

USE AND MAINTENANCE MANUAL AND ORIGINAL INSTRUCTIONS Machine: AUTOMATIC ORBITAL WELDER

- **Power Supply: ET200 Compatible Soldering Heads: Closed Series (5H, 10H,**
- **EC40, EC80, EC120, EC170)**

METALSELF S.r.l.
VAT Number: 13261560018
Corso Unione Sovietica 248, 10134 Turin (TO), Italy
Email: info@metalself.com
Website: www.metalself.com

Machine Serial Number: ET.200.01.00000 Year of Manufacture: 0000
*PLEASE READ CAREFULLY AND RETAIN THIS MANUAL PRIOR TO INSTALLING, USING, OR MAINTAINING THE MACHINE.

INDEX

Introduction
Purpose and Utilization of the
Manual Conservation of
Public Destinations Manual
Symbols and Conventions

Chapter 1: SECURITY
1.1. Intended Use and Misuse
1.2. Remaining Risks
1.3. Personal Protective Equipment (PPE)
1.4. Specific Safety Regulations
1.4.1. Electrical Risk
1.4.2. Arc Radiations and Projections
1.4.3. Fumigants and Hazardous Gases
1.4.4. Oversight of Compressed Gas Cylinders
1.4.5. Fire Hazard
1.4.6. Mechanical Hazard
1.4.7. Noise
1.4.8. Electromagnetic Interference (EMI)
1.4.9. Burn Risk

Chapter 2: MACHINE DESCRIPTION
2.1. Overview and Operational Principle
2.2. Technical Specifications ET200 Power Supply
2.3. Technical Specifications of the Welding Head
2.4. Identification of Key Components (ET200 Power Supply)

Chapter 3: TRANSPORTATION, HANDLING, AND STORAGE
3.1. Reception and Evaluation
3.2. Guidelines for Management
3.3. Storage Conditions

Chapter 4: INSTALLATION AND COMMISSIONING
4.1. Environmental and Spatial Requirements
4.2. Electrical Connectivity
4.3. Connecting the Soldering Head, Gas, and Cooling System
4.4. Filling the Cooling Circuit
4.5. Assembly and Installation of the Tungsten Electrode
4.6. Verification of Commissioning

Chapter 5: OPERATIONS
5.1. Overview of the User Interface
5.2. Sequential Operating Procedure
5.2.1. Phase 1: Activation and Initial Assessments
5.2.2. Phase 2: Development of a New Welding Program
5.2.3. Phase 3: Execution of Welding
5.2.4. Phase 4: Cycle Termination (Normal, Soft, Emergency)
5.3. Comprehensive Overview of Interface Functions
5.3.1. Primary Display (Standby)
5.3.2. Automated Programming (Auto Prog)
5.3.3. Manual Programming (Manual)
5.3.4. Program Administration (Select Prog)
5.3.5. Auxiliary Functions (Gas, Water, CW/CCW, Home)
5.3.6. Advanced Functions Display (More)
5.3.7. Printing Function

Chapter 6: TROUBLESHOOTING
6.1. System Alert Notifications 6.2. Diagnostic Table

Chapter 7: MAINTENANCE
7.1. Maintenance Safety Warnings
7.2. Scheduled Maintenance Intervals
7.2.1. Routine Inspections
7.2.2. Weekly Inspections
7.2.3. Monthly Evaluations
7.2.4. Yearly Evaluations
7.3. Maintenance Guidelines
7.4. Maintenance of the Cooling System
7.5. Maintenance of the Soldering Head
7.6. Refining and Substituting the Tungsten Electrode

Chapter 8: REPLACEMENT COMPONENTS
8.1. Procedure for Ordering Spare Parts
8.2. Table of Recommended Spare Parts

Chapter 9: DECOMMISSIONING AND DISPOSAL 9.1. Decommissioning Protocol
9.2. Waste Electrical and Electronic Equipment (WEEE) Disposal Instructions

ATTACHMENTS
Annex A: EU Declaration of Conformity
Annex B: Technical Support Contacts

INTRODUCTION

Identification Plate and CE Marking

The identification plate of the machine, featuring the CE marking, is essential for its traceability, compliance, and safety. It is permanently and clearly attached to the main body of the power supply.

Nameplate Location: The CE identification plate is situated on the rear panel of the ET200 power supply, adjacent to the power cord connection and the main switch.

The following essential information is permanently displayed on the plate, as mandated by the Machinery Directive 2006/42/EC:

- METALSELF Srl
- The machine designation (e.g., Automatic Orbital Welder). The CE
- Marking symbol.
- The model designation (e.g., ET200).
- The distinctive serial number.
- The year of completion.



1. Objectives and Application of the Manual

This manual contains all the information required for the installation, safe usage, proper operation, and routine maintenance of the ET200 orbital welder and its corresponding welding heads. A comprehensive reading and understanding of this document is crucial for ensuring operator safety, machine integrity, and welding quality. This manual is an integral and indispensable component of the product.

2. Manual Storage

The manual must be stored in a designated, dry location that is readily accessible to all authorized personnel throughout the machine's entire operational lifespan. In the event of loss or damage, a replacement copy should be requested from METALSELF Srl. If the machine is sold or transferred, this manual must be provided to the new owner.

3. Intended Audience

The information presented in this manual is designed for qualified and trained personnel.

- **Qualified Operator: A technically proficient individual, trained in the operation of orbital TIG welding machines, who has reviewed and comprehended this manual and is authorized to conduct setup and welding operations.**
- **Qualified Maintenance Technician: An individual possessing specialized skills in electrical engineering and mechanics, authorized to perform maintenance, cleaning, and repair tasks on the machinery, in accordance with the safety protocols outlined herein.**

4. Symbolism and Conventions

The symbols presented in this manual are employed to emphasize messages of differing significance:

- **DANGER: Signifies an imminent hazard that, if not averted, will lead to death or severe injury.**
- **WARNING: Signifies a potentially hazardous situation that, if not averted, could result in death or severe injury.**
- **CAUTION: Signifies a potentially hazardous situation that, if not addressed, may lead to minor or moderate injury, or damage to the machine or workpiece.**
- **NOTE: Offers essential information, insights, or recommendations to facilitate your work and**
- **enhance outcomes.**

SAFETY SIGNS IMPLEMENTED

The machine and the work area must display the following safety pictograms:

Danger	Symbol	Reference	Position
Hazards of non-ionizing radiation *Risk of contact with energized components* *Hazard posed by elevated temperatures*		*W005 Table 2 EN ISO 7010:2021*	*Machine (power supply)*
		*W012 Table 2 EN ISO 7010:2021*	*Power Supply Unit*
		*W017 Table 2 EN ISO 7010:2021*	*Welding apparatus*
Optical radiation risk		*W027 Table 2 EN ISO 7010:2021*	*Power Supply Unit*
Hazards of pressurized cylinders		*W029 Table 2 EN ISO 7010:2021*	*Area di Lavoro*
Obligation	**Symbol**	**Reference**	
Requirement to consult the operator's manual		*M002 table 2 EN ISO 7010:2021*	**Power Supply Unit**
Requirement to wear opaque eye protection		*M007 Table 2 in ISO 7010:2021*	*Area di Lavoro*
Compulsory use of safety footwear		*M008 Table 2 in ISO 7010:2021*	*Area di Lavoro*
Compulsory use of protective gloves		*M009 Table 2 EN ISO 7010:2021 M010 Table 2 EN ISO 7010:2021 M019 Table 2 EN ISO 7010:2021 M026 Table 2 EN ISO 7010:2021*	*Area di Lavoro*
Requirement to don protective attire			*Area di Lavoro*
Compulsory use of a welding mask		*M005 table 2 EN ISO 7010:2021*	*Area di Lavoro*
Requirement to wear a protective apron		*M016 table 2 EN ISO 7010:2021*	*Area di Lavoro*
Requirement to establish a terminal earth connection		*M003 Table 2 EN ISO 7010:2021*	*Power Supply Unit*
Compulsory use of a protective mask			*Area di Lavoro*
Requirement to utilize hearing protection devices			*Area di Lavoro*

Chapter 1

SAFETY

Safety is the paramount consideration when utilizing this equipment. Neglecting to adhere to safety protocols may lead to severe injury, fire, or fatality. The operator bears the responsibility for their own safety as well as that of others present in the work environment.

1.1 Intended Use and Misuse

- **Intended Use: The machine is specifically engineered and constructed for the automatic orbital TIG (Tungsten Inert Gas) welding of thin-walled pipes composed of materials such as stainless steel.** carbon, stainless steel, and titanium alloys. Any other application is deemed inappropriate and not sanctioned by the manufacturer. The machine is designed for professional use within an industrial setting. It is relevant in sectors including electronics, pharmaceuticals, plant installation, the military sector, and nuclear energy.

- **Reasonably Foreseeable Misuse: The following actions are deemed improper and are consequently strictly prohibited:**
  Do not operate the machine in environments with explosive atmospheres or in the presence of dust.
  flammable.
  Welding unverified materials without prior consultation with the supplier.
  Utilize the machine as a pipe thawing apparatus.
  Modify or eliminate safety devices.
  Utilize non-genuine replacement components.
  o Operate the machine in rainy or excessively humid conditions. o Lift the machine by any area other than the specified handles.



1.2 Remaining Risks

Despite the secure design, there remain risks that the operator must recognize and address:

- **Electrical Hazard: The potential for electrocution due to direct or indirect contact with live**
- **components. Thermal Hazard: The risk of burns resulting from contact with the welding head,**
- **electrode, and welded material, which can attain elevated temperatures.**
  Optical Radiation: The welding arc produces intense visible and infrared (IR) radiation.
- Ultraviolet (UV) rays are highly detrimental to both the eyes and skin.
  Fumes and Gases: The welding process produces fumes and gases that pose health risks. Shielding gas
- Argon can induce asphyxiation in poorly ventilated environments.
- **Fire Hazard: Sparks and splashes of molten metal can ignite fires when flammable materials are present.**
  Mechanical Risk: The potential for crushing or entangling fingers or clothing by
  component of the rotating crown of the welding head.
- **Noise: If the noise generated exceeds 70 decibels, it can result in permanent hearing damage.**

1.3 Personal Protective Equipment (PPE)



It is essential to consistently don the following personal protective equipment (PPE) during welding operations:

- **Welding helmet: Conforms to EN 379, featuring a suitable filter (recommended protection level DIN 9-13) to safeguard against UV/IR radiation.**
- **Protective clothing: Composed of flame-retardant material, it envelops the entire body to safeguard against projections and radiation.**
- **Welding gloves: Dry, leather, heat-resistant, and mechanically durable, designed to safeguard your hands.**
- **Safety footwear: Featuring a reinforced toecap and an insulating sole.**
- **Hearing protection: Use earmuffs or earplugs in environments with elevated ambient noise levels.**
-

1.4 Specific Safety Guidelines

- **1.4.1 Electrical Risk**

The primary risk is electrocution due to contact with live components. To avert accidents, adherence to the following guidelines is essential:



- Avoid contact with electrical components using bare hands or damp clothing.
- Ensure that the power supply is connected to an effective grounding system.
- Regularly inspect all cables and promptly replace any that are damaged.
- Always ensure the machine is turned off and unplugged prior to performing any maintenance.

- **1.4.2 Arc Radiations and Projections**

The welding arc produces intense ultraviolet and infrared radiation, which poses a risk to the eyes and skin.



- Always don a proper welding helmet prior to initiating the arc. Safeguard others in the
- vicinity with fire-resistant screens or curtains.

- **1.4.3 Fumigants and Toxic Gases**

The fumes produced during welding, along with the shielding gas (Argon), pose health risks.



- Always operate in a well-ventilated environment and, when feasible, utilize localized extraction systems.
- Avoid welding in confined spaces without proper forced ventilation and sufficient oxygen monitoring, as Argon can lead to asphyxiation.

- **1.4.4 Oversight of Compressed Gas Cylinders**

Inadequate management of gas cylinders may result in explosions or fires.



- Cylinders must always be secured in an upright position on a stand to prevent them from toppling.
- Maintain a safe distance between cylinders and heat sources, as well as the welding area.
- Never permit the electrode or ground clamp to make contact with the cylinder.

- **1.4.5 Fire Hazard**



Sparks and splashes of molten metal can readily ignite fires.

- Eliminate all combustible or flammable materials from the workspace.
- Always maintain an appropriate fire extinguisher readily available, ideally Class C for electrical equipment.

- **1.4.6 Mechanical Hazard**



The primary mechanical hazard arises from the rotating crown of the welding head, which poses a risk of crushing or entangling fingers or clothing. It is crucial to exercise utmost caution and maintain a safe distance with your hands.
distance during operation.

- **1.4.7 Noise**



Noise levels exceeding 70 decibels can result in permanent hearing damage.

- In environments with elevated noise levels, the use of hearing protection, such as earmuffs or earplugs, is essential.

- **1.4.8 Electromagnetic Interference**

To mitigate electromagnetic interference that may disrupt other equipment, it is advisable to:



- Conduct routine maintenance on your welder.
- Maintain cables at the shortest length feasible and position them in close proximity to one
- another or near the ground. Shield cables and equipment to minimize radiation exposure.

- **1.4.9 Fire Risk**

The welded components and the head attain temperatures exceeding 100˚C during and subsequent to the welding process.



- Avoid direct contact with the electrode, welding head, and workpiece using bare hands following the welding process.
- Always don dry, heat-resistant protective gloves when handling freshly welded components. Allow the parts to cool naturally. Never submerge hot electrodes in water for cooling.
- When operating at elevated currents, if the surface temperature of the head surpasses 90°C, cease work and allow it to cool down.

Chapter 2

MACHINE SPECIFICATION

2.1 Overview and Operational Principle

The orbital welding system comprises two primary components: a power supply and a welding head.

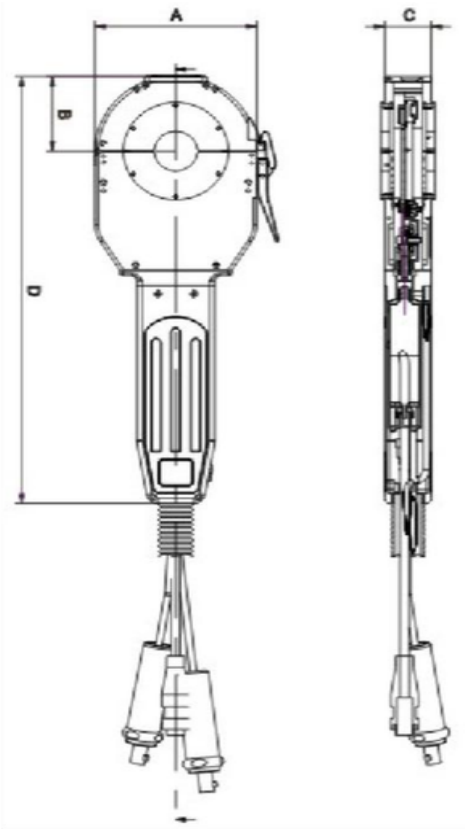
- The ET200 power supply is a microprocessor-controlled inverter TIG welding source. It produces the welding current, regulates the flow of shielding gas (argon) and coolant, and manages all process parameters through a touchscreen interface.
- The welding head is a mechanical apparatus that affixes to the pipe designated for welding. It features a tungsten electrode positioned on a rotating crown that pivots 360° around the joint, generating a continuous, high-quality weld.

The system enables the storage of up to 200 welding programs, ensuring high repeatability and process traceability, aided by the integrated printer.

2.2 Technical Specifications ET200 Power Supply

Model	**Value**	**Source**
Attribute	ET200 power supply unit	
	Type	inverter
Input Voltage	220VAC ±10% / 110V (optional)	
Frequency	50/60Hz	
Power Consumption	4.5KVA	
Welding Current	5~200A	
Current Control	DC and pulsed, including report generation	
Notable Programs	200	
Dimensions (L x W x H)	500 x 380 x 300 mm Water	
Cooling System	circulation, integrated English	
Languages	(Italian supported)	
Interface	28 Kg < 70 dB(A)	
Weight		
LpA		

2.3 Technical Specifications of Welding Heads (Closed Series)

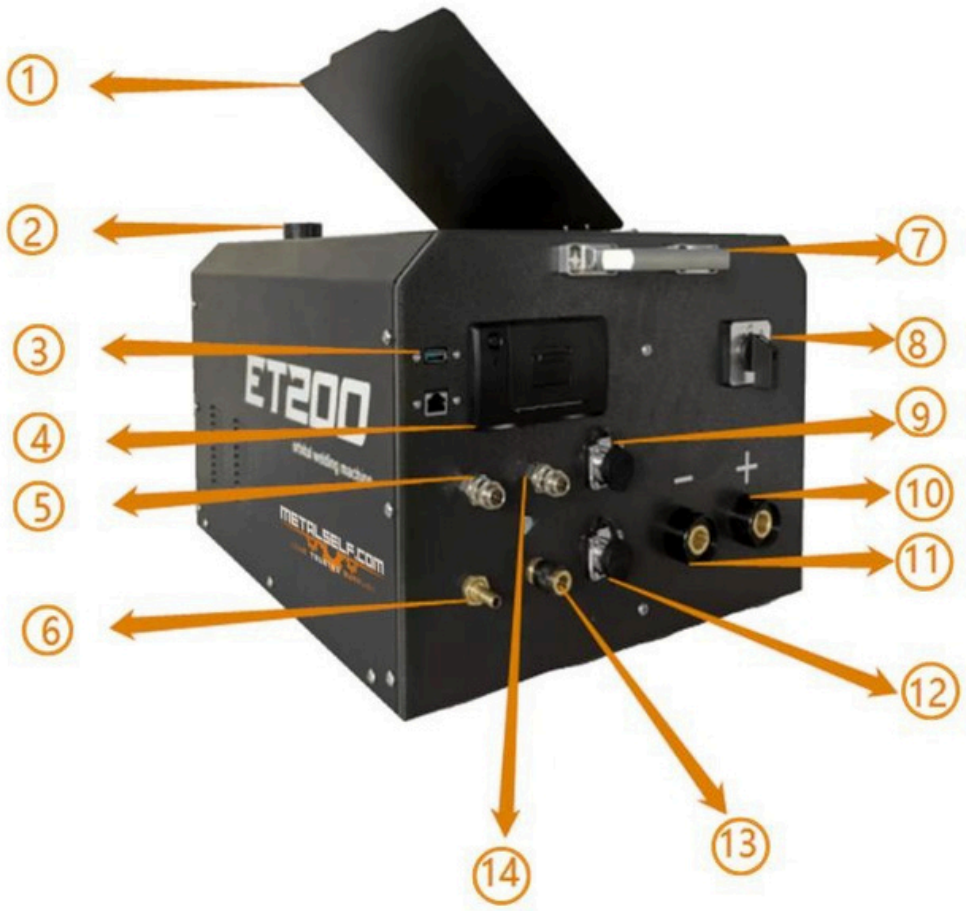


Model	EC40	EC80	EC120
Dimensions (mm)			
A	95	155	184
B	48	75	88
C	37	42	47
D	374	425	503



Model	Welding Area (mm)	Maximum Thickness (mm)	Gas Cooling Technique		Weight (kilograms)
5H	ϕ 6.35 - ϕ 12.7	≤ 1.5	Water circulation	Argon	1.5
10H	ϕ 6.35 - ϕ 25.4	< 2 <	Water circulation	Argon	1.8
EC40	ϕ 6.35 - ϕ 38.1	2.5 ≤	Water circulation	Argon	3.5
EC80	ϕ 12.7 - ϕ 76.2	3 ≤ 3	Water circulation	Argon	5
EC120	ϕ 19 - ϕ 114.3 ϕ	≤ 3	Water circulation	Argon	6.5
EC170	50.8 - ϕ 165.2		Water circulation	Argon	14

2.4 Identification of Primary Components (ET200 Power Supply)



Screen Protector Cover: Safeguards the touch screen display against impacts and debris.
2. Coolant Reservoir Cap: Unscrew to introduce coolant.
3. USB port: Facilitates the export of welding reports to a USB drive for traceability.
4. Printer: Thermal printer designed for generating a paper report detailing the welding parameters.
5. Water Return Fitting (blue): Connects the coolant return hose from the soldering unit.
6. Gas Inlet Connection: Attach the hose from the Argon cylinder.
7. Carrying Handle: Designed for lifting and transporting the unit.
8. Main Power Switch: Activates and deactivates the primary power supply to the machine.
9. Head Control Connector (9 pin): Facilitates the connection of the head control signal and button wire. soldering.
10. Positive (+) Terminal: Connection point for the ground cable.
11. Negative Terminal (-): Connection point for the power cable of the soldering head.
12. Head Motor Connector (7 pins): Supplies power and regulates the rotation motor of the welding head. 13. Gas Output Connection: Links the hose that transports the shielding gas to the welding head.
14. Water Supply Connection (red): Links the coolant supply hose to the welding head.

Chapter 3

TRANSPORTATION, HANDLING, AND STORAGE

3.1 Reception and Evaluation

Upon receiving the machine, examine the packaging for any transport-related damage. If any damage is detected, promptly contact the carrier and METALSELF Srl. Unpack the contents and confirm that the shipment is complete and that the machine exhibits no visible damage.

3.2 Guidelines for Management

WARNING: Handling should be conducted by trained personnel.

- The ET200 power supply has an approximate weight of 28 kg. Always lift the unit by the handle while maintaining proper posture to prevent back injuries.
- The soldering heads have a weight range of 1.5 kg to 14 kg. Exercise caution when handling them to prevent impacts that may compromise the precision mechanisms.
- Never pull the machine by its cables.

3.3 Storage Conditions

If the machine is not utilized for an extended duration, store it in its original packaging in a suitable location:

- Shielded from precipitation and safeguarded.
- With an ambient temperature range of -10°C to +50°C, it is
- safeguarded against dust and corrosive agents.

Chapter 4

INSTALLATION AND COMMISSIONING

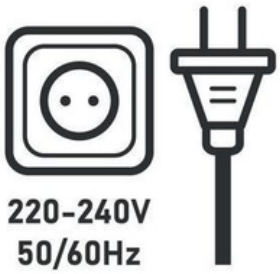
4.1 Environmental and Spatial Requirements

Position the machine on a level, stable surface capable of supporting its weight. Maintain a clearance of at least 50 cm around the machine to facilitate proper ventilation and access for maintenance. The workspace should be well-lit and adequately ventilated.

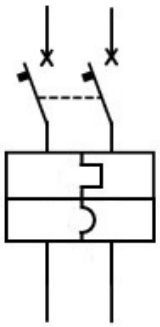
4.2 Electrical Connection

DANGER: The electrical connection must be performed by a licensed electrician.

1. Verify that the voltage and frequency of the electrical network align with those specified on the machine data plate (220VAC ±10%, 50/60Hz).



2. The power supply line must be safeguarded by a differential circuit breaker appropriate for the machine's power consumption (4.5 KVA).



3. Utilize an industrial outlet and plug that adhere to current regulations. Confirm that the ground connection is effective.



4.3 Connecting the Soldering Head, Gas, and Cooling Systems



1. **Switching off the machine: Ensure that the main switch (8) is set to 'O' and that the plug is disconnected.**
2. **Connect the power and ground wires: Insert the black connector into the negative (-) terminal and the red connector into the positive (+) terminal, ensuring they are securely locked. Attach the ground clamp to the workpiece to be welded, positioning it as close to the joint as feasible.**
3. **Connecting the controls: Insert the 9-pin and 7-pin connectors (9, 12) by aligning the guides and securing the ring nut.**
4. **Connect the gas supply.** Utilize an Argon pressure regulator fitted with a flow meter to ensure quality. For optimal welding, it is advisable to utilize a double flowmeter reducer, which enables effective management. separately the torch shielding gas and the internal flushing gas within the tube. *Connect the output of the initial flow meter at the junction **Gas inlet (6) of the machine. Regulate the flow for safety.** Set the torch to a flow rate between 15 and 20 L/min. Connect the output of the second flow meter to the internal flushing (or purging) tube of the pipe designated for welding. The flow in this secondary circuit must be adjusted based on the pipe's diameter to guarantee complete saturation of the inert gas within. * Connect the Gas Output fitting (13) of the machine to the pipe that delivers gas to the welding head.
5. Connect the cooling system: Attach the water pipes using quick couplings: flow (14) and return (5).

4.4 Filling the Cooling Circuit

1. Remove the tank cap (2).
2. Gradually fill the tank with distilled water (refer to Chapter 8) until it attains the MAX level. Secure the cap once more.
3. Upon activation, engage the "Water" function (Water Test) for several seconds to purge air from the
4. circuit and replenish as needed.

5.

4.5 Tungsten Electrode Assembly



1. Select an electrode with the suitable diameter.
2. Sharpen the tip at an angle of roughly 30°.
3. Insert the electrode into the holder.
4. **CAUTION: The electrode tail must NOT extend beyond the inner surface of the gear ring.** Modify the distance between the tip and the workpiece to approximately 1 to 1.5 mm.
5. **Centering the electrode: After adjusting the distance between the tip and the workpiece**
6. **(approximately 1-1.5 mm), meticulously verify that the tip of the tungsten electrode is precisely centered and positioned equidistantly between the two pipes to be welded. Proper alignment is crucial to guarantee consistent penetration and a symmetrical weld around the entire circumference.**
   Secure the M3 screw to fasten the electrode.
7.

4.6 Commissioning Inspections

Before commencing the initial welding cycle, conduct the following final checks to guarantee the safety and proper functioning of the machine:

- **Check Connections: Ensure that all wires (power, ground, control) and pipes (gas, water) are securely connected and free from leaks.**
- **Auxiliary Function Test: In "Test Mode," conduct a final, concise assessment of the "Gas" and "Water" functions to verify appropriate flow in both circuits.**
- **Work Area Inspection: Ensure that the area is devoid of flammable materials, that ventilation is sufficient, and that protective measures for third parties (such as screens or fireproof curtains) are in place.**
- **Presence of PPE: Ensure that the operator is equipped with all required Personal Protective Equipment.**
- **Ground Clamp: Ensure that the ground clamp is securely fastened to the workpiece, positioned cleanly, and located as close to the joint as feasible.**

Chapter 5

OPERATION

5.1 Overview of the User Interface

The user interface features a touch-screen display that enables control over every facet of the welding process.



5.2 Sequential Operating Procedure

5.2.1 Phase 1: Activation and Initial Assessments

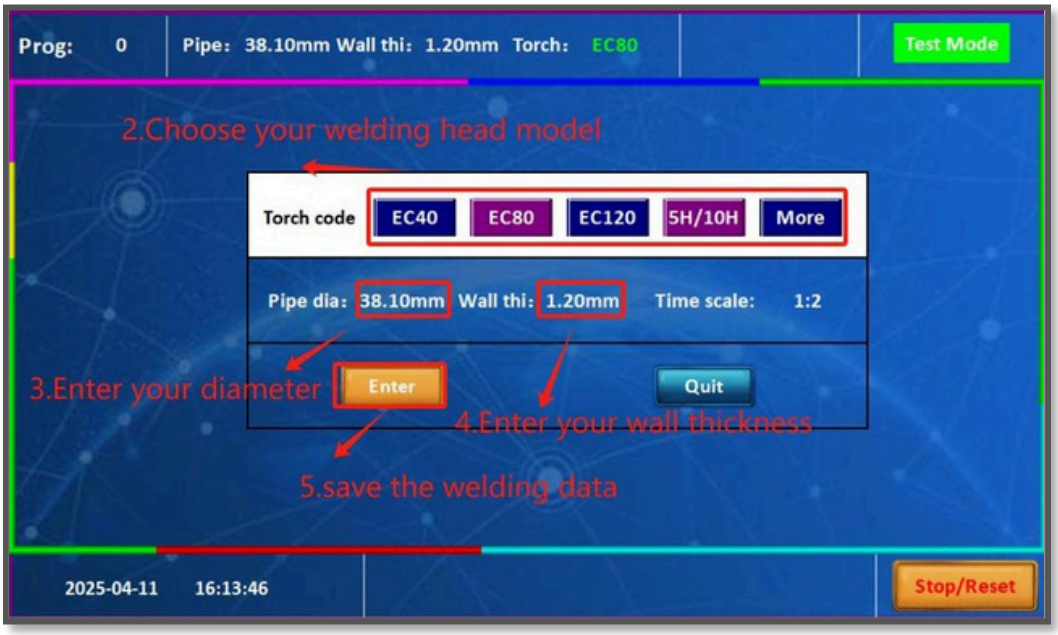
1. Activate the machine by using the main switch (8). The system will initiate and present the display screen.
   on Standby.
2. Verify that the machine is
operational.

Test Mode (green button in the upper right corner).

3. Conduct a gas test by pressing the "Gas" button. Verify the flow on the flowmeter and ensure the absence of
   of leaks. The examination endures for 10 seconds.
4. Conduct a cooling circuit test by pressing and holding the "Water" button. Verify that
   The liquid circulates
5. appropriately.

5.2.2 Phase 2: Development of a New Welding Program

1. From the Standby screen, select "Auto Prog."
2. A dialog box appears. Choose the welding head model you are utilizing (e.g., EC80). Input the
3. pipe's outer diameter (e.g., 38.10 mm) and wall thickness (e.g., 1.20 mm) using the numeric keypad.
4. Press "Enter" to confirm. The system automatically generates the expert welding specifications.



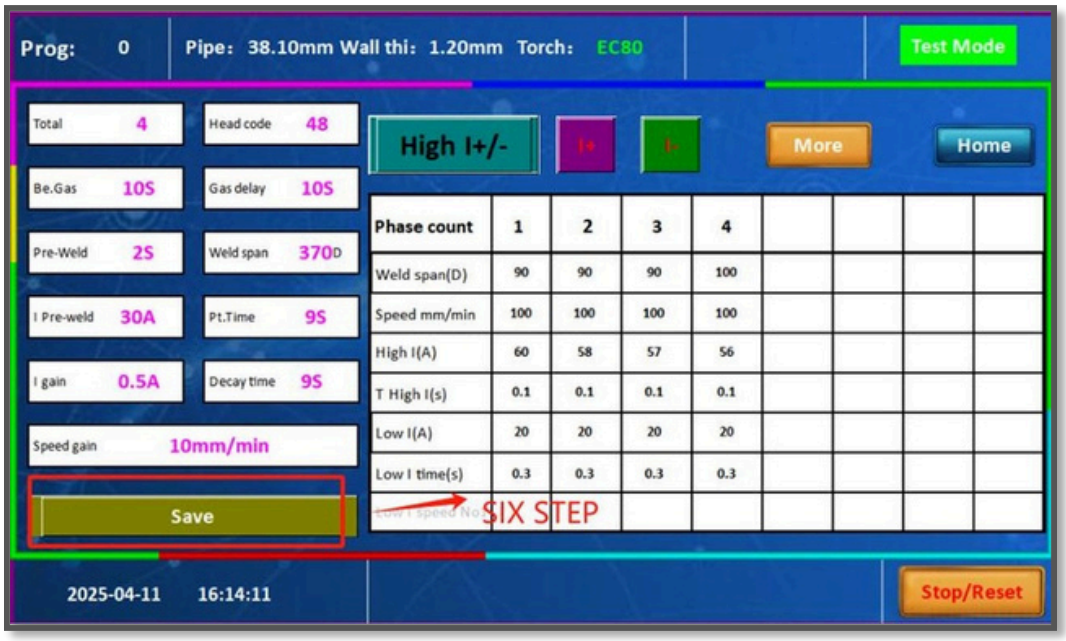
NOTE: When developing the program, the system permits you to select between two existing delivery modes by adjusting the "Time scale" parameter:

- **Time scale 1:1 (DC Welding): Establishes a constant current (Direct Current). This mode is straightforward and efficient, making it suitable for thicker materials.**
- **Time scale 1:2 (Pulsed Welding): Establishes a current that oscillates between a high peak and a baseline value.** Low (Pulse Welding). This mode provides precise thermal regulation, prevents overheating, and is particularly suited for thin-walled pipes, stainless steel, and titanium, resulting in cleaner welds.

I am waiting.	DC (Direct Current) Welding provides a constant	**Pulsed Welding**
Principle of Heat	**and stable current throughout the welding process.** welding.	The current oscillates between elevated peak levels and diminished background levels.
Control in Welding		Accurate temperature regulation prevents overheating or rupture.
Quality Material	Consistent heat application, reduced flexing.	
Spectrum	Steady weld pool, appropriate for standard joints.	Cleaner, more polished welds with reduced spatter.
User-Friendliness	Optimal for thicker wall pipes and various applications.	Ideal for thin-walled tubing, stainless steel, titanium, and high-performance materials.
	Streamlined and effective operation.	Demands increased control while providing enhanced precision. Aerospace, semiconductor, pharmaceutical, and high-precision sectors.
	General industry, stainless steel, carbon steel.	
Applications		

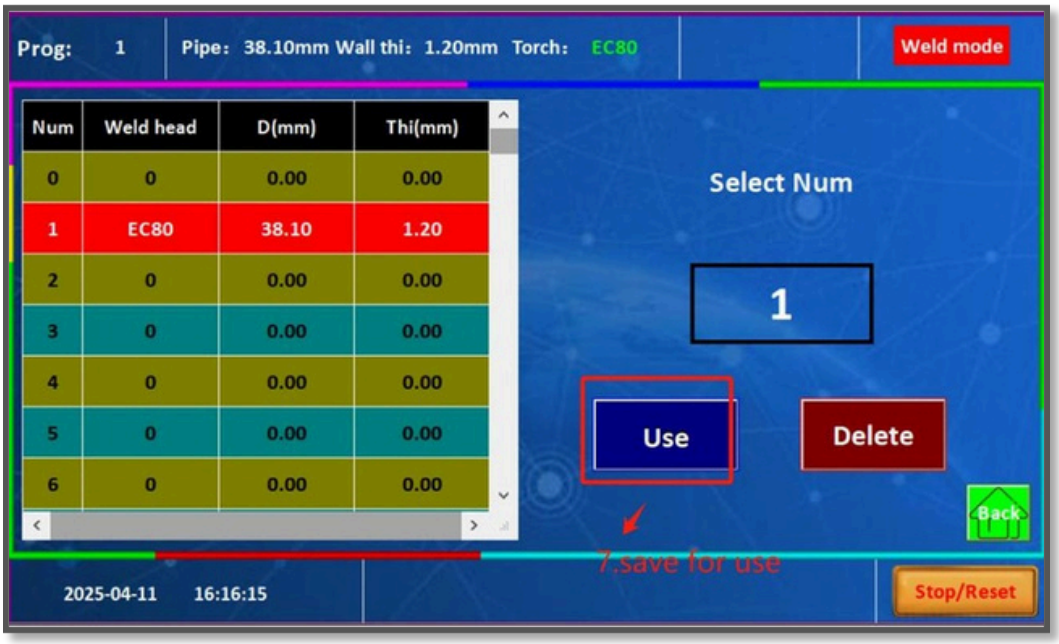
5. This directs you to the parameter editing page. Typically, it is unnecessary to modify the current or speed values. It is advisable to adjust only the throttle timing.

   o Be.Gas (Before Gas): Pre-flow duration for gas (approximately 20 seconds).
   o Gas delay: Post-flow duration for gas (approximately 20 seconds).



6. Press "Save" to record the parameters.

7. The system will prompt you to assign a program number (ranging from 0 to 199). Choose an available number or overwrite an existing one, then press "Use."



8. The system reverts to the main screen, now featuring the newly loaded program.

5.2.3. Phase 3: Execution of Welding

Position and secure the soldering head on the joint designated for soldering.

On the main screen, select the "Test Mode" button to transition to "Weld Mode."

Welding. The button will illuminate in red.

3. WARNING: Don your welding helmet. The machine is prepared to initiate the arc.

Press the "Start" button on the touch screen or double-tap the button on the welding head to

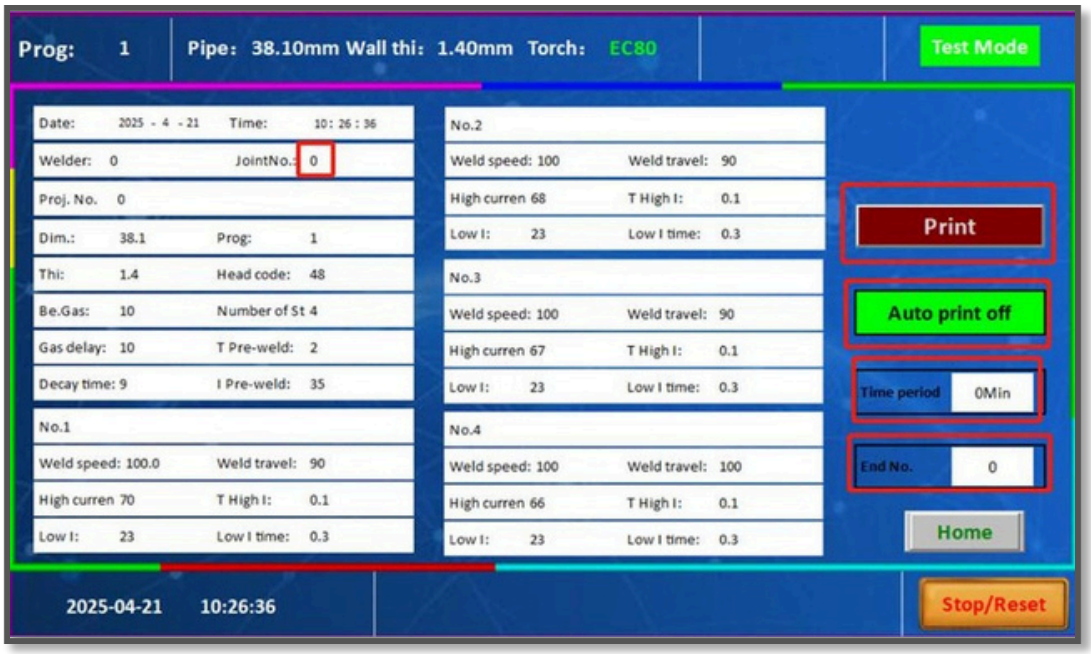
Initiate the welding cycle.

5. The cycle will operate automatically: pre-gas, arc initiation, rotation, and welding, followed by shutdown.

arc, post-gas.

6. Upon completion, the machine ceases operation. If the "Auto print" function is enabled, it will automatically print the

report. If the "Home Switch" function is enabled, the head will revert to its original position.



5.2.4. Phase 4: Halting the Cycle

Soft Stop: Press the "Decay" button during the welding process. The current and speed will gradually diminish until the welding ceases.

Emergency Stop: Press the "Stop/Reset" button located at the bottom right. The cycle will halt immediately. This function should be utilized solely in genuine emergencies to prevent damage to the workpiece.

5.3. Comprehensive Overview of Interface Functions

5.3.1. Primary Display (Standby)
The main screen serves as the primary interface upon powering on the device. From this point, users can access all operational and programming functions of the machine. The currently loaded program (Prog:) is shown in the top left corner, while the operating mode (Test Mode or Weld Mode) is indicated in the top right corner.

5.3.2. Automated Programming (Auto Prog)
This feature aims to streamline the development of a welding program. The operator merely selects the welding head model and inputs the pipe's outer diameter and wall thickness. The system automatically produces expert welding parameters, enabling even individuals with limited knowledge of the process to commence swiftly.

5.3.3. Manual Programming (Manual)

This mode enables the seasoned operator to meticulously adjust each parameter of the automatically generated or manually created program. Pre- and post-flow durations, peak and base current values, pulse durations, rotation speed for each sector, and various other advanced parameters can be modified to enhance welding according to specific requirements.

5.3.4. Program Administration (Select Prog)
This function enables access to the library of stored programs (ranging from 0 to 199). From this interface, you can select an existing program to load, overwrite it with new parameters, or delete it.

5.3.5. Auxiliary Functions (Gas, Water, CW/CCW, Home)

These buttons initiate manual operations for managing and preparing the machine:

- **Gas: Activates the Argon gas flow for 10 seconds to facilitate the verification of the flow rate on the flow meter and to check for leaks.**
- Water: Engages the cooling circuit pump. Pressing and holding the button activates the Circulation of the liquid to expel air from the circuit and verify proper functioning.
- CW / CCW (Clockwise / Counterclockwise Rotation): Pressing and holding one of the two buttons regulates the Manual rotation of the welding head crown in the desired direction facilitates precise electrode positioning.
- **Home: Automatically repositions the welding head crown to its original (or "home") location, as previously established by the operator.**

Chapter 6

TROUBLESHOOTING

Alert Notification / Issue	Probable Cause	Solution
Failure to initiate arc failure	1. No electric arc was generated. 2. The electrode is positioned too far from the workpiece. 3. Ground clamp not secured or suboptimal connection. 4. Incorrect or absent gas.	1. Inspect the gas circuit. 2. Verify that the ground clamp is properly connected. correctly. 3. Disable the I>0 function in the advanced settings. 4. Resharpen the tungsten electrode.
Rotational fault	1. Rotation is restricted. The soldering head is not properly connected. 3. Encoder malfunction or disconnection.	1. Verify that the rotation is functioning normally in test mode. 2. Verify that the parameters are accurate. 3. Verify the speed code card.
Voltage disruption	1. Voltage < 7V: The electrode has made contact with the workpiece. 2. Voltage exceeding 13V: arc length is excessive.	1. Verify that the distance between the electrode and the workpiece is maintained between 1 and 1.5mm. 2. Deactivate the voltage sampling function.
Gas circuit malfunction	1. The gas cylinder is closed. 2. Gas flow is insufficient. 3. Gas circuit malfunction.	Examine the cylinder. 2. Verify the gas flow. 3. Disable the gas detection feature.
Parameter error	1. No parameters configured. 2. Improper parameter configuration.	1. Confirm that the information at the top of the screen is visible. 2. Execute automatic programming and choose a new program number.

Chapter 7

MAINTENANCE

WARNING: Prior to conducting any maintenance, ensure the machine is powered off and the power supply is disconnected. Allow a duration of 2 minutes for the capacitors to fully discharge. Maintenance should only be carried out by qualified personnel.

7.1 Safety Precautions for Maintenance

- Always utilize genuine spare parts.
- Never conduct maintenance while the machine is powered on. If uncertain,
- please reach out to authorized technical support.

7.2 Scheduled Maintenance Plan

7.2.1 Daily Inspections (Prior to Use):

- Conduct a visual inspection of the cables and hoses for any signs of damage or wear.
- Verify the coolant level (distilled water).
- Verify the pressure of the argon cylinder and the flow rate setting on the regulator.
- Assess the condition, sharpness, and proper centering of the tungsten electrode.

7.2.2 Weekly Inspections:

- Conduct a comprehensive external cleaning of the machine and the welding head.
- Meticulously cleanse the welding head clamps of all residues.

7.2.3 Monthly Evaluations:

- Clean the interior of the power supply (ensuring the machine is
- unplugged). Verify the tightness of all accessible electrical connections.

7.2.4 Yearly Evaluations:

- Thoroughly replace the distilled water within the cooling circuit.
- Request a general inspection and calibration performed by an authorized METALSELF Srl technician.

7.3 Maintenance Guidelines

- **External Cleaning: Employ a soft, dry cloth to clean the exterior of the power supply and the soldering head. Avoid the use of solvents or abrasive detergents.**
- **Internal Cleaning (Monthly): With the power supply disconnected, remove the cover. Utilize a vacuum cleaner or low-pressure compressed air to carefully eliminate any dust that has accumulated on the internal components and fans, exercising utmost caution to avoid damaging the electronic circuitry.**

7.4 Maintenance of the Cooling System

- **Level Check (Daily): Ensure that the distilled water level in the tank remains near the MAX level. Replenish as needed.**
- **Fluid Replacement (Annual): Thoroughly drain the tank and circuit. Refill with fresh distilled water to inhibit the growth of algae or the accumulation of deposits.**

7.5 Maintenance of the Soldering Head

- Maintain the cleanliness of the rotation mechanisms (gear ring) and collets to guarantee smooth operation and secure locking.
- Regularly examine the electrode holder and connecting cables, confirming that there are no indications of overheating or deterioration.

7.6 Sharpening and Replacing the Tungsten Electrode

- **Sharpening: The electrode should be regularly sharpened using a specialized diamond wheel. This process must be conducted longitudinally to form a conical tip with an angle of** approximately 30°. A finely honed tip guarantees a consistent arc.
- **Replacement: Replace the electrode when it is insufficiently long to be securely locked or when the tip is irreversibly contaminated. Always ensure that the new electrode is installed in accordance with the centering instructions (section 4.5).**

Chapter 8

REPLACEMENT
COMPONENTS

8.1. Procedure for Ordering Spare Parts

Utilize only genuine spare parts provided by METALSELF Srl to ensure the safety and performance of the machine.

8.2. Suggested Spare Parts Table

Spare Part Code (METALSELF)	Description
MS-ET200-FUSE-5A	5A power protection fuse, Cerium Tungsten
MS-TUNG-16-C20	Electrode Ø 1.6 mm (pack of 10), Cerium Tungsten
MS-TUNG-24-C20	Electrode Ø 2.4 mm (pack of 10), pair of clamping
MS-ECCL-381	rings, roll of thermal paper for printer (pack of 5)
MS-PRINT-ROLL	

Chapter 9

DECOMMISSIONING AND DISPOSAL

9.1. Decommissioning Protocol

When the machine is to be permanently decommissioned for disposal or for an extended period of inactivity, the following procedure must be adhered to in order to ensure its safety:

Electrical Disconnection:

Turn off the machine by utilizing the main power switch.
Disconnect the power cord from the electrical socket.
WARNING: Allow a minimum of 2 minutes for the internal capacitors to discharge.
discharge entirely before proceeding.

2. Fluid Drainage and Disconnection:

Completely drain the cooling circuit, eliminating all distilled water.
from the reservoir.

Disconnect the Argon gas cylinder from the pressure regulator and close the valve.
Store the cylinder in a secure storage location.

3. Disassembly and Maintenance:

Disconnect all cables (power, ground, control) and hoses from the machine and the head.
soldering.
Conduct a thorough cleaning of the power supply and soldering head to eliminate dust.
and residues.

4. Packaging:

If feasible, retain the machine and its accessories in their original packaging to ensure protection.
during extended storage or transportation to the disposal facility.

9.2. Waste Electrical and Electronic Equipment (WEEE) Disposal Instructions

When the machine has reached the end of its useful life, it must be disposed of in compliance with current regulations. The machine is classified under the Waste Electrical and Electronic Equipment (WEEE) category and should not be discarded as municipal waste. Please contact METALSELF Srl or a company that specializes in industrial waste disposal for appropriate disposal methods.

ATTACHMENTS

Annex A: Template for EU Declaration of Conformity

For any technical support, training, or spare parts inquiries, please reach out to:

METALSELF Srl: info.metalself@gmail.com