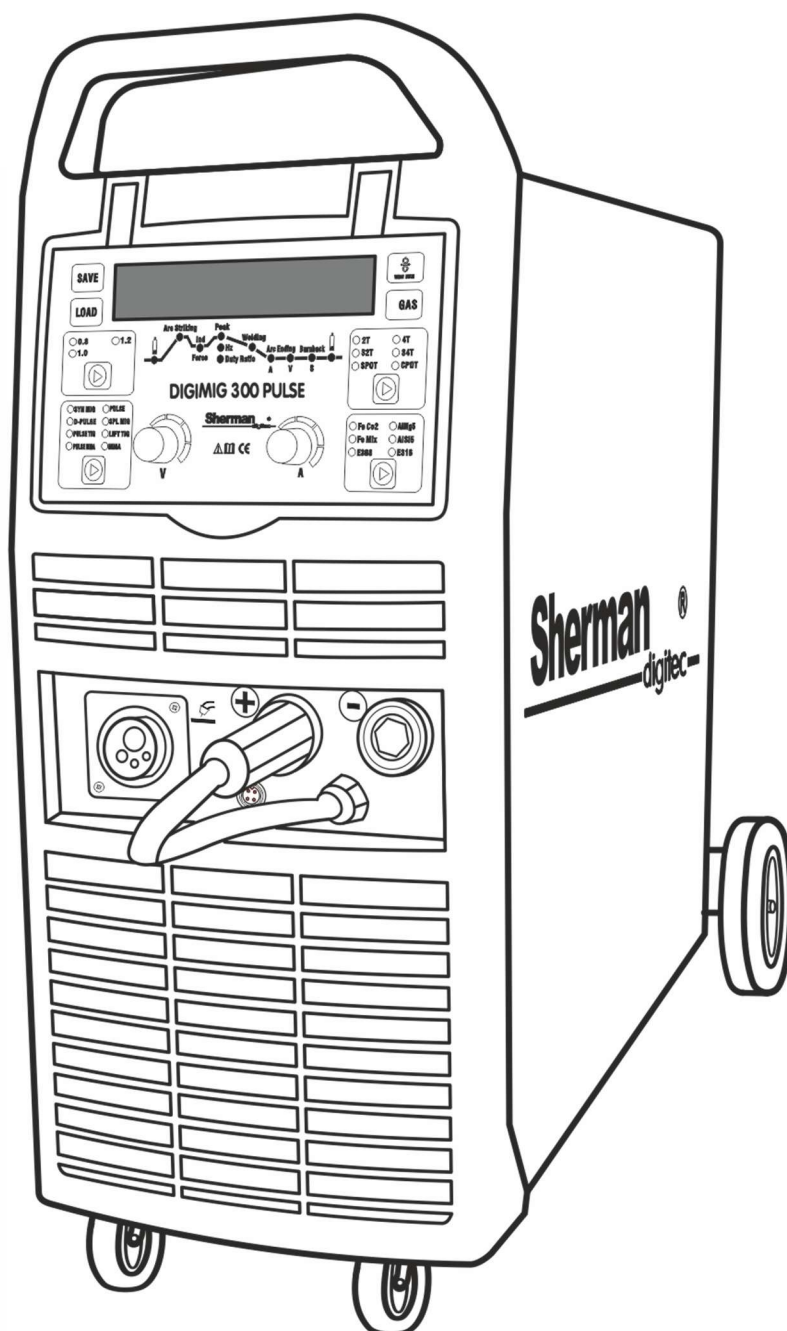


USER MANUAL

SYNERGIC INVERTER WELDER DIGIMIG 300 PULSE





ATTENTION!

Before installing and starting the appliance, please refer to this manual

1. GENERAL COMMENTS

The device can only be commissioned and operated after carefully reading these Operating Instructions.

Due to the continuous technical development of the device, the external appearance and some of its functions may be modified and their operation may differ in detail from the descriptions in the manual and on the cardboard. This is not a fault of the device, but the result of progress and continuous modification work of the device. The standard equipment of the device may also change.

Damage to the device caused by improper operation will void your warranty rights.
Any modifications to the charger are prohibited and will void the warranty.

2. SAFETY

Employees operating the device should have the necessary qualifications to perform welding work:

- they should have an electric welder license in the field of welding in gas shields,
- know the health and safety rules in the operation of electric power equipment, such as welding equipment and auxiliary equipment powered by electricity,
- know the rules of health and safety when operating cylinders and installations with compressed gas (argon),
- Be familiar with the contents of this manual and operate the appliance for its intended purpose.



WARNING



Welding can endanger the safety of the operator and other people in the vicinity. Therefore, special precautions should be taken when welding. Before welding, you should familiarize yourself with the health and safety regulations of the workplace.

The following hazards exist during MIG/MAG electric welding:

- **ELECTRIC SHOCK**
- **NEGATIVE EFFECTS OF THE ARC ON HUMAN EYES AND SKIN**
- **VAPOR AND GAS POISONING**
- **BURNS**
- **EXPLOSION AND FIRE HAZARDS**
- **NOISE**

Electric shock prevention:

- connect the device to a technically efficient electrical system with proper protection and zeroing efficiency (additional protection against electric shock); check and correctly connect other devices at the welder's workplace to the network,
- install power cables when the device is switched off,
- Do not touch the non-insulated parts of the electrode holder, electrode and welded object at the same time, including the device housing,
- do not use torch and power cords with damaged insulation,
- in conditions of particular risk of electric shock (work in environments with high humidity and closed tanks), work with an assistant supporting the welder's work and watching over safety, use clothing and gloves with good insulating properties,
- if you notice any irregularities, you should contact competent people to remove them,
- It is forbidden to operate the device with the covers removed.

Preventing the negative effects of the electric arc on the eyes and skin of a person:

- Wear protective clothing (gloves, apron, leather shoes),
- Use protective shields or visors with a properly selected filter,
- Use protective curtains made of non-flammable materials and properly choose the colors of the walls that absorb harmful radiation.

Prevention of poisoning by vapours and gases emitted during welding from the electrode coating and metal evaporation:

- Use ventilation devices and exhausts installed in positions with limited air exchange,
- Blow fresh air when working in confined spaces (tanks),
- Use masks and ventilators.

Burn prevention:

- Wear appropriate protective clothing and footwear to protect against burns caused by arc radiation and spatter,
- Avoid staining the garment with greases and oils that may lead to its inflammation.

Explosion and fire prevention:

- It is forbidden to operate the device and weld in rooms at risk of explosion or fire,
- The welding station should be equipped with fire-fighting equipment,
- The welding station should be located at a safe distance from flammable materials.

Preventing the negative effects of noise:

- Use earplugs or other noise protection equipment,
- Warn of danger to people nearby.



WARNING!

Do not use a power source to defrost frozen pipes.

Before starting the device, you should:

- Check the condition of the electrical and mechanical connections. It is forbidden to use torch and power cables with damaged insulation. Improper insulation of torch and power cables may result in electric shock,
- Take care of proper working conditions, i.e. ensure proper temperature, humidity and ventilation in the workplace. Protect against precipitation outside closed spaces,
- Place the charger in a place that allows it to be easily operated.

Welding machine operators should:

- have a license for electric welding using the MIG/MAG process,
- know and comply with health and safety regulations applicable when performing welding work,
- use appropriate, specialized protective equipment: gloves, apron, rubber shoes, welding shield or visor with a properly selected filter,
- Know the contents of this instruction manual and operate the welding machine as intended.

Any repairs to the appliance may only be carried out by unplugging the plug from the power socket.

When the appliance is connected to the mains, it is not allowed to touch any components that make up the welding current circuit with your bare hand or through damp clothing.

It is forbidden to remove the external covers when the device is plugged in.

Any modifications to the charger on your own are prohibited and may impair safety conditions.

All maintenance and renovation work may only be carried out by authorized persons in compliance with the occupational safety conditions applicable to electrical equipment.

It is forbidden to operate the welding machine in rooms with a risk of explosion or fire!

The welding station should be equipped with fire-extinguishing equipment.

When you have finished working, the power cord of the appliance must be unplugged.

The hazards and general OHS rules presented above do not exhaust the issue of welder's work safety, as they do not take into account the specifics of the workplace. They are an important complement to on-the-job OHS instructions and training and instruction provided by supervision employees.

3. GENERAL DESCRIPTION

The synergic DIGIMIG 300 PULSE welding machine is used for manual welding of steel and non-ferrous metals. It allows welding using MMA (coated electrode), MMA with pulse, TIG Lift, TIG Lift with pulse, and MIG/MAG process. MIG/MAG welding can be carried out using single and double pulse. The MIG/MAG process can be used in manual and synergic modes, simplifying its operation and allowing the welding machine to be used by people with less experience and hobbyists. Thanks to the change in polarity, the device allows you to weld using the MIG/MAG process using both standard shielded gas wires and self-shielding powder wires.

The device allows you to connect a Spool Gun (SG) with a mini wire feeder and a D100 spool of steel or colored wire.

The device is made in IGBT technology, which allows for a significant reduction in the weight and dimensions of the welding machine and an increase in efficiency while reducing energy consumption.

The welding machine is used in closed or covered rooms, not exposed to direct atmospheric influences.

4. TECHNICAL PARAMETERS

4.1 Welding Machine

Supply Voltage:	AC 3x400V 50Hz
Maximum power consumption:	MIG: 10 kVA; MMA: 8.8 kVA; TIG: 5.8 kVA
Rated Welding Current:/ Duty Cycle	MIG: 300 A / 45%; MMA: 280 A / 50%; TIG: 280 A / 60%
Rated no-load voltage	76 V (9V with VRD)
Wire spool diameters:	200mm, 300mm
Maximum power consumption:	MIG: 18 A; MMA: 17 A; TIG: 11.5 A
Weight:	43 kg
Dimensions [mm]:	935 x 402 x 775
Degree of protection:	IP21

4.1.1 Parameter control ranges

Welding Current:	MIG: 20 – 300 A; MMA: 20 – 280 A; TIG: 20 – 280 A
Welding Voltage:	MIG: 15 – 31.0 V
Wire Feeding Speed:	2 – 14 m/min
Inductance:	-99 – +50%
Gas pre-outflow	0 – 10 s
Gas post-outflow	0.1 – 50 s
Pulse Rate	TIG, MMA: 0.1 – 99 Hz; D-PULSE MIG: 0.5 – 5 Hz.
ARC FORCE (MMA):	0 – 100 %
HOT START (MMA) - Current:	20 – 280 A
HOT START (MMA) - time:	0 – 99 ms

4.2 MIG Torch

Torch Type:	TW-25
Maximum current carrying capacity:	300 A (CO ₂)
Cooling Type:	gas
Cooling Gas Flow:	10-18 l/min
Length:	4 m

Duty cycle

The duty cycle is based on a 10-minute period. A duty cycle of 45% means that a 5.5-minute break is required after 4.5 minutes of operation of the machine. A duty cycle of 50% means that a 5-minute break is required after 5 minutes of operation of the machine. A duty cycle of 60% means that a 4-minute break is required after 6 minutes of operation of the machine. A duty cycle of 100% means that the unit can operate continuously, without interruptions.

Attention! The heating tests were carried out at the ambient air temperature. The duty cycle at 40°C was determined by simulation.

Degree of protection

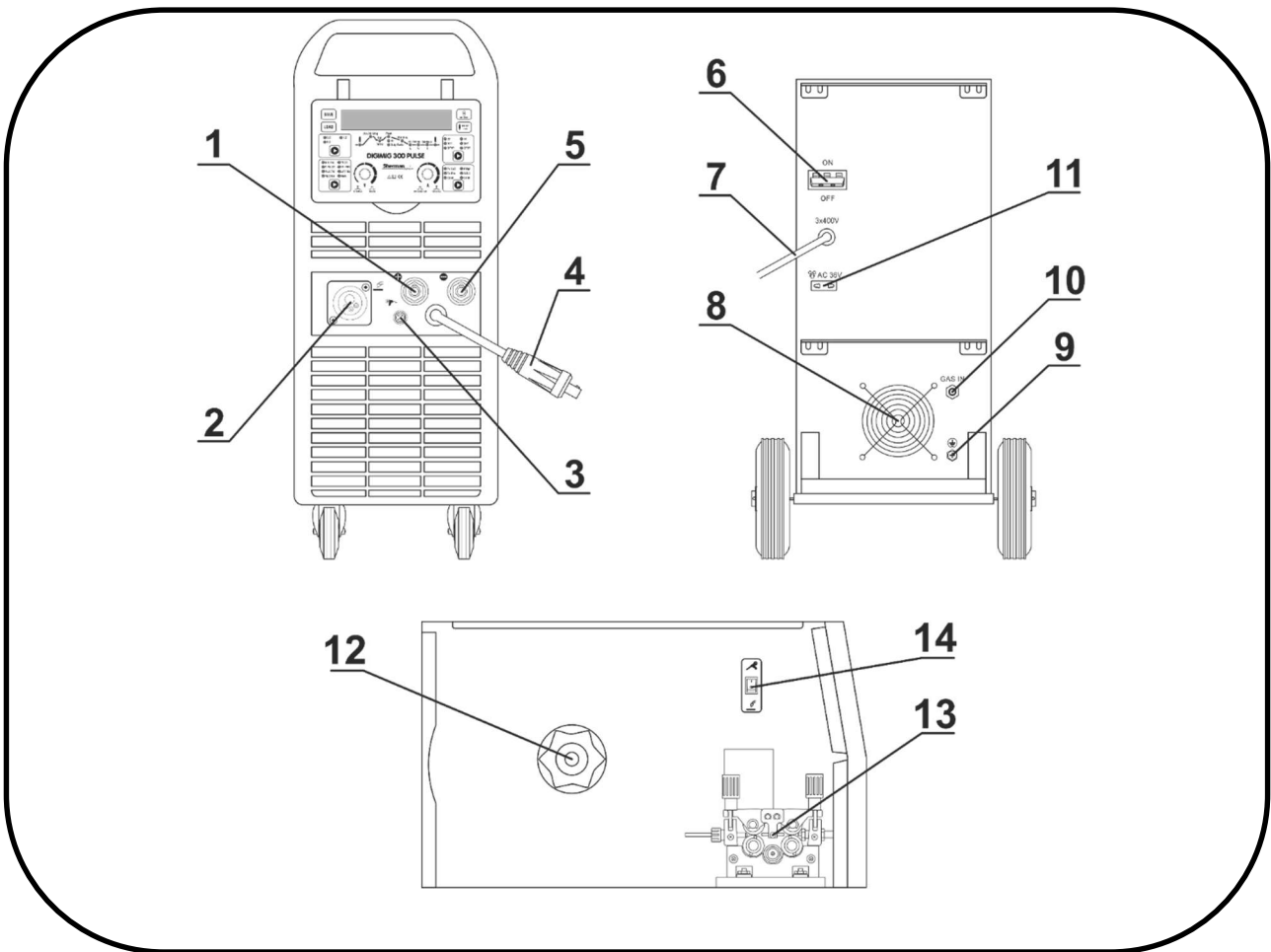
IP determines the degree to which the device is resistant to the ingress of solid and water contaminants. IP21 means that the device is suitable for indoor use.

Overheating protection

The IGBT module is protected from overheating by a protective system that turns off the power supply to the welder. After a few minutes, the device is cooled down to a temperature that allows it to be switched on again. Do not disconnect the power supply during this time, as the continuously running fan cools the internal heat sinks of the device in order to reduce the temperature faster. After restarting, remember to limit the welding parameters in order to continue to operate the device continuously.

5. PREPARING THE DEVICE FOR OPERATION

If the device is stored or transported in freezing conditions, bring the device to a temperature above zero before starting work.



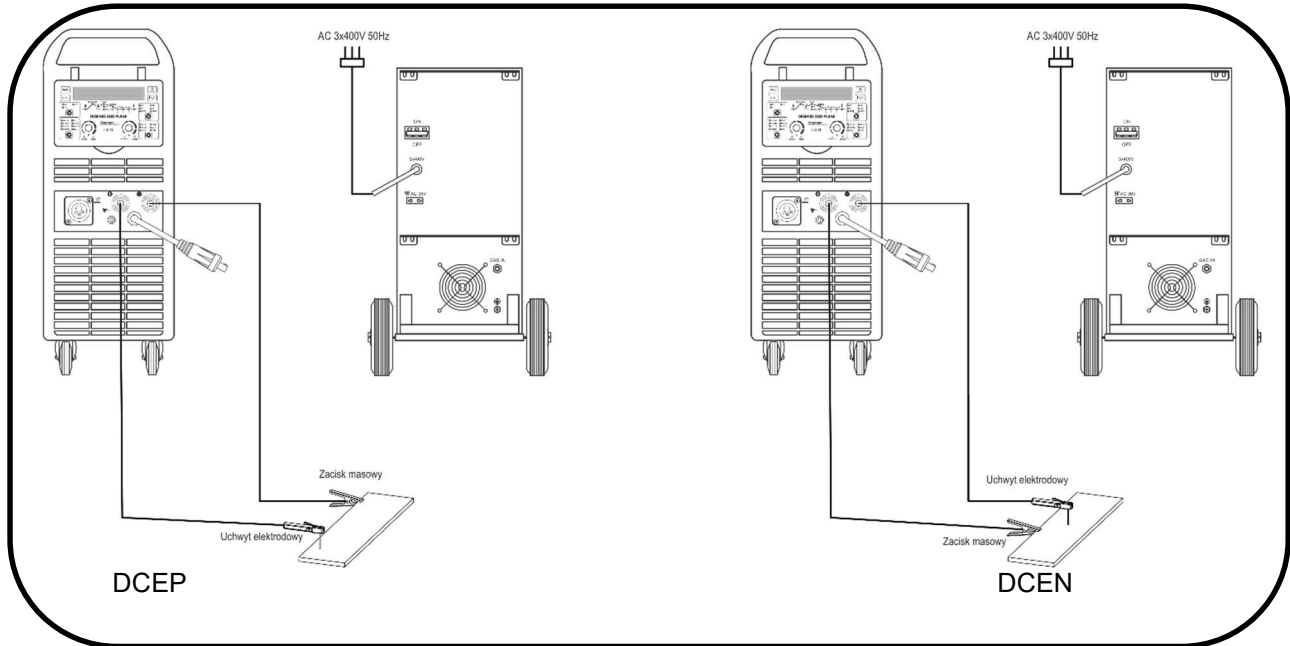
1. "+" socket
2. MIG Holder Socket
3. Remote Control/Spool Gun Socket
4. Polarity change plug
5. Socket "-"
6. Power Switch
7. Power cord
8. Fan
9. Ground Terminal
10. Shielding gas connection connector
11. AC power socket 36V

12. Wire spool shank
13. Wire feeder
14. Spool Gun Torch Switch

5.1 Connecting the Wires

5.1.1 MMA process

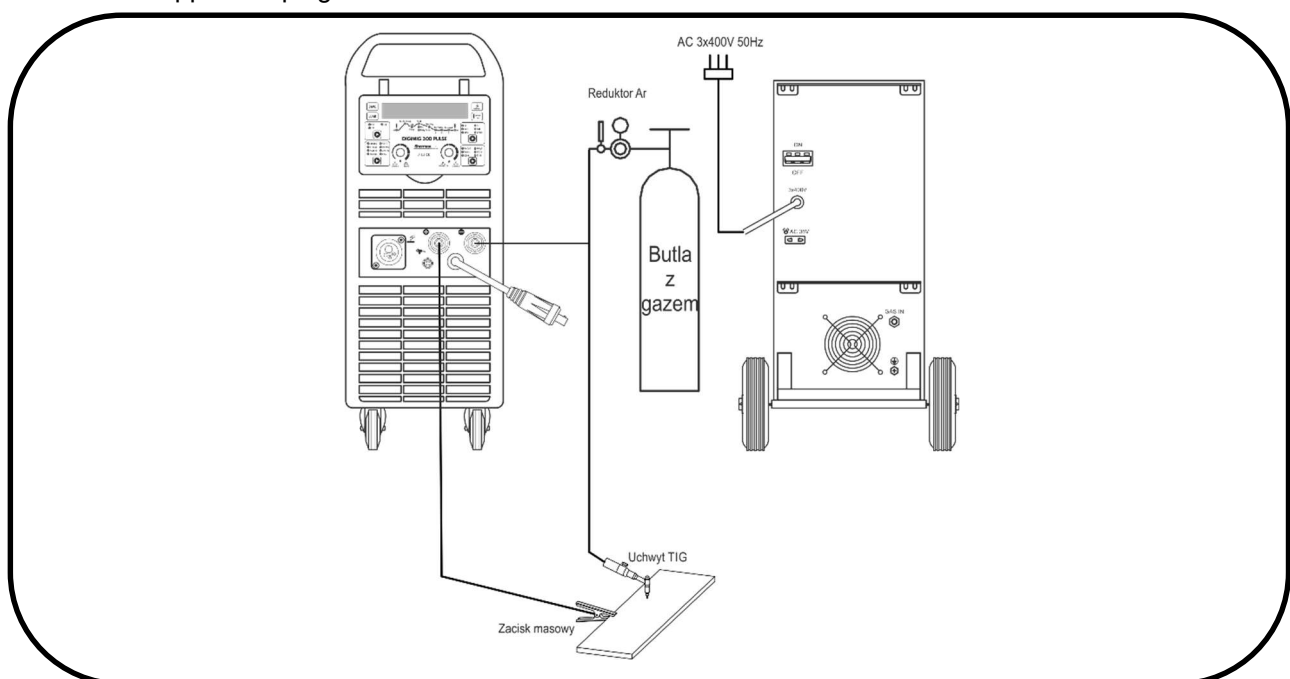
Connect the ends of the welding wires to the sockets (1) and (5) located on the faceplate so that the electrode holder has the correct pole for the electrode. The polarity of the connection of the welding wires depends on the type of electrode used and is indicated on the electrode packaging (DCEN negative polarity or DCEP positive polarity). The return wire terminal must be carefully fixed to the welded material. Connect the appliance plug to a 3x400V 50Hz mains socket.



5.1.2. TIG process

An additional TIG torch is required for welding using this process. A gas-cooled torch with a current capacity of 280A is required, equipped with a shielding gas control valve.

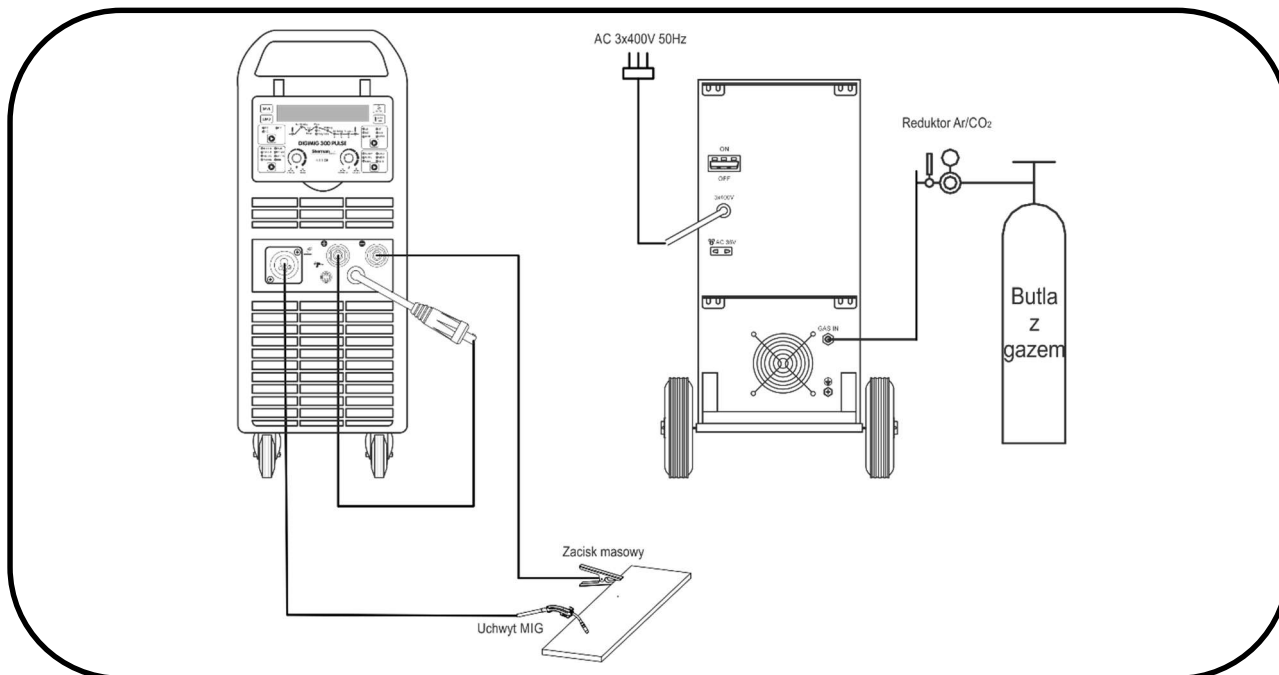
Connect the current terminal of the torch to the negative polarity socket (5) and the gas line to the reducer on the gas cylinder. Connect the positive pole of the source (1) to the welded material using a clamp cable. Connect the appliance plug to a 3x400V 50Hz mains socket.



5.1.3 MIG Process and Brazing

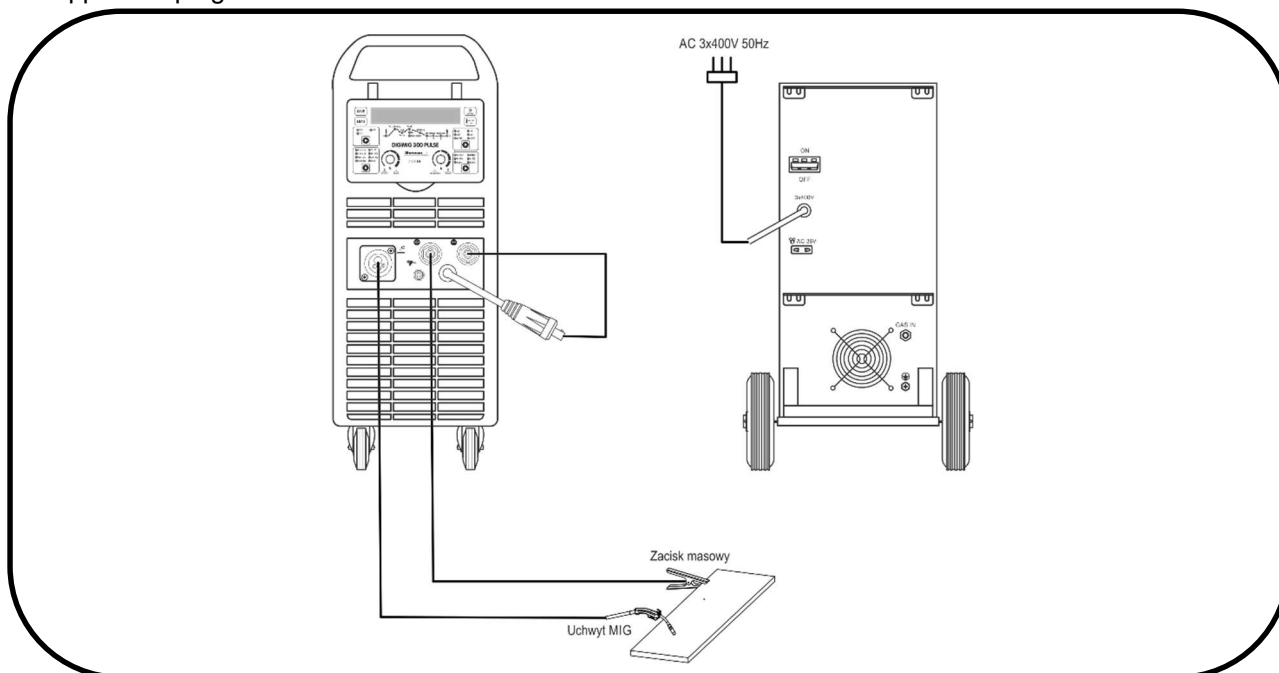
5.1.3.1 Shielded Gas Welding and Brazing

Connect the current terminal of the torch to the MIG socket (2). Lead the gas hose from the reducer and attach it to the gas connector (10) located on the rear wall of the appliance. Place the polarity change plug (4) in the "+" socket (1). Connect the negative pole of the source (5) to the welded material using a clamp cable. Connect the appliance plug to a 3x400V 50Hz mains socket.



5.1.3.2 Welding with steel self-shielding wire

Connect the current terminal of the torch to the MIG socket (2). Place the polarity change plug (4) in the "-" socket (5). Connect the positive pole of the source (1) to the welded material using a clamp cable. Connect the appliance plug to a 3x400V 50Hz mains socket.



5.1.3.3 Spool Gun Welding (Optional)

Connect the current terminal of the torch to the MIG socket (2). Place the polarity change plug (4) in the "+" socket (1). Connect the negative pole of the source (5) to the welded material using a clamp cable. Connect the appliance plug to a 3x400V 50Hz mains socket.

Switch the switch (14) located inside the feeder compartment to the Spool Gun position.

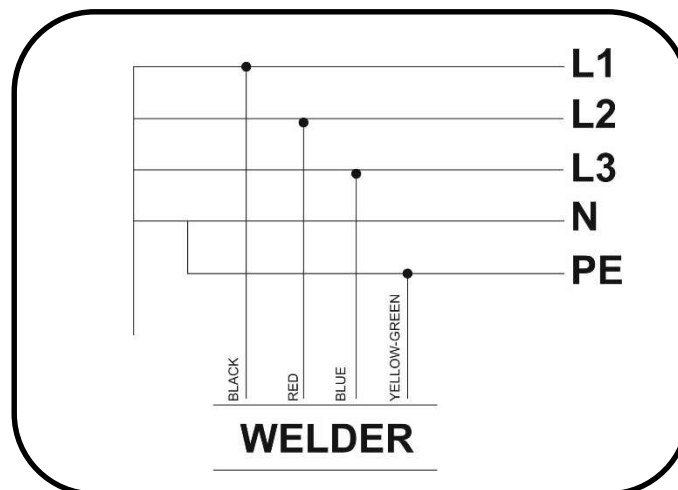
5.2 Shielding Gas Connection

1. Fix the cylinder and secure it from tipping over.
2. Unscrew the cylinder valve for a moment to remove any debris.
3. Install the reducer on the cylinder.
4. Connect the reducer to the gas connector (10) on the back of the welding machine with a hose.
5. Unscrew the cylinder and reducer valve.

5.3 Connecting to the power supply

1. The appliance should only be used in a three-phase, four-wire, grounded zero point power supply system.
2. The DIGIMIG 300 PULSE inverter rectifier is adapted to work with a 3x400V 50Hz network protected by 16 A delay-acting fuses. The power supply should be stable, without voltage drops.
3. Before connecting the power supply, make sure that the power switch (6) is in the OFF position.

5.3.1 Connecting the power cords to the three-phase mains plug



The yellow-green cable (protective wire) must be connected to the mains plug in the place marked with the symbol "PE" or "N".

The black, red, blue wires are the power supply wires to the device (phase) and should be connected to the mains plug in the places marked with the symbols L1, L2, L3 or R1, S2, T3. The order in which the phase wires are connected to the plug in the marked places is arbitrary and does not cause any changes in the operation of the device.

5.4 Fitting the Electrode Wire Spool

1. Open the side cover of the case.
2. Check that the drive rollers are suitable for the type and diameter of the wire. If necessary, fit the correct roller. Use V-grooved rollers for steel wires and U-grooved rollers for aluminum wires.
3. Place the electrode wire spool on the mandrel.
4. Protect the spool from falling.
5. Release the pressure of the feed rollers.
6. Blunt the end of the electrode wire.
7. Feed the wire through the feeder drive roller into the holder.
8. Press the wire into the grooves of the drive roller.

9. Remove the contact tip from the holder, turn on the power to the welding machine and pull the wire into the welding machine holder using the quick wire extension function.
10. When the wire appears in the outlet of the torch, release the button and screw on the power tip.
11. Adjust the pressure force of the feeder roller by turning the pressure knob. Too little clamping force will result in the drive roller slipping, too much clamping force will increase the feeding resistance, which may lead to wire deformation and damage to the feeder.

5.5 Preparing the MIG Torch for Operation

Depending on the type of material to be welded and the diameter of the electrode wire, fit the appropriate current terminal and wire guide insert to the MIG holder.

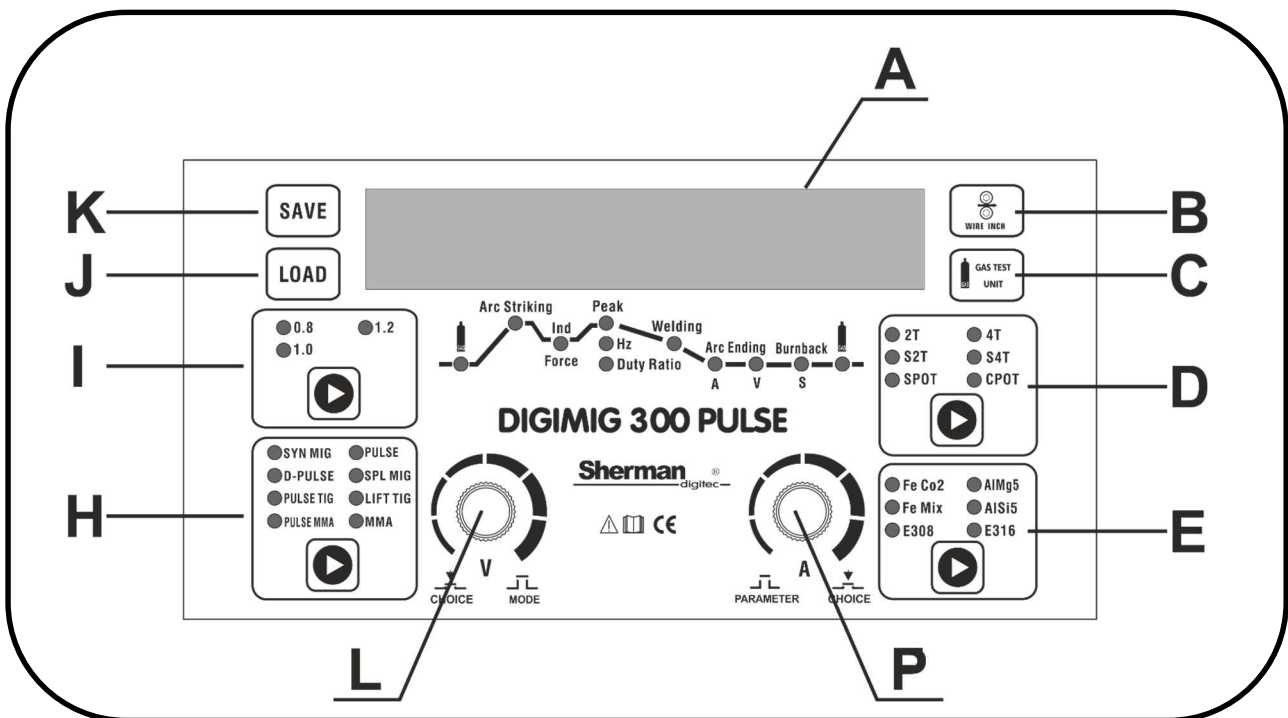
For steel welding, use steel welding current terminals and a steel insert. For aluminum welding, use aluminum welding current terminals and a Teflon cartridge.

5.5.1 Quick wire extension

The device has a quick wire ejection function. Pressing the button (B) causes a quick ejection of the wire allowing it to be easily inserted into the holder.

6. OPERATION

6.1 Front Panel



A – Display



The display indicates the names and values of the parameters, the numbers of the set of settings stored in the memory and the error codes.

BU	The voltage (arc length) of the base current. Only for the D-PULSE MIG process. Adjustment range: -50 – 50 %.
Burn	Wire burning – the time for which the wire feed continues after the arc is extinguished. Adjustment range: -50 – 50% of factory settings.
Cur	Welding Current
Duty	Pulse width - the duration of the pulse, allows you to adjust the depth of the embedding. Increasing the width increases the depth of fusion, decreasing reduces the amount of heat introduced into the material, reducing the risk of burning through thinner sheets or smaller elements. Lower pulse width values should be used for higher currents. A larger pulse width should be used for small currents, for example, a width above 50% should be used for currents below 100A. Only for D-PULSE MIG, PULSE TIG and PULSE MMA. Adjustment range: PULSE TIG, PULSE MMA: 5 – 95 %; D-PULSE MIG: 20 – 80 %.
EndI	Final Current (Crater Fill) Only for MIG/MAG in S2T and S4T modes. The adjustment range depends on the type of material to be welded and the diameter of the wire.
Endt	Duration of the final current (crater fills). Only for MIG process in S2T mode Adjustment range: 0 – 50 s
EndU	The voltage (arc length) of the final current (crater fills). Only for MIG process in S2T and S4T modes. Adjustment range: -50 – 50 %
FORC	ARC FORCE function. Only for MMA and PULSE MMA. Adjustment range: 0 – 100 %.
Freq	Pulse rate. Only for D-PULSE MIG, PULSE TIG and PULSE MMA. Adjustment range: PULSE TIG, PULSE MMA: 0.1 – 99 Hz; D-PULSE MIG: 0.5 – 5 Hz.
HotI	HOT START (MMA) / Starting Current (MIG/MAG) MMA: HOT START function Through the HotI parameter, the value of the current by which the welding current will be increased is adjusted. The adjustment range depends on the type of material to be welded and the diameter of the wire. MIG/MAG: Starting current. Only in S2T and S4T modes. The adjustment range depends on the welding process, the type of material to be welded and the diameter of the wire.
Hott	HOT START (MMA) duration / initial current time (MIG/MAG) MMA: Duration of the HOT START function. Adjustment range: 0 – 99 ms. MIG/MAG: Duration of the initial current. Only in S2T mode. Adjustment range: 0 – 50 s.

HotU	The voltage (arc length) of the initial current. Only for MIG/MAG in S2T and S4T modes. Adjustment range: -50 – 50 %.
IND	Inductance – its adjustment allows you to optimize the arc characteristics depending on the thickness of the welded element and the welding process and conditions. Only for the MIG/MAG process. Adjustment range: -99 – 50 %.
Ip-p	Peak current. Exclusive to D-PULSE MIG, PULSE TIG and PULSE MMA Adjustment range: MIG/MAG 5 – 50%, PULSE TIG 1 – 500%, PULSE MMA 1 – 50%.
Load	The number of the parameter set to be loaded.
Post	Gas discharge – the time it takes for shielding gas to continue to flow after the arc is extinguished. For MIG/MAG process only. Adjustment range: 0.1 – 50 s.
Preg	Pre-outflow of gas – the time it takes for shielding gas to flow out before igniting the arc. Only for the MIG/MAG process. Adjustment range: 0 – 10 s.
PU	The voltage (arc length) of the peak current. Only for the D-PULSE MIG process. Adjustment range: -50 – 50 %.
Save	Number of the parameter set to be saved
Slop CC	Arc characteristics - constant current mode. Only for the MMA process.
Slop CP	Arc characteristics - constant power mode. Used in welding with cellulose electrodes. Only for the MMA process.
Sptt	Duration of spot welding. Only for MIG/MAG in SPOT and CPOT spot welding modes. Adjustment range: 0.1 – 9.9 s.
StFd	The wire feed speed before igniting the arc. Adjustment range: 1 – 15 m.
Stop	The interval time between cyclic arc ignition. Only for MIG/MAG process in CPOT continuous spot welding mode Adjustment range: 0.1 – 25.5 s
Tick	The thickness of the material to be welded. Only for MIG/MAG in SYN MIG, PULSE and D-PULSE modes. The adjustment range depends on the type of material to be welded and the diameter of the wire.
VRD	VRD function - lowers the voltage in the no-load state. Only for the MMA process. Adjustment range – On/Off.

B – Quick Wire Ejection Button



Pressing the button causes a quick extension of the electrode wire. It can be used when inserting a wire spool in order to quickly feed it into the welding torch.

C – Shielding throttle button / change the way MIG/MAG parameters are displayed

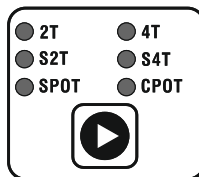


Button active only during MIG welding. MAG

Pressing and holding the button will cause the shielding gas to flow out, releasing it will end the gas flow.

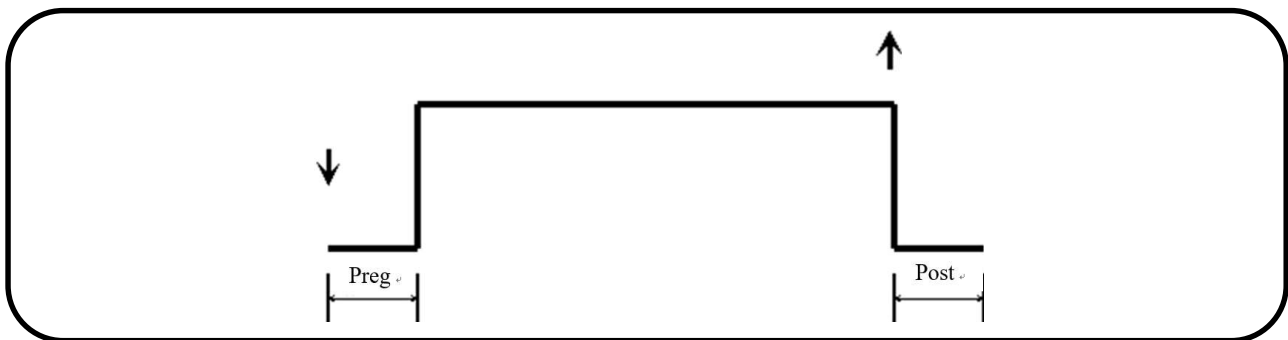
In synergy modes, a short press of the button will proceed to current regulation and weld voltage correction, and the display will indicate the welding current (right) and information about the percentage correction of the welding voltage in relation to the factory synergic settings.

D – Source control button



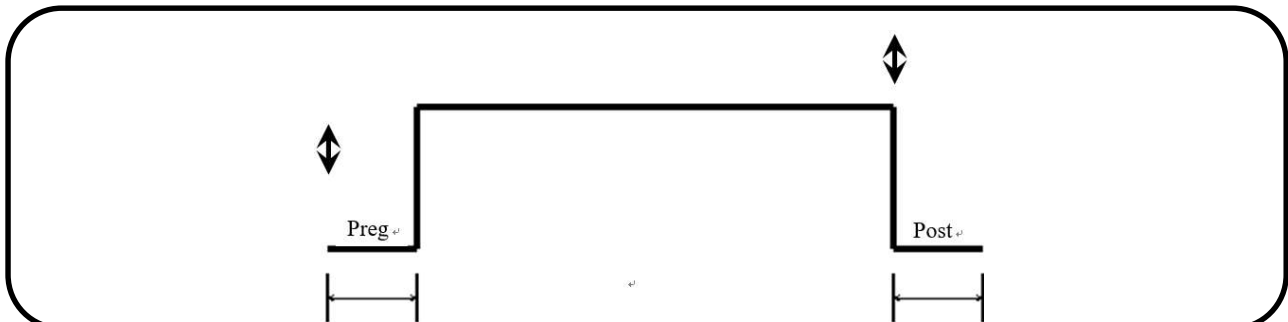
The button is active only in the MIG/MAG process. It allows you to select the mode of control of the source. The selection of the appropriate mode is indicated by the lighting of the correct LED.

● 2T



Pressing the torch button will pre-flow the gas, then ignite the arc and start welding. When the button is released, the arc will be extinguished and the gas will be extinguished.

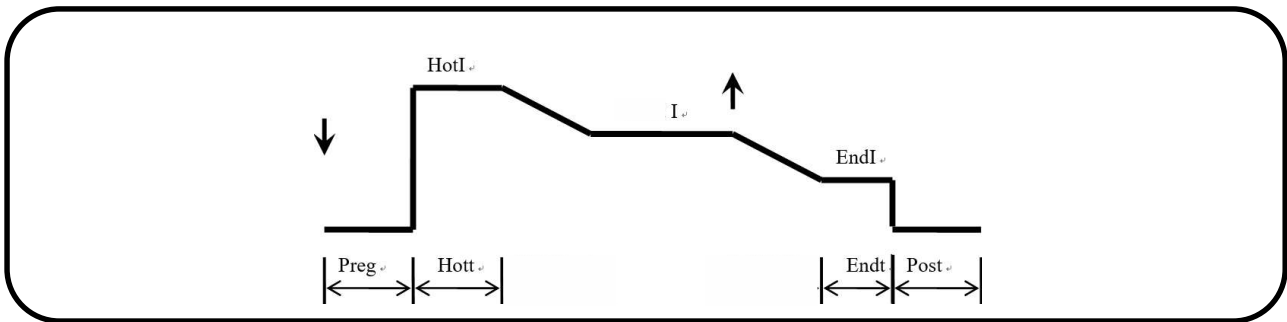
● 4T



Pressing and releasing the torch button will cause the gas to flow pre-emption, then ignite the arc and start welding. When the button is pressed and released again, the arc will be extinguished and the gas will flow out.

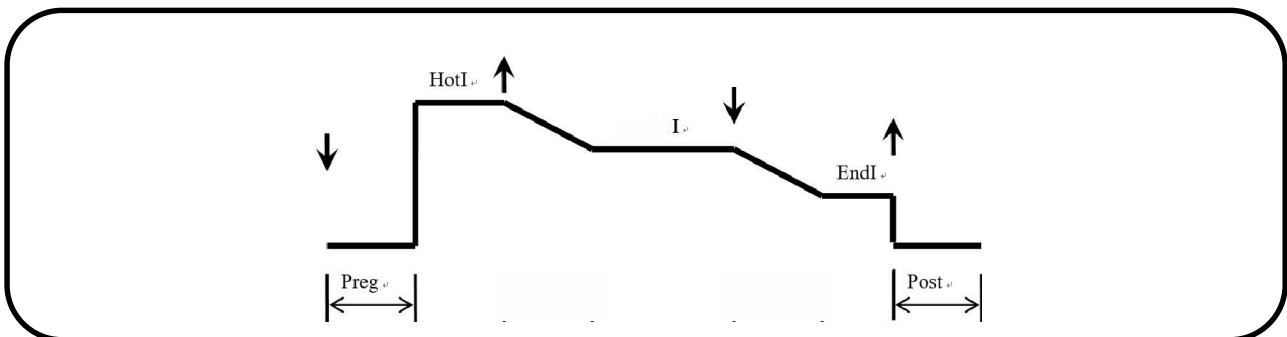
Sherman

● S2T



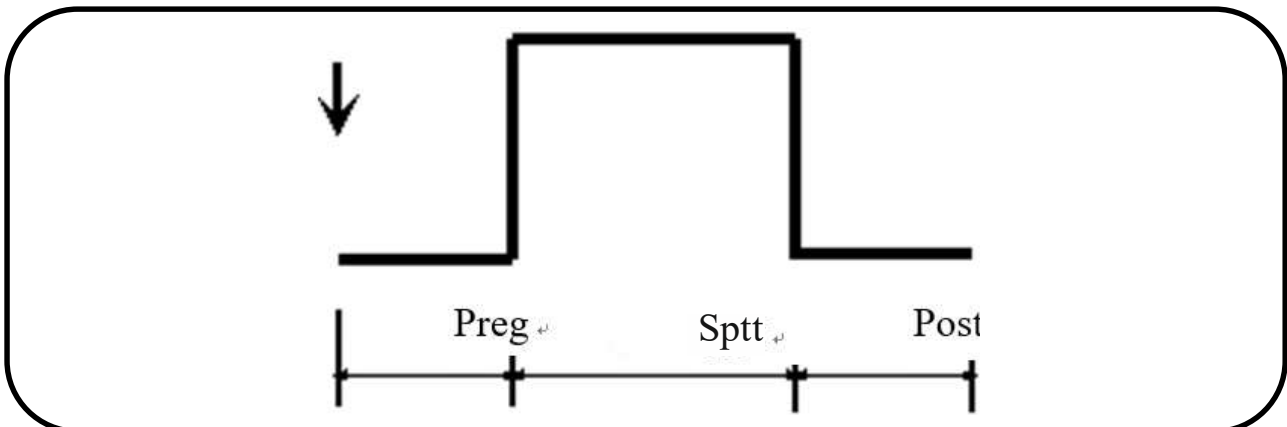
Pressing the torch button will cause the gas to pre-discharge, then ignite the arc and start welding with the initial current HotI. After the HOTT time, the welding current value will change to the set value. Releasing the torch button will change the welding current value to EndI, and after the Endt time has elapsed, the arc will be extinguished and the gas will be discharged.

● S4T



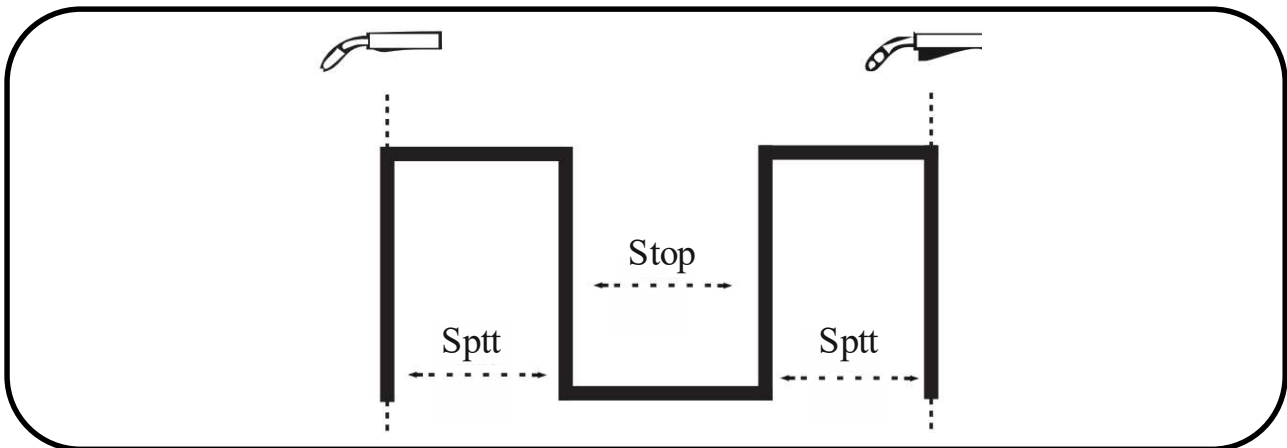
Pressing the torch button will cause the gas to pre-flow, then ignite the arc and start welding with the initial current HotI. Releasing the button will change the welding current value to the set value. Pressing the torch button again will change the welding current value to EndI, and when the button is released, the arc will be extinguished and the gas will be discharged.

● SPOT



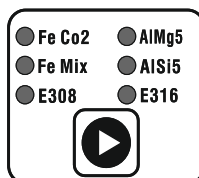
Spot welding. Pressing the welding torch button will cause the gas to flow before and ignite the arc. After the Sptt time has elapsed, the arc will be extinguished and the gas will be discharged. By releasing the torch button earlier, the arc will be extinguished immediately and the gas will be discharged.

● CPOT



Continuous spot welding. Pressing the torch button will cause the gas to pre-flow and ignite the arc. After the Sptt time has elapsed, the arc will be extinguished. After the Stop time, the arc will ignite again and the cycle will continue until the torch button is released. At that time, the arc will be extinguished and the gas will be discharged.

E – Weld material selection button.



The button is active only during MIG/MAG welding in **SYN MIG** the modes , **PULSE** and **D-PULSE**. Used to select the material to be welded. The selection of the appropriate mode is confirmed by the illumination of the control diode.

SYN MIG All types of material are available in mode, in modes **PULSE** and **D-PULSE** is not available . **Fe Co2**

● **Fe Co2** - welding of carbon steels in CO2 shielding.

● **AlMg5** - welding of magnesium aluminum alloys in argon sheath.

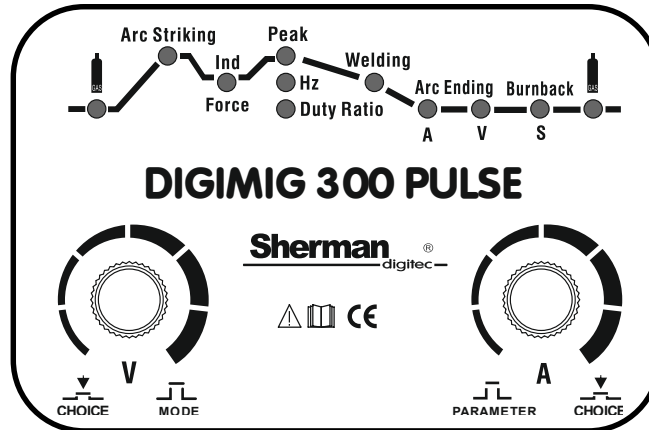
● **Fe Mix**- welding of carbon steels in the shield of the Ar/CO2 mixture. The recommended proportions of the mixture are 82% Ar 18% CO2.

● **AISi5** - welding of aluminum silicon alloys in argon sheath.

● **E308** - welding of stainless steels in the shield of the Ar/CO2 mixture. The recommended proportions of the mixture are 98% Ar 2% CO2.

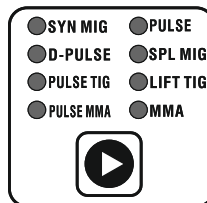
● **E316**- welding of stainless steels in the shield of the Ar/CO2 mixture. The recommended proportions of the mixture are 98% Ar 2% CO2.

L, P – Adjustment knobs/buttons and parameter graph



The knobs (L-left) and (P-right) are used to adjust the welding parameters. Turning the knobs to the left decreases and turning to the right increases the parameter value. Pressing the knob (P) remembers the currently set parameter and moves to the next parameter or group of parameters. The currently set parameter or group of parameters is indicated by the corresponding LED on the parameter graph. In the case of a parameter group, pressing the button (L) switches between the individual parameters in the group. The knob (P) is used to adjust most parameters, the knob (L) can only be used to adjust the welding current during SPL MIG welding or to correct the voltage during MIG welding using synergic settings.

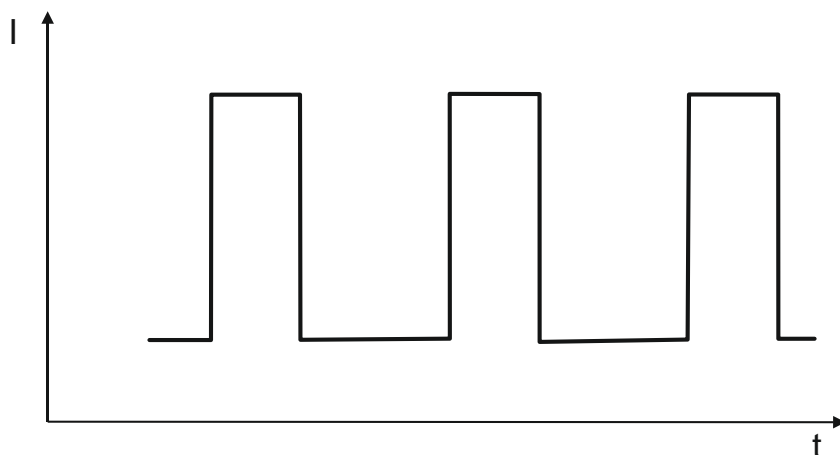
H – Welding process selection button



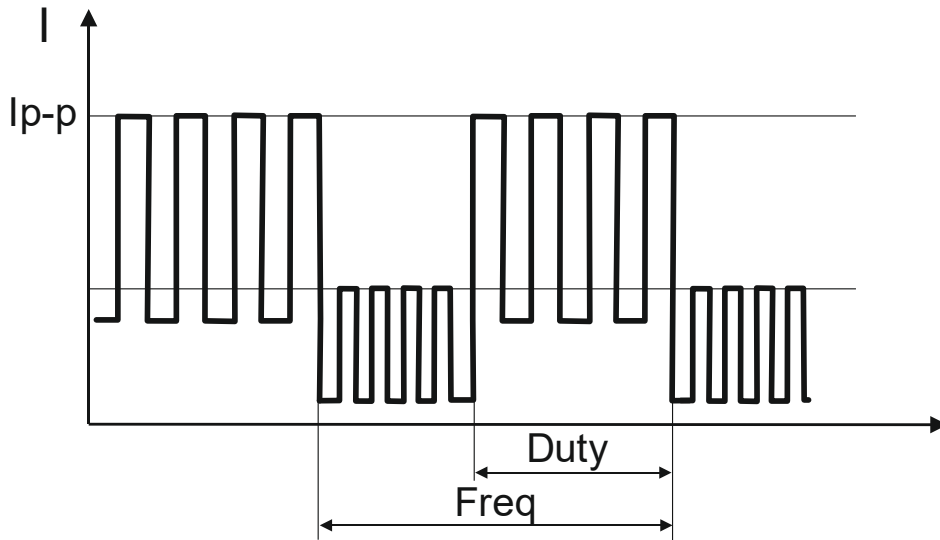
The button is used to select the welding process. The selection of the appropriate mode is confirmed by the illumination of the control diode.

● **SYN MIG** - MIG/MAG welding using synergic settings. The device selects welding parameters depending on the selected type and thickness of the material. These parameters can be changed by the user.

● **PULSE** - MIG/MAG welding with pulse. This is an advanced form of welding that uses the best form of transfer of molten electrode wire material to the welded material. It significantly reduces the formation of spatter and enables welding in all positions. A smaller heat input eliminates burning through thin materials. This process uses synergic settings.

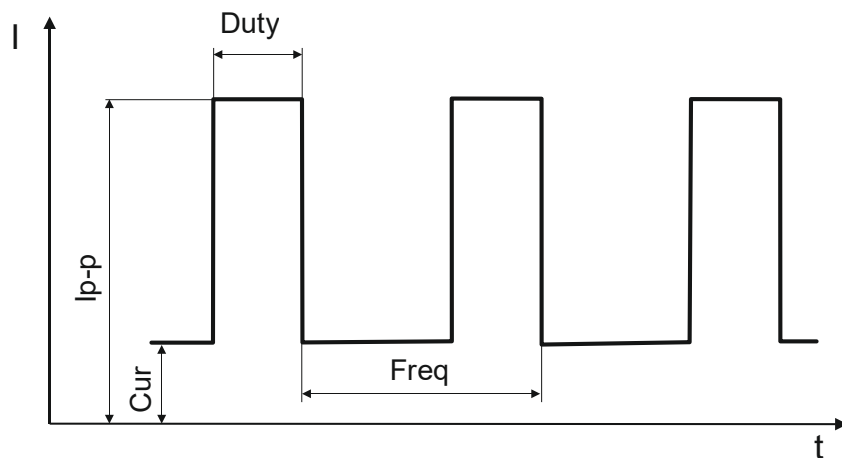


● **D-PULSE** - MIG/MAG welding with double pulse. This is the most advanced welding process in which current pulses occur in two ranges. It combines the benefits of single-pulse welding, and additionally allows to achieve a very high aesthetics of the weld face – the so-called shell effect. Welding with this process is very efficient, causes small deformations and at the same time allows you to achieve a perfect appearance of the weld. This process uses synergic settings.



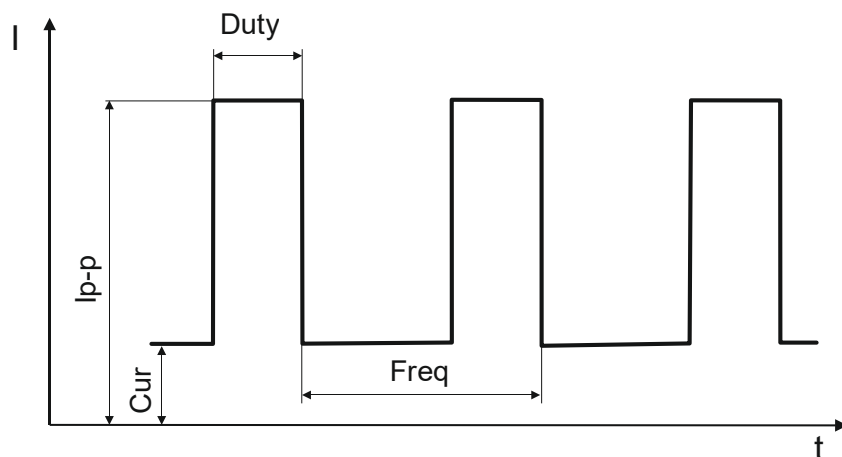
● **SPL MIG** - MIG welding with manual selection of settings.

● **PULSE TIG** - TIG lift welding with pulse.



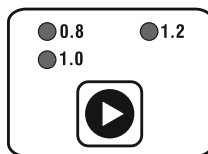
● **LIFT TIG** - TIG lift welding.

● **PULSE MMA** - MMA welding (coated electrode) with pulse.



● **MMA** - MMA welding (coated electrode).

I – Electrode wire diameter selection button



The button is active only during MIG/MAG welding in **SYN MIG** the modes , **PULSE** and **D-PULSE**. Used to select the diameter of the electrode wire. The selection of the appropriate mode is confirmed by the illumination of the control diode.

J – Settings Load Button



The button is used to load sets of parameters previously stored in the device's memory. When the button is pressed, the display will show LOAD and the flashing number of the parameter set that will be loaded. You can change the set number by turning the knob (P). When the knob (P) is pressed, the LoadData message will appear on the display and the selected set of parameters will be loaded. To exit the setting loading mode and proceed to parameter adjustment, press the button (L).

K – Save Settings Button



The button is used to store the currently set parameters in the memory. It is possible to save 33 sets of parameters. When the button is pressed, the SAVE inscription will appear on the display and the flashing number of the parameter set, under which the current parameters will be stored. The set number can be changed by turning the knob (P). After pressing the knob (P), the message SaveData will appear on the display and the current parameters will be stored in the device's memory.

7. PARAMETER SETTINGS

7.1 MMA and PULSE MMA process

By selecting the MMA or PULSE MMA process, it is possible to adjust the parameters according to the table below. The welding current can be adjusted with the adjustment knob directly after switching on the device or switching the welding process.

MMA		PULSE MMA	
Arc Striking	Hotl Hott	Arc Striking	Hotl Hott
Force	Force	Force	Force
Welding	Cur	Peak	Ip-p
	Slop	Hz	Freq
	VRD	Duty Ratio	Duty
		Welding	Cur VRD

VRD function

The VRD function lowers the voltage in the no-load state. The correct voltage value is only restored just before the arc is ignited. This minimizes the risk of electric shock, but in some cases it can make it difficult to ignite the arc.

ARC FORCE function

The ARC FORCE function allows you to adjust the arc dynamics. The shortening of the arc length is accompanied by an increase in the welding current, which stabilizes the arc. A decrease in the value results in a soft arc and a shallower penetration depth, while an increase in the value results in a deeper penetration and the possibility of short arc welding. With a high value of the ARC FORCE function, it is possible to weld while maintaining a minimum arc length and a high electrode melting speed

HOT START function

The HOT START function it works when the arc is ignited, causing a temporary increase in the welding current above the value set by the welder. HOT START is designed to prevent the electrode from sticking to the material and is a great convenience when igniting the arc. In the case of welding small components, it is recommended to disable this function, as it may cause the welded material to burn out.

7.2 LIFT TIG and PULSE TIG process

After selecting the LIFT TIG or PULSE TIG process, it is possible to adjust the parameters according to the table below. The welding current can be adjusted with the control knob directly after switching on the device or switching the welding process.

LIFT TIG		PULSE TIG	
Welding	Cur	Peak	Ip-p
Nr seryjny		Hz	Freq
		Duty Ratio	Duty
		Welding	Cur

7.3 SYN MIG, PULSE, D-PULSE and SPL MIG process

During MIG welding, the device can operate in synergic mode (SYN MIG, PULSE, D-PULSE) and manual mode (SPL MIG). The synergic mode allows less experienced users to select welding parameters. In this mode, the device automatically selects the welding current and wire feed speed depending on the type of material to be welded and the diameter of the electrode wire. It is possible to correct the welding voltage. The manual mode allows the user to select the welding voltage, and wire feeding speed according to their needs. Depending on the selected control mode and welding process, it is possible to adjust according to the table below.

0,8 / 1,0	1,0 / 1,2	0,8 / 1,0	1,0 / 1,2	0,8 / 1,0	0,8 / 1,0
↑	↑	↑	↑	↑	↑
FeCo2	AlMg5	Fe MIX	AlSi5	E308	E316
↑	↑	↑	↑	↑	↑
SYN MIG / PULSE / D-PULSE / SPL MIG					
↓					
Tryb sterowania / Control mode					
2T	4T	S2T	S4T	SPOT	CPOT
↓	↓	↓	↓	↓	↓
↑	↑	↑	↑	↑	↑
Preg	Preg	Preg	Preg	Preg	Preg
		HotI HotU	HotI HotU		
Ind	Ind	Ind	Ind	Ind	Ind
IND	IND	IND	IND	IND	IND
Peak	Peak	Peak	Peak	Peak	Peak
Ip-p	Ip-p	Ip-p	Ip-p	Ip-p	Ip-p
PU	PU	PU	PU	PU	PU
BU	BU	BU	BU	BU	BU
Hz	Hz	Hz	Hz	Hz	Hz
Freq	Freq	Freq	Freq	Freq	Freq
Duty Ratio	Duty Ratio	Duty Ratio	Duty Ratio	Duty Ratio	Duty Ratio
Duty	Duty	Duty	Duty	Duty	Duty
Welding	Welding	Welding	Welding	Welding	Welding
U/I	U/I	U/I	U/I	U/I	U/I
Tick	Tick	Tick	Tick	Tick	Tick
StFd	StFd	StFd	StFd	StFd	StFd
		ArcEndingA EndI EndU	ArcEndingA EndI EndU		
Burnback	Burnback	Burnback	Burnback	Burnback	Burnback
Burn	Burn	Burn	Burn	Burn	Burn
↑	↑	↑	↑	↑	↑
Post	Post	Post	Post	Post	Post

Note! In SPL MIG mode, it is not possible to select the welded material or wire diameter.

Welding stress correction in synergic modes

After setting the welding current in the synergy modes, it is possible to correct the welding voltage. After setting the welding current with the knob (P), you can correct the welding voltage using the knob (L). To check the percentage change in voltage from the value set according to the synergy program, press the GAS button (C). By turning the knob (L), it is possible to further correct the voltage. To return to the voltage display, press the GAS button (C) again.

Inductance control

Inductance control allows you to optimize the arc characteristics depending on the thickness of the welded component and the welding process and conditions. This function is useful when welding thin components with the MIG/MAG process, preventing them from burning, and when brazing galvanized components.

A change in the inductance value also reduces the amount of welding spatter during welding in a CO₂ shield. The higher the inductance value (+) the number of spatters decreases, when the value is negative (-), the number of spatters increases. The optimal setting of the inductance value depends on several factors and may differ from standard recommendations, so it should be selected experimentally during welding tests.

Adjusting this parameter also makes it possible to solder thin (up to 3 mm) elements galvanized with wires made of copper alloy CuSi3 in a sheath of pure argon or, in some cases, an Ar/CO₂ mixture in a ratio of (82/18).

Pulse width

The pulse width is the duration of the pulse, it allows you to adjust the depth of the embedding. Increasing the width increases the depth of embedding, decreasing reduces the amount of heat introduced into the material, reducing the risk of burning thinner sheets or smaller elements.

Lower pulse width values should be used for higher currents. A larger pulse width should be used for small currents, for example, a width above 50% should be used for currents below 100A.

The welding machine has built-in synergy programs for selected materials, wire diameters and shielding gases according to the table below:

Material	Marking	Genre	Wire - diameter	Shielding Gas - Recommended
Plain steel	Fe Co2		0.8/1.0	CO2
	Fe Mix		0.8/1.0	Ar+CO2 (82/18)
Aluminium	AlMg5	ER5356	1.0/1.2	Argon
	AlSi5	ER4043	1.0/1.2	Argon
Stainless steel	E308	ER308LSi	0.8/1.0	Ar+CO2 (98/2)
	E316	ER316LSi	0.8/1.0	Ar+CO2 (98/2)

- Argon of high quality class should be used: recommended 4.8 and higher

In addition, depending on the operating conditions, the inductance value can be set, which affects the shape of the weld, the penetration depth and the number of spatters during welding. **It should be taken into account that the recommended welding parameters in the synergy mode apply to the typical welding materials of the selected group and the recommended shielding gases. In the case of welding different alloying materials, the operating parameters may not be optimal and require adjustment of the settings. Therefore, the synergic mode should not be considered as a universal parameterization proposal, but as a starting point for precise adjustment of the settings.**

The manual function of SPL MIG, i.e. manual selection of parameters, is particularly useful for brazing. Using three welding parameters, the optimal set should be set to obtain the right weld. When selecting parameters, low voltage values and high wire feed speeds should be chosen. It is recommended to use argon as a shielding gas, but the use of a mixture of argon and CO2 (82/18) also gives good results. Due to the required shape of the weld, the inductance should be selected experimentally depending on the thickness and type of welded material.

Copper-based binders are most often used as an additional material. These are wires marked as CuSi3 or SG -CuAl.

It is recommended to use a torch with a length of no more than 3 m equipped with a Teflon insert.

8. WELDING OF ALUMINUM ALLOYS

In the synergic mode, one of two programs for aluminum welding can be selected. The programs have been selected for welding with AlSi5 wires type ER 4043, mainly intended for casting aluminum and AlMg5 wire type ER 5356, which is suitable for welding all types of structures and sections.

Welding aluminum is not a simple activity, it requires experience, knowledge and certain practices from the welder that will facilitate the execution of welds on aluminum elements. In the synergy program, the device selects the output parameters for the appropriate type of materials and types of wires. Depending on the needs, appropriate adjustments of voltage and inductance should be made to achieve the desired effect.

First of all, it is important to remember about a few important things that significantly affect the appearance of the weld and affect the correct course of the welding process.

Before starting welding work on aluminum components, the following steps should be performed:

Device:

- Make sure that the feed rollers are designed to work with aluminum: the groove is "U" shaped and is dedicated to the correct diameter of the welding wire. Using the wrong rollers will cause wire deformation and problems in the welding process.
- Make sure that the feed rollers are not positioned too tightly. Excessive wire tension may cause a feeding problem.

- Make sure the chuck is equipped with a Teflon guide cartridge designed for aluminum. Using steel components used to feed the steel wire will cause feeding problems.
- Make sure the current tip is the correct size and is designed for aluminum wire
- It is worth replacing the wire guide insert in the feeder with a Teflon version, which improves wire feeding as it does in the welding torch.

Job position:

- Attention should be paid to the proper preparation of the welding site: the hall should be clean, have good ventilation and low air humidity should be maintained. The presence of iron oxide dust or dust after electro-air gouging of steel is unacceptable.
- Aluminum welding stations should be vacuumed with industrial vacuum cleaners once a day, after work.
- Welders' clothes should be clean, gloves must not be greasy.

Material preparation:

- The welding site should be cleaned and degreased just before welding,
- Degrease the aluminium elements by wiping them with a clean cloth soaked in a degreasing agent, e.g. acetone (Alcohol is not a good degreasing agent, we advise against using it when cleaning aluminium).
- Remove the residue of heavy oxides before welding. Normally, this is done manually or mechanically with a steel wire brush. If the material has been heavily contaminated, it may be necessary to use a grinder.
- Once the surface has been properly prepared, the welding process should be carried out as quickly as possible.
- If the part has to remain unwelded for a long period of time, it must be protected with brown kraft paper and covered with adhesive tape.

Proper storage of welding wire

- Aluminum welding wire should be stored in a clean, dry environment, preferably in its original packaging.
- The wire does not need to be stored in air-conditioned rooms, it is best to store it in low humidity conditions. Do not soak the wire in water.
- If a wire that is relatively cold is brought into the room on a hot, humid day and opened immediately, it is possible that the humid air will pollute the wire. Therefore, when storing the wire in an air-conditioned room, remember not to unpack the wire until it is heated and adapted to the ambient temperature.
- When the work is complete, the wire should be removed from the feeder and secured in a plastic bag for the next use.

For welding aluminum alloys, pure argon of high quality class, recommended not less than 4.8, should be used as a shielding gas. The gas flow should be selected according to the thickness and speed of welding. Good welding results are achieved when the direction of the process is to the left.

9. WELDING OF STAINLESS STEELS

The synergic program in the device has been developed for welding the most popular stainless steel alloys type 308LSi and 316LSi and the applied mixture of shielding gas argon + CO₂ in a ratio of 98/2. The welding parameters of other high-alloy steels and other shielding gas mixtures used may require correction of welding parameters.

10. ARC INITIATION

10.1 MMA process

1. Touch the electrode to the welded material, rub briefly and tear off.
2. In the case of arc initiation with electrodes, the coating of which forms non-conductive slag after solidification, pre-clean the tip of the electrode by hitting the hard surface several times until metallic contact with the welded material is achieved.

10.2 TIG Process

1. Unscrew the valve in the TIG torch to allow the shielding gas to escape.
2. Lightly touch the welded material with the electrode, detach the electrode from the welded material by tilting the torch so that the gas nozzle touches the material.
3. Once the arc is ignited, straighten the torch and start welding.

10.3 MIG/MAG Process

1. Bring the torch closer to the welded workpieces so that the distance between the nozzle and the welded workpieces is approx. 10 mm.
2. Press the button on the welding torch and start welding.

11. BEFORE YOU CALL FOR SERVICE

In the event of malfunction of the device, before sending the welding machine for service, you should check the list of basic failures and try to fix them yourself.

Any repairs to the appliance may only be carried out by unplugging the plug from the power socket.

Attention! The device is not sealed and the user can remove the cutter housing to remove minor malfunctions.

Symptoms	Cause	Procedure
Lack of power, malfunction signal, or malfunction of the device	No connection or loose plug inside the device	Check and correct the connections of all electrical plugs inside the device
No electrode wire feeding (feeder motor running)	Too little roller pressure	Set the correct pressure
	Incorrect diameter of guide roller groove	Fit the correct guide roller
	Contaminated chain in the holder	Clean the electrode wire guide
	Blocked electrode wire in the current tip	Replace the current adapter
No electrode wire feeding (feeder motor not running)	Device switched to Spool Gun mode	Switch the machine to standard MIG holder mode  using the switch (14) in the feeder compartment
Irregular electrode wire feed	Damaged current terminal	Replace the current adapter
	The groove of the feed roller is dirty or damaged	Clean the roller groove or replace the roller
	The wire spool rubs against the walls of the welding machine cover	Fix the wire spool correctly
The arc does not ignite	Lack of proper contact of the ground cable terminal	Improve the contact of the ground terminal
	Damaged switch in MIG holder	Replace the switch
	Improper connection of the MIG mount to the device	Check the condition of the electrical connections of the torch, check that the pins in the socket are not broken or jammed
Arc too long and irregular	Welding Voltage Too High	Reduce welding voltage
	Wire feed speed too low	Increase wire feed speed
Arc too short	Welding Voltage Too Low	Increase welding voltage
	Wire feed speed too high	Reduce wire feed speed
When the power is turned on, the displays and LEDs do not light up	No supply voltage	Check the fuses on the mains connection
Fan not working	The fan has been blocked by a bent cover	Straighten the fan cover
Unsatisfactory weld quality in MIG welding	Inadequate or poor-quality materials or consumables used,	Replace consumable parts. Change welding wire or gas cylinder to suitable or higher quality materials
	The shielding gas comes out with the wrong intensity.	Check the gas supply hose, improve the hose connection to the fittings and the condition of the quick connectors Check Cylinder Reducer
Unsatisfactory weld quality in MMA welding, the electrode sticks to the welded material	Incorrect polarity of the connection of welding cables	Connect the welding wires correctly
	Damp electrode.	Replace the electrode
	The welding machine is powered by a generator or through a long extension cord with too small a cable cross-section	Connect the device directly to the mains
Unsatisfactory weld quality in TIG welding	Check the quality of the materials and consumables used, especially the tungsten electrode and shielding gas	Replace consumable parts, replace shielding gas with higher quality
	Shielding gas does not flow out or flows out with insufficient intensity	Check the cylinder reducer, gas supply hose, improve the connection of the hose with the fittings and the condition of the quick connectors

List of errors indicated on the display

Error code	Description
OverTemp	Overheating protection. Wait a few minutes until the device has cooled down to a temperature that allows it to turn on again on its own. Do not disconnect the power supply during this time, as the continuously running fan cools the internal heat sinks of the device in order to lower the temperature faster. After restarting, remember to limit the welding parameters in order to continue to operate the device continuously.

12. OPERATING INSTRUCTIONS

The operation of the DIGIMIG 300 PULSE welding machine should take place in an atmosphere free of corrosive components and high dust. Do not place the device in dusty places, near running grinders, etc. Dust and metallic filing contamination of control plates, cables and connections inside the device can lead to an electrical short circuit and, consequently, damage to the welding machine.

Avoid use in environments with high humidity, especially in situations where dew occurs on metal components. In the event of dew on metal components, e.g. after a cold device has been introduced into a warm room, wait until it is completely dry and the device has warmed up to ambient temperature. Running a cold welding machine in these conditions may cause damage to it. If the welding machine is operated outdoors, it is recommended to place it under a roof to protect it from adverse weather conditions.

The DIGIMIG 300 PULSE should be operated under the following conditions:

- changes in the rms value of the supply voltage not greater than 10%
- ambient temperature from -10°C to $+40^{\circ}\text{C}$
- atmospheric pressure 860 to 1060 hPa
- relative humidity of atmospheric air not exceeding 80%
- altitude up to 1000m above sea level

List of consumable parts:

Lp	For steel wires	For aluminum wires
1	Feeder roller 30x22x10mm	Feeder roller Al 30x22x10mm
2	TW-25 M6x28 Contact tip	Al TW-25 M6x28 Contact tip
3	TW-25 contact tip	
4	Gas nozzle TW-25	
5	3m steel insert	3m Teflon Cartridge

A full list of consumable parts and spare parts is available on the www.tecweld.pl website and from TECWELD. It is possible to purchase these parts directly.

13. MAINTENANCE INSTRUCTIONS

As part of daily operation, keep the welding machine clean, check the condition of external connections, and the condition of electrical wires and cables.

Replace consumable parts regularly.

Periodically (depending on the operating conditions), remove the housing and clean the device inside by blowing with compressed air to remove dust and metal swarf from the control boards and electrical cables and connections.

At least once every six months, a general inspection and condition of electrical connections should be carried out, in particular:

- state of protection against electric shock
- isolation status
- security system status
- correct operation of the cooling system

Damage resulting from operating the welding machine under improper conditions and failure to follow maintenance recommendations are not covered by warranty repairs.

14. STORAGE AND TRANSPORT INSTRUCTIONS

The device should be stored at a temperature of -10°C to $+40^{\circ}\text{C}$ and a relative humidity of up to 80% free of corrosive fumes and dust. Transport of packaged devices should be carried out by covered means of transport. During transport, the packaged device must be protected against movement and provided with the correct position.

15. SET SPECIFICATION

1. Source	1 pc.
2. TW-25 welding torch	1 pc.
3. Clamp Clamp Ground Cable	1 pc.
4. Electrode wire	1 pc.
4. User Manual	1 pc.
5. Packaging	1 pc.

16. WARRANTY

The warranty is granted for a period of 12 months for business entities, but excluding warranty claims, or 24 months for consumers from the date of sale.

The warranty will be respected upon presentation by the complainant of proof of purchase (invoice or receipt) and a warranty card with the product name, serial number, date of sale and stamped point of sale.

To order a warranty repair, please fill in the form located on the www.tecweld.pl website in the SERVICE tab. On the basis of the notification, the device will be transported to the service by a courier company. Devices sent in any other way at the expense of TECWELD will not be accepted!

The welding machine must be supplied with the welding torch. Complaints about the appliance without the welding torch will not be considered.

The device sent for complaint must be packed in the original cardboard box secured with original polystyrene fittings. TECWELD is not responsible for damage to the welding machine resulting from transport.



If you intend to dispose of this product, do not dispose of it with ordinary household waste. According to the WEEE Directive (Directive 2012/19/EU) in force in the European Union, separate disposal process must be used for used electrical and electronic equipment.

In Poland, in accordance with the provisions of the Act of 11 September 2015 on Waste Electrical and Electronic Equipment, it is prohibited to place waste equipment marked with the crossed-out bin symbol together with other waste.

The user who intends to dispose of this product is obliged to hand over waste electrical and electronic equipment to a waste equipment collection point. Collection points are operated, m.in, by wholesalers and retailers of this equipment and by municipal organisational units operating in the field of waste collection.

The above statutory obligations have been introduced in order to reduce the amount of waste generated from waste electrical and electronic equipment and to ensure an appropriate level of collection, recovery and recycling of waste equipment. The proper implementation of these obligations is particularly important when waste equipment contains hazardous components that have a particularly negative impact on the environment and human health.

TECWELD Piotr Polak
41-943 Piekary Śląskie, 21/3/6 Szmaragdowa St.

Branch:
41-909 Bytom, 1G Krzyżowa Street
Tel. +48 32 386 94 28
E-mail: info@tecweld.pl, www.tecweld.pl

17. ELECTRICAL DIAGRAM

