



MIG/MAG Semi-Automatic Welding Machine

Fanmig 522i Pulse

with Multifill-LCD feeder

Operation Manual



Catalogue no: 51 00 023945

Attention! A copy of this manual should be located in the place of device use and should always remain available to the operator.

Original manual

MIG/MAG Semi-Automatic Welding
Machine
Fanmig 522i Pulse

Operation Manual
rev. 1.0 of 09.05.2018



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1. Introduction

Thank you for purchasing a semi-automatic welding machine Fanmig 322W Pulse with Multifill-LCD feeder.

We do believe that this product will meet your requirements. Before starting the work please familiarize yourself with this User Manual

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!












2. Health and Safety Manual



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.

Attention: The device is may not be used for the purpose of pipe defrosting!

	Use and maintenance of welding equipment may be dangerous. The user must observe health and safety rules and regulations. Welding 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 liquids storage is forbidden. Place any flammables in a safe location away from welding spatter.
	Do not expose the device to rain, 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.
	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 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.
	<p>Electromagnetic interference</p> <p>The device may influence other devices sensitive to electro-magnetic interference (robots, computers, etc.)</p> <p>Always ensure that the devices within the welding work station are resistant to interference.</p> <p>For the purpose of limiting interference, it is recommended to use as short welding cables as possible and arranged in parallel.</p> <p>Always work in a distance at least 100 m from other sensitive devices.</p> <p>Always make sure that the installation is grounded.</p> <p>If there still are interference with other devices, properly shield the cables or use appropriate filters.</p>

INTRODUCTION

Commissioning and normal operation are possible only after reading the carefully reading following manual. The MIG/MAG, and MMA welding requires meeting the conditions corresponding to electric arc welding and fire regulations.

Device operator should be equipped with appropriate personal health and safety equipment. It is necessary to use a set of personal protective equipment in accordance with the provisions of Directive of the Council Directive No. 89/686/EC. Personal protective equipment includes: welding mask, welding gloves, protective apron, leather shoes, non-flammable welding clothing.

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

In order to ensure adequate service life and trouble-free operation it is recommended to:

- 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 can get into the device,
- device has an IP23S protection rating for housing and may be used outdoors,
- do not use the device for welding tanks previously used for flammable substances storing.



GASES AND FUMES

Using MIG / MAG, TIG and MMA techniques 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.



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),
- location with wall colour providing appropriate for radiation absorption.

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. It is prohibited to use of device with shields removed or remove the external shields while the device is connected to electric network. It is not allowed to work on a suspended device (e.g. using a crane or a gantry). Only authorized persons should perform maintenance and repair works keeping it in compliance with the safety conditions applicable to renovation equipment.

3. Maintenance (power supply and wire feeder)

ATTENTION: In order to carry out any repair or maintenance activity, it is recommended to contact your nearest technical support of **RYWAL-RHC** (for list of company locations providing technical support - see last page of this 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 appropriate service - **RYWAL-RHC** technical support.

General maintenance (daily):

- check the condition of cables and connections, replace if necessary,
- remove spatter from the gas nozzle of the welding torch, spatter may transfer with the shielding gas to the welding arc, tend to disrupt the shielding gas flow and can effect in a short circuit,
- check condition of welding torch, 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 the environment in which the device is operating. Maintenance scope:

- 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 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 PN-EN ISO 17662 2016 clause 4.2), and post-repair tests after each repair that restored welding functionality - legal basis: PN-EN 60974-4 2017 clause 4.6.

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

4. Technical description

Fanmig 522i Pulse has a modular construction.

The power source is mounted on the cooler with running gear attached. A separate wire Multifill-LCD feeder is connected to the power source with a 5 m

composite cable as standard. Different length of intermediate cables is available on request.

Fanmig 522i Pulse is an industrial purpose designed device. Welding current of 500A/40% for MIG/MAG and MMA coated electrode MMA welding methods is suitable for all users. For other materials there is also a MIG/MAG pulse current welding option available - see section 8.4. Device can also be used for air arc gouging. TIG DC welding is available in two options: regular and with pulse. TIG arc ignition is made by rubbing wolfram electrode against the material (LiftArc). Semi-automatic Fanmig 522i Pulse device is operated synergistically controlled digitally. After selecting the synergy mode and respective program, a changing to one parameter adjusts all other parameters required for proper welding. Synergy programs are available for both MIG/MAG and pulsating

current arc welding. Also MMA welding is possible after selecting correct program for various diameters and types of electrodes. When welding with electrode is important to equip the device with VRD function (with the possibility of shutdown), decreasing idling voltage for safety to approx. 20V. For MIG/MAG, MMA and TIG methods, synergy can be switched off in order to use "manual settings".

Device operation is simple and cutting edge. The control panel and parameter displays are located both on the wire feeder and power source.. Both panels are protected against mechanical damage and splinters with "plexi" panels. The main panel is the DPF panel placed inside the wire feeder. Descriptions of all panels can be found in the chapters 8, 9 and 10.

In case of coolant leak none of the current parts or electronics is damaged as the cooling system is located at the bottom of the device. Coolant circuit includes a sensor effectively protecting welding torch against a lack of coolant flow. The device ergonomics was also taken care of. Feeder spins freely being mounted on a spindle, based on the power source. The device is also fitted with wheels

to move across the floor freely. Feeder shape provides a short and slim profile helping to fit in tight spaces of welded constructions. At the power source side there is an additional shelf/hanger for intermediate cables or tools. Thanks to special connectors, intermediate cables are secured against being pulled out of feeder or power source sockets..

The device is sensor protected against overheating. Produced according to EN 60974-1:2012, (arc welding device - Part 1: Welding energy sources).

Wire feeder may be used for spools between 5 to 15 kg. Basket spools require an additional adapter.

5. Device construction

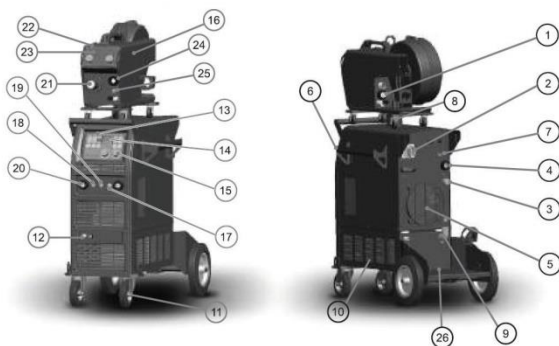


Figure 1. Device construction

1. Feeder male power socket (for intermediate cable assembly, not presented in the picture)
2. Main switch ON/OFF
3. 14-pin socket of power source(for intermediate cable assembly, not presented in the picture)
4. Power socket on power source (for intermediate cable assembly, not presented in the picture)
5. Fan cover
6. Handle for wrapping the intermediate cable assembly
7. Digital control socket
8. Swivel base
9. Cooling unit inlet
10. Liquid cooling unit
11. Front wheel with break
12. Liquid connectors blue/red
13. Control panel on the source
14. Plexi panel cover
15. Knob
16. Multifill-LCD wire feeder
17. TIG gas connection

18. Contr. socket 2-pin TIG
19. Contr. socket 5-pin TIG
20. Current socket (+)
21. Euro socket for the welding torch
22. DPF control panel (inside feeder - see Figure 2)
23. Control panel on the feeder
24. Current socket on feeder
25. Push-Pull handle control socket
26. Gas cylinder shelf



Figure 2. Location of DPF panel in the feeder

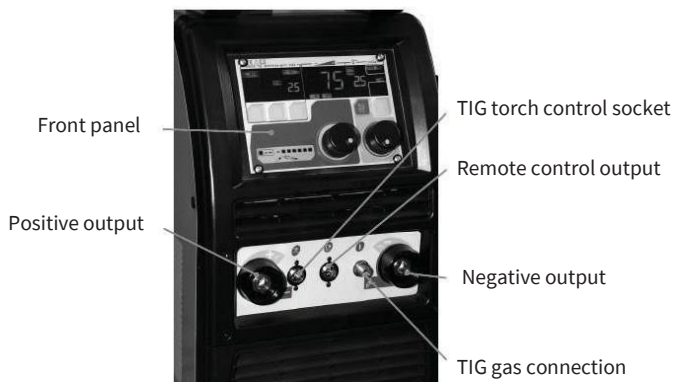


Figure 3. TIG torch and electrode connections on current source.

6. Technical parameters

Paramete	Fanmig 522i Pulse
Electrical power supply [V]	3x400/ 50/60Hz
Power consumption I max. [A]	38
Current I ef. [A]	24
Power factor cos fi.	0.95
Open circuit voltage MMA U ₀ [V]	72
Welding current range [A]	20-500 (MIG) 20-500 (MMA) 5-500 (TIG)
Work cycle	MIG: 500 A / 40 V / 40% 316 A / 29,8 V / 100% 405 A / 32,5 V / 60% MMA: 500 A / 40 V / 40% 316 A / 32,6 V / 100% 405 A / 36,2 V / 60 % TIG: 500 A / 30.V / 40% 316 A / 22,6 V / 100% 405 A / 26,2 V / 60%
Welding current set point	Infinitely smooth
Protection class	IP 23S
Wire feeding speed [m/min]	1-25
Multifill-LCD wire feeder	4-roller
Wire diameter [mm]: Steel Aluminum Brazing	0.8 -0.9 -1.0 -1.2 -1.6 1.0-1.2 0.8-1.9-1.0-1.2
Dimensions [mm] & weight [kg] Current source Power source, cooler and cart Power source, cooler, cart, feeder and intermediate cables	520x310x500 mm / 36 kg 520x940x900 mm / 70 kg 520x940x1320 mm / 92 kg

Figure 1: Fanmig 522i Pulse Technical data

Product in offer includes:

- Multifill-LCD feeder on a rotating base and wheels.
- Ground cable, length 4 m.
- Power cable length, 4,5 m.
- Intermediate cables source - 5m feeder length.
- Wire feeder steel rolls 1,0-1,2 mm.
- Additional rolls: 1.2 -1.6 mm steel (2 pcs.) and 1.0 -1.2 mm AL (2 pcs.)
- Gas wire and connectors set.

Devices available on request supplied with different cable lengths or welding torches.

7. Device commissioning

Before starting work, connect the intermediate cable set between the power source and the wire feeder unit.

Make sure that the coolant hoses are connected correctly.

7.1 Power connections

The device is powered from a three-phase 400 V/50 Hz. The required protection is a 32 A slow-blow fuse. CEE, 32 A, 5-pin type plug.

7.2 Welding torch connection

The welding torch should be connected with euro socket and screwed with a nut. The torch insert and contact tip must refer to welded wire diameter – see torch catalogue.

7.3 Feed rolls in wire feeder (see Table 2)

Each roll includes two notches - marking is stamped on roll side. The notch must reflect the wire type and diameter. When changing the wire, make sure that the correct roll is applied.

Typ		Ø40 Coopim
Size	External diameter	40 mm
	Internal	32 mm
	Internal	10 mm
Wire diameter [mm]	0.6- 0.8	51 13 007792
	0.8- 1.0	51 13 007819
	0.8- 1.0 Al	51 13 007830
	1.0- 1.2	51 13 007880
	1.0- 1.2 Al	51 13 007879
	1.0 - 1.2 R	51 13 007866
	1.2- 1.6	51 13 007971
	1.2- 1.6 Al	51 13 007960
	1.6- 2.0	51 13 007999
	1.6 - 2.0 R	51 13 007997
	2.4 - 3.2 R	51 13 007991



Table 2 – types of feed rolls.

7.4 Mounting the spool on a feeder and wire feeding in welding torch - see DPF panel section 8.1

Attention! When feeding the wire in the welding torch, do not aim the nozzle (torch wire outlet) at your face.

The wire spool should be installed on the feeder so the wire unwinds from the bottom of the spool and goes straight to feed rolls. If the spool is based on a metal basket, use a basket spool adapter. It is necessary to secure the spool so the basket does not touch the device metal casing.

The spool's braking force is controlled by a bolt inside the spool's sleeve. Unroll a short wire section from spool. Align the wire ending (cutting it off with off-cuts) and guide it onto feeding roll with upper press mechanism is lifted! Than guide the wire through euro socket and welding torch Press the pressure arm after inserting the initial 20 cm wire section into the welding torch and continue feeding wire automatically by pressing torch button \SW3 on DPF panel (Figure 4). It is recommended to demount the gas nozzle and the tip contact when inserting the wire into the torch. It is not allowed to use excessive pressure on the rolls, as it may lead to wire deformation and feeding issues.

7.5 Gas hose and shielding gas flow.

Shielding gas hose connects the device to gas bottle. Gas reducer located on the cylinder used for gas mixtures and argon. Cylinder should be located on the rear shelf of the device and secured with a chain to prevent tipping over. Having the cylinder placed and gas hose connected to the back of welding device, unscrew the cylinder valve and set pressure level with the reducer. Gas flows out after pressing the SW4 button located on DPF panel. Recommended gas flow rate is 10 x the wire diameter and equals the gas flow in litres per minute.

7.6 Aluminium welding

For aluminium welding, use reels with U-shaped groove cut (marked with the letter A next to wire diameter, see table No. 2). Recommended wire type: AlMg3 or AlMg5 and 1.0 mm or 1,2 mm. diameter. Welding torch should be accordingly adjusted and have its insert replaced to a Teflon one and tip fitting the wire diameter. Having the above operations completed and connection checked, the device is ready for operation. Check the availability of synergic programs for welding for a given aluminium diameter.

8 MIG/MAG welding technique

Start the device with the ON/OFF switch (2 according to figure 1) located on the back of the power source.

Choose the welding method and most of the functions from the DPF panel (item 22 in Figure 1) located inside wire feeder.

Welding current settings and function values are made on the feeder panel (23) using knobs.

Display presents function names and values

Button UP (SW1) scrolls messages up

Button DOWN (SW2) scrolls messages down

ESC (prev.) Separate wire feed (SW3)

ENTER (confirm) Gas test (SW4)



Figure 4. DPF panel (22).

8.1 DPF panel

DPF panel sets following functions:

- Welding method (MIG Synergic, MIG Manual, MMA electrode, MIG Pulse and MIG Dual-Pulse).



Figure 5. DPF Panel Choice of welding method Here: MIG Synergy and Double Pulse.

- Work cycle choice for welding torch (2-step, 2-step with falling, 4-step 4-step with falling, SPOT - spot welding).



Figure 6. DPF Panel Exemplary button cycles on the welding torch. Here: 2-cycle.

- Choice of material type, wire diameter and shielding gas (Argon/CO mix, Argon or CO -only for MIG Synergia)
- Gas test
- Independent wire feed

2

2



Figure 7. DPF panel: independent wire feeding (SW 3 button) and independent gas supply (SW4 button).

Press UP (SW1) and DOWN (SW2) buttons to scroll through the messages, select the highlighted function by pressing ENTER (SW4). Press ESC (SW3) button to exit menu level.

- Language selection: for a few sec. press and hold SW1 and SW2 to switch between messages in Polish / English.

8.2 MIG Manual - setting of welding parameters (current and wire feed speed) to be set using knobs located at the front panel of wire feeder (23). At DPF panel choose just a welding torch button work cycle (2-cycle, 2-cycle with falling, 4-cycle etc.). Additionally, use SW3 for wire feeding independently to welding process, and SW5 to start gas feed. Feeder panel setting (23) in MIG

Manual mode



Figure 8. Feeder panel (23) Here: MIG manual, wire feed speed 22.8 m/min, arc voltage 45.3 V, 2-cycle.

Turn the left knob to set feed speed and the right to set arc voltage.

Also regulate the inductance in 1-20 range. To do so, press the knob SW4 and turn it to see correct value.



Figure 9. Feeder panel (23) regulation of inductance in MIG manual mode.

Additional functions set on the feeder panel are available for 2-cycle with falling and 4-cycle with falling (press right-side knob for a few seconds and turn right-side knob):

POS GAS - gas post-flow in range 0.5-10 s

SLO - falling time (s) in range 0.5-10 s, end current set to 50% of welding current

RTI - short arc dynamics. The higher the RTI value, the softer and less stable arc becomes. For steel mix programs the RTI was set to 3, for the CO2 steel RTI=10.

Starting work after pressing the welding torch button

8.3 MIG Synergia (short arc) - after picking MIG Synergia method on DPF panel and confirming with ENTER, in the next step, choose work cycle for welding torch (2/4-stroke, etc.), type of material, wire diameter and gas type. Synergy means welding according to a specific program (synergic curve), where changing a single parameter leads to changes in all related parameters. **These parameters can be adjusted, but only within a certain range pre-set in the program.**

8.3.1 Choose from a number of welding torch work cycles

- 2-cycle
- 2-cycle with current drop (crater filling)
- 4-cycle
- 4-cycle (crater filling)
- SPOT - spot welding



Figure 10. DPF Panel - Work cycle choice, exemplary 2-cycle setting.

8.3.2 Following welding programs are available (synergistic curves) for materials:

Material type and diameter	Progra
Carbon steel 0.8 mix 82/18	SG2 0.8
Carbon steel 0.9 mix 82/18	SG2 0.9
Carbon steel 1.0 mix 82/18	SG2 1.0
Carbon steel 1.2 mix 82/18	SG2 1.2
Carbon steel 1.6 mix 82/18	SG2 1.6
Carbon steel 0.8 CO2	SG2 0.8 CO2
Carbon steel 0.9 CO2	SG2 0.9 CO2
Carbon steel 1.0 CO2	SG2 1.0 CO2
Carbon steel 1.2 CO2	SG2 1.2 CO2
Carbon steel 1.6 CO2	SG2 1.6 CO2
Stainless steel 0.8	SST 0.8
Stainless steel 0.9	SST 0.9
Stainless steel 1.0	SST 1.0

Material type and diameter	Program
Stainless steel 1.2	SST 1.2
Stainless steel 1.6	SST 1.6
Magnesium aluminium 1.0	ALMG 1.0
Magnesium aluminium 1.2	ALMG 1.2
Magnesium aluminium 1.6	ALMG 1.6
Silicon aluminium 1.0	ALSI 1.0
Silicon aluminium 1.2	ALSI 1.2
Silicon aluminium 1.6	ALSI 1.6
Brazing AlBz 0.8	ALBZ 0.8
Powder wire 1.2	FLUX 1.2
Brazing CUSI 0.8	CUSI 0.8
Brazing CUSI 0.9	CUSI 0.9
Brazing CUSI 1.0	CUSI 1.0
Brazing CUSI 1.2	CUSI 1.2

Table 3: Programs available in MIG Synergia mode



Figure 11. DPF Panel Material choice (welding programme) Here: Steel powder wire (Flux).

8.3.3 Choice of wire diameter depending on a material



Figure 12. DPF Panel Choice of wire diameter Here: 1.0 mm

8.3.4. Choice of gas type available when welding steel (mix or CO) For other materials the type of gas is strictly defined and not subject to choice.

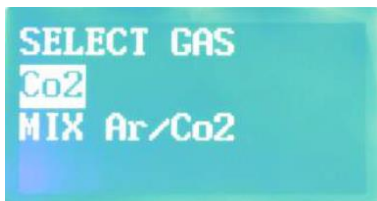


Figure 13. DPF Panel Choice of gas type Here: CO

2

8.3.5 Settings made on the feeder panel (23) for MIG Synergia method.



Figure 14. Exemplary method for MIG Synergia Here: welding current 384A, arc length 18, 4-cycle.

Use left knob to set the welding current in amperes (I set) or by pressing the knob by setting the wire feeder speed (v).

Use right knob to set additional parameters (select by pressing, setting the parameter value by rotation):

- Arc length range ± 20



Figure 15. Setting arc length

- Inductance ± 10



Figure 16. Inductance setting

- Material thickness in mm



Figure 17. Setting material thickness

Starting work after pressing the welding torch button.

8.4 MIG Pulse and MIG Double Pulse welding

The main advantage of Pulse welding is almost no spatter and a high aesthetics of welds. Fanmig 522i Pulse has some basic pulse welding programs for steel, spineless steel and aluminium (see section 8.4.2). Choice of parameters remains the same as for MIG Synergic (chapter 8.3).

8.4.1 MIG Double Pulse welding

The so-called double pulse welding produces less heat transferred to the weld. The weld turns into an aesthetic husk. On the feeder panel set the left dial to double pulse value in range 0.5-4.0 Hz (the TWICE LED lights up).



Figure 18: Feeder panel, active Double Pulse (Twice) function.



Figure 19: Feeder panel, setting of double pulse frequency. Here: 4Hz

8.4.2 MIG Pulse and Double Pulse re the available programs

Material / Wire [mm]	Program
Carbon steel 0.8 mix 82/18	SG2 0.8
Carbon steel 1.0 mix 82/18	SG2 1.0
Carbon steel 1.2 mix 82/18	SG2 1.2
Stainless steel 0.8	Inox 0.8
Stainless steel 1.0	Inox 1.0
Stainless steel 1.2	Inox 1.2
Magnesium aluminium 1.2	AlMg 1.
Silicon aluminium 1.2	AlSi 1.

Table 4: Programs available in MIG Pulse and Double Pulse modes

Other parameter settings according to section 8.3.1; 8.3.2; 8.3.3; 8.3.4 and 8.3.5.

8.5 Spot welding

In both MIG Manual and MIG Synergic methods, the spot welding is available. Choose SPOT welding torch work cycle.



Figure 20. DPF Panel SPOT work cycle (spot welding).

Then with the right knob on the feeder panel (press and turn) set the spot welding time in seconds. Range from 0.3 to 25 seconds.



Figure 21. Feeder panel (23) Spot welding time setting Here: 3.5 sec. for MIG Synergic welding

8.6 MMA electrode welding - wire feeder settings

After setting the MMA electrode welding on the DPF panel, connected the electrode cable to feeder socket (24) - see also point 8.2. Connect ground cable to the (-) socket on power source. Turn the left knob to set welding current value in Amps. Turn the right knob to set ArcForce value (AF message) in range: 0-100. ArcForce features for electrode welding helps to stabilize arc despite change in its length.



Figure 22. Feeder panel (23) ArcForce function setting Here: ArcForce 50.

9. MMA welding method

9.1 Control panel on power source (13)

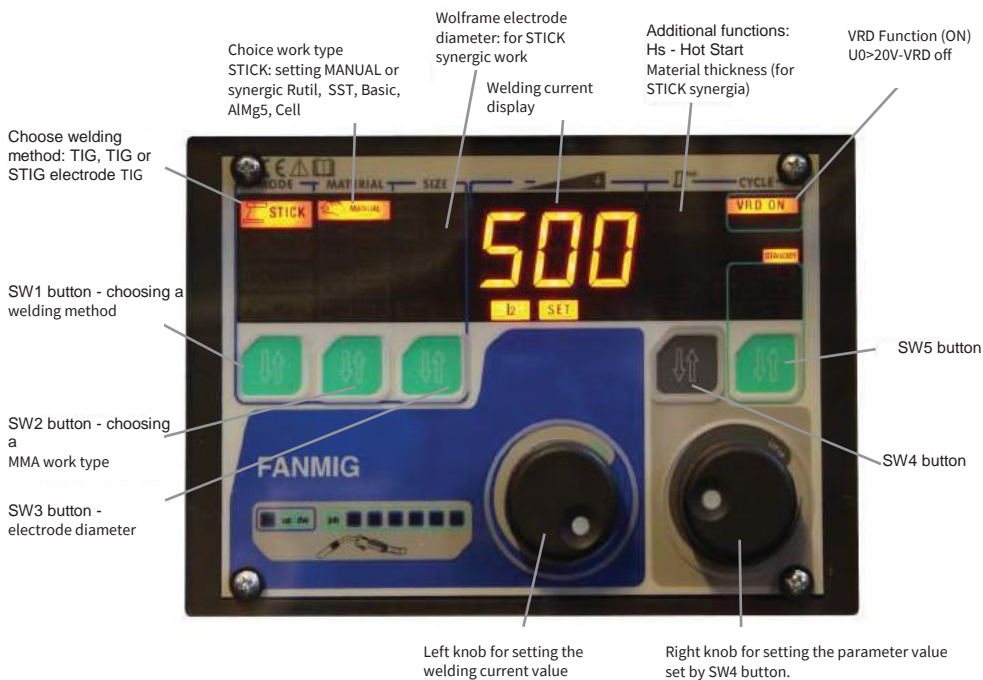


Figure 23. Panel on the current source

Set work mode for MMA Electrode on DPF panel. You can weld with electrode torch connected to the feeder socket (24) or to the socket on the power source.

9.2 Connecting the electrode torch to feeder socket. Welding current for electrode is set with the left side knob.



Figure 24. Feeder panel, welding current setting for MMA electrode - 500 A.

9.3 Connecting the electrode torch to current source socket.

Use SW1 button to chose welding method, work type (Manual or Synergic) with SW2 button Welding current value is set with the left side knob.

9.3.1 Stick MANUAL electrode welding



Figure 25. Current source panel, STICK coated electrode welding mode.

Manual, 500A welding current. VRD function on. An additional function called HotStart HS is available.

Hs - HotStart is a short term (0.5 s) increase of current to facilitate arc ignition. Adjustable in 0-100 range. Hs 200 with 100 A welding current setting makes the arc ignition match 120 A value.



Figure 26. HotStart setting. Here: Hs 20.

9.3.2 Synergic mode welding

Synergy means welding according to a specific program (synergic curve), where changing a single parameter leads to changes in all related parameters. These parameters can be adjusted, but only within a range pre-set in the program. SW2 button picks one of the welding programs

- Rutil - rutile coated electrode welding,
- SST - spineless steel electrode welding,
- Basic - alkaline coated electrode welding,
- AlMg5 - aluminium electrodes,
- Cell - electrodes with a cellulose casing.



Figure 27. STICK synergic welding. Here: alkaline coated electrode of 3.2 m diameter, 80A welding current, 2.1 mm suggested material thickness, VRD function switched on.

Material thickness to be welded (in mm) changes with current and electrode diameter settings.

Only for information.

An additional function called Hs is available.

Hs - HotStart is a short term increase of current to facilitate arc ignition. Adjustable in +/- 50 range.

10. TIG DC (LiftArc) welding method

Fanmig 522i Pulse can welded with the TIG method, ignited by rubbing LiftArc with DC current. Welded materials include steel and stainless steel. Available in two welding modes: TIG or TIG Pulse set with SW1 button, both in Manual or synergic setting.

Synergy means welding according to a specific program (synergic curve), where changing a single parameter leads to changes in all related parameters. These parameters can be adjusted, but only within a range pre-set in the program.

Use the left-hand knob to set the welding current value.

10.1 TIG Manual - SW2 button switches to MANUAL, SW button is not active

Select the active functions using SW4 button depending on the torch work cycle settings above the SW5 button. Use the right side knob to set parameter value.

- Gas post-flow in 0.5-10 s range
- Current drop (crater filling) in 0.5-10 s range.
- Spot welding time 03.5-25 s.

Press SW5 to switch between the welding torch work cycles (2-cycle, 2-cycle with drop, 4-step, 4-stroke with drop or spot welding).

10.2 TIG synergic - use SW2 button to chose material type: SG2 (steel) or SST (stainless steel). Select the wolfram electrode diameter using SW3 button. Use SW4 button to choose

active functions depending on the torch work cycle settings above the SW5 button: Welded material thickness (in mm) changes with current and electrode diameter settings. Only for information.

Gas post-flow correction in +/- 30% range.

- Current falling (crater filling) correction in +/- 30%. range
- Spot welding time 0.5-25 s.



Figure 28. TIG synergic setting Here: SG2 steel 1.6 mm wolfram electrode diameter, 159 A welding current, 6,0 mm material thickness to be welded, 2-cycle with current drop.

Press SW5 to switch between the welding torch work cycles (2-cycle, 2-cycle with drop, 4-step, 4-stroke with drop or spot welding).

10.3 TIG Pulse Manual - SW2 button switches to MANUAL, SW3 button is not active.

Select the active functions using SW4 button depending on the torch work cycle settings above the SW5 button.

- Gas post-flow in 0.5-10 s range
- Pulse in 0,5-500 Hz range.
- Current drop (crater filling) in 0.5-10 s range.
- Spot welding time 0.5-25 s.

Press SW5 to switch between the welding torch work cycles (2-cycle, 2-cycle with drop, 4-step, 4-stroke with drop or spot welding).

10.4 TIG Pulse synergic - use SW2 button to chose material type: SG2 (steel) or SST (stainless steel).

Select the wolfram electrode diameter using SW3 button.

Select the active functions using SW4 button depending settings above the SW5 button:

Material thickness to be welded (in mm) changes with current and electrode diameter settings. Only for information.

- Pulse in +/- 30% range.
- Gas post-flow correction in +/- 30% range.
- Current falling (crater filling) correction in +/- 30%. range
- Spot welding time 0.5-25 s.



Figure 29. TIG Pulse synergic setting Here: SST stainless steel, tungsten electrode diameter 4.0 mm, -20% pulse correction, 4-cycle with current drop.

Press SW5 to switch between the welding torch work cycles (2-cycle, 2-cycle with drop, 4-step, 4-stroke with drop or spot welding).

11. Device operation defects

Faults during MIG/MAG welding

ATTENTION! The device may only be repaired by authorized personnel!
Technical support!

Fault	Potential cause	Recommendations
Arc unstable	Welding current set incorrect	Set the correct welding current
	Wire speed too high / too low	Set the right speed
	Poor contact of the mass clamp with the welded	Check the clamp and secure it again
	Incorrect tip contact	Replace the tip with the correct one
	Incorrect gas flow	Set the correct flow
	Blocked wire insert in welding torch	Clean with compressed air or replace
	Wire feeding incorrect	Check wire feed unit rolls and pressure force
Too much spatter during welding	Power source failure	Contact technical support
	Too high wire feeding speed	Lower the speed
	Too high welding current	Lower welding current
Wire feed motor does not work	Transition arc welding	Switch to pulse or double pulse current
	No power supply	Check the electrical connection
	Poor operation of the welding torch button	Check button
	Damage to the control board	Contact technical support
Wire feed motor does operate but without feeding or with feeding unstable	Motor damage	Contact technical support
	Pressure arm tightened to loose	Adjust the pressure with the appropriate nut
	Incorrect feed roll	Turn or change the feed roll
The device automatically switches off / LED switches on to signal overheating	The wire is blocked in the current terminal	Exchange the tip contact.
	Work cycle exceeded	Allow the device to cool down and follow the instructions for use
	Fan does not work	Contact technical support
	Electric power source failure	Contact technical support

Table 5. Faults during MIG/MAG welding

11.2 Error messages

FEEder message on the power source panel - only DPF panel is active, welding is set to MIG Manual or MIG Synergia.

Settings are possible only using feeder controls.



Figure 30. FEEder message on current source panel Only DPF panel is active

Komunikat na wyświetlaczu	Widok	Potencjalna przyczyna	Zalecenia
PHA NO (Err 10)		Brak jednej fazy lub napięcie jednej z faz zbyt niskie	Sprawdzić zasilanie i wtyczkę. Wyłączyć i ponownie włączyć urządzenie. Sprawdzić ewentualne przedłużacze.
NO AC (Err 11) Lub LO AC (Err 13)	 	Za niskie lub brak napięcia zasilania	Sprawdzić zasilanie i wtyczkę. Wyłączyć i ponownie włączyć urządzenie. Sprawdzić ewentualne przedłużacze.
HI AC (Err 12)		Za wysokie napięcie zasilania	Sprawdzić wartość napięcia zasilającego.
FRQ AC (Err 14)		Niewłaściwa częstotliwość prądu zasilania	Sprawdzić agregat prądotwórczy lub sieć zasilającą.
ALL SC (Err 60)		Zwarcie w obwodzie wtórnym	Sprawdzić przewody spawalnicze i uchwyt.

ALL °C (Err 30)		Przegrzanie urządzenia, przekroczony cykl pracy.	Nie wyłączać urządzenia, poczekać aż wentylator schłodzi przegrzane komponenty. Stosować się do podanych parametrów pracy urządzenia.
UR ALL H2)		Błąd w układzie chłodzenia uchwytu	Sprawdzić węże cieczne i przyłącza. Sprawdzić poziom cieczy w chłodnicy, ewentualnie uzupełnić.

Table 6. Error messages on current source panel

In case of following error occurrence the device stops welding until the cause of the fault ceases. If the Fanmig 522i Pulse still does not work, please contact the technical support. The appearance of other error messages also means a need to contact RYWAL-RHC technical support.

11.3 Parameters RESET.

Pressing SW1 button for approx. 10 seconds will display a question about the parameter reset. Pressing the SW4 (YES) button effects a parameter reset - return to the factory settings.

12. EU Declaration Of Conformity

1. **Product** Fanmig 522i Pulse Semi-Automatic Welding Device
2. **Name and address of the producer:**
RYWAL-RHC Sp. z o.o. Warszawa
Chełmżyńska 180
04-464 Warszawa
3. **This declaration of conformity is issued under the sole responsibility of the manufacturer.**
4. **Object of the declaration** Fanmig 322W Pulse Most Semi-Automatic Welding Inverter with a liquid cooling system and a separate Multifill-LCD feeder



5. **The subject matter of this declaration referred to above is in line with the relevant requirements of EU harmonization legislation:**
 - Low Voltage Directive LVD 2014/35/EC,
 - EMC Directive 2014/30/EC (class A)
 - The directive on the restriction of the use of certain hazardous substances use in electrical and electronic equipment RoHS 2011/65 / EC
6. **References to the relevant harmonized standards in relation to which conformity is declared:**
EN 60974-1:2012; EN 60974-10:2014 +A1:2015.
7. **Additional information:** The declaration becomes invalid in the event of any modifications to the device not agreed with the manufacturer.

Toruń, 19.04.2018

Signed on behalf of:

Product Manager
Dyrektor Produktu


mgr inż. Wojciech Wierzba

13. Electrical diagrams for power source and feeder:

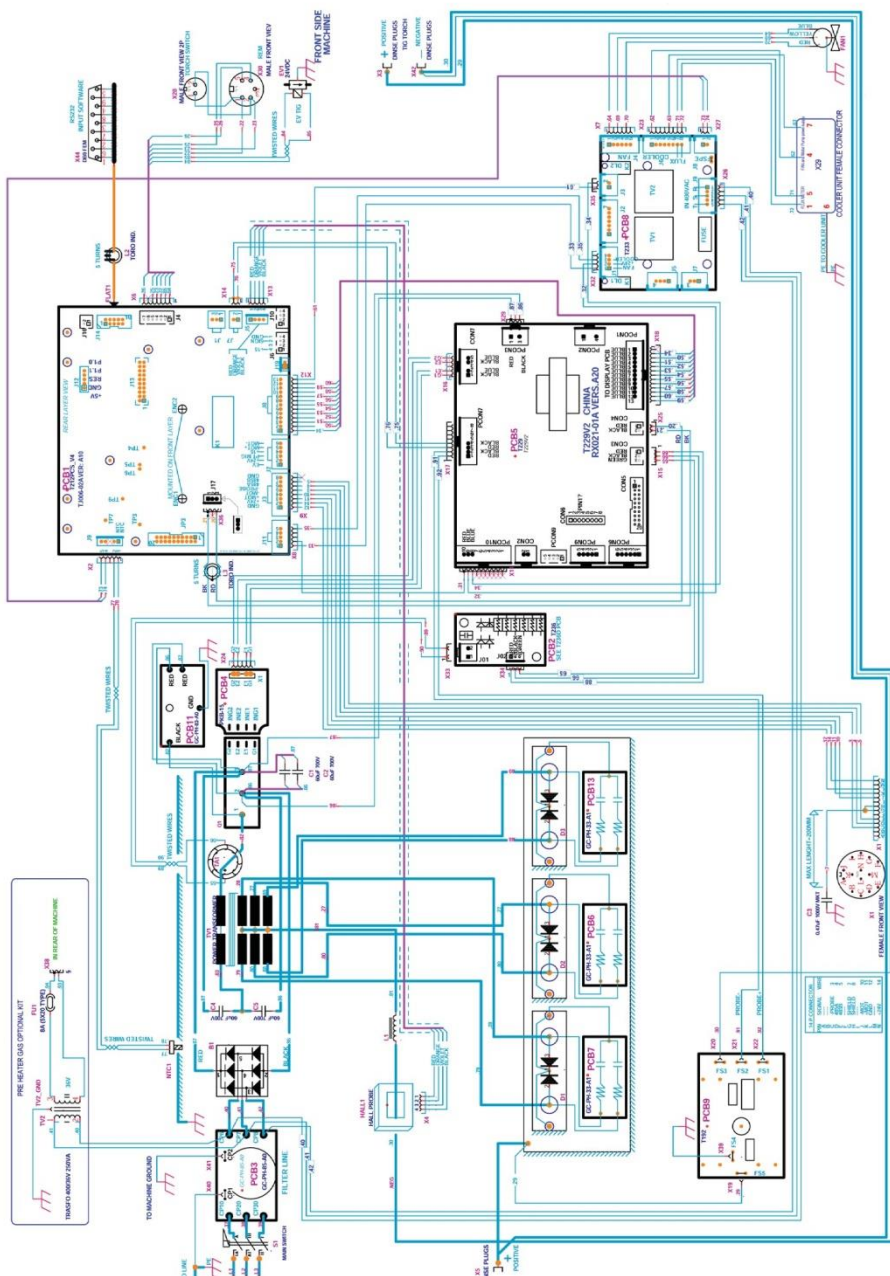


Figure 31: Fanmig 522i Pulse Electrical Diagram

MIG/MAG Semi-Automatic Welding
Machine

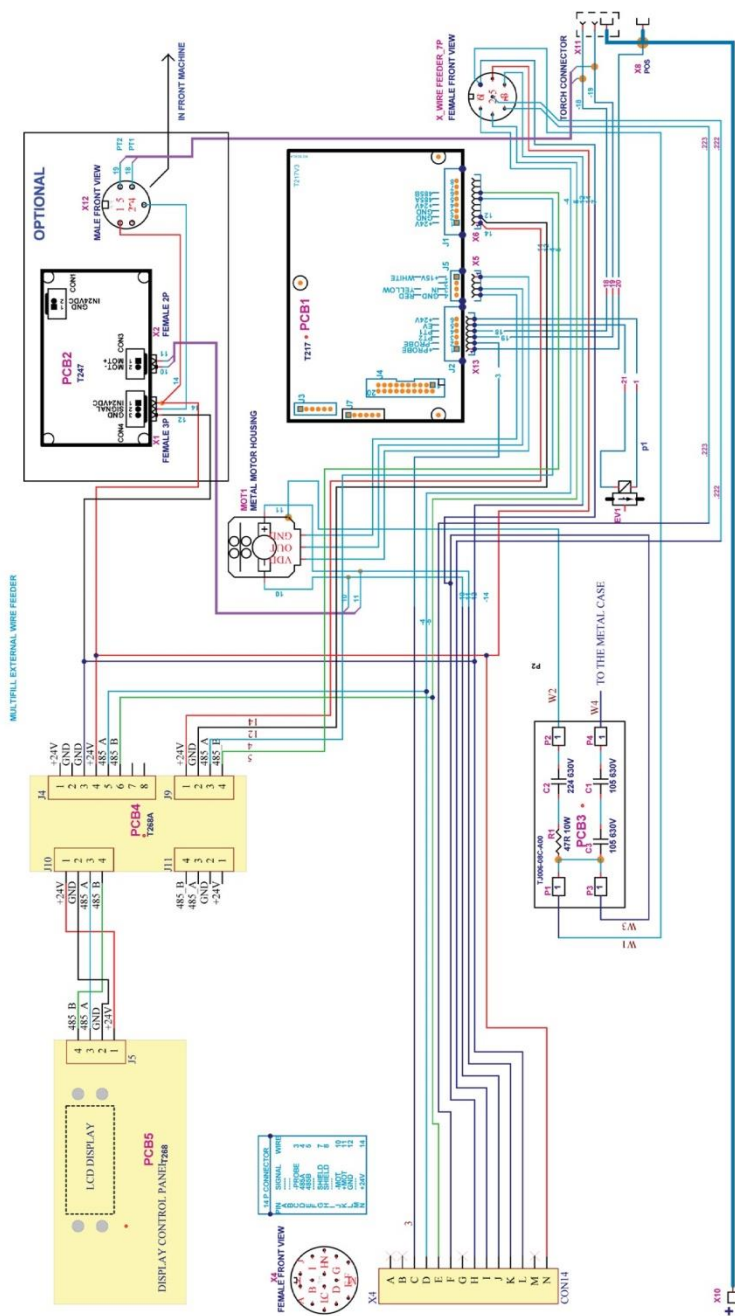


Figure 32: Electrical diagram for Multifill LCD feeder

14. Spare parts for Fanmig 522i Pulse and Multifill-LCD feeder

14.1 Current source spare parts

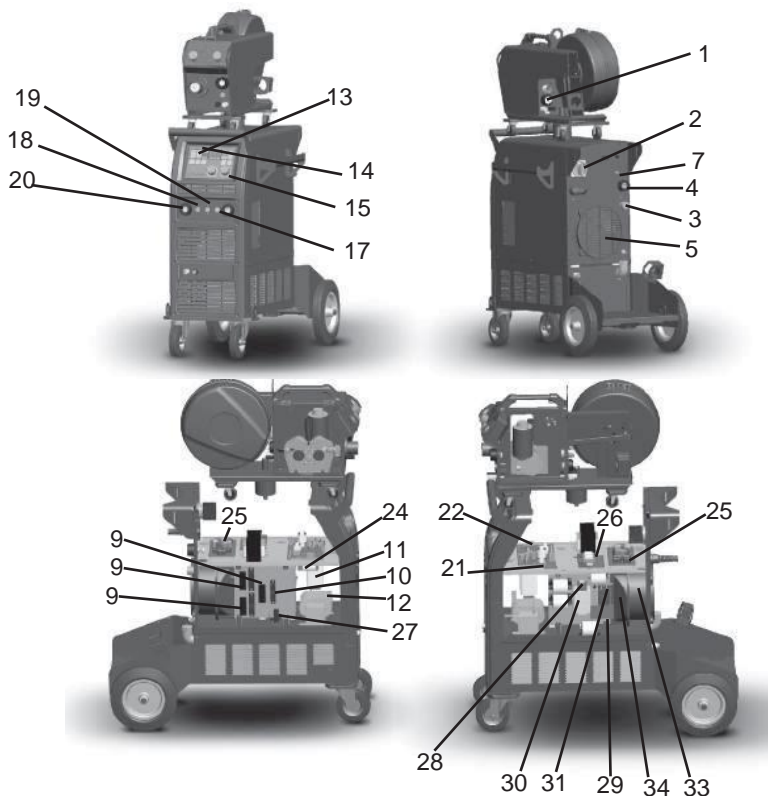


Figure 33: Fanmig 522i Pulse spare parts

Nr	Kod	Opis	Oznaczenie na schemacie elektrycznym
1		GNIAZDO PRĄDOWE MĘSKIE	
2	N-07-070000-03-00	WŁĄCZNIK GŁÓWNY 60A – 400V	S1
3	N-40-141010-04-00	GNIAZDO STER. 14-WTYK. TYLNE	X1
4	R-40-160810-01-00	GNIAZDO PRĄDOWE	X5
5	R-37-130310-01-00	OŚŁONA WENTYLATORA	-
7		GNIAZDO ZŁ. CYFROWE	
9	N-51-PH02-033-B	ABSORBER PCBA PCB6-PCB7	PCB6, PCB7
10	R-04-010300-47-00	PROSTOWNIK	D1, D2
11	R-03-010200-03-00	TRANSFORMATOR GŁÓWNY	TV1
12	R-03-020103-06-00	DŁAWIK WYJŚCIOWY	L1
13	N-51-TR-T212-A	PANEL STEROWANIA	PCB1
14		OCHRONA PANELU Z PLEXI	-
15	R-37-231410-05-01	POKRĘTŁO	-
16	A0003AA	ZAWÓR GAZOWY	Ev1
17	R-24-031000-01-A0	PRZYLĄCZE GAZOWE	-
18	N-40-140120-01-00	GNIAZDO STER (2 BOLC)	X28
19	N-40-140120-05-00	GNIAZDO STER. (5 BOLC.)	X30

Nr	Kod	Opis	Oznaczenie na schemacie elektrycznym
20	R-40-160810-01-00	GNIAZDO PRĄDOWE (+/-)	X3, X5
21	T236D PCB	PLYTKA PRÓBNIKA PRĄDU MULTI SY- NERGIC 500 (T236D)	PCB2
22	R-51-TR-T229-A	ZASILACZ	PCB5
23	R-51-TR-T235-A	FALOWNIK	PCB10
24	N-51-TR-T192-B-RL	FILTR PRÓBNIKA	PCB9
25	N-51-PH02-085-B-RL	FILTR EMC	PCB3
26	R-51-TR-T233-A	MONITOR ZASILANIA	PCB8
27	R-06-010000-10-00	PRÓBNIK HALLA	HALL1
28	N-51-PK03-015-C-RL	MODUŁ NAPIĘDU PCB	PCB4
29	N-51-PH02-083-A-RL	OGRANICZNIK PCB GC-PH-83-A0	PCB11
30	R-04-050100-05-00	BLOK MOCY IGBT	Q1
31	R-04-010401-00-00	MOSTEK PROSTOWNICZY 3PH	B1
33	N-37-120321-01-00	WENTYLATOR	FAN1
34	N-23-020602-15-A0	OŚŁONA WENTYLATORA	-

Table 7: Fanmig 522i Pulse spare parts

14.2 Cooling unit spare parts

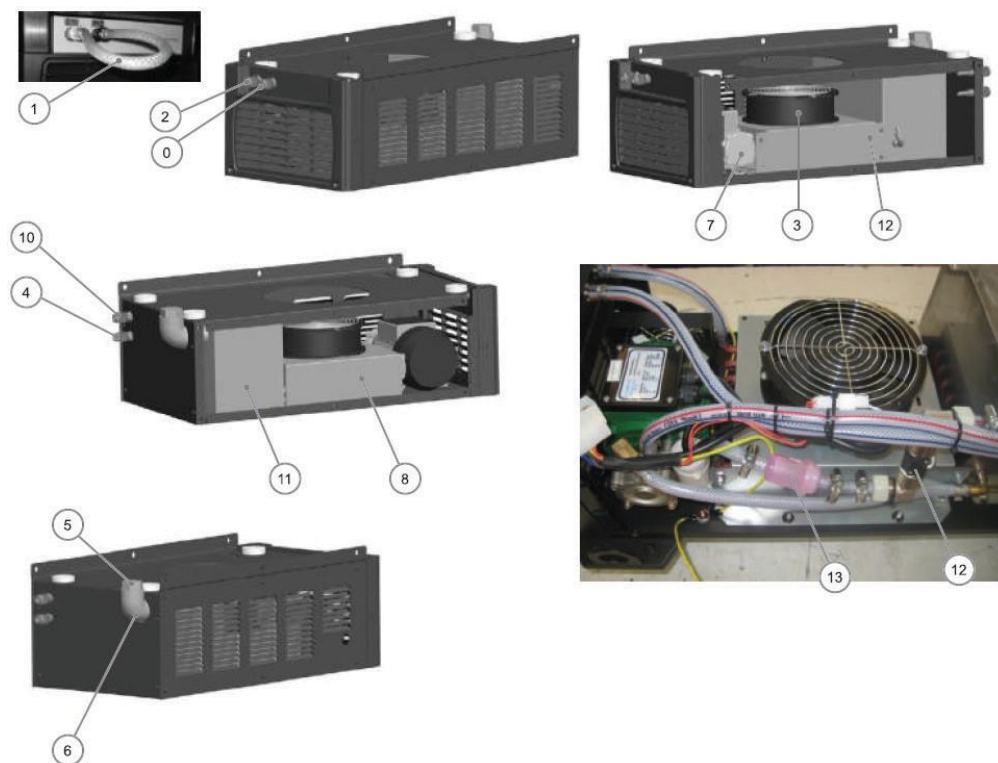


Figure 34: Spare parts for Fanmig 522i Pulse cooling unit

Nr	Kod	Opis	
0	N-40-160910-11-00	SZYBKOZŁĄCZE WODY, CZERW.	-
1	R-38-107080-01-00	ZEWN. BY-PASS RURY WODNEJ	-
2	N-40-160910-10-00	SZYBKOZŁĄCZE WODY, NIEBIESKIE	-
3	N-37-120522-01-00	WENTYLATOR	FAN1
4	N-40-160910-11-00	SZYBKOZŁĄCZE WODY, CZERW.	-
5	R-24-031200-13-A0	WTY CZKA PLASTIKOWA	-
6	R-24-032200-07-A0	KOLANKO PLASTIKOWE 90°	-
7	R-37-310000-01-00	POMPA WODNA	PUMP1
8	R-37-340000-01-00	WYMIENNIK CIEPŁA	-
10	N-40-160910-10-00	SZYBKOZŁĄCZE WODY, NIEB.	-
11	R-37-320000-04-00	POJEMNIK WODY	-
12	R-06-030001-02-00	CZUJNIKI PRZEPŁYWU	FLUX1
13	A0025AA	FILTR CIECZY	-

Table 8: Spare parts for Fanmig 522i Pulse cooling unit

14.3 Spare parts for Wire Feeder Multifill-LCD

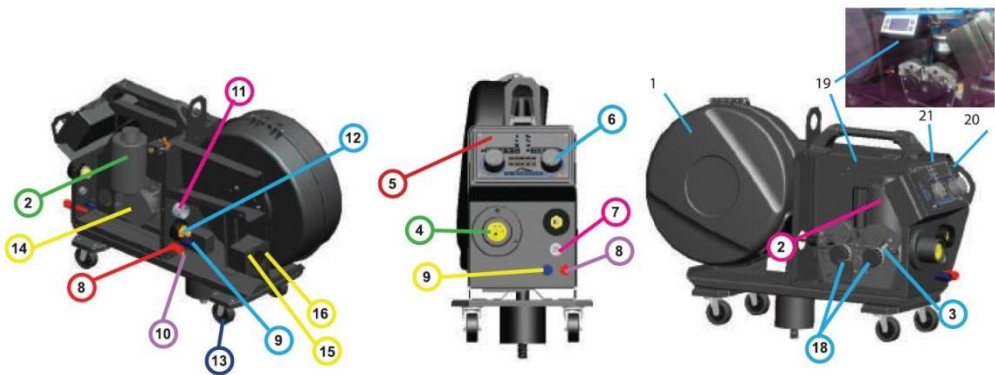


Figure 35: Spare parts for Feeder Multifill-LCD

Nr	Kod	Opis	Oznaczenie na schemacie elektrycznym
1	D0164AA	Gniazdo prądowe MMA	
2	R-37-210423-01-00	Silnik podajnika drutu	MOT1
3	R-38-115020-01-00	Rura mosiężna	
4	R-40-180000-09-00	Eurogniazdo	X11
5	R-37-380000-01-10	Oslona z plexi	
6	R-37-231410-05-01	Pokrećło	
7	N-44-20110426-04	Gniazdo pow. 7 Wtyk.	X_PODAJNIK DRUTU, GNIAZ. 7P
8, 9	D0137AA czerw D0168AA nieb	Gniazdo, czerw., nieb.	
10	R-37-221400-04-00	Elementy mosiężne	

Nr	Kod	Opis	Oznaczenie na schemacie elektrycznym
11	N-40-141020-09-00	Gniazdo pow. 14 Wtyk.	(MALE) X3
12	R-40-160910-07-00	Gniazdo prąd.	X10
13	R-37-160320-07-00	Kółko uniwers.	
14	R-37-140110-02-00	Zawór solenoid.	EV1
15	C0208AA	Lewe mocowanie przewodów	
16	C0209AA	Prawe mocowanie przewodów	
18		Rollki wg tabeli 2 (standardowo na drut 1,0-1,2 stal)	
19	T268PCB	Panel DFP	PCB5
20	T217PCB	Płytką panelu podajnika	PCB1
21	T268APCB	Interfejs podajnika	PCB4

Table 9: Spare parts for Feeder Multifill-LCD

Manufacturer:

RYWAL-RHC Sp. z o.o. Warszawa
Chelmszyńska 180
04-464 Warszawa

Sales and Service network:



www.rywal.eu

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

80-298 **Gdańsk**, ul. Budowlanych 19
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62-510 **Konin**, ul. Spółdzielców 12
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75-100 **Koszalin**, ul. Powstańców Wlkp. 2
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09-400 **Płock**, ul. Przemysłowa 7
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61-371 **Poznań**, ul. R.Maya 1/12
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35-211 **Rzeszów**, ul. M.Reja 10
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37-450 **Stalowa W.**, ul. Energetyków 49
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72-006 **Mierzyn k. Szczecina**, ul. Welecka 22 E
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41-703 **Ruda Śląska**, ul. Stara 45 tel.
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