



WELDING INVERTER

RYVAL 160 T PULSE HF
RYVAL 200 T PULSE HF

OPERATING MANUAL

CONTENT:

1.	INTRODUCTION.....	3
2.	 SAFETY INSTRUCTIONS AND WARNINGS 	4
3.	TECHNICAL DATA	6
4.	EQUIPMENT	7
5.	OPERATOR CONTROLS	8
6.	GETTING STARTED	12
7.	TWO STROKE AND FOUR STROKE IN TIG MODE	13
8.	ROUTINE MAINTENANCE & INSPECTION	14
9.	STATEMENT OF WARRANTY.....	15
10.	DISPOSAL	16

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.

Ryval 160-200 T PULSE HF weld by those methods

- a) E – (MMA) coated electrodes up to 4,0 mm
- b) TIG HF (High Frequency ignition)
- c) TIG lift arc.

Welding machines Ryval 160-200 T PULSE HF have these function: pre-gas, post-gas, up slope, down slope, final current, high frequency ignition, two stroke and four stroke, pulsed mode, bilevel, UP-DOWN control from the torch. In MMA method are machines equipped with functions HOT START, ARC FORCE and ANTISTICK.


In TIG method are machines equipped with function „fan as required“ (if it is not necessary to cool the machine, it automatically shuts down the fan).

2. SAFETY INSTRUCTIONS AND WARNINGS

1. Once the packing has been opened, make sure that the machine is not damaged. If in any doubt, call the service centre.
2. This equipment must only be used by qualified personnel.
3. During installation, any electric work must only be carried out by trained personnel.
4. The machine must be used in a dry place with good ventilation.
5. 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.
6. It is prohibited to connect more than one INVERTER generator in series or in parallel.
7. When installing the machine, follow the local regulations on safety.
8. The position of the machine must allow easy access by the operator to the controls and connectors.
9. When the welding machine is operating, all its covers and doors must be closed and well fixed.
10. Do not expose the welding machine to direct sunlight or to heavy rain. This equipment conforms to protection rating IP23S.
11. During welding, the welding cables must be located near or at ground level. They should be as short as possible.
12. 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 welding.
13. 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 electrical welding 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.
14. The operator is obliged to warn anyone near the welding area of the risks that welding involves and to arrange to provide adequate protection equipment.
15. It is very important to arrange for sufficient ventilation, especially when welding in enclosed spaces. We suggest using suitable fume extractors to prevent the risk of intoxication by fumes or gas generated by the welding process.
16. The operator must ensure all flammable materials are removed from the work area to avoid any risk of fire.
17. The operator must NEVER weld 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.**
18. The operator must be aware of all the special regulations which he needs to conform to when welding in enclosed spaces with a high risk of explosion.
19. To prevent electric shock, we strongly suggest the following rules:

20. Do not work in a damp or humid environment.
21. Do not use the welding machine if its cables are damaged in any way.
22. Make sure that the earthing system of the electric equipment is correctly connected and operational.
23. The operator must be insulated from the metal components connected to the return wire.
24. The earthing of the piece being worked could increase the risk of injury to the operator.
25. 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 welding clamps. In our generator this voltage is 61V respective 65 V.
26. The maximum open-circuit voltage of the welding machines is established by national and international standards (EN 60974-1) depending on the type of weld 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.
27. 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

28. In case 1, the dc welding 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 welding machines of this type can be marked with the symbol: 
29. Before opening the machine switch off the machine and disconnect it from the power socket.
30. Only personnel authorised by this company can carry out maintenance on the machine.



NOTE:

Device complies with IEC 61000-3-12.

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.

3. TECHNICAL DATA

RYVAL 160 T PULSE HF			
Method		MMA	TIG
Mains voltage	V/Hz	1x230/50-60	
Welding current range	A	5 - 160	5 - 160
Open-circuit voltage U_{20}	V	63,0	63,0
Mains protection	A	16 @	
Max. effective current I_{1eff}	A	16,0	10,8
Welding current (DC=100%) I_2	A	80	80
Welding current (DC=60%) I_2	A	100	100
Welding current (DC=x%) I_2	A	25% = 160	25% = 160
Protection		IP23S	
Standards		EN 60974-1, EN 60974-10 cl. A	
Dimensions (w x l x h)	mm	130 x 375 x 230	
Weight	kg	7,3	

RYVAL 200 T PULSE HF			
Method		MMA	TIG
Mains voltage	V/Hz	1x230/50-60	
Welding current range	A	5 - 170	5 - 200
Open-circuit voltage U_{20}	V	63,0	63,0
Mains protection	A	16 @ (20 @)	
Max. effective current I_{1eff}	A	16,0 (18,8)	14,5 (14,5)
Welding current (DC=100%) I_2	A	80 (100)	100 (100)

Welding current (DC=60%) I ₂	A	110 (120)	120 (120)
Welding current (DC=x%) I ₂	A	20%=170 (30%=170)	25%=200 (25%=200)
Protection		IP23S	
Standards		EN 60974-1, EN 60974-10 cl. A	
Dimensions (w x l x h)	mm	130 x 375 x 230	
Weight	kg	7,3	

The machine is equipped with a 16 A plug for connection to a single phase supply 1 x 230 V, the corresponding data for this 16 A plug (Duty Cycle = DC) are in the table above without brackets.

In order to fully use the technical capabilities of the machine, the machine must be connected to the industrial single phase networks with a blue plug 32 A with the maximum permissible fuse of 25 A. The corresponding data for such a 32 A plug are stated in the table above in brackets.

Replacement of the plug may only be performed by Linde AG, Linde Gas Deutschland as authorized service personnel.

Linde AG, Linde Gas Deutschland continuously strives to produce the best product possible and therefore reserves the right to change, improve or revise the specifications or design of this or any product without prior notice. Such updates or changes do not entitle the buyer of equipment previously sold or shipped to the corresponding changes, updates, improvements or replacement of such items.

4. EQUIPMENT

PART OF THE DELIVERY

Item No.	Description
	RYVAL T PULSE HF
5847	Set Connectors ST 12 PIN
8.462.124	Quick connector RYVAL female

ACCESSORIES ON REQUEST

Item No.	Description
VM0321-2	Hose Gas 3m RYVAL quick connector G1/4
17FSL4ST	Torch PARKER SGT 17 4m 35-50 FX ST
17FSL4STUD	Torch PARKER SGT 17 4m 35-50 FX ST UD
17FSL8ST	Torch PARKER SGT 17 8m 35-50 FX ST
VM0253	Welding Cable Set 2x 3m 35-50 200A
6008	Pressure Reducer FIXICONTROL Ar 2 manometers GCE
5.0178	Box for RYVAL BLACK 50x58,5x18 cm

7.511.249	Belt Ryval
S7SUN9B	Welding Helmet S9B Shooting Blue Shark
S7SUN9BBlack	Welding Helmet S9B Shooting Blue Shark Black
3178	Gas Cylinder Argon 5 l
3176	Hose AR 1m with manom.
6053	MAGNET ON/OFF 40 kg
6052	MAGNET ON/OFF 75 kg

5. OPERATOR CONTROLS

MAIN PARTS

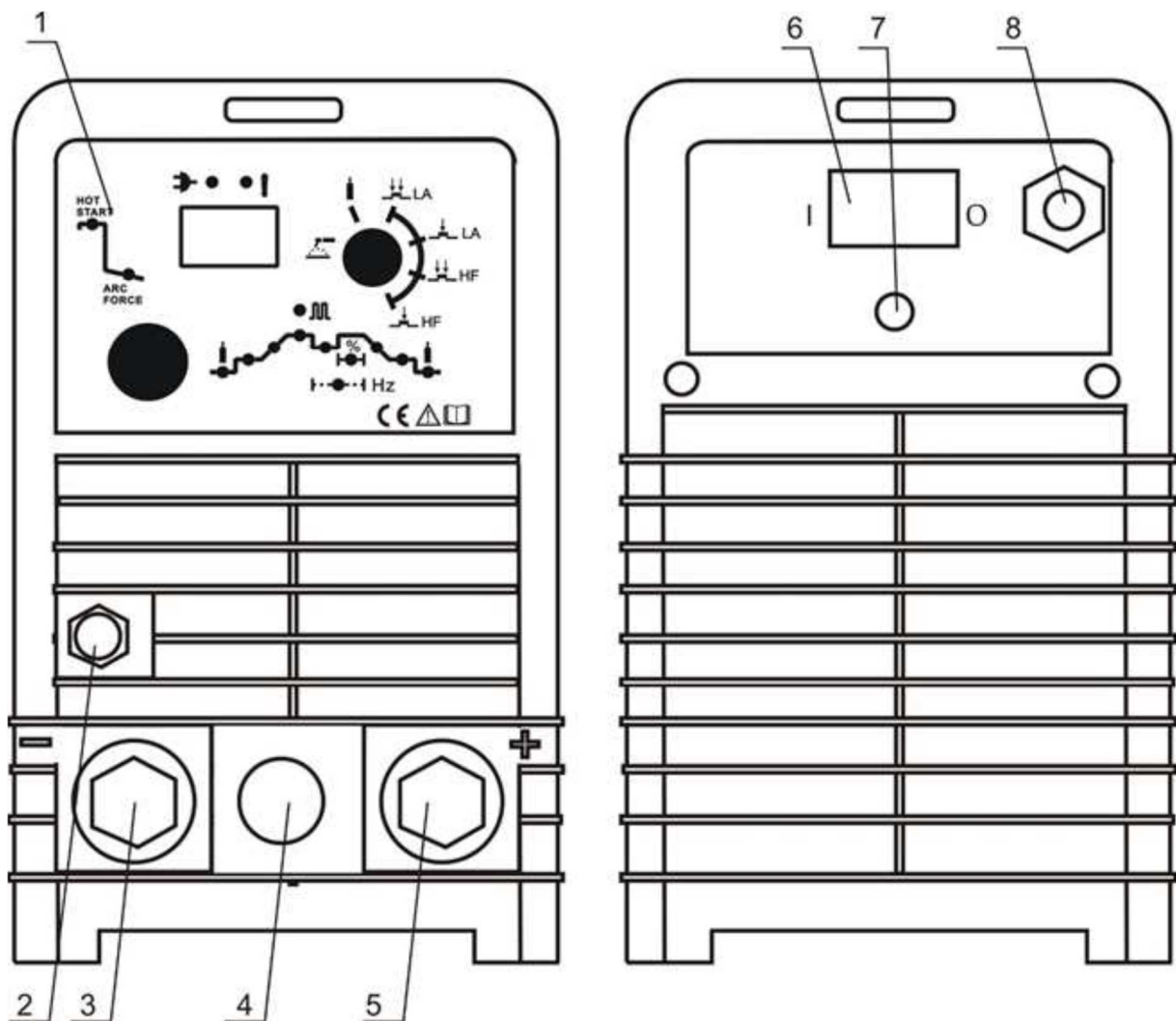
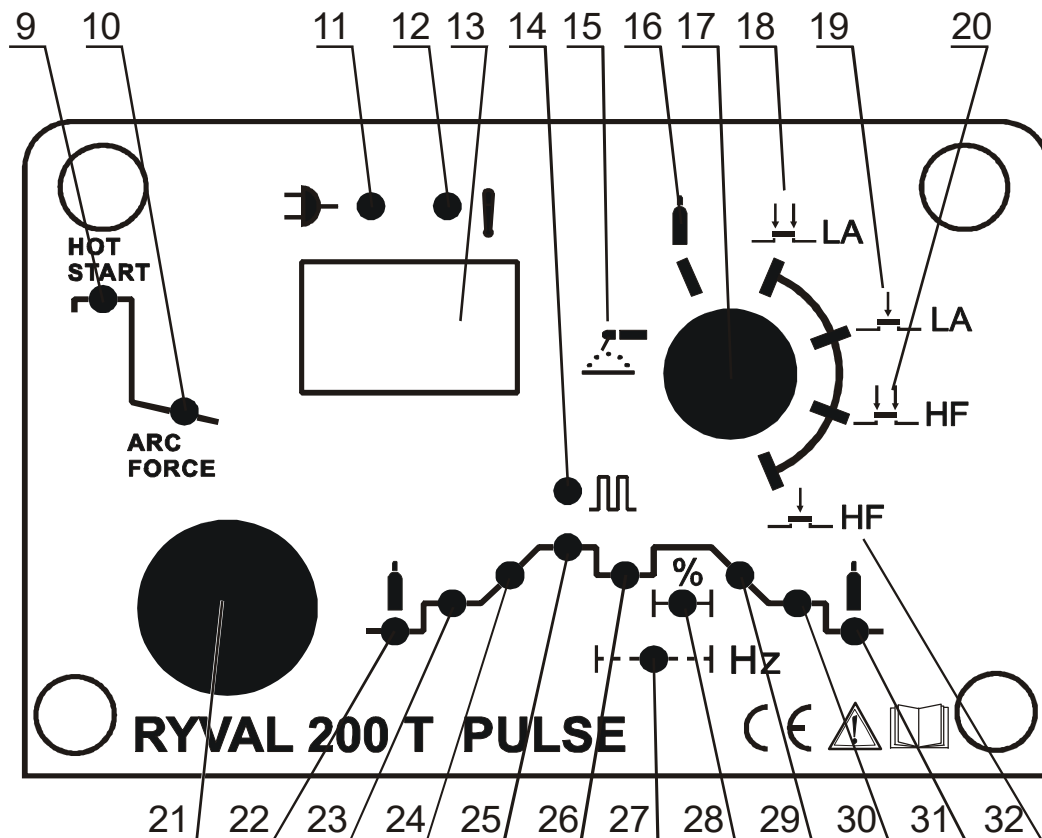


Fig . 1 Main parts

Pos.	Description
1	Operating panel LED ON
2	Gas outlet connector

3	Panel quick connector -
4	Torch control connector
5	Panel quick connector +
6	ON/OFF switch
7	Mains socket with a plug
8	Gas inlet connector

OPERATING PANEL

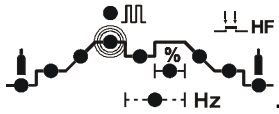


Pos.	Description
9	LED HOT START – only MMA (1-10 s, default 5 s)
10	LED ARC FORCE - only MMA (1-10, default 3)
11	LED ON
12	LED over heating or over voltage in the mains
13	Display
14	LED PULSE selected – only TIG
15	MMA – position of the method switch 17 , can be set current 25 , HOT START 9 or ARC FORCE 10 by means of the encoder 21
16	Adjusting the gas flow - position of the method switch 17
17	Method switch 1. MMA coated electrode

	<p>2. TIG Adjusting the gas flow - it is not possible to weld in this position</p> <p>3. TIG LA start 4T</p> <p>4. TIG LA start 2T</p> <p>5. TIG HF start 4T</p> <p>6. TIG HF start 2T</p>
18	TIG LA 4T – Lift Arc ignition TIG, four stroke - position of the method switch 17
19	TIG LA 2T – Lift Arc ignition TIG - position of the method switch 17 , the start current and end current are set to 5 A, impossible to change.
20	TIG HF 4T –TIG HF ignition, four stroke - position of the method switch 17
21	<p>ENCODER</p> <p>1. Every press of the encoder switches between selecting mode of the parameter to be set and setting mode of the selected parameter</p> <p>2. By means of turning selects the parameters to be set respective sets the selected parameters.</p> <p>3. Sets the current 25 – that function is active strait after switching the machine ON or if no pressing of the encoder was done.</p>
22	LED pre gas time - only TIG (0-1 s, default 0,1 s)
23	LED start current - only TIG (5-160 A, 5-200 A, default 50 A)
24	LED up slope time - only TIG (0-10 s, default 0 s)
25	LED welding current – all methods
26	LED lower current – only TIG, just in case the pulse LED 14 illuminates (5-160 A, default 64 A; 5-200 A, default 64 A)
27	LED pulse frequency - only TIG, just in case the pulse LED 14 illuminates (0,5-100 Hz, default 100 Hz)
28	LED pulse width - only TIG, just in case the pulse LED 14 illuminates (5-100%, default 50%)
29	LED down slope time - only TIG (0-10 s, default 0 s)
30	LED end current - only TIG (5-160 A, 5-200 A, default 5 A)
31	LED post gas time - only TIG (0,1-10 s, default 10 s)
32	TIG HF 2T –TIG HF ignition, two stroke - position of the method switch 17

PRINCIPLE OF SETTING PARAMETERS

1. The machine will be the **Main Mode** after switching ON - LED **25** will illuminate and turning the encoder **21** will change main welding current



2. Turning the encoder **21** changes parameters.
3. Pressing the encoder **21** activates function of selecting a new parameter to be set. That function will stay active just for 3 s. In case there is no movement of the encoder during the period of those 3 s the function deactivates and the machine switches automatically into the Main Mode.
4. After selection of a LED of a parameter to be set, appropriate LED will start flashing. That function will stay active just for 3 s. It is possible to change the value of the appropriate parameter by means of encoder 21 during that time.
5. To save the setting press the encoder 21 or wait for more than 3 s
6. The machine will switch back to the Main Mode after any change of setting 3 s later of last movement of the encoder **21**.

EN EXAMPLE OF SETTING

1. Select method LA by means of method switch **17**, LED 25 will illuminate



2. Press the encoder **21**, then by means of turning the encoder select



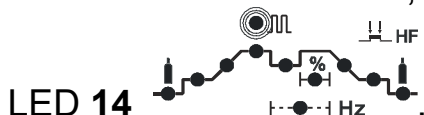
3. Press again the encoder **21**, LED **24** will start flashing. Now you can change the up slope time by means of turning the encoder **21**.
4. Press the encoder **21** third time. That will save the change of the parameter. In case you omit to press the encoder for the third time the machine will save the parameter change automatically after 3 s of no movement of the encoder 21. LED **25** will illuminate then.

SELECTING PULSE MODE

1. Select the required TIG method by means of method switch **17**, LED 25 will



2. Press the encoder **21**, then by means of turning the encoder select





3. Press again the encoder **21**, LED **14** will flash. Press the encoder 21 for the third time. On the display will appear "ON". The function will be automatically saved and LED **25** – main welding current will become active.
4. One can set off the pulse similarly. Just select "OFF".

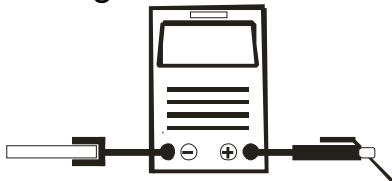
6. GETTING STARTED

Getting started must be consistent with technical data and conditions of use.

Insert the mains plug into a suitable 1x230 V mains socket. The supply fuses or circuit breaker should correspond to the technical data in section 3. Switch the machine on by the ON/OFF switch **6**.


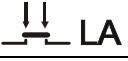
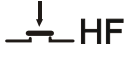

GETTING STARTED MMA – COATED ELECTRODE

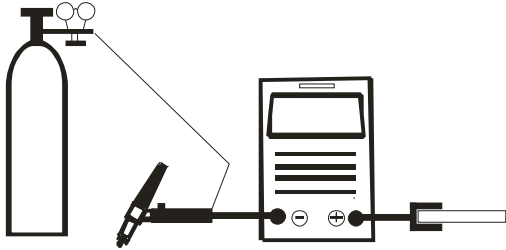
1. Set the method switch **17** to position **15** MMA.
2. Connect the welding cables to the panel quick connectors **3** and **5** (+ -) according the instruction on the electrodes packing.
3. Set the welding current by means of encoder **21**. The values will be showed on the display **13**.
4. You may adjust HOT START and ARC FORCE similarly to EN EXAMPLE OF SETTING.
5.  **NOTE**  **Prevent touching the electrode any metal material for in this mode the terminals (5) and (6) are under current.**
6. Insert the coated electrode into the electrode holder and you may start welding.



GETTING STARTED TIG

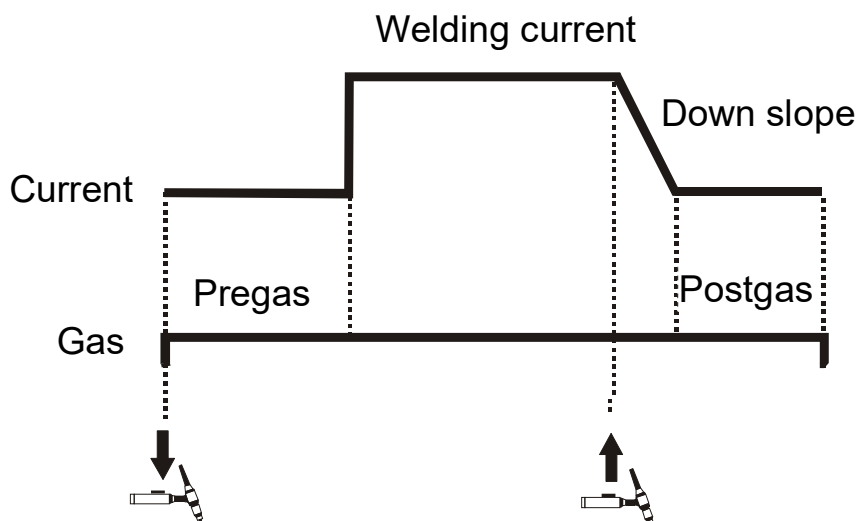
1. Fit the TIG Torch to the Panel quick connector - **3** and fasten it by turning the connector to the right.
2. Connect the work lead to Panel quick connector + **5** and fasten it by turning the connector to the right.
3. Connect the to the reduction valve on the gas cylinder and on the Gas inlet connector **8**.
4. Connect the gas hose of the TIG torch onto Gas outlet connector **2**.
5. Connect the torch control connector onto the matching connector **4**.
6. Connect the work clamp to the work piece or at the welding table.
7. Set the method switch 17 to desired TIG method.

Symbol	Description
 LA	4T LA – four stroke, contact ignition – Lift Arc
 LA	2T LA – two stroke, contact ignition – Lift Arc
 HF	4T HF – four stroke, HF ignition (High Frequency)
 HF	2T HF – two stroke, HF ignition (High Frequency)

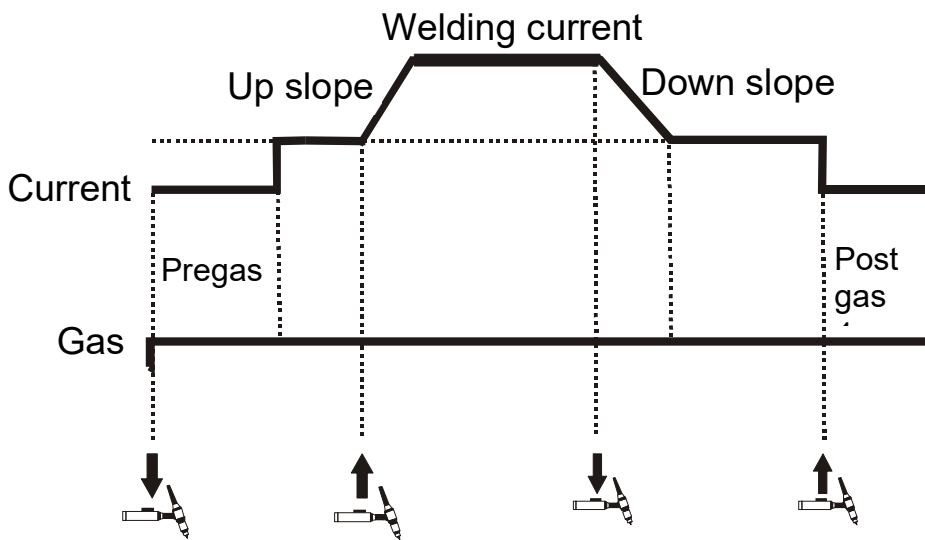


7. TWO STROKE AND FOUR STROKE IN TIG MODE

TWO STROKE – 2T



FOUR STROKE – 4T



BILEVEL – SECOND WELDING CURRENT

When the machine is in 4T mode, there is always active the BILEVEL function. The value of the second current is automatically set to 50% of the pre-set value of the main welding current. To enter the second welding current press the torch button for a short time and release it. To get back to the main welding current press the torch button for a short time and release it.

8. ROUTINE MAINTENANCE & INSPECTION

1. The only routine maintenance required for the Ryval range of machines is a thorough cleaning and inspection, with the frequency depending on the usage and the operating environment.



2. Disconnect the Ryval from the mains supply voltage before disassembling.
3. Special maintenance is not necessary for the control unit parts in the Welder. If these parts are damaged for any reason, replacement is recommended.



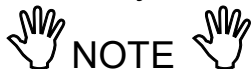
4. Do not blow air into the welder during cleaning. Blowing air into the welder can cause metal particles to interfere with sensitive electronic components and cause damage to the welder.
5. To clean the welder, disconnect it from the mains supply voltage then open the enclosure and use a vacuum cleaner to remove any accumulated dirt and dust. The welder should also be wiped clean. If necessary, solvents that are recommended for cleaning electrical apparatus may be used.
6. Troubleshooting and repairing of Ryval welding 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.

9. 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 welding 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:
6. 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.
7. Equipment that has been used beyond the specifications established in the operating manual.
8. Installation not in accordance with the installation/operating manual.
9. Any product that has been subjected to abuse, misuse, negligence or accident.
10. Failure to clean and maintain (including lack of lubrication, maintenance and protection), the machine as set forth in the operating, installation or service manual.
11. Within this operating manual are details regarding the maintenance necessary to ensure trouble free operation.



12. Warranty repairs must be performed by either an 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.

10. 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.