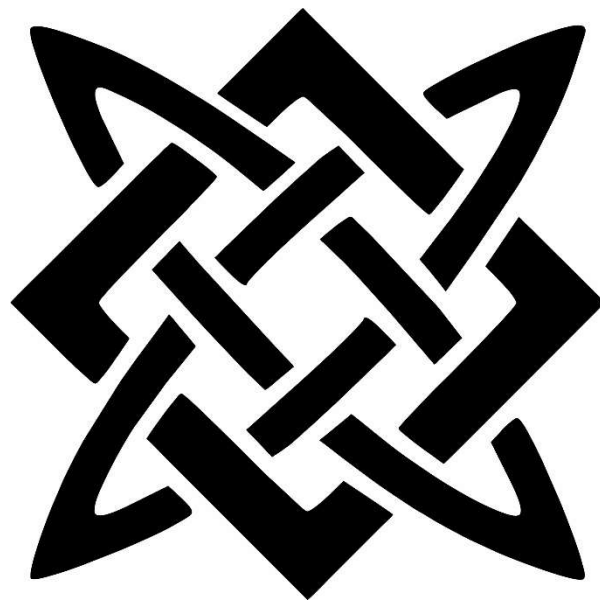


Plasma SVS-105 machine torch - cutting data for

**SVAROG 85 PLASMA CNC
SVAROG 105 PLASMA CNC
SVAROG 125 PLASMA CNC**



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1. INTRODUCTION

This document is only about the SVS-105 machine torch. For information about the conditions of use and maintenance of the SVAROG plasma torches, please refer to the respective operating manuals.

Operating instructions SVAROG 85	Operating instructions SVAROG 105	Operating instructions SVAROG 125
		

2. SV-FIT SYSTEM

The SV-FIT system allows for great variability in the use of different welding torch terminations or allows the torch length to be extended from the standard 9 m by 6 or 12 m using the Coax Extension Cable # 7088.

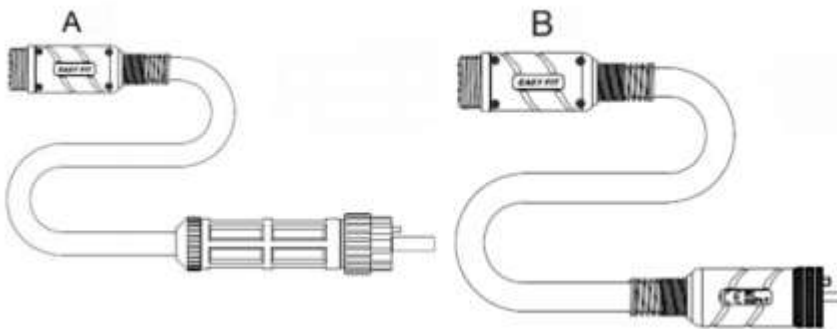


Fig. 1 SV-FIT systém

3. TECHNICAL DATA OF THE SVS-160 TORCH

Max. input air pressure	bar	8,5
Load cell DZ-60%	A	105
Working pressure (cutting, torch SVH/SVS 160/6,7-9m)	bar	5,0 - 5,5
Working pressure (grooving, torch SVH-160 6,7m)	bar	3,5 - 4, 5
Air consumption at 105 A (torch SVH/SVS 105 6,7-9m)	l/min	240
Arc ignition		pneu-mechanic

Pressure air source requirements

See the relevant instructions.

4. SPARE AND CONSUMABLE PARTS

Lifetime of consumable parts

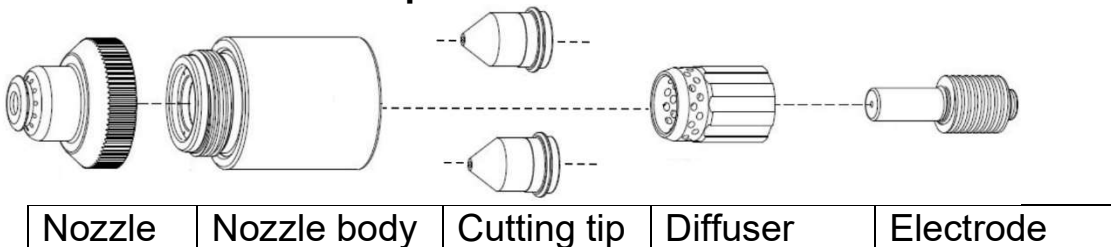
The need to change consumable parts on your torch depends on the thickness of the material to be cut, the length of the cut, the air quality (presence of moisture, oil and dirt), the way the cut starts (from the side or through the piercing), the appropriate piercing height, the cutting mode (solid material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

In general, the current set of consumable parts lasts on average 1 to 3 hours of cutting (arc firing). For machine cutting, the principle is that the electrode needs to be replaced at the same time as the nozzle. When replacing the 6013 o-ring, lubricate the o-ring area with 7101 lubricant.

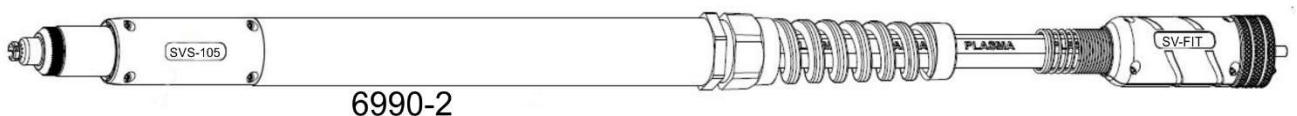
How to choose the right consumable parts

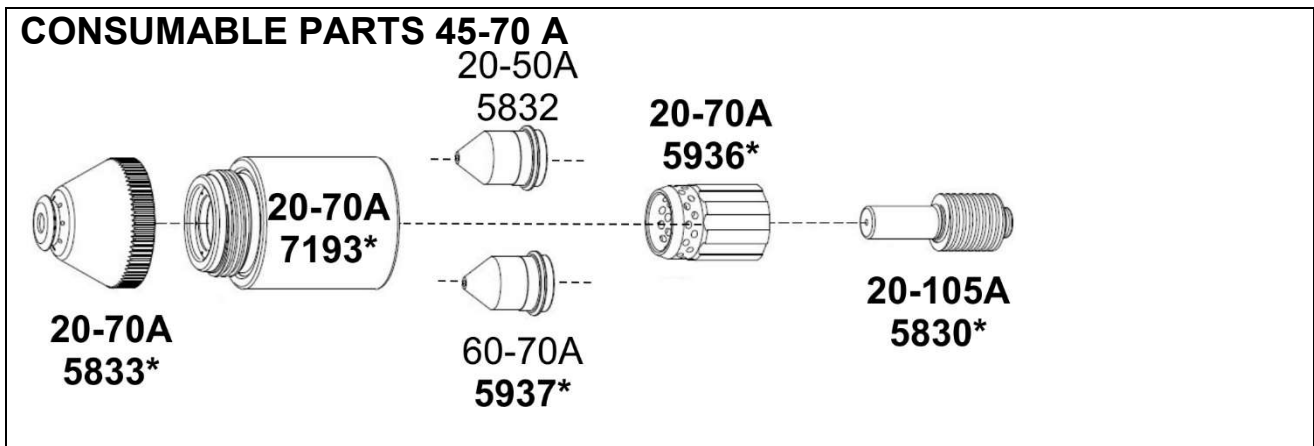
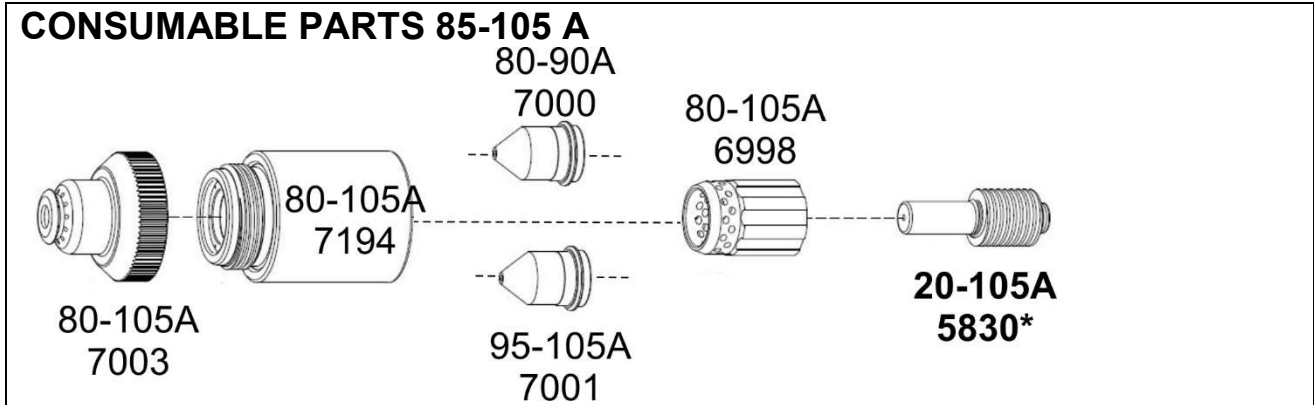
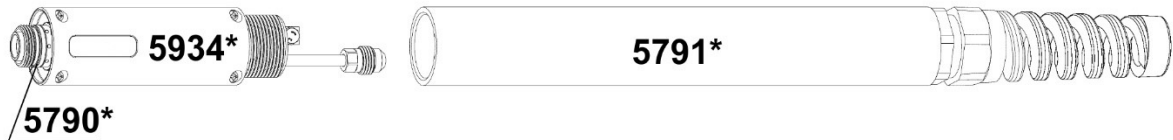
For the best quality of cut, it is essential to use the appropriate consumable parts assemblies. The assemblies are shown below by performance and type of operation.

Names of SVS Torch parts



O-ring	Head	Position tube
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Parts with * are fitted to the torch on delivery.

Start set

The starter kit includes a nozzle and nozzle body and a deflector, which are not fitted to the burner, 5 nozzles of each type and 20 electrodes.

Code	Name	Number of
7195-1	START set for machine torch SVS-105	
7194	Nozzle body 80-105A eco	1
7003	Machine nozzle 85-105A	1
6998	Gas distributor 85-105A (pack of 2) eco	1
5830	Electrode 20-105A	20
5832	Cutting tip 20-50A	5
5937	Cuttin tip 60-70A	5
7000	Cutting tip 80-90A	5
7001	Cutting tip 95-105A	5

5. INDICATIVE PARAMETERS OF THE CUTTING JOINT COMPENSATION

The parameters in the table are for reference only. They were measured at the highest cutting quality setting.

Current	Thickness (mm)										
	0,5	1	2	3	6	8	10	12	16	20	25
	Fine grain steel										
105 A					2,1	2,2	2,2	2,2	2,5	2,7	3,3
85 A				1,7	1,8	1,9	2,0	2,2	2,4	2,6	
65 A			1,6	1,6	1,8	1,9	2,0	2,2	2,3		
45 A	1,1	1,1	1,4	1,5	1,7						
30 A	1,0	1,0									
	Stainless steel										
105 A					1,9	2,1	2,3	2,3	2,3	2,6	2,9
85 A				1,6	1,8	1,9	2,1	2,3	2,4	2,5	
65 A			1,5	1,6	1,8	1,9	2,0	2,2	2,4		
45 A	0,9	1,1	1,5	1,6	1,8						
30 A	0,8	1,0									
	Aluminium										
105 A					2,3	2,3	2,4	2,6	2,7	3,0	3,5
85 A				2,0	2,0	2,0	2,1	2,2	2,4	2,6	
65 A			1,9	1,9	1,9	2,0	2,1	2,3	2,5		
45 A	0,5	1,0	1,3	1,5	1,5						
30 A	0,5	0,9									

6. INDICATIVE CUTTING PARAMETERS

Fine grain steel 105 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality, speed (m/min)
6	3,2	6,4	0,50	5,09	4,14
8	3,2	6,4	0,75	3,87	3,14
10	3,2	6,4	0,75	2,79	2,26
12	3,2	6,4	0,75	2,06	1,69
16	3,2	6,4	1,00	1,31	1,06
20	3,2	6,4	1,00	0,94	0,78
25	3,2	Side start	Side start	0,58	0,55
30	3,2	Side start	Side start	0,41	0,37
32	3,2	Side start	Side start	0,37	0,35

35	3,2	Side start	Side start	0,32	0,29
40	3,2	Side start	Side start	0,21	0,19

Stainless steel 105 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
6	3,2	6,4	0,50	6,00	4,87
8	3,2	6,4	0,50	4,21	3,46
10	3,2	6,4	0,50	2,67	2,24
12	3,2	6,4	0,60	1,86	1,49
16	3,2	6,4	0,75	1,08	0,95
20	3,2	8,0	1,25	0,81	0,66
25	3,2	Side start	Side start	0,53	0,44
30	3,2	Side start	Side start	0,36	0,34
32	3,2	Side start	Side start	0,32	0,30

Aluminium 105 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
6	3,2	6,4	0,5	7,09	5,98
8	3,2	6,4	0,75	5,02	4,17
10	3,2	6,4	0,75	3,28	2,64
12	3,2	6,4	1,0	2,45	1,91
16	3,2	6,4	1,0	1,66	1,29
20	3,2	6,4	1,25	1,19	1,02
25	3,2	Side start	Side start	0,79	0,66
30	3,2	Side start	Side start	0,57	0,43
32	3,2	Side start	Side start	0,49	0,34

Fine grain steel 85 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
3	1,5	3,8	0,1	9,20	6,80
4	1,5	3,8	0,2	7,30	5,65
6	1,5	3,8	0,5	4,40	3,60
8	1,5	3,8	0,5	3,10	2,50
10	1,5	3,8	0,5	2,07	1,68

12	1,5	4,5	0,7	1,60	1,28
16	1,5	4,5	1,0	0,93	0,87
20	1,5	6,0	1,5	0,68	0,57
25	1,5	Side start	Side start	0,45	0,35
30	1,5	Side start	Side start	0,30	0,20

Stainless steel 85 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
3	1,5	3,8	0,1	9,20	7,50
4	1,5	3,8	0,2	7,50	6,10
6	1,5	3,8	0,5	4,60	3,70
8	1,5	3,8	0,5	3,05	2,45
10	1,5	4,5	0,5	1,90	1,55
12	1,5	4,5	0,7	1,40	1,10
16	1,5	4,5	1,0	0,76	0,70
20	1,5	Side start	Side start	0,57	0,48
25	1,5	Side start	Side start	0,37	0,30

Aluminium 85 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
3	1,5	3,8	0,1	9,40	8,00
4	1,5	3,8	0,2	8,00	6,50
6	1,5	3,8	0,5	4,90	3,80
8	1,5	3,8	0,5	3,47	2,65
10	1,5	4,5	0,5	2,50	1,92
12	1,5	4,5	0,7	1,93	1,45
16	1,5	4,5	1,0	1,20	0,95
20	1,5	Side start	Side start	0,88	0,60
25	1,5	Side start	Side start	0,54	0,38

Fine grain steel 65 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
2	1,5	3,8	0,1	7,00	6,05
3	1,5	3,8	0,2	6,10	5,20

4	1,5	3,8	0,5	5,10	4,25
6	1,5	3,8	0,5	3,24	2,55
8	1,5	3,8	0,5	2,23	1,70
10	1,5	4,5	0,7	1,50	1,10
12	1,5	4,5	1,2	1,14	0,85
16	1,5	6,0	2,0	0,65	0,56
20	1,5	Side start	Side start	0,45	0,35
25	1,5	Side start	Side start	0,27	0,21

Stainless steel 65 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
2	1,5	3,8	0,1	10,00	8,10
3	1,5	3,8	0,2	8,26	6,70
4	1,5	3,8	0,5	6,15	5,20
6	1,5	3,8	0,5	2,85	2,45
8	1,5	3,8	0,7	1,86	1,50
10	1,5	4,5	0,7	1,25	0,96
12	1,5	4,5	1,2	0,92	0,75
16	1,5	Side start	Side start	0,50	0,50
20	1,5	Side start	Side start	0,37	0,30

Aluminium 65 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
2	1,5	3,8	0,1	10,30	8,80
3	1,5	3,8	0,2	8,80	7,40
4	1,5	3,8	0,5	7,35	6,00
6	1,5	3,8	0,5	4,40	3,20
8	1,5	3,8	0,7	2,75	1,95
10	1,5	4,5	0,7	1,65	1,20
12	1,5	4,5	1,2	1,33	1,00
16	1,5	Side start	Side start	0,80	0,65
20	1,5	Side start	Side start	0,56	0,38

Fine grain steel 45 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
0,5	1,5	3,8	0,0	12,50	9,00
1	1,5	3,8	0,0	10,80	9,20
1,5	1,5	3,8	0,1	10,20	9,30
2	1,5	3,8	0,3	7,80	6,60
3	1,5	3,8	0,4	4,90	3,85
4	1,5	3,8	0,4	3,56	2,20
6	1,5	3,8	0,6	2,05	1,35

Stainless steel 45 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
0,5	1,5	3,8	0,0	12,50	9,00
1	1,5	3,8	0,0	10,80	9,10
1,5	1,5	3,8	0,1	10,20	9,30
2	1,5	3,8	0,3	8,66	6,00
3	1,5	3,8	0,4	4,40	3,10
4	1,5	3,8	0,4	2,60	2,00
6	1,5	3,8	0,5	1,02	0,90

Aluminium 45 A

Sheet thickness (mm)	Cutting height of the torch (mm)	Initial piercing height (mm)	Punching time (s)	Max. productive cut (m/min)	High cutting quality (m/min)
1	1,5	3,8	0,0	11,00	8,25
2	1,5	3,8	0,1	9,20	6,60
3	1,5	3,8	0,2	6,25	3,10
4	1,5	3,8	0,4	4,85	2,20
6	1,5	3,8	0,5	2,80	1,50

7. THE MOST COMMON MISTAKES IN MACHINE CUTTING

Insufficient cutting penetration, excessive sparks on the top of the sheet during cutting. Possible causes:

1. The sheet metal has an unclean surface from rust or paint.
2. Consumable parts are worn out. For optimum machine cutting, replace electrodes and cutting tips at the same time.
3. High cutting speed.
4. The current is set too low.
5. Large material thickness and inappropriate choice of cutting current and cutting tip diameter.
6. Poor electrical contact between the grounding clamp and the material.

Pilot arc passes, but no ignition

1. There is poor electrical contact between the cut sheet and the grounding clamp.
2. Torch cutting height too high.

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

1. Worn cutting tip or electrode, replace both.
2. High air pressure.
3. Polluted air.
4. Untrapped 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

1. If a crooked cut occurs, turn off the machine, release the nozzle body, and rotate the cutting tip about 1/4 and try cutting again.
2. Damaged cutting tip and electrode, replace both.
3. The position of the torch is not perpendicular to the material.
4. Large distance of the torch from the material.

 **Notice** 

If the electrode is burnt deeper than 1.5mm, it must be replaced together with the cutting tip.

Scales on the underside of the cut

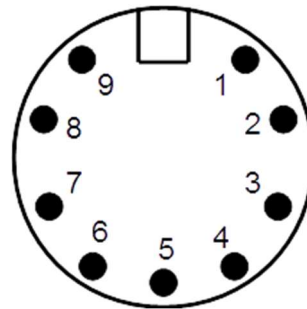
1. High air pressure.
2. Damaged cutting tip or electrode, replace both.
3. The cutting speed is not correct.
4. The distance between the torch and the cut sheet is not correct.

Consumable lifetime is short

1. High or low air pressure.
2. Set current, cutting speed and other parameters are not set according to chapter recommendations
3. The puncture is made from an inappropriate height.
4. The air quality is not good.

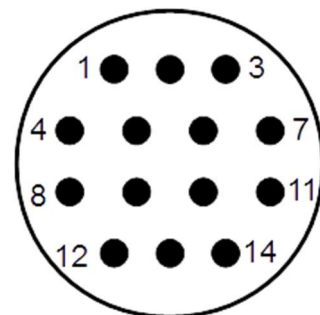
8. TORCH WIRING DIAGRAM

PIN NO.	TORCH
1	Torch switch
2	Torch switch
3	Machine / manual torch
4	/
5	Pilot arc
6	Pilot arc
7	/
8	Safety
9	Safety



9. CNC REMOTE CONTROL SCHEMATIC + DIVIDER

PIN #	DIRECTION
1	Current setting Input I+
8	Start
9	Start
6	Divider output arc voltage (+)
7	Divider output arc voltage (-) Current setting Input I-
13	Signal OK move cutting arc is ON
14	Signal OK move cutting arc is ON



Signal	Type	Instruction	The connector socket
Trigger Start (start plasma)	Input	Normally open. 18 VDC open circuit voltage at START terminals. Requires dry contact closure to activate.	8,9
OK MOVE	Output	Normally open. Dry contact closure when the arc transfers. 120 VAC/1 A maximum at the machine interface relay or switching device (supplied by the customer).	13,14
Voltage divider	Output	CUT: Divided arc signal of 20:1,30:1, 40:1, 50:1 (provides a maximum of 18 V).	6 (+) , 7 (-)

Machines with CNC interface are equipped with the possibility of remote current adjustment. The setting is done by using current from an external source. The output current of the machine can be controlled in the range of 20A up to the value set by the encoder, i.e. if we set e.g. 60A on the potentiometer, we will be able to control the current with an external signal in the range of 20-60A. Remote control signal for current setting 3-25 mA (1 - 5 V)

DIP switches - Voltage divider

Scale selection	20:1	30:1	40:1	50:1
Dial number				
1	ON	1	1	1
2	2	ON	2	2
3	3	3	ON	3
4	4	4	4	ON

The voltage divider is factory preset to 20:1. To change the voltage divider to a different setting:

1. Switch off the plasma and disconnect the power cord from the mains.
2. Remove the plasma cover.
3. The voltage divider DIP switches are on the left side of the plasma.

