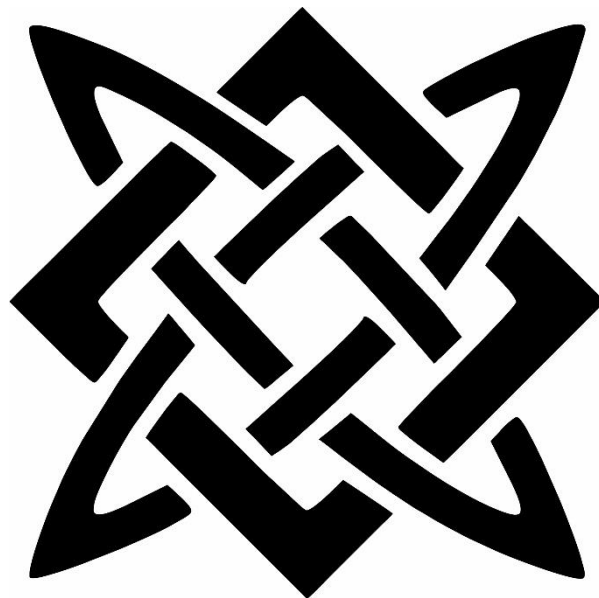


PLASMA CUTTING MACHINE

**SVAROG 85 PLASMA
SVAROG 85 PLASMA CNC**

OPERATING MANUAL



CONTENT

1.	INTRODUCTION	3
2.	SAFETY	4
	General requirements.....	4
	Protective equipment.....	4
	Risks - overview	4
	Prohibited activities	6
3.	CONDITIONS OF USE.....	6
4.	TECHNICAL DATA.....	7
	Torchs.....	8
	Cutting parameters.....	8
	Operation on the power generator.....	9
	Pressure air source requirements.....	9
	Connection to the central air distribution system	10
	Pre-set Water Separator and Air Filter for SVAROG PLASMA.....	11
5.	DESCRIPTION OF MACHINE AND FUNCTIONS.....	12
	Main parts	12
	Control panel.....	13
6.	ACCESSORIES	17
	Part of delivery SVAROG 85 HAND PLASMA.....	17
	Accessories to order.....	17
7.	HAND TORCH AND CONSUMABLE PARTS	18
	SV-FIT system	18
	Lifetime of consumable parts.....	19
	How to choose the right consumable parts.....	19
	Names of SVH torch parts.....	20
	Hand torch SVH-105 and consumables	20
	Consumable parts	20
	Superlong nozzle	22
	Bevel tools and circle cutting	23
	Single-use cartridges.....	23
8.	MACHINE COMMISSIONING	24
9.	HAND CUTTING	25
	Important rules	25
	Causes of poor quality cuts	26
10.	MACHINE CNC CUTTING	27
11.	TORCH WIRING DIAGRAM.....	28
12.	MAINTENANCE	28
13.	ERROR MESSAGES	29
14.	SERVICE	30
	Provision of a guarantee	30
	Warranty and post-warranty repairs	31
15.	DISPOSAL OF ELECTRICAL WASTE	31
16.	WARRANTY LETTER	32

1. INTRODUCTION

Dear consumer,

ALFA IN a.s. Thank you for purchasing our product and we believe that you will be satisfied with our machine.

The SVAROG 85 PLASMA CNC machine is designed for cutting metals on the basis of modern technology of material cutting by means of a thin jet of plasma gas. This technology has several advantages over other methods

1. High cutting speed
2. Quality cut with a minimum area of the changed material structure
3. Smaller thermal deformations of the cut material
4. Possibility of cutting carbon and high-alloy, stainless steels and non-ferrous metals
5. The method does not require any special gases
6. Lower costs

SVAROG 85 PLASMA CNC is equipped with a proportional valve that allows precise automatic and synergic settings of the required working pressure of the cutting gas (according to the cutting mode and the cutting current). As well the manual settings of the cutting gas pressure can be adjusted right from the control panel.

The machine is equipped with the ecological function "fan on demand". If cooling is not required, the machine automatically shuts off the fan.

The CNC models support the cutting arc remote control of the CNC table controllers.

SVAROG 85 PLASMA CNC is designed for high-quality cutting of materials up to 30 mm thick mild steel. Productive cutting of carbon steel can be to a thickness of 20 mm. At lower demands on the quality of the cut can be cut through (separate) the material thickness to 35 mm. Maximal piercing is 25 mm (mild steel). For more data see TECHNICAL DATA.

We reserve the law of adjustments and changes in case of printing errors, change of technical parameters, accessories etc. without previous notice. These changes may not be reflected in the manuals for use in paper or electronic form.



2. SAFETY

General requirements

1. The machine may only be operated by a worker who is thoroughly familiar with the issue of plasma cutting and who has received appropriate training.
2. Disconnect the device from the mains before any work on the electrical part, removal of the cover or cleaning.
3. For the cutting machine, it is necessary to perform a periodic inspection once every 6/12 months by an authorized employee – see paragraph Maintenance.
4. For safety reasons, protective gloves must be worn when plasma cutting. These gloves protect you from heat radiation and splashes of hot metal.
5. Wear solid insulated shoes. Open shoes are not suitable as drops of hot metal can cause burns.
6. Do not look into the cutting arc without face and eye protection. Always use a high-quality welding helmet with an intact protective filter.
7. Persons in the vicinity of the cutting site must also be informed of the danger and must be provided with protective equipment.
8. When cutting, especially in small spaces, a sufficient supply of fresh air must be ensured, as harmful fumes are produced during cutting.
9. Do not perform cutting work on gas, oil, fuel, etc. tanks (even empty ones) as there is a risk of explosion.
10. Special regulations apply in potentially explosive atmospheres.

Protective equipment

1. Welding helmet with filter shade at least 10
2. Welding gloves
3. Welding apron and cloth
4. Welding boots

Risks - overview

1. Risk of electric shock
2. Ultraviolet light and light radiation
3. Risk of inhaling gas fumes and dust particles
4. Burns
5. Noise



Note

Danger of electric shock, especially if the insulation of the torch, the supply cable fails and if the machine covers are damaged. be aware that the torch can have a voltage of up to 330 volts.

The parameters of the torch comply with the EN 60974-7 standard, voltage class M.

**Note**

The machine torch cannot be used for versions without CNC!

**Note**

1. It is forbidden to operate a machine with damaged insulation of the cutting torch or supply cable.
2. Never operate the machine taken down or damaged covers.
3. In addition to the risk of injury, the cooling efficiency decreases and the level of interference increases.
4. It is forbidden to operate the machine in wet environments and outdoors in rain or snow.
5. Ensure proper grounding clamping pliers, which also reduces the risk of electric shock.
6. Use prescribed protective utilities, keep them dry.
7. Plasma arc cutting produces intense electric and magnetic emissions that may interfere with the proper function of cardiac pacemakers, hearing aids, or other electronic health equipment. Persons who work near plasma arc cutting applications should consult their medical health professional and the manufacturer of the health equipment to determine whether a hazard exists.
8. The cutting and pilot arc is a source of very intense light and especially ultraviolet radiation. This radiation can significantly damage the eyesight in a very short time and, with prolonged exposure, causes redness to burns of uncovered parts of the skin.
9. Use a welding helmet equipped with an intact filter with a degree of protection of min. 10.
10. The risk of burns arises when cutting from flying hot metal particles, plasma arc and hot cut material. A thin beam of red-hot plasma (4th state of matter) reaches up to 10,000 ° C in its core!
11. Never point the torch at the eyes, body or other person during ignition.
12. Always wear good quality and undamaged welding gloves, apron and welding clothing, including closed shoes and headgear.
13. During cutting, a large amount of gaseous emissions and dust particles is formed from the material being cut.
14. High temperatures lead to chemical reactions and the formation of various oxides and other compounds, some of which are harmful to health.
15. Particularly hazardous fumes are produced when cutting material containing lead, beryllium, cadmium (cadmium-plated parts) and painted materials.
16. Ultraviolet radiation and high temperatures also produce significant amounts of ozone and nitrogen oxides.

17. Exceeding the concentration of these gases above the values given by hygienic standards can cause damage to health, especially with prolonged exposure.
18. Workplaces must be well ventilated and equipped with an effective extraction system.
19. In addition, a breathing mask must be used when cutting material where particularly hazardous fumes are generated.
20. During its operation, the machine produces noise, the level of which reaches the value of 80-85 dB.
21. We recommend using hearing protection for longer work.

Prohibited activities

1. It is forbidden to use the machine in areas with a risk of explosion and in areas with the possibility of easily flammable and flammable substances.
2. It is forbidden to cut containers with residues of any flammable or unknown substances.
3. It is forbidden to cut on closed pressure vessels without first releasing the pressure and leaving it open.

👉 Notice 👉 Persons with implanted pacemakers must not operate the machines or move in close proximity to them! There is a risk of impaired pacemaker function!

3. CONDITIONS OF USE

1. 1st Putting into operation may only be performed by trained personnel and only in the technical provisions. The manufacturer is not liable for damage caused by improper use and operation. Only use original spare parts from ALFA IN for maintenance and repairs.
2. The device complies with IEC 61000-3-12.
3. The cutting machine is tested according to the standard for degree of protection IP 23 S, which provides protection against the ingress of solid bodies with a diameter greater than 12 mm and protection against the ingress of water falling in a vertical to oblique direction up to 60°.
4. Working ambient temperature between -10 and +40 °C.
5. Relative humidity below 90% at +20 °C.
6. Up to 3000 m altitude.
7. The machine must be positioned so that cooling air can enter and exit the cooling vents without restriction. Care must be taken to ensure that no mechanical particles, especially metal particles, are sucked into the machine (during grinding).
8. When the machine overheats, cutting is automatically interrupted.
9. All interventions in the el. equipment as well as repairs (disassembly of the

mains plug) may only be carried out by an authorized person.

10. SVAROG 85 PLASMA is designed for mains voltage 3x400 V.
11. The mains voltage and power input must correspond to the mains plug.
12. For the cutting machine, it is necessary to perform a periodic inspection once every 6/12 months by an authorized employee – see paragraph Maintenance.
13. Cutting machine in terms of interference suppression is intended primarily for industrial premises. In the case of use of other areas may be need for special measures (see EN 60974-10).
14. The machine must be protected against:
 - a. Moisture and rain and snow
 - b. Mechanical damage
 - c. Draft and any ventilation of neighbouring machine
 - d. Excessive overloading – crossing technical parameters
 - e. Rough handling

Electromagnetic compatibility

The welding device is in terms of interference designed primarily for industrial areas. It meets the requirements of EN 60974-10 class A and it isn't designed for using in residential areas, where the electrical energy is supplied by public low-voltage power supply network. It can be here potential problems with ensuring of electromagnetic compatibility in this areas, due to interference caused by power lines as well as the radiated interference.

During operation, the device may be the source of interference.

 Caution 

We warn users, that they are responsible for possible interference from cutting.

4. TECHNICAL DATA

Method		Plasma cutting
Mains voltage	V/Hz	3 x 400/50-60
Cutting current range	A/V	20/88,0 - 85/140,0
Open-circuit voltage U_{20}	V	330
Mains protection	A	@32
Max. effective current $I_{1\text{eff}}$	A	26,7
Cutting current (DC=100%) I_2	A	85
Cutting current (DC=60%) I_2	A	85
Cutting current (DC=x%) I_2	A	100%=85
Current regulation		continuous
Protection		IP 23 S
Standards		EN IEC 60974-1, EN 60974-10 ar. A

Dimensions (w x l x h)	mm	378 x 696 x 619
Weight	kg	39,6
Efficiency	%	90
Input power in idle mode P ₁₀	W	24
Ambient temperature	°C	-10 ÷ +40
Relative humidity	%	90
Altitude above the sea level	m	max. 1000 m

DC – (Duty Cycle) load time. The parameter specifies the time of the ten-minute interval as a percentage (at surrounding temperature and machine temperature 40°C), during which the thermal protection of the machine or the circuit breaker does not switch off the cutting process.

Torches

Max. Input pressure	bar	8,5
Working pressure (Cutting, torch SVH/SVS 105/6,7-9m)	bar	5,0 - 5,5
Working pressure (Gauging, torch SVH-105/6,7m)	bar	3,5-4,5
Air consumption at 85 A (torch SVH/SVS 105/6,7-9m)	l/min	205
Arc ignition		pneu-mechanic

Cutting parameters

Productive Pierce/Cut (I _{2max})*		mm	20*
Productive Pierce/Cut (I _{2 DC=100%})**		mm	20**
Max. Pierce/Cut (I _{2max})***		mm	25***
Max. cut (separate mat.) (Edge start) (I _{2max})		mm	35
Quality Cut (I _{2max}) _Δ	Mild steel	mm	30 ^Δ
	Stainless steel	mm	26 ^Δ
	Aluminium	mm	20 ^Δ
	Copper	mm	16 ^Δ
Max. productive cut speed (material thickness) ^{Δ Δ}			
6 mm		m/min	5,09 ^{ΔΔ}
12 mm		m/min	2,06 ^{ΔΔ}
25 mm		m/min	0,58 ^{ΔΔ}
Parameters were measured on laboratory conditions on CNC ALFATEC machines. Actual cutting speeds and thicknesses may vary based on different cutting applications.			

*Cutting process whereby the plasma is set to the maximum cutting current and a good cut quality is achieved at a relatively good speed.

** Cutting process whereby the plasma is set to the current equal to 100% of duty cycle and a good cut quality is achieved at a relatively good speed.

*** Cutting process whereby the plasma is set to the maximum cutting current and an acceptable cut quality is achieved.

△ Cutting process whereby the plasma is set to the maximum cutting current and a good cut quality is achieved.

△△ Cutting process whereby the plasma is set to the maximum cutting current and a good cut quality is achieved.

Operation on the power generator

Cutting current	Sustained performance of power generator
85 A	26 kVA
70 A	20 kVA
40 A	16 kVA
30 A	11 kVA

The continuous power of the control panel is stated only for the connection of the plasma, as a single appliance.

Pressure air source requirements

The supply air pressure must not exceed 8.5 bar and must not be less than 6.5 bar. The operating pressure and air consumption for the prescribed torch are given in chapter **Chyba! Nenalezen zdroj odkazů..**



For reliable operation of the plasma cutter and quality cuts, we recommend the following recommendations when selecting the appropriate type of compressor:

1. The compressor must be able to deliver a minimum of 295/370 litres/min of compressed air permanently. This parameter is referred to in the catalogues as the so-called "compressed air capacity".

 **Notice**  **Not to be confused with „suctioned quantity”!**

2. The aerator must be equipped with a drain valve.
3. It is essential that the compressor is equipped with a compressed air cooler or a sufficiently large air receiver. Otherwise, heated air enters the distribution system and may contain significant amounts of water that cannot be captured in the separators. As the air cools after it passes through the ducts, it may reach the dew point, causing water droplets to be expelled, which may be after the separator. The optimum size of the airbox is at least 100 litres.
4. An efficient filter with sufficient capacity, an oil and condensate separator or a pressure regulator must be installed at the outlet if the compressor operating pressure is higher than 8.5 bar. These elements must be rated for a flow rate of at least 370 l/min so as not to cause a drop in outlet pressure during cutting.
5. The inside of the airbox should be coated against corrosion.

6. The compressor intake should be fitted with an efficient intake air filter, especially for mobile compressors when operating in dusty environments.

 **Caution**  **Some compressors have a built-in pressure air mixer at the outlet. Under no circumstances must the plasma cutter be connected to this outlet! This would contaminate the entire pneumatic system and could damage the torch.**

Connection to the central air distribution system

1. Before connecting, determine the working pressure in the system and the extent of its fluctuation.
2. During cutting, the working pressure must be between 5.0 and 6.0 bar. To achieve maximum cutting performance, we recommend that the pressure does not drop below 5.5 bar.
3. Check the performance and technical condition of the central compressor(s). The same requirements as above apply here.
4. Check the design and condition of pressure air filtration and condensate trapping.
5. Ensure that the system is not centrally lubricated.
6. Include an additional filter and separator at the connection point closest to the cutter. This is particularly important for older pipes made of conventional steel pipes where the inner walls may be badly corroded. A filter and separator is essential for systems with long ducts that pass through cold environments where the compressed air may cool to the dew point, causing condensation of water droplets.

Pre-set Water Separator and Air Filter for SVAROG PLASMA

To achieve high quality cutting and to avoid serious malfunctions on the torch, it is strongly recommended that a water separator or at least a filter is always included in the water supply.

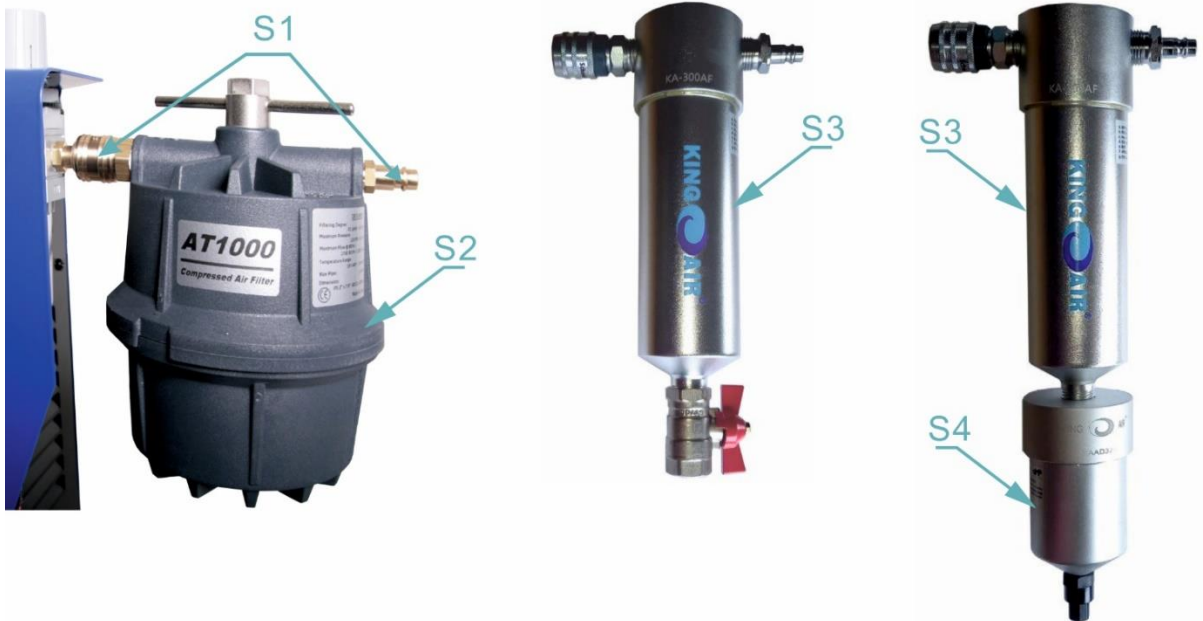


Fig. 1 Air Filter and Water Separator

Pos.	Code	Description
S1	5304	Filter - set AT 1000 k SVAROG PLASMA
S2	5302	Air filter AT 1000
S3	7704	Water separator including fittings
S4	6079	Condensate drain

👉 Note 👉 Max. operating pressure of the AT 1000 filter is 8.5 bar.

5. DESCRIPTION OF MACHINE AND FUNCTIONS

Main parts

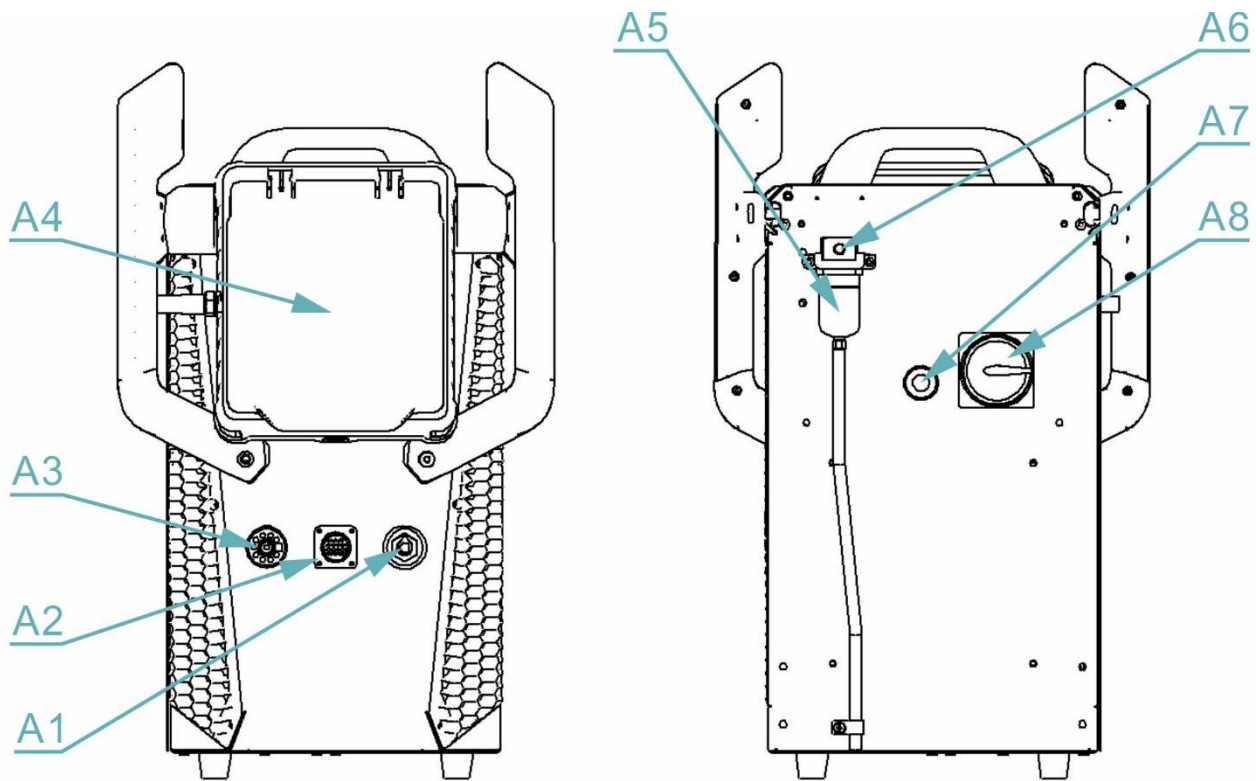


Fig. 2 Main parts of the machine, front and rear view

Pos.	Description
A1	Quick connector - earthing cable
A2	Connector - remote control (CNC version only)
A3	Connector - torch
A4	Control panel
A5	Cleaner
A6	Air connection
A7	Network cable
A8	Main switch

Control panel

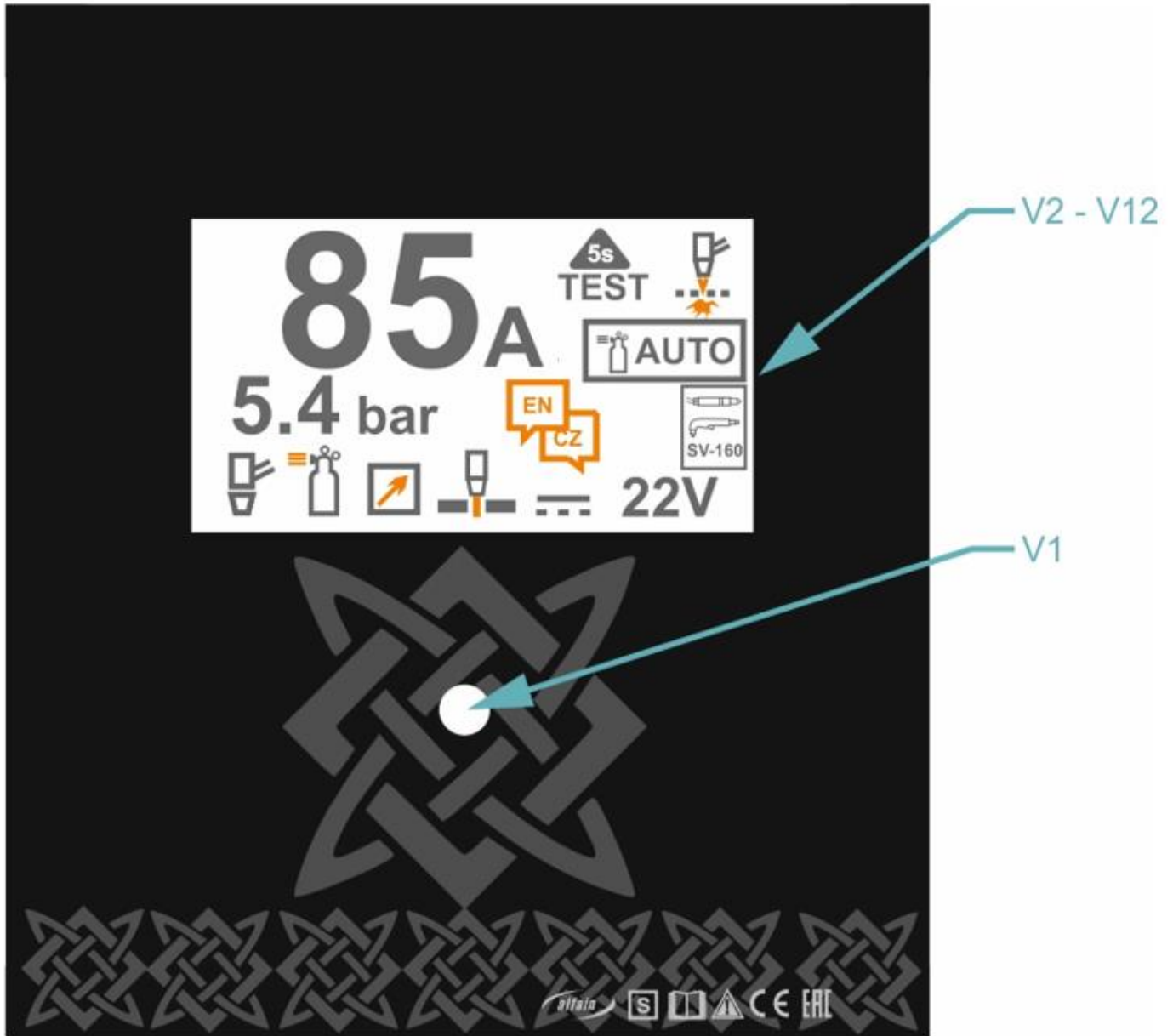




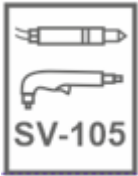














Fig. 3 Control panel

Pos.	Icon	Description
V1	---	Encoder with button
V2-V11	---	Display with overall icon layout
V2	85_A 85 _A	Cuttin current <ul style="list-style-type: none"> Always active after switching on the machine
V3	5s TEST	Gas test <ul style="list-style-type: none"> active when encoder V1 is pressed for 5 sec The value is changed by

		turning the encoder V1 <ul style="list-style-type: none"> Exit the gas test by briefly pressing encoder V1
V4	5.4 bar	Pressure
		Cutting solid material
		Cutting of perforated material
		Grooving
V6	bar Mpa Psi	Change of units
V7	 10	Display brightness 1 - 10
V8	22 V	Current voltage <ul style="list-style-type: none"> this value cannot be changed
V9		Consumable catalogue <ul style="list-style-type: none"> If a torch is not recognised, this icon does not appear. If a torch is recognised, you can reach this icon by means of short presses of the encoder V1. Then first window of the consumable catalogue will be displayed. By means of turning the encoder you scroll through the consumable catalogue. To get out of this catalogue, press the encoder or wait for 5 s.

V10		<p>Automatic/manual pressure setting mode selector. The selector switches between automatic and manual mode.</p> <ul style="list-style-type: none"> • If the torch is not recognised, the machine will be only in the manual mode. AUTO mode cannot be selected. • AUTO mode is the default mode if the torch is recognised. <p>In the automatic mode, the power supply automatically sets the gas pressure based upon the torch, cutting current and cutting mode.</p> <p>In the AUTO mode the pressure is displayed, but cannot be changed.</p> <p>In the MAN mode the pressure can be changed.</p> <p>When you switch from a manual mode to an automatic mode, the power supply automatically sets the gas pressure and the amperage setting is unchanged. When you switch from an automatic mode to a manual mode, the machine remembers the previous manual gas pressure setting and the amperage setting is unchanged.</p> <p>When you switch off the power and then ON, the machine remembers the previous mode, gas pressure, and amperage settings.</p>
V11		<p>Selecting the language of the ERROR codes legend. (Czech, English, German, Polish, Russian, Spanish)</p>

V12		The consumable parts on the torch are complete
		Gas flow is active
		Remote current setting is active.
		The arc is active
		There is tension on the arc
		The S mark indicates that the machine and torch are suitable for operations in environments with an increased risk of electric shock in accordance with EN 60974-1
		CE mark declaration of the manufacturer's stairs with European directives and standards
		EAC brand of product safety and meeting EMC requirements for export to the Russian Federation, Belarus and Kazakhstan.
		Read the operating manual carefully before use.
		Warning - general danger.

Note:

Switch between individual parameters / modes by pressing encoder V1. The active parameter / mode is highlighted in orange, when switching to another parameter / mode the original quantity will be highlighted in gray and the new one in orange.

6. ACCESSORIES

Part of delivery SVAROG 85 HAND PLASMA

Pos.	Code	Description
Fig. 8	7037-1	Torch Plasma SVH-105 hand 75°
Fig. 6 A	7076	Cable Package 6,7 m SV-105, SV-125 6 PIN
	V9030092	Earthing cable 6m 10-25 200 A 16 mm2

Accessories to order

Pos.	Code	Description
	7192	Starting Kit for SVH-105 Hand (85A)
	7195	Starting Kit for SVS-105 Machine (85A)
Fig. 6 B	7088	Cable koax. extension 6,0 m SV-105, SV-125 6 PIN
Fig. 6 A	7076	Cable Package 6,7 m SV-105, SV-125 6 PIN
	7101	Lubricant silicon WSF-2 brutto 6 g
Fig. 8	7037-3	Torch Plasma SVH-105 hand 75°
Fig. 8	7038-3	Torch Plasma SVH-105 hand 15°
Fig. 8	7094-3	Torch Plasma SVH-105 hand, handle 80 cm 90°
Fig. 8	7095-3	Torch Plasma SVH-105 hand, handle 130 cm 90°
Fig. 8	7096-3	Torch Plasma SVH-105 hand, handle 80 cm 15°
Fig. 8	7097-3	Torch Plasma SVH-105 hand, handle 130 cm 15°
	7088	Cable koax. extension 6,0 m SV-105, SV-125 6 PIN
	5872	Bevel Tolls PT 40, 60, SCP 60, TH-70,125
	7175	Circle cutting attachment - set SVH-105,125
Fig. 5	5.0545	Cart SVAROG 85 Plasma
Fig. 4	5.0508	Welding carriage P 80
	5302	Air filter AT 1000
	5304	Filter - set AT 1000 k SVAROG PLASMA
	S777c.	Welding Helmet Barracuda S777C

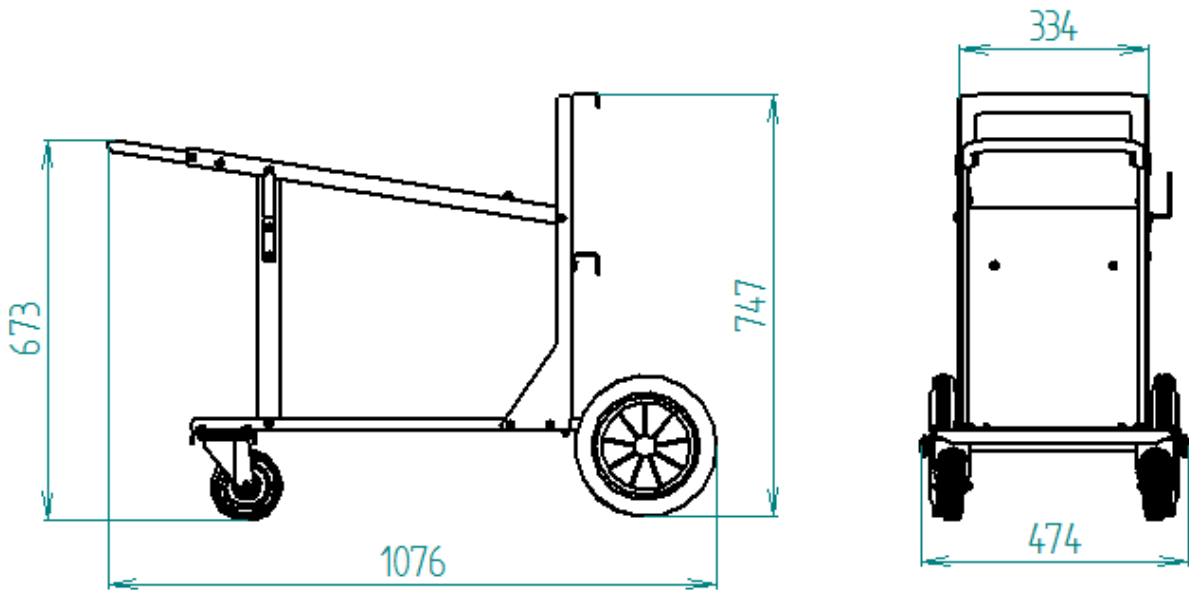


Fig. 4 Carriage P 80

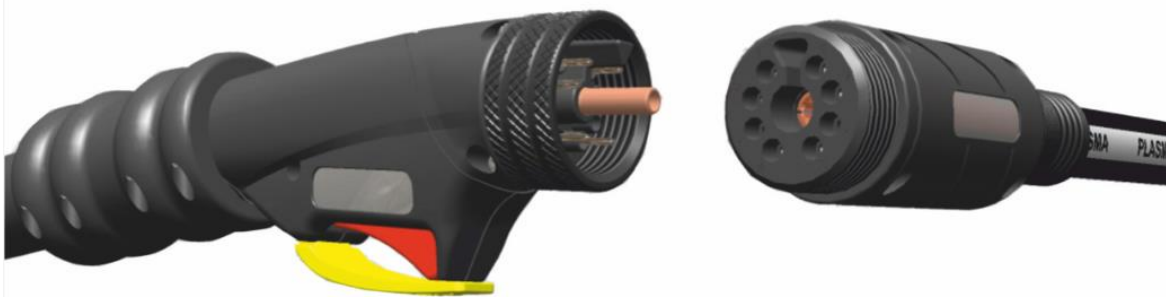


Fig. 5 Cart SVAROG 85 Plasma

7. HAND TORCH AND CONSUMABLE PARTS

SV-FIT system

The SV-FIT system allows great variability when using different ends of welding torches or allows to extend the torch length from the standard 6.7 m to 12.7 m by purchase. (Extensions up to a total length of 16 m are available on request).



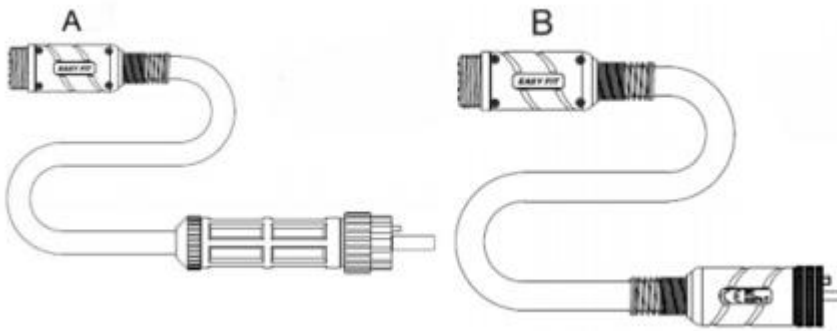


Fig. 6 SV-FIT system



Fig. 7 Torches SVH with long handles, SV-FIT system

Lifetime of consumable parts

The need to change consumables on your torch depends on the thickness of the material to be cut, the length of the cut, the air quality (presence of moisture, oil and dirt), the way the cut is started (side or puncture), the appropriate piercing height, cutting mode (solid material or perforated).

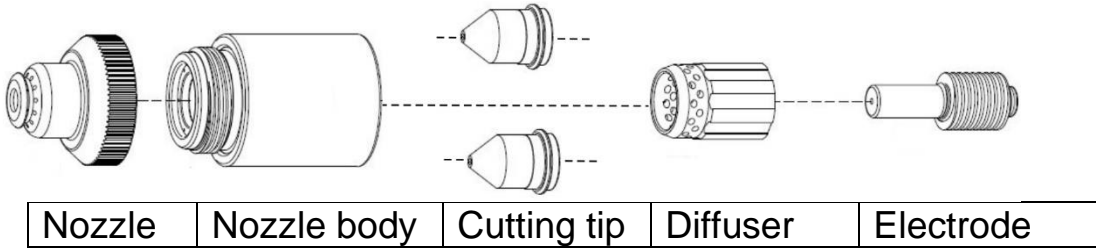
In general, the current set of consumables lasts an average of 1 to 3 hours of cutting (ignited arc). Under normal conditions, the nozzle wears first when cutting by hand, the electrode lasts about half as long.

How to choose the right consumable parts

All 6 types of torch SVH-105 use the same consumables that are protected, so the nozzles can be pulled over the cut material.

For the best cut quality, it is necessary to use suitable sets of consumable parts. The individual assemblies by power and type, including order numbers, are listed in the table below.

Names of SVH torch parts



You can use the SUPERLONG NOZZLE SET for cutting in very hard-to-reach areas, Fig. 9.

Hand torch SVH-105 and consumables

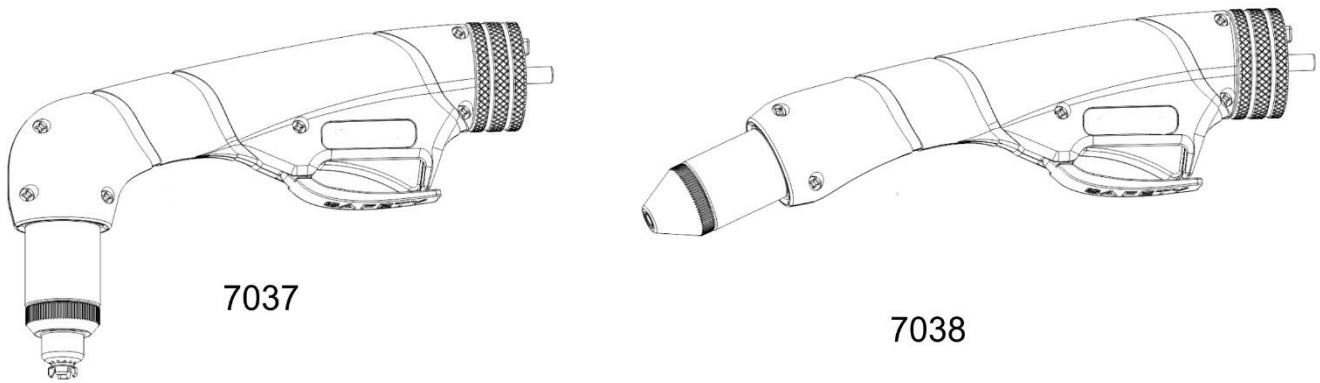
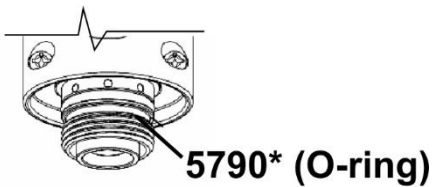
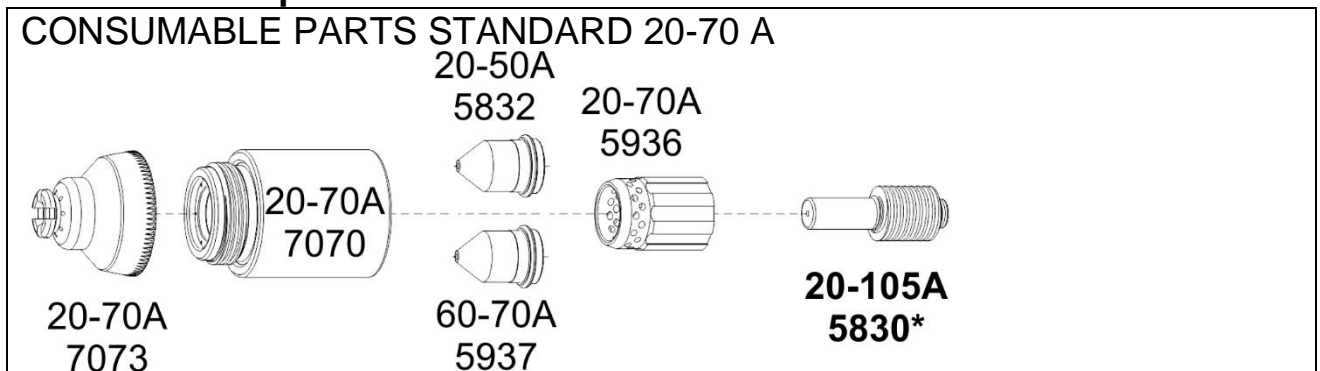
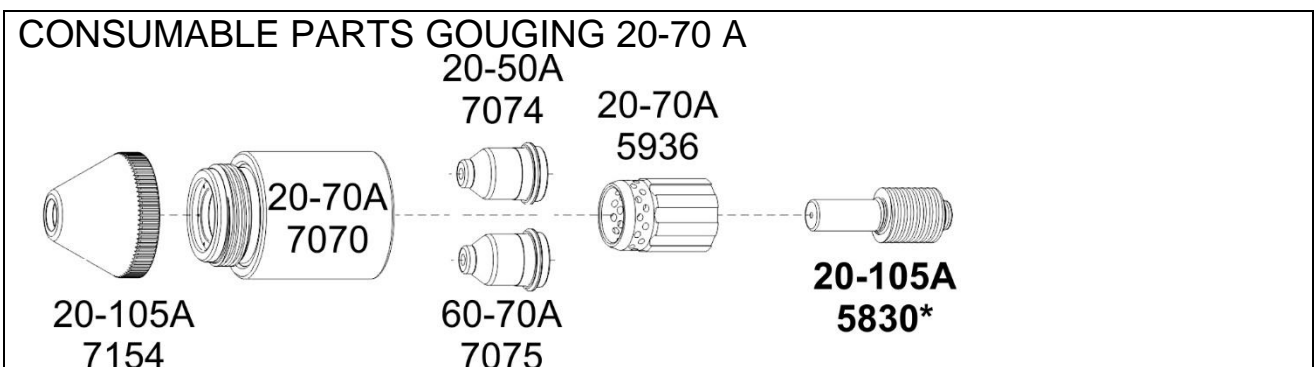
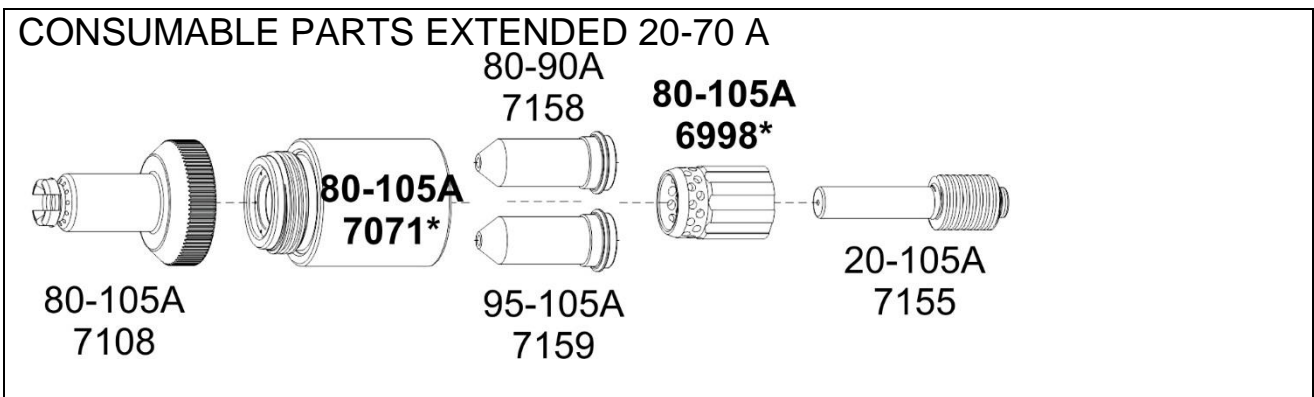
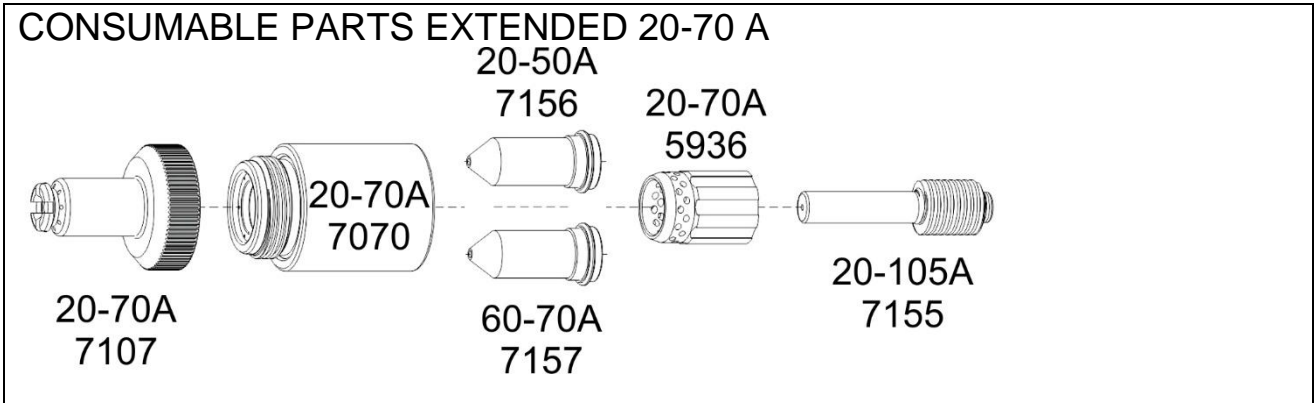
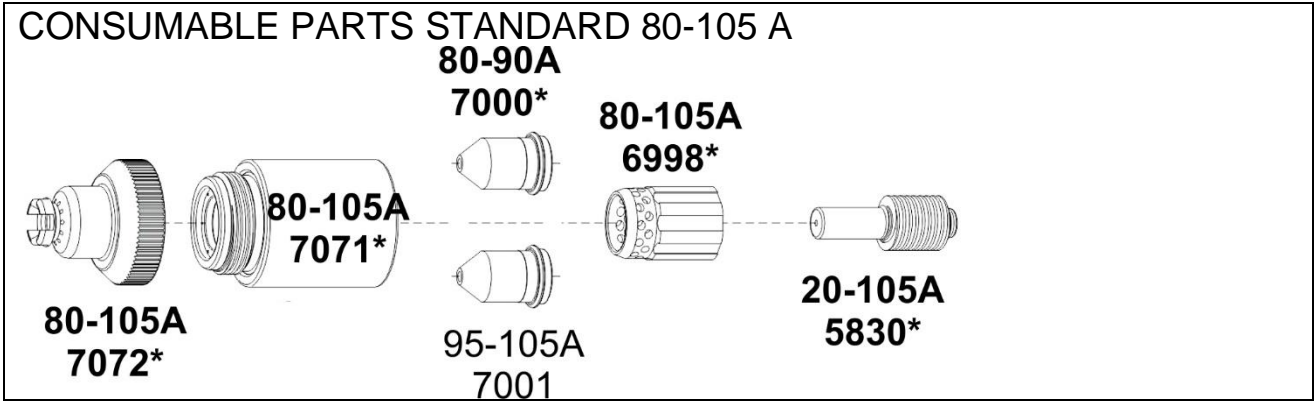


Fig. 8 Hand torch SVH-105

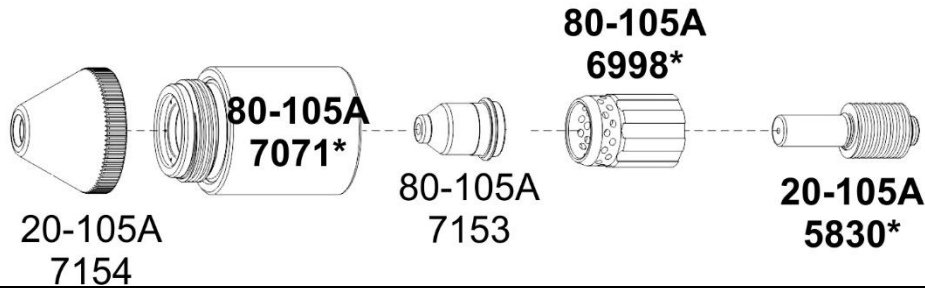


Consumable parts





CONSUMABLE PARTS GOUGING 80-105 A



Parts with * are mounted on the torch upon delivery.

Starting kit

7192	Starting Kit for SVH-105	
5832	Cutting tip 20-50A	2pc
5937	Cutting tip 70A	2pc
7000	Cutting tip 85A	2pc
5830	Electrode	8pc
7073	Nozzle 20-70A	1pc
7070	Nozzle body 20-70A	1pc
5936	Diffuser 20-70A (pack.2)	1pc

Superlong nozzle

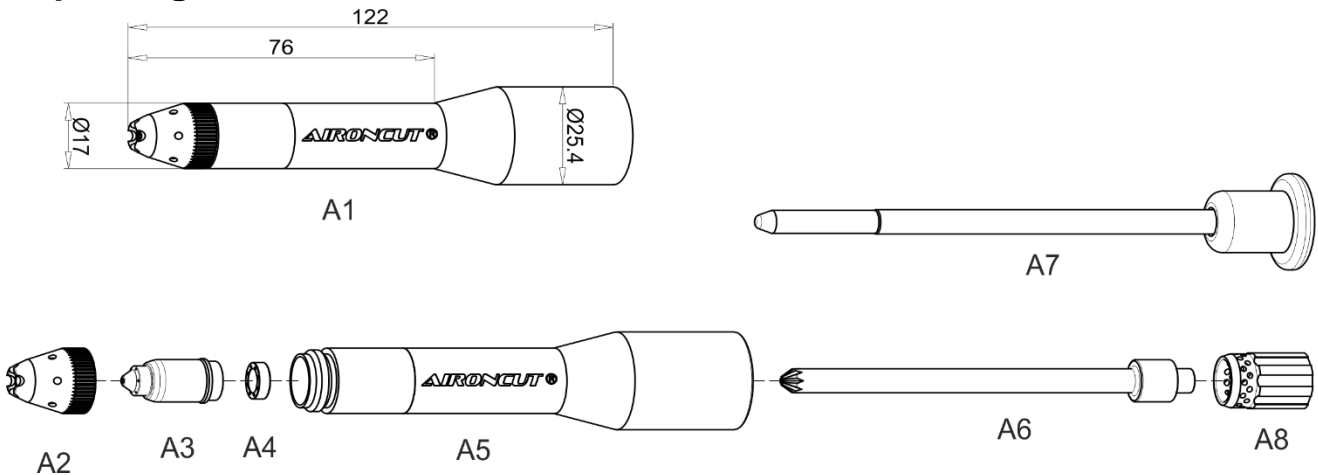


Fig. 9 Superlong Nozzle – consumable parts

Consumable parts of torch (see Fig. 9)		
A1	7168	Complete super long set 70A SVH-105
A2	7166	Nozzle 20-70A
A3	7163	Cutting tip 15-30A
	7164	Cutting tip 45A
	7165	Cutting tip 70A
A4	7162	Ring A SVH
A5	7161	Nozzle super long body
A6	7160	Super long Electrode

A7	7167	Nozzle ejector
A8	5936	Diffuser (bal.2)

Bevel tools and circle cutting

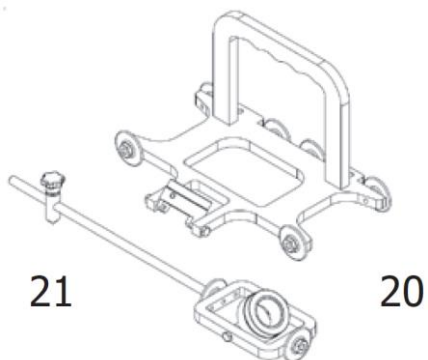
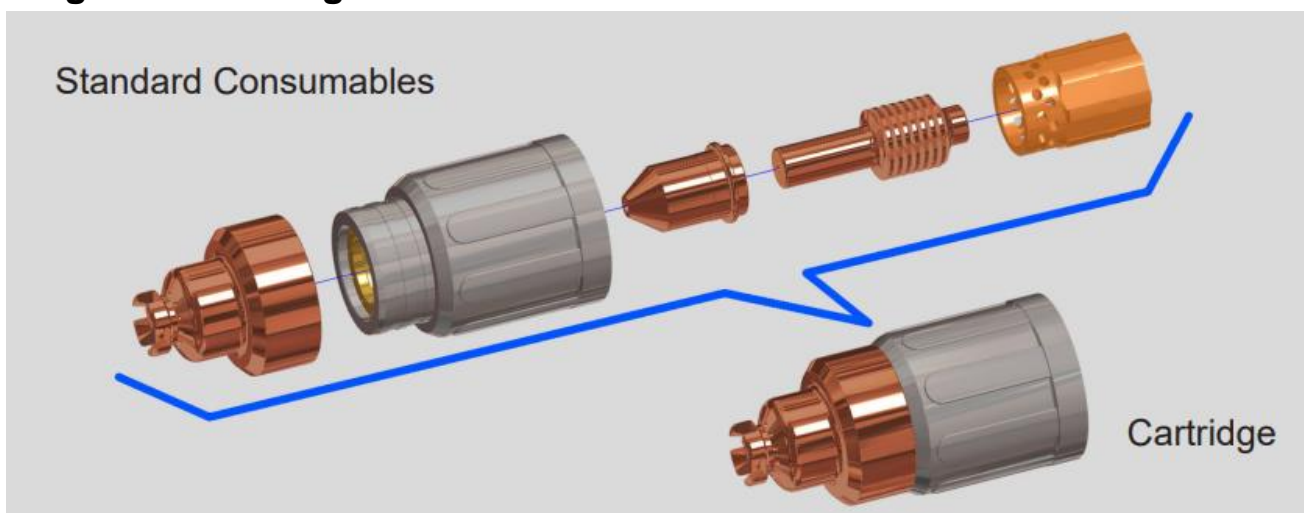

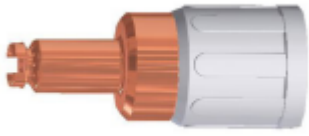




Fig. 10 Bevel tools and circle cutting

20	5872	Bevel tools
21	7175	Circle cutting – set SVH-105,125

Single-use cartridges






	7284	Cartridge SVH-105 45A Hand
	7285	Cartridge SVH-105 70A Hand
	7286	Cartridge SVH-105 85A Hand
	7287	Cartridge SVH-105 105A Hand
	7295	Cartridge extended SVH-105 45A
	7296	Cartridge extended SVH-105 70A
	7297	Cartridge extended SVH-105 85A
	7298	Cartridge extended SVH-105 105A
	7292	Cartridge gouging SVH-105 45A
	7293	Cartridge gouging SVH-105 70A

	7294	Cartridge gouging SVH-105 105A
	7299	Cartridge SVH-105 40/70A FLATCUT
	7300	Cartridge SVH-105 80/105AA FLATCUT

8. MACHINE COMMISSIONING

The commissioning of the machine must be in accordance with the technical data and operating conditions.

 **Caution**  **The machine may only be operated by properly trained persons.**

1. Before starting work, the machine must be connected to a network that meets the requirements specified in the technical data.
2. Check the completeness of the cutting torch.
3. Fit the torch and turn the nut clockwise to secure the torch securely.
4. Connect the **A7** network cable to the network according to the parameters in chapter 4. TECHN1.
5. Use the quick connectors to connect the compressed air to the **A6** connector on the back of the machine.
6. Set the pressure with encoder **V1** to 5.5 bar for cutting and 4.8 bar for grooving.
7. When the **A8** main switch is turned on, the display lights up.
8. Connect the earth cable to the quick coupler **A1** and the cut material pliers.
9. Check the inlet air pressure and adjust if necessary. It must not be higher than 8.5 bar and not lower than 6.5 bar.
10. Set the potentiometer of the cutting current size control to the value corresponding to the material to be cut.
11. Depending on the selected cutting stream size, set the torch with the appropriate cutting tip diameter.
12. Press the button on the torch handle, the pre-blowing starts for 1 s.
13. Pilot arc ignites.
14. Move the torch to the material, the pilot arc turns into a cutting arc. If you do not start cutting within two seconds, the arc will go out. If the torch is moved away from the material while cutting, the arc will go out. If the machine is in the gap material cutting mode - see the corresponding **V5** icon  on the control panel, the cutting arc will change to a pilot arc and if you do not start cutting within 2 seconds, this arc will go out.
15. Stop cutting by releasing the button on the torch handle.

9. HAND CUTTING

1. Pressing the torch button ignites the pilot arc. The torch must then be immediately attached to the material to be cut. At this point, the main arc between the torch and the material being cut starts to burn.
2. It is necessary to move the torch at a uniform speed by pulling the nozzle directly over the material, its value depends on the thickness and type of material to be cut and the size of the cutting current. We recommend to test first.
3. Metal cutting can be carried out in all possible positions (horizontal, horizontal, overhead, vertical ascending and descending and also across in the above positions) if the appropriate parameters are selected, however, if possible, a horizontal cut is preferred. In other positions, the operator is at increased risk from flying droplets of molten material.
4. If possible, we recommend starting at the edge of the material. In case you are cutting a hole or need to start from the centre of the material, tilt the torch head slightly and gradually straighten it to a vertical position so that the spraying material does not block the cutting tip, (see Fig. 11) This working procedure must always be followed if the thickness of the material to be cut exceeds 3 mm.
5. If the cut is made in a corner or angle (see Fig. 12), we recommend using an extended electrode and cutting tip. However, the lower cutting power compared to the short version must be taken into account.

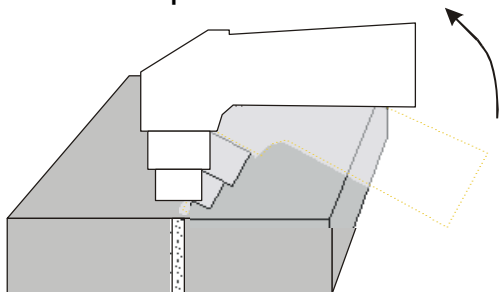


Fig. 11 Lateral start

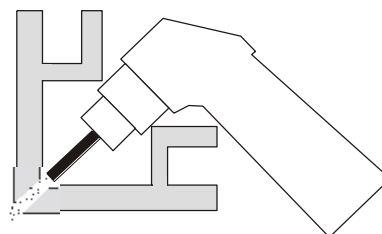


Fig. 12 Cutting in the corner

Important rules

1. The burning time of the pilot arc must be limited to the necessary time only. This reduces wear on the cutting tip and electrode. Frequent idle starts will stress the cutting tip and electrode and could overheat the pilot arc ballast.
2. When you have finished cutting, never switch off the machine immediately with the main switch, but always allow the torch to run through a cooling cycle. Only switch off immediately in an emergency.
3. The air pressure has a decisive influence on the quality of the cut, the lifetime of the cutting tips, electrodes and the entire torch. Make sure that the pressure is set correctly: the optimum value is 5.5 bar (4.8 bar for grooving), fluctuations between 5.0 and 6.0 bar are permissible. The air must be free of mechanical impurities, oil and water condensate. These

impurities reduce the quality of the cut, cause instability and arc extinction and can damage the torch. The source of pressurised air must therefore be equipped with an efficient filtration and a reliable oil and water condensate separator. The use of the filter and separator built into the SVAROG 85 PLASMA as the only air treatment stage is totally inadequate. In cases where the compressor draws in air with high humidity, which results in the need for frequent depressurization of the pressure vessel, it is necessary to include another efficient separator as a 3rd stage in the supply. Trapped condensate must be drained daily from all separators and the compressor pressure vessel.

4. Ensure good electrical contact between the grounding pliers and the material.
5. The cutting tip and electrode need to be checked and replaced in time. The service life of these parts is only a few hours of cutting time and is heavily dependent on following the correct cutting principles.

Notice

1. When the air pressure is low, the E13 light on the control panel will illuminate and block further operation.
2. If the machine overheats during cutting, error message E02 on the control panel lights up and blocks further operation.
3. Disconnect the machine from the mains before replacing torch parts.
4. Disconnect the machine from the mains before any intervention inside the machine.
5. The machine is adapted for the use of the Plasma SVH-105 torch. In this combination, it forms a safe system in accordance with EN 60974-7 Article 10.1.4.
6. SVAROG 105 PLASMA must not be directly connected to a pressure source of more than 8.5 bar or to cylinders! Connection to such sources is only possible via a suitable pressure reducing valve that is tested for the appropriate inlet pressure and flow.
7. Imperfect condensate trapping will cause condensate to be discharged in the torch nozzle area and prevent the pilot arc from igniting.

Causes of poor quality cuts

Insufficient cut penetration

1. High cutting speed (make sure that the inclination of the penetrating cutting arc does not exceed approx. 15° (see Fig. 13).
2. High cutting tip or electrode wear (see Fig. 14).
3. Large material thickness and improperly selected cutting current and cutting tip diameter.

- Poor electrical contact between the grounding clamp and the material.

👉 Notice 👈

If the cutting arc does not penetrate the material perfectly, the splashing material clogs the torch cutting tip and reduces its service life.

The cutting arc is unstable, goes out and "shoots"

- Worn cutting tip or electrode
- High air pressure
- Polluted air
- Uncaptured water condensate

👉 Notice 👈

An unstable arc causes very intense interference that can cause the machine control system to collapse or endanger surrounding equipment!

Conical cut

- If a crooked incision occurs (see Fig. 15), switch off the machine, release the shield cup and rotate the cutting tip by about 1/4 and try cutting again.
- Damaged cutting tip and electrode.
- The position of the torch is not perpendicular to the material
- Large distance of the torch from the material
- Worn electrode or cutting tip

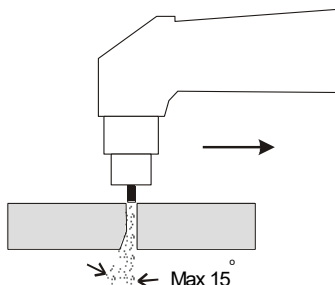


Fig. 13

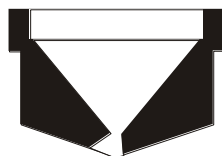


Fig. 14



Fig. 15

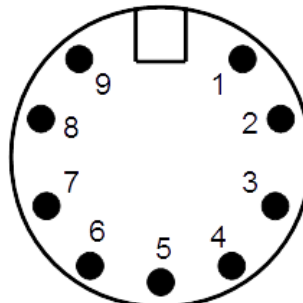
10. MACHINE CNC CUTTING

See Appendices

- Plasma SVS-160 machine torch - cutting data EN
- Plasma SVS-125 machine torch - cutting data EN
- Plasma SVS-105 machine torch - cutting data EN

11. TORCH WIRING DIAGRAM

PIN NO.	TORCH
1	/
2	/
3	/
4	/
5	Pilot arc
6	Pilot arc
7	/
8	Safety
9	Safety



12. MAINTENANCE

1. Great care must be taken with the torch. When cutting the material, it blasts off molten material that contaminates the inside of the torch. The plasma torch should be maintained regularly and worn parts should be replaced in time. Regularly check the condition of the diffuser channels (see torch drawing). If they are dirty, they must be purged or the diffuser replaced. Poor condition of this part has a negative effect on the cutting quality and causes very strong interference that can cause the machine control electronics to crash or affect surrounding equipment. If the torch cable is damaged, it must be replaced immediately - there is a risk of electric shock!
2. The maintenance of the pneumatic system consists in regular draining of the trapped condensate, at least once a day during continuous operation. Furthermore, visually check the degree of contamination of the air filter and dismantle and clean it as necessary.
3. Working pressure setting - when cutting, the pressure must not fall below 5.0 bar (4.8 bar for grooving). Setting the desired value is done by means of the control head on the pressure regulator. The head must first be unlocked by pulling upwards, set the desired pressure and locked by pushing it in again. If the machine is not removing any air, the pressure will increase slightly (approx. 1 bar). It is therefore necessary to check or adjust the pressure value during cutting or in the air flow adjustment mode.
4. The source cabinet must be blown out with compressed air periodically according to the level of environmental dustiness.

 **Caution**  Beware of the risk of damage to electronic components from a







direct hit of compressed air from a short distance.

OPERATIONAL SAFETY CHECK ACCORDING TO EN 60 971-1

The prescribed test operations, procedures and required documentation are listed in EN 60974-4.

13. ERROR MESSAGES

Error messages appear on the machine display. At the same time, a QR code is displayed, which allows you to open the legend of error messages on mobile phones.

Error code	Symbol	Fault / Solution procedure
E01	QR code	Overloading of the power module. Call your country's service.
E02		Overheating. Stop cutting and allow the machine to cool down.
E03		Faulty diode MUR module; faulty IGBT block; faulty driver or cables. Call your country's service.
E04		Failure of the pilot arc. Check the torch consumables.
E05		The torch consumables did not separate, got stacked. Check the torch consumables.
E06	QR code	PFC is not connected. Call your country's service.
E07	QR code	Mains is over 460 V AC. Have the mains checked.
E08	QR code	Mains is below 340 V AC. Have the mains checked.
E09	QR code	One phase is missing. Have the mains checked.
E11		The torch is not connected or incorrectly fitted consumables of the torch. Fix it.
E13		Low input pressure (it must be at least one bar higher than the set cutting pressure) or no input pressure. Check the air supply or set the input pressure. The air flow can be stopped by turning the machine off and on.

E14	QR code	The torch button was pressed during start-up. It is necessary to restart the machine.
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14. SERVICE

Provision of a guarantee

1. The warranty includes the responsibility for the fact that the delivered machine has the characteristics specified in the binding technical conditions and standards at the time of delivery and during the warranty period.
2. Liability for defects that occur in the machine after its sale within the warranty period consists in the obligation to remedy the defect free of charge by the manufacturer of the machine or a service organization authorized by the manufacturer.
3. The warranty period of the machine is 24 months from the sale to the buyer. The warranty period starts on the date of handover of the machine to the buyer or on the date of possible delivery. The warranty period does not include the period from the time a legitimate claim is made until the machine is repaired.
4. The warranty period of the torch is 6 months.
5. It is a condition of the warranty that the cutting machine is used in the appropriate manner and for the purposes for which it is intended. Damage and abnormal wear and tear caused by lack of care or neglect of even apparently insignificant defects, failure to fulfil the owner's obligations, inexperience or reduced ability, failure to comply with the regulations set out in the operating and maintenance instructions, use of the machine for purposes for which it is not intended, overloading of the machine, even if temporary. Only original manufacturer's parts must be used when maintaining the machine.
6. Compliance with all compressed air quality requirements, compliance with the prescribed filtration and condensate collection method is a condition for the torch warranty to be valid. The plasma cutter must be connected via a filter, whose parameters are specified in the operating instructions. Furthermore, faults caused by insufficient compressor performance, penetration of lubricating oil into the compressed air and electrical breakdowns caused by the presence of moisture in the torch cannot be accepted.
7. It is a condition of the warranty that the cutting machine is used only with the torch specified in this manual.
8. During the warranty period, no modifications or changes to the machine that may affect the functionality of individual machine components are permitted.
9. Warranty claims must be made immediately after discovery of a manufacturing defect or material defect and must be filed with the

manufacturer or dealer.

10. If a defective part is replaced during warranty repair, ownership of the defective part passes to the manufacturer.
11. The warranty certificate is the proof of purchase (invoice) with the serial number of the product or the warranty certificate on the last page of this manual.

Warranty and post-warranty repairs

1. Warranty repairs are carried out by the manufacturer or its authorised service organisations.
2. A similar procedure is followed in the case of post-warranty repairs.
3. Please report your complaint by e-mail: servis@alfain.eu or by phone +420 563 034 626. The service hours are from 7:00 a.m. to 3:30 p.m. every working day.

15. DISPOSAL OF ELECTRICAL WASTE

Information for users on the disposal of electrical and electronic equipment in the Czech Republic:

ALFA IN a.s. as a producer, it places electrical equipment on the market and is therefore obliged to ensure the take-back, treatment, recovery and disposal of electrical waste.

ALFA IN a.s. is enrolled in the LIST of the collective system EKOLAMP s.r.o. (under manufacturer's registration number 06453/19-ECZ).



This symbol on the products and / or accompanying documents means that used electrical and electronic products should not be mixed with general household waste.

The device must be disposed of at separate collection and collection points. EKOLAMP s.r.o. You can find a list of places at: <http://www.ekolamp.cz/cz/mapa-sbernych-mist>.

For users in European Union countries:

If you want liquidate electrical and electronic equipment, contact your dealer or supplier for the necessary information.

16. WARRANTY LETTER

As a warranty list serves proof of purchase (invoice) on which is the serial number of the machine, eventually a warranty list below, which is filled in by an authorized dealer.

Serial number:	
Day, month (written in words) and year of sale:	
Stamp and dealer signature:	