

PLASMA CUTTING MACHINE

RYVAL 60 PLASMA

OPERATING MANUAL

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1. INTRODUCTION

Congratulations on your new Linde AG, Linde Gas Deutschland product. We are proud to have you as our customer and will strive to provide you with the best service and reliability in the industry.

This Operating Manual has been designed to instruct you on the correct use and operation of your Linde AG, Linde Gas Deutschland product. Your satisfaction with this product and its safe operation is our ultimate concern. Therefore please take the time to read the entire manual, especially the Safety Precautions. They will help you to avoid potential hazards that may exist when working with this product.

Read and understand this entire Manual and your employer's safety practices before installing, operating, or servicing the equipment. While the information contained in this Manual represents the Manufacturer's best judgement, the Manufacturer assumes no liability for its use.

Machine RYVAL 60 PLASMA is designed for cutting metal on the basis of modern technology cutting material through a thin beam plasma gas.

RYVAL 60 PLASMA is designed for high-quality cutting of materials up to 25 mm thick carbon steel (for more information, see instructions below). 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 30 mm.

2. SAFETY INSTRUCTIONS AND WARNINGS

1. OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.
2. 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.
3. Once the packing has been opened, make sure that the machine is not damaged. If in any doubt, call the service centre.
4. This equipment must only be used by qualified personnel.
5. During installation, any electric work must only be carried out by trained personnel.
6. The machine must be used in a dry place with good ventilation.
7. Make sure that no metal dust can be drawn in by the fan inside the machine, as this could cause damage to the electronic circuits.
8. It is prohibited to connect more than one INVERTER generator in series or in parallel.
9. When installing the machine, follow the local regulations on safety.
10. The position of the machine must allow easy access by the operator to the controls and connectors.
11. When the cutting machine is operating, all its covers and doors must be closed and well fixed.
12. Do not expose the cutting machine to direct sunlight or to heavy rain. This equipment conforms to protection rating IP 23S.
13. The operator must wear gloves, clothes, shoes, and a helmet or a welder's helmet, which protect and are fire-resistant in order to protect him against electric shock, flashes and sparks from cutting.
14. The operator must protect his eyes with safety visor or mask designed for welding, fitted with standard safety filters. He should also be aware that during plasma cutting ULTRAVIOLET RADIATION is emitted. Therefore it is vital that his face is also protected from radiation. Ultraviolet rays produce the same harmful effect as sun burning on unprotected skin.
15. The operator is obliged to warn anyone near the cutting area of the risks that cutting involves and to arrange to provide adequate protection equipment.
16. Keep all fumes and gases from the breathing area.
17. Keep your head out of the fume plume.
18. Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
19. The kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or welding any metals which may contain

one or more of the following:

Antimony	Chromium	Mercury
Nickel	Cobalt	Arsenic
Barium	Copper	Selenium
Beryllium	Lead	Silver
Cadmium	Manganese	Vanadium


20. Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using. These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.
21. It is very important to arrange for sufficient ventilation, especially when cutting in enclosed spaces. We suggest using suitable fume extractors to prevent the risk of intoxication by fumes or gas generated by the cutting process.
22. Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.
23. To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
24. Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.
25. The operator must ensure all flammable materials are removed from the work area to avoid any risk of fire.
26. The operator must NEVER cut containers that have previously contained petrol, lubricants, gas or similar flammable materials, even if the container has been empty for a considerable time. THERE IS A VERY HIGH RISK OF EXPLOSION.
27. The operator must be aware of all the special regulations which he needs to conform to when cutting in enclosed spaces with a high risk of explosion.
28. To prevent electric shock, we strongly suggest the following rules:
 - a) Do not work in a damp or humid environment.
 - b) Do not use the machine if its cables are damaged in any way.
 - c) Make sure that the earthing system of the electric equipment is correctly connected and operational.
 - d) The operator must be insulated from the metal components connected to the return wire.
 - e) The earthing of the piece being worked could increase the risk of injury to the operator.
29. EN 60974-1 Standard: Open-circuit voltage. During the operation of the machine, the highest voltage, with which it is possible to come into contact, is the open-circuit voltage between the clamps. In our generator this voltage is 310V.
30. The maximum open-circuit voltage of the plasma machines is established by national and international standards (EN 60974-1) depending on the type

of current to be used, on its waveform and on the hazards arising from the work place. These values are not applicable to the strike currents and those for stabilisation of the arc that could be above it.

31. The open-circuit voltage, for as many adjustments as possible, must never exceed the values relating to the various cases shown in the following table:

Case	Working conditions	Open-circuit voltage	
1	Places with increased risk of electric shock	DC current: 113V peak value	AC current: 68V peak value and 48V effective
2	Places without increased risk of electric shock	DC current: 113V peak value	AC current: 113V peak value and 80V effective
3	Torches held mechanically with increased protection for the operator	DC current: 141V peak value	AC current: 141V peak value and 100V effective
4	Plasma cutting	DC current: 500V peak value	

32. In case 1, the dc machines with rectifier must be built in such a way that, in case of a fault developing in the rectifier (for example open circuit, short circuit or lack of power), the permitted values cannot be exceeded. The

plasma cutting machines of this type can be marked with the symbol: 

33. Before opening the machine switch off the machine and disconnect it from the power socket.
34. Only personnel authorised by this company can carry out maintenance on the machine.

PROTECTIVE UTILITIES

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

RISK 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

The Machine Torches (AUT) must not be used with RYVAL 60 PLASMA. It may only be used together with RYVAL 60 PLASMA 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. It is forbidden to operate the machine in wet environments and outdoors in rain or snow.
4. Ensure proper grounding clamping pliers, which also reduces the risk of electric shock.
5. Use prescribed protective utilities, keep them dry.
6. 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.
7. Never aim the torch against the eyes, body or other person.

3. CONDITIONS OF USE

1. This equipment must only be used by qualified personnel.
2. Device complies with IEC 61000-3-12 with following conditions: Short-circuit power S_{sc} of network in place at an interface between the user's supply and the public network (PCC) must be least 3561 kW. User is obliged to consult with the electricity supplier if the impedance of the network at this point is that required short-circuit capacity $Z_{max} = 45 \text{ m}\Omega$ and whether the device can be connected with a public low-voltage network.

On the nameplate are the following symbols:   .

3. During installation, any electric work must only be carried out by trained personnel.
4. Working ambient temperature between -10 and +40 °C.
5. Relative humidity below 90% at +20 °C.
6. Up to 3000 m altitude.
7. Do not expose the plasma machine to direct sunlight or to rain or snow. This equipment conforms to protection rating IP23S.
8. Place the machine the way that the cooling air can enter the vents without restriction to. It is necessary to ensure that no impurities, especially metal particles, are not drawn into the machine.
9. 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).

10. The machine must be protected against
- Moisture and rain and snow
 - Mechanical damage
 - Draft and any ventilation of neighbouring machine
 - Excessive overloading - crossing technical parameters
 - 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.

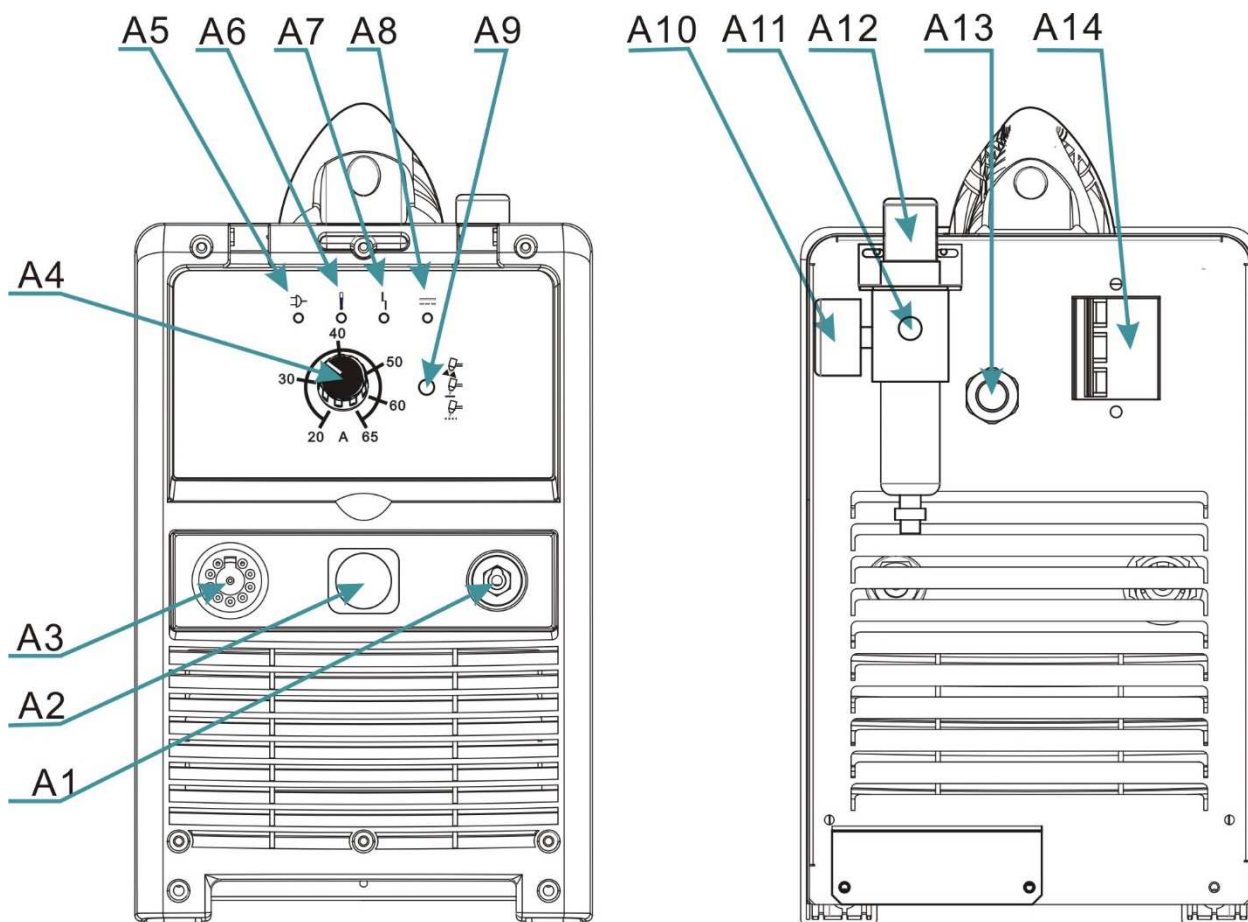
 **Caution**  We warn users, that they are responsible for possible interference from welding.

4. TECHNICAL DATA

RYVAL 60 PLASMA			
Method		Plasma cutting	
Mains voltage	V/Hz	3 x 400/50-60	
Mains protection	A	20 - 65	
Max. effective current $I_{1\text{eff}}$	A	310	
Cutting current range	A	16 @	
Open-circuit voltage U_{20}	V	15,6	
Cutting current (DZ=100%) I_2	A	60	
Cutting current (DZ=60%) I_2	A	65	
Cutting current (DZ=90%) I_2	A	90%=65	
Max. productive cutting thickness – carbon steel	mm	20	
Max. cutting thickness – carbon steel	mm	30	
Quality cutting thickness	Carbon steel	25	25
	Stainless steel	18	18
	Aluminium	15	15
	Copper	10	10
Working pressure	bar	8,5	








Max. input pressure	bar	5,0 – 5,5
Air consumption	l/min	240
Arc ignition		pneu-mechanic
Current regulation		continuous
Protection		IP 23 S
Standards		EN 60974-1, EN 60974-10 cl. A
Dimensions (w x l x h)	mm	240 x 440 x 595
Weight	kg	24,0

5. MAIN PARTS OF THE MACHINE FRONT AND REAR PANELS



Picture 1 – The main parts

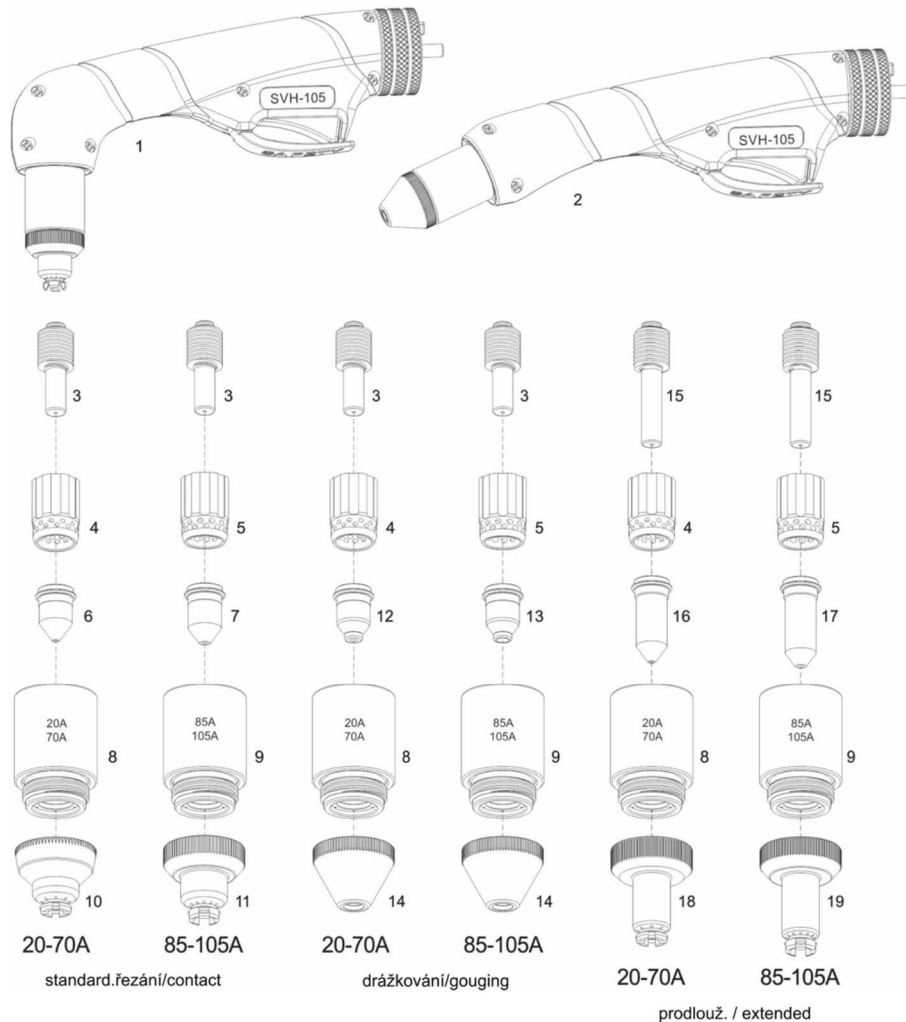
Pos.	Description
A1	Quick connector - earthing cable
A2	Connector - remote control – in standard doesn't work – only on request
A3	Connector - torch
A4	Potenciometer - set cut current

A5	 LED indicator – when illuminated, the machine is ON.
A6	 LED indicator-overheating when illuminated, please leave the machine turned on and wait on cooling the machine down.
A7	 1. LED indicator flashes – the Retaining Cup isn't on or is fitted badly 2. LED indicator shines – low gas pressure
A8	 LED indicator – arc burning – after you press the torch button, it shines, on the torch is a voltage
A9	Switch  Setting of gas flow  Continuous cutting  Cutting material with gaps – Caution! Higher wear of nozzles and electrodes
A10	Manometer
A11	Gas fitting
A12	Controler
A13	Mains cable
A14	Switch ON/OFF

6. ACCESSORIES

PART OF DELIVERY

Pos.	Code	Description
		Earthing cable PEGAS 60 3 m



Picture 2 – Torch SVH-105 – parts

ON REQUEST

Pos.	Code	Description
	5872	Bevel Tolls for PT 40, 60, SCP 60, TH-70, 125
	5302	Air Filter AT 1000
	5304	Adapter for AT 1000 PEGAS PLASMA
	S777c.	Welding Helmet Barracuda S777C Black
	7037	Torch Plasma SVH-105 hand 75°
	7042	Cable Package 6,0 m SV-125 6 PIN
	7101	Silicone Lubricant Brutto 6 g
	7102	Silicone Lubricant Brutto 9 g

7112 Set START to the torch SVH-105 (Recommended START set for the torch – Pic. 2)			Quantity
8	5832	Tip 20-50A STM-70, TM-70, TM-105, SVH-105 (pkg.10)	2
8	7001	Tip 105A TM-105, SVH/SVM-105 (pkg.10)	2
7	5937	Tip 70A TM-70, TM-105, SVH-105 (pkg.10)	2
7	7000	Tip TM-105, SVH/SVM-105 (pkg.10)	5
5	5830	Electrode STM-70, TM-70, TM-105, SVH/SVM-105 (pkg.10)	10
11	7072	Shield Cup 85-105A SVH-105	1
9	7071	Shield Cup body 80-105A SVH/SVM-105	1
5	6998	Swirl Ring 85-105A TM-105, SVH-105 eco (pkg.2)	1
Parts of the torch (Pic. 2)			
	5790	O-Ring TM-70, TM-105, TM-125, SVH/SVM-105 (pkg.2)	
3	5830	Electrode STM-70, TM-70, TM-105, SVH/SVM-105 (pkg.10)	
4	5936	Swirl Ring TM-70, TM-105, SVH-105 eco (pkg.2)	
4	5831	Swirl Ring STM-70, TM-70, TM-105, SVH-105 Maximum Life (pkg.2)	
5	6998	Swirl Ring 85-105A TM-105, SVH-105 eco (pkg.2)	
5	6999	Swirl Ring 85-105A TM-105, SVH-105 Life (pkg.2)	
6	5832	Tip 20-50A STM-70, TM-70, TM-105, SVH-105 (pkg.10)	
6	5937	Tip 70A TM-70, TM-105, SVH-105 (pkg.10)	
7	7000	Tip TM-105, SVH/SVM-105 (pkg.10)	
7	7001	Tip 105A TM-105, SVH/SVM-105 (pkg.10)	
8	7070	Shield Cup body 20-70A SVH-105	
9	7071	Shield Cup body 80-105A SVH/SVM-105	
10	7073	Shield Cup 20-70A SVH-105	
11	7072	Shield Cup 85-105A SVH-105	
12	7074	Tip gouging 45A SVH-105 (pkg.10)	
12	7075	Tip gouging 70A SVH-105 (pkg.10)	
17	7000	Tip TM-105, SVH/SVM-105 (pkg.10)	
17	7001	Tip 105A TM-105, SVH/SVM-105 (pkg.10)	

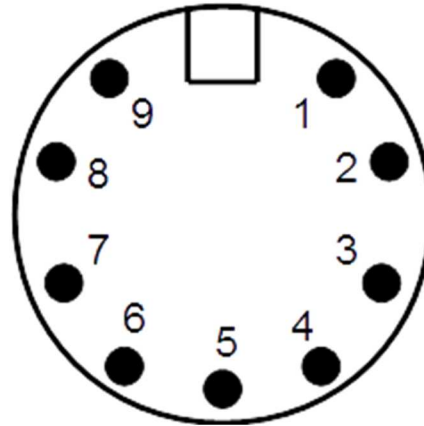
18	7107	Shield Cup extended 20-70A SVH-105
19	7108	Shield Cup extended 85-105A SVH-105

Note – the bold items are equipped on the torch

7. GETTING STARTED

TORCH CONNECTION SCHEMA

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




Getting started must be consistent with technical data and conditions of use (especially with 2. point).

FIRST STEPS



NOTE This equipment must only be used by qualified personnel.

1. Before beginning work is necessary to connect the machine to the mains.
2. Check completeness of the mounted cutting torch.
3. Connect the torch to the connector. By means of the thorn (part of the delivery) press the safety pin. Turn the nut of the connector clock wise and tight it properly.
4. Connect the mains cable **A13** to the on the network according 4 TECHNICAL DATA.
5. Connect the compressed air on connector **A11** on the rear wall of the machine.
6. Set the air pressure by means of regulator **A12** and manometer **A10** to 5 bars.
7. Connect the mains plug to the mains socket.
8. After turning on the ON/OFF switch **A14** the display **A5** will illuminate.
9. Connect the work lead cable to the material being cut and to the connector **A1**.

10. Check up the input air pressure (min 5 bar, max 8,5 bar) and make a regulation if necessary.
11. Set potentiometer **A4** to the cutting power you need.
12. Fit the torch with appropriate type of cutting tip electrode and shield cup according to the selected cutting current.
13. Press the trigger on the cutting torch, the pre gas will flow for 1 s.
14. The pilot arc will start.
15. Shift the torch with the pilot arc close to the material, the pilot arc will change to cutting arc automatically. If you do not start cutting within 2 s, the arc will snuff off. If the torch delays during the cutting from the material, the arc will snuff off. In case that the machine is in mode Cutting material with gaps – switch **A9** position , cutting arc will change to pilot arc and if you do not start cutting within 2 s, this arc will snuff off.
16. To finish the cutting process, release the torch trigger.

REQUIREMENTS FOR SOURCE OF COMPRESSED AIR

1. Delivered air pressure must be max. 8,5 bar and min. 5 bar.
2. Air consumption minimal 260 l/min
3. Compressed air for the plasma must be clean and dry.
4. Pressure dew point +3 °C
5. Maximum oil content 0.1 mg/m³
6. Maximal size of solid particles 15 microns
7. The minimal size of an air tank is 50 l
8. No additional oiling if the pressure air is permitted. That could damage the plasma machine and the cutting torch.

OPTIONAL AIR FILTERS

To achieve high quality cutting and to avoid serious disturbances to the torch it is highly advised to include the air filter.

Pos.	Item No	Description
24	5302	Air filter AT 1000
25	5304	Set for filter AT 1000 to RYVAL Plasma

 **NOTE**  Max. allowable pressure of filter AT 1000 is 8,5 bar.



Picture 3 – Air filter

8. CUTTING

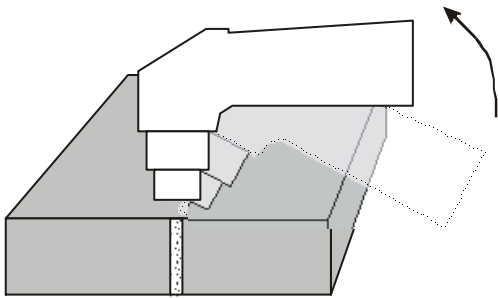
The table below shows just referential values. The real values may change according the material qualities. The darker colour highlights heat area where the consumables are more worn off.

S 105	Carbon steel – material thickness and recommended cutting tips															Tip	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30		
50 A																	4546 (1,0)
70 A																	4547 (1,2)
100 A																	4548 (1,4)

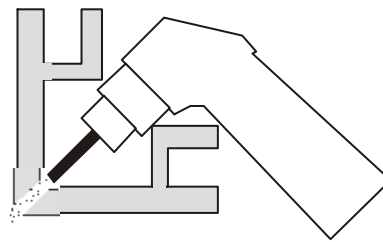
1. Press the torch trigger. The pilot arc will ignite. Then you have to immediately attach the torch to the cut material. At this point begins to burn the main arc between the torch and the material.
2. Move the torch with a constant speed. Cutting speeds vary according to torch output amperage, the type of material being cut, and operator skill.
3. Output current setting or cutting speeds may be reduced to allow slower cutting when following a line, or using a template or cutting guide while still producing cuts of excellent quality.
4. To achieve a good cutting quality make sure the distance between the tip and

the material is about 3,5 mm. The Stand Off Guide located at the end of the plasma torch guarantees the distance. At a greater distance decreases cutting power and the arc may go off. With too small distance the torch parts will be worn off faster.

5. Plasma cutting may be done in all possible positions (vertically, horizontally, overhead, vertical ascending and descending), but as far as possible choose primarily horizontal cut. In other positions the operator is increasingly threatened by flying drops of molten material.
6. We recommend starting cutting at the edge of the material. If needed to start from the centre of the material, or to cut hole into the material, slightly tilt the torch head and gradually it straighten into a vertical position so the spraying material would not damage the cutting tip (see Pic. 4). This workflow must always be followed, if the thickness of material is above above 3 mm.
7. In case of cutting in the corner or around the corner (see Pic. 5), use the long electrode and cutting tip. The cutting power while using the Long cutting tip is decreased.



Picture 4 - Cutting



Picture 5 - Cutting

IMPORTANT RULES

1. The pilot arc burning time should be limited only to the time necessary. It lowers the wear of the cutting tips and electrodes.
2. Never turn off the main switch immediately after finishing cutting but always leave time to run cooling cycle to cool down the torch. Immediate turn-off only in case of emergency.
3. Ensure a good el. Contact of the work lead clamps and cutting material.
4. Check and timely exchange cutting tips and the electrodes. Lifetime of these parts is only a few hours of cutting time and is highly dependent on compliance with the principles of good cutting.
5. Disconnect the machine from the mains before replacing the torch consumable parts.
6. Unplug the machine from the mains before any intervention inside the machine.
7. RYVAL 60 PLASMA is adapted for use with torch Plasma SVH-105. This combination comply with EN 60974-7 Article 10.1.4. Using any other type and design of a torch must be approved by Linde AG, Linde Gas

Deutschland.

8. Imperfect capture of condensate would cause its elimination in the area of the cutting tip and it would prevent ignition of the pilot arc.

SOURCES OF POOR QUALITY CUTS

Shallow penetration of the cut

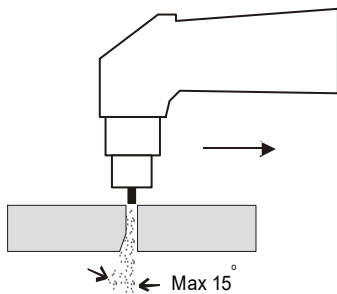
1. The cutting speed is too high. Make sure the slope of the cutting arc does not exceed about 15° (see Pic. 6).
2. High wear of the cutting tip or electrode (see Pic. 7).
3. Too large thickness of material and not adequately chosen value of current and diameter of the cutting tip.
4. Bad contact between the work lead clamps and material.

Cutting arc is unstable, goes off and "shoots"

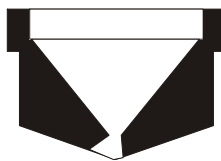
1. Worn out cutting tip or electrode
2. High pressure
3. Impurities in the pressure air
4. Not captured water condensate

Conical cut

1. If there is a false cut (see Pic. 8) turn off the machine, release the shield cup and rotate the cutting tip about $1/4$ and again try to cut.
2. Damaged cutting tip and electrode
3. The position of the torch is not perpendicular to the material.
4. Too large distance from the cutting tip to the material.



Picture 6



Picture 7



Picture 8

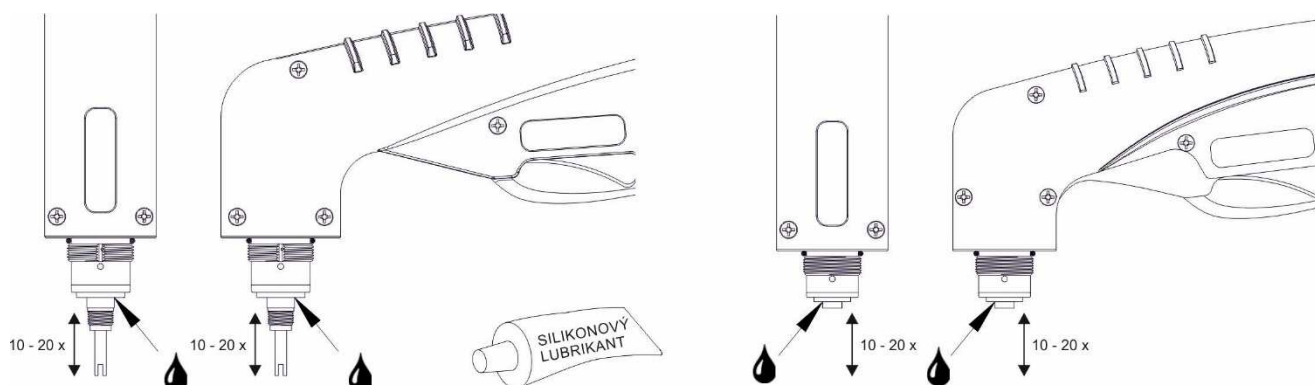
9. MAINTENANCE

1. A great care should be taken to the cutting torch. The molten material sprays while cutting. This sputter contaminates the interior space of the torch. The worn parts (consumables) of a plasma torch should be regularly maintained and timely exchanged. Regularly check the condition of diffuser channels (see diagram of the torch). If contaminated, you must clean it with a pressure air or to replace the diffuser. Poor state of the diffuser has a negative impact on the quality of cutting and causes very strong interference that may cause the collapse of the machine control electronics or influence the surrounding devices. If the cable bundle of the torch is worn out it must be replaced immediately - danger of electrical shock.
2. Disconnect the RYVAL from the mains supply voltage before disassembling.
3. Special maintenance is not necessary for the control unit parts in the plasma cut machine. If these parts are damaged for any reason, replacement is recommended.



4. Do not blow air into the plasma cut during cleaning. Blowing air into the plasma cut can cause metal particles to interfere with sensitive electronic components and cause damage to the welder.
5. To clean the plasma cut, disconnect it from the mains supply voltage then open the enclosure and use a vacuum cleaner to remove any accumulated dirt and dust. The plasma cut should also be wiped clean. If necessary, solvents that are recommended for cleaning electrical apparatus may be used.
6. Troubleshooting and repairing of RYVAL equipment should only be carried out only by suitably qualified or competent person.
7. A 'competent person' must be a person who has acquired through training, qualification or experience, or a combination of them, the knowledge and skills enabling that person to safely carry out a risk assessment and repairs to the electrical equipment in question.
8. The person carrying out the servicing needs and repairs must know what to look at, what to look for and what to do.

LUBRICATION OF THE ELECTRODE HOLDER WITH THE SILICONE LUBRICANT



Picture 9 - Lubrication of the electrode holder

Lubrication procedure:

1. Remove the retaining cap, cutting tip and swirl ring; keep the electrode in the electrode holder.
2. Lubricate the electrode holder with the silicone lubricant, as shown in the pictures above (ordering numbers of lubricants you can find in Accessories on request).
3. Then push the electrode up and down for 10-20 times for thorough lubrication.
4. Remove the excess silicone lubricant before putting the torch back together.

Lubrication must be performed in the following cases:

1. If is any difficulty in the movement of the electrode holder.
2. After the period of the prolonged inactivity.

Note: Thoroughly clean the electrode holder before lubricating it!

10. STATEMENT OF WARRANTY

1. In accordance with the warranty periods stated below, Linde AG, Linde Gas Deutschland guarantees the proposed product to be free from defects in material or workmanship when operated in accordance with the written instructions as defined in this operating manual.
2. Linde AG, Linde Gas Deutschland products are manufactured for use by commercial and industrial users and trained personnel with experience in the use and maintenance of electrical welding and cutting equipment.
3. Linde AG, Linde Gas Deutschland will repair or replace, at its discretion, any warranted parts or components that fail due to defects in material or workmanship within the warranty period. The warranty period begins on the date of sale to the end user.

4. If warranty is being sought, please contact your Linde AG, Linde Gas Deutschland product supplier for the warranty repair procedure.
5. Linde AG, Linde Gas Deutschland warranty will not apply to:
 - a) Equipment that has been modified by any other party other than Linde AG, Linde Gas Deutschland's own service personnel or with prior written consent obtained from Linde AG, Linde Gas Deutschland Service Department.
 - b) Equipment that has been used beyond the specifications established in the operating manual.
 - c) Installation not in accordance with the installation/operating manual.
 - d) Any product that has been subjected to abuse, misuse, negligence or accident.
 - e) Failure to clean and maintain (including lack of lubrication, maintenance and protection), the machine as set forth in the operating, installation or service manual.
6. Within this operating manual are details regarding the maintenance necessary to ensure trouble free operation.
7. Validity condition of warranty is, that the cutting machine must be used only with the torch, which is said in this manual.



Warranty repairs must be performed by either a Linde AG, Linde Gas Deutschland Service Centre, an Linde AG, Linde Gas Deutschland distributor or an Authorised Service Agent approved by the company Linde AG, Linde Gas Deutschland.

11. DISPOSAL



Only for EU countries. Do not dispose of electric tools together with household waste material.

In accordance with European Council Directive 2002/96/EC on electrical and electronic equipment waste and its implementation in accordance with national law, electric tools that have reached the end of their service life must be collected separately and returned to an environmentally compatible

recycling facility.