User Manual for Welding Rectifier

PONTIG 202 AC/DC MOST

Attention! Every person using or responsible for the maintenance of this device should read the entire contents of this user's manual before starting work. This will optimize the use of device potential.
Attention! A copy of this User Manual should be stored near the device and available for operator at all times.

Original manual
Catalogue no: 52 00 005421

User Manual
Version 1.0k of 11.06.2019

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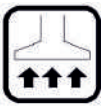
Thank you for buying the Inverter Rectifier **PONTIG 202 AC/DC MOST**.
Prior commencing work please familiarize yourself with the user manual. The device **PONTIG 202 DC MOST** was designed for DC TIG welding with argon shield (steel and stainless steel), and for AC welding (aluminium and its alloys) or for coated electrodes MMA. We do believe that this product will meet your requirements.

1. Health and Safety Manual

WARNING: The device can not be used for the purpose of pipe defrosting!
Information contained on the icons placed on the device:

	Use and maintenance of welding equipment may be dangerous. The user must observe health and safety rules and regulations. Welding and cutting machines may be used only by qualified personnel. Follow your local rules and regulations on working with that type of devices and prevention of accidents.
	Prior to starting your work remove all flammables from the welding area. Welding inside tanks previously used as flammable liquid storage (e.g. petrol) is forbidden. Place all combustible materials away from welding spatter.
	Do not expose the device to rain or water vapour and do not spray water over it.
	Do not weld without proper eye protection. Pay attention to providing safety for bystanders against welding radiation.
	Use ventilation and filters in order to remove welding fumes from the work site. Use individual filters if the filtering/ventilation system does not operate correctly or is not available.
	Stop your work immediately after finding damage to the power cords. Do not touch the damaged cords. Prior a repair or maintenance disconnect the device from power source. Never use the device with damaged power cords.
	Keep a fire extinguisher close to the welding location. After finishing work check the work station against fire hazards.
	Never try to fix a damaged gas reducer on your own. In case of malfunction replace the reducer to a fully functional one.

ATTENTION: The following user manual should be read prior installing and starting the device. OSH manual should be known to every welder and employee responsible for equipment maintenance.

PRELIMINARY REMARKS

Commissioning and normal operation are possible only after carefully reading the following manual. Arc welding requires compliance with the requirements for electric arc welding and fire regulations. The welder should be supplied 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 provisions of the Council Directive 2016/425/EEC. The personal protective equipment includes: welding mask with a protective filter, welding gloves, protective apron, welding clothing, and leather shoes. Despite the high technical standard of the device, the personnel should represent considerable discipline in approach to health and safety requirements to protect against harmful and health hazardous factors developed from welding technology.

OPERATING CONDITIONS

This device can operate under severe conditions. It is however important to apply simple preventive measures to ensure long and reliable work:
- do not place or use this device on an inclined surface (of more than 15º),
- do not use the device for pipe defrosting,
- the device must be located in a place where the free circulation of clean air is ensured without any restriction of airflow to and from the fan. When the device is connected to the network, do not cover it with, for example, paper or cloth;
- minimize the amount of dirt and dust that can get into the device,
- device housing has an IP21S protection. Keep it dry and do not place on wet surfaces or in a puddle,
- do not use the device for welding the tanks previously used for storing flammable substances.

ENVIRONMENTAL CONDITIONS

Range of air temperatures for
- operation: from-10ºC to +40ºC
- storage and transportation: from -25ºC to +55ºC
- Relative air humidity: up to 50% at +40ºC; up to 90% at +20ºC.

GASES AND FUMES

TIG and MMA welding modes produce harmful gases and fumes containing ozone and hydrogen as well as oxides or metal particles. Therefore, the welding work station should be fitted with very good ventilation (dust and smoke extraction or airy location). Metal surfaces intended for welding should be free from chemical contamination, especially degreasers (solvents),
that decompose during welding process and produce toxic gases. Welding of galvanized, cadmium-coated or chromium-plated parts is permitted only when a suction and filtering device is fitted, and with introduction of fresh air to the welding work station.

RADIATION
Ultraviolet emission radiated when welding is harmful to eyesight and skin. Therefore a welding mask with protective filters is required. Welding work station should meet certain requirements and include:
• adequate lighting system,
• fixed or movable protection screens, governing bystanders against radiation effects (depending on requirements),
radiation effects,
• placed in a room with appropriate wall colour (absorption of UV radiation)

FIRE PROTECTION
Welding work station should be located at a safe distance from flammables placed especially on the floor or walls. All flammables need fire protection against hot metal drops. It is recommended to fit the work station with fire blankets and fire extinguishers.

PROTECTION AGAINST ELECTRIC SHOCK
It is unacceptable to connect the device to an improper installation or to an installation with unverified zeroing efficiency. Removing the outer covers at a time the device is connected to the electricity network, as well as the use of the device with covers removed **IS PROHIBITED**. It is not allowed to work on a suspended device e.g. using gantry or crane. Maintenance and repair works should be carried out by authorized personnel in compliance with the applicable safety conditions.

2. Maintenance

ATTENTION: In order to carry out any repair or maintenance work, it is recommended to contact your nearest **RYWAL-RHC** technical support (a list of authorized service shops is available on the last page of the manual).

In the event of noticing any damage, the welder should stop working, should disconnect the device from power supply and report it to direct supervisor or appropriate service - **RYWAL-RHC** technical support.

General maintenance (daily)
- check the condition of cables and connections, replace if necessary,
- check condition of welding torch and connection with welding cable, replace if necessary,
- check condition and operation of the cooling fan; keep the cooling air inlet and outlet openings clean,
- keep the device clean.

Periodic maintenance (every 3 months at least)
Periodic maintenance frequency can be increased depending on working conditions and the intensity of use.
Maintenance:
- using a stream of dry air (at low pressure) remove the dust from the outer parts of the casing and from inside of the welding device,
- check and tighten all the screws,
- check the state of all electrical contacts and correct if necessary.

ATTENTION: Device must be disconnected from electrical network before performing any maintenance or service work. After each repair, perform respective check to ensure safe use.

Mandatory device checks
According to the Labour Code provisions: „All responsibility for the safe use of machinery and equipment shall be borne by the owner." This results in the obligation to perform periodic and post-repair checks and inspections of equipment.
Periodic tests are carried out at least once a year (legal basis EN ISO 17662 clause 4.2), and post-repair tests after each repair that restored welding functionality (legal basis: EN 60974-4 clause 4.6).
All above services are performed by the technical support of **RYWAL-RHC**.

3. Technical description

The **PONTIG 202 AC/DC** is an inverter welding rectifier for TIG welding in an argon shield (arc ignition by HF ionizer) or for MMA with coated electrode (Stick). The device has excellent welding properties and has a wide application range. It may be used for welding:
a/ MMA electrode welding - in direct current (DC)
Recommended electrodes from 1.6 to 3.25 mm in diameter. Electrodes with a rutile or alkaline coating (idling voltage DC U_o = 60V), for steel or stainless steel,
b/ TIG DC welding method
Ignition of the arc by the HF ionizer, gas opened automatically by the electrovalve in the device. For welding stainless steel or ordinary steel, recommended tungsten electrode diameter 1.6 or 2.4 mm You can weld in a continuous or pulsed current.
c/ TIG AC method
Ignition of the arc by the HF ionizer, gas opened automatically by the electrovalve in the device. Welding of aluminium or its alloys, recommended diameter of tungsten electrode 1,6 or 2.4 mm Available functions of AC balance, negative / positive AC and pulsed voltage regulation.
The device is protected against overheating by a thermal sensor. It is made in accordance with the IEC 60974-1 standard, „Arc welding equipment. Part 1: Welding power sources".

4. Installation and use

- The user is responsible for connecting the device in accordance with the manufacturer instructions. In the event of electromagnetic interference, the user should remove the cause after prior consultation with the manufacturer.
- Before using the equipment, the welder should estimate the possible impact of disturbances on the environment, in particular the presence of persons with pacemakers or hearing aids.
- Work with a power generator is acceptable, but it must meet certain requirements. It is recommended to use a unit with a power of min. 8 kVA with asynchronous generator. If the generator does not provide adequate power, this results in lowering the arc parameters or turning off the rectifier.

5. Technical data and device completion

Parameter	Unit	Value
Electrical power supply	V/Hz	1x230/50-60
Power tolerance	%	+15/-15
Welding current range	A	TIG: 10-200 MMA: 10-160
Welding current set point		Stepless
Overload protection	A	16 delayed
Work cycle MMA DC	A/%	160/30 114/60 88/100
Work cycle TIG	A/%	200/25 129/60 100/100
MMA electrode diameter	mm	1,6-3,25
Sockets for connecting welding cables.		35/50 (large)
Power factor	cos fi	0,7
Power consumption	kW	8,2 (MMA) 6,0 (TIG)
Efficiency	%	85
Plug		Schuko 16A
Insulation class		F
Protection class		IP 21S
Standard		EN 60974-1
Mark		CE
Dimensions	mm	502x218x382
Weight	kg	9,0 (17 kg carton of accessories)
Catalogue no.		52 00 005421

Table 1: Technical data PONTIG 202 AC/DC MOST.

Device assembly:
PONTIG 202 DC is delivered in a cardboard box with gas hoses, mass cables and MMA welding electrode. TIG torch is an optional accessory - see Accessories.

Accessories:

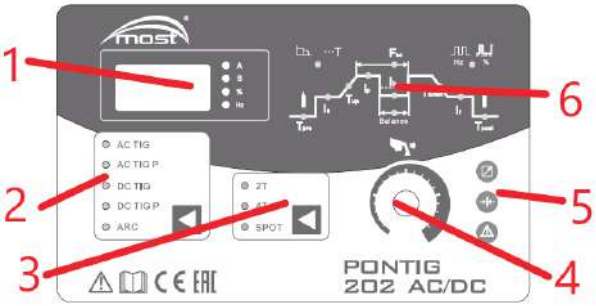
TIG 26 Most 4m Torch (Pontig 210 /202)	56 01 032622
TIG 26 Most 8m Torch (Pontig 210/202)	56 01 032624
Welding trolley WUS HD	50 03 003942

6. Device construction

Figure 1: Construction of PONTIG 202 AC/DC MOST

1. ON/OFF switch (rear side)
2. Gas connection (rear side)
3. Top handle
4. Control panel (see section 7)
5. Current socket (+)
6. TIG torch control socket
7. TIG torch gas socket
8. Current socket (-)
9. Power cable with plug (rear side)

7. Pontig 202 AC/DC Control panel



1. Display and unit diodes
2. Welding method selection
3. Operating mode of the TIG torch
4. Knob
5. Additional functions
6. Welding parameter curve

Figure 2: Control panel for Pontig 202 AC/DC MOST

Figure 3: 3-digit display (1) and unit diodes

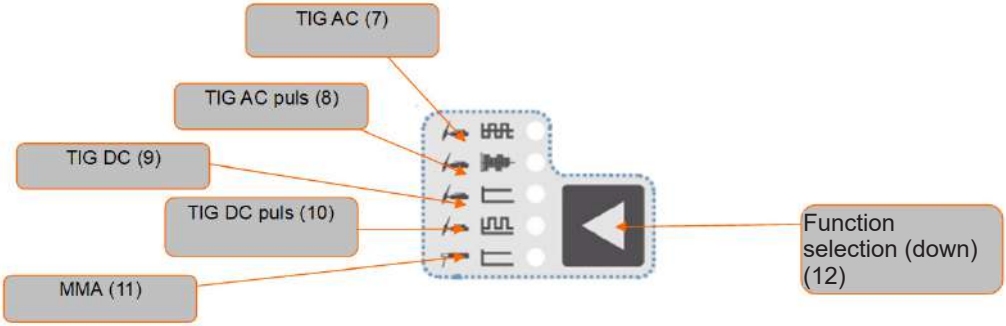


Figure 4: Selection of welding method (2)

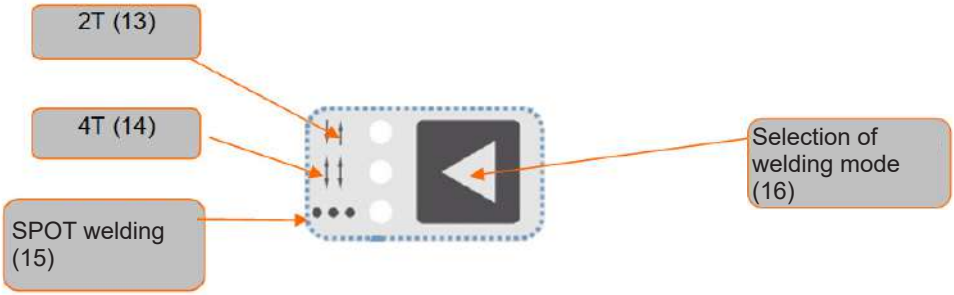


Figure 5: Operating mode of the TIG torch (3)

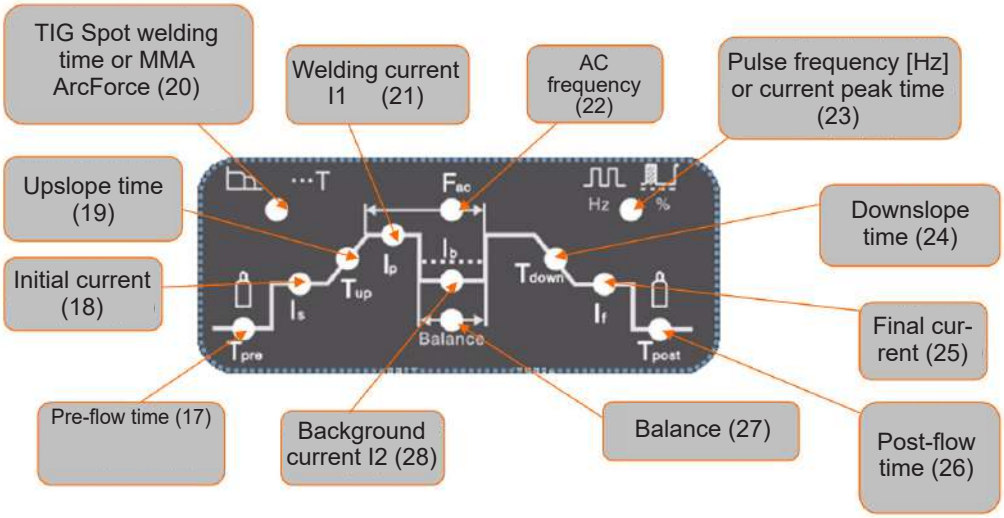


Figure 6: Welding parameters diagram (6)

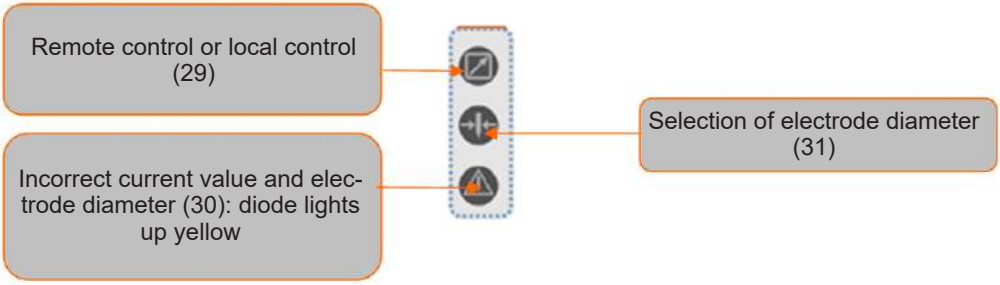


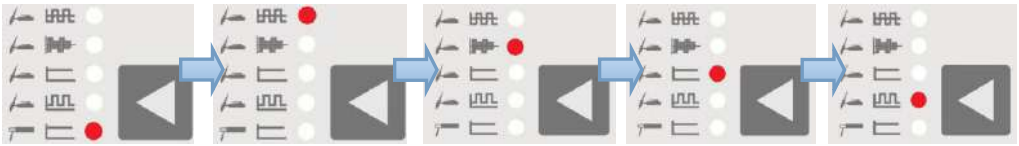
Figure 7: Additional functions (5)

On the left side of the panel with additional functions there is a knob (**4**) to switch between parameters. After pressing we can set the parameter value, which is confirmed by pressing (**4**) again.

7.1 Description of the device buttons

Selecting welding method (2)

By pressing  (**12**, see Fig. 4)switch between welding methods. The button works if there is no welding in process. The following welding methods are available:



MMA with electrode AC TIG AC Pulse TIG DC TIG DC Pulse TIG

Figure 8: Selecting welding method

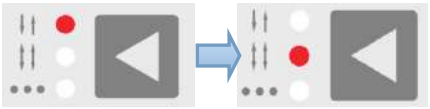
Selecting the operating mode of the TIG welding torch

By pressing  (**16**, see fig. 5) we can choose between different modes of operation of the TIG torch **with digital control**. The button works if there is no welding in process.
The following operating modes are available:

2T (2-stroke) 4T (4-stroke) Spot welding

Figure 9: Welding mode selection / digital control.

By pressing  (**16**, see Fig. 5) we can choose between different operating modes of the TIG torch **with analogue control or a remote control pedal**. The button works if there is no welding in process. The following operating modes are available:



2T (2-stroke) 4T (4-stroke)

Figure 10: Selection of welding modes / Remote control pedal or analog controlled torch mode.

Attention: Remote control of the pedal is connected to the TIG control socket (**6** see Fig. 1).

7.2 Welding parameter settings

Press the knob (**4**) to switch between different welding parameters (see figure 6. Settings can also be changed while welding. The selection of the parameter (the choice is marked with the diode) is done by turning the knob (**4**).

Welding method	Operating mode of the TIG torch (13; 14; 15)	Gas pre-flow (17)	Initial current (18)	Upslope time (19)	Welding current I1 (20)	I2 Base Current (28)	AC frequency (22)	AC Balance (23)
MMA (11)	NO	×	×	×	●	×	×	×
TIG DC (9)	2T	●	●	●	●	×	×	×
	4T	●	●	●	●	×	×	×
	Spot weld.	●	●	●	●	●	×	×
TIG DC Puls (10)	2T	●	●	●	●	●	×	×
	4T	●	●	●	●	●	×	×
	Spot weld.	●	●	●	●	●	×	×
TIG AC (7)	2T	●	●	●	●	●	●	●
	4T	●	●	●	●	●	●	●
	Spot weld.	●	●	●	●	●	●	●
TIG AC Puls (8)	2T	●	●	●	●	●	●	●
	4T	●	●	●	●	●	●	●
	Spot weld.	●	●	●	●	●	●	●
Direction of turning								

Table 2.1 Selection of parameters depending on the welding method (numbering according to figure 4, 5, 6 and 7)

Welding method	Operating mode of the TIG torch (13; 14; 15)	Arc Force (20)	Time of spot weld. (20)	Upslope time (24)	Pulse frequency (23)	Peak current time (23)	Final current (25)	Gas outlet (26)	Selection of the MMA electrode diameter or tungste
MMA (11)	NO	●	×	×	×	×	×	×	●
TIG DC (9)	2T	×	×	●	×	×	●	●	●
	4T	×	×	●	×	×	●	●	●
	Spot weld.	×	×	●	●	●	●	●	●
TIG DC Puls (10)	2T	×	×	●	●	●	●	●	●
	4T	×	×	●	●	●	●	●	●
	Spot weld.	×	●	●	●	●	●	●	●
TIG AC (7)	2T	×	×	●	×	×	●	●	●
	4T	×	×	●	×	×	●	●	●
	Spot weld.	×	●	●	●	●	●	●	●
TIG AC Puls (8)	2T	×	×	●	●	●	●	●	●
	4T	×	×	●	●	●	●	●	●
	Spot weld.	×	●	●	●	●	●	●	●
Direction of turning									

Table 2.2 Selection of parameters depending on the welding method (numbering according to figure 4, 5, 6 and 7)

Notes to Tables 2.1 and 2.2:

1. ● parameter available × parameter not available
2. Press the knob for 2 seconds to quickly switch between parameters.
If any parameter is highlighted, it will be restored after approx. 10 seconds without any action the welding current I1 will be shown on the display.
3. The function of electrode selection (**31**) is used to automatically adjust some functions eg initial current, welding current range, etc. for a given electrode diameter. If values of selected parameters by the welder do not correspond to the diameter of the electrode, diode ⚠ (**30**) will be highlighted in yellow. This is a warning of incompatibility between the used electrode and welding parameters. Therefore, after setting the appropriate parameter values, the diode ⚠ (**30**) will go out.
4. Switching between welding methods, parameter values relevant for the given method will remain unchanged. Their ranges may vary depending on the chosen method.

7.3 Description of the control panel operation:

- The control panel consists of buttons, LED indicators, a digital display and a knob. The control panel is convenient for users.
- The 3-digit panel display shows parameter settings, current values and error codes E-x.
-Functions 2T; 4T and spot welding are available at operating mode of the TIG button
- ArcForce function for MMA electrode welding: automatic increase of welding current in the case of sticking of the end of the electrode with the material being welded, particularly useful at welding pipes.
- High-reliability TIG HF ignition
- All functional parameters are adjustable.
- TIG DC, TIG pulse, TIG AC, TIG AC pulse and MMA welding methods are available.
- Gas pre-flow time,post-flow time, initial current, upslope time, downslope time and final current are regulated in the TIG DC and TIG AC methods.
- Gas pre-flow time, post-flow time, initial current, upslope time, downslope time, welding current, background current, pulse frequency are adjustable at TIG pulse and TIG AC pulse operating modes.
- The device displays error codes (see section 10) in the event of overvoltage, undervoltage or overheating.
- An error memory function and a statistical function available Cumulative error times can be obtained.

7.4 Saving the parameters after finishing welding.

The parameters used will be automatically saved after switching off the device (no automatic saving will be done if no operation is performed after setting the parameters and when the machine is switched off within 5 seconds).
When the device is switched on the next time, the parameters will be restored. When the welding mode and the TIG button operating mode are selected again, auto-saving will be carried out after 10 seconds.

8. TIG welding

Connect the device to the 230 V mains cable (**9**, see fig. 1).
Connect the TIG holder to the socket (8) (minus) on the front of the device, connect the control plug to the socket (**6**) and tighten the gas connection (**7**).
Insert the mass cable and secure it to the socket (**5**) (plus), provide gas to connector 2 at the back of the device. Switch on the device with the ON / OFF switch (**1**). The TIG torch should have a tungsten electrode with the appropriate diameter and the appropriate angle of sharpening corresponding to the TIG welding current. The same applies to DC / stainless steel (TIG DC) as well as aluminium and its alloys (TIG AC).
After the appropriate setting of the welding parameters, set the correct argon flow with a bottle reducer.
Press the TIG torch trigger to start the solenoid valve and the HF ionizer.
The TIG torch should be kept 2 ~ 4 mm from the workpiece. After arc ignition, HF current disappears and welding current I1 increases to the set value. After releasing the torch trigger, the current begins to automatically decrease to the final current value. Then the arc goes out while maintaining gas flow in the set up time.

8.1 TIG DC welding

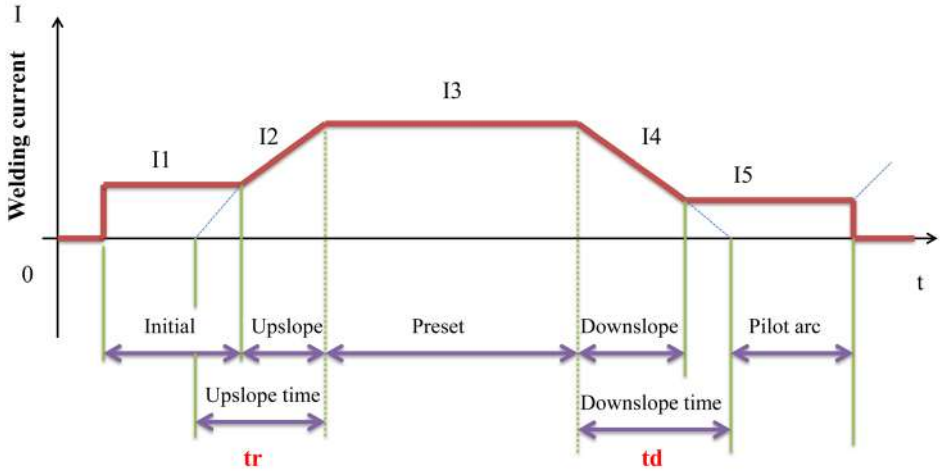


Figure 11: TIG DC current path

To choose the method press button (**12**), the diode (**9**) lights up (according to figure 4)
In TIG DC mode, 8 adjustable parameters are available. Description according to Figure 11:
- **Welding current (I3)** : set according to your user's welding requirements.
- **Initial current (I1)**: turns up when the arc is ignited. If the initial current is high enough, the arc is easier to ignite. However, when welding thin elements, reduce its value to avoid material burn-out when starting to work. In some welding methods, the current does not increase, but remains at the initial value to preheat the material or highlight it.
- **Final current (I5)** : In some welding methods, the arc does not go out after the downslope time, but it remains at the value of the final current. The final current is used to fill the crater on the end of the weld.

- Gas pre-flow time: This is the time after pressing the trigger on the TIG torch, in which the gas flows before the arc is ignited using the HF ionizer. It should usually be longer than 0.5s to protect the gas purity at the start of the weld. The gas flow time should be increased if the welding torch is long.
- Gas post-flow time: This is the time since the arc goes out until the gas valve is closed inside the device. If it's too long, it causes argon loss; if it is too short, it can cause oxidation of the end of the weld (crater). In the case of TIG AC or non-ferrous metal welding, this time should be longer.
- Upslope time (tr): This is the time of I2 current increase from zero to preset value of welding current, according to the user's welding requirements.
- Downslope time (td): gradual ramping down of welding current I4 to zero (or final current) and should be set in accordance with user's welding requirements.
- Selection of tungsten electrodes: see details in table 3:

Diameter of tungsten electrode. (mm)	Welding current range (A)
1,0	5 - 30
1,6	21 - 90
2,0	46 - 135
2,4	71 - 180
3,2	131 - 200

Table 3: Recommended TIG DC currents for a given tungsten electrode diameter

8.2 TIG DC Pulse welding

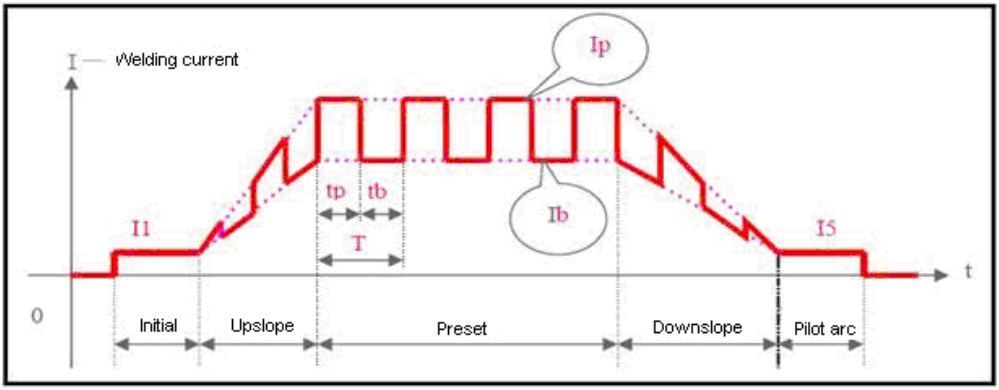
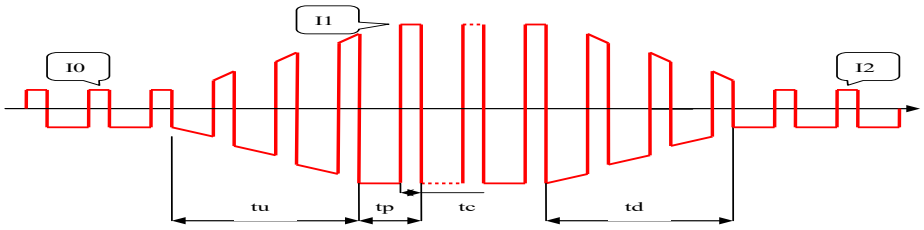


Figure 12: TIG DC pulsed current

To choose the method press button (**12**), the diode (**10**) lights up (see figure 4).
In the TIG DC Pulse method, all TIG parameters are available, but the welding current consists of two components: Ip and Ib. Four parameters are subject to regulation. Description below according to the Figure 9:
- Peak current (Ip): current in amperes at time tp according to the customer's welding technology.
- Background current (Ib): current in amperes at time tb according to client welding technology.
- Pulse rate (1/T): according to the formula T = tp + tb. value according to client welding technology, range of 0.2-200 Hz (see Fig. 12).
- Peak current time factor (100% * tp / T): percentage of peak current in the pulse period, value according to client welding technology, range 10-90%.

8.3 TIG AC welding



I0 - Initial current; I1 - welding current; I2 - final current, tu - upslope time; td - downslope time
tp - alternating current (AC) period; tc - positive electrode time

Figure 13: Alternating current flow TIG AC square wave

To choose the method press button (**12**), the diode (**7**) lights up (see figure 4).
In the case of TIG AC welding, the gas pre-flow time and the outflow time are the same as in DC TIG welding. Other parameters are described below (according to figure 12):

- Initial current (I0 - range 5 - 160A), welding current (I1) and final current (I2): The preset value of three parameters is the average (average deviations) of the welding current, values according to the user's welding requirements.
- Pulse rate (1/tp): value according to the user's welding requirements, range 20-250 Hz
- AC balance (100% * tc / tp). The ratio of negative and positive current within Alternating Current affecting welding speed and weld cleanness for aluminium and its alloys, range 20 - 80%. In the alternating current, the negative electrode is responsible for cleaning the weld from oxides generated during welding. Its high percentage slows down welding and causes faster electrode wear, the weld pool is wide and shallow. Usually the share of the negative electrode is 10-40% of the total. The positive electrodes of the AC current increases the welding speed, the welding arc is more concentrated, the penetration is deeper.

8.4 TIG AC Pulse welding

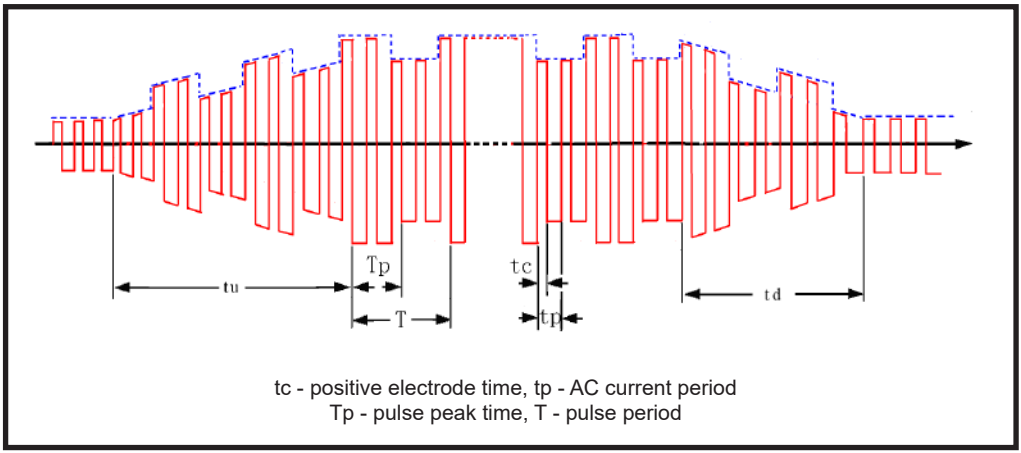


Figure 14: TIG AC current flow with additional pulse

To choose the method press button (**12**), the diode (**8**) lights up (see figure 4).
The TIG AC welding with an additional pulse is distinguished by a different waveform AC and additional values of the peak current and the background current. Preset peak current and the background current is respectively the peak value of the low frequency pulse (average value) and background value (average value). The settings are similar to those described in the chapter 8.2 (AC welding with a square wave). To set the frequency of the current pulse and the duration of the pulse you can refer to the values as for TIG DC pulse welding. Frequency of AC (1 / T) pulses can be adjusted in the range from 0.2 to 200 Hz. Pulse duration ratio (Tp / T) can be adjusted from 1-99%.

9. Operating mode available on the TIG torch trigger

The TIG operating mode determines the operation of the torch trigger in the TIG method. The operating mode can be connected to the remote control in the grip handle.
The operating mode of the TIG torch should be selected in accordance with the welding technology and welding preferences at the workplace. All TIG operating modes for this device are listed in this chapter.

Notes on the operation of the torch trigger			
↓	2-stroke operation mode (2T): Press the torch trigger to start welding	↑	2-stroke operation mode (2T): Release the torch trigger to stop welding
↓↑	4-stroke operation mode (4T): Press the torch trigger, and then release release it at any time, the welding current stays on without having to hold the trigger	↓↑	4-stroke operation (4T): to stop welding again press the torch trigger, the current will start to fall to the final value.

TIG operation modes

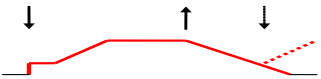
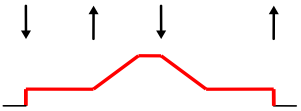
Mode no.	Action	Operation of the torch trigger and current curve
1	**Spot welding SPOT mode (diode (15) according to fig. 5)** 1) Press the torch trigger: the arc is ignited and the current increases to the set value within the set time. 2) After the spot welding time, the current drops gradually and the arc goes out. You do not have to release the trigger on the torch. **Attention: We choose the time of spot welding with the parameter (20) according to Fig. 5). We suggest resetting the upslope times (19) and downslope times (24) according to Fig. 6.**	
2	**2-stroke mode 2T (diode (13) according to fig. 5)** 1) Press the torch trigger: the arc is ignited and the current gradually increases. 2) Release the torch trigger: the current drops gradually and the arc goes out. 3) If you press the torch trigger again before the arc goes out, the current will gradually increase as in point 2.	
3	**4-stroke mode (4T): (diode (14) according to fig. 5)** 1) Press the torch trigger: the arc is ignited and the current reaches the initial value. 2) Release the torch trigger - current increases gradually. 3) Press again: the current falls to the value of the final arc current level. 4) Release the torch trigger: the arc stops.	

Table 4: Operating modes of the TIG torch

10. MMA coated electrode welding

Connect the device to the 230 V mains cable (9, see fig. 1). Connection of wires to the MMA electrode welding

- Connect the ground wire plug to the (**8**) (-) socket on the device
- Connect the plug of the electrode holder to socket (**5**) (+) on the device.

ATTENTION: Some coated electrodes require reverse polarity - see instructions on the electrode pack. Switch on the device with the ON / OFF switch (**12**). Starting the welding mode with the electrode is carried out by pressing the button (**5**) - the indicator (11, see fig. 2) lights up.

ATTENTION: Avoid accidentally touching the end of the electrode with the material, as the welding current is still present in the cables.
After switching the device on (ON), set the proper welding current for the given electrode diameter with the knob (**4**) (see instructions on the electrode pack). The value of the welding current is shown in the panel display (**1**) (the indicator (**21**) is continuously lit).

The electric arc is initiated by rubbing the end of the electrode with the base material (connected
with the device by earth cable), and after the arc occurs, it is necessary to quickly move the electrode tip for the right distance.

If the end of the electrode is removed too quickly, the arc will be torn off and alternatively, moving too slow can result in creating short circuit and sticking the end of the electrode to the material.

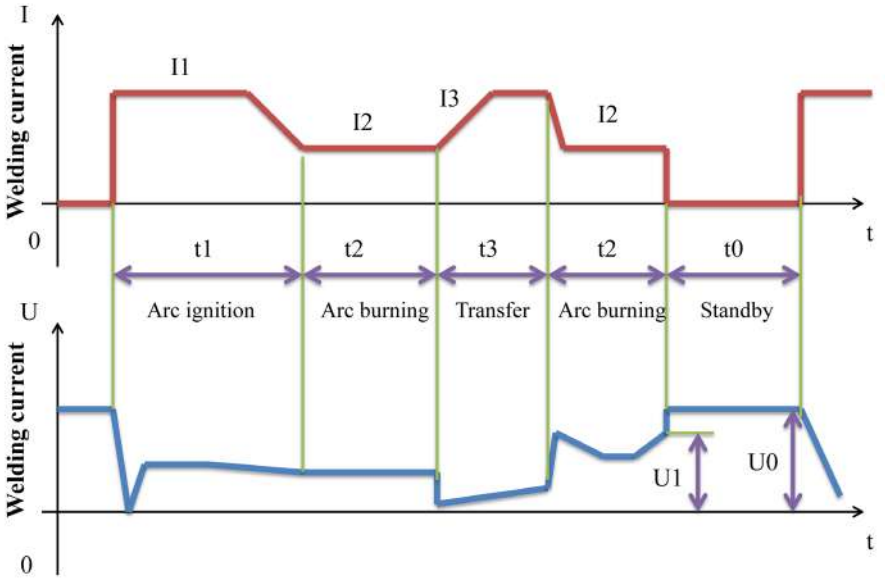


Figure 15: Changing of current and voltage during welding

Notes to the drawing:
t0 - Standby mode: there is no welding current; a open circuit voltage U0 in the circuit.
t1 - arc ignition time: arc ignition current (I1).
t2 - Arc burning time: the welding current has the value set by the welder (I2).
t3 - arc short-circuit time: short-circuit current (I3).

To choose welding with the MMA electrode by pressing button (**12**), the diode (**11** , see Fig. 4) lights up . The MMA method regulates 4 parameters, whose values can be set on the panel and 1 parameter, the value of which is regulated only by the software. The description is below (see Figure 15):
- **Current (I2)** : This is the welding current set in accordance with the welding technology. It should correspond to
the value specified by the electrode manufacturer for a given diameter
- **Arc Force**: causes the current to increase in the event of a short circuit of the electrode and is set as an increase in the current per millisecond. The current will rise from the set value with the slope until the short circuit closes (eg when the set current is 100A and the arc strength is 20, the current will be 200A in 5 ms when a short circuit occurs.) If the short circuit still occurs, then the current will rise to a maximum value of 250A. If the short-circuit lasts for 0.8s or more, the device will activate the anti-stick system and reduce the current to facilitate detaching the electrode. Arc Force should be set according to the electrode diameter, welding current and welding technology. If the Arc Force is large, the molten drop can be moved quickly and the electrodes are hard to stick. However, setting too much Arc Force value can lead to excessive splashes. If the Arc Force value is small, the spatter will be small and the shape of the weld will be well formed. However, too low arc strength can lead to too soft arc and sticking of the electrode. Therefore, when welding with a thick electrode, the arc force should be increased at low current.
In welding, the recommended Arc Force value is between 0 and 40.
- **Arc ignition current (I1) and arc ignition time (t1)**: The arc ignition current is the initial current when starting welding. The arc ignition time is the duration of the ignition current. In the high ignition current mode, the current value is 1.5 ~ 3 times the welding current, and the arc ignition time range is between 0.02 ~ 0.05s. During operation in the low ignition current mode, the current value is 0.2 ~ 0.5 times the welding current, and the arc ignition time is 0.02 ~ 0.1 s,range from 10 to 160A.

MMA arc ignition modes
- Low arc ignition current: It can also be referred to as a lifting / soft arc Set the arc ignition current (I1) to a value lower than I2, and the device will enter the arc ignition mode at low current. Touch the workpiece with the end of the electrode and lift it to the normal position to start welding. **- High arc ignition current:** It can also be described as a contact or thermal ignition. Set the arc ignition current (I1) to a value not lower than I2, and the device will enter arc ignition mode at high current. Touch the workpiece with the end of the electrode and welding can be started without lifting the electrode.

11. Problems occurring during welding

If a hazardous error occurs for the operator or working environment, immediately turn off the power supply of the device.
It is necessary to protect the device from unauthorized use until the defect is removed.
The device may only be repaired by authorized personnel!

Problem	Potential cause
The control panel does not work, no diodes nor display are on	
No power supply.	Check the fuses. Check the electricity in the network.
Damaged cables or plugs.	Check the cables and plugs, replace if damaged.
The device is overheated.	Wait for the welding machine to cool automatically.
Incorrect supply current, error code **E-1** appears on the display.	Check the power supply network, overvoltage occurred (too high supply current). Switch the device off and on again. If the error persists, contact technical support.
Incorrect supply current, error code **E-2** appears on the display.	Check the power supply network, low supply current. Switch off and again switch on the device. In case the fault persists contact technical support.
error message **E-4** (display-error)	If the error persists, contact technical support. In this case you can continue welding, but the panel display indications are incorrect.
Welding with the MMA electrode cannot be performed	
The device is not in MMA work mode	Switch to MMA welding (indicator **8** should be on)
Welding arc cannot be ignited in TIG	
The device is not in TIG mode	Switch to TIG welding (indicators **7; 8; 9 or 10** should be on)
Torch control plug is not connected	Check and connect
Torch control plug damaged	Check the plug
The mass cable is not connected properly	Check and connect
Argon does not flow	
The bottle is empty or gas hose is blocked	Check the cylinder
A defective argon reducer	Check the reducer
TIG or orifice defective Defective gas valve in the device	Contact technical support
TIG current does not pulse	
TIG pulse is not active	Check whether the indicator **7 or 10** is on
I2 current is set to 100%	Check the setting of indicator **28**
I1 current has a minimum value	Check the setting of indicator **21**

Problem	Potential cause
No high frequency TIG Pulse current	
Defective HF ionizer	Contact technical support
The mass cable is not connected properly	Check and connect
The tip of the tungsten electrode is dirty	Grind
Wrong tungsten electrode	Replace

Table 5: List of potential problems during work

12. Electrical scheme

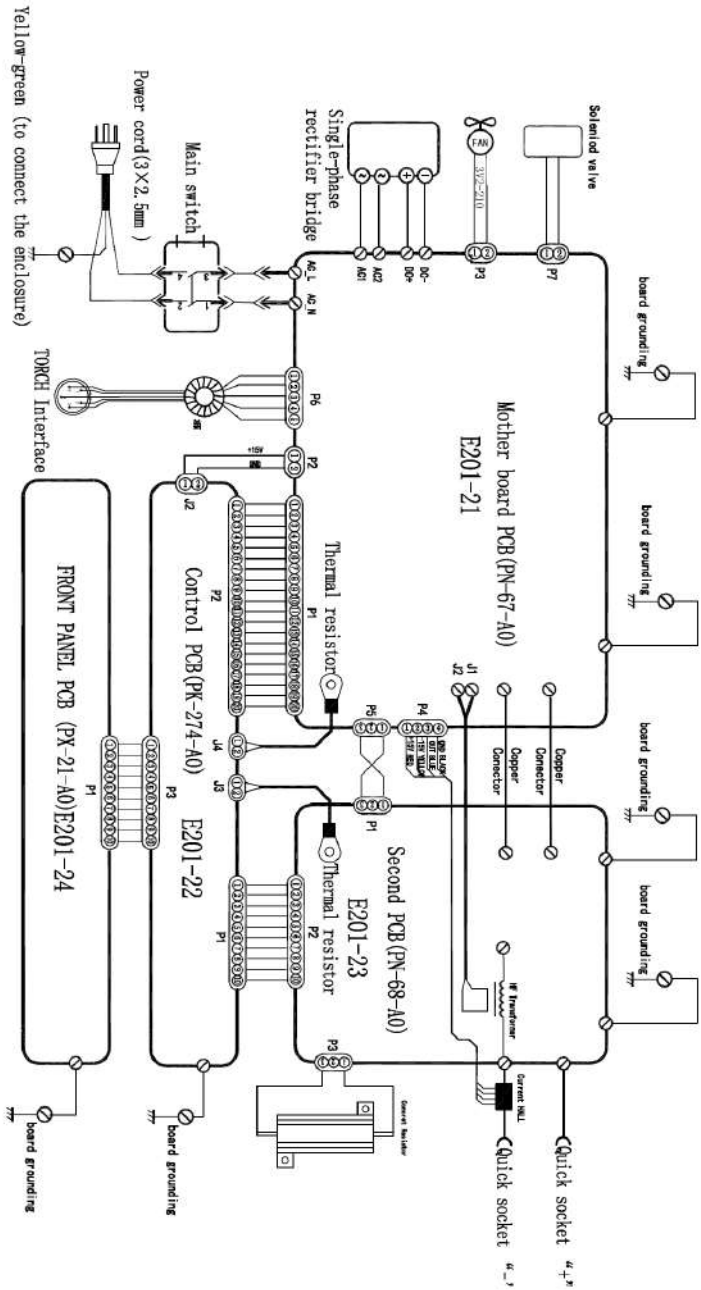


Figure 16: Electrical scheme

13. EU Declaration Of Conformity

1. Product Welding rectifier **PONTIG 202 AC/DC MOST.**
2. Name and address of the producer:
RYWAL-RHC sp. z o.o. Warsaw
Chełmżyńska 180
04-464 Warszawa,
3. This declaration of conformity is issued under the sole responsibility of the manufacturer.
4. Object of the declaration Welding rectifier **PONTIG 202 AC/DC MOST.**

5. The subject matter of this declaration mentioned above is in conformity with the relevant requirements of EU harmonization legislation:
- The Low Voltage Directive LVD 2014/35/EC,
- The Electromagnetic Compatibility EMC Directive 2014/30/EU,
- with the directive RoHS 2011/65 / EU on the restriction of the use of certain dangerous substances in electrical and electronic equipment

6. References to the relevant harmonized standards in relation to which conformity is declared:
PN-EN 60974-1:2018 + A1:2019; PN-EN 60974-10:2014 + A1:2015

7. Additional information: None

Signed on behalf of:

Toruń, 03.06.2019

Product Manager
Dyrektor Produktu
mgr inż. Wojciech Wierzba

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

14. Recycling

In accordance with Directive 2012/19 / EU WEEE II (WEEE - Waste Electrical and Electronic Equipment), after decommissioning, the device must be recycled by a specialized company. Do not dispose of worn-out welding equipment with domestic waste!

The End.

NOTES

Manufacturer:

RYWAL-RHC Sp. z o.o. w Warszawie
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04-464 Warszawa

Sales and Service network:

Grupa RYWAL RHC
www.rywal.eu

RYWAL-RHC Sp. z o.o.

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ISO 14001

AC 014
QMS, EMS