V1.2 08.03.24

# USER MANUAL

## INWERTOROWA SPAWARKA PÓŁAUTOMATYCZNA MIG 200 SMART

Sherman® hobby

**ATTENTION!**
Before installing and starting the device, please read this manual

**1. GENERAL REMARKS**

The device may only be started and operated after carefully reading this Operating Instructions.

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

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

**2. SECURITY**

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

- should have qualifications of an electric welder in the field of gas shielded welding,
- know the health and safety rules when operating electrical power equipment such as welding equipment and auxiliary equipment powered by electricity,
- know the health and safety regulations when handling cylinders and installations with compressed gas (argon),
- be familiar with the contents of this manual and use the device in accordance with its intended purpose.

# WARNING

**Welding can pose a safety risk to the operator and other people in the vicinity.**
**Therefore, special precautions must be taken when welding. Before starting to weld, familiarize yourself with the health and safety regulations applicable at the workplace.**
**The following hazards exist during MIG/MAG electric welding:**

- **ELECTRIC SHOCK**
- **NEGATIVE IMPACT OF ARC ON HUMAN EYES AND SKIN**
- **VAPORS AND GAS POISONING**
- **BURNS**
- **EXPLOSION AND FIRE HAZARDS**
- **NOISE**

**Preventing electric shock:**

- connect the device to a technically efficient electrical installation with proper protection and effective zeroing (additional protection against electric shock); other devices at the welder's workstation should also be checked and correctly connected to the network,
- install power cables when the device is switched off,
- do not touch the non-insulated parts of the electrode holder, the electrode and the object at the same time welded, including the device housing,
- do not use handles and power cables 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 ensuring safety, use clothing and gloves with good insulating properties,
- if you notice any irregularities, please contact the competent persons to have them corrected. removal,
- It is prohibited to operate the device with removed covers.

**Preventing the negative impact of electric arc on human eyes and skin:**

- 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 choose the right wall colors absorbing harmful radiation.

**Prevention of poisoning by vapors and gases emitted during welding from electrode coating and metal evaporation:**

- Use ventilation devices and exhaust systems installed in places with limited air exchange. air,
- Blow with fresh air when working in a confined space (tanks),
- Use masks and respirators.

**Burn prevention:**

- Wear appropriate protective clothing and footwear to protect against radiation burns. arc and splinters,
- Avoid contaminating clothing with grease and oils that may cause ignition.

**Explosion and fire prevention:**

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

**Preventing the negative impact of noise:**

- Use earplugs or other noise protection measures,
- Warn people nearby about dangers.

**WARNING!**

Do not use an electrical source to thaw frozen pipes.

Before starting the device, you must:

- Check the condition of electrical and mechanical connections. It is forbidden to use handles and power cables with damaged insulation. Improper insulation of handles and power cables may cause electric shock,

- Ensure proper working conditions, i.e. ensure proper temperature, humidity and ventilation in the workplace. work. Outside closed rooms, protect against atmospheric precipitation,
- Place the charger in a place where it can be easily operated.

People operating a welding machine should:

- have the qualifications for electric welding using the MIG/MAG method,
- know and comply with the occupational health and safety regulations applicable to welding work,
- use appropriate, specialist protective equipment: gloves, apron, rubber boots, shield or a welding helmet with a properly selected filter,
- be familiar with the contents of this instruction manual and use the welding machine in accordance with its intended purpose.

Any repairs to the device may only be performed after disconnecting the plug from the power socket.

When the device is connected to the mains, it is not permitted to touch any elements forming the welding current circuit with bare hands or through wet clothing.
It is prohibited to remove external covers when the device is connected to the mains.
Any modifications to the rectifier on your own are prohibited and may constitute a deterioration of safety conditions.

All maintenance and repair work may only be carried out by authorised persons in compliance with the work safety conditions applicable to electrical devices.
It is prohibited to operate the welding machine in rooms at risk of explosion or fire!
The welding station should be equipped with fire extinguishing equipment.
After finishing work, the device's power cord must be disconnected from the mains.

The above-mentioned hazards and general health and safety rules do not exhaust the issue of welder's work safety, because they do not take into account the specifics of the workplace. An important supplement to them are workplace health and safety instructions and training and instruction provided by supervisory employees.

#### 3. GENERAL DESCRIPTION

The synergic MIG 200 SMART welder is designed for manual welding of steel. It enables welding using the following methods: MMA (covered electrode), TIG Lift, and MIG/MAG in synergistic mode. Thanks to the change of polarity, the device allows for MIG/MAG welding using both standard wires in a protective gas shield and self-shielded flux-cored 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 built-in synergistic system allows less experienced users to select welding parameters.

The device is made in IGBT technology, which allows for a significant reduction in the weight and dimensions of the welder and an increase in efficiency while reducing energy consumption.
The welding machine is intended for use in closed or roofed rooms, not directly exposed to atmospheric influences.


## 4. TECHNICAL PARAMETERS

#### 4.1 Welding machine

| | |
|---|---|
| Supply voltage: | AC 230V 50Hz |
| Maximum power consumption: | 4.6kVA |
| Rated welding current:/ duty cycle | 200A / 60% |
| No-load rated voltage Wire spool diameters: | 78V |
| | 100mm, 200mm |
| Maximum current consumption: | MIG: 19.9 A; MMA: 23.9 A; TIG: 14.8 A |
| Network security | 20A |
| Mass: | 12.5kg |
| Dimensions [mm]: | 430x185x320 |
| Degree of protection: | IP23S |

### 4.2 MIG torch

| | |
|---|---|
| Handle type: | TW-15 |
| Maximum current capacity: | 200A (CO2) |
| Cooling type: | gas |
| Cooling gas flow: | 10-18 l/min |
| Length: | 3m |

**Work cycle**
The duty cycle is based on a 10-minute period. A duty cycle of 60% means that after 6 minutes of operation, a 4-minute break is required. A duty cycle of 100% means that the device can operate continuously without interruption.

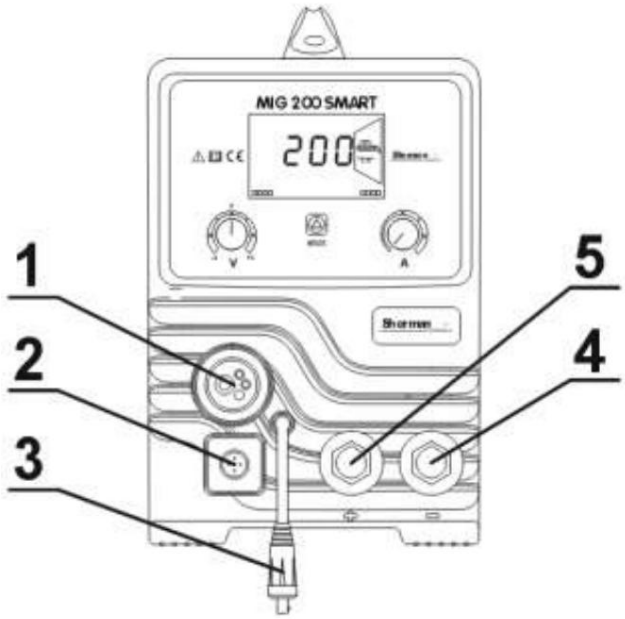
Note! Heating tests were conducted at ambient air temperature. Duty cycle at 20ºC was determined by simulation.

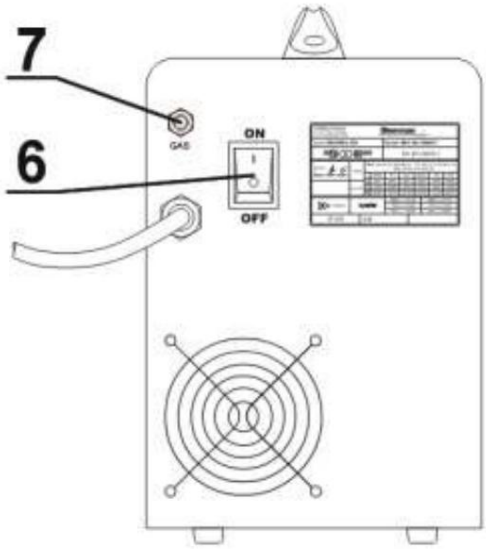
**Degree of protection**
IP specifies the degree to which the device is resistant to the ingress of solid and water contaminants. IP23S means that the device is suitable for operation in closed rooms.

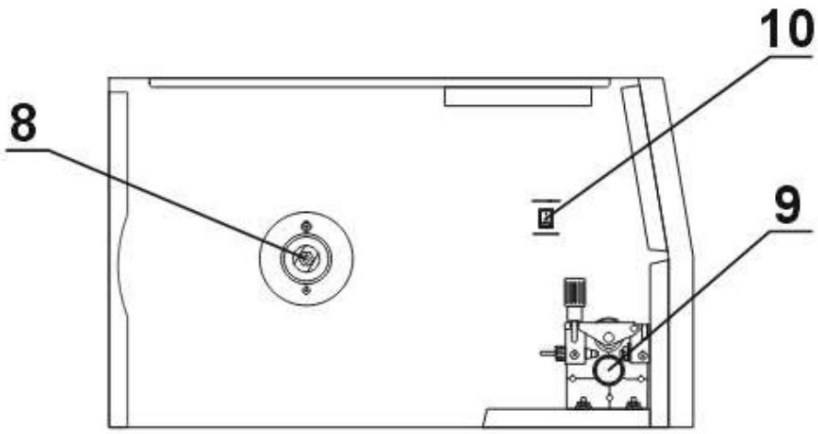
**Overheating protection**
The IGBT module is protected against overheating by a protective device that switches off the welding circuit device. After a few minutes, the welder cools down to a temperature that allows it to be switched on again automatically. Do not disconnect the power supply during this time, because the continuously operating fan cools the internal radiators of the device in order to lower the temperature faster. After restarting, remember to limit the welding parameters in order to continue the continuous operation of the device.

**5. PREPARING THE DEVICE FOR WORK**

**If the device is to be stored or transported in frosty conditions, the temperature must be above freezing before starting work.**



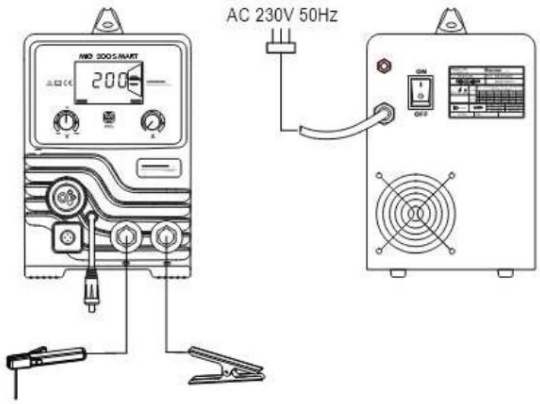



1. MIG gun socket
2. Spool Gun Control Socket 3. Polarity Change Plug
4. Socket "-"
5. Socket "+"
6. Power switch
7. Shielding gas connection stub 8. Wire spool pin
9. Wire feeder
10. Spool Gun Handle Switch

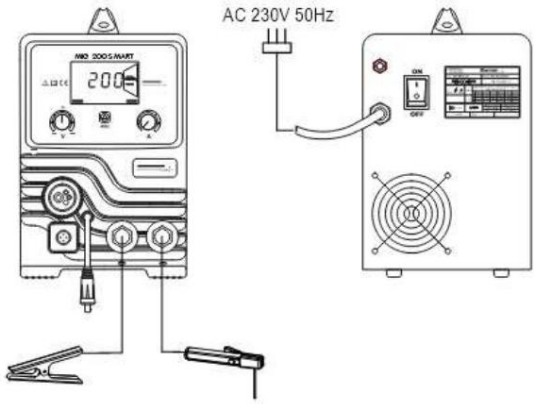
**5.1 Connecting the cables**

**5.1.1 MMA method**

The ends of the welding cables should be connected to the sockets (4) and (5) located on the front panel so that the correct pole for the given electrode is on the electrode holder. The polarity of the welding cable connection depends on the type of electrode used and is given on the electrode packaging (negative polarity DCEN or positive polarity DCEP). The ground cable clamp should be carefully secured to the welded material. Connect the device plug to a 230V 50Hz mains socket.



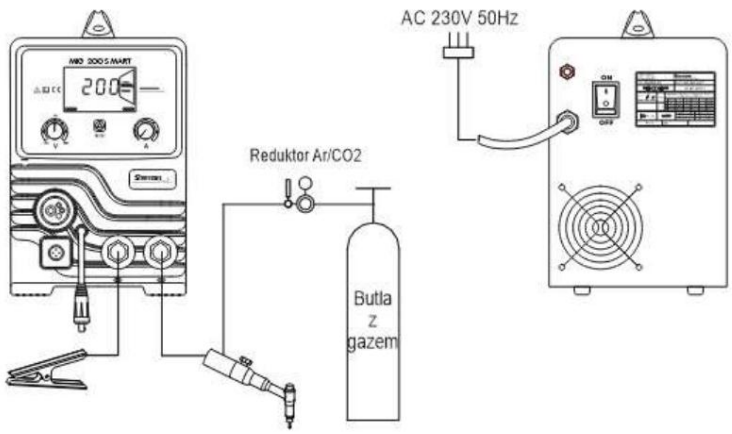

DCEP




DCEN

**5.1.2 TIG method**

For welding with this method, it is necessary to use an additional TIG torch. A gas-cooled torch with a current load of 200A, equipped with a shielding gas control valve, is required.
The current terminal of the handle should be connected to the negative polarity socket (4), and the gas hose to the reducer on the gas cylinder. The positive pole of the source (5) should be connected to the welded material using a cable with a clamp. Connect the device plug to a 230V 50Hz mains socket.

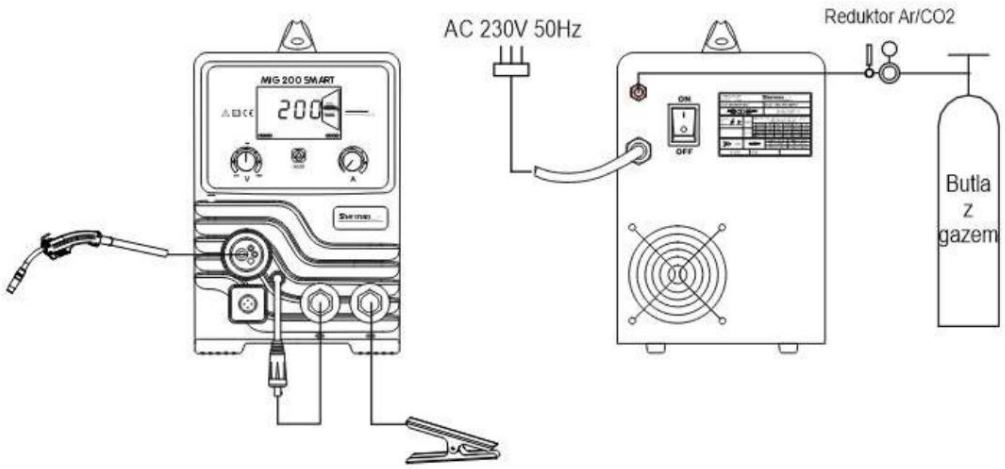



TIG

### 5.1.3 MIG method

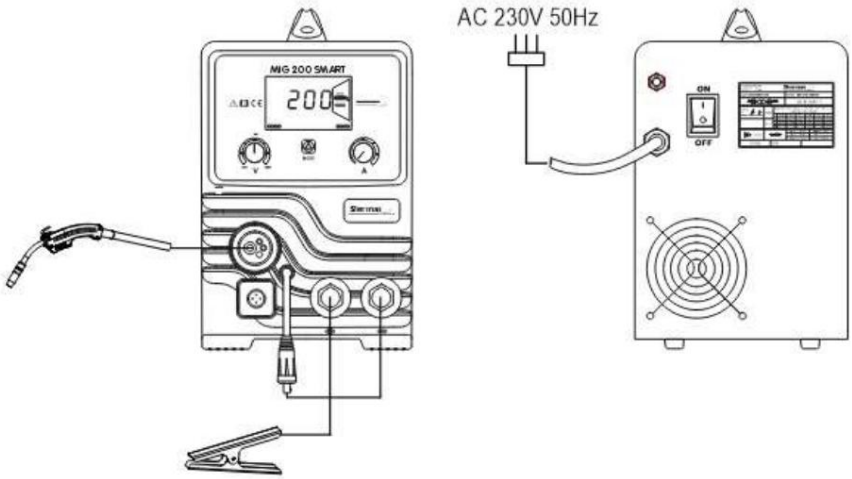
#### 5.1.3.1 Welding in protective gases

The current plug of the torch should be connected to the MIG torch socket (1). The gas hose from the reducer should be led and secured to the gas connector (7) located on the rear wall of the device. The polarity change plug (3) should be placed in the socket (5). The negative pole of the source (4) should be connected to the welded material using a cable with a clamp. Set the switch (10) located inside the feeder chamber to the STANDARD position. Connect the device plug to a 230V 50Hz mains socket.




#### 5.1.3.2 Welding with self-shielded steel wire

The current plug of the torch should be connected to the MIG torch socket (1). The polarity change plug (3) should be placed in the socket (4). The positive pole of the source (5) should be connected to the welded material using a cable with a clamp. Set the switch (10) located inside the feeder chamber to the STANDARD position. Connect the device plug to a 230V 50Hz mains socket.




#### 5.1.3.3 Welding with a Spool Gun (option)

The current plug of the torch should be connected to the MIG torch socket (1). The polarity change plug (3) should be placed in the + socket (5). The negative pole of the source (4) should be connected to the welded material using a cable with a clamp. Switch the switch (10) located inside the feeder chamber to the SPOOL GUN position. Connect the control plug of the torch to the socket (2). Connect the device plug to a 230V 50Hz mains socket.

**5.2 Shielding gas connection**

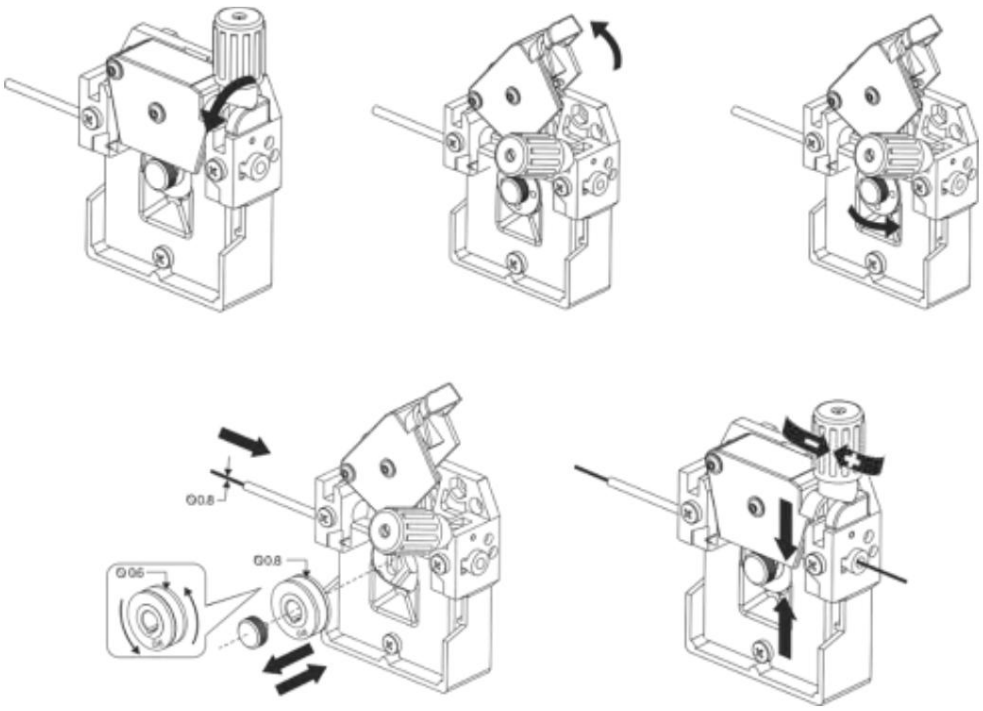
1. Secure the gas cylinder against tipping over.
2. Open the cylinder valve momentarily to remove any contamination.
3. Install the reducer on the cylinder.
4. Connect the reducer with the gas nozzle (7) on the rear wall of the welder using a hose.
5. Unscrew the cylinder and reducer valve.

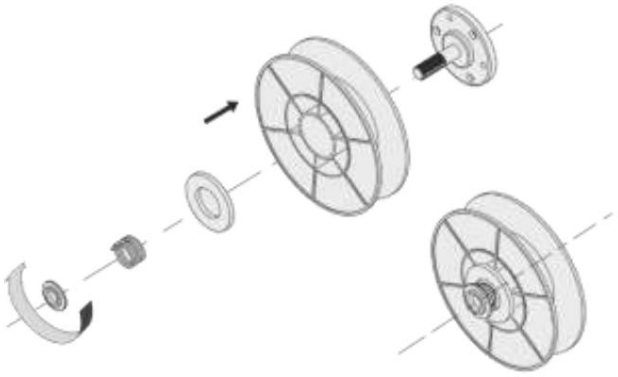
**5.3 Connection to the mains**

1. The device should only be used in a single-phase power supply system, three-wire, with grounded neutral point.
2. The MIG 200 SMART inverter rectifier is designed to work with a 230V50 Hz network protected by 20 A delayed fuses. The power supply should be stable, without voltage drops.
3. The device is equipped with a power cord and plug. Before connecting the power supply, make sure that the power switch (6) is in the OFF position.

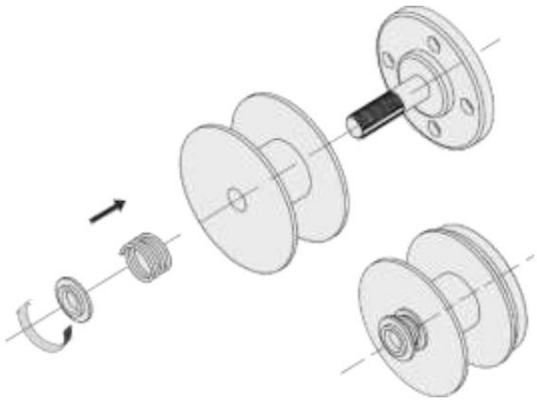
**5.4 Installing the electrode wire spool**

1. Open the side cover of the housing.
2. Check that the drive rollers are suitable for the type and diameter of wire. If necessary, fit the correct roller. For solid steel wires, use rollers with V-grooves and for self-shielded wires, use Flux knurled grooves.
3. Place the spool of electrode wire on the mandrel.
4. Secure the spool against falling.
5. Release the pressure on the feed rollers.
6. Blunt the tip of the electrode wire.
7. Insert the wire through the feeder drive roller into the holder.
8. Press the wire into the grooves of the drive roller.
9. Unscrew the current tip from the holder, turn on the welding machine power supply and pull the wire into the holder welding machine by pressing the button on the MIG torch handle.
10. Once the wire appears in the handle outlet, release the button and screw on the contact tip.
11. Adjust the feed roller pressure by turning the pressure knob. Too low a pressure will result in slipping of the drive roller, too high a pressure will increase the feeding resistance, which may lead to wire deformation and damage to the feeder.

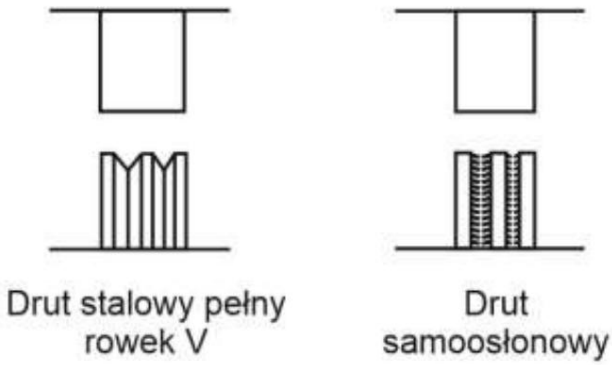




spool D200



spool D100

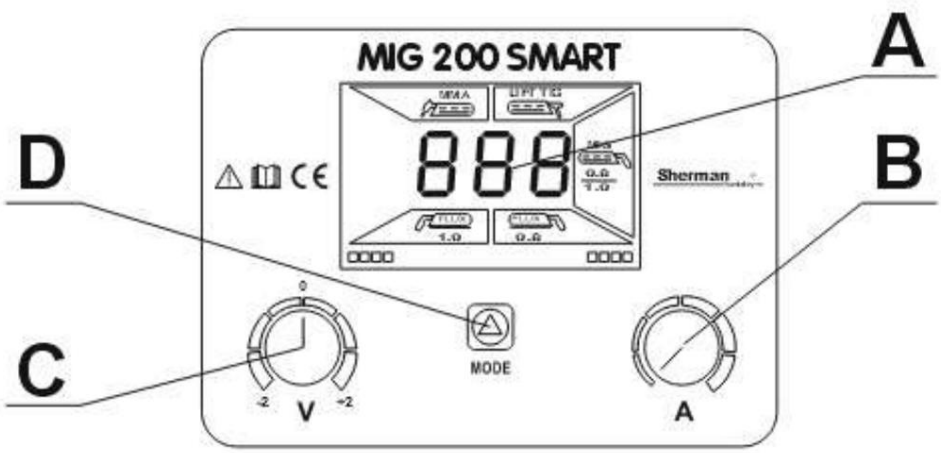



**5.5 Preparing the MIG gun for work**

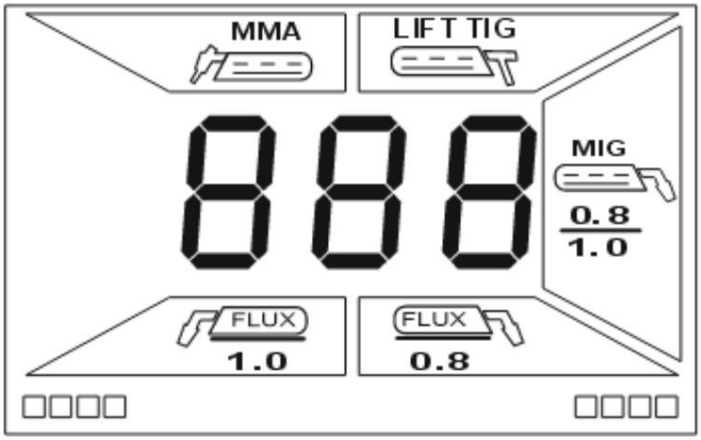
Depending on the type of material being welded and the diameter of the electrode wire, fit the appropriate current tip and wire guide insert to the MIG torch.

**6. SERVICE**

**6.1 Front panel**

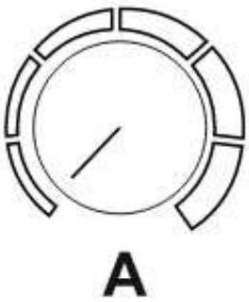


**A – Display**



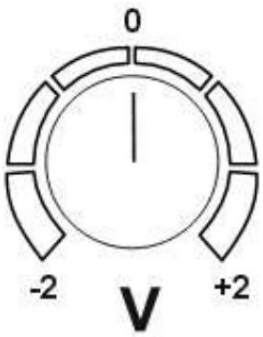

The display shows the welding current and the selected welding method.

**B – Current Adjustment Knob**




The knob is used to adjust the welding current. The value of the set current is indicated by the display.

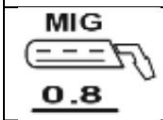
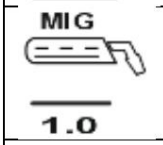
**C - Welding voltage correction knob**




Knob active only during MIG welding. In this method, after selecting the wire diameter and type and setting the welding current, the welder will automatically select the wire feed speed and welding voltage. The welding voltage can be corrected with the knob (D) in the range of -2 - +2V.

**D – Welding method selection button**


The button is used to select the welding method. The selected method is indicated on the display:

| | |
|---|---|
|   | Welding with coated electrode (MMA method) |
|   | TIG Lift welding |
|   | MIG welding with 0.8 wire |
|   | MIG welding with wire 1.0 |
|   | MIG welding with self-shielded flux-cored wire 0.8 |
|   | MIG welding with self-shielded flux-cored wire 1.0 |

**7. PARAMETER SETTINGS**

After selecting the MMA and TIG Lift methods, it is possible to adjust the welding current. After selecting the MIG method, the user can adjust the welding current, and the corresponding welding voltage and wire feed speed will be selected automatically depending on the selected wire type and its diameter. After setting these parameters, it is possible to manually correct the welding voltage.

**Recommendations for selecting parameters**

High quality argon should be used: recommended 4.8 and above

**8. ARC INITIATION**

**8.1 MMA method**

1. Touch the electrode to the workpiece, rub briefly and remove.
2. In the case of arc initiation with electrodes whose coating forms a non-conductive slag after solidification, pre-clean the electrode tip by striking it several times against a hard surface until metallic contact with the welded material is achieved.

**8.2 TIG method**

1. Open the valve on the TIG torch to allow the shielding gas to flow.
2. Lightly touch the welded material with the electrode, remove the electrode from the welded material by tilting the handle so that the gas nozzle touches the material.
3. Once the arc is struck, straighten the torch and start welding.

**8.3 MIG/MAG method**

1. Bring the torch closer to the welded parts so that the distance between the nozzle and the welded parts is elements was approximately 10 mm.
2. Press the button on the welding torch and start welding.

**9. BEFORE YOU CALL FOR SERVICE**

If the device does not function properly, before sending the welding machine to the service center, check the list of basic faults and try to fix them yourself.
Any repairs to the device may only be performed after disconnecting the plug from the power socket.

Note! The device is not sealed and the user can remove the welding machine housing to eliminate minor faults.

| Symptoms | Cause | Procedure |
|---|---|---|
| No power, failure signal or device malfunction | 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 is running) | Roller pressure too weak | Set the correct pressure |
| | Incorrect guide roller groove diameter | Install the correct guide roller |
| | Dirty wire guide in the holder | Clean the electrode wire guide |
| | Electrode wire blocked in the current tip | Replace the contact tip |
| No electrode wire feeding (feeder motor not working) | Device switched to Spool Gun mode | Set the switch (10) in the feeder chamber to the "STANDARD" position |
| Irregular electrode wire feed | Damaged current terminal | Replace the contact tip |
| | The feed roller groove is dirty or damaged. | Clean the roller groove or replace the roller |
| | The wire spool rubs against the walls of the welding machine cover | Secure the wire spool correctly |
| The arc does not ignite | No proper contact of the ground wire terminal | Improve the contact of the ground terminal |
| | Damaged switch in MIG torch | Replace the switch |
| | Improper connection of the MIG gun to the device | Check the condition of the electrical connections of the holder, check if the pins in the socket are not broken or jammed |
| | Device switched to Spool Gun mode | Switch the device to the standard MIG torch mode using the switch (10) in the feed chamber. |
| The arc is too long and irregular | Welding voltage too high | Reduce welding voltage |
| | Wire feed speed too slow | Increase wire feed speed |
| Bow too short | Welding voltage too low | Increase welding voltage |
| | Wire feed speed too high | Reduce wire feed speed |
| After switching on the power, the displays and diodes do not light up | No power supply voltage | Check the fuses at the mains connection |
| The fan is not working | The fan was blocked by a bent cover | Straighten the fan cover |
| Unsatisfactory weld quality when welding with the MIG method | Inappropriate or poor quality materials or consumables used, | Replace consumable parts. Change welding wire or gas cylinder to suitable or higher quality materials |
| | Shielding gas flows at an inappropriate rate. | Check the gas supply hose, improve the connection of the hose with the connectors and the condition of the quick connectors. Check the cylinder reducer |
| Unsatisfactory weld quality when welding using the MMA method, the electrode sticks to the welded material | Incorrect polarity of welding cable connection | Connect the welding cables correctly |
| | Wet electrode. | Replace the electrode |
| | The welder is powered by a generator or by a long extension cord with a cable cross-section that is too small. | Connect the device directly to the mains |
| Unsatisfactory weld quality when welding with the TIG method | Check the quality of the materials and consumables used, especially the tungsten electrode and shielding gas. | Replace consumables, replace the shielding gas with a higher quality one |
| | Shielding gas does not flow or flows with insufficient intensity | Check the cylinder reducer, gas supply hose, improve the hose connection with the connectors and the condition of the quick connectors. |

## 10. OPERATING INSTRUCTIONS

The MIG 200 SMART welder should be operated in an atmosphere free from corrosive components and high dust levels. The device should not be placed in dusty places, near working grinders, etc. Dust and contamination with metal filings of control boards, cables and connections inside the device may lead to an electrical short circuit and, consequently, to damage to the welder.
Avoid operation in high humidity environments, especially where dew occurs on metal parts.

If dew appears on metal elements, e.g. after bringing a cold device into a warm room, wait until it dries completely and the device warms up to the ambient temperature. Starting a cold welder in these conditions may damage it. It is recommended

If the welding machine is to be used outdoors, it should be placed under a roof to protect it from adverse weather conditions.
The MIG 200 SMART device should be used in the following conditions: - changes in the effective value of the supply voltage not greater than 10%
- ambient temperature from -10°C to +40°C
- atmospheric pressure 860 to 1060 hPa
- relative humidity of atmospheric air not exceeding 80%
- altitude above sea level up to 1000m

List of consumable parts:

| No. | For solid steel wires | For self-shielding wires |
|---|---|---|
| 1 | Feeder roller 30x10x10mm | Flux Feed Roller 30x10x10mm |
| 2 | TW-15 M6x25 power tip | |
| 3 | TW-15 current switch | |
| 4 | Gas nozzle TW-15 | |
| 5 | Steel insert 3m | Teflon insert 3m |

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

## 11. MAINTENANCE INSTRUCTIONS

As part of daily maintenance, you should 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 operating conditions) remove the cover and clean the device inside by blowing it with compressed air to remove dust and metal filings from the control boards and electrical wires and connections.

At least once every six months, the general condition of the device and electrical connections should be inspected, in particular:
- condition of electric shock protection -
condition of insulation
- status of the security system
- correct operation of the cooling system

**Damage resulting from operating the welding machine in improper conditions or failure to follow maintenance recommendations is not covered by warranty repairs.**

## 12. STORAGE AND TRANSPORT INSTRUCTIONS

The device should be stored at a temperature of -10°C to +40°C and relative humidity of up to 80%, free from corrosive fumes and dust. The transport of packed devices should be carried out in covered means of transport. During transport, the packed device should be secured against moving and ensured in the correct position.

## 13. COMPLETE SPECIFICATION

| | |
|---|---|
| 1. Welding machine | 1 pc. |
| 2. TW-15 welding torch | 1 pc. |
| 3. Ground cable with clamp | 1 pc. |
| 4. Electrode cable | 1 pc. |
| 5. Gas hose | 1 pc. |
| 6. Operating instructions | 1 pc. |
| 7. Packaging | 1 pc. |

## 14. 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 honored upon presentation by the claimant of proof of purchase (invoice or receipt) and a warranty card with the product name, serial number, date of sale and the stamp of the point of sale.**
**To order a warranty repair, please fill out the form available at www.tecweld.pl in the SERVICE tab. Based on 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 delivered with a welding torch. Complaints about the machine without a welding torch will not be considered.**
**The device sent for complaint must be packed in the original carton secured with original polystyrene shapes. TECWELD is not responsible for any damage to the welder caused during transport.**

If you intend to dispose of this product, do not dispose of it with your normal household waste. According to the WEEE directive (Directive 2012/19/EU) in force in the European Union, separate collection methods 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 used equipment marked with the crossed-out wheeled bin symbol together with other waste.

The user who intends to dispose of this product is obliged to return used electrical and electronic equipment to a collection point for used equipment. Collection points are run by, among others, wholesalers and retailers of this equipment and by municipal organizational units conducting activities in the field of waste collection.
The above statutory obligations were introduced to limit the amount of waste generated from used electrical and electronic equipment and to ensure an appropriate level of collection, recovery and recycling of used equipment.
Correct implementation of these obligations is especially important when used equipment contains hazardous components that have a particularly negative impact on the environment and human health.

TECWELD Piotr Polak
41-943 Piekary ÿlÿskie ul. Szmaragdowa 21/3/6

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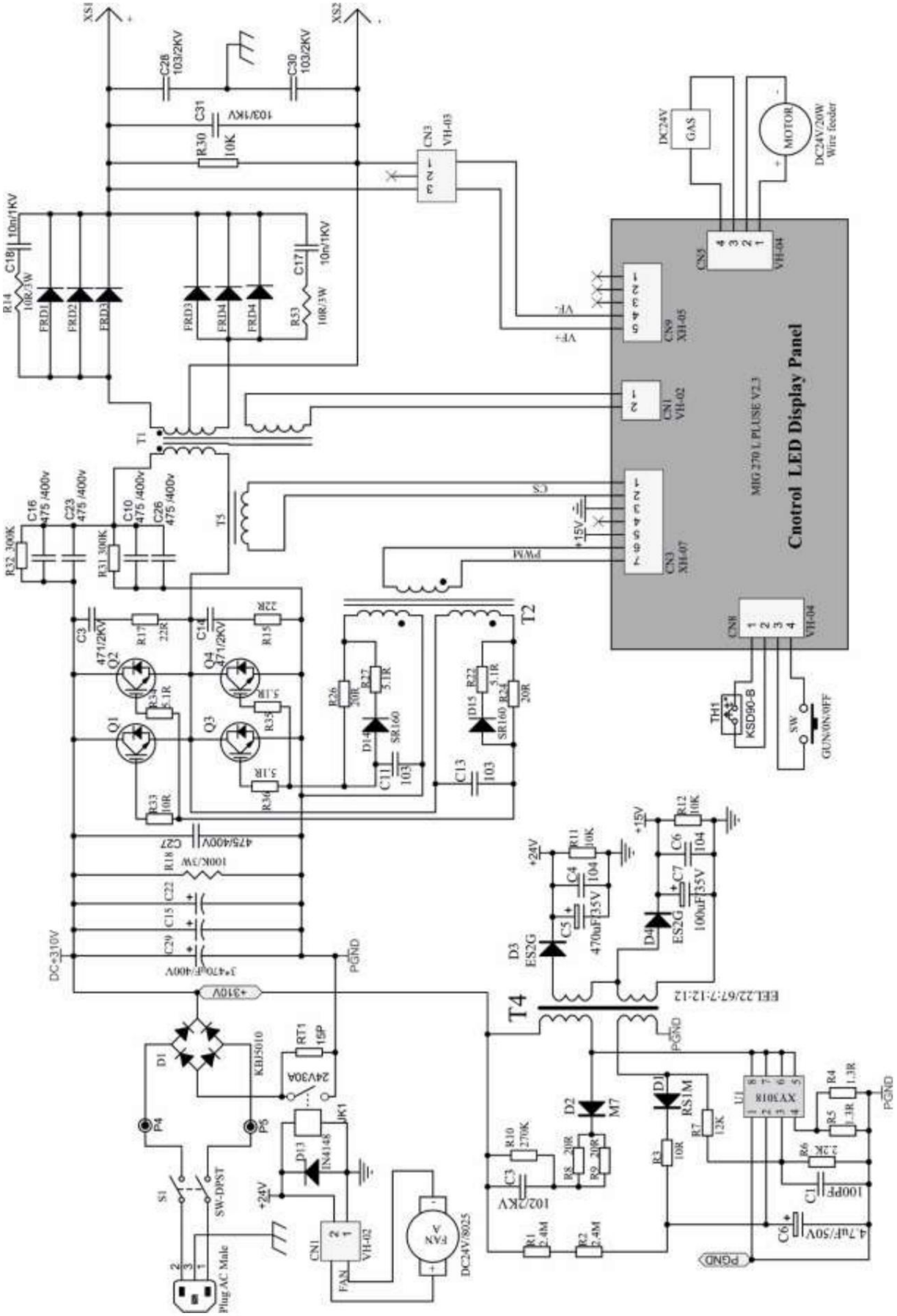
e-mail: info@tecweld.pl, www.tecwel.pl

## 15. ELECTRICAL DIAGRAM



# DECLARATION OF CONFORMITY
# 01/MIG200SMART/2023

Authorized manufacturer representative:
**TECWELD Piotr Polak**
41-943 Piekary ÿlÿskie
ul. Emerald 21/3/6

branch:
41-909 Bytom
1G Krzyÿowa Street
POLAND

We declare that the product listed below:

# Inverter welder

**Trade name:** **MIG 200 SMART**

**Type:** **MIG/MMA 200**

**Manufacturer's trademark:** Sherman hobby

to which this declaration relates complies with the requirements of the following European Union directives and national provisions implementing these directives:

**Low Voltage Directive LVD 2014/35/EU**

**EMC Electromagnetic Compatibility Directive 2014/30/EU**

**RoHS II Directives 2011/65/EU**

and complies with the following standards:

**PN-EN IEC 60974-1:2018-11+A1:2019-06** Arc welding equipment - Part 1: Welding energy sources,

**PN-EN 60974-10:2014-12** Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements,

**PN-EN IEC 63000:2019-01** technical documentation for the assessment of electrical and electronic products electronic in relation to the restriction of hazardous substances.

Year of CE marking on the device: 2022

Bytom, 03/07/2023

Peter the Pole
*(signature of authorized person)*