

WELDING INVERTER

RYVAL 200 AC/DC PULSE *dave*

RYVAL 200 AC/DC *dave*

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.

RYVAL 200 AC/DC PULSE *dave* welds by those methods:

1. E – (MMA) DC coated electrodes
2. E – (MMA) AC coated electrodes
3. TIG DC (Lift arc or High Frequency ignition)
4. TIG AC (Lift arc or High Frequency ignition)

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.

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.

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.

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

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.

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

NOTE

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 4499 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 $Z_{max} = 36 \text{ m}\Omega$ and whether the device can be connected with a public low-voltage network.

On the nameplate are the following symbols: .

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

Method		MMA - AC	MMA - DC	TIG - AC	TIG - DC
Mains voltage	V/Hz	1x230/50-60			
Welding current range	A	10 - 170	10 - 170	10 -200	10 - 170
Open-circuit voltage U_{20}	V	53,0	63,0	53,0	63,0
Mains protection	A	16 @ (25 @)			
Max. effective current I_{1eff}	A	16,0 (22,5)		16,0 (16,6)	
Welding current (DC=100%) I_2 $t_a=40\text{ }^\circ\text{C}$	A	80 (110)	80 (110)	120 (120)	120(120)
Welding current (DC=60%) I_2 $t_a=40\text{ }^\circ\text{C}$	A	100 (140)	100 (140)	140 (140)	140 (140)
Welding current (DC=x%) I_2 $t_a=40\text{ }^\circ\text{C}$	A	20%=170 (40%=170)	20%=170 (40%=170)	30%=200 (35%=200)	40%=170 (40%=170)
Protection		IP23S			
Standards		EN 60974-1; EN 60974-10 class A			
Dimensions (w x l x h)	mm	130 x 430 x 230			
Weight	kg	8,5			

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.

Another option is to connect the machine to the three-phase mains 3x400 / 230V TN-S (CS). The condition is to use a 5 pin 32 A plugs for the supply cable and connection to the phase voltage. Black (brown) wire connected to one phase (e.g. L1), the blue wire to the neutral wire (N) and green-yellow wire to the grounded conductor "PE". In this case, it is possible to connect the machine to a three-phase socket, which may be protected by fuse max. 25 A.

Attention! Do not connect to the interconnected voltage (delta voltage) (between 2 phases)!

Replacement of the plug may only be performed by Linde AG, Linde Gas Deutschland 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

CONTENT OF DELIVERY

Item No.	Description	Quantity
5.0279	RYVAL 200 AC/DC PULSE DAVE	1
5.0278	RYVAL 200 AC/DC DAVE	1
5847	Set of Connectors for RYVAL AC/DC Dave	1
8.462.124	Quick connector Ryval 160 female	1

In case you order a torch with the connector on, the set 5756 would be used for that purpose and will not be delivered then. In case you order a Gas Hose, the quick connector 8.462.124 would be used for that purpose and will not be delivered then.

ACCESSORIES TO ORDER

Item No.	Description
VM0321-2	Hose Gas 3m Ryval quick connector G1/4
VM0253	Welding Cable Set 2x 3m 35-50 200A
5.0508	Welders Cart P 80
17FSL4S	Torch PARKER SGT 17 4m 35-50 FX S
17FSL4SUD	Torch PARKER SGT 17 4m 35-50 FX S UD
17FSL8S	Torch PARKER SGT 17 8m 35-50 FX S
17FSL8SUD	Torch PARKER SGT 17 8m 35-50 FX S UD

26FSL4S	Torch PARKER SGT 26 4m 35-50 FX S
26FSL4SUD	Torch PARKER SGT 26 4m 35-50 FX S UD
26FSL8S	Torch PARKER SGT 26 8m 35-50 FX S
26FSL8SUD	Torch PARKER SGT 26 8m 35-50 FX S UD
6008	Pressure Reducer FIXICONTROL Ar 2 manometers
5.0174ST	Foot Pedal Remote CTRL 3 m RYVAL incl. Connector ST

5. OPERATOR CONTROLS

MAIN PARTS

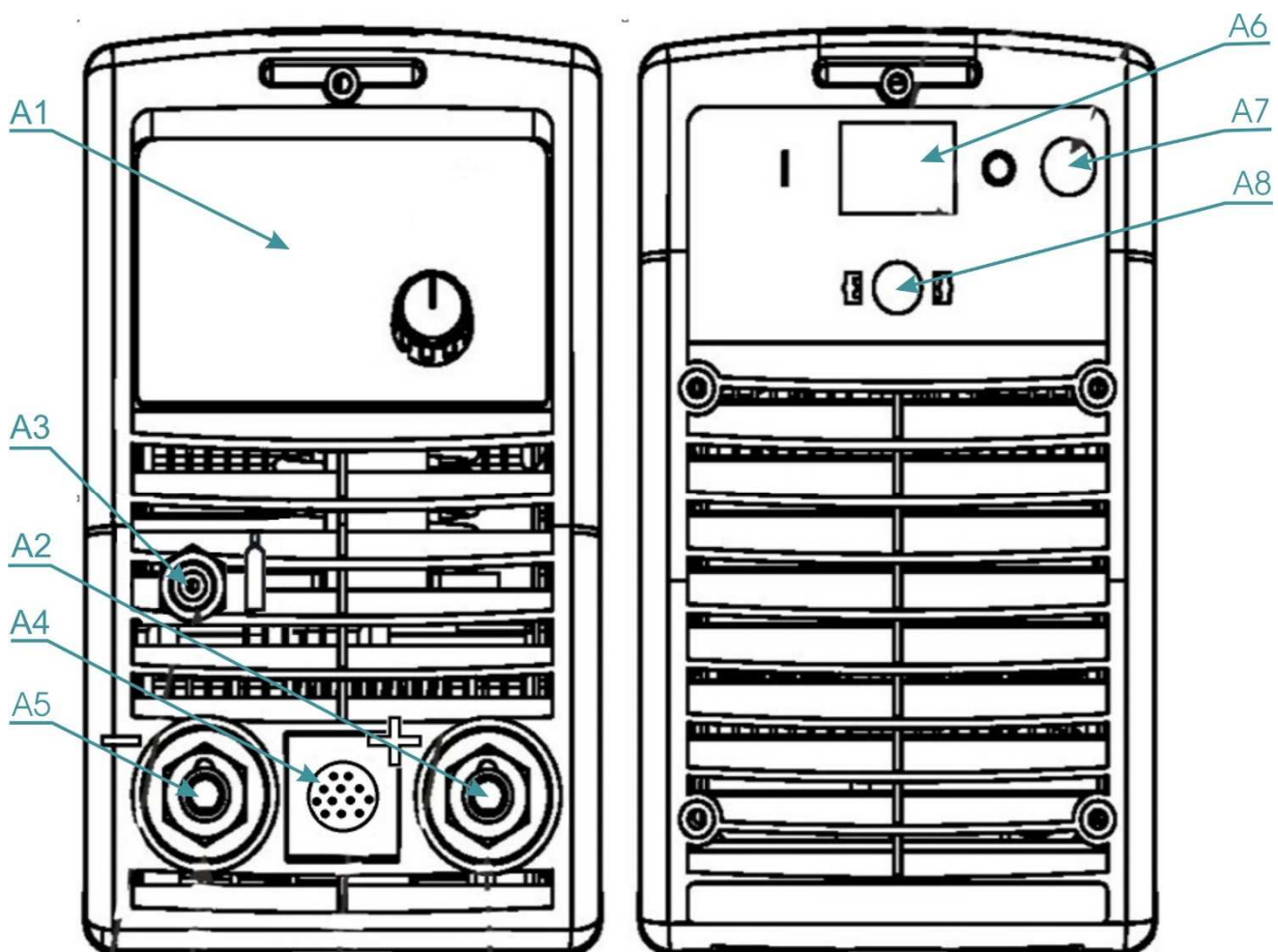


Fig . 1 Main parts

Pos.	Description
A1	Operating panel
A2	Quick connector +
A3	Gas connector of the welding torch
A4	Torch control connector
A5	Quick connector -
A6	ON/OFF switch

A7	Gas inlet
A8	Mains cable and plug

OPERATING PANEL

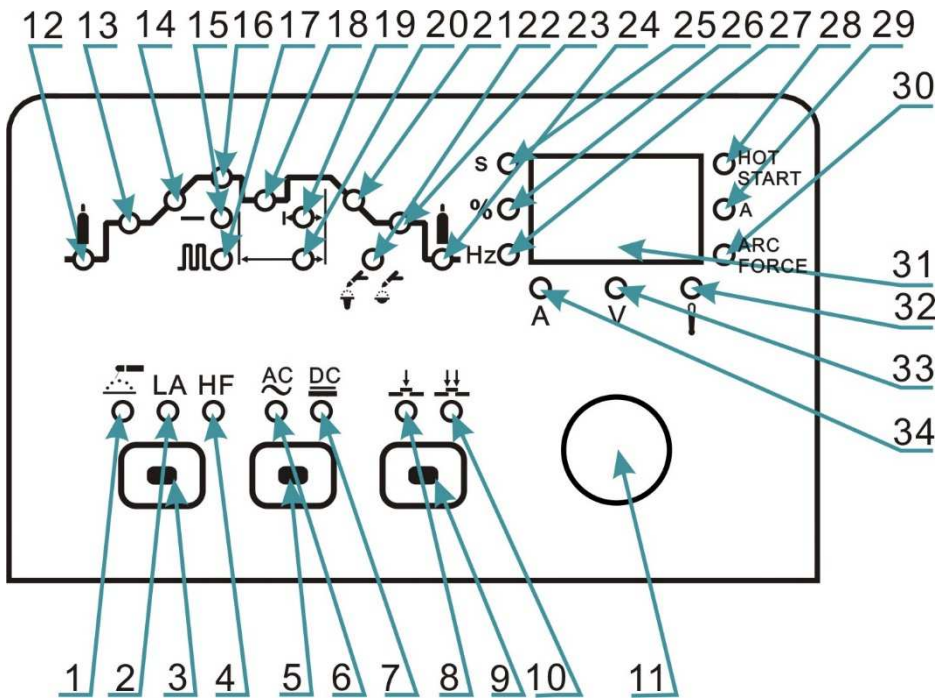


Fig. 2 RYVAL 200 AC/DC Pulse Dave

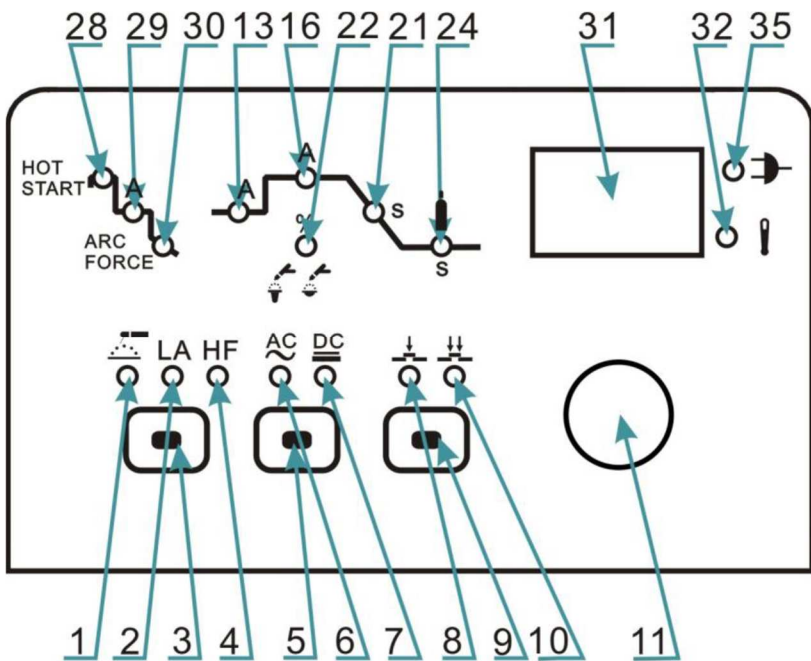


Fig. 3 RYVAL 200 AC/DC Dave

Pos.	Description
1	LED MMA
2	LED TIG LA – Lift Arc ignition

3	Button switch MMA/TIG HF/TIG LIFT ARC.
4	LED HF. If illuminated the HF ignition was set.
5	Button switch AC/DC mode
6	LED AC
7	LED DC
8	LED Two Stroke (2T).
9	Button TIG 2T or 4T (two stroke, four stroke)
10	LED Four Stroke (4T)
11	Encoder
12	LED Pregas, 0,0 – 2,0 s
13	LED start current (just 4T), 10 – 170 A DC, 10 – 200 A AC.
14	LED Up slope, 0 – 10 s
15	LED – non pulse mode. To change, turn the encoder 11 and confirm by means of pressing the encoder 11 down. Display 31 shows ---
16	LED Main Welding Current. 10 - 170 A (TIG-DC) ; 10 - 200 A (TIG-AC) ; 10 – 170 A (MMA-AC/DC)
17	LED – PULSE selected To change, turn the encoder 11 and confirm by means of pressing the encoder 11 down. Display 31 shows -P-.
18	LED lower current, 10 – 170 A (TIG-DC) ; 10 – 200 A (TIG-AC) ; 10 – 170 A (MMA-AC/DC).
19	LED ratio of the pulse current and the base current. 5 – 95 %. Just for the pulse mode.
20	LED Pulse Frequency. 0,5 – 200 Hz. Just for the pulse mode.
21	LED Down Slope, 0 – 10 s
22	LED Balance (just TIG AC). Used for elimination of the aluminium oxides. Range +5 to -5, (more in the text below).
23	LED end current, 10 – 170 A DC, 10 – 200 A AC, just in 4T.
24	LED Post Gas, 0 – 10 s.
25	LED Time (s). If illuminated there are values in s on the display.
26	LED %. If illuminated there are values in % on the display.
27	LED Hz. If illuminated there are values in Hz on the display.
28	LED HOT START, just for MMA, 0 – 100. LED lights up after pressing the encoder 11.

29	LED welding current MMA 10 – 170 A, just for MMA. LED lights up after pressing the encoder 11.
30	LED ARC FORCE just for MMA, 0 – 100. LED lights up after pressing the encoder 11.
31	Display
32	LED ALARM. If illuminated there is under or over voltage in the mains or the machine is overheated.
33	LED Voltage (V). If illuminated there are values in V on the display.
34	LED current (A)
35	LED ON

6. GETTING STARTED

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

GETTING STARTED MMA – COATED ELECTRODE

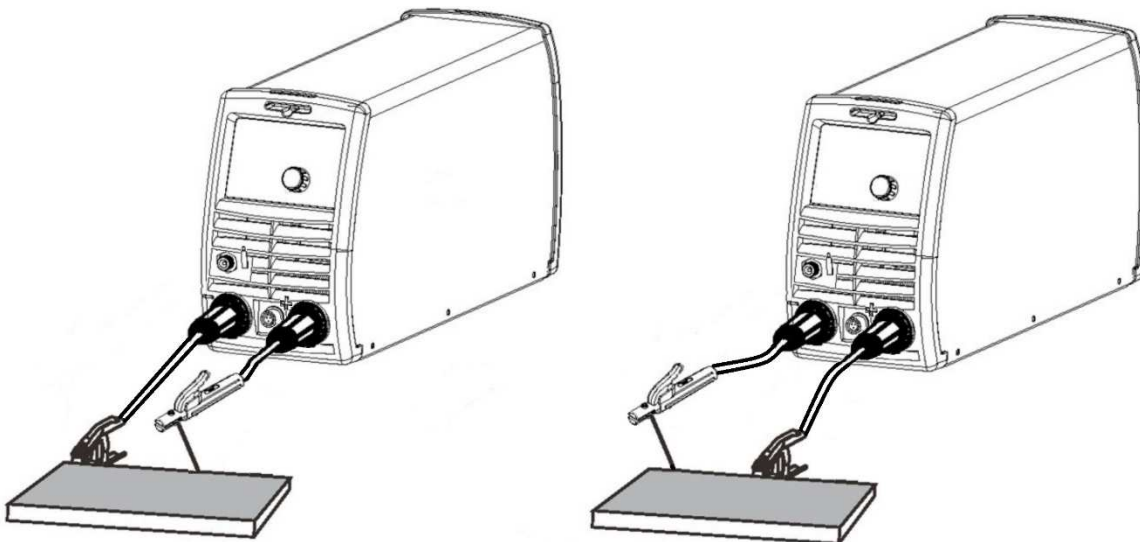


Fig. 4 Ways of connecting the welding cables. Follow the instructions on the packing of the welding electrodes.

1. Insert the mains plug **A8** into a suitable 1x230 V mains socket.
2. Connect the welding cables to the panel quick connectors (+) **A2** and (-) **A5** according the instruction on the electrodes packing.
3. Switch the machine on by the ON/OFF switch **A6**.
4. Then switch to the MMA mode by means of the button **3**.
5. Set the welding current by means of encoder **11**. The values will be showed on the display.
6. Press button **5** to select AC or DC welding current.
7. It is possible to change the settings of the **HOT START** (increase of current during arc ignition time), **ARC FORCE** (an automatic increase of the

welding current in case the electrode touches the welding piece) by means of the Encoder **11**.

NOTE Prevent touching the electrode any metal material for in this mode the terminals **A2** and **A5** are under current.

8. Insert the coated electrode into the electrode holder, connect the clamps of the ground cable to the welding piece and you may start welding.

GETTING STARTED TIG

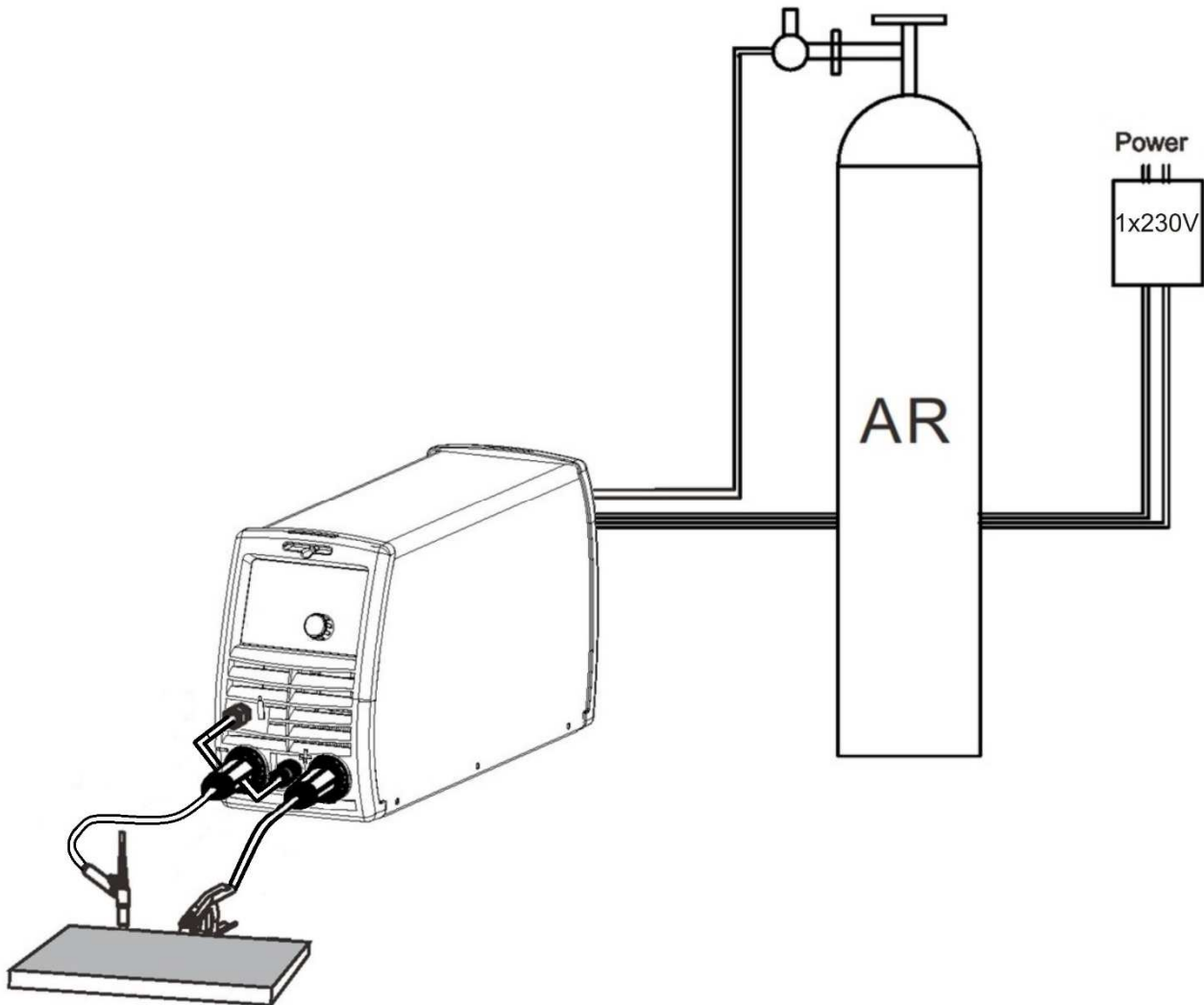
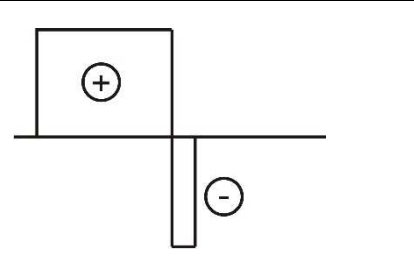
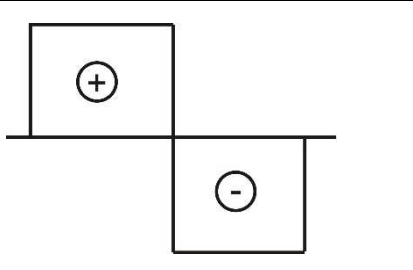


Fig. 5 TIG welding set up

1. Insert the mains plug **A8** into a suitable 1x230 V mains socket.
2. Fit the TIG Torch to the Panel quick connector (-) **A5**.
3. Connect the gas hose of the TIG torch onto Gas outlet connector **A3**.
4. Connect the torch control connector onto the matching connector **A4**.
5. Connect the work lead to Panel quick connector (+) **A2**.
6. Connect the gas hose to the reduction valve on the gas cylinder and on the Gas inlet connector **A7** on the rear panel.
7. Switch the machine on by the ON/OFF switch **A6**.
8. Press the torch trigger, the solenoid valve will open; set the desired gas flow (pure argon).

9. Select TIG LA or HF mode by means of switch **3**. The corresponding LED will light up.
10. Select 2T (two stroke) or 4T (four stroke) mode by means of switch **9**. The corresponding LED will light up.
11. Select the method desired DC or AC method by means of the button **5**. The corresponding LED will light up.
12. In the welding torch must be installed a corresponding tungsten electrode (for AC green or golden). The electrode should be sharpened also corresponding to the AC or DC mode.
13. Set the welding current by means of Encoder **11**.
14. Other parameters may be set by means of the encoder **11**. Illuminate the appropriate LED by means of pressing the encoder **11**, by means of turning the encoder **11** set the parameter and save it by means of pressing the encoder **11**. After that a next LED will illuminate and you may set that parameter the same way. The set parameter will be automatically memorised when you move to another parameter of after 3 s. At every turning of the encoder 11 the last selected parameter will be offered to be changed.
15. Connect the work clamp to the work piece or at the welding table and you can start welding.
16. The following table describes the influence setting the clearance effect.

Clearance effect	Value -5 to 0	Value +1 to +5
Shape of the current curve		
Penetration	Deep	Shallow
Level of wear of the of tungsten electrode	Smaller	Bigger

REMOTE CONTROL

The RYVAL 200 AC/DC PULSE supports three kinds of remote controls.

1. TIG torch with UP-DOWN buttons
2. Foot pedal
3. Standard separate remote control for changing the value of the welding current.

All three models of remote controls can be connected by means of the front panel connector **A4**.

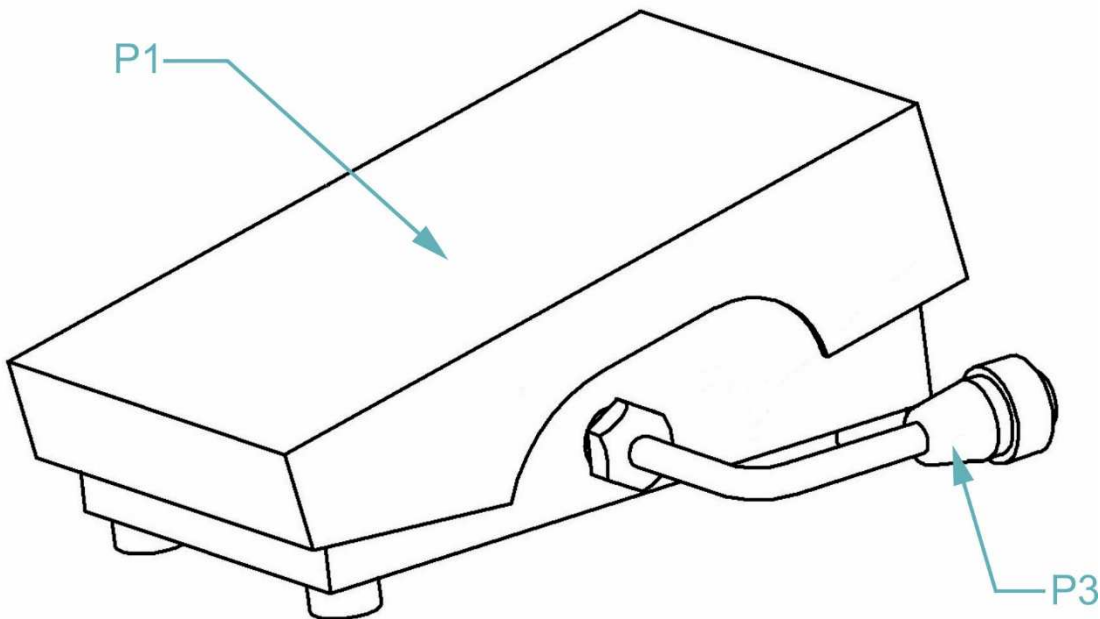


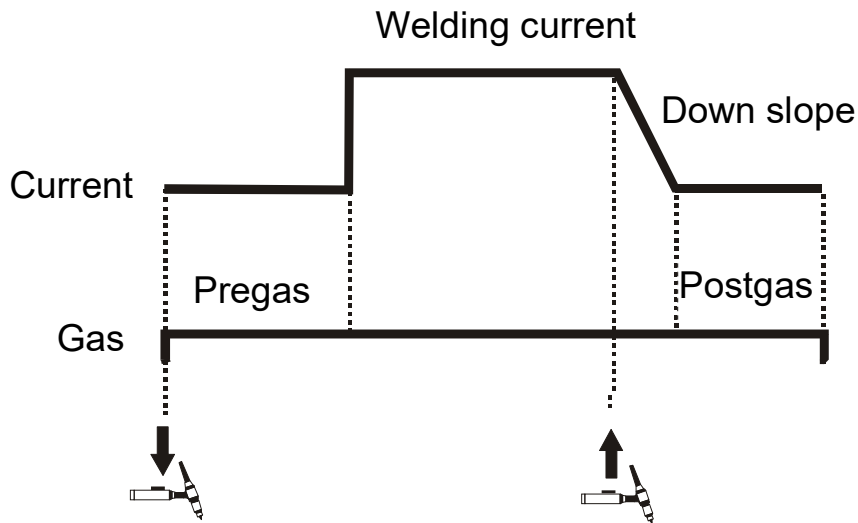
Fig. 6 Foot pedal remote control

Pos.	Description
P1	Stepping surface
P3	Connector (connect to matching connector 13 on the front panel)

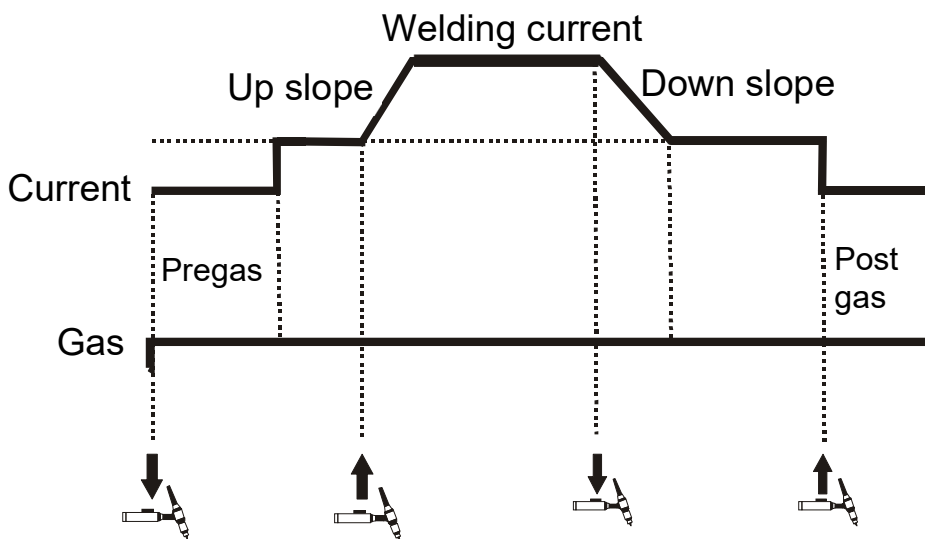
1. When you connect the **P3** connector to matching connector on the front panel **A4** the function setting the current from the front panel will be blocked.
2. Set by the encoder **11** the maximal required value of the current.
3. Set the machine to the mode **2T**.
4. By pressing the stepping surface **P1** down you start the welding process. The value of the welding current depends on the level of pressing the stepping surface. To reach the maximal current, set by encoder **11**, requires to gently pressing to the lowest position of the stepping surface **P1**. The set current will be displayed on the display **31**.
5. The welding process ends after releasing the stepping surface **P1**.

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. GENERAL INFORMATION ON THE WELDING MODES

MMA welding

The manufacturers of the electrodes specify the optimum welding current for each type of electrode. The type of electrode to be used depends on the thickness of the material to be welded and on its position.

Insert the chosen electrode into the electrode holder. To strike the electric arc, rub the electrode against the material to be welded connected to the earth (ground) clamp. Once the arc is struck, lift the electrode holder slowly to the normal welding distance.

To strike the arc better, an initial current is supplied which is higher (hot-start) compared to the welding current. The electrode on melting deposits in the form of drops onto the piece to be welded and its outer coating is consumed supplying the shielding gas for the welding. To facilitate the fluidity of the welding arc, while the drops are coming off, which can cause a short circuit between the electrode and the weld pool, a momentary increase in the welding current (arc-force) is given, thus preventing the arc from going out. If the electrode stays stuck to the piece to be welded, there is an anti-stick function that, after a certain short-circuit time, cuts off the power to the generator. Thus you can detach the electrode without damaging it.

When the coating electrodes are used, you need to remove the dross from the welding after every pass.

TIG welding



In TIG (Tungsten Inert Gas) welding the electric arc is struck between a non-consumable electrode (pure tungsten or an alloy) and the workpiece in an atmosphere protected by an inert gas (argon).

The TIG lift-arc process is struck by contact. A low short-circuit welding current is set to limit the tungsten inclusion on the workpiece. This process does not guarantee a weld of high quality at the start of the bead.



To completely prevent the tungsten being included, you must not let the electrode touch the piece to be welded. However you use a start-up with high frequency (HF) discharge that allows striking of the electric arc at a distance.

9. 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.

 **WARNING**  Disconnect the RYVAL from the mains supply voltage before disassembling.

2. Special maintenance is not necessary for the control unit parts in the Welder. If these parts are damaged for any reason, replacement is recommended.

 **CAUTION**  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.

3. 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.
4. Troubleshooting and repairing of RYVAL welding equipment should only be carried out only by suitably qualified or competent person.
5. 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.
6. The person carrying out the servicing needs and repairs must know what to look at, what to look for and what to do.

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 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.

👉 NOTE 👉 Warranty repairs must be performed by either a Linde AG, Linde Gas Deutschland Service Centre, a 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.