



Operating manual of welding rectifier PONTIG 320 AC/DC LCD MOST with CS cooler



Anyone using or responsible for the maintenance of this device should read this entire user manual before starting work.

This will enable optimal use of the device's capabilities.

Warning! Read the user manual before starting work.

Warning! A copy of this manual should be kept at the place of operation of the device and should always be available to the operator.



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Thank you for purchasing the **PONTIG 320 LCD AC/DC MOST** welding rectifier **with CS co-oler**. Please read this user manual before starting work. The **PONTIG 320 AC/DC LCD MOST** device is used for TIG welding in argon shielding with direct current (steel and stainless steel), alternating current (aluminium and its alloys) or MMA coated electrode. We hope you will be satisfied with this equipment.

1. Health and safety instructions



CAUTION: The device must not be used to defrost pipes! Information contained in the icons on the device:



The use and maintenance of welding equipment can be dangerous. The user must follow health and safety rules to avoid accidents. Welding and cutting equipment may only be used by qualified personnel. Keep abreast of national regulations concerning the use of this equipment and accident prevention.



Remove all combustible materials from the welding area before starting work. Do not weld in tanks that previously contained flammable substances (fuel). Remove all combustible materials from the welding spatter area.

	Do not expose the device to rain or steam, and do not spray water on it.
	Do not weld without adequate eye protection. Take care to protect bystanders from radiation.
	Use extractors or filters to remove fumes from the welding area. If the filter ventilation is not working properly or is not available, use helmets with a forced air flow system.
	Stop work immediately if you notice damage to the power cables. Do not touch damaged cables. Disconnect the device from the power supply before maintenance or repair. Do not use the device if the power cables are faulty.
	Place a fire extinguisher near the welding site. After welding, check the work area for fire hazards.
	Never attempt to repair a damaged gas regulator yourself. If the regulator is damaged, replace it with a working one.
	Electromagnetic interference. The device may affect other devices sensitive to electromagnetic interference (robots, computers, etc.). Ensure that the devices within the welding area are resistant to interference. To reduce interference, it is recommended to use welding cables that are as short as possible and laid parallel to each other. Work at least 100 m away from sensitive devices. Always ensure that the installation is earthed. If interference with other equipment still occurs, shield the cables properly or use appropriate filters. The device complies with current standards. In accordance with EN IEC 60974-10:2022, it is classified as class A and is intended for use in workshop and industrial environments. Using the device near residential buildings, and especially when powered from the domestic mains supply, may cause interference with other electrical or telecommunications equipment. The user is responsible for connecting the device correctly and eliminating any electromagnetic interference.



NOTE: The following instructions should be read before installing and starting up the device. Every welder and employee responsible for equipment maintenance should be familiar with the health and safety instructions.

PRELIMINARY NOTES

The device may only be started up and operated after thoroughly reading the following instructions. Welding requires compliance with the regulations for electric arc welding in accordance with fire safety regulations. The operator of the welding device should be equipped with protective clothing and equipment in accordance with current regulations. It is necessary to use a set of personal protective equipment (PPE) in accordance with the provisions of Regulation 2016/425. Personal protective equipment includes: a welding mask with a protective filter, welding gloves, a protective apron, welding clothing, leather boots, and possibly a forced air ventilation system. Despite the high technical standard of the equipment, operators should demonstrate considerable discipline in applying health and safety requirements that protect against harmful and hazardous factors arising from welding technology during operation.

OPERATING CONDITIONS

This device can operate in harsh conditions. However, it is important to take simple preventive measures to ensure long life and reliable operation, including:

- do not place or use this appliance on a surface with a slope greater than 10%,
- do not use this appliance to defrost pipes,
- this device must be placed in a location where there is free circulation of clean air without any restrictions on air flow to and from the fan; when the device is connected to the mains, do not cover it with anything, e.g. paper or a cloth;
- keep dirt and dust that may enter the device to a minimum,
- this device has an IP23S enclosure protection rating, keep it dry and do not place it on wet ground or in a puddle,
- do not use the device for welding tanks containing flammable substances.

ENVIRONMENTAL CONDITIONS

Air temperature range during:

- operating temperature range from -10°C to +40°C,
- transport and storage from -25°C to +55°C,
- relative air humidity: up to 90% at +20°C.
- Permissible working environment up to 3000 m above sea level.



GASES AND FUMES

During MMA and TIG welding, harmful gases and fumes containing ozone, hydrogen, oxides and metal particles are produced. Therefore, the welding station should have very good ventilation (dust and fume extraction or be located in a well-ventilated area). Metal surfaces intended for welding should be free of chemical contaminants, especially degreasing agents (solvents), as these decompose during welding, producing toxic gases. Welding of galvanised parts or parts coated with cadmium or chromium is only permitted with the use of a device for extracting and filtering contaminants and with the supply of fresh air to the welding station.

RADIATION

Ultraviolet radiation emitted during welding is harmful to the eyes and skin, therefore the use of a welding mask with protective filters is required.

- The welding station should meet certain requirements, including:
- have adequate lighting,
- depending on the need, have fixed or movable screens to protect bystanders from the effects of radiation,
- be located in a room with walls of an appropriate colour (radiation absorption).

FIRE SAFETY

The welding station should be located at a safe distance from flammable materials (especially on the floor or walls), which should protect against fire from hot metal droplets. It is advisable to equip the station with fire blankets and fire extinguishers.

ELECTRIC SHOCK PROTECTION

It is unacceptable to connect the device to an unsuitable installation or an installation with unproven zeroing effectiveness. Removing external covers while the device is connected to the mains, as well as using the device with the covers removed, **IS PROHIBITED**. The device must not be operated while suspended, e.g. from a crane or hoist. Maintenance and repair work should be carried out by authorised persons in accordance with the safety conditions applicable to repair equipment.

2. Technical description

The **PONTIG 320 AC/DC LCD** device is an inverter welding rectifier for TIG welding in argon shielding (arc ignition by HF ioniser or rubbing with the tip of a tungsten electrode) or with a coated MMA (Stick) electrode. The device has excellent welding properties and a wide range of applications. It can be used for welding:

- a) MMA electrode welding – direct current DC or alternating current AC.
Recommended electrode diameters from 1.6 to 5.0 mm. Rutile or basic coated electrodes (DC no-load voltage $U_0 = 74V$), for steel or stainless steel,
- b) TIG DC method.
Arc ignition by HF ioniser, gas automatically opened by solenoid valve in the device. For welding stainless or low carbon steel, recommended tungsten electrode diameter 1.6 or 2.4 mm (full range 1.6-4.0 mm). Can be welded with continuous or pulse current.
- c) TIG AC method
Arc ignition by HF ioniser, gas automatically opened by solenoid valve in the device. Welding of aluminium or its alloys, recommended tungsten electrode diameter 1.6 or 2.4 mm (full range 1.6-4.0 mm). Available functions: AC balance, negative/positive AC component adjustment and pulse current. Three current waveforms are available for TIG AC welding, depending on the application.

The device is protected against overheating by a thermal sensor. It is manufactured in accordance with EN-IEC 60974-1, „Arc welding equipment. Part 1: Welding power sources”.

3. Installation and transport

- The user is responsible for connecting the device in accordance with the manufacturer's instructions. In the event of electromagnetic interference, the user should remove the cause, if necessary with the manufacturer's knowledge.
- Before using the device, the welder should assess the possible impact of interference on the environment, in particular on the presence of persons with pacemakers or hearing aids.
- It is not recommended to supply PONTIG from a generator.

Transport.

Only use suitable slings for vertical transport by crane. Disconnect the gas cylinder before transporting the device. The maximum permissible angle of inclination during transport is 10°.



CAUTION: Risk of the device falling or tipping over during transport! The device must not be laid flat, as this may cause the cooling system to leak!



CAUTION: If the device has been moved from a low temperature to a significantly warmer environment, water vapour may condense inside the welder. This can lead to an electrical short circuit causing serious damage to the device. Therefore, in such a situation, leave the welding machine to rest for about 1 hour until the temperature inside the device equals the ambient temperature. Only after this time has elapsed can the welding machine be connected to the power supply and started up.

4. Technical data and device configuration

EN

PONTIG 320 AC/DC LCD					
WELDING method		MMA - AC	MMA - DC	TIG - AC	TIG - DC
Power supply	V/ Hz	3 x 400/50-60			
Welding current range	A	10-320 (20,4-32,8V)	10-320 (20,4-32,8V)	10-320 (10,4-22,8V)	5-320 (10,2-22,8V)
Open circuit voltage U_0	V	74,0		74,0	
Mains protection	A	20 A			
Max. effective current I_{eff}	A	18,5	18,5	14,1	14,1
Welding current (duty cycle = 100%) I_2	A	250	250	250	250
Welding current (duty cycle = 60%) I_2	A	320	320	320	320
Welding current (duty cycle = x%) $I_{2\text{max}}$	A	40% = 320	40% = 320	40% = 320	40% = 320
Class of protection		IP23S			
Dimensions (W x D x H)	mm	250 x 700 x 715			
Weight	kg	29,3			
Max. input current I_i	A	25,4	25,4	19,5	19,5
Idle voltage $U_{\text{zero}} / \text{UR}$	V	74,0 / 11,0		74,0	
Insulation class		F			
Max. input power $P_{1\text{max}}$	kW	11,1	11,9	8,6	9,0
Efficiency	%	83			
Power consumption in idle state	W	23			
CS liquid cooling system					
Cooling capacity (Q=1 l/min)	kW	0,92			
Total liquid volume	l	7			
Maximum pressure	bar	3,5			
Max. flow rate	l/m	8			
Power supply U_i	V/ Hz	380~415 / 50/60			
Input current I_i	A	0,6			
Class of protection		IP 23 S			
Weight	kg	15,4			
Dimensions (W x D x H)	mm	240 x 640 x 290			

Table 1: Technical data for PONTIG 320 AC/DC LCD MOST.

Device assembly:

PONTIG 320 AC/DC LCD is delivered on a pallet in a cardboard box, connected to a liquid cooler and mounted on a 2-wheel trolley. The device comes complete with a ground cable and a gas hose. The TIG torch is optional – see Accessories.

Product codes and language versions.

The device can be ordered in two software versions, differing in the set of languages available in the Menu:

- 1) Standard version, product code 52 00 005570 - languages **EN - PL - CZ - LT - RO**
- 2) Special version, product code 52 00 00557W - languages **EN - DE - FR - IT - ES**

Optional accessories:

EN

TIG T26 S-GRIP MOST welding torch (PONTIG 300/320 LCD) 4 m	56 01 032650
TIG T26 S-GRIP MOST welding torch (PONTIG 300/320 LCD) 8 m	56 01 032652
TIG T18 S-GRIP MOST welding torch (PONTIG 300/320 LCD) 4 m	56 01 032662
TIG T18 S-GRIP MOST welding torch (PONTIG 300/320 LCD) 8 m	56 01 032663
Remote control (foot)	coming soon
ACL 10 ECO coolant	50 20 790047

5. Device construction

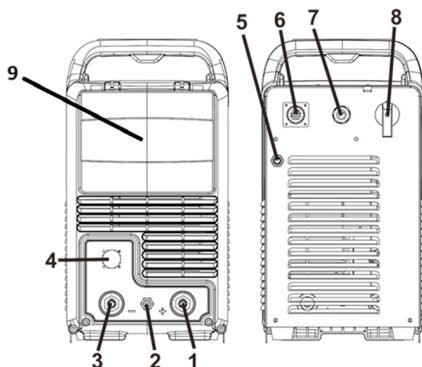


Figure 1: Device design

Item	Description
1	Welding current socket (+)
2	Shielding gas connection for TIG torch
3	Welding current socket (-)
4	TIG control plug connection
5	Shielding gas inlet connector
6	Cooler connection
7	Power cable
8	Main switch
9	Control panel (see Figure 3)

Table 2: Device components according to Figure 1.

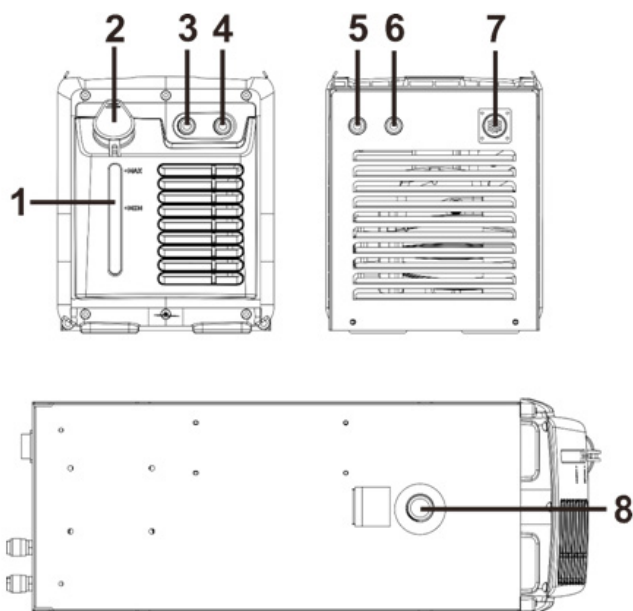


Figure 2: CS cooler design.

Item	Description
1	Liquid level indicator
2	Coolant filler
3	Liquid return quick connector (red)
4	Liquid outlet quick connector (blue)
5	Liquid outlet quick connector (blue)
6	Liquid return quick connector (red)
7	Cooling unit connection
8	Coolant tank drain

Table 3: CS cooler parts according to Figure 2.



NOTE:

When connecting a gas-cooled burner, it is necessary to bridge quick couplings (3) and (4) with a water hose. Failure to do so may result in damage to the pump

6.PONTIG 320 AC/DC LCD control panel

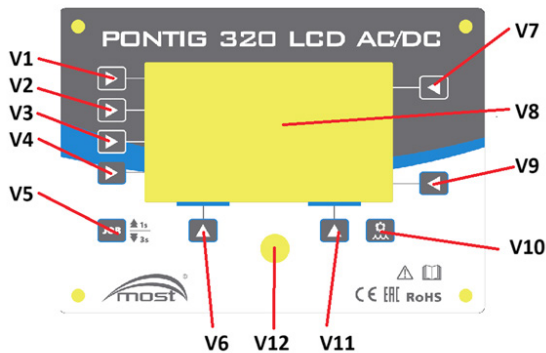


Figure 3: PONTIG 320 AC/DC LCD control panel MOST.

Position	Description
V1	Button for selecting the welding method (MMA / TIG HF / LIG LIFT) or language (see section 7.1.7)
V2	Button for selecting the type of current and TIG waveform (DC / AC square wave / AC sine wave / AC triangular wave) (see section 7.1.1)
V3	TIG torch operating mode button (2T / 4T / BI-LEVEL) (see section 7.1.2)
V4	TIG welding mode button (PULSE / SPOT / MultiSpot) (see section 7.1.3)
V5	JOB menu button (see section 8.3)
V6	Function selection button A (setting the gas pre-flow value, start current and rise time) (see section 8.1, point 10 and section 9.1, point 7)
V7	Parameter A button (HOT START in MMA method, balance and frequency in TIG AC method) (see section 8.1 point 10 and 9.1 point 7)
V8	LED display - shows welding voltage, welding current and other parameters. (see section 8.1 point 11 and 9.1 point 7)
V9	Parameter B selection button (ARC FORCE in MMA method, electrode diameter in TIG method) (see section 8.1, point 11)
V10	TIG torch cooling selection button – gas/liquid (see section 8.1, point 17)
V11	Button for selecting function B (setting the values for current decay time, final current and gas post-flow time) (see section 7.1.5)
V12	Encoder (knob and button) – parameter value setting / confirmation

Table 4: Buttons and knobs on the PONTIG 320 AC/DC LCD panel.

6.1 General control panel functions

6.1.1 Button (V2) for selecting the type of current and TIG waveform (DC / AC square wave / AC sine wave / AC triangular wave)

Press to select the type of TIG DC or AC current and the waveform for TIG AC current: triangular, square or sinusoidal. TIG DC (direct current) is suitable for TIG welding of steel, copper or stainless steel.

- TIG DC (direct current) is suitable for TIG welding of steel, copper or stainless steel.
- TIG AC square wave focuses the arc for maximum penetration.
- TIG AC sine wave is the traditional waveform for AC TIG welding (soft arc).
- TIG AC triangular wave reduces the amount of heat delivered at the same current setting, making it suitable for welding thin metals.

6.1.2. 2T/4T/BI-LEVEL mode button (V3)

2T - Pressing and holding the button activates the welding arc, and releasing the button terminates the welding arc. This function is suitable for welding short welds.

4T - Pressing and releasing the button activates the welding arc, and pressing and releasing the button again stops the welding arc. This function is suitable for longer welds, as there is no need to hold the button down continuously.

BI-LEVEL - Automatic reduction of the main welding current by 50%. The BI-LEVEL function is activated by briefly pressing the handle button during welding. The PULSE function is not available in BI-LEVEL mode.

6.1.3 TIG operating mode button (V4)

- **PULSE ON/OFF** pulse current on/off
- **SINGLE SPOT** spot welding
- **MULTI SPOT** interval welding

6.1.4. Function selection button A (V6)

In **HF TIG / Lift TIG** mode, press the button to select the gas pre-flow time, initial current value and ramp-up time. In spot welding mode (**SPOT, MULTISPOT**), the welding duration or interval between welds is set. Adjust the value by turning the knob.

6.1.5. Function selection button B (V11)

In **HF TIG / Lift TIG** mode, press the button to select the current decay time, final current value and gas post-flow time. In spot welding mode (**SPOT, MULTI-SPOT**), the gas flow time is set. Adjust the value by turning the knob.

6.1.6. Encoder (V12) – parameter value setting/confirmation

Press the knob to select the parameter and set it by turning it left or right.

6.1.7 V1 button:

- short press – select welding method
- long press – language selection (available language options – see section 5)

6.2 Example of shielding gas and welding wire consumption in the TIG method

Tungsten electrode diameter mm (inches)	Ceramic nozzle size*	Argon flow Steel / stainless steel		Argon flow Aluminium and aluminium alloys TIG AC current	
		Standard collet body l/min (CFH)	Gas lens l/min (CFH)	Standard collet body l/min (CFH)	Gas lens l/min (CFH)
0,50 (0,020)	3, 4 lub 5	3-4 (5-8)	3-4 (5-8)	3-4 (5-8)	3-4 (5-8)
1,00 (0,040)	4 lub 5	3-5 (5-10)	3-4 (5-8)	3-6 (5-12)	3-5 (5-10)
1,6 (1/16)	4, 5 lub 6	4-6 (7-12)	3-5 (5-10)	4-7 (8-15)	4-6 (7-12)
2,40 (3/32)	6, 7 lub 8	5-7 (10-15)	4-5 (8-10)	5-10 (10-20)	5-7 (10-15)
3,20 (1/8)	7, 8 lub 10	5-9 (10-18)	4-6 (8-12)	6-12 (12-25)	5-10 (10-20)
4,00 (5/32)	8 lub 10	7-12 (15-25)	5-7 (10-15)	7-14 (15-30)	6-12 (12-25)
4,80 (3/16)	8 lub 10	10-17 (20-35)	6-12 (12-25)	12-19 (25-40)	7-14 (15-30)
6,40 (1/4)	10	12-24 (25-50)	10-17 (20-35)	14-26 (30-55)	12-21 (25-45)

* numerical marking on the nozzle body

Table 5: Approximate gas consumption for TIG AC and TIG DC welding.

Welding wire consumption in the TIG method.

Additional wire in the form of rods can be used optionally as a filler in the TIG method. In general, the diameter of the rod should correspond to the diameter of the tungsten electrode used. Filler metal consumption depends on individual factors (welding current, type of weld, rod feed rate into the weld pool, etc.) and cannot be precisely determined.

7. TIG DC and AC welding

7.1 Preparing the equipment for TIG welding

EN

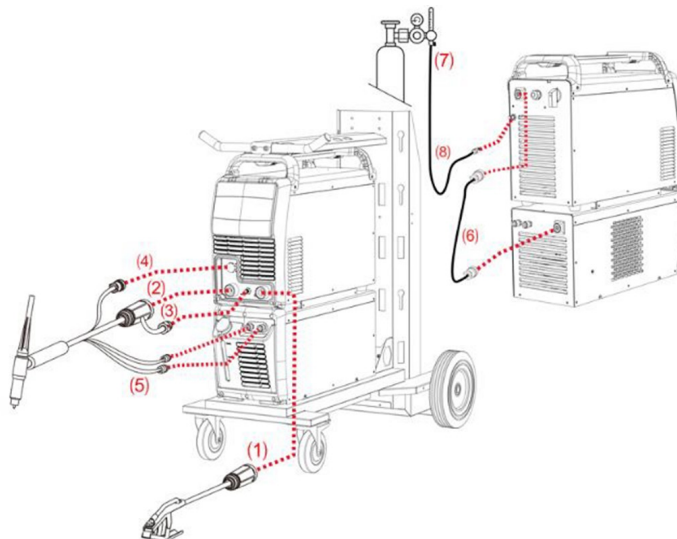


Figure 4: Connecting cables for TIG welding.

1. Insert the mains plug into a suitable 3x400 V, 50-60 Hz socket.
2. Connect the TIG torch (gas/liquid cooled) to the front panel of the machine as shown above (connectors 4-2-3 and possibly 5).
3. Connect the earth cable to the (+) socket (1).
4. Connect the gas hose to the regulator on the gas cylinder and to the connector on the rear panel (8) as shown in Figure 4.
5. Switch on the device using the main switch (8) as shown in Figure 1.

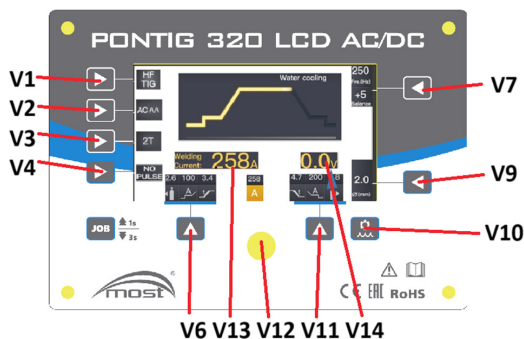
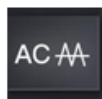
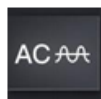
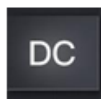


Figure 5: TIG parameter settings on the control panel.

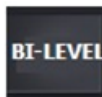
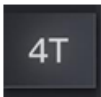
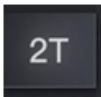
6. Use the **V1** button to select the TIG LIFT or TIG HF ignition method.



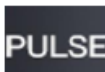
7. Press the **V2** button to select the type of current DC (steel, stainless steel) or AC (aluminium and alloys) and the waveform of the TIG AC current.



8. Select the type of operation for the TIG torch button 2T, 4T or BI-LEVEL using the **V3** button.



9. Press the **V4** button to select the type of current waveform: direct current / pulse current / spot welding / interval welding



10. Press the **V7** button to select the TIG AC balance value (-5 to +5) or the TIG AC current frequency (50~ 250 Hz).

11. Use the **V9** button to select the diameter of the tungsten electrode used.

12. Press the **V6** button to set the gas pre-flow, start current and start current time.

13. Press the **V11** button to set the operating time, end current and gas flow.

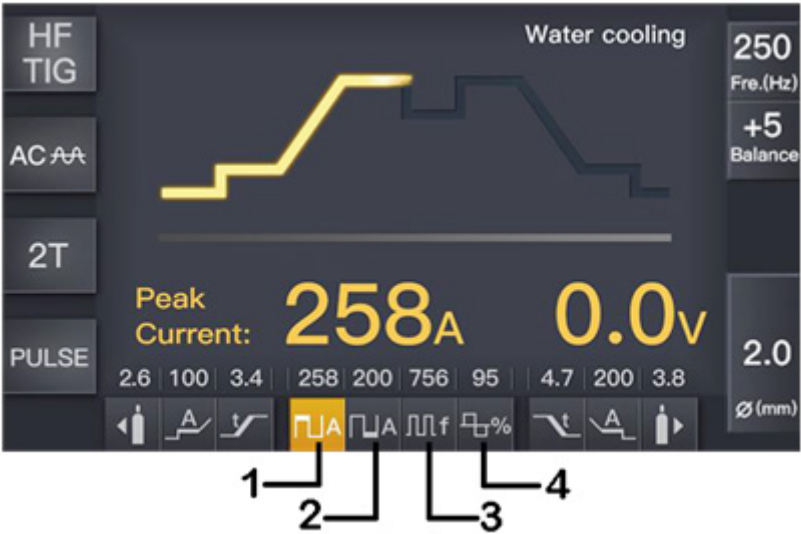
14. The welding current and other parameters are set by turning and then pressing the **V12** encoder.

15. The **V13** display shows the welding current value and displays the selected current before welding.

16. The **V14** display shows the welding voltage.

17. Press the **V10** button to select the cooling mode depending on the TIG torch used (gas/liquid cooling).

7.2 Setting parameters for TIG welding
7.2.1 Parameters for TIG PULSE current



Position	Description
1	Main current (5 - 320 A)
2	Base current (5–320 A) – lower than the main current
3	Pulse frequency (0.5 - 999 Hz)
4	Pulse – ratio of main current to base current (5–95%)

Figure 6: TIG pulse current – control panel and description. Example settings on the panel: TIG HF ignition, sinusoidal alternating current, 2-stroke button mode, TIG PULSE current, gas pre-flow 2.6 seconds, starting current 100 A, current rise time 3.4 seconds, pulse welding current 258 A, pulse base current 200 A, frequency 756 Hz, main current to pulse base current ratio 95%, current fall time 4.7 seconds, final current 200 A, gas flow time 3.8 seconds, tungsten electrode diameter 2.0 mm, TIG AC balance +5, TIG AC frequency 250 Hz. Water cooling - the TIG torch liquid cooler is activated.

7.2.2 TIG spot welding (single/interval)

In **SINGLE SPOT** mode, set the desired Ton time. Pressing the handle button (in 2T mode) will start welding with the set current for exactly the set Ton time.

In **MULTISPOT** mode, set the on time T (on) and off time Toff. Pressing the handle button (in 2T mode) will start welding with the set current for exactly the set Ton on time, followed by the Toff off time. This process can be repeated until the handle button is released.

**NOTE:**

The MULTISPOT spot welding mode is also available in 4T mode. Start the spot welding process by briefly pressing the handle button. To end spot welding, briefly press the handle button again.



Position	Description
1	Welding current (5–320 A) – here 127 A
2	Ton (0.2 - 1.0 s) - switch-on time
3	Toff (off - 10.0 s) – switch-off time

Figure 7: Spot and interval TIG welding – control panel and description. Example settings on the left panel: TIG HF ignition, TIG DC constant current, 2-stroke button mode, SINGLE SPOT spot welding, gas flow time 2.0 seconds, spot welding current 127 A, spot welding time 0.9 seconds, gas post-flow time 3.5 seconds, tungsten electrode 2.0 mm. Water cooling - TIG torch liquid cooler is enabled.

Example settings on the panel on the right: TIG HF ignition, TIG DC direct current, 2-stroke button mode, MULTI SPOT interval welding, gas purge 2.0 seconds, spot welding current 127 A, spot welding time 1.5 seconds, pause time 1.0 second, gas post-flow time 3.5 seconds, tungsten electrode 2.0 mm. Water cooling - the TIG torch liquid cooler is activated.

7.2.3 Lift TIG welding

During TIG welding, an electric arc is ignited in an inert gas (argon) protective atmosphere between a non-consumable electrode (pure tungsten or its alloys) and the weld metal. The **Lift TIG** method involves igniting the arc by rubbing the end of the electrode against the welded element. The machine provides a low initial welding current to minimise the amount of tungsten inclusions in the weld. However, this method does not guarantee the highest quality at the beginning of the weld. The Lift TIG method is selected using the **V1** button.

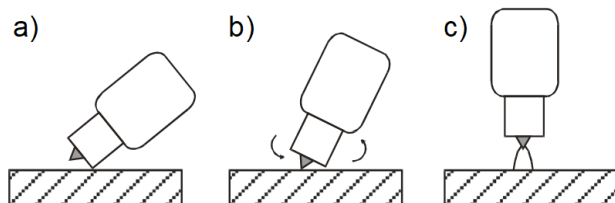


Figure 8: How to ignite a TIG arc in LIFT TIG.

TIG HF is a non-contact arc ignition method using high frequency (HF) ignition, which allows for non-contact arc ignition and prevents tungsten particles from entering the welded element.

7.2.4 TIG welding current waveform depending on the TIG torch pressure mode 2T/4T/Bi-Level

Two-stroke 2T

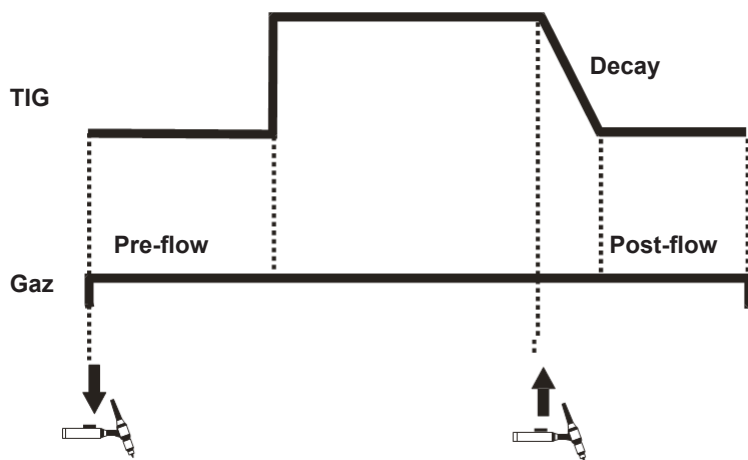


Figure 9: TIG 2T welding current waveform.

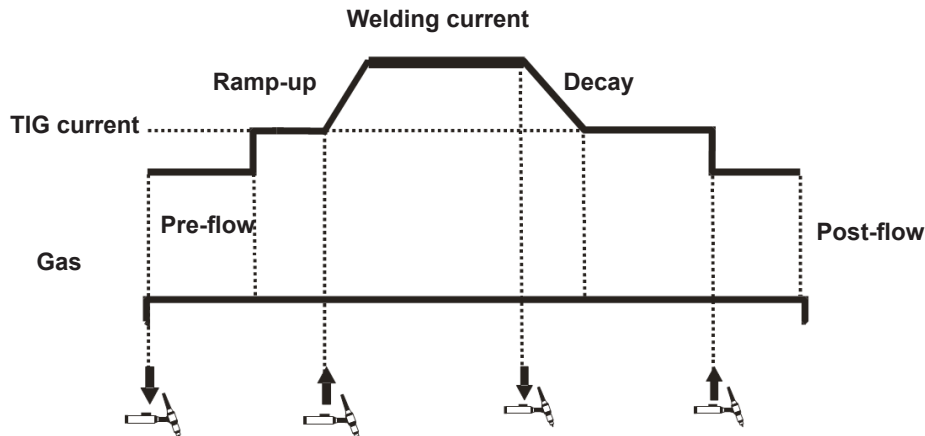


Figure 10: TIG 4T welding current waveform.

BI-LEVEL welding mode

The **BI-LEVEL** value is automatically set to 50% of the main welding current. To switch to the **BI-LEVEL** setting, briefly press the torch button during welding with the main current. To return to the main current, press the handle button again. The current is set using the V12 encoder, and the base current is automatically set to 50%.



NOTE:

The other welding phases (gas pre-flow, initial current, ramp-up, ramp-down, final current, gas post-flow) are the same as in 4T mode.

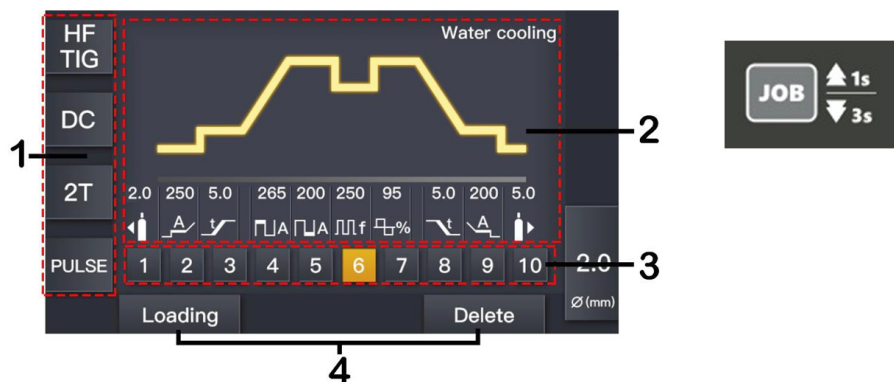
7.3 JOB menu (parameter storage)

1. To access the list of saved tasks, briefly press (1 s) the JOB button (**V5**).
2. To save the task, press and hold (3 seconds) the JOB button.



NOTE:

The job is always saved in the first available position in the job list. If the job list is full, the job will not be saved. To save a new job, you must first delete one of the existing jobs.



Item	Description
1	Information about the type of welding (method, torch button operating mode, type of current)
2	Stored welding parameters: curve and individual values
3	List of saved tasks (1-10)
4	Loading LOADING / deleting DELETE parameters of the selected task

Figure 11: Saving JOB parameters and description on the panel.

8. Welding using the MMA method (COATED ELECTRODE)

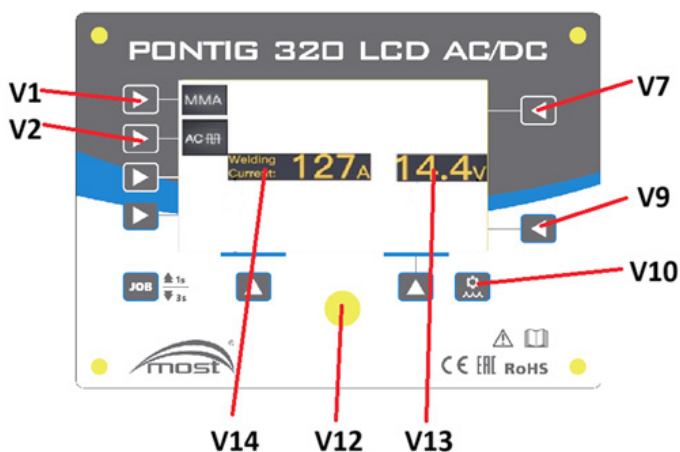


Figure 12: Welding parameters for the MMA method.

8.1 Preparing the device for MMA welding

1. Insert the mains plug into a 3x400 V, 50-60 Hz mains socket. Mains fuses or circuit breakers should comply with the technical data specified in this manual.
2. Connect the welding cables to the (+) **(1)** and (-) **(3)** sockets as shown in Figure 1, in accordance with the instructions on the electrode packaging.
3. Switch on the device using the main switch **(8)** as shown in Figure 1.
4. Use the **V1** button as shown in Figure 12 to select the MMA method.
5. Use the **V2** button to select the welding current mode (variable AC or constant DC).
6. Use the **V12** encoder to set the welding current.
7. Use the **V7** button to set the HOT START value (temporary increase in welding current during arc ignition) or the **V9** ARC FORCE button (arc reinforcement for welding in forced positions).
8. Connect the earth clamp to the workpiece.
9. Start the welding process and, if necessary, adjust the welding parameters using the **V12** encoder.
10. After welding is complete, leave the device switched on for 2-3 minutes to cool down.
11. After this time, the device can be switched off (OFF position of the main switch **(8)**).



CAUTION: When the device is switched on, ensure that the electrode does not touch any metal objects, as the welding cables are still under idle voltage.

8.2 MMA Welding

Electrode manufacturers specify the polarity and recommended maximum welding current for a given diameter on the packaging.

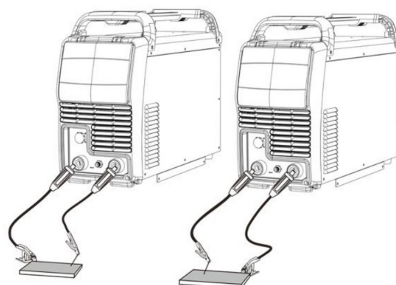


Figure 13: Connecting the cables for electrode welding.

The arc is initiated by rubbing the electrode against the welded material.

To facilitate arc ignition, the device is equipped with a **HOT START** function, which temporarily increases the current above the set welding current I1. To ensure a smooth welding process, it is necessary to maintain continuous melting of the material droplets from the electrode. To prevent the arc from extinguishing in forced positions (e.g. pipe welding) due to a short circuit between the electrode and the weld pool, the **ARC FORCE** function is used - a temporary increase in the welding current above the set value.

If the electrode sticks to the workpiece and a short circuit occurs, the **ANTISTICK** function will switch off the welding current, preventing the electrode from overheating and allowing it to be easily detached from the workpiece.

Electrode diameter [mm]	Welding current range [A]	Electrode length [mm]	Electrode core weight [g]	Welding time for 1 electrode [s]	Weld metal yield [g/s]
1,6	30-55	300	4	35	0,11
2,5	70-110	350	11	49	0,22
3,2	90-140	350	19	60	0,32
4,0	120-190	450	39	88	0,44

Table 6: Approximate MMA electrode consumption (weld metal yield) when welding with a rutile electrode with a steel core in the PB position.

9. Troubleshooting device problems and error codes

9.1 Problems with the power source

Item	Problem		Cause	Solution
1	After switching on the power, the LCD display is on, but the fan is not working.		Foreign object in the ventilator	Clean
			Damaged fan start capacitor	Replace the capacitor by an authorised service centre
			Damaged fan motor	Replace fan by authorised service centre
2	The displayed maximum and minimum values do not match the set values No voltage without load (MMA)		The maximum value does not match	Adjust the I _{max} potentiometer on the control board (authorised service)
			The minimum value does not match	Adjust the potentiometer in the current meter (authorised service)
3	No output voltage without load (MMA)		The device is faulty	Check the main circuit (authorised service centre)
4	No arc ignition (TIG)	Sparking on the HF ignition board	The power plug or control plug of the TIG torch is not connected	Connect the TIG torch to the welder sockets
			Damaged welding cable	Repair or replace
			Ground cable connected loosely	Check the connection and correct if necessary.
			The welding torch is too long.	Use a shorter TIG torch.
			There is oil or dust on the workpiece	Clean the welded material
			The distance between the tungsten electrode and the workpiece is too large	Reduce the distance (to approximately 3 mm)
		No sparking on the HF ignition plate	The HF ignition plate is not working	Repair by an authorised service centre
			The distance between the ioniser plates is too small	Adjust this distance (approx. 0.7 mm)
			Malfunction of the welding handle button	Check the welding handle button, control cable and socket on the device.

Item	Problem	Cause		Solution
5	No gas flow (TIG)	The gas cylinder is empty or the regulator is turned off		Replace the cylinder with a new one or adjust the gas regulator
		Contamination in the gas solenoid valve		Clean
		The solenoid valve is damaged		Repair by an authorised service centre
6	Gas flows continuously	The gas test on the front panel is permanently activated		Gas test on the front panel is switched off
		Contamination in the gas solenoid valve		Repair by an authorised service centre
		Solenoid valve is faulty		Repair by an authorised service centre
		Damaged gas flow selection button (V6)		Repair by an authorised service centre
7	Welding current cannot be adjusted	The welding current potentiometer on the front panel is not working properly or is damaged.		Repair by an authorised service centre
8	The welding current displayed does not correspond to the actual value	The displayed minimum value does not correspond to the actual value		Repair by an authorised service centre
		The displayed maximum value does not correspond to the actual value		Repair by an authorised service centre
9	The welding pool penetration is insufficient	Welding current is set too low		Increase the welding current
10	The alarm LED on the front panel is lit	Overheating protection	High welding current	Reduce welding current
			Too long operating time	Reduction of operating cycle (shortening of welding)

Table 7: Problems with the power source.

9.2 Problems with MMA welding

Item	Problem	Cause	Solution
1	No arc	Incomplete welding circuit	Check that the earth cable is connected. Check all cable connections
		Incorrect welding mode selected	Check that switch V1 is set to MMA
		No power	Ensure that the device is switched on and connected to the power supply
2	Porosity - small cavities or holes resulting from the presence of gas in the weld.	Excessively long arc	Shorten the arc length
		Dirty, contaminated or damp working element	Remove moisture and coatings such as paint, grease, oil and dirt, including mill scale
		Damp electrodes	Use only dry electrodes
3	Excessive spatter	Excessive current	Reduce the current or select a larger electrode
		Arc too long	Shorten the arc length
4	Weld without fusion	Insufficient energy	Increase the current or change the electrode
		Dirty, contaminated or damp workpiece	Remove moisture and coatings such as paint, grease, oil and dirt, including mill scale from the metal
		Incorrect welding technique	Use the correct welding technique or seek assistance with the correct technique
5	Lack of material penetration	Insufficient energy	Increase the current or change the electrode
		Incorrect welding technique	Use the correct welding technique or seek assistance with the correct technique
		Poor joint preparation	Check the shape of the joint and the fit, ensure that the material is not too thick in relation to the size of the electrode

Item	Problem	Przyczyna	Rozwiązanie
6	Excessive penetration - burn-through	Excessive energy	Reduce the current or change the electrode
		Incorrect electrode travel speed	Try to increase the welding speed
7	Uneven weld surface	Unstable guidance	Where possible, use both hands to stabilise the grip and practise your technique.
8	Metal deformation due to overheating during welding	Too much heat supplied	Reduce the current or use a smaller electrode
		Incorrect welding technique	Use the correct welding technique or seek assistance with the correct technique
		Poor preparation or joint design	Check the design and fit of the joint, ensure that the material is not too thick. Seek assistance with the correct design and fit of the joint
9	Arc behaves unusually, special types of electrodes	Incorrect polarity	Change the polarity, check the manufacturer's recommendations for polarity

Table 8: Problems with MMA welding.

9.3 Problems with TIG welding

Item	Problem	Cause	Solution
1	Tungsten burns out quickly	Incorrect gas or lack of gas	Use pure argon. Check that the cylinder contains gas, is connected and that the regulator is open
		Insufficient gas flow	Check that the gas is connected, check that the hoses, gas valve and torch are not blocked or kinked
		The torch cap is not tight	Ensure that the TIG torch cap has an O-ring fitted and is tight
		TIG torch connected to the positive (+) terminal	Connect the TIG torch to the (-) socket
		The wrong type of tungsten electrode is being used	Check and, if necessary, change the type of tungsten
		The tungsten oxidises after welding is completed	Maintain the shielding gas flow for 10-15 seconds after extinguishing the arc. 1 second for every 10 amps of welding current
2	Contaminated tungsten	Tungsten contact with the weld pool	Protect tungsten from contact with the weld pool. Raise the torch so that the tungsten electrode is 2-5 mm from the workpiece
		Touching the welding wire to the tungsten electrode	During welding, the welding wire should not touch the tungsten. The wire should be inserted into the front edge of the weld pool in front of the tungsten

Item	Problem	Cause	Solution
3	Porosity – poor appearance and colour of the weld	Incorrect gas/poor gas flow/gas leak	Check that the gas is connected, the regulator is open, and the hoses, gas valve and burner are not blocked. Set the gas flow to between 6 and 12 l/min. Check the hoses and connectors for leaks.
		Contaminated welded material	Remove moisture and coatings such as paint, grease, oil and dirt.
		Contaminated welding wire	Clean the welding wire.
		Incorrect welding wire	Check that the welding wire is correct.
4	Yellowish coating/sooting on the ceramic nozzle and discoloured tungsten	Incorrect gas	Use pure argon
		Insufficient gas flow	Set the gas flow to between 6 and 12 l/min.
		Ceramic nozzle too small	Increase the size of the ceramic nozzle
5	Unstable arc during DC welding	Welding torch connected to the (+) terminal	Connect the TIG torch to the (-) terminal
		Contaminated weld metal	Remove coatings such as paint, grease, oil and dirt, including mill scale.
		Tungsten electrode contaminated at the tip	Remove 10 mm of contaminated tungsten and re-sharpen the electrode tip.
		Arc too long	Lower the torch so that the tip of the tungsten electrode is 2-5 mm from the workpiece.
		Contaminated weld metal	Remove coatings such as paint, grease, oil and dirt, including mill scale.

Item	Problem	Cause	Solution
6	The arc wanders during DC welding	Poor gas flow	Set the gas flow to between 6 and 12 l/min.
		Incorrect arc length	Lower the torch so that the tungsten is 2-5 mm from the workpiece.
		Tungsten electrode incorrect or in poor condition	Check that the correct type of tungsten is being used. Remove 10 mm from the welded end of the tungsten and re-sharpen the rod.
		Poorly prepared tungsten electrode	The sharpening direction should be along the electrode axis, not across it. Use the appropriate grinding method and electrode sharpener.
		Contaminated base metal or welding wire	Remove coatings such as paint, grease, oil and dirt. Use clean welding wire.
7	Arc is difficult to start or no DC arc	Arc is difficult to start or no DC arc	Check that the parameters are correct
		No gas, incorrect gas flow	Check that the gas is connected to the regulator and that it is open. Check the TIG torch hoses for blockages and leaks.
		Incorrect size or type of tungsten electrode	Check and, if necessary, change the diameter or type.
		Loose connection of power cables	Check all connections and tighten them if necessary
		The earth clamp is not connected to the welded material	If possible, connect the earth clamp directly to the workpiece.

Table 9: Problems with TIG welding.

9.4 Error codes

Location of error	Error code	Description
Thermal relay	E01	Overheating (1st thermal relay)
	E02	Overheating (2nd thermal relay)
	E03	Overheating (3rd thermal relay)
	E04	Overheating (4th thermal relay)
	E09	Overheating (default programme)
Power source	E10	Phase loss
	E11	No or insufficient liquid in the radiator
	E12	No gas connected
	E13	Low supply voltage
	E14	Power supply voltage too high
	E15	Current too high (internal error)
Switch	E20	Control panel button error when switching on the device
	E21	Other errors on the control panel when switching on the device
	E22	TIG torch error when switching on the device
	E23	TIG torch error during normal operation
Accessories	E31	Liquid cooler disconnected
Communication	E41	Communication error

Table 10: Error codes.

10. Maintenance and servicing of the device



NOTE:

In order to carry out any repairs or maintenance work.

It is recommended to contact the nearest **RYWAL-RHC** service centre (see the list of service centres on the last page of the manual).

If any damage is noticed, the welder should stop work, disconnect the device from the power supply and report it to their supervisor or the relevant services - **RYWAL-RHC** service centre.

10.1 List of checks to be performed by the operator on a daily basis before start-up

Tasks	Completed
Check the housing, parking brake, controls, power cables, quick couplings and hoses for damage	
Check that the connections/sockets are not damaged	
Check accessories for damage and wear (visual inspection; hose package, pressure reducer)	
Check the power source and hoses for leaks or loss of coolant (visual inspection)	
Check the coolant level and top up if necessary	
Check the welding torch, nozzles, etc. for damage, wear and contamination	

10.2 List of checks and maintenance tasks to be performed by the operator at regular intervals:

every 8 weeks – 1-shift operation

every 4 weeks – 2-shift operation

every 2 weeks – 3-shift operation



NOTE: In a heavily polluted environment, the above intervals must be reduced by 50%.

Activities	Performed
Clean ventilation slots with compressed air	



NOTE: To ensure functionality and maintain the warranty, the device must be serviced at least once a year or more frequently (every 12 months for 1-shift operation, every 6 months for 2-shift operation, every 3 months for 3-shift operation) by an authorised **RYWAL-RHC** service centre. Safety regulations must also be observed, in particular EN 60974-4 Arc welding equipment Part 4: Periodic inspection and testing; EN 60974-14 Arc welding equipment Part 14: Calibration, validation and repeatability testing. Measurements and tests are performed by the **RYWAL-RHC** service centre.

10.3 List of inspection and maintenance activities to be performed by the Service at regular intervals:

every 12 months – 1-shift operation
every 6 months – 2-shift operation
every 3 months – 3-shift operation

Diagnosis

Activities	Performed
Read error codes from the log (if available)	
If error messages are active, perform the procedure according to point 10.4	
Check the software versions and update if necessary	

Check

Actions	Performed
Switch off the power supply to the device, open the casing and check the electrical connections, contacts, transformer and rectifier.	
Check the insulation of the power cord, control cable and plugs/sockets	
Check the insulation and separating/insulating films	
Check the gas pipe outside the appliance for leaks	
Check the gas pipe inside the appliance for leaks	
Check the operation and tightness of the solenoid valve and compressed air regulator	
Check the housing for damage	
Check the chassis for damage and contamination	
Check the housing handle/grip	
Check the operation and feel of the controls (buttons, switches, foils) on the front panel	
Cooling system	
Check the cooling system for leaks	
Check the operation of the fans	
Check the fluid reservoir cap for damage and leaks	

Maintenance

Actions	Completed
Check/clean the unit housing	
Blow out the interior of the unit	
Cooling system	
Flush the cooling system, replace the coolant if necessary	

Test/Final inspection

Actions	Completed
Perform a safety inspection in accordance with EN 60974-4 Arc welding equipment Part 4: Inspection and periodic testing; and/or EN 60974-14 Arc welding equipment Part 14: Calibration, validation and repeatability testing.	
Perform a functional test, welding under load	



NOTE: The device must be disconnected from the mains before any maintenance or servicing. After each repair, perform the appropriate checks to ensure safe use

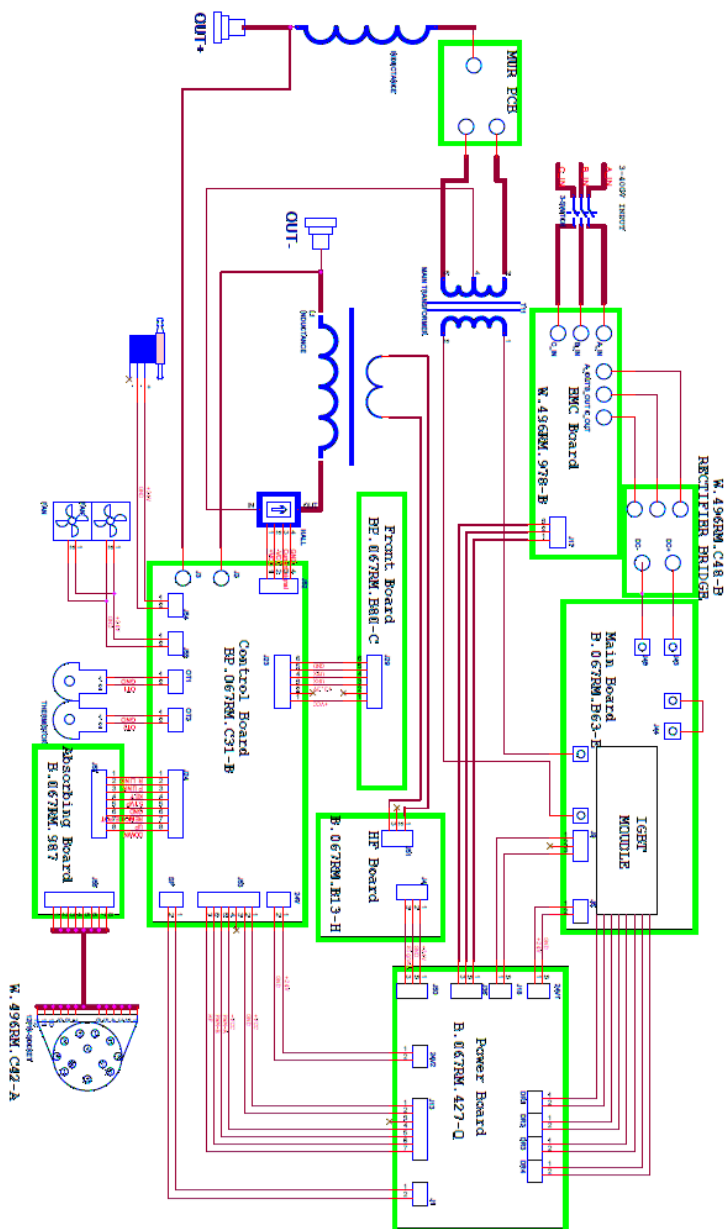
Mandatory device testing

According to the Labour Code: „The owner bears full responsibility for the safe use of machinery and equipment.” This implies the obligation to perform periodic and post-repair tests and inspections of equipment.

Periodic inspections shall be carried out at least once a year - legal basis EN ISO 17662 point 4.2, and post-repair inspections - after each repair that has restored the welding function - legal basis EN 60974-4 point 4.6

All of the above services are performed by the **RYWAL-RHC** service department.

In accordance with Regulation 2019/1784 (EU) Annex II point 2. b1, **RYWAL-RHC** provides information on repairs and maintenance to PROFESSIONAL REPAIR SERVICES on the terms specified in the regulation



12. List of spare parts

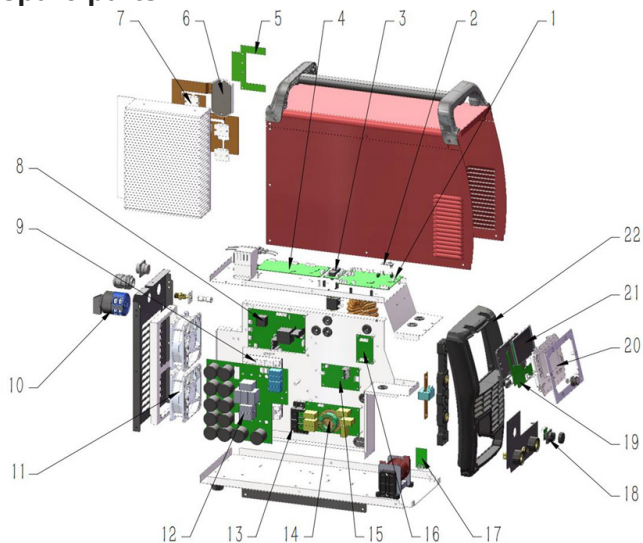


Figure 14: Components of the PONTIG 320 AC/DC LCD power supply.

No.	Part Code	Name	Qty
1	WP.496RM.C31-B-1	Control Board LCD Version	1
2	W.496RM.901	PCBA, Wireless circuit board	2
3	W.496RM.C33-A	7-core wire filter board	1
4	W.496RM.C51-F	PCB substitute, TIG ACDC auxiliary arc plate	1
5	W.496RM.C48-B	Absorption board of rectifier bridge module	1
6	7.411.502	Rectifier bridge	1
7	7.425.847-A	IGBT module	5
8	W.496RM.427-Q	ACDC power board	1
9	7.425.106-E	IGBT module	2
10	7.232.033-C	Rotary switch	1
11	7.720.057	Fan	2
12	W.496RM.B63-E	500SYN mainboard	1
13	7.411.115-B	3f rectifier bridge	1
14	W.496RM.978-B	3f rectifier bridge directly connected to EMC Board	1
15	W.496RM.B13-H	New Electronic High Frequency	1
16	W.496RM.987	Absorption plate	1
17	W.496RM.450	PCBA, TIGACDC high-frequency absorption	1
18	W.496RM.C42-A	TIG standard 12 core aviation plug board	1
19	WP.496RM.B80-C	TIG 5.0 LCD Screen Installation Board	1
20	8.123RM.978	Universal large TIG front sealing plate	1
21	7.122.462-A	Serial Screen	1
22	8.069RM.971	CUT 65 series front panel	1

Table 11: List of spare parts for the PONTIG 320 AC/DC LCD power supply.

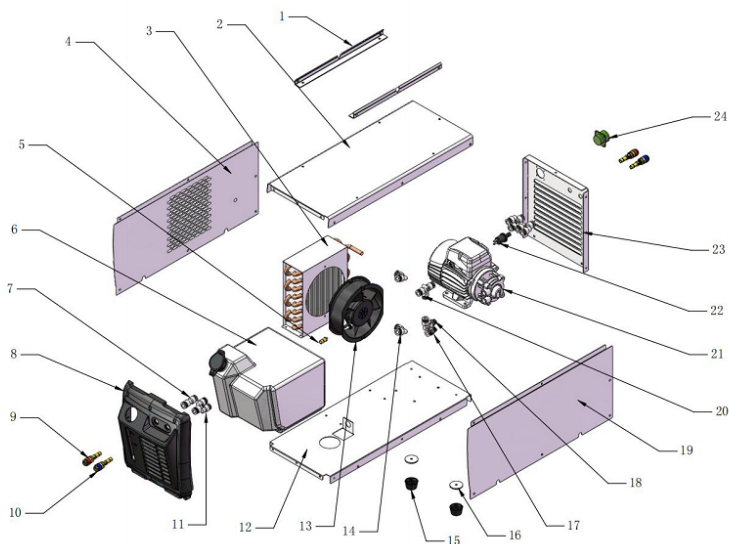


Figure 15: Components of the CS liquid cooler.

No.	Part Code	Name	Qty
1	8.126RM.159-C	Water cooler connection plate	2
2	8.301RM.922-A	Housing	1
3	6.081RM.001-F	Water tank heat pipe radiator	1
4	8.050RM.922	Left side panel	1
5	8.462RM.109	Pressure relief water joint	1
6	7.722.014-A	Kettle	1
7	7.624.214	Direct quick connect air hose connector	1
8	8.126RM.942	HZ water cooler panel	1
9	8.462.188-A	Quick plug for water supply (red)	2
10	8.462.189-A	Quick plug for water supply (blue)	2
11	7.624.213	Three way quick plug air pipe connector	3
12	8.055RM.922-A	Baseplate	1
13	7.720.224-A	Wind turbine	1
14	7.624.215	Right side panel	2
15	8.046RM.002	Machine foot	2
16	8.126RM.949	Machine foot gasket	4
17	7.624.210	Threaded straight through tracheal joint	1
18	7.624.211	Threaded bent vent pipe joint	1
19	8.051RM.922	Right side panel	1
20	7.624.212	Three way quick plug air pipe connector	1
21	7.710.115	Water pump	1
22	7.232.260-A	Pressure switch	1
23	8.068RM.922	Rear panel	1
24	7.132.114-A	Fourteen core aviation socket	1

13. EU Declaration of Conformity

1. Product: PONTIG 320 AC/DC LCD MOST welding rectifier.

2. Name and address of the manufacturer:

RYWAL-RHC Sp. z o.o.

ul. Polna 140B

87-100 Toruń

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Subject of the declaration: PONTIG 320 AC/DC LCD MOST welding rectifier.



5.5. The above-mentioned subject of this declaration complies with the relevant requirements of EU harmonisation legislation:

- the Low Voltage Directive LVD 2014/35/EU,
- the Electromagnetic Compatibility Directive EMC 2014/30/EU
- with the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment RoHS 2011/65/EU
- with the Ecodesign Directive 2009/125/EU and Regulation 2019/1784 for welding equipment

6. References to the relevant harmonised standards with which compliance is declared:

- EN IEC 60974-1:2023+A11:2023+A12:2024
- EN IEC 60974-2:2019
- EN IEC 60974-10:2022

Additional information: the declaration also covers the CS liquid cooler, which is an integral part of the device.

Toruń, 19.08.2025

Signed on behalf of:

Product Manager
Dyrektor Produktu


mgr inż. Wojciech Wierzba

The devices are subject to continuous changes and improvements.
We reserve the right to make changes.



In accordance with Directive 2012/19/EU WEEE II (WEEE – Waste Electrical and Electronic Equipment), the device must be recycled by a specialised company after it has been taken out of service.

Do not dispose of used welding equipment with normal waste!

The components used in the construction of the device do not contain critical raw materials in a total amount exceeding 1 g in accordance with the requirements of the Ecodesign Directive 2009/125/EC and Regulation 2019/1784 Annex II point 3h.

END.

Producent / Manufacturer / Gamintojas / Producătorul / Výrobca / Hersteller:

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61-371 **Poznań**, ul. Roberta Maya 1/12
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41-703 **Ruda Śląska**, ul. Stara 45
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35-211 **Rzeszów**, ul. Mikołaja Reja 10
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Zintegrowany System Zarządzania

ISO 9001 & ISO 14001

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