



User Manual for Welding Rectifier

PONTE 402 MOST



Attention! Before starting work every person using or responsible for maintenance work on this device should familiarize with the entire content of these operating manual. 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.



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1. Introduction

Thank you for buying the Inverter Rectifier PONTE 402 MOST. Prior commencing work please familiarize yourself with the user manual.

The PONTE 402 MOST device is used for MMA coated electrode welding and TIG DC welding with arc ignition by rubbing (LiftARC).

We do believe that this product will meet your requirements.

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 components used to build the device do not contain critical raw materials in the total

amount of more than 1g regarding the requirements of the Ecodesign Directive 2009/125/EC and the Regulation 2019/1784 Annex II, point 3h.



2. Health and Safety Manual



ATTENTION: The device cannot be used for the purpose of pipe defrosting!

Information contained on the icons placed on the device:



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.

	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 to 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 welding check work station against fire hazard.
	Never try to fix a damaged gas reducer on your own. In case of malfunction replace the reducer to a fully functional one.
	Electromagnetic interference. The device may influence other devices sensitive to electromagnetic interference (robots, computers, etc.) Make sure that the devices within the welding work station are resistant to interference. In order to minimize interference it is recommended to use possibly shortest welding cables arranged in parallel. Always work in a distance at least 100 m from other sensitive devices. Always make sure that the installation is grounded. In case of interference with other devices, shield the cables or use appropriate filters. The device is compliant with the currently applicable standards. In accordance with EN IEC 60974-10, it is classified as class A and is intended for work in workshop and industrial conditions. The device application nearby to residential buildings, especially the power supply using a home electrical network, may interfere with the operation of other electrical or telecom devices. The user is responsible for the correct device connection and removal of potential electromagnetic disturbances.
	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. The national regulations for working with this device and accident prevention should be kept up to date.
	All flammable or combustible materials must be removed from the working area. Do not weld in tanks where flammable liquids (fuel) were stored previously. 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 start welding without proper eye protection equipment. Also protect other people against generated radiation.



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

INTRODUCTION

Commissioning and normal operation are possible only after carefully reading the following manual. Manual metal arc welding requires compliance with the requirements for electric arc welding and fire regulations. Device operator should be equipped with appropriate personal protective equipment. It is necessary to use a set of personal protective equipment (PPE) in accordance with according to provisions of the Council Directive 2016/425/EEC. The protection measures includes: welding mask with protective filter, welding gloves, apron, welding clothing, 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.



ATTENTION: GASES AND FUMES

MMA and TIG method produces 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.



ATTENTION: RADIATION

Ultraviolet radiation emitted during welding is harmful to eyesight and skin. Therefore a welding mask with protective filters is required.

Welding work station should meet certain requirements, including:

- adequate lighting system,
- fixed or movable protection screens, governing bystanders against radiation effects (depending on requirements),
- location with wall colour providing appropriate for radiation absorption.



ATTENTION: FIRE PROTECTION

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



ATTENTION: PROTECTION AGAINST ELECTRIC SHOCK

It is unacceptable to connect the device to an improper installation or to an installation with unverified zeroing efficiency. Removal of external shields while the device is connected to the electric network, as well as the use of the device with shields removed IS PROHIBITED. It is not allowed to work on a suspended device (e.g. using a crane or a gantry). Maintenance and repair works should be carried out by authorized personnel in compliance with the applicable safety conditions.

3. Periodic maintenance and mandatory testing of equipment



ATTENTION: In order to carry out any repair or maintenance activity, it is recommended to contact your nearest technical support of RYWAL-RHC (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, disconnect the device from power supply and report it to direct supervisor or applicable technical support - RYWAL-RHC.

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 at all times.

Periodic maintenance (every 3 months at least)

Periodic maintenance frequency can be increased and the intensity of use. Scope of 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 and service work. After each repair, perform a proper 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: PN-EN 60974-4 clause 4.6).

All above services are performed by the technical support of RYWAL-RHC.

In accordance with 2019/1784 Commission Regulation (EU) Annex II pt. 2. b1, RYWAL-RHC company provides information on repairs and maintenance to PROFESSIONAL TECHNICAL SUPPORT PROVIDERS under the terms of the regulation.

4. Transportation, operating conditions and ambient conditions

Be especially careful when transporting device with a forklift or a lift truck - risk of damage to the device's chassis.

Use only suitable slings for a vertical transport by crane.

Disconnect gas cylinder (TIG welding) and power cord before transporting the machine.

The maximum permissible inclination angle for transport is 15°.

ATTENTION: Danger of falling or overturning the device during transportation!

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 15°),
- do not use the device for pipe defrosting,
- the device needs to be located in a place with free clean air circulation (to and from the fan without obstacles). When connected to electrical network the device must not be covered (with, for example, paper or cloth)
- minimize the amount of dirt and dust that could get inside the device,
- with IP21S protection rating of housing, keep the device dry and not locate on wet surfaces or in a puddle.
- do not use the device for welding tanks previously used for flammable substances storing.

ENVIRONMENTAL CONDITIONS

Range of air temperatures for

- | | |
|-----------------------------------|--------------------------------------|
| - operation from | -10°C to +40°C |
| - storage and transportation from | -25°C to +55°C |
| - air relative humidity: | up to 50% at +40°C; to 90% at +20°C. |

5. Technical data

Parameter	Unit	Value
Power supply voltage	V/Hz	3x400 +/- 15% / 50/60
Current I ₁ max	A	25,3
Effective current I ₁ eff	A	19,6
Idle mode power consumption	W	27
Welding current at duty cycle: PJ 60% PJ 100%	A/V	400 / 36 310 / 32,4
Welding current range TIG and MMA	A	30 A / 21,2 V - 400 A / 36 V
Power source efficiency	%	89
Idling voltage U ₀	V	79
Open circuit voltage with active VRD function	V	9
EMC noise level according to IEC 60974-10		class A
Noise emission	dB(A)	<70
Protection class		IP21S
Insulation class		F
Dimensions	mm	680 x 340 x 528
Weight	kg	23
Catalogue no.		53 00 040400

Table 1: Device technical data PONTE 402 MOST

Device assembly:

The device is delivered in a cardboard box, without welding cables, with a 4 m (4x2.5 mm²) power cable with a 32CEE plug.

Additional equipment (option):

Ground cable 3 m and electrode 5m/50 mm ²	53 99 990115
Remote control Ponte 402 P110B007 15 m	53 13 000010
TIG torch 26V 35/50 MOST 4 m	56 01 062634
FANDRY 20 electrode dryer	50 00 003002
Thermos for FANTERM 5T electrodes	50 00 004300

6. 6. Device construction

PONTE 402 MOST is an inverter rectifier for welding with various types of coated electrodes or the TIG DC method with ignition by scratching the tip of the tungsten electrode.

All settings are made on the front panel of the device. On the rear panel of the device there is a main ON/OFF switch.

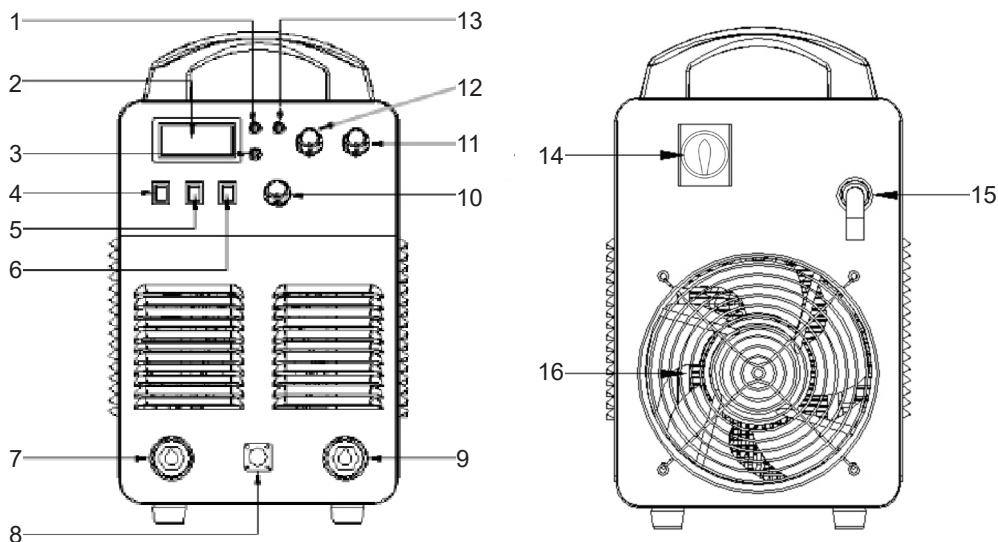


Figure 1: PONTE 402 MOST construction

1. Error LED (overheating)
2. Welding current display A
3. Error LED (power)
4. Control switch: from the panel (Local) or remote control (Remote)
5. Welding method switch: MMA or TIG DC electrode (LiftARC, scratch ignition)
6. Electrode characteristics switch: standard (rutile, basic, acid or similar coating) or cellulose coating
7. Current socket (+)
8. Remote control socket
9. Current socket (-)
10. Current control knob
11. ArcForce knob
12. HotStart knob
13. LED VRD function
14. Main switch ON/OFF
15. Power cable
16. Fan cover

7. MMA coated electrode welding.

Connect the device to the 3x400V mains by means of the no. 15 cable . Then connect the welding cables as follows:

- Connect the ground wire plug to the **9 (-)** socket on the device
- Connect the plug of the electrode holder to socket **7 (+)** on the device.



Attention:

Some coated electrodes require reverse polarity - see instructions on the electrode package.

After starting the device with the main switch **14 (ON)**, set the correct welding current for a given electrode diameter with the knob 10 (see instructions on the package of electrodes and recommendations in table 2).

Button **5** must be in MMA position. The ground clamp should be permanently attached to the welded material, the electrode should be placed in the electrode holder. The electric arc is created by rubbing the end of the electrode with the native material (connected to the device with a mass line), and after the arch is created, it is necessary to quickly move the tip to the correct 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.

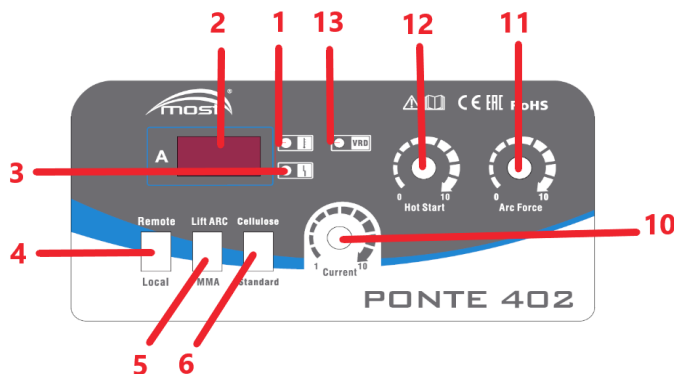


Figure 2: PONTE 402 MOST control panel

1. Error LED (overheating)
2. Welding current display A
3. Error LED (power)
4. Control switch: from the panel (Local) or remote control (Remote)
5. Welding method switch: MMA or TIG DC electrode (LiftARC, scratch ignition)
6. Electrode characteristics switch: standard (rutile, basic, acid or similar coating) or cellulose coating
10. Current control knob
11. ArcForce knob
12. HotStart knob
13. LED VRD function

The following MMA functions are available:

7.1 Remote control

Button **4** can be used to switch between setting the welding current on the control panel with knob **10** (Local) or using the remote control type P110B007 15 m (Remote).

7.2 Welding with cellulose electrodes

Cellulose coated electrodes require special current characteristics during welding . When welding with cellulose electrodes, set button **6** to the Cellulose position. For all other types of electrodes, set button **6** to the Standard position.

7.3 ArcForce function

The ArcForce strengthens the arc when the metal droplet enters the weld pool, it is especially useful during circumferential welding of pipes in out-of-position. Knob **11** activates the function and sets the value.

6.4 HotStart

The HotStart function is a temporary increase in the welding current to support arc ignition. Knob **12** activates the function and sets the value.

8. Welding with MMA VRD - LED (13) is on

VRD Function

The VRD function is designed to increase the safety of the welder when working in a hazardous environment. If there is high air humidity or water is on the floor, you should additionally protect yourself against electric shock. The VRD function reduces the voltage on the coated electrode to a safe level (about 9 V) after welding. Another attempt to start welding starts the device and allows you to ignite the electric arc.

The active VRD function results in more difficult arc ignition, especially if the surface of the welded materials is not perfectly clean.

The VRD function is not active by default, LED 13 is off.

The VRD function can be activated inside the device. On the control board, set the DIP sliders to the lower position as shown in the figure:

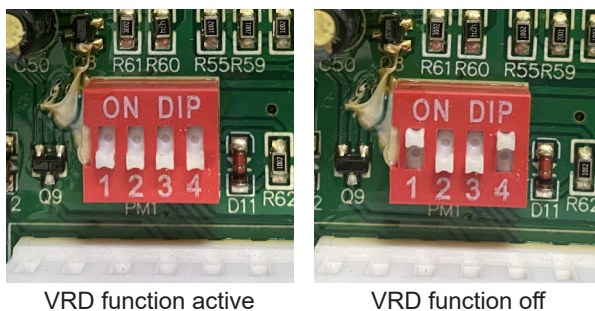


Figure 3: DIP sliders setting - VRD function active.

When the VRD function is activated, LED **13** is lit.

**ATTENTION:**

Since the activation of the VRD function requires the removal of the cover, it may only be performed by qualified personnel.

Electrode diameter [mm]	Welding current [A]	Electrode length [mm]	Electrode core weight [g]	Welding time 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 2: Approximate electrode consumption when welding with MMA

9. TIG LiftARC (DC) welding

PONTE 402 can weld steel or stainless steel using the TIG method with arc ignition by scratching the tip of the tungsten electrode against the welded material.

Connect the TIG torch (with a gas valve) to the minus socket on the front of the device (**socket 9 as shown in Fig. 1**), tighten the gas connection of the TIG torch to the argon cylinder reducer.

Set the TIG LiftARC welding method with the switch **5** and set the welding current I1 with the knob **10**. Open the gas flow with the valve on the TIG torch (gas flow in liters per minute should correspond to the numerical value of the ceramic nozzle, e.g. 5 means a flow of 5 l/min), rub the end of the tungsten electrode against the material and, after striking the arc, lift the end of the electrode approx. 3 mm above the material. To stop welding, lift the TIG torch („break the arc”).

Tungsten electrode diameter mm (inch)	Ceramic nozzle size*	Argon flow Steel / stainless steel	
		Standard tip adapter lpm (CFH)	Gas lens l/min (CFH)
0,50 (0,020)	3, 4 lub 5	3-4 (5-8)	3-4 (5-8)
1,00 (0,040)	4 lub 5	3-5 (5-10)	3-4 (5-8)
1,6 (1/16)	4, 5 lub 6	4-6 (7-12)	3-5 (5-10)
2,40 (3/32)	6, 7 lub 8	5-7 (10-15)	4-5 (8-10)
3,20 (1/8)	7, 8 lub 10	5-9 (10-18)	4-6 (8-12)
4,00 (5/32)	8 lub 10	7-12 (15-25)	5-7 (10-15)
4,80 (3/16)	8 lub 10	10-17 (20-35)	6-12 (12-25)
6,40 (1/4)	10	12-24 (25-50)	10-17 (20-35)

* numerical mark on the nozzle body

Table 3: Approximate gas consumption for TIG DC welding.

Welding wire consumption in the TIG method.

Additional wire in the form of rods can be used optionally as a binder in the TIG method. In general, the diameter of the rod should correspond to the diameter of the tungsten electrode used.

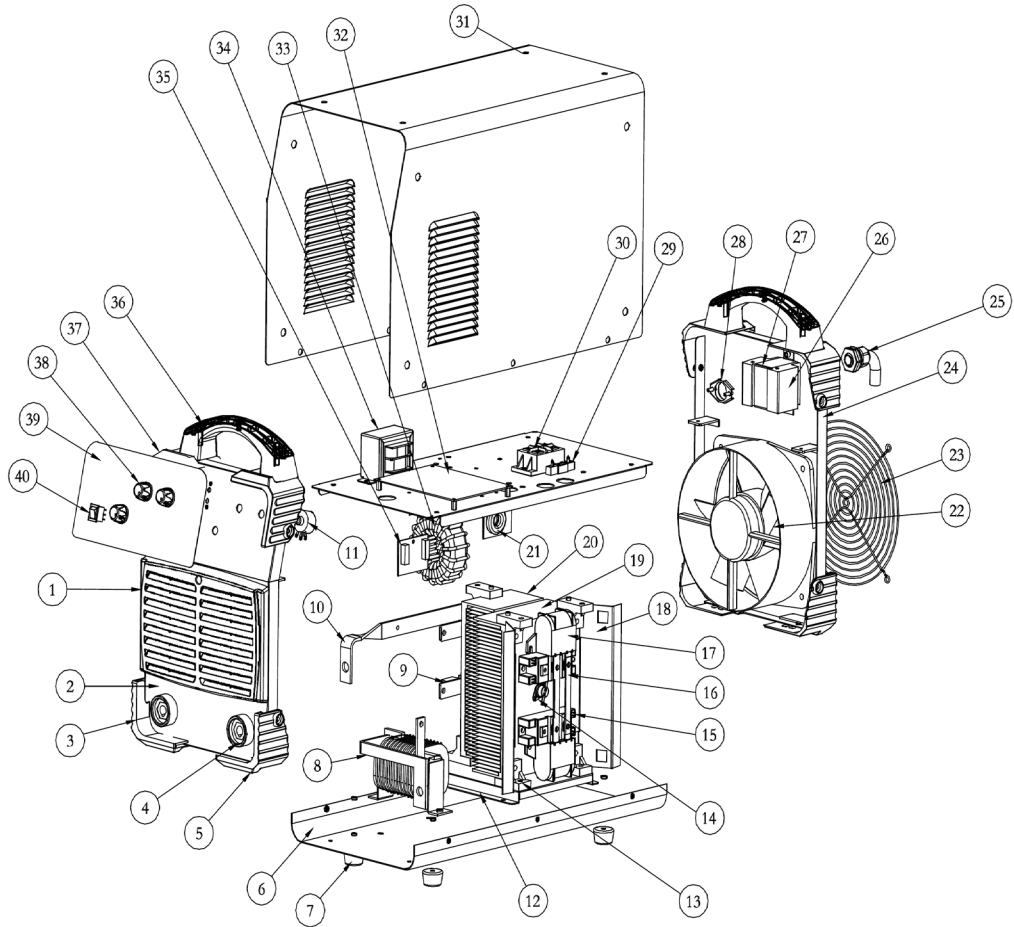
The consumption of the weld metal depends on individual factors (welding current, type of weld, speed of feeding the rod into the weld pool, etc.) and cannot be precisely determined.

10. Problems occurring during work

Problem	Potential cause	Recommendations
Excessive splatter	Arc too long.	Shorten the arc.
	Too high welding current.	Adjust the welding current to the electrode diameter.
Crater (TIG weld)	Too quick detachment of the electrode from the workpiece.	Hold the tungsten electrode longer over the weld.
Inclusions-slugs	Low material purity or densely placed welds	Only weld materials after cleaning.
	Incorrect electrode leading.	Arrange stitches according to the art.
Lack penetration, no sticking	Too high welding speed	Lower welding current.
	Welding current too low.	Increase welding current.
	Too small bevel angle	Weld according to the art.
	Incorrect edge cleaning.	Only weld materials after cleaning.
Electrode sticking to the workpiece being welded	Arc too short.	Weld according to the art.
	Welding current too low.	Adjust the welding current to the electrode diameter.
	Insufficient or lack of shield gas flow (TIG).	Check gas flow - see table 3.
Bobbles in weld	Moistened electrode coating	Dry the electrodes before welding - see accessories page 7.
	Arc too long.	Shorten the arc.
Cracks in weld	Too high welding current.	Adjust the welding current to the electrode diameter.
	Welded workpiece dirty	Only weld clean and dry materials.
	Hydrogen in weld (from electrode coating)	The electrodes must be dried before welding - check the recommendations on the electrode packaging. Use electrode dryers and thermoses.
Problem with arc ignition	Function VRD is active – LED 13 is on.	Switch off VRD function – see chapter 8.

Table 4: Faults during MMA and TIG welding.

11. Spare parts list

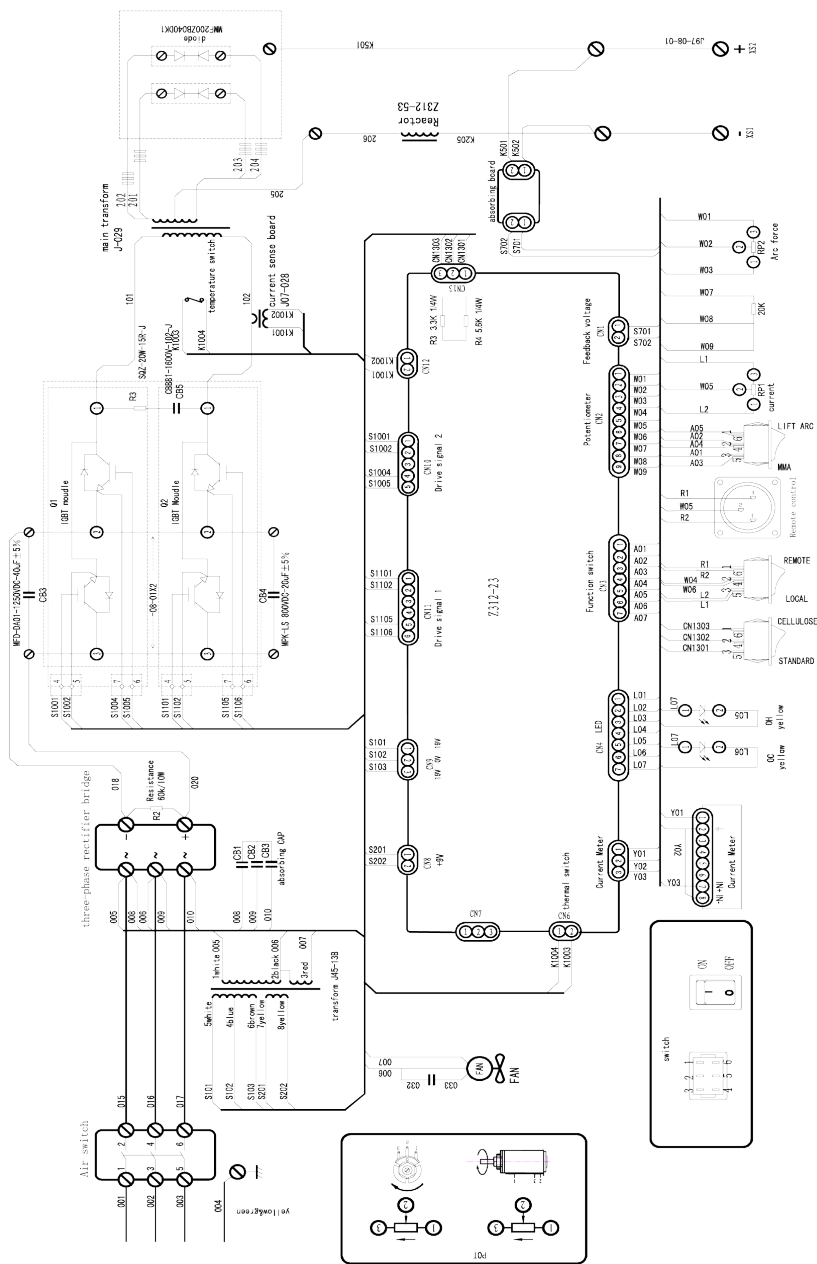


Picture 4: Spare parts PONTÉ 402.

Pos.	Product code	Nazwa	Description	Szt / pcs
1	10047339	Żaluzja przednia	front louver	1
2	10061633	Panel przedni	front panel	1
3	10047352	Oslona plastikowa 1	plastic part	3
4	10004640	Gniazdo prądowe	quick socket	2
5	10047353	Oslona plastikowa 2	plastic part2	1
6	10057775	Podstawa	chassis	1
7	10016489	Gumowa stopka	rubber feet	4
8	10056126	Dławik	reactor	1
9	10046114	FRD	FRD	2
10	*	Wspornik	Structural parts	*
11	10043112	Potencjometr	potentiometer	1
12	10045086	Podstawa inwertera	bracket of inverter	1
13	10016565	Podstawa radiatora	bracket of heat sink	7
14	10006445	Wyłącznik termiczny	thermoswitch	1
15	10051315	Moduł IGBT	IGBT module	2
16	10055489	Złącze IGBT	connection on IGBT	2
17	10005910	Kondensator filtrujący	filtering capacitor	1
18	10027441	Oslony tunelowe	windshield	2
19	*	Radiator IGBT	IGBT heat sink	*
20	10045163	Radiator dla diód	heat sink for diode	1
21	10060115	Płytki transformatora	current transfo board	1
22	10097227	Wentylator	fan	1
23	10007335	Oslona wentylatora	fan guard	1
24	10065051	Ściana tylna	rear panel	1
25	10004886	Zacisk kabla	cable clip	1
26	10004935	Włącznik główny	main switch	1
27	*	Wspornik włącznika	support of switch	1
28	*	Mocowanie zacisku	bracket of clip	1
29	10044942	Opornik absorbujący	absorbing resistor	1
30	10006635	Mostek prostowniczy 3-fazowy	3-phase rectifier bridge	1
31	10097487	Oslona	cover	1
32	10097253	Płytki sterująca	control board	1
33	10060186	Transformator główny	main transformer	1
34	10097283	Transformator zasilający	power transformer	1
35	10007041	Płytki filtrująca	absorbing board	1
36	10049941	Uchwyt	handle	2
37	10047349	Część plastikowa 2	plastic part 2	1
38	10097589	Pokrętło	knob	3
39	10097433	Naklejka	sticker	1
40	10062441	Przełącznik	rocker switch	1

Table 5: Spare parts list according picture 4.

12. Electric diagram



Picture 5: Electric diagram of PONTE 402 MOST.

13. EU Declaration Of Conformity

1. Product: Welding Rectifier PONTE 402 MOST.

2. Name and address of the producer:

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. Object of the declaration: Welding Rectifier PONTE 402 MOST.



5. The subject matter of this declaration referred to above is in line with the relevant requirements of EU harmonization legislation:

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

6. References to the relevant harmonized standards in relation to which conformity is declared:

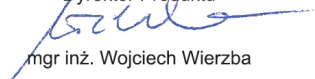
EN IEC 60974-1:2018; EN IEC 60974-10:202

7. Additional information: in case of changes or repairs of the device not authorized by RYWAL-RHC, this declaration becomes invalid.

Toruń, 18.05.2023

Podpisano w imieniu:

Product Manager
Dyrektor Produktu


mgr inż. Wojciech Wierzba

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

The End

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This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small gaps between them. There are no margins, text, or other markings on the page.

Manufacturer:

RYWAL-RHC Sp. z o.o.
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87-100 Toruń

Sales and service network:



www.rywal.eu

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85-825 **Bydgoszcz**, ul. Fordońska 112 A
tel. 52 345 38 73, 52 345 38 79

42-200 **Częstochowa**, ul. Warszawska 285/287
tel. 34 324 39 98, 34 324 60 61

80-298 **Gdańsk**, ul. Budowlanych 19
tel. 58 768 20 00

58-500 **Jelenia Góra**, ul. K. Miarki 42
tel. 669 605 408

75-124 **Koszalin**, ul. Jasna 4
tel. 94 342 05 31

30-798 **Kraków**, ul. C. Botewa 6a
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20-328 **Lublin**, ul. A. Walentyłowicz 18
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93-490 **Łódź**, ul. Pabianicka 119/131
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10-409 **Olsztyn**, ul. Lubelska 44 D
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09-400 **Płock**, ul. Przemysłowa 7
tel. 24 269 22 24

61-371 **Poznań**, ul. R. Maya 1/12
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41-703 **Ruda Śląska**, ul. Stara 45
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35-211 **Rzeszów**, ul. M. Reja 10
tel. 17 85 90 141, -142

37-450 **Stalowa Wola**, ul. Energetyków 49
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70-784 **Szczecin**, ul. A. Struga 41
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03-231 **Warszawa**, ul. Odlewnicza 4
tel. 22 331 42 90

54-156 **Wrocław**, ul. Stargardzka 9 C
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65-410 **Zielona Góra**, ul. Fabryczna 14
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**Zintegrowany System
Zarządzania
ISO 9001 & ISO 14001**

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Powyższe dotyczy w szczególności powielania, tłumaczeń oraz przechowywania i przetwarzania w systemach elektronicznych.