle @ 60% (40°C)	A	65
Duty cycle @ 40% (40°C)	A	70
Cutting capacity recommended maximum severance piercing	 mm mm mm mm	 20 25 30 15
Type of machine intake air/gas		**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 **N2** - 99.95%
Air pressure		5,0 ÷ 5,5
Air flow		180 ÷ 210
Standards		IEC 60974-1 IEC 60974-7 IEC 60974-10 CE S
Protection class		IP 23 S
Insulation class		F
Dimensions	mm	595-390-185
Weight	kg	22,8

WARNING: *This equipment complies with* **EN/IEC 61000-3-12** *provided that the maximum permissible system impedance Z_{max} is less than or equal to 0,107 at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with maximum permissible system impedance Z_{max} less than or equal to 0,107.*

This system, tested according to **EN/IEC 61000-3-3**, *meets the requirements of* **EN/IEC 61000-3-11**.

SHARK 105 technical characteristics

The powerful, compact SHARK 105 model is a plasma unit that satisfies the needs of medium / light metalwork most fully.
The cuts are always precise and ensure high cutting standards in any situation.
High quality and cutting speed thanks to the SK 125 torch, with (HPC) High Performance Cutting technology, which ensures a concentrated, powerful plasma beam.
Further particular features of this machine include:

- SK 125 torch with (HPC) High Performance Cutting technology and coaxial cable.
- Powerful, compact and light-weight, only 23,9 kg.
- High productivity thanks to high cutting quality and speed.
- Lower operating costs due to the long lifespan of consumables.
- "Energy Saving" function that starts ventilation of the generator only when necessary.
- Electrical protective device on the torch to guarantee the operator's safety.
- The possibility of automated CNC cutting, using the SHARK 105-M version, fitted with a straight SKM 125 torch.

The technical data for this equipment is summarized in the table 2.

Table 2

Model		**SHARK 105**
Three-phase power supply 50/60 Hz	V	400
Mains supply: Z_{max}	Ω	0,109
Power input @ I_2 Max	kVA	15
Delayed fuse (I_2 @ 100%)	A	16
Power factor / cosφ		0,90 / 0,99
Efficiency degree	η	0,85
Open circuit voltage (peak)	V	300
Current range	A	20 ÷ 100
Duty cycle @ 100% (40°C)	A	70
Duty cycle @ 60% (40°C)	A	90
Duty cycle @ 40% (40°C)	A	100
Cutting capacity recommended maximum severance piercing	 mm mm mm mm	 30 35 40 20
Type of machine intake air/gas		**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 **N2** - 99.95%
Air pressure		5,0 ÷ 6,0
Air flow		280 ÷ 330
Standards		IEC 60974-1 IEC 60974-7 IEC 60974-10 CE S
Protection class		IP 23 S
Insulation class		F
Dimensions	mm	595-390-185
Weight	kg	23,9

WARNING: *This equipment complies with* **EN/IEC 61000-3-12** *provided that the maximum permissible system impedance Z_{max} is less than or equal to 0,107 at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with maximum permissible system impedance Z_{max} less than or equal to 0,107.*

This system, tested according to **EN/IEC 61000-3-3**, *meets the requirements of* **EN/IEC 61000-3-11**.

Opening the packaging

The standard composition of this plasma cutting system is made up of:
- Plasma cutting units.
- Plasma torch with centralised connection and initial supply spare parts kit.
- Ground cable.
- Trolley for transportation (optional).

On receipt of the unit, perform the following operations:
- Remove the plasma cutting unit and all relative accessories and components from the packaging.
- Check that the plasma cutting unit is in good condition. If it is not, inform your dealer immediately.
- Make sure that all the ventilation louvers are open and that the airflow is not obstructed.

Plasma cutting

The cutting system used by this equipment is a low current system that uses compressed air as its plasma equipment as well as for cooling. The air normally used is a mixture of 79% nitrogen and 21% oxygen. These two biatomic gasses have almost identical enthalpy and form a highly energetic blend. The low current also makes it possible to use torches with a low air capacity and moderate cutting speed, that are more suitable for manual procedures.

CUTTING PARAMETERS

In analyzing the parameters that characterize manual plasma cutting it is necessary to note that they depend on the material to be cut, its thickness and the skill of the operator in following the cutting line. Optimum speed depends largely on the skill of the operator and amount of material to be cut and is achieved when the fused material flows through the groove and is not projected in the direction of the torch. If the latter occurs, cutting speed has to be reduced.

The parameters that affect cutting are:
- **Electric power.** Any increase in electric power will permit higher cutting speed and greater thickness of the material to be cut
- **Compressed air capacity.** Increasing the air capacity enables cutting thicker material and ensures better quality at any thickness
- **Distance between the nozzle and workpiece.** The appearance of the cut and wear of the torch's working parts, depend on the correct distance between the nozzle and the workpiece.

NOTE: *The width of the cut path is equal to about twice the diameter of the hole in the nozzle.*

Respect of the above recommendations ensures greatly reduced thermal alterations of the material due to cutting, that are in any case always fewer than those caused by oxygen torches. The thermally altered zone is in any case smaller than the zone on which the weld is effective, so that in welding pieces that have been cut by plasma it is not necessary to perform any cleaning or grinding operations.

Installation

The place where the equipment is installed should be selected with care so as to ensure satisfactory, safe use.

The user is responsible for installation and use of the equipment according to the instructions provided by the manufacturer in this manual.

Temperatures must be between -25 °C e +55 °C. during transportation and/or storage in stores.

Before installing the equipment the user should take into consideration any possible electromagnetic problems in the work area.

In particular, we recommend that the equipment not be installed in the vicinity of:
- Signalling, control and telephone cables.
- Radiotelevision transmitters and receivers.
- Computers or controlling and measuring instrument.
- Safety and protection devices.

If the operator wears a pacemaker, hearing aid or other similar device, he should consult his doctor before approaching the equipment while it is running. The environment where the equipment is installed must conform with the degree of protection of the chassis that is IP 23 S (IEC publication 60529). The system is capable of working in environments where working conditions are particularly hard.

This equipment cools water by forced circulation of air and must therefore be positioned in such a way that the air can easily be drawn in and expelled through the openings in the chassis.

Connection to the electrical supply

Connection of the machine to the user line (electrical current) must be performed by qualified personnel.

Before connecting the cutting equipment to the mains supply, check that the data on the machine plate correspond to the supply voltage and frequency and its main switch is on the "0" position.

This system has been designed for nominal voltage 400 V - 50/60 Hz.

The connection to the supply, should be made with four core cable which is supplied with the machine, connecting:
- Three wires the supply.
- The fourth one, YELLOW-GREEN, to ground.

Connect a suitable plug (3p+e) of proper capacity to the mains cable and fix to a socket fitted with fuses or automatic switch: the proper ground terminal must be connected to the ground connector (yellow-green) of the main supply.

Table 3 shows the capacity values that are recommended for fuses in the line with delays.

Table 3

Model		SHARK	
		75	105
Power input @ I_2 Max	kVA	11	15
Delayed fuse (I_2 @ 100%)	A	16	16
Duty cycle @ 40% (40°C)	A	70	100
Mains supply connection cable Length Section	 m mm^2	 4 2,5	
Ground cable Length Section	 m mm^2	 4 10	

NOTE: *If extensions of the power supply cable are used, they must be of adequate cross section and never inferior to that of the cable supplied.*

Usage norms

COMMAND AND CONTROL DEVICES (Fig. A)

Pos. 1 Control panel (Fig. B).
Pos. 2 Snap-in connector for ground line.
Pos. 3 Connector, 14 pole, for CNC control interface (optional extra).
Pos. 4 Centralised torch attachment.
Pos. 5 Power supply switch.
Pos. 6 Cutting machine power supply cable.
Pos. 7 Fast coupling to connect compressed air tube.
Pos. 8 Filter and cutting air pressure regulator. The air filter automatically expels impurities.
Pos. 9 Pressure gauge for reading cutting air pressure.

CONTROL PANEL (Fig. B)

Pos. 1 Cutting current adjustment knob.
Pos. 2 Yellow LED: signals lack of compressed air. It lights up when air pressure is below the set value.
Pos. 3 Yellow LED: signals intervention of overheat cutoff. This LED shines to indicate that the overheating protection has cut in because the work cycle is not being followed. After several minutes the overheat cut-off rearms automatically (and the yellow LED turns itself off) and the welder is ready for use again.
Pos. 4 Green selection LED for full cut mode. When this LED is switched on, it means that the operator has set the cutting mode for solid material.
Pos. 5 Green selection LED for mesh cutting mode. When this LED is switched on, it means that the operator has set the cutting mode for mesh material.
Pos. 6 Cutting mode selection button.
This can be used to select one of the 2 cutting modes, as indicated by the corresponding LED that switches on:

- Solid material mode (when the torch button is pushed, when the operator goes out of the workpiece during cutting, the arc switches off automatically).
- Mesh material mode (when the torch button is pushed, when the operator goes out of the workpiece during cutting, the pilot arc ignites again automatically, to allow cutting to continue).

Pos. 7 Compressed air button.
When this button is pushed and released, the cutting air valve opens, allowing the operator to regulate the compressed air pressure, using the filter / regulator knob (Pos. 8, Fig. A) located on the back panel.
The pressure gauge (Pos. 9, Fig. A) provides a reading for the cutting air pressure.
The operation is terminated manually by pushing the cutting torch button, or automatically after a time of about one minute.
Pos. 8 Green compressed air button LED
When this LED is switched on, this means the operator is doing the compressed air test.
Pos. 9 Red inverter switch on indication LED. The machine is “on” and ready for the cutting operation.
Pos. 10 Red LED: signals activation of torch button. When the torch button is pushed, the LED switches on and the machine checks correct functioning of the plasma torch connection.
Pos. 11 Green LED - power supply on. When on the system is powered and ready for use.

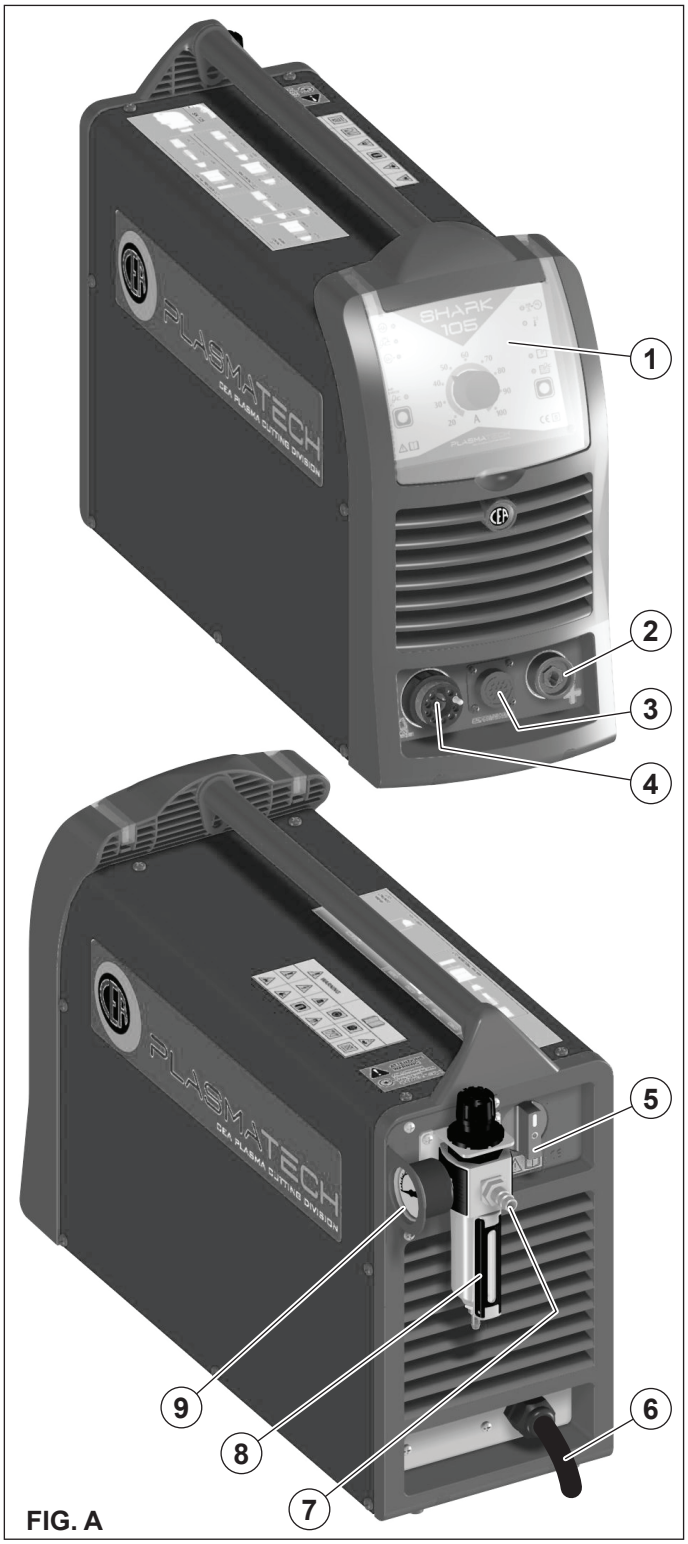


FIG. A

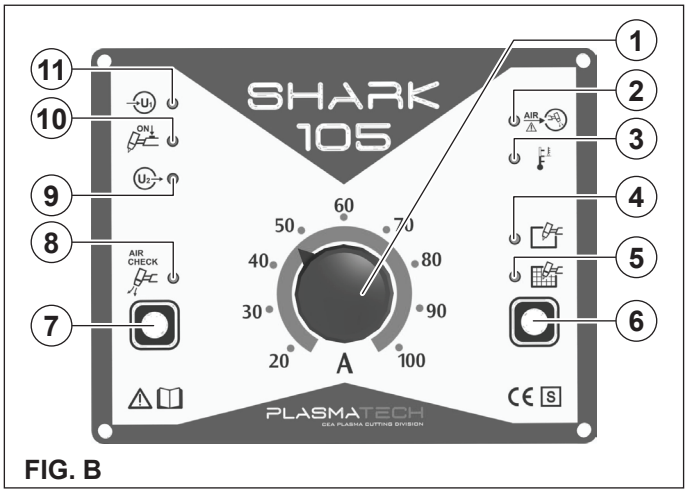


FIG. B

Connection of plasma torch and ground wire

IMPORTANT: *Before performing any operation regarding connection of the torch and ground wire, disconnect the power to the system.*

IMPORTANT: *Do not connect to the Plasma equipment any other torch different from the standard supplied unes; the utilisation of other non suitable torches might be dangerous for the operator.*

To obtain elevated cutting quality, the torch must transform the power generated by the machine into a high energy density plasma jet, so that it can efficiently melt metal and guarantee sufficient strength to remove the meted part from the cutting zone, impeding the formation of burrs. The torch is this a fundamental, indispensable component of the plasma cutting machine.

The standard supplied Plasma torch has special CEA electrical connections in the central adaptor. Before fitting a new equipment, make sure that the torch central adaptor electrical connectios are matching the ones of the Plasma equipment.

The following plasma torches are supplied with the machine:

	Torch	
	manual cutting	mechanised cutting
SHARK 75	SK 75	SKM 75
SHARK 105	SK 125	SKM 125

To assemble the plasma torch, proceed as follows:
- Screw the male connection on the plasma torch clockwise all the way into the corresponding centralised female connection, located on the front of the plant.
- Align the male polarisation pin (n° 8) with the corresponding pin (n° 8) on the plasma torch's male coupling (Fig. C).

To disconnect the torch, proceed in the reverse order.

To assemble the earth cable, proceed as follows:
- Connect the earth cable to the rapid coupling on the positive pole as indicated in figure C.
- The earth cable must be connected to the workpiece to be cut, using the relevant terminal, so that the workpiece is effectively earthed along with the cutting bench.

To connect the earth cable correctly:
- Make sure that the metal-to-metal contact between the earth clamp and the steel plate is adequate. Remove any rust, dirt, paint, coating or other debris, in order to ensure correct contact between the generator and the steel plate.
- In order to achieve an excellent quality cut, connect the earth clamp as close as possible to the area to be cut.
- Do not connect the earth clamp to the piece of material to be removed.

FIG. C

Connection of compressed air

Connect the compressed air hose to the rapid coupling (Fig. D). Use a compressed air hose with a minimum internal diameter of 8 mm.
Make sure that the gas feed pressure does not exceed 8,6 bar / 861 kPa. If the pressure is higher than this value, the filter could explode.
The plant must be fed with a constant air flow, with the following characteristics:

Equipment	SHARK 75	SHARK 105
Torch	SK 75 SKM 75	SK 125 SKM 125
Air / gas	**AIR -** Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 **N_2 -** 99.95%	
Pressure	5,0-5,5 bar 72-80 psi	Cutting: 5,0-6,0 bar 72-87 psi Gouging: 4,0-4,5 bar 58-65 psi
Flow rate	185 l/min 390 cfh	295 l/min 630 cfh

Having pressed the compressed air button (Pos. 7, Fig. B), set the pressure regulator to obtain the value indicated on the table above, by raising and then rotating the ring nut, as indicated in figure D. Once regulation has been completed, lower the ring nut.

NOTE: *The pressure must be set with the pressure rising, while the air / gas is flowing.*

If the quality of the air / gas supply is not good, the cutting speed diminishes, the cut quality worsens, the cuttable thickness diminishes, and the working lifespan of consumables is reduced.
If moisture, oil or other pollutants get into the air line, due to the general compressor, use the additional CEA filtration system, code 427529 (Fig. D) with a filtration grade of 0,01 µinch - 0,25 µm available via CEA PLASMATECH distributors (the order code for replacement filters is 427530).
The additional filtration system must be installed between the air / gas supply and the filter located on the generator's back panel. Additional filtration could increase the minimum feed pressure required.

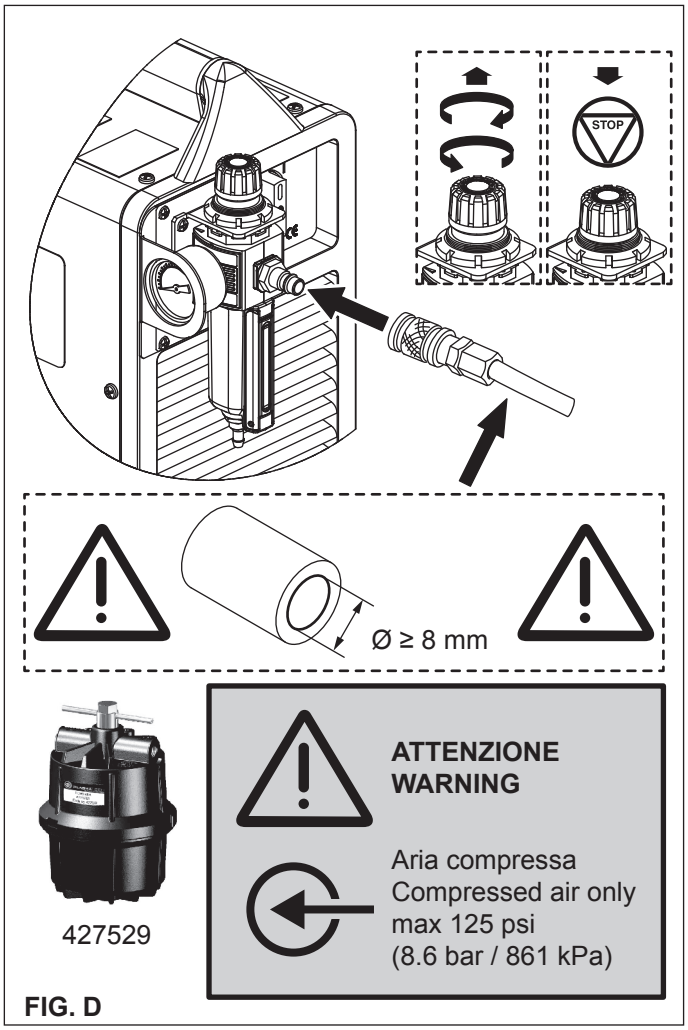


FIG. D

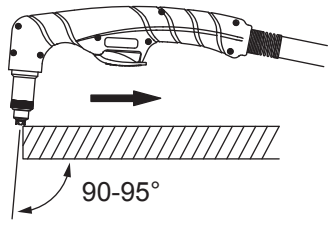


FIG. E

Sequence of operations to perform before cutting

IMPORTANT: *Before switching on the equipment follow these instructions carefully:*

- Make sure the voltage and frequency of the supply network correspond to the data on the rating plate.
- Make sure all the torch components are correctly installed.
- Do not point the torch toward yourself or other persons nearby. If switched on accidentally the pilot arc spark would ignite and cause dangerous burns.

1) Turn the main switch (Pos. 5, Fig. A) to 1.
2) Check that the green LED (Pos. 11, Fig. B) on the front of the machine is on.
3) Push the testing button for initial airflow adjustment (Pos. 7, Fig. B) upward: air will come out of the torch for about 1 minute.
4) Check that the green AIR CHECK LED switches on (Pos. 8, Fig. B) on the machine's front panel.
5) Turn adjustment filter (Pos. 8, Fig. A) to adjust air pressure until the pressure gauge (Pos. 9, Fig. A) reads 5.5 bar. After about one minute, the air stops and the green AIR CHECK LED (Pos. 8, Fig. B) switches off.
6) By pushing the cutting mode selection button (Pos. 6, Fig. B), according to the corresponding lit LED, the operator can select one of the following cutting modes:
   - Solid material mode: when the torch button is pushed, when the operator goes out of the workpiece during cutting, the arc switches off automatically.
   - Mesh material mode: when the torch button is pushed, when the operator goes out of the workpiece during cutting, the pilot arc ignites again automatically, to allow cutting to continue.
7) Adjust the cutting current by turning the potentiometer (Pos. 1, Fig. B). The digital amperometer will display the set cutting current. Increasing the current will permit higher speed cutting or, at the same speed, cutting of greater thickness.
8) Move the torch close to the workpiece (Fig. E) and, keeping the shield supported without exerting pressure, push the torch button, thereby igniting the pilot arc and the air supply. Introduce the flame to the workpiece, and begin the cut. Go with the flame to the piece and start cutting. The red LEDs (Pos 9-10, Fig. B) are lit up during cutting operations. Do not keep the pilot arc in the air, to avoid needless consumption of the electrode and nozzle.
9) In special cases if the arc is switched off when the workpiece enters, observe the correct angle of inclination between the torch and the metal (Fig. E). A special control

device prevents arc transfer in case of incorrect inclination between the torch and the workpiece.

10) Cut taking care that the fused material flows through the groove and is not projected in the direction of the torch. If this occurs, reduce cutting speed.
11) Upon completion of the cutting operation, the air will continue to issue from the torch for about one minute so as to cool the torch components. Wait for the air to stop flowing before switching the equipment off. During this time, you can also start a new cutting operation. If you have to make cuts near corners or indentations, it is advisable to use extended electrodes and hoods. If you have to perform circular cuts, it is advisable to use the special compass supplied on request.

Configuring the torch for manual cutting

INTRODUCTION

These machines are supplied with the following standard torches for manual cutting:

	Torch	Length
SHARK 75	SK 75	6 m
SHARK 105	SK 125	6 m

Other lengths are available by request.
The torches are air cooled, and do not require special cooling.
The main nominal characteristics of the torches supplied, are as follows.

PLASMA	**SK 75**	**SK 125**
	SK 75 = 6 m (standard) (Other lengths are available by request)	**SK 125 = 6 m (standard)** (Other lengths are available by request)
I_2 MAX X% AIR	**70 A @ 50%** (10 min. 40°C)	**125 A @ 60%** (10 min. 40°C)
V_2	**DC**	**DC**
AIR	**5,0-5,5 bar - 72-80 psi 185 l/min - 390 cfh**	**Cutting: 5,0-6,0 bar / 72-87 psi Gouging: 4,0-4,5 bar / 58-65 psi Gas flow @ 125A: 295 l/min - 630 cfh**
AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 N_2 - 99.95%	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 N_2 - 99.95%
V VOLTAGE CLASS	**M**	**M**
NO HF	**Without HF**	**Without HF**
CE	**IEC 60974-7**	**IEC 60974-7**

WORKING LIFESPAN OF CONSUMABLES

The following factors affect the frequency with which consumables need to be replaced:

- Thickness of the metal cut.
- Average cut length.
- Air quality (presence of oil, moisture, or other pollutants).
- Execution of piercing of the metal or cutting from the edge.
- Correct piercing depth.
- Cutting done using mesh or solid material cutting mode. Cutting done in mesh mode give rise to more wear of consumables.

Under normal conditions, the nozzle wears out before the other consumables during cutting operations.

CONSUMABLES FOR MANUAL CUTTING

Figure F shows the consumables used for the plasma torches supplied, complete with the CEA order codes.
These torches use shielded consumables and so the point of the torch can be dragged over the metal to be cut.
To improve the quality of cuts for thin metals (about 2 mm or less) CLEAN-CUT consumables should preferably be used, with maximum cutting currents of 45 A (only for SK 125 torch).

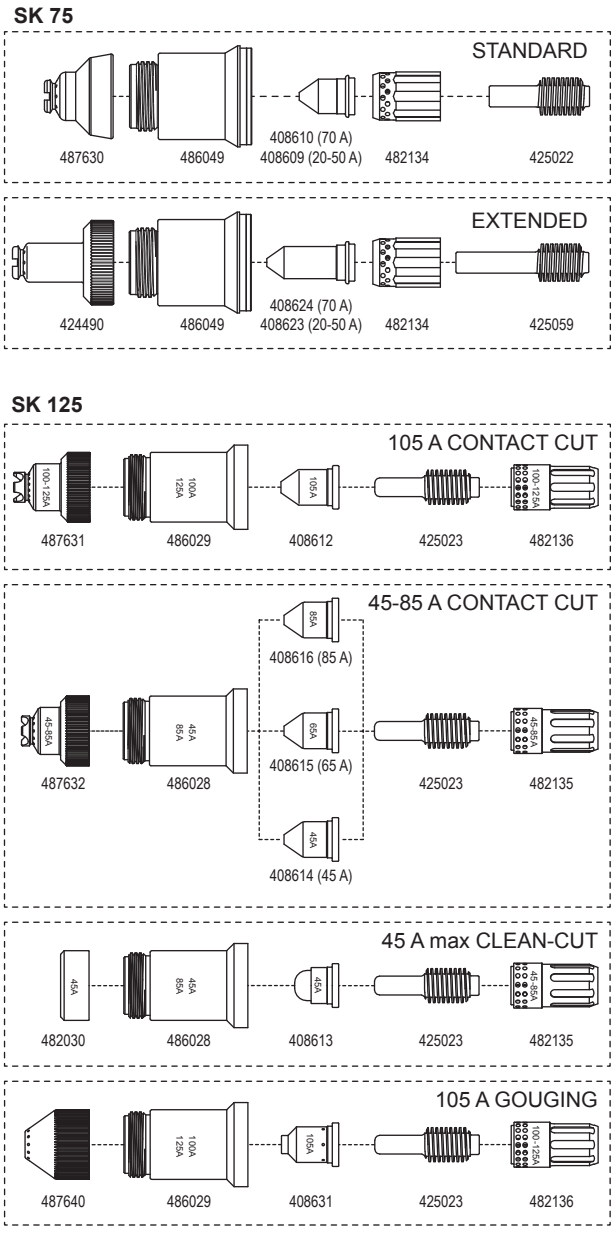


FIG. F

FITTING CONSUMABLES ON THE TORCH FOR MANUAL CUTTING

WARNING: *changing consumables, check that the machine's main switch is in the O position.*

To use the torch for manual cutting, a complete set of consumables must be fitted, as shown in figure G.

Using the torch for manual cutting

WARNING

Torch with immediate ignition

A plasma arc can cause injuries and burns.

The plasma arc ignites immediately, when the torch button is pushed.

The plasma arc passes through gloves and the skin quickly.

Use appropriate equipment to protect your head, eyes, ears, hands, and body.

Keep away from the tip of the torch.

Do not hold the plate and keep your hands away from the cutting path.

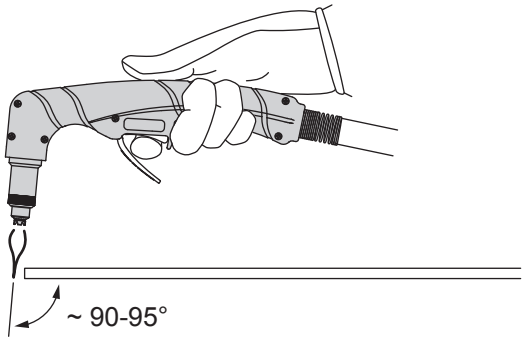
Never point the torch at yourself or other people.

TORCH SAFETY

Torches for manual cutting have a safety guard to prevent involuntary ignition. When you are ready to use the torch, rotate the button's safety guard (towards the tip of the torch) and push the red torch button, as shown in figure H.

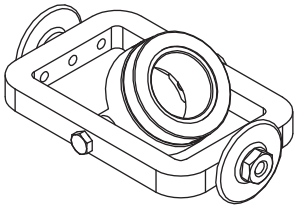
SUGGESTIONS FOR USING THE TORCH FOR MANUAL CUTTING

- Drag the torch slightly over the plate to maintain a set cut.
- While cutting, make sure that the sparks come out from the underside of the plate.
- If the sparks come out from the upper side of the plate, move the torch more slowly, or set the output current to a higher value.
- When using SK series torches for manual cutting, keep the nozzle on the torch perpendicular to the plate, so that the nozzle forms a 90-95° angle with the cutting surface. Watch the cutting arc while the torch is cutting.



WARNING: *If the torch is ignited when not necessary, the working lifespan of the nozzle and the electrode is reduced.*

For cutting straight lines, using a straight edge as a guide, or the carriage supplied.



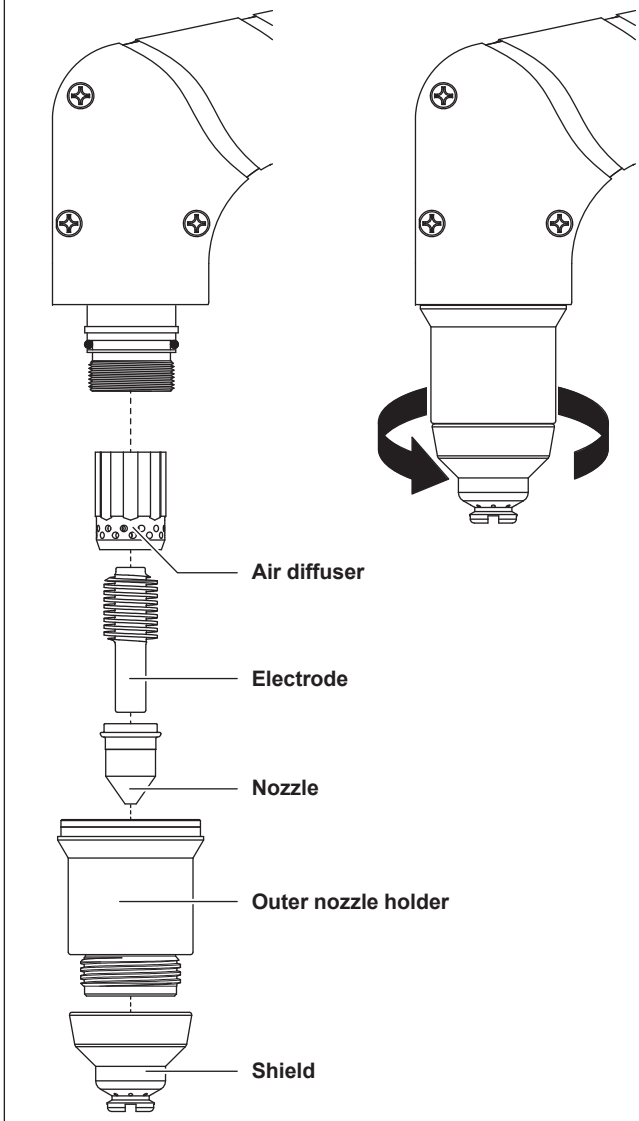


FIG. G

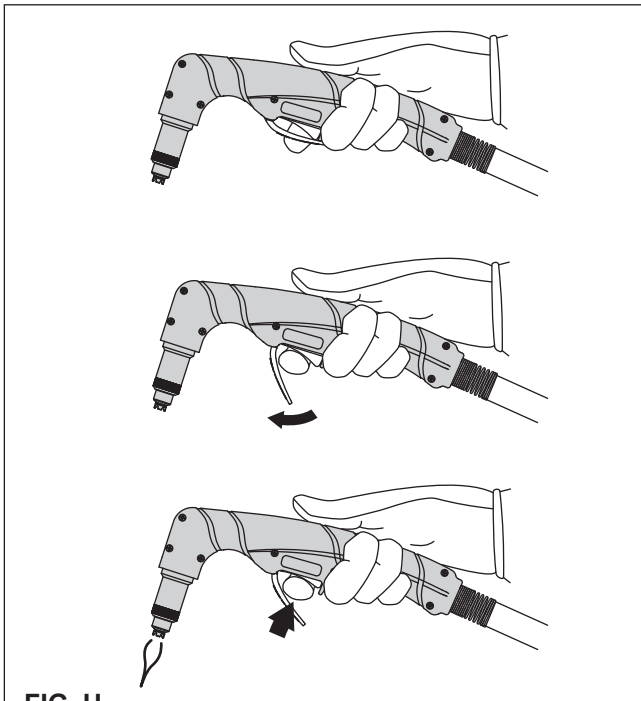
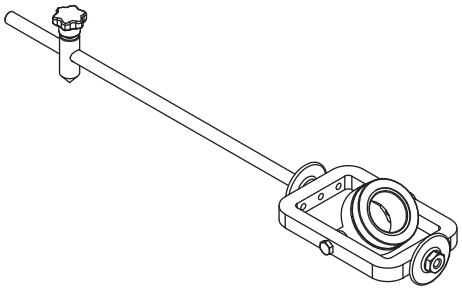


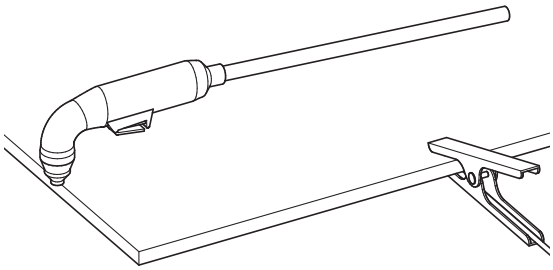
FIG. H

For circular cuts, using the compass kit supplied.

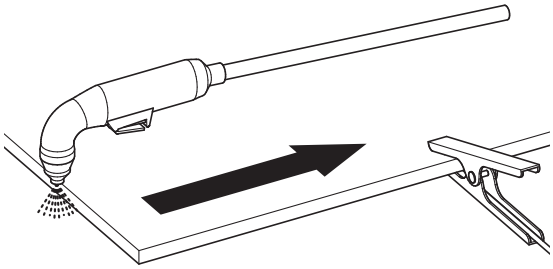


CUTTING FROM THE EDGE OF THE PLATE

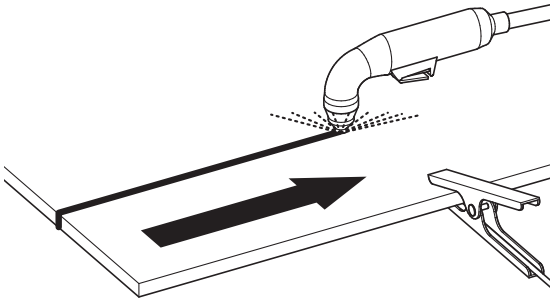
With the earth clamp connected to the plate, keep the torch nozzle perpendicular (90-95°) to the edge of the plate.



Push the torch button to ignite the arc. Wait at the edge until the arc has cut the plate completely.



Drag the torch over the plate to do the cut. Maintain a regular, linear pace.



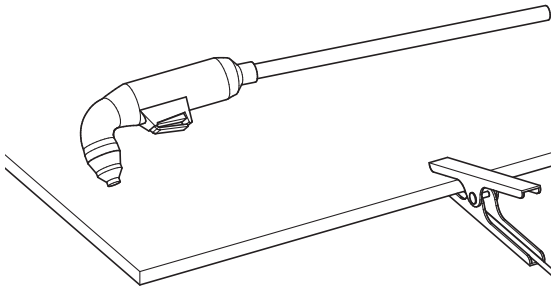
CUTTING FROM WITHIN THE PLATE (PIERCING)

WARNING: *Sparks and hot metal can cause injuries to the eyes and the skin.*

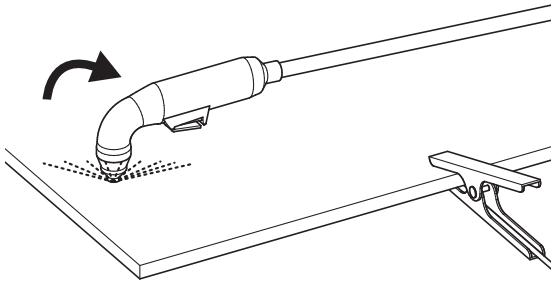
When the torch is ignited in an inclined position, the sparks and hot metal are projected away from the nozzle. Do not point the torch at yourself or other people nearby.

■ Cutting thin material

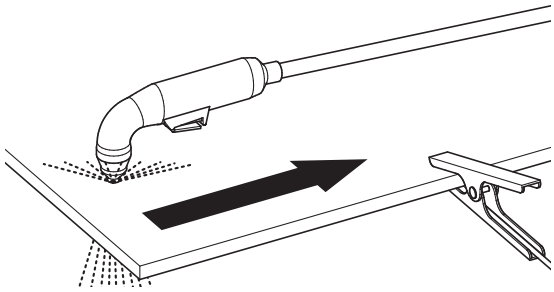
With the earth clamp connected to the plate, keep the torch at about 30° to the plate, with the torch shield about 1,5 mm from the plate, before pushing the torch button.



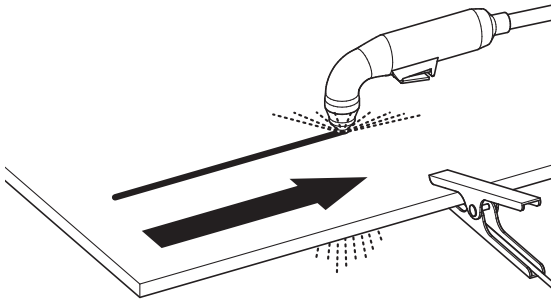
Push the torch button. Slowly rotate the torch to a perpendicular position (90°).



Keep the torch in this position, while continuing to push the button. When the sparks come out from the underside the plate, the arc has pierced the material.

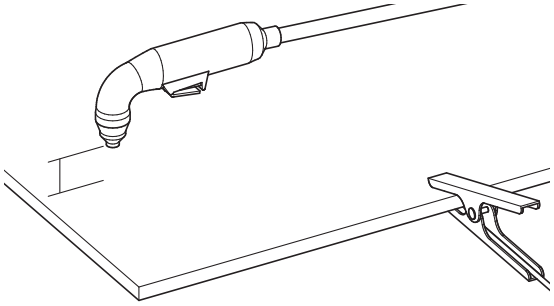


On completion of piercing, drag the nozzle lightly over the plate to make the cut.

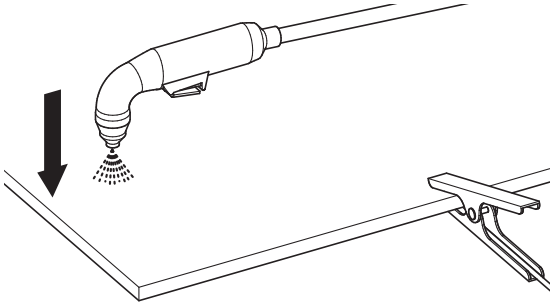


■ **Medium / thick material cuts**

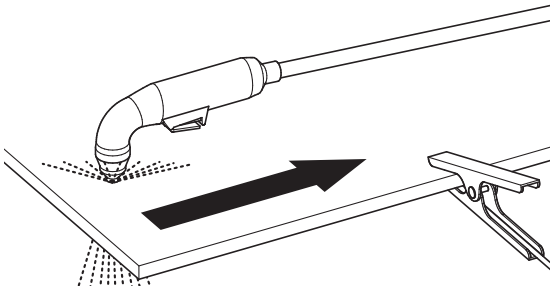
With the earth clamp connected to the plate, keep the torch raised above the plate.



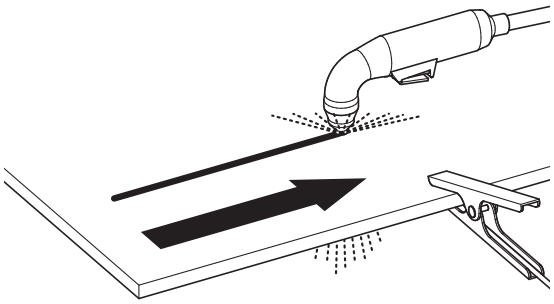
Push the torch button and move slowly towards the plate.



When the sparks come out from the underside the plate, the arc has pierced the material. Once the material has been pierced, the torch's shield can be rested on the material to be cut.



Drag the nozzle lightly over the plate to make the cut.



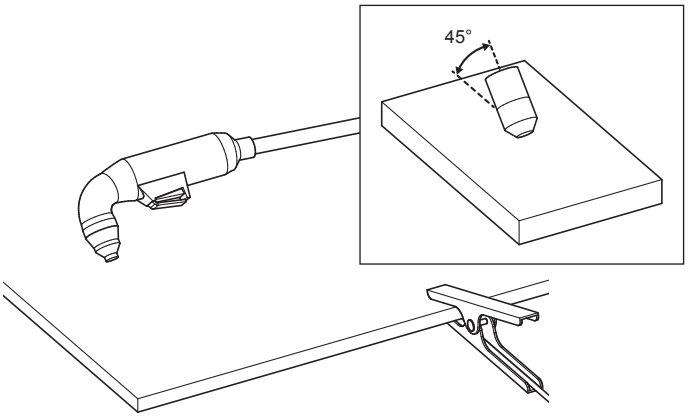
GOUGING THE PLATE

WARNING: *The plant must be fed with a constant air flow, with the following characteristics: pressure* ***4,0-4,5 bar (58-65 psi)****.*

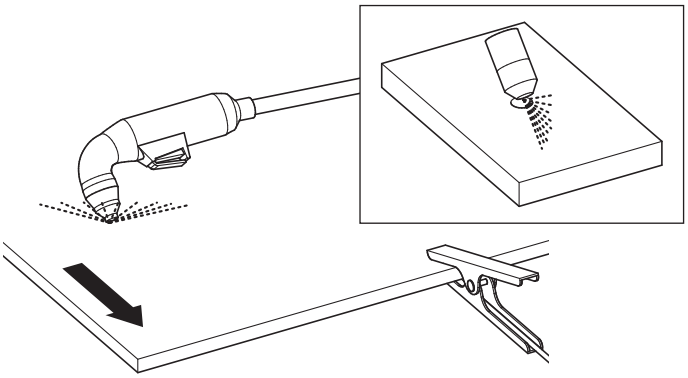
WARNING: *Sparks and hot metal can cause injuries to the eyes and the skin.*

When the torch is ignited in an inclined position, the sparks and hot metal are projected away from the nozzle. Do not point the torch at yourself or other people nearby.

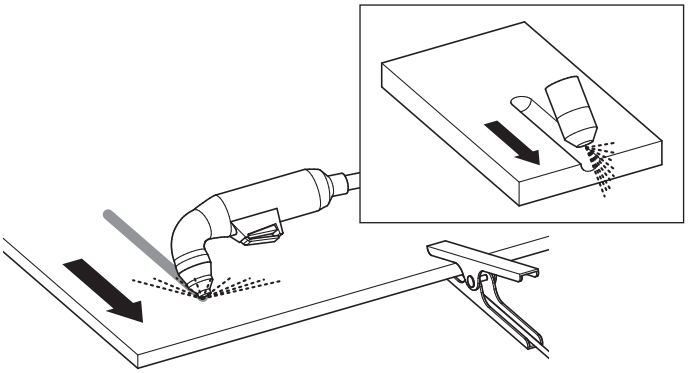
With the earth clamp connected to the plate, keep the torch at about 45° to the workpiece, with the torch shield about 1,5 mm from the plate, before pushing the torch button.



Keep the torch at 45° to the plate, leaving a small gap between the torch shield and the plate. Push the trigger to ignite the pilot arc. Transfer the arc to the plate.



Maintain the 45° angle to the plate, while executing gouging. Push the plasma arc in the direction of the gouge you wish to form. Maintain a small gap between the torch shield and the molten metal, to avoid reducing the lifespan of consumables or damaging the torch. If the torch angle is changed, the dimensions of the gouge also change.



The gouge profile can be varied by varying the speed at which the torch passes over the plate, changing the distance between the torch and the plate, changing the angle between the torch and the plate, and by changing the output current on the generator.

The following actions have the relevant effect on the gouge profile:

		Gouge profile width	Gouge profile depth
Torch speed	⊕	⊖	⊖
	⊖	⊕	⊕
Distance between torch and plate	⊕	⊕	⊖
	⊖	⊖	⊕
Torch angle	⊕	⊖	⊕
	⊖	⊕	⊖
Generator current	⊕	⊕	⊕
	⊖	⊖	⊖

⊕ = increase (or more vertical angle)

⊖ = decrease (or less vertical angle)

COMMON ERRORS FOR MANUAL CUTTING

Problem	Cause
The torch does not cut the plate completely.	The cutting speed is too high.
	The consumables are worn.
	The metal to be cut is too thick for the voltage selected.
	Gouging consumables are fitted, instead of cutting consumables.
	The earth clamp is not connected to the plate correctly.
	The gas pressure or flow rate is too low.
The quality of the cut is poor.	The metal to be cut is too thick for the voltage.
	The wrong consumables are being used (e.g. gouging consumables are used instead of cutting consumables).
	The torch is being moved too fast or too slow.
The arc splutters and the lifespan of consumables is shorter than envisaged.	Moisture in the gas supply.
	Incorrect gas pressure.
	Consumables fitted incorrectly.

Configuring the torch for automatic cutting

INTRODUCTION

These machines are supplied with the following standard torches for automatic cutting:

	Torch	Length
SHARK 75/M	SKM 75	6-12 m
SHARK 105/M	SKM 125	6-12 m

Other lengths are available by request.
The torches are air cooled, and do not require special cooling.
The main nominal characteristics of the torches supplied, are as follows:

PLASMA	**SKM 75**	**SKM 125**
	SKM 75 = 6/12 m (standard) (other lengths by request)	**SKM 125 = 6/12 m (standard)** (other lengths by request)
I_2 MAX X % AIR	**70 A @ 50%** (10 min. 40°C)	**125 A @ 60%** (10 min. 40°C)
V_2 ---	**DC**	**DC**
AIR	**5,0-5,5 bar - 72-80 psi 185 l/min - 390 cfh**	**5,0-6,0 bar - 72-87 psi 295 l/min - 630 cfh**
AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 N_2 - 99.95%	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2 N_2 - 99.95%
V VOLTAGE CLASS	**M**	**M**
NO HF	**Without HF**	**Without HF**
CE	**IEC 60974-7**	**IEC 60974-7**

WORKING LIFESPAN OF CONSUMABLES

The following factors affect the frequency with which consumables need to be replaced:

- Thickness of the metal cut.
- Average cut length.
- Air quality (presence of oil, moisture, or other pollutants).
- Execution of piercing of the metal or cutting from the edge.
- Correct piercing depth.
- Cutting done using mesh or solid material cutting mode. Cutting done in mesh mode give rise to more wear of consumables.

Under normal conditions, the nozzle wears out before the other consumables during cutting operations.

CONSUMABLES FOR AUTOMATIC CUTTING

Figure I shows the consumables used for the plasma torches supplied, complete with the CEA order codes.
To improve the quality of cuts for thin metals (about 2 mm or less) CLEAN-CUT consumables should preferably be used, with maximum cutting currents of 45 A (only for SKM 125 torch).

FITTING CONSUMABLES ON THE TORCH FOR AUTOMATIC CUTTING

WARNING: *Before changing consumables, check that the machine's main switch is in the O position.*

To use the torch for automatic cutting, a complete set of consumables must be fitted, as shown in figure L. An outside nozzle holder is available with an Ohmic sensor, which is to be used with shielded consumables.

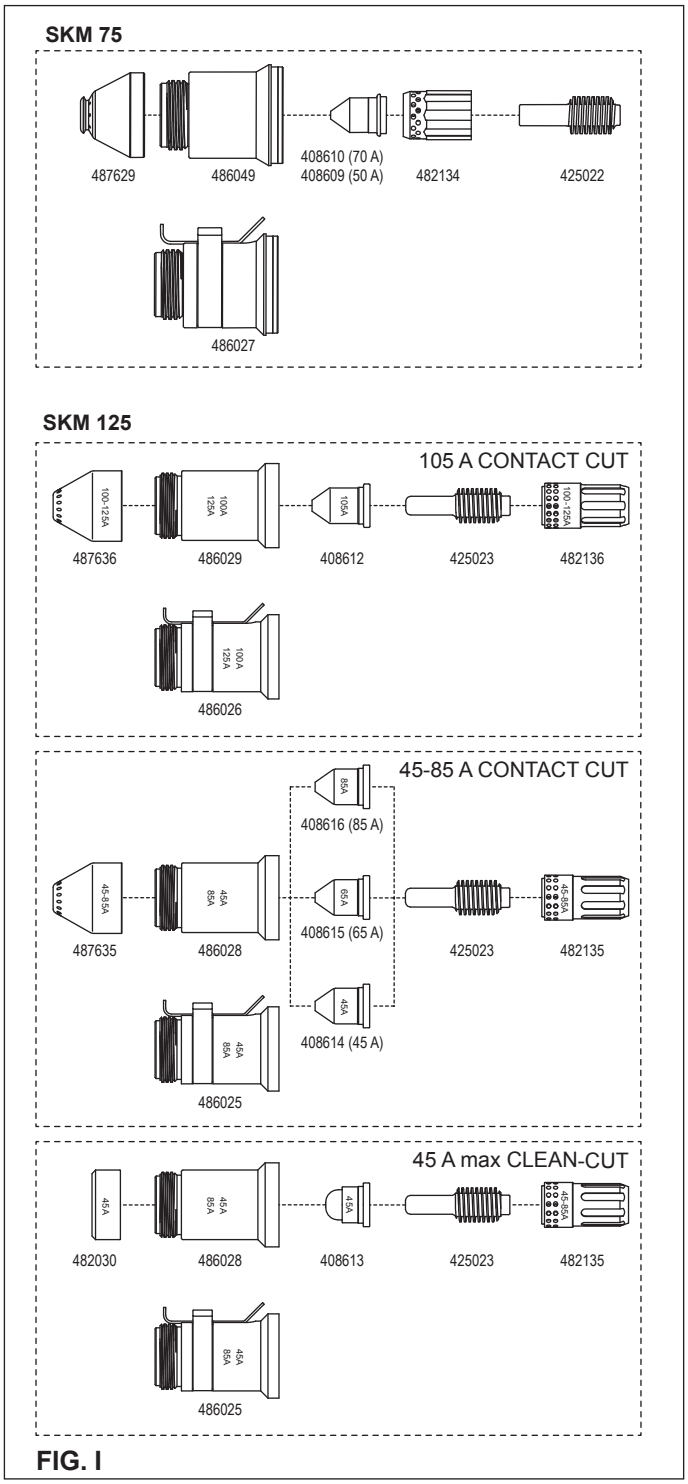


FIG. I

EQUIPPING THE TORCH FOR AUTOMATIC CUTTING

The SKM series of torches for automatic cutting can be fitted on a wide range of X-Y-Z benches, motorised equipments, bevellers for tubes, and other equipment. Install the torch according to the manufacturer's instructions.
Fit the SKM torch perpendicular to the plate, to achieve a vertical cut. Use a square to align the torch at 90° (Fig. M).

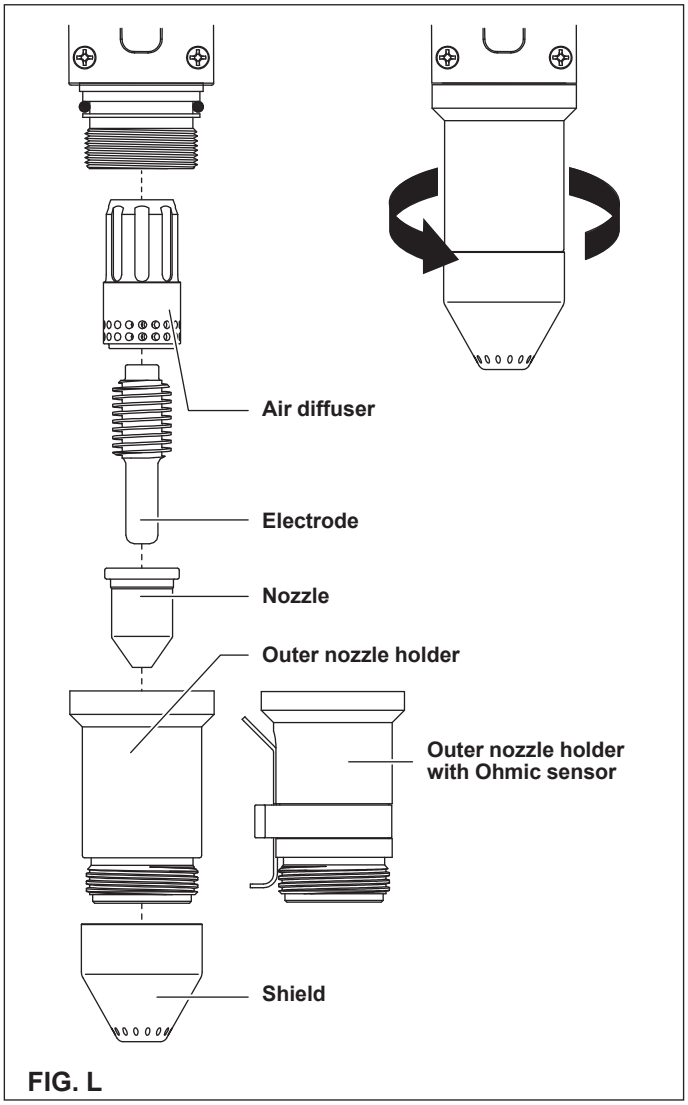


FIG. L

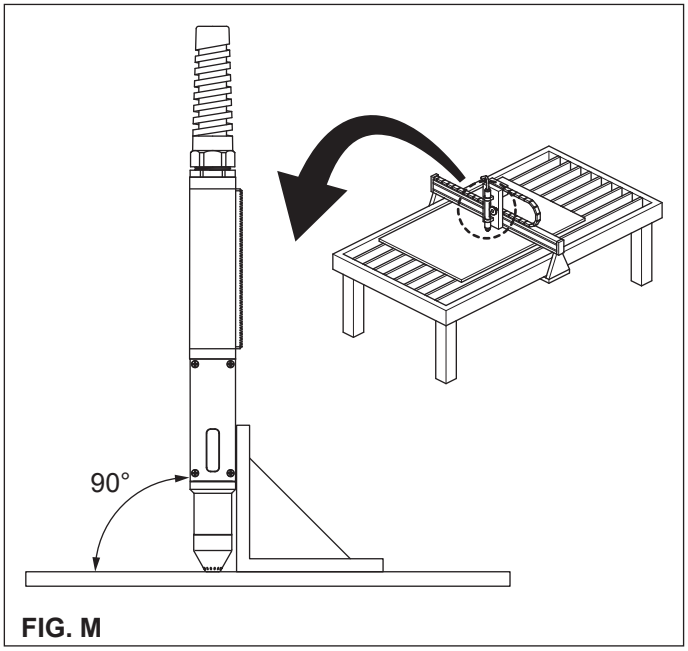
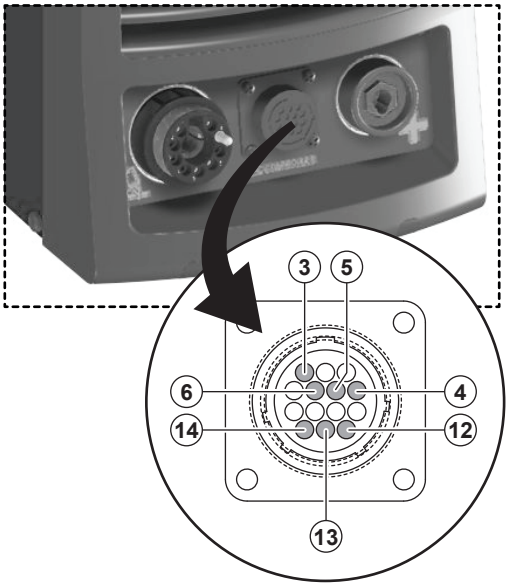


FIG. M

Signal	Type	Notes	Pole n°	Wire colour
Start cut	Input	An isolated contact has to be closed for activation to occur. The characteristics of this contact are: voltage > 20 Vdc; current > 10 mA.	3 4	Green Green
Arc transferred Start machine movement	Output	Closure of isolated photo relay contact. This contact's characteristics are as follows: • Max voltage 60 Vdc • Max current 400 mAdc Alternating current (AC) is not allowed.	12 (+) 14 (-)	White (+) Black (-)
Earth protection (PE)	Earth		13	Yellow Green
Reduced cutting voltage	Output	Signal proportional to the cutting voltage, not galvanically isolated, according to the following ratios: 1:50 (factory setting); 1:20; 1:21; 1:30; 1:40.	5 (-) 6 (+)	Black (-) Red (+)



CNC	Female 14 pole connector
Vd	Green wire
Nr	Black wire
Rs	Red wire
Bc	White wire
GV	Yellow / green wire

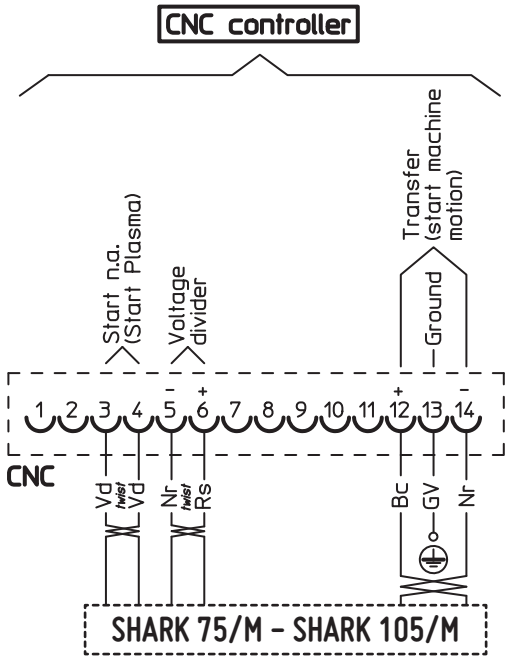


FIG. N

If the cutting bench's guides and transmission system are cleaned, checked and optimised, the torch moves easily. Unsteady movement of the machine can give rise to an undulating, irregular path on the cutting surface.
Make sure that the torch does not touch the plate while cutting. Contact could damage the shield and nozzle, and affect the cut surface.
Having connected to the torch to the X-Y-Z bench, screw it to the centralised connection on the SHARK system generator.
The two-pole cable that sticks out about 2 m from the centralised connection for the SKM plasma torch, is in series with the start cut button.
Depending on the type of X-Y-Z bench and the software used, the two-pole cable can be used as:
- An additional emergency stopping unit for the mechanised cutting machine.
- A short-circuit for the 2 wires of the two-pole cable, if used as an emergency stopping unit.

INTERFACE WITH A CNC CONTROLLER PLANT

The special SHARK 75/M and SHARK 105/M plasma versions, are already complete with an interface for CNC controller equipments, such as X-Y-Z cutting benches, for example.
On the front of the SHARK 75/M and SHARK 105/M machine there is a 14-pole female connector (CPC TE Connectivity series) for connecting the CNC interface cable.
This socket makes the following signals available:
- Arc voltage reduced to 1:50 (factory setting), with a maximum output of 15 V (NOT galvanically isolated signal). Inside the SHARK machine there is a dip-switch that can be used to set other reduced arc voltages:

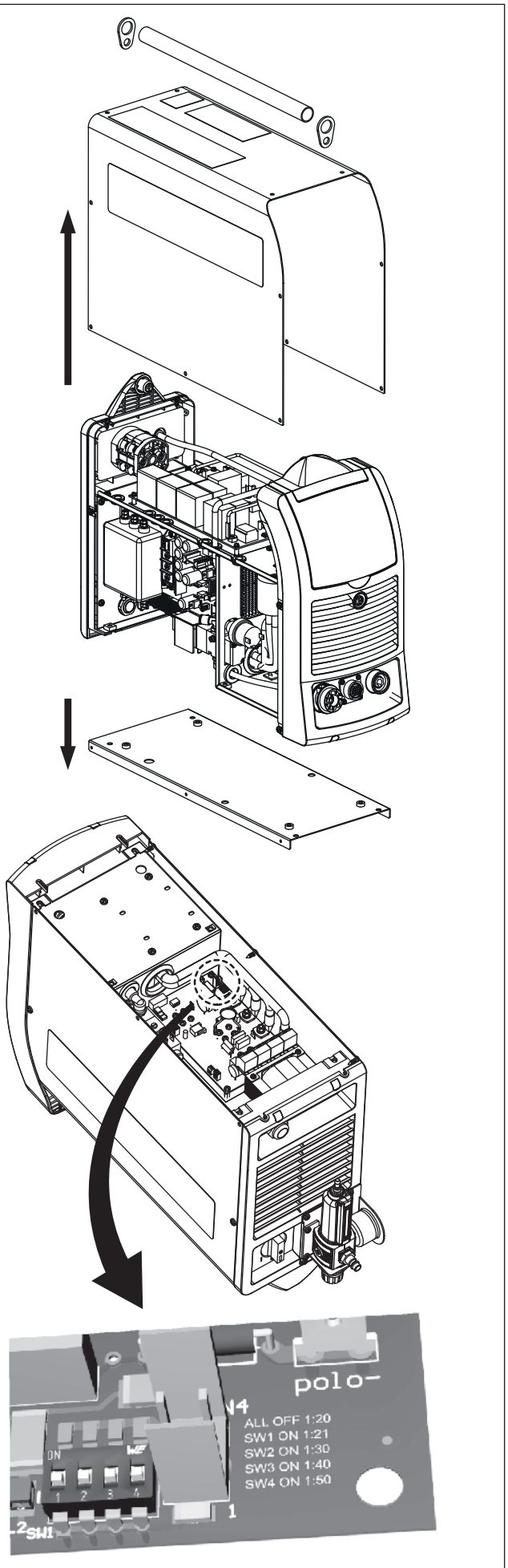
1:20	1:21	1:30	1:40

- Arc transfer / start machine movement signal
- Start cut signal.

The machine interface cable must be installed by a technician from an authorised service centre.
To install the machine's interface cable:
- Disconnect the power supply to the machine, by shifting the switch to the O position.
- Connect the machine's interface cable to the 14-pole CNC controller socket located on the front panel of the SHARK 75/M and SHARK 105/M machines. The male 14-pole interface connector (CPC TE Connectivity series) is available from our Company, using order code 460180.

FEMALE 14-POLE MACHINE INTERFACE CONNECTOR OUTPUTS

On the front of the SHARK 75/M and SHARK 105/M machine there is a 14-pole female connector (CPC TE Connectivity series) for connecting a CNC controller cable or a height controller.
The signals available on the machine interface connector, are indicated in figure N.



ALL OFF	SW1 ON	SW2 ON	SW3 ON	SW4 ON
1:20	1:21	1:30	1:40	1:50

FIG. O

VOLTAGE DIVIDER SETTINGS

The secondary voltage divider is set in the factory at a value of 1:50.
Inside the machine there is a dip-switch (SW1) that can be used to set 4 other secondary voltage values:

1:20	1:21	1:30	1:40

To access the dip-switch (SW1) proceed as follows (Fig. O):

1) Disconnect the power supply from the system by turning the line switch on the back panel to the O position. Disconnect the machine's power supply cable from the main power supply socket in the wall.
2) Remove the machine's metal bottom plate to access the machine's secondary board.
3) Set the dip-switch (SW1) to one of the configurations available.
4) Reassemble the machine, following the points above in reverse order.

USING THE MANUAL PLASMA TORCH ON PLASMA SHARK, "M" VERSION PLANTS

Manual torches can be used on SHARK "M" version plasma plants for automatic plants as well:

	Automatic cutting torch	Manual torch	Length
SHARK 75/M	SKM 75	SK 75	6-12 m
SHARK 105/M	SKM 125	SK 125	6-12 m

The manual torches can work in SHARK "M" version plants only if terminals 3 and 4 are short-circuited on the 14 pole male connector used to interface with the CNC controller plants (Fig. P).
Code 460180: buying code for the 14 pole male connector used to interface with CNC controller plants.

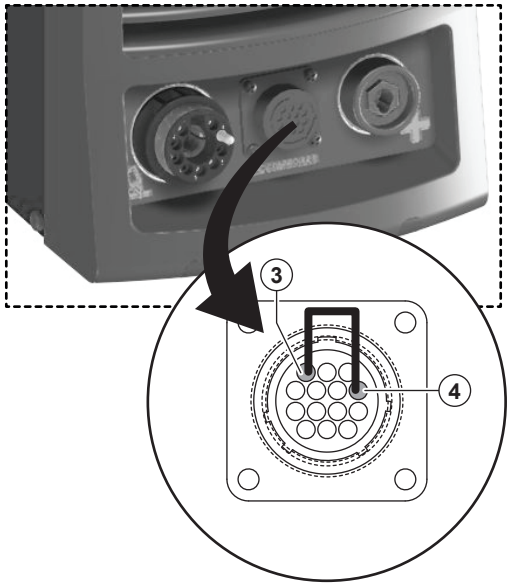


FIG. P

Using the torch for automatic cutting

WARNING

Torch with immediate ignition

A plasma arc can cause injuries and burns.

The plasma arc ignites immediately, when the torch button is pushed.

The plasma arc passes through gloves and the skin quickly.

Use appropriate equipment to protect your head, eyes, ears, hands, and body.

Keep away from the tip of the torch.

Do not hold the plate and keep your hands away from the cutting path.

Never point the torch at yourself or other people.

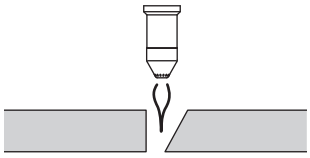
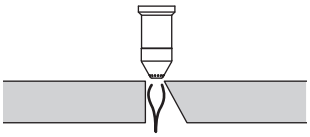
SUGGESTIONS FOR USING THE TORCH FOR AUTOMATIC CUTTING

For a better quality cut, the following parameters must be examined:

- Cut angle / cut inclination.
- Burr.
- Straightness of the cut surface. Concave or convex cutting surfaces.

■ Cut angle / cut inclination

This gives the angle of the cut edge, and can be:

Positive angle	Negative angle
	
This is achieved when a greater quantity of material is removed from the upper part of the cut. **Cause** Torch too high **Solution** Lower the torch. If a torch height control is being used, increase the cutting arc voltage.	This is achieved when a greater quantity of material is removed from the lower part of the cut. **Cause** Torch too low **Solution** Raise the torch. If a torch height control is being used, reduce the cutting arc voltage.

The angle closest to a right angle will be on the right in relation to the movement of the torch. The left side will always be characterised by an angle other than 90° (Fig. Q).

Often a cutting angle problem is caused by the cutting bench system, and is not due to the plasma machine. Use a square to check the right angle between the torch's position and the plate to be cut.

Set the torch at 90° in the respective torch holder, or reverse the direction of movement, to check whether the cutting problem disappears.

Cutting angle problems can occur if the material to be cut is hardened or magnetised.

■ Burr

Each time a cut is made, some burrs will be formed. The quantity and type of burr can be reduced, by setting the machine correctly in relation to the application.

If the torch is too low or, when using a height control system, the cutting voltage is too low, an excessive burr will be formed on the upper edge of the plate to be cut. To resolve this problem, adjust the torch of the voltage in small steps of about 5V, until the burr is reduced.

In other cases, the excessive burr occurs due to the speed being too low or too high.

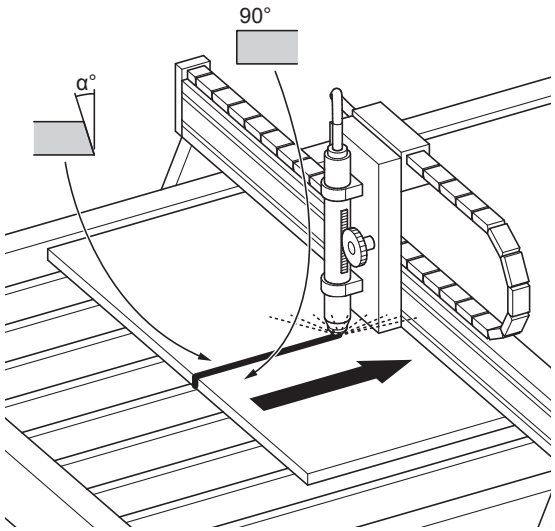


FIG. Q

Type of burr	Cause	Solution
Heavy deposit on the underside of the cut (can be removed easily).	Speed too low.	Increase the speed.
Slight deposit on the underside of the cut (difficult to remove).	Speed too high.	Reduce the speed.
	Gap between torch and plate too big.	Reduce the gap between the torch and the plate or the cutting voltage, when using height control systems.

CUTTING FROM WITHIN THE PLATE (PIERCING)

As happens for manual cutting, a cut can be made starting from inside the plate (piercing), instead of from the outer edge. It is worth remembering that cutting from inside the plate can shorten the working lifespan of consumables.

When cutting a plate from inside, the following parameters must be considered:

- **Initial piercing height:** about 2-2,5 times the cutting depth, depending on the thickness of the material to be cut.
- **Piercing delay:** period of time for which the ignited torch stays at the piercing height, before it begins moving. A sufficiently long piercing delay must be applied to allow the cutting arc to pierce the material. Subsequently, the torch can be lowered to the normal cutting height. In addition, as wear on the materials increases, it may be necessary to increase the piercing delay.

For optimum execution of a hole, it is worth considering that the diameter must be more than twice the thickness of the plate.

The chemical properties of the materials, can have an impact on the piercing capacity. For example, a high-strength steel with a high manganese or silica content, may reduce the maximum piercing capacity.

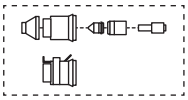
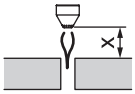
COMMON ERRORS FOR AUTOMATIC CUTTING

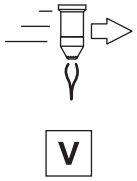
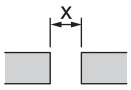
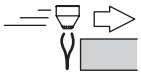
Problem	Cause
The pilot arc ignites, but is not transferred.	The earth cable is not making good contact with the cutting bench, or the cutting bench is not making good contact with the plate.
	The torch / plate gap is too big.
The plate has not been penetrated completely and excessive sparks are produced on the upper side of the plate.	Rust or paint on the surface of the plate.
	The consumables are worn and must be replaced.
	The earth cable is not making good contact with the cutting bench, or the cutting bench is not making good contact with the plate.
	The cutting voltage is too low.
	The cutting speed is too high.
	The cutting thickness is too great.
Burrs formed at the bottom of the cut.	The air settings are incorrect.
	The consumables are worn and must be replaced.
	The cutting speed is incorrect.
	The voltage is too low.
The cutting angle is not perpendicular.	The torch is not perpendicular to the plate.
	The air settings are incorrect.
	The consumables are worn and must be replaced.
	The direction of movement of the torch is incorrect. The high quality cut is always to the right in relation to the forward movement of the torch.
	The gap between the torch and plate is incorrect.
	The cutting speed is incorrect.
The lifespan of consumables is short.	The air settings are incorrect.
	The arc current, arc voltage, cutting speed, and other variables are not configured correctly.
	Ignite the arc in the air (start of end the cut outside the plate's surface). It is possible to start from the edge, provided the arc is in contact with the plate when ignited.
	Beginning of piercing with the torch at the wrong height.
	The piercing time is incorrect.
	The air quality is poor (oil or water in the air). Use the additional filtration system, CEA code 427529 (Fig. D) with a filtration grade of 0,01 µinch - 0,25 µm available via CEA PLASMATECH distributors (the order code for replacement filters is 427530).

Automatic CNC cutting tables

The following pages contain the cutting tables for each series of consumables for automatic cutting of the following materials:
- Mild steel.
- Stainless steel (CrNi).
- Aluminium.

Each table contains the following information:

I_2	Cutting current setting.
Fe	Carbon steel Fe 430 B - S275JR
CrNi	Stainless steel Aisi 304 / X5 CrNi 18-10
Al	Aluminium
	Torch configuration, complete with codes for consumables to be fitted on the plasma torch.
P	Air pressure setting.
	Indication of the air flow rate (cold air condition).
AIR	Cutting gas indication.
mm	Metric system.
in	Imperial system.
	Thickness of the material to be cut.
	Cutting height. • Shielded consumables: gap between the shield and the piece to be cut. • Non-shielded consumables: gap between the nozzle and the piece to be cut.
	Initial piercing height. This is the initial gap between the shield (shielded consumables) or the nozzle (non-shielded consumables) and the piece to be cut, when the arc is ignited, before going down to the cutting height. The percentage value indicates the increment in cutting height, to obtain the initial piercing height.

	Piercing delay. The period of time for which the torch, with the arc ignited, remains at the initial piercing height, before beginning the cutting movement at the final cutting height.
	Cutting speed and arc voltage settings (THC systems with torch height control), which indicate the starting point for finding the best parameters for achieving the desired result.
PRODUCTION	Production quality. To obtain a good cutting angle (0-10°), and acceptable burrs and surface finish. These parameters make it possible to produce a larger number of cut pieces, but not necessarily with the best quality cut possible.
QUALITY	Maximum quality. To obtain the best cutting angle (*) minimum burrs, and the best cutting surface finish. (*) 0-6° using standard consumables, and 0-4° using CLEAN-CUT consumables.
	“Kerf” cutting width. The values indicated in the cutting tables are indicative and are obtained using the maximum quality settings.
	Starting from the edge.

NOTE: *The arc voltage increases with wearing of the consumables, and so the voltage settings must be increased in order to maintain the correct gap between torch and plating.*

NOTE: *The data in the table was obtained during laboratory tests using new consumables and taking the ISO 9013 international standard as a reference. The precision of plasma cuts depends basically on the interaction between the plasma plant, the guide system, and the height control. The cutting speed also affects the inclination of the cutting surface.*

SHARK 75/M

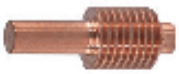
I_2	70 A	Fe


487629


486049


408610
(70 A)


482134


425022


486027

P	5,5 bar 80 psi	AIR	185 l/min 390 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

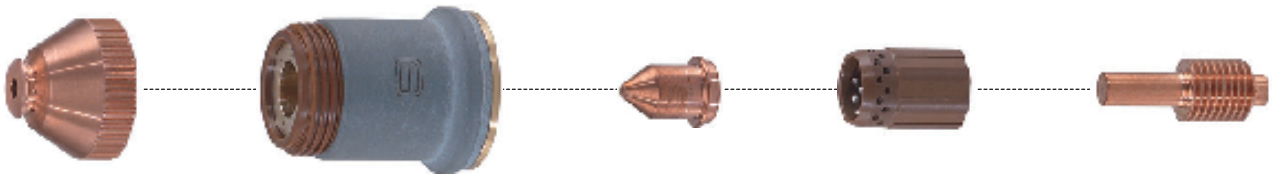
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
3	2	4	200	0,3	6300	125	5400	127	1,6
4	2	4	200	0,6	5250	126	4400	127	1,7
6	2	4	200	0,6	3350	129	2650	129	1,8
8	2	4	200	0,6	2320	130	1770	131	1,9
10	2	5	250	0,8	1560	131	1160	133	2,0
12	2	5	250	1,4	1180	133	880	136	2,2
16	2	6	300	2,2	670	138	580	140	2,3
20	2				460	144	360	144	2,5
25	2				280	147	220	147	2,7

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
9/64"	0.08"	0.16"	200	0.15	231	125	196	127	0.065"
3/16"	0.08"	0.16"	200	0.2	173	127	144	128	0.068"
1/4"	0.08"	0.16"	200	0.6	119	129	93	129	0.070"
3/8"	0.08"	0.16"	200	0.8	64	131	46	132	0.076"
1/2"	0.08"	0.20"	250	1.4	41	134	31	137	0.088"
5/8"	0.08"	0.24"	300	2.2	27	138	24	140	0.090"
3/4"	0.08"				20	143	15	143	0.095"
7/8"	0.08"				14	145	12	145	0.100"
1"	0.08"				10	147	8	147	0.105"

SHARK 75/M

I_2	70 A	CrNi



487629 | 486049 | 408610 (70 A) | 482134 | 425022

486027

P	5,5 bar 80 psi	AIR	185 l/min 390 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
2	2	4	200	0,2	10300	123	8350	127	1,4
3	2	4	200	0,3	8500	125	6900	127	1,5
4	2	4	200	0,6	6350	126	5360	127	1,6
6	2	4	200	0,6	2950	128	2550	128	1,8
8	2	4	200	0,8	1910	131	1550	131	1,9
10	2	5	250	0,8	1290	134	990	134	2,0
12	2	5	250	1,4	950	136	775	137	2,2
16	2				515	141	515	141	2,4
20	2				380	145	310	145	2,6

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
9/64"	0.08"	0.16"	200	0.15	305	125	250	127	0.065"
3/16"	0.08"	0.16"	200	0.2	173	127	160	128	0.068"
1/4"	0.08"	0.16"	200	0.6	100	128	85	128	0.070"
3/8"	0.08"	0.16"	200	0.8	54	133	41	133	0.076"
1/2"	0.08"	0.20"	250	1.4	33	137	27	138	0.088"
5/8"	0.08"				21	141	21	141	0.090"
3/4"	0.08"				16	144	14	144	0.095"

SHARK 75/M

I_2	70 A	Al


487629


486049


408610
(70 A)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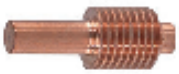

425022


486027

P	5,5 bar 80 psi	AIR	185 l/min 390 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

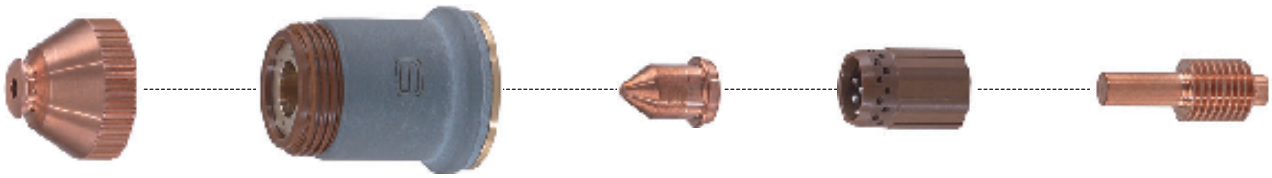
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
2	2	4	200	0,2	10650	124	9100	123	1,9
3	2	4	200	0,3	9070	126	7650	126	1,9
4	2	4	200	0,6	7570	127	6200	128	1,9
6	2	4	200	0,6	4540	130	3300	132	1,9
8	2	4	200	0,8	2840	132	2010	135	2,0
10	2	5	250	0,8	1700	134	1240	138	2,1
12	2	5	250	1,4	1370	138	1030	140	2,3
16	2				825	143	670	145	2,5
20	2				580	147	390	149	2,7

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/16"	0.08"	0.16"	200	0.15	445	123	375	123	0.073"
1/8"	0.08"	0.16"	200	0.15	350	126	290	126	0.074"
1/4"	0.08"	0.16"	200	0.6	157	130	108	133	0.076"
3/8"	0.08"	0.16"	200	0.8	70	133	52	137	0.083"
1/2"	0.08"	0.20"	250	1.4	49	140	36	141	0.091"
5/8"	0.08"				33	143	27	145	0.100"
3/4"	0.08"				25	146	16	148	0.110"

SHARK 75/M

I_2	50 A	Fe



487629 | 486049 | 408609 (50 A) | 482134 | 425022

486027

P	5,5 bar 80 psi	AIR	175 l/min 370 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

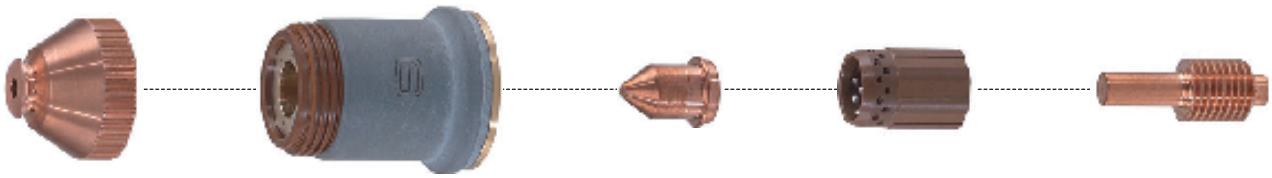
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
0,5	2	4	200	0,1	12900	128	9300	130	1,1
1	2	4	200	0,1	11130	130	9300	130	1,1
1,5	2	4	200	0,2	10510	131	9300	132	1,3
2	2	4	200	0,4	8040	131	6800	132	1,4
3	2	4	200	0,5	5050	133	3970	135	1,5
4	2	4	200	0,5	3670	133	2270	136	1,6
6	2	4	200	0,6	2115	134	1395	139	1,7
8	2	4	200	0,7	1400	135	1000	141	1,9
10	2	5	250	0,8	950	136	750	143	2,2

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
26 GA	0.08"	0.16"	200	0.1	515	130	360	130	0.035"
22 GA	0.08"	0.16"	200	0.1	465	130	360	130	0.040"
18 GA	0.08"	0.16"	200	0.2	415	130	360	131	0.050"
16 GA	0.08"	0.16"	200	0.2	415	131	360	132	0.050"
14 GA	0.08"	0.16"	200	0.3	330	131	280	132	0.055"
12 GA	0.08"	0.16"	200	0.5	223	133	195	135	0.060"
10 GA	0.08"	0.16"	200	0.5	170	133	100	136	0.065"
3/16"	0.08"	0.16"	200	0.6	110	134	72	137	0.070"
1/4"	0.08"	0.16"	200	0.7	75	134	49	139	0.080"
3/8"	0.08"	0.20"	250	0.8	38	135	30	141	0.090"

SHARK 75/M

I_2	50 A	CrNi



487629 | 486049 | 408609 (50 A) | 482134 | 425022

486027

P	5,5 bar 80 psi	AIR	175 l/min 370 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

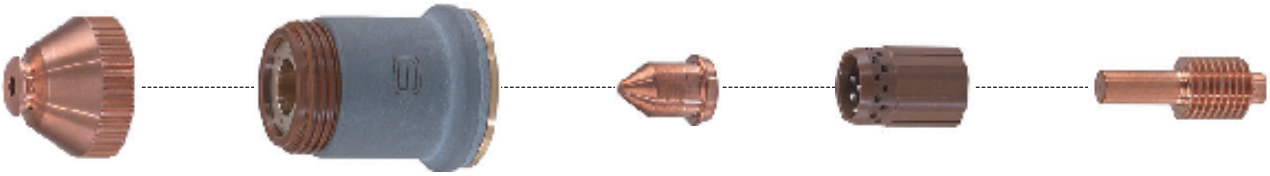
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
0,5	2	4	200	0,1	12870	131	9270	132	0,9
1	2	4	200	0,1	11130	132	9270	132	1,1
1,5	2	4	200	0,2	10500	132	9270	132	1,3
2	2	4	200	0,4	8920	133	6180	134	1,5
3	2	4	200	0,5	4540	134	3200	134	1,6
4	2	4	200	0,5	2680	136	2060	136	1,7
6	2	4	200	0,6	1050	141	930	142	1,8
8	2	4	200	0,7	950	144	850	145	2,0
10	2	5	250	0,8	610	147	560	148	2,2

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
26 GA	0.08"	0.16"	200	0.1	515	131	360	132	0.030"
22 GA	0.08"	0.16"	200	0.1	465	131	360	132	0.035"
18 GA	0.08"	0.16"	200	0.2	415	132	360	132	0.055"
16 GA	0.08"	0.16"	200	0.2	415	132	360	132	0.057"
14 GA	0.08"	0.16"	200	0.3	370	133	260	134	0.059"
12 GA	0.08"	0.16"	200	0.5	213	133	145	134	0.060"
10 GA	0.08"	0.16"	200	0.5	138	136	103	135	0.061"
3/16"	0.08"	0.16"	200	0.6	60	137	54	137	0.065"
1/4"	0.08"	0.16"	200	0.7	36	142	31	143	0.067"
3/8"	0.08"	0.20"	250	0.8	24	145	22	146	0.080"

SHARK 75/M

I_2	50 A	Al



487629 | 486049 | 408609 (50 A) | 482134 | 425022

486027

P	5,5 bar 80 psi	AIR	175 l/min 370 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
	×	IHS		sec IHS		V		V	x
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
1	2	4	200	0,1	11330	138	8500	138	1,5
2	2	4	200	0,2	9475	137	6800	138	1,5
3	2	4	200	0,3	6440	136	3200	141	1,6
4	2	4	200	0,5	4995	137	2270	143	1,6
6	2	4	200	0,6	2885	139	1550	144	1,6
8	2	4	200	0,7	2050	141	1050	147	1,8
10	2	5	250	0,8	950	143	500	150	2,0

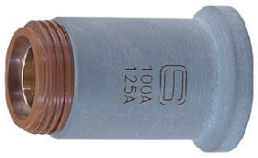
in

					PRODUCTION		QUALITY		
	×	IHS		sec IHS		V		V	x
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/32"	0.08"	0.16"	200	0.1	463	138	335	138	0.059"
1/16"	0.08"	0.16"	200	0.2	412	138	335	138	0.059"
3/32"	0.08"	0.16"	200	0.3	338	136	206	138	0.061"
1/8"	0.08"	0.16"	200	0.5	230	136	103	142	0.062"
1/4"	0.08"	0.16"	200	0.6	99	139	56	144	0.063"
3/8"	0.08"	0.20"	250	0.8	38	142	20	148	0.080"

SHARK 105/M

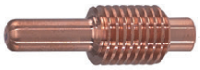
I_2	100 A	Fe

487636
(100-125 A)



486029
(100-125 A)

408612
(105 A)



425023

482136
(100-125 A)

486026
(100-125 A)

P	5,5 bar 80 psi	AIR	295 l/min 630 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

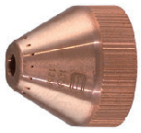
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
6	3	6	200	0.6	4580	146	3720	145	2,1
8	3	6	200	0.8	3480	146	2820	146	2,2
10	3	6	200	0.8	2510	146	2030	146	2,2
12	3	6	200	0.8	1850	149	1520	146	2,2
16	3	6	200	1.2	1170	150	950	150	2,5
20	3	6	200	1.2	840	153	700	153	2,7
25	3				520	159	490	160	3,1
30	3				360	162	330	163	3,6
32	3				330	162	310	167	3,8
35	3				280	166	260	169	3,9
40	3				180	171	170	174	4,1

in

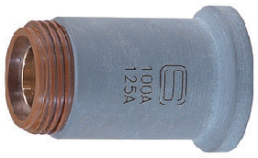
					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/4"	0.125”	0.25”	200	0.6	173	146	140	145	0.083"
3/8"	0.125”	0.25”	200	0.8	104	146	85	146	0.088"
1/2"	0.125”	0.25”	200	0.8	68	149	56	147	0.089"
5/8"	0.125”	0.25”	200	1.2	47	150	38	150	0.100"
3/4"	0.125”	0.25”	200	1.2	36	151	30	152	0.101"
7/8"	0.125”	0.25”	200	1.4	27	158	23	155	0.120"
1"	0.125”				20	159	19	161	0.133"
1-1/8"	0.125”				15	161	14	163	0.140"
1-1/4"	0.125”				14	162	13	167	0.150"
1-1/2"	0.125”				9	169	8	172	0.158"

SHARK 105/M

I_2	100 A	CrNi

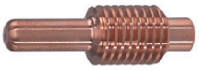


487636
(100-125 A)



486029
(100-125 A)

408612
(105 A)



425023

482136
(100-125 A)

486026
(100-125 A)

P	5,5 bar 80 psi	AIR	295 l/min 630 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

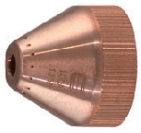
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
6	3	6	200	0,6	5400	142	4380	140	1,9
8	3	6	200	0,6	3780	143	3110	142	2,1
10	3	6	200	0,6	2400	143	2010	145	2,3
12	3	6	200	0,7	1670	145	1340	149	2,3
16	3	6	200	0,9	970	150	850	150	2,3
20	3	7,5	250	1,4	720	153	590	155	2,6
25	3				470	157	390	159	2,9
30	3				320	161	300	165	3,0
32	3				280	164	270	167	3,1

in

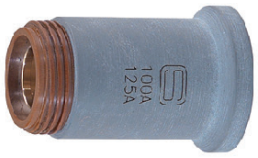
					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/4"	0.125"	0.25	200	0.6	202	142	167	140	0.076"
3/8"	0.125"	0.25	200	0.6	101	143	85	144	0.089"
1/2"	0.125"	0.25	200	0.6	61	146	50	149	0.091"
5/8"	0.125"	0.25	200	0.9	39	150	34	150	0.092"
3/4"	0.125"	0.31	250	1.4	31	152	25	154	0.099"
7/8"	0.125"				24	154	20	157	0.105"
1"	0.125"				18	157	15	159	0.113"
1-1/8"	0.125"				14	160	13	163	0.116"
1-1/4"	0.125"				12	164	11	167	0.120"

SHARK 105/M

I_2	100 A	Al

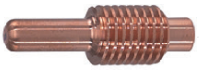


487636
(100-125 A)



486029
(100-125 A)

408612
(105 A)



425023

482136
(100-125 A)

486026
(100-125 A)

P	5,5 bar 80 psi	AIR	295 l/min 630 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
6	3	6	200	0,6	6380	145	5380	146	2,3
8	3	6	200	0,9	4510	149	3750	150	2,3
10	3	6	200	0,9	2950	152	2370	153	2,4
12	3	6	200	1,2	2200	155	1710	157	2,6
16	3	6	200	1,2	1490	156	1160	158	2,7
20	3	6	200	1,4	1070	163	910	164	3,0
25	3				710	166	590	167	3,5
30	3				510	172	380	174	3,8
32	3				440	174	300	176	4,0

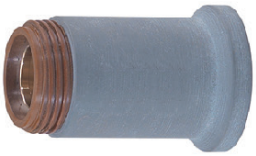
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/4"	0.125"	0.25"	200	0.6	239	146	201	147	0.091"
3/8"	0.125"	0.25"	200	0,9	122	151	99	152	0.092"
1/2"	0.125"	0.25"	200	1.2	82	155	64	157	0.102"
5/8"	0.125"	0.25"	200	1.2	59	156	46	158	0.107"
3/4"	0.125"	0.25"	200	1.4	45	162	39	163	0.111"
7/8"	0.125"				36	164	31	165	0.120"
1"	0.125"				27	166	23	167	0.138"
1-1/8"	0.125"				23	170	18	172	0.145"
1-1/4"	0.125"				18	174	14	176	0.15"

SHARK 105/M

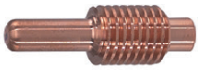
I_2	85 A	Fe

487635
(45-85 A)



486028
(45-85 A)

408616
(85 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	280 l/min 595 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

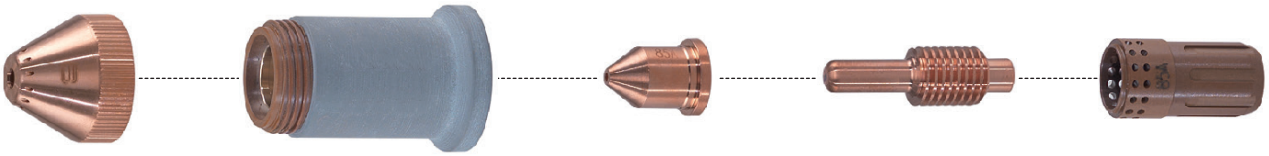
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
3	2	4	200	0,2	8740	121	6460	123	1,7
4	2	4	200	0,3	6930	123	5360	123	1,7
6	2	4	200	0,6	4180	126	3420	124	1,8
8	2	4	200	0,6	2940	128	2370	126	1,9
10	2	4	200	0,6	1960	129	1590	128	2,0
12	2	5	250	0,8	1520	131	1210	131	2,2
16	2	5	250	1,2	880	134	820	135	2,4
20	2	6	300	1,7	640	137	540	138	2,6
25	2				420	142	330	143	3,2
30	2				280	145	190	147	3,7

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
10 GA	0.08"	0.16"	200	0.1	319	122	238	123	0.068"
3/16"	0.08"	0.16"	200	0.3	209	124	176	124	0.071"
1/4"	0.08"	0.16"	200	0.6	152	127	124	124	0.073"
3/8"	0.08"	0.16"	200	0.6	82	128	67	127	0.078"
1/2"	0.08"	0.2"	250	0.6	53	132	43	132	0.090"
5/8"	0.08"	0.2"	250	1.2	35	134	33	135	0.095"
3/4"	0.08"	0.24"	300	1.7	28	136	23	137	0.100"
7/8"	0.08"				21	139	18	140	0.115"
1"	0.08"				16	142	12	143	0,130"
1-1/8"	0.08"				12	144	9	146	0.140"
1-1/4"	0.08"				10	147	7	149	0.146"

SHARK 105/M

I_2	85 A	CrNi



487635
(45-85 A)

486028
(45-85 A)

408616
(85 A)

425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	280 l/min 595 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
3	2	4	200	0,2	8740	121	7120	123	1,6
4	2	4	200	0,3	7120	121	5790	123	1,7
6	2	4	200	0,6	4370	123	3510	123	1,8
8	2	4	200	0,6	2890	125	2320	125	1,9
10	2	5	250	0,6	1800	127	1470	128	2,1
12	2	5	250	0,8	1330	131	1040	132	2,3
16	2	5	250	1,2	720	135	660	136	2,4
20	2				540	138	450	139	2,5
25	2				350	142	280	144	2,6

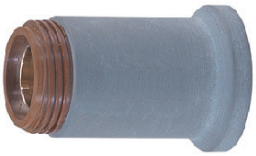
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
10 GA	0.08"	0.16"	200	0.3	319	121	261	123	0.065"
3/16"	0.08"	0.16"	200	0.3	228	122	190	123	0.068"
1/4"	0.08"	0.16"	200	0.6	156	123	124	123	0.070"
3/8"	0.08"	0.16"	200	0.6	76	126	62	127	0.080"
1/2"	0.08"	0.20"	250	0.6	46	132	34	133	0.094"
5/8"	0.08"	0.20"	250	1.2	29	135	27	136	0.095"
3/4"	0.08"				23	137	19	138	0.096"
7/8"	0.08"				18	140	15	141	0.098"
1"	0.08"				13	142	10	144	0.100"

SHARK 105/M

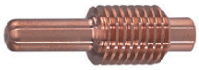
I_2	85 A	Al

487635
(45-85 A)



486028
(45-85 A)

408616
(85 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	280 l/min 595 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
3	2	4	200	0,2	8930	122	7600	123	1,8
4	2	4	200	0,3	7600	124	6170	124	1,9
6	2	4	200	0,6	4650	127	3610	127	2,0
8	2	4	200	0,6	3290	130	2510	131	2,0
10	2	5	250	0,6	2370	132	1820	133	2,1
12	2	5	250	0,8	1830	134	1370	135	2,2
16	2	5	250	1,2	1140	138	900	140	2,4
20	2				830	142	570	144	2,6
25	2				510	145	360	147	2,8

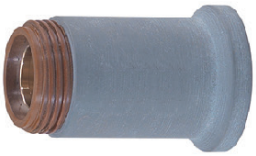
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/8"	0.08"	0.16"	200	0.3	342	122	285	123	0.075"
1/4"	0.08"	0.16"	200	0.6	163	128	124	128	0.080"
3/8"	0.08"	0.16"	200	0.6	99	132	76	133	0.085"
1/2"	0.08"	0.2"	250	0.6	65	134	48	136	0.090"
5/8"	0.08"	0.2"	250	1.2	46	138	36	140	0.095"
3/4"	0.08"				35	141	24	143	0.100"
7/8"	0.08"				28	143	19	145	0.105"
1"	0.08"				19	145	13	147	0.110"

SHARK 105/M

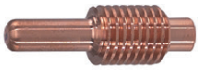
I_2	65 A	Fe

487635
(45-85 A)



486028
(45-85 A)

408615
(65 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	245 l/min 520 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
2	2	4	200	0,2	6650	122	5740	125	1,6
3	2	4	200	0,3	5790	124	4940	126	1,6
4	2	4	200	0,6	4840	125	4030	126	1,7
6	2	4	200	0,6	3070	128	2420	128	1,8
8	2	4	200	0,6	2110	129	1610	130	1,9
10	2	5	250	0,8	1420	130	1040	132	2,0
12	2	5	250	1,4	1080	132	800	135	2,2
16	2	6	300	2,2	610	137	530	139	2,3
20	2				420	143	330	143	3,0
25	2				250	146	190	146	3,4

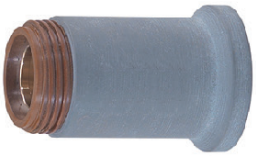
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
16 GA	0.08"	0.16"	200	0.2	279	122	247	124	0.060"
10 GA	0.08"	0.16"	200	0.2	213	124	181	126	0.065"
3/16"	0.08"	0.16"	200	0.3	160	126	133	127	0.068"
1/4"	0.08"	0.16"	200	0.6	110	128	86	128	0.070"
3/8"	0.08"	0.16"	200	0.8	59	130	43	131	0.076"
1/2"	0.08"	0.20"	250	1.4	38	133	29	136	0.088"
5/8"	0.08"	0.24"	300	2.2	25	137	22	139	0.090"
3/4"	0.08"				18	142	14	142	0.091"
7/8"	0.08"				13	144	11	144	0.115"
1"	0.08"				10	146	8	146	0.134"

SHARK 105/M

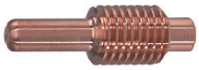
I_2	65 A	CrNi

487635
(45-85 A)



486028
(45-85 A)

408615
(65 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	245 l/min 520 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
2	2	4	200	0,2	9500	122	7690	126	1,4
3	2	4	200	0,3	7840	124	6360	126	1,5
4	2	4	200	0,6	5840	125	4940	126	1,7
6	2	4	200	0,6	2700	127	2320	127	1,8
8	2	4	200	0,8	1760	130	1420	130	1,9
10	2	5	250	0,8	1180	133	910	133	2,0
12	2	5	250	1,4	870	135	710	136	2,2
16	2				470	140	470	140	2,4
20	2				350	144	280	144	2,5

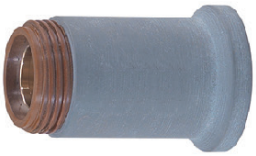
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
16 GA	0.08"	0.16"	200	0.2	405	122	328	125	0.054"
10 GA	0.08"	0.16"	200	0.2	281	124	228	126	0.062"
3/16"	0.08"	0.16"	200	0.3	160	126	147	127	0.068"
1/4"	0.08"	0.16"	200	0.6	91	127	76	127	0.073"
3/8"	0.08"	0.16"	200	0.8	49	132	38	132	0.076"
1/2"	0.08"	0.2"	250	1.4	30	136	25	137	0.090"
5/8"	0.08"				19	140	19	140	0.093"
3/4"	0.08"				14	143	13	143	0.096"

SHARK 105/M

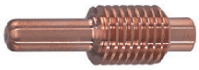
I_2	65 A	Al

487635
(45-85 A)



486028
(45-85 A)

408615
(65 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	245 l/min 520 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
2	2	4	200	0,2	9780	123	8360	122	1,9
3	2	4	200	0,3	8360	125	7030	125	1,9
4	2	4	200	0,6	6980	126	5700	127	1,9
6	2	4	200	0,6	4180	129	3040	131	1,9
8	2	4	200	0,8	2610	131	1850	134	2,0
10	2	5	250	0,8	1560	133	1140	137	2,1
12	2	5	250	1,4	1260	137	950	139	2,3
16	2				760	142	610	144	2,5
20	2				530	146	360	148	2,7

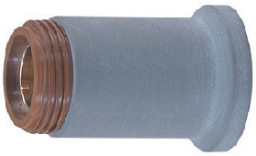
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/16"	0.08"	0.16"	200	0.2	407	122	347	122	0.073"
1/8"	0.08"	0.16"	200	0.2	319	125	266	125	0.074"
1/4"	0.08"	0.16"	200	0.6	144	129	100	132	0.076"
3/8"	0.08"	0.16"	200	0.8	65	132	48	136	0.083"
1/2"	0.08"	0.20"	250	1.4	46	139	33	140	0.091"
5/8"	0.08"				30	142	25	144	0.100"
3/4"	0.08"				23	145	15	147	0.105"

SHARK 105/M

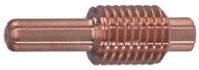
I_2	45 A	Fe

487635
(45-85 A)



486028
(45-85 A)

408614
(45 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	235 l/min 500 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
0,5	2,0	4	200	0,1	11870	127	8500	129	1,1
1	2,0	4	200	0,1	10260	129	8500	129	1,1
1,5	2,0	4	200	0,2	9690	130	8500	131	1,3
2	2,0	4	200	0,4	7410	130	6270	131	1,4
3	2,0	4	200	0,5	4650	132	3650	134	1,5
4	2,0	4	200	0,5	3380	132	2090	135	1,6
6	2,0	4	200	0,6	1940	133	1280	138	1,7

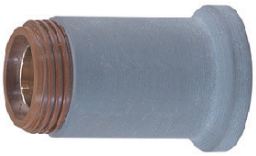
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
26GA	0.04"	0.08"	200	0.1	475	129	330	129	0.030"
22GA	0.04"	0.08"	200	0.1	428	129	330	129	0.035"
18GA	0.04"	0.08"	200	0.2	380	129	330	130	0.053"
16GA	0.04"	0.08"	200	0.2	380	130	330	131	0.054"
14GA	0.08"	0.16"	200	0.3	304	130	257	131	0.055"
12GA	0.08"	0.16"	200	0.4	205	132	181	134	0.058"
10GA	0.08"	0.16"	200	0.4	156	132	95	135	0.061"
3/16"	0.08"	0.16"	200	0.5	103	133	67	136	0.065"
1/4"	0.08"	0.16"	200	0.7	69	133	46	138	0.066"

SHARK 105/M

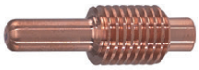
I_2	45 A	CrNi

487635
(45-85 A)



486028
(45-85 A)

408614
(45 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	235 l/min 500 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
0,5	2	4	200	0,1	11870	130	8500	131	0,9
1	2	4	200	0,1	10260	131	8500	131	1,1
1,5	2	4	200	0,2	9690	131	8500	131	1,3
2	2	4	200	0,4	8220	132	5700	133	1,5
3	2	4	200	0,5	4180	133	2940	133	1,6
4	2	4	200	0,5	2470	135	1900	135	1,7
6	2	4	200	0,6	960	140	850	141	1,8

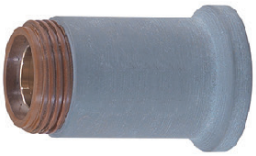
in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
26GA	0.04"	0.08"	200	0.1	475	130	330	131	0.030"
22GA	0.04"	0.08"	200	0.1	428	130	330	131	0.032"
18GA	0.04"	0.08"	200	0,2	380	131	330	131	0.055"
16GA	0.04"	0.08"	200	0,2	380	131	330	131	0.057"
14GA	0.08"	0.16"	200	0,3	342	132	238	133	0.058"
12GA	0.08"	0.16"	200	0,5	196	132	133	133	0.062"
10GA	0.08"	0.16"	200	0,5	127	135	95	134	0.067"
3/16"	0.08"	0.16"	200	0,6	55	136	49	136	0.069"
1/4"	0.08"	0.16"	200	0,7	33	141	29	142	0.070"

SHARK 105/M

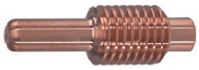
I_2	45 A	Al

487635
(45-85 A)



486028
(45-85 A)

408614
(45 A)



425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	235 l/min 500 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

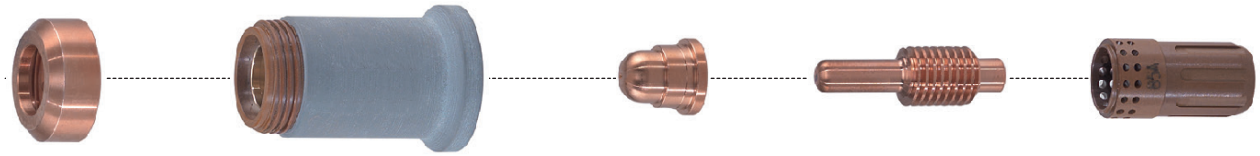
					PRODUCTION		QUALITY		
mm	mm	mm	%	sec	mm/min	V	mm/min	V	mm
1	2	4	200	0,1	10450	137	7830	137	1,5
2	2	4	200	0,2	8740	136	6270	137	1,5
3	2	4	200	0,3	5930	135	2940	140	1,6
4	2	4	200	0,5	4600	136	2090	142	1,6
6	2	4	200	0,6	2660	138	1420	143	1,7

in

					PRODUCTION		QUALITY		
inches	inches	inches	%	sec	ipm	V	ipm	V	inches
1/32"	0.08"	0.16"	200	0.10	428	137	310	137	0.059"
1/16"	0.08"	0.16"	200	0.20	380	137	310	137	0.061"
3/32"	0.08"	0.16"	200	0.30	312	135	190	137	0.063"
1/8"	0.08"	0.16"	200	0.50	213	135	95	141	0.065"
1/4"	0.08"	0.16"	200	0.60	91	138	51	143	0.067"

SHARK 105/M

I_2	45 A Clean CUT	Fe



482030
(45-85 A)

486028
(45-85 A)

408613
(45 A)

425023

482135
(45-85 A)

486025
(45-85 A)

P	5,5 bar 80 psi	AIR	225 l/min 475 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

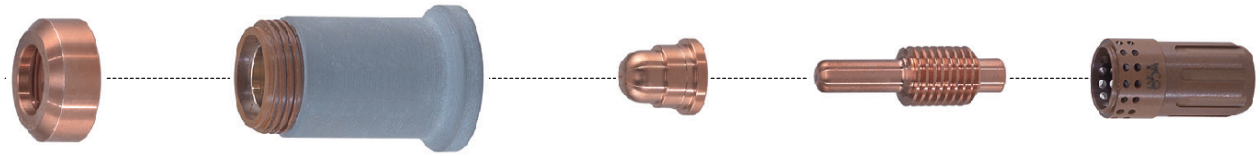
I_2	×	IHS		sec IHS		QUALITY V	x
mm	A	mm	mm	%	sec	mm/min	V	mm
0,5	30	1,5	2,25	150	0,10	3600	72	0,60
0,6	30	1,5	2,25	150	0,10	3600	72	0,65
0,8	30	1,5	2,25	150	0,20	3600	74	0,65
1	40	1,5	2,25	150	0,30	3600	75	0,70
1,5	40	1,5	2,25	150	0,50	3600	77	0,70
2	45	1,5	2,25	150	0,50	3500	78	0,75
3	45	1,5	2,25	150	0,60	2600	80	0,80
4	45	1,5	2,25	150	0,60	1800	80	0,85

in

I_2	×	IHS		sec IHS		QUALITY V	x
inches	A	inches	inches	%	sec	ipm	V	inches
26GA	30	0.06"	0.09"	150	0.10	145	72	0.024"
24GA	30	0.06"	0.09"	150	0.10	145	72	0.025"
22GA	30	0.06"	0.09"	150	0.20	145	74	0.026"
20GA	30	0.06"	0.09"	150	0.20	145	75	0.028"
18 GA	40	0.06"	0.09"	150	0.30	145	75	0.030"
16GA	40	0.06"	0.09"	150	0.50	145	75	0.031"
14 GA	45	0.06"	0.09"	150	0.50	145	77	0.032"
12GA	45	0.06"	0.09"	150	0.60	115	80	0.033"
10GA	45	0.06"	0.09"	150	0.60	90	80	0.034"

SHARK 105/M

I_2	45 A Clean CUT	CrNi



482030 (45-85 A) | 486028 (45-85 A) | 408613 (45 A) | 425023 | 482135 (45-85 A)

486025 (45-85 A)

P	5,5 bar 80 psi	AIR	225 l/min 475 cfh	AIR	**AIR** - Clean, dry, oil-free for ISO 8573-1 Class 1.2.2

mm

I_2		IHS		sec IHS		QUALITY V	x
mm	A	mm	mm	%	sec	mm/min	V	mm
0,5	30	0,5	2	400	0,10	3600	75	0,50
0,6	30	0,5	2	400	0,10	3600	75	0,55
0,8	30	0,5	2	400	0,20	3600	75	0,60
1	40	0,5	2	400	0,20	3600	75	0,60
1,5	40	0,5	2	400	0,50	2800	75	0,60
2	40	0,5	2	400	0,50	2700	75	0,65
3	45	0,5	2	400	0,60	2500	85	0,65
4	45	0,5	2	400	0,70	1000	85	0,70

in

I_2		IHS		sec IHS		QUALITY V	x
inches	A	inches	inches	%	sec	ipm	V	inches
26GA	30	0.02"	0.08"	400	0,10	145	75	0.020"
24GA	30	0.02"	0.08"	400	0,10	145	75	0.022"
22GA	30	0.02"	0.08"	400	0,20	145	75	0.023"
20GA	30	0.02"	0.08"	400	0,20	145	75	0.024"
18GA	40	0.02"	0.08"	400	0,30	140	75	0.025"
16GA	40	0.02"	0.08"	400	0,50	110	75	0.026"
14GA	40	0.02"	0.08"	400	0,50	105	75	0.026"
12GA	45	0.02"	0.08"	400	0,60	115	85	0.027"
10GA	45	0.02"	0.08"	400	0,70	73	85	0.028"

Maintenance

IMPORTANT: *The machine is to undergo routine maintenance, as suggested by the manufacturer.*

ATTENTION: *Cut off the power supply to the equipment before effecting any internal inspection.*

SPARE PARTS

Original spares have been specifically designed for our equipment.
The use of spares that are not original may cause variations in the performance and reduce the safety level of the equipment. We are not liable for damage due to use of spare parts that are not original.

THE EQUIPMENT

As these systems are completely static except for the fan that is, in any case, provided with self-lubricating bushes, only the following operations are necessary:

- Periodic removal of accumulations of dirt and dust inside the equipment using compressed air. Do not direct the air jet directly to electrical components that could be damaged.
- Periodical inspection for worn cables or loose connections that could cause overheating.
- Make sure the air circuit is completely free of any impurities and that the connections are tight and free of any leaks. In this regard, particular attention must be given to the solenoid valve and the air filter.
- Although the air filters do not have an automatic condensate drain, it is good practice to clean the air filter insert from time to time (Fig. R).

CARRYING OUT ROUTINE MAINTENANCE

WARNING: *Disconnect the electricity supply before doing maintenance work. All tasks that call for the generator's cover to be removed, must be done by a qualified technician.*

Each time you use the machine:

- Check the indication LEDs and fault icons. Correct any faulty condition.
- Check that the consumables are fitted correctly and are not worn.

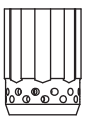
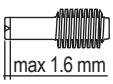
Every 3 months:

- Inspect the power supply cable and plug. Replace if damaged.
- Check that the button is not damaged. Check that the torch grip is not cracked and there are no exposed wires. Replace any damaged component.
- Inspect the torch cable. Replace if damaged.

Every 6 months:

- Periodic removal of accumulations of dirt and dust inside the equipment using compressed air. Do not direct the air jet directly to electrical components that could be damaged.

INSPECTION OF CONSUMABLES

Component	Inspection	Action
O-ring on the torch body 	Check that the surface is not damaged, worn or without lubrication.	If the O-ring is dry, lubricate it and the threads, with a thin layer of silicone lubricant. If the O-ring is worn or damaged, replace it.
Air diffuser 	Check that the internal surface of the diffuser ring is not damaged or worn, and that the air holes are not obstructed.	Replace the diffuser ring if the surface is damaged or worn, or if the air holes are obstructed.
Electrode 		Replace the electrode if the surface is worn or the depth of the crater is more than 1,6 mm.

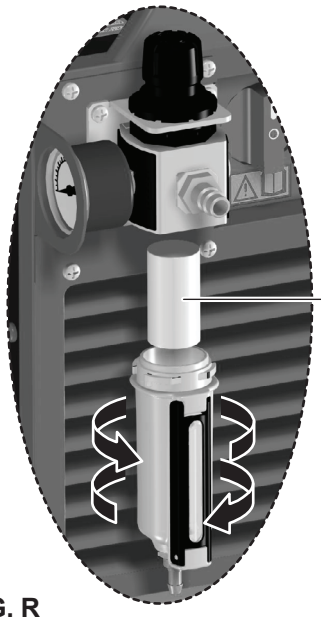
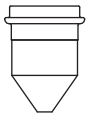
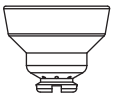


FIG. R

Nozzle 	Roundness of the central hole. 	Replace the nozzle if the central hole is not round.
Shield 	Roundness of the central hole. Accumulation of debris in the space between the shield and the nozzle.	Replace the shield of the hole is oval. Remove the shield and clean off any debris.

Possible problems and remedies

The power line is the cause of most problems. In case of breakdowns proceed as follows:

1) Check the line value of the voltage
2) Check that the power cable is perfectly fastened to the plug and mains switch
3) Make sure the fuses are not burnt or loose
4) Check the following for defects:
   - The switch that powers the machine
   - The wall socket for the plug
   - The equipment power switch

NOTE: *Given the technical knowledge required for equipment repair, we recommend, in case of faults, that you contact qualified personnel or our technical support service.*

Troubleshooting table

It is normally possible to find the cause of a breakdown through the warning LEDS located on the right hand side of the front of the system. The first thing to do, therefore, is to check which leds are on. Here below we are listing some of the possible breakdowns that may occur on the system.

Defect	Cause	Remedy
Green power supply on LED switched off (Pos. 11, Fig. B)	• Cutting machine power supply cable not connected to the mains power supply	• Connect the cutting machine power supply cable to the mains power supply
	• Power supply switch off (Pos. 5, Fig. A)	• Switch on the machine by turning the power supply switch to position 1 (Pos. 5, Fig. A)
	• Mains voltage incorrect	• Check that the voltage for the power supply to the cutting machine corresponds to that for the actual mains power supply
	• Some components in the cutting machine are defective or malfunctioning	• Call in technical assistance
	• No power supply to the machine due to the action of fuses or trip switches for the power supply socket upstream of the machine	• Replace blown fuses or reset the trip switches that have tripped
Yellow thermostatic protection LED on (Pos. 3, Fig. B)	• When this LED switches on it indicates that the trip switch has tripped because you are working beyond the work cycle	• After several minutes the overheat cut-off rearms automatically (and the yellow LED turns itself off) and the welder is ready for use again
Yellow indication LED for no compressed air, switched on (Pos. 2, Fig. B)	• No compressed air or insufficient pressure	• Check and replace the pressure switch if necessary. • Check the feed circuit for the compressed air
	• Fault in the pneumatic circuit	• Check and replace the solenoid valve if necessary
Red torch button activation LED switched off (Pos. 10, Fig. B)	• Torch button circuit defective	• Replace the torch button
	• Outside nozzle holder on the torch not tight.	• Tighten the outside nozzle holder on the torch
No air when the torch button is pushed • Red torch button activation LED switched on (Pos. 10, Fig. B) • Red inverter activation LED switched off (Pos. 9, Fig. B)	• Control board defective	• Replace
	• Solenoid valve defective	• Replace
	• Compressed air supply circuit upstream of the machine, closed or faulty	• Open or repair the compressed air supply circuit for the machine.
Pilot arc does not go on when torch button is pressed • Red torch button activation LED switched on (Pos. 10, Fig. B) • Red inverter activation LED switched off (Pos. 9, Fig. B)	• Defective control board	• Replace
	• Worn electrode and hood on torch	• Replace
	• Torch button defective	• Replace
	• Plasma torch connected incorrectly or defectively.	• Check the plasma torch's connection and replace it if necessary.
	• Undervoltage or overvoltage protection activated	• Check that the power supply voltage is between 300 V and 480 V.
Arc goes out on contact with piece to be cut	• Lack of connection of ground wire	• Connect the earth cable or check the machine's earth circuit.

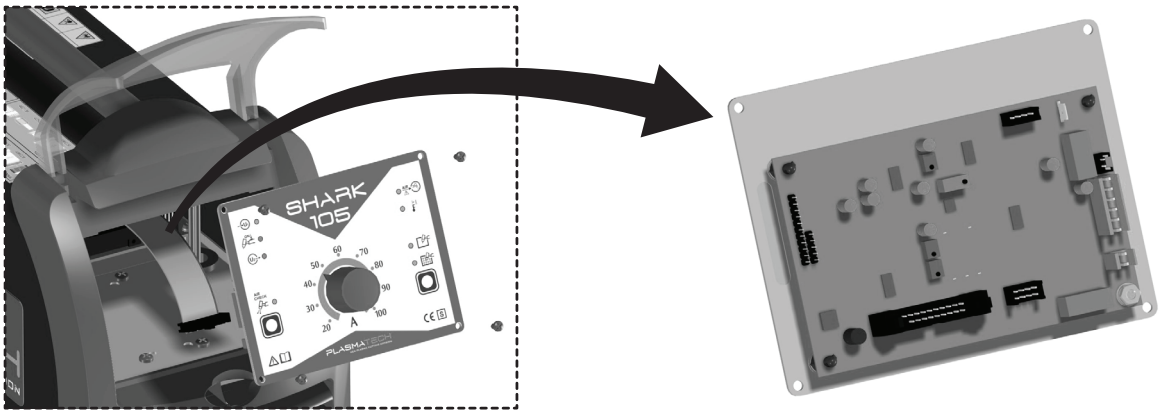


FIG. S

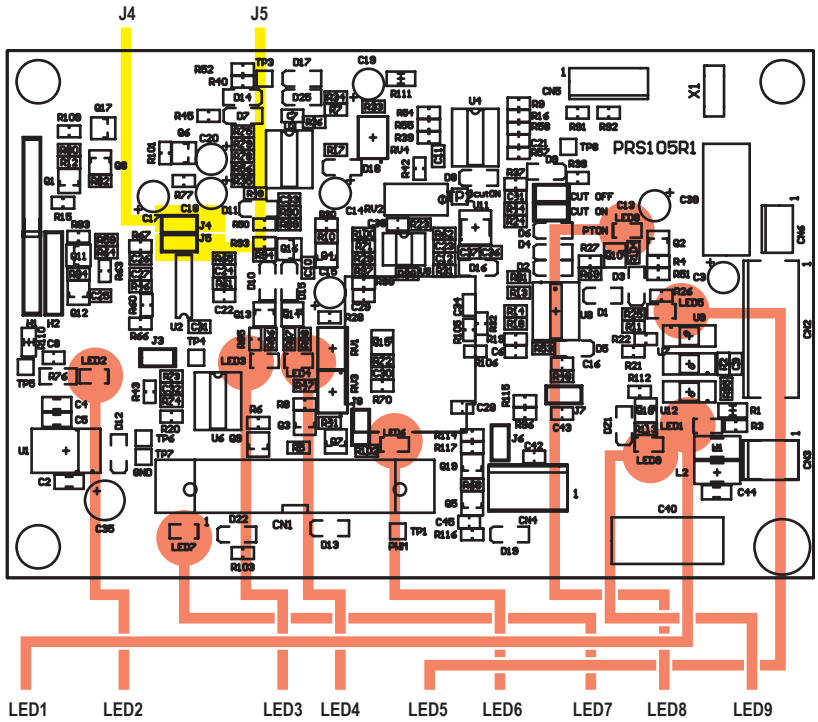


FIG. T

A more advanced search can be done for any faults, by accessing the front rack board and examining the diagnostic LEDs provided.
The purpose of this board is to allow the operator to regulate and interact with the machine, and determines all the functions necessary for it to function, and for the cut to be executed.
The operator interface is in the form of a membrane keyboard on the front panel, which included diagnostic / functional LED's for the machine, and the operating buttons for selecting the cutting mode and activating the air flow test.
To be able to access the control board, proceed as follows (Fig. S):

- Unscrew the 4 screws that fix the front rack panel.
- The control board is fixed to the front rack, removed previously.

Figure T shows the layout of the front control rack board, highlighting the diagnostic LEDs and main trimmers fitted.

List of LEDs

LED1	Green LED, on when the TORCH BUTTON is pushed.
LED2	Green LED, on when the +24 voltage is on.
LED3	Green LED, on when the inverter board is in an OVER VOLTAGE state.
LED4	Green LED, on when the inverter board is in an UNDER VOLTAGE state.
LED5	Green LED, one when the ARC TRANSFERRED signal is active.
LED6	Green LED, on when the air solenoid valve is activated.
LED7	Green LED, on when the fan is switched on.
LED8	Green LED, on when the torch button signal is recognised by the board.
LED9	Green LED, on when the safety optical unit PT(U12) is switched off (PT OFF).

List of JUMPERS

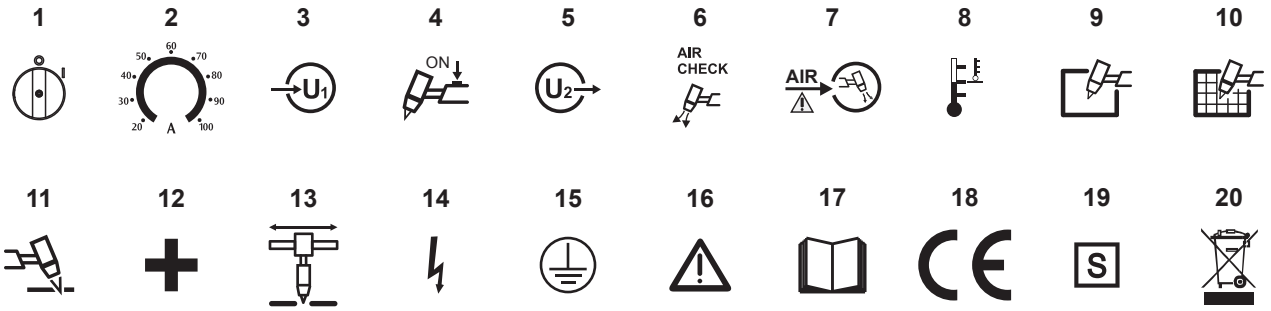
JP1	When inserted, on switching on the machine will be in SOLID CUT mode.
JP2	When inserted, on switching on the machine will be in MESH CUT mode.

Common cutting defects

The table below provides an overview of common cut defects that can arise when using the machine, and explains how to resolve them.

Defect	Cause	Remedy
Insufficient penetration	• Cutting speed too high	• Reduce speed
	• Current too low	• Increase current
	• Ground wire connected wrong	• Check ground wire connection
Main arc goes out	• Cutting speed too slow	• Increase speed
	• Excessive erosion of electrode	• Replace electrode
Excessive residues	• Cutting speed too slow	• Increase speed
	• Electrode hole eroded	• Replace electrode
Nozzle overheated or black	• Current too high	• Reduce current
	• Gap between the nozzle and workpiece too small.	• Increase space
	• Air dirty	• Clean air filter
	• Excessive erosion of electrode	• Replace electrode
Pilot arc intermittent or sparking	• Air dirty, greasy, wet	• Clean air filter
	• Pilot arc current too low	• Check the equipment pilot arc circuit
	• The air filter element is polluted, replace the element.	• Replace the element.
	• Check that there is no moisture in the air circuit.	• Install or repair the generator's air filter system.
The arc goes out but ignites again when the torch button is pushed again	• Consumables worn or damaged	• Inspect consumable components and replace them
	• Air dirty and polluted	• Replace the air filter element
	• Air pressure incorrect	• Make sure the air pressure is at the correct level
The quality of the cut is poor	• Torch not used correctly	• Check that the torch is used correctly
	• Consumables worn or damaged	• Check that the consumables are not worn, and replace if necessary
	• Incorrect pressure or poor quality air	• Check the air pressure and quality
	• Cutting mode selector in incorrect position	• Check that the cutting mode selector is in the correct position for the cutting operations.
	• Consumables not correct or fitted incorrectly	• Check that the correct consumables are fitted
The arc is not transferred to the plate	• Ground wire connected wrong	• Clean the contact area between the earth clamp and the plate, to ensure a good connection
	• Earth clamp damaged	• Repair or replace the earth clamp
	• Piercing distance too great	• Reduce the distance

Meaning of graphic symbols on machine



•1 Main equipment switch **•2** Cutting current scale potentiometer **•3** Green LED: signals power ON **•4** Red LED: signals activation of torch button **•5** Red LED to indicate that the inverter is activated and the machine is working **•6** Green LED, air test activated **•7** Yellow LED: signals lack of compressed air **•8** Yellow LED for overheat cutoff **•9** Green LED, solid material cutting mode **•10** Green LED, mesh material cutting mode **•11** Centralised plasma torch connection connector **•12** Positive earth cable connection polarity **•13** Connector for CNC control **•14** Dangerous voltage **•15** Grounding protection **•16** Warning! **•17** Before using the equipment you should carefully read the instructions included in this manual **•18** Product suitable for free circulation in the European Community **•19** System for use in environments with increased risk of electrocution **•20** Special disposal

•1 **CNC**	•2 **CP**	•3 **CT**	•4 **D1-2**	•5 **EL**	•6 **EVG**	•7 **FE**	•8 **FR**	•9 **IL**	•10 **L**
•11 **M**	•12 **MI**	•13 **MV**	•14 **P**	•15 **PM**	•16 **PR**	•17 **PT**	•18 **Q1**	•19 **RF**	•20 **RP**
•21 **RV**	•22 **RSN**	•23 **S-AL**	•24 **S-INT DIG**	•25 **S-INV**	•26 **SL**	•27 **ST**	•28 **TA**	•29 **THI**	•30 **THP**
•31 **THS**	•32 **TIP**	•33 **TP**	•34 **TPL**	•35 **V**					

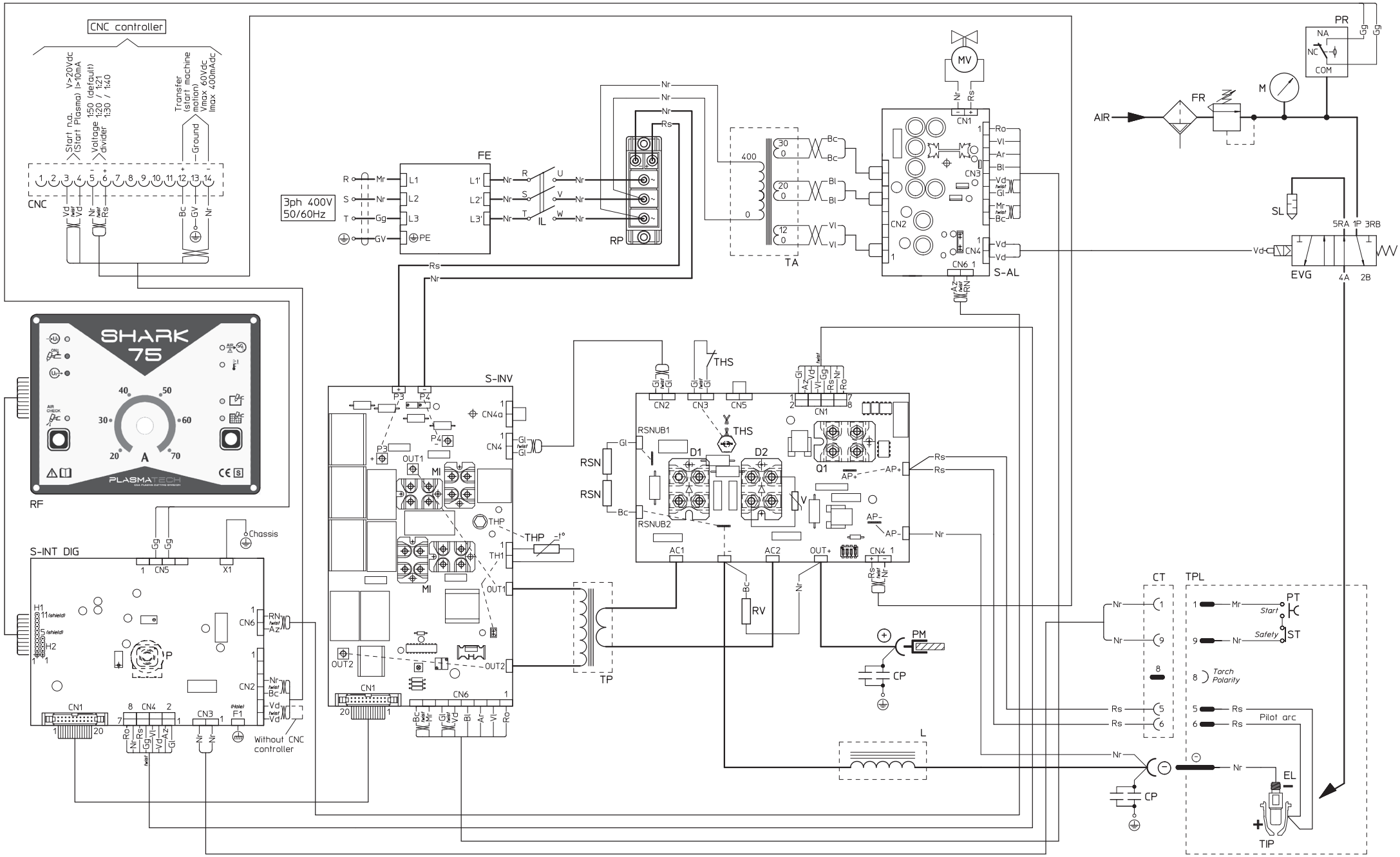
Key to the electrical diagram

•1 CNC controller **•2** EMC condenser **•3** Plasma torch connector, machine side **•4** Secondary circuit diode module **•5** Plasma torch electrode **•6** Air solenoid valve **•7** EMC filter **•8** Regulator filter **•9** Mains switch **•10** Inductance **•11** Pressure gauge **•12** Primary circuit IGBT module **•13** Fan motor **•14** Current potentiometer **•15** Earth clamp **•16** Pressure switch **•17** Plasma torch button **•18** Pilot arc IGBT circuit **•19** Front panel membrane keyboard **•20** Primary circuit rectifier **•21** Voltage divider resistor **•22** Secondary circuit snubber resistor **•23** Power supply board **•24** Rack panel board **•25** Primary Inverter PCB **•26** Exhaust **•27** Plasma torch safety sensor **•28** Auxiliary transformer **•29** Inductor thermostat (SHARK 105) **•30** Primary circuit thermistor **•31** Secondary circuit thermostat **•32** Plasma torch nozzle **•33** Main transformer **•34** Plasma torch **•35** Secondary circuit varistor

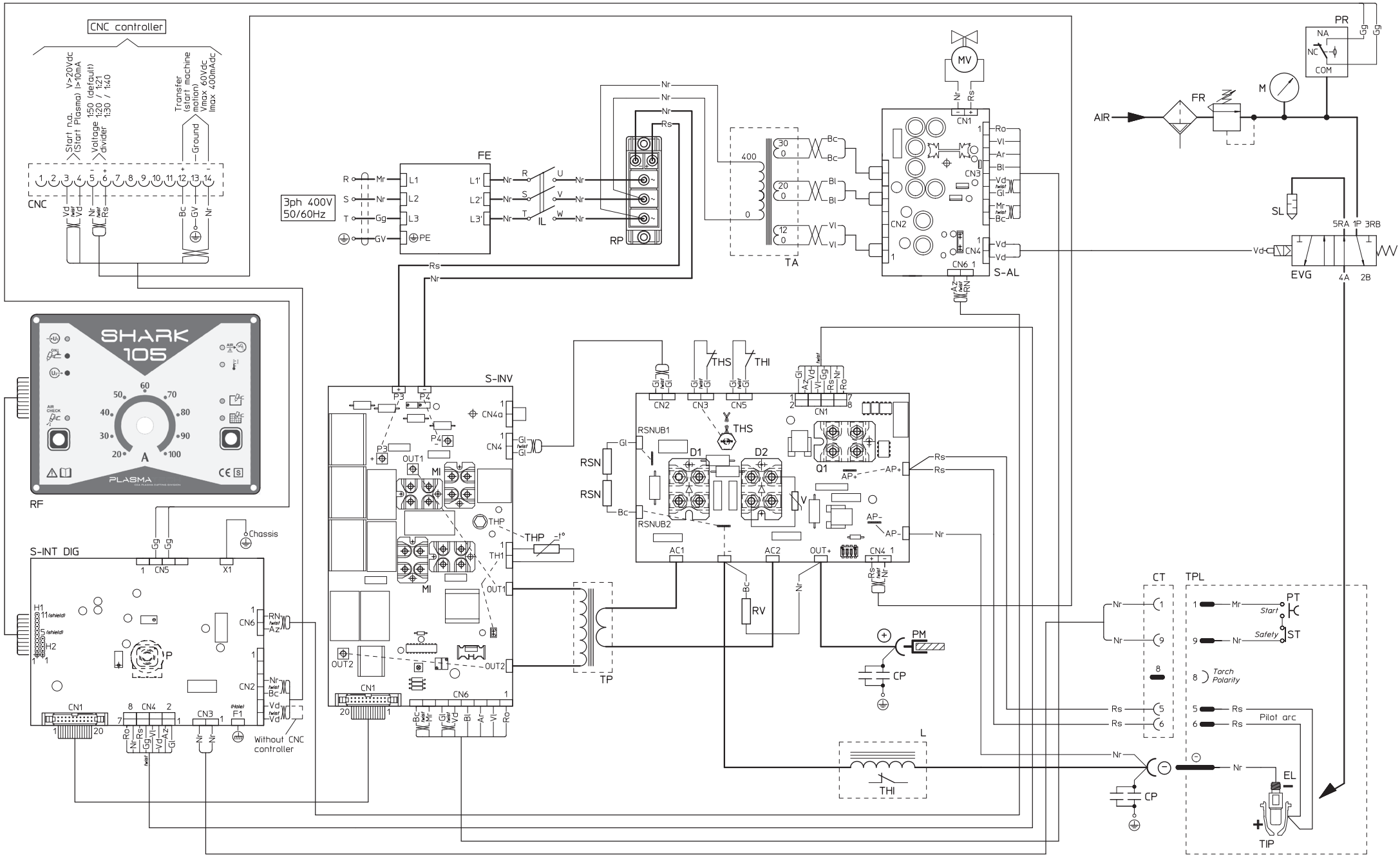
Colour key

AN Orange-Black
Ar Orange
Az Sky Blue
Bc White
Bl Blue
BN White-Black
Gg Grey
Gl Yellow
GV Yellow-Green
Mr Brown
Nr Black
RN Red-Black
Ro Pink
Rs Red
Vd Green
Vl Violet

Wiring diagram SHARK 75



Wiring diagram SHARK 105



SHARK 75 - 105

IT	*Lista ricambi*	LEGGERE ATTENTAMENTE
EN	*Spare parts list*	READ CAREFULLY
FR	*Liste pièce de rechange*	LIRE ATTENTIVEMENT
DE	*Ersatzteilliste*	SORGFÄLTIG LESEN
ES	*Lista repuestos*	LEER ATENTAMENTE
NL	*Onderdelenlijst*	EERST GOED DOORLEZEN
PT	*Lista de peças de substituição*	LER ATENTEMENTE
DA	*Liste over reservedele*	LÆS OMHYGGELIGT
SV	*Reservdelslista*	LÄS NOGAS
FI	*Varaosaluettelo*	LUE HUOLELLISESTI
N	*Reservedelliste*	LES NØYE
RU	*Список запасных частей*	ПЕРЕД НАЧАЛОМ РАБОТЫ ВНИМАТЕЛЬНО ПРОЧТИТЕ ИНСТРУКЦИЮ

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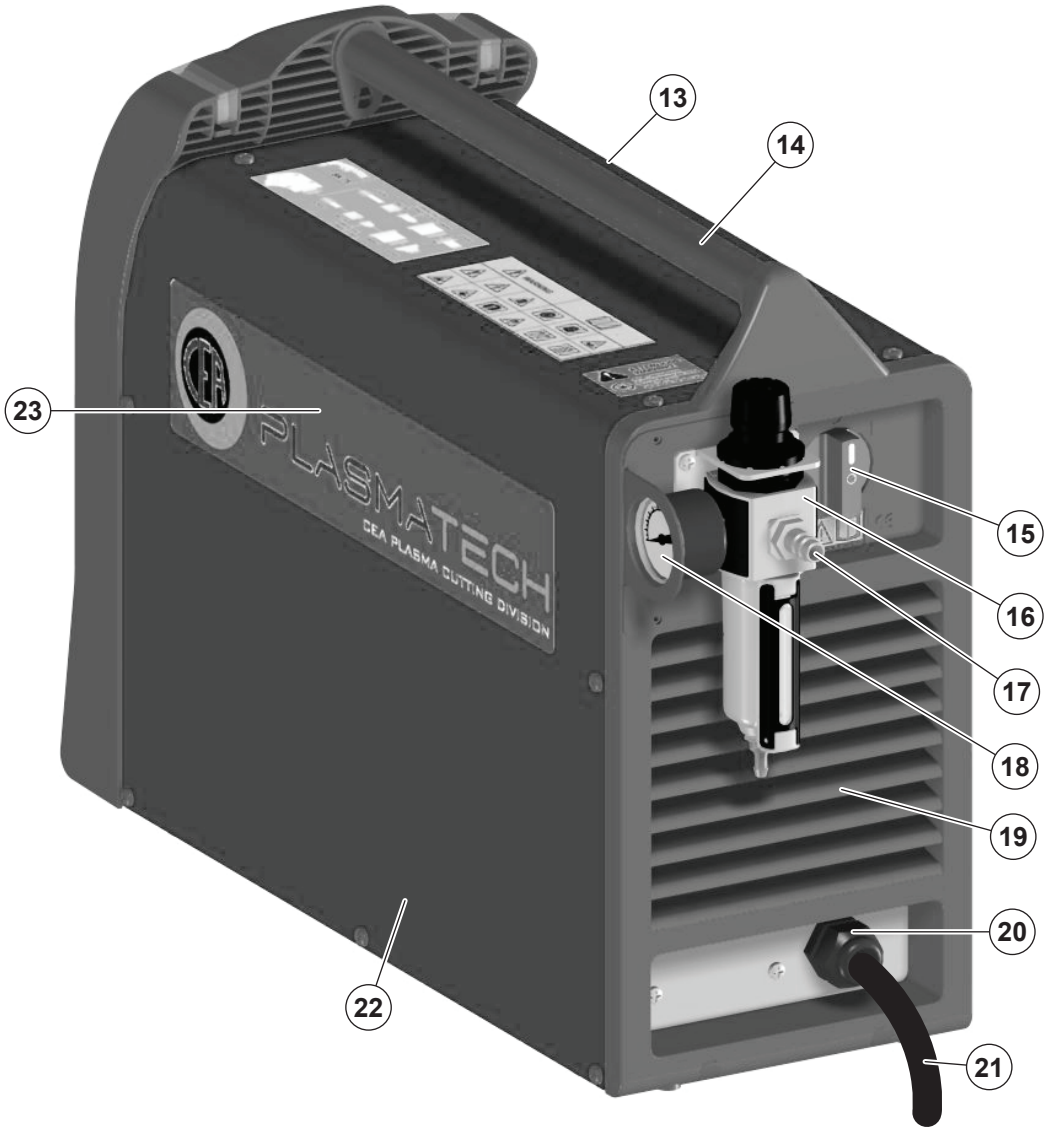
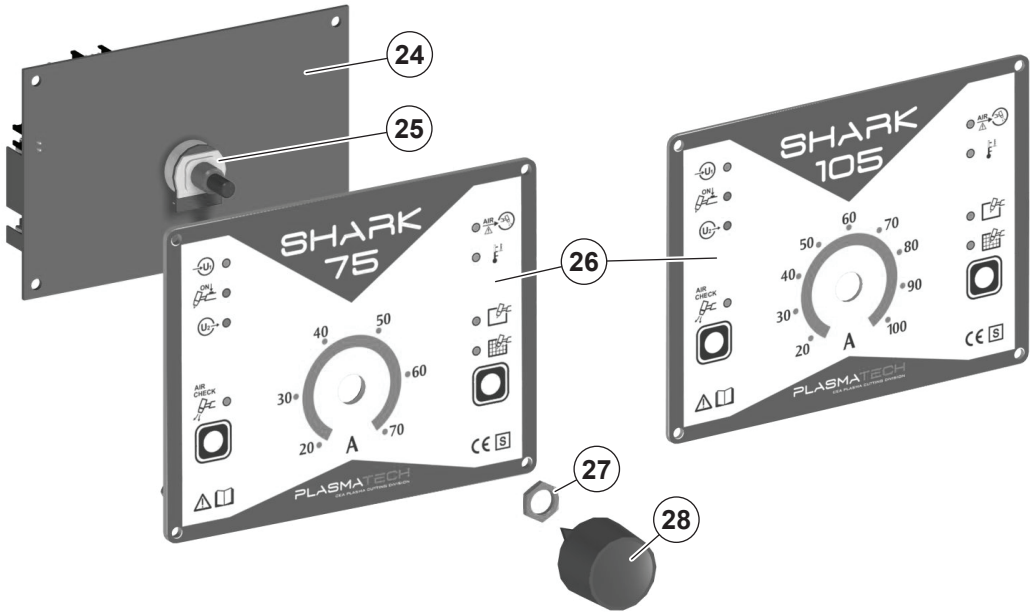
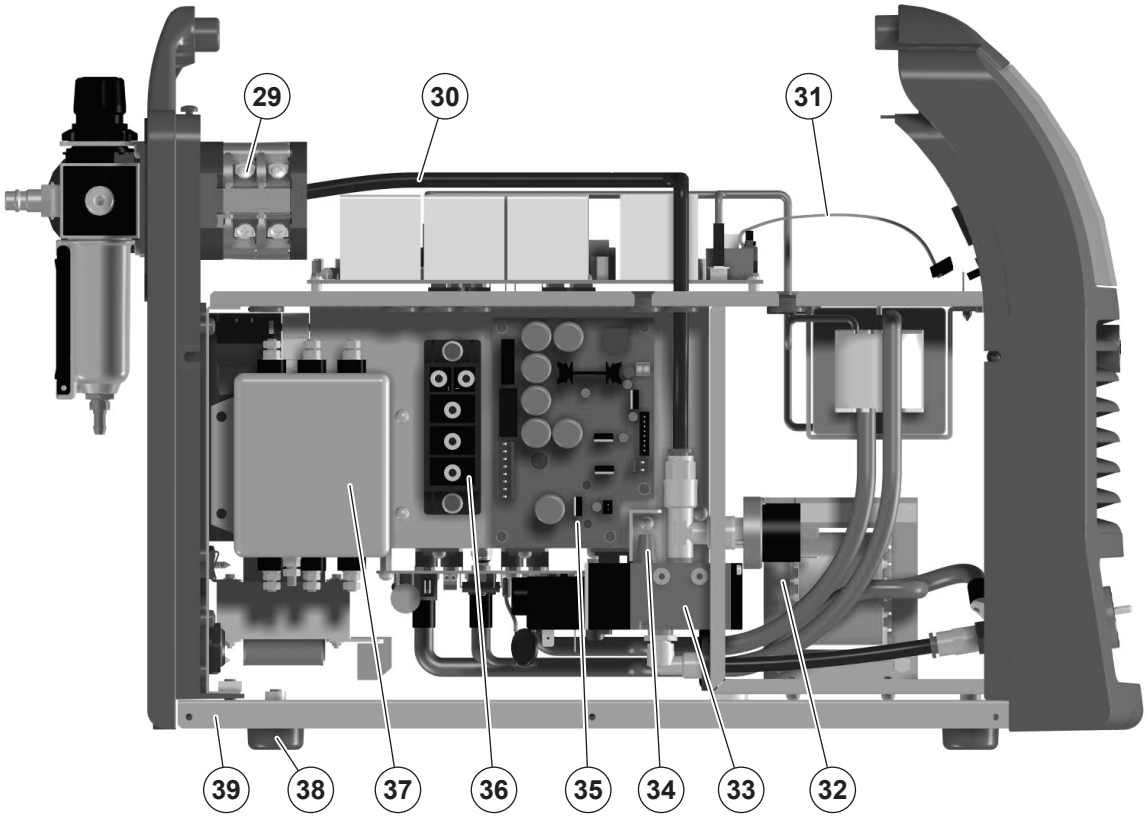
CE

Pos.	SHARK 75	SHARK 105	Descrizione	Description
1	352453	352453	Visiera pannello frontale	Front rack transparent visor
2	352378	352378	Pannello frontale con logo CEA	Plastic front panel complete with logo CEA sticker
3	468191	468191	Logo CEA pannello frontale	Logo CEA sticker for front panel
4	403608	403608	Attacco dinse 25 mmq	Quick connection positive polarity
5	419129	419129	Presa pannello femmina 14P CNC + terminali femmina	Panel CNC 14P female connector complete of female terminals
6	520717	520717	Contatto femmina per connettore CNC (N.10pz)	Female terminal for connector CNC (No.10 pcs)
7	460180	460180	Connettore volante maschio 14P CNC + terminali maschio	Mobile CNC 14P male connector complete of male terminals
8	460179	460179	Contatto maschio per connettore CNC (N.10pz)	Male terminal for connector CNC (No.10 pcs)
9	236648	236648	Attacco centralizzato plasma	Central connector for plasma torch
10	461947	461947	Contatto femmina per attacco centralizzato (N.10pz)	Female terminal for central connector (No.10 pcs)
11	022029	-	Torcia Plasma taglio manuale SK75 6 metri	Manual Plasma torch SK75 6m
	022073	-	Torcia Plasma taglio automatico SKM75 6 metri con cremagliera	Machine Plasma torch SKM75 6m with gear rack
	022080	-	Torcia Plasma taglio automatico SKM75 12 metri con cremagliera	Machine Plasma torch SKM75 12m with gear rack
	-	022028	Torcia Plasma taglio manuale SK125 6 metri	Manual Plasma torch SK125 6m
	-	022074	Torcia Plasma taglio automatico SKM125 6 metri con cremagliera	Machine Plasma torch SKM125 6m with gear rack
	-	022081	Torcia Plasma taglio automatico SKM125 12 metri con cremagliera	Machine Plasma torch SKM125 12m with gear rack
12	239623	239623	Cavo massa	Work cable and clamp

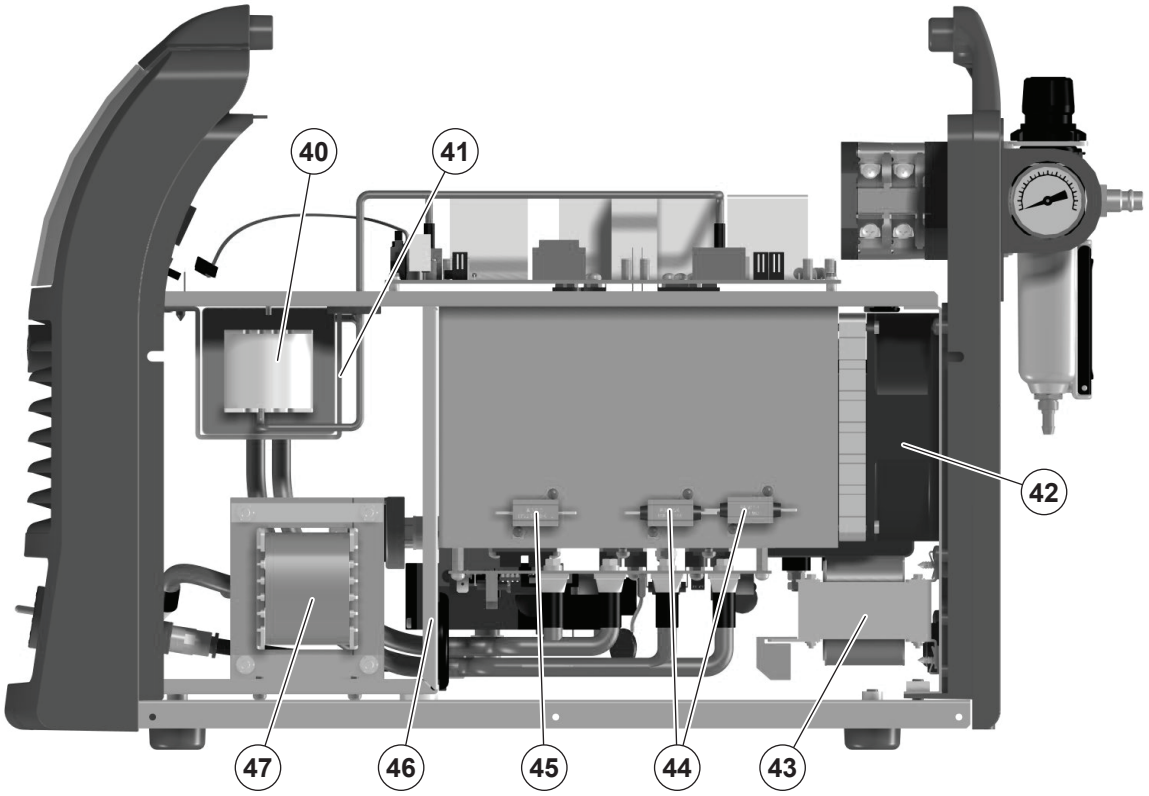


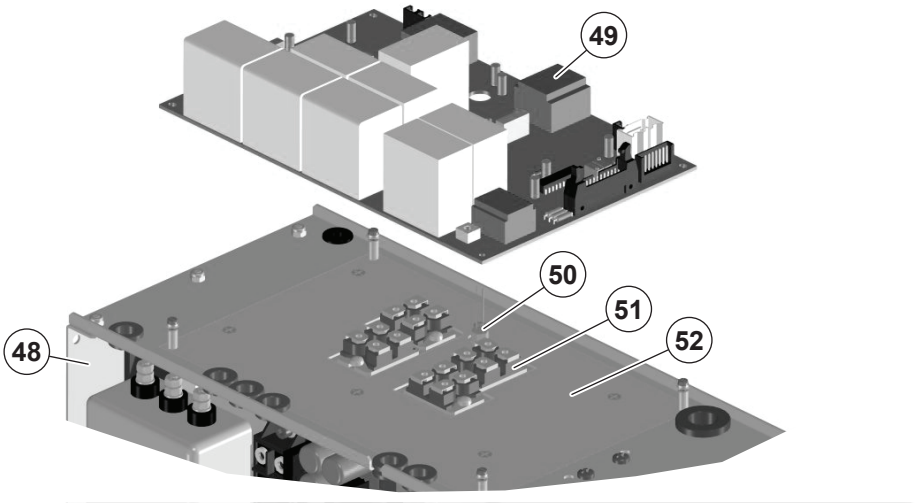
Pos.	SHARK 75	SHARK 105	Descrizione	Description
13	468750	468750	Adesivo logo PLASMATECH	Sticker logo PLASMATECH
14	438103	438103	Maniglia	Handle
15	438710	438710	Manopola interruttore di linea	Knob for main switch
16	432029	432029	Filtro aria con regolatore pressione aria	Air filter with adjustment pressure
17	404370	404370	Attacco tubo 1/4 gas ingresso aria	Input air nipple 1/4 gas
18	438400	438400	Manometro	Manometer
19	352377	352377	Pannello posteriore	Plastic rear panel
20	427895	427895	Pressacavo completo	Main cable clamp
21	235994	235994	Cavo linea	Main cable
22	420483	420483	Coperchio completo dei loghi PLASMATECH	Steel cover complete of logo PLASMATECH sticker
23	468750	468750	Adesivo logo PLASMATECH	Logo PLASMATECH sticker



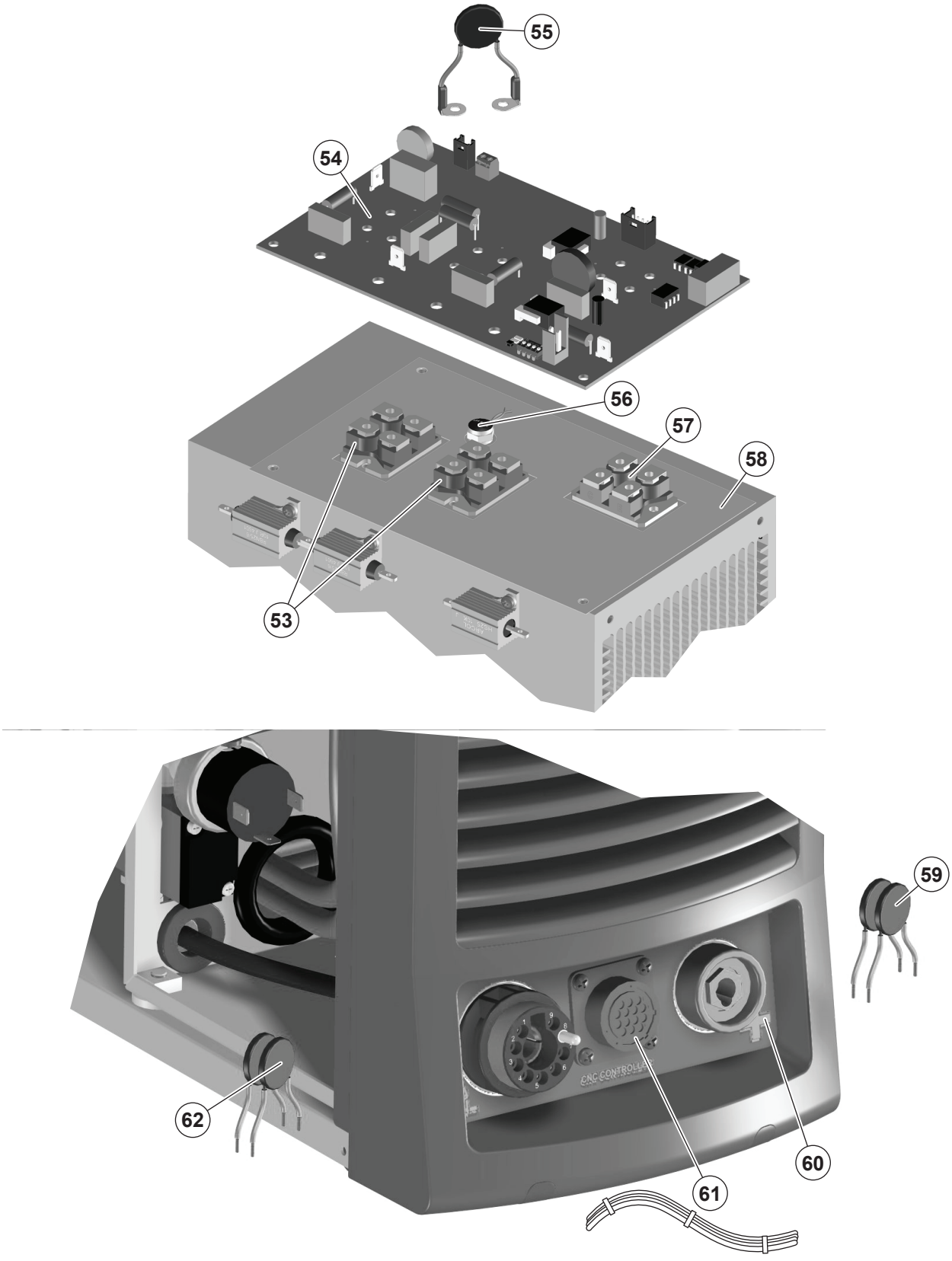


Pos.	SHARK 75	SHARK 105	Descrizione	Description
24	377182	377182	Scheda controllo	Rack control PCB
25	452989	452989	Potenziometro regolazione corrente	Adjustment current potentiometer
26	439399	439400	Pannello rack completo di tastiera a membrana	Rack membrane keyboard complete of steel support
27	423112	423112	Dado per potenziometro	Potentiometer nut
28	438883	438883	Manopola indice nero Ø 29 mm	Current knob
29	435755	435755	Interruttore tripolare	3PH main switch
30	485497	485497	Tubo aria RILSAN PA12 Ø6x8	Ø6x8 rilsan hose
31	413442	413442	Cablaggio ausiliario	Electric wiring
32	453245	453245	Pressostato	Pressostat
33	425946	425946	Elettrovalvola aria	Air solenoid valve
34	463211	463211	Staffa fissaggio elettrovalvola	Solenoid air valve steel bracket
35	377183	377183	Scheda alimentazione	Auxiliary power supply PCB
36	455517	455517	Ponte trifase circuito primario	3PH Primary bridge rectifier
37	376887	376887	Filtro EMC	EMC filter
38	431329	431329	Piedino in gomma	Rubber foot
39	404898	404898	Basamento metallico	Steel base





Pos.	SHARK 75	SHARK 105	Descrizione	Description
40	481443	481442	Trasformatore principale	Power transformer
41	463237	463236	Staffa trasformatore	Bracket for power transformer
42	486383	486383	Ventilatore	Fan
43	481441	481441	Trasformatore ausiliario	Auxiliary transformer
44	457123	457123	Resistore di snubber circuito secondario	Secondary snubber resistor
45	457066	457066	Resistore partitore di tensione	Voltage divider resistor
46	449483	449483	Telaio metallico	Steel chassis
47	240247	240246	Induttore	Inductor
48	466176	466176	Pannello metallico supporto ventilatore	Steel rear panel for fan
49	377185A	377185	Scheda inverter primario	Primary inverter PCB
50	478867	478867	Termistore	Thermistor
51	286046	286046	Modulo IGBT primario	Primary IGBT module
52	352381	352381	Isolamento scheda primaria	Primary circuit insulation sheet



Pos.	SHARK 75	SHARK 105	Descrizione	Description
53	423236	423236	Diodo secondario di potenza	Secondary power diode
54	377184	377184	Scheda secondaria	Secondary PCB
55	418886	418886	Varistore scheda secondaria	Secondary varistor
56	478846	478846	Termostato diodi secondari	Secondary diode thermostat
57	286039	286039	IGBT comando arco pilota	Pilot arc IGBT module
58	352382	352382	Isolamento scheda secondaria	Secondary circuit insulation sheet
59	418858	418858	Condensatori Y2 EMC dinse polo positivo	EMC capacitor for positive pole
60	466869	466869	Adesivo DINSE / attacco centralizzato	DINSE / central plasma connector sticker
61	413392	413392	Cablaggio CNC controller	Electric wiring for CNC controller
62	418854	418854	Condensatori Y2 EMC polo negativo	EMC Capacitor for negative pole

IT Ordinazione dei pezzi di ricambio

Per la richiesta di pezzi di ricambio indicare chiaramente:
1) Il numero di codice del particolare
2) Il tipo di impianto
3) La tensione e la frequenza che rileverete dalla targhetta dei dati posta sull'impianto
4) Il numero di matricola

ESEMPIO
N° 2 pezzi, codice n. 377184 - per l'impianto SHARK 75 - 400 V - 50/60 Hz - Matricola n° .....

EN Ordering spare parts

To ask for spare parts clearly state:
1) The code number of the piece
2) The type of device
3) The voltage and frequency read on the rating plate
4) The serial number of the same

EXAMPLE
N. 2 pieces code n. 377184 - for SHARK 75 - 400 V - 50/60 Hz - Serial number .....

FR Commade des pièces de rechange

Pour commander des pièces de rechange indiquer clairement:
1) Le numéro de code de la pièce
2) Le type d'installation
3) La tension et la fréquence que vous trouverez sur la petite plaque de données placée sur l'installation
4) Le numéro de matricule de la même

EXEMPLE
N. 2 pièces code 377184 - pour l'installation SHARK 75 - 400 V - 50/60 Hz - Matr. Numéro .....

DE Bestellung Ersatzeile

Für die Anforderung von Ersatzteilen geben Sie bitte deutlich an:
1) Die Artikelnummer des Teiles
2) Den Anlagentyp
3) Die Spannung und Frequenz, die Sie auf dem Datenschild der Anlage finden
4) Die Seriennummer der Schweißmaschine

BEISPIEL
2 Stück Artikelnummer 377184 - für Anlage SHARK 75 - 400 V - 50/60 Hz - Seriennummer .....

ES Pedido de las piezas de repuesto

Para pedir piezas de repuesto indiquen claramente:
1) El número de código del particular
2) El tipo de instalación
3) La tensión y la frequencia que se obtien de la chapa datos colocada sobre la instalación
4) El número de matrícula de la soldadora misma

EJEMPLO
N. 2 piezas código 377184 - para instalación SHARK 75 - 400 V - 50/60 Hz - Matrícula N. .....

NL Bestelling van reserveonderdelen

Voor het bestellen van onderdelen duidelijk aangeven:
1) Het codenummer van het onderdeel
2) Soort apparaat
3) Spanning en frequentie op het gegevensplaatje te vinden
4) Het serienummer van het lasapparaat

VOORBEELD
N. 2 stuks code 377184 - voor apparaat SHARK 75 - 400 V - 50/60 Hz - Serie Nummer .....

PT Requisição de peças sobressalentes

Ao pedir as peças de substituição indique claramente:
1) O número de código da peça
2) O tipo de equipamento
3) A tensão e a frequência indicadas na la placa de dados do equipamento
4) O número de matrícula da própria máquina de soldar

EXEMPLO
N° 2 peças código n. 377184 - para o equipamento SHARK 75 - 400 V - 50/60 Hz
Matrícula n. .....

DA Bestilling af reservedele

For at bestille reservedele skal man nøjagtigt angive:
1) Reservedelens kodenummer
2) Anlæggets type
3) Spænding og frekvens, som står på anlæggets typeskylt
4) Selve svejsemaskinens registreringsnummer

EKSEMPEL
2 stk. nummer 377184 - til anlæg model SHARK 75 - 400 V - 50/60 Hz
Registreringsnummer Nr. .....

SV Beställning af reservdelar

Vid förfrågan av reservdelar ange tydligt:
1) Detaljens kodnummer
2) Typ av apparat
3) Spänning och frekvens - den står bland tekniska data påapparatens märkplåt
4) Svetsens serienummer

EXEMPEL
2 st. detaljer kod 377184 - för apparat SHARK 75 - 400 V - 50/60 Hz - Serienummer .....

FI Varaosien tilaus

Tiedustellessanne varaosia, ilmoittakaa selvästi:
1) Osan koodinumero
2) Laitteiston tyyppi
3) jännite ja taaiuus, jokta on ilmoitettu laitteistolle sijoitetusta tietokyltistä
4) Hitsauskoneen sarjanumero

ESIMERKKI
2 osaa, koodi 377184 - laitteistoon SHARK 75 - 400 V - 50/60 Hz - Sarjanumero .....

N Bestilling av reservedeler

Ved bestilling av reservedeler må du oppgi:
1) Delenes kodenummer
2) Type apparat
3) Apparatets spenning og frekvens som finnes på merkeplaten for data på apparatet
4) Sveiseapparatets serienummer

EKSEMPEL
2 stk. kode 377184 - for apparat SHARK 75 - 400 V - 50/60 Hz - Serienummer.....

RU Заказ запасных частей

Для запроса запасных частей укажите точно:
1) код запчасти,
2) модель машины,
3) напряжение и частоту, написанные на пластине,
4) ее серийный номер.

ПРИМЕР
2 шт., код № 438401
n - штук деталей, код 377184, для сварочной машины SHARK 75 - 400 B - 50/60 Hz
Серийный номер .....

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