OPERATION MANUAL

WSME-200

DISCLAIMER

All efforts have been made to ensure the correctness and completeness of the information in this manual. We reserve the right to change specifications at any time.

IMPORTANT INSTRUCTIONS

NOTE

During welding or cutting you will be confronted with possible hazards. For this reason, please read these operating instructions carefully before using the appliance. Understand these instructions, familiarize yourself with the device and its operation. Observe the general safety instructions for your own safety. Always pass this manual with the appliance if you hand it over to other persons.

ATTENTION

There are many situations where you may be injured during welding or cutting. For this reason, you should consider protecting yourself appropriately. For more details please refer to the application safety guidelines, which correspond to the manufacturers preventive requirements.
Functional Disorder – If problems occur, rely on professionals!
If you have any problems with the repair or use of the appliance, please contact a specialist. Please follow the instructions for the control examination.
If you do not fully understand the operating instructions or if you cannot correct the error by means of operating instructions, you should contact your dealer for professional help.

DANGER

Electrical shock can lead to death!
A welding machine works with high voltages. These can lead to life-threatening burns or even to a fatal electric shock.
Even when touching low voltages, you can startle and cause an accident.
• Open the appliance only by qualified personnel!
• Do not touch any live power source on the unit!
• Connection and connection cables must be defect-free!
• Place the welding torch and electrode holder in isolation!
• Wear only dry protective clothing!

Gases and vapors can harm your health, or even lead to death! If necessary, wear a respirator and provide sufficient fresh air.

Risk of fire!
Welding sparks, slag and hot parts can ignite themselves or other objects. Have funds available for counter-measures.

Electromagnetic fields!
Electrical or electromagnetic fields can be generated by the current source, which can be electronic devices such as CNC devices, telecommunication lines, computer systems and for example heart pacemaker in their function.

No improper repairs and modifications!
In order to avoid injuries and damage to the device, the device may only be repaired or modified by competent, qualified persons! Warranty is void if unauthorized!
• In the event of a repair, hire qualified persons (competent service personnel)!

WARNING

Hazards due to improper use! The device is manufactured according to the state of the art and the rules and standards. If the device is not used in accordance with its intended use, the device may pose a risk to persons, animals and property. No liability is accepted for any resulting damage!
• Only use the appliance in accordance with its intended use and by trained, competent personnel!
• Do not modify or change the appliance improperly!

WARNING

Risk of injury from radiation or heat!
Arc radiation can harm your eyes and contract with hot work pieces can lead to burns.
Use a suitable helmet and light filter, wear protective clothing to protect your body as well. Use a suitable helmet or darkening to allow good visibility.

Extreme volume can cause hearing damage!
Use ear protectors or other aids to protect the ear. Noise above 70 dB can cause hearing damage.

Risk of explosion! Apparently harmless substances in closed containers can build up overpressure by heating!
• Remove containers with flammable or explosive liquids from the working area!
• Do not heat explosive liquids, dusts or gases by welding or cutting!

ATTENTION

Obligations of the operator! In the European Economic Area (EWR), the respective national implementation of the framework guidelines must be complied with and observed!
• National implementation of the Framework Directive (89/391/EWG) and the related individual directives.
• In particular, Directive (89/655/EWG) on the minimum health and safety requirements for the use of work equipment by workers at work.
• The accident prevention regulations of the respective country (for example in Germany the BGV D 1)
• Check the safety-conscious work of the user at regular intervals! Damage caused by foreign components! The manufacturing guarantee expires in case of equipment damage caused by external components!
• Only use system components and options (current sources, welding torches, electrode holders, remote control, spare and war parts, etc.) from our product range!
• Connect the accessory component to the connection socket only when the power source is switched off and lock it! Electromagnetic interference! According to IEC 60974-10 the devices are intended for use in industrial areas. If, for example, used in residential areas, difficulties can arise if electromagnetic compatibility is to be endured.
• Check the influence of other devices!

CONTROL PANEL DESCRIPTION

1. Digital display
2. Switch hand trigger / foot pedal
3. LED over heating
4. LED short circuit
5. Switch Pulse (off,long,short)
6. Switch 2 Takt / 4 Takt / S4
7. Switch AC / DC
8. Switch MMA / TIG
9. Start Current
10. Peak Current MMA / TIG
11. Basic Current
12. End current
13. Up-Slope
14. Pulse Duty
15. Pulse Frequency
16. AC-Balance
17. Down-Slope
18. Post Flow

CONNECTION PANEL DESCRIPTION

1. Connection electrode holder MMA/ARC
2. Gas/earth connection for TIG torch
3. Power supply connection for TIG torch
4. Connection foot pedal
5. Earth clamp for MMA / TIG

FEATURES

1.AC/DC TIG welding – direct current- and alternating current. Welding of almost all materials (also aluminum).

2.The weld penetration and the weld width can be influenced by the AC frequency.

3.TIG (tungsten-inert gas welding) – Welding process with many advantages: easy handling, good controllability of the arc, narrow weld zone, splash-free arc, clean weld seam ……

HF Ignition – high-frequency ignition (HF) by TIG - TIG High Frequency.

Non contact ignition. Reproducible welding results by HF ignition and constant welding parameters at start-up.

Gas pre-flow protects the tungsten electrode from excessive wear and protects the weld seam for oxidation.

Gas post-flow protects the tungsten electrode from excessive wear and protects the weld seam for oxidation.

With the switch **2T/4T/S4** the operating modes of the control can be determined. This mode provides extended control over the current flow.

The **start current** specifies the current which is used at the start of the ignition before it switches to the set welding current.

End current specifies the current that is applied at the end of the ignition before the ignition is extinguished.

Up slope. After the arc has been completely ignited, the welding process changes into a current rise phase in which the welding current is raised linearly from the set starting current value to the desired welding current value.

Down slope prevents piping (end craters) at the end of the weld. After the button on the burner has been released, the machine switches to an automatic current lowering phase. Down slope works only in 4T mode.

TIG PULSE - Prevents the burning of materials and reduces deformation due to heat. TIG-PULS function is particularly suitable for welding thin plates, the material of which may be heated only slightly.

MMA/ARC-Stick Electrode welding can be used under almost all conditions and therefore MMA welding can be described as a universal process in the welding industry.

Anti-Stick-function prevents sticking of the stick electrode. In the case of a sticking of the electrode to the workpiece, the welding current is switched off.

ARC Force – with spray arc, also called ARC Force. This allows to regulate the arc range.

Hotstart – automatic voltage increase at start-up for better welding results.

With all our digital devices, we trust in **IGBT** technology from, whose innovative solutions set new standards in welding technology.

High Performance Cooling through two high-speed fans.
Fast cooling fan allows maximum power consumption and increases the operating time (ED) of the unit.

Overheating -Control (O.C. - Overheating Control). Overheat protection starts as soon as the unit is overloaded. A yellow indicator light turns on and goes out as soon as the unit has cooled down again.

The welding machine is connected directly to the single-phase alternating current (AC) 230 V (+ -15%), 50/60 Hz operation. The single-phase alternating current is to be protected in the household with a 16 A fuse.

ST-Guard-Housing is ergonomic, robust and operationally reliable:
- Sturdy sheet steel housing, - Shock-proof, - Hard plastic formwork,
- Control panel conveniently accessible and easier to operate, - Intelligent fan guide.

TECHNICAL SPECIFICATIONS

NOTE

Values are only valid for correct operation and use of STAHLWERK original parts.

Operating
Temperature range -5 °C to +40 °C

Transport and Storage
Storage in closed room, Temperature range -15 °C to +55 °C

Data sheet

	AC/DC TIG 200 Pulse ST
Output current TIG / MMA	10-200 A / 10-200 A
Duty cycle TIG / MMA	60% at 200 A
Off-load voltage	60 V
Degree of protection	IP21S
Protection class	F
Mains voltage	230 V AC (+-15%) / 1 ~(single-phase)
Power frequency	50/60 Hz
Mains fuse	1 x 16 A
Maximum input current	22,2 A / 28 A
Maximum connected rating	7,5 kVA~
Recommended generator power	> 6,1 kVA / 1~
Weight	12,4 kg
Dimension L x W x H (mm)	460 x 225 x 370

TIG WELDING TORCH CONSTRUCTION

1. Collet body

2. Adapter sleeve

3. Gas nozzle

4. Tungsten electrode

5. Long burner cap

6. Short burner cap

Assemble:

- No. 1 screw
- No. 2 + 4 connect
- No. 2 and 4 together put in No. 1
- No. 5 or No. 6 screw in
- No. 3 over No. 1 screw in

BEFORE IMPLEMENTING

NOTE

Machine cooling
In order to achieve an optimum duty cycle of the power parts, please pay attention to the following conditions:
• Ensure adequate ventilation in the workplace
• Air inlet and outlet openings of the appliance
• Metal parts, dust or other foreign objects must not penetrate the device

Ensure that the air supply to the machine is not covered or blocked, otherwise the cooling system may fail.

ATTENTION

Damage caused by foreign components!
The manufacturing guarantee expires in case of equipment damage caused by external components!
• Only use systems components and options (current sources, welding torches, electrode holders, remote control, spare and wear parts, etc.) from our product range!
• Connect the accessory component to the connection socket only when the power source is switched off and lock it!
Damage to equipment by operation in non-upright position!
The devices are designed for operation in an upright position. Operation in other positions can damage or override the device and safety devices of the device!
Risk of death!

The device may only be installed and operated on a suitable, load-bearing and level surface (also outdoors in accordance with IP 21)!
• Provide for non-slip, level ground and adequate workplace lighting.
• Safe operation of the device must be ensured at all times.
Damage to equipment due to pollution!
Excessively high quantity of dust or other substances can damage the device.

IMPLEMENTING

DANGER

Risk of injury from electrical voltage!
Contact of live parts, for example welding current sockets, can be hazardous to life!
• Commissioning only by persons with appropriate knowledge of the use of arc welding devices!
• Connect the connecting or welding lines (for example electrode holder, welding torch, workpiece cable, interfaces) with the device switched off!

Risk of injury from electrical voltage after switching off! Working on the open device can lead to injuries with a death row! During operation, capacitors are charged with electrical voltage in the device.

1. Turn the unit off.
2. Disconnect the appliance reliably from the mains: pull the mains plug!

Danger due to improper mains connection!
Incorrect mains connection can lead to persons or property damage!
• The power cord must be properly connected to the ground.
• Only operate the appliance at a socket with a protective grounding conductor.
• If a new mains plug has to be connected, this installation must only be carried out by a qualified electrician according to the respective national laws or national regulations (any phase sequence for three-phase current generators)!
• Mains plug, plug and socket must be checked at regular intervals by an electrician!
Incorrect handling of the protective gas bottle can lead to serious injuries and death!

ATTENTION

Risk of burning at the welding current connection! By means of non-locking welding current connections, connections and lines can be heated and lead to burns on contact!
• Check welding connections daily and, if necessary, lock them by turning clockwise.

MMA:

Connect the ground cable to the socket labeled + (plus). Connect the electrode holder at the bottom left to the – (minus) marked socket. The trigger switch at the front is set to MMA. The power plug is plugged in and the device is switched on at the main switch (back side)

The welding **current** knob is used to set the correct current intensity for the respective welding task. The welding current can be infinitely variable regulated up to 200 A. The selected welding current depends on the thickness of the material and the material to be machined, the thickness and composition of the rod electrode, the welding position in which welding is performed (flat seam, fillet seam, uphill seam, downhill seam etc.), and the personal habits of the welder.

TIG-Welding:

Connect the ground cable to the socket marked with + (plus). Depending on the type of cable-hose assembly, the connector is marked with a – (minus) sign, the gas threaded connector and the two-pole switch box. The two-pin connector and the gas- threaded connector marked with – (minus) are both current-carrying. The connection of a cable-hose assembly with gas and current supply in one is thus easily possible. The clamp of the ground cable is connected to the workpiece to be welded.

On the back side, the gas (for example ARGON 4.6) must be connected. The trigger switch on the front is moved to TIG. The switch 2T / 4T can be adjusted according to personal preference. Depending on the device, there is a push button instead of the toggle switch.

A **"foot pedal"** is compatible with the AC/DC TIG 200 Pulse ST and is used as follows. Insert the two and three pin plugs into the respective socket. Now press the button next to "Rem" and "Near" to switch from manual mode to the foot pedal. Now you can adjust the welding current stepless by pressing the pedal.

2T/4T Mode:
In the **2 T** mode, the torch must be held down by the TIG hose pack, as soon as the button is released, the arc goes out.

At **4 T** mode, the arc is stable after pressing and releasing the torch once. The arc is not extinguished until the burner button is pressed again.

With **S4**, the arc remains stable after pressing and releasing the torch button once. Pressing the switch again will not extinguish the arc. This will only extinguish when the burner is removed from the workpiece.

AC Balance (control of arc cleaning)

For AC devices, the energy is distributed asymmetrically between the electrode and the base material. Advantages: The tungsten electrode remains cooler and the penetration of the oxide layer goes deeper. Aluminum oxide cleaning is 1.0 - 3.0 mm wide.

With this controller, you can influence the penetration and the breaking of the oxide layer during AC TIG welding.

-In the “0” position (middle position), the balance shift is deactivated.
The shares are:70% minus and 30% plus. Both half-cycles are the same at low current. When the current is increased, the 0-line automatically moves to the plus side

- In the positive “+” range you achieve a better breaking (cleaning) of the oxide layer. This also means a higher temperature at the electrode and on the workpiece.

- In the negative “-“ range you increase the penetration. The oxide layer is broken less. The electrode remains a little cooler and does not burn off so quickly.

„**Start current**“ (only in 4T-mode) allows a different current intensity to be set at the beginning of the welding process than the actual welding current, which we regulate at the welding current knob. In TIG welding, for example, this can be a smaller current strength in order to find the arc once the welding helmet is lowered. However, it can also have a

higher current strength, for example, to add a little more heat to the material in the case of thick aluminum.
The use of this function is therefore dependent on the welding process. If the start current is selected, the switch is triggered by pressing the switch on the TIG torch and remains active for as long as the switch is held down. After releasing the switch, the device automatically switches to the welding current set at the welding current knob.

„**End current**“ (only in 4T -mode) applied at the end of the welding process can be adjusted. This is generally set to be less than the welding current, in order to avoid deflections at the end of the seam, due to deep penetration.

„**Upslope**“: After the arc has been completely ignited, the welding process changes into a current rise phase in which the welding current is raised linearly from the set starting current value to the desired welding current value. The duration of this phase is adjustable from 0 to 10 seconds only in 4 T mode.

„**Upslope**“ (only in 4T-mode) is the slow lowering of the welding current until the arc is extinguished. This prevents blowholes in the welding seam when the arc is set down.

Welding with pulsating current:
The rotary knobs “basic current”, “pulse duty” and “pulse frequency” all act together. By means of the two rotary knobs “welding current” and “basic current”, two different current intensities can be set for a welding operation between which the welding current always changes.

- The strong pulse current ensures a deep penetration.
- Due to the weak background current, the weld pool becomes smaller and easier to control.

It is advisable to select a difference of approximately one quarter of the set welding current. We are dealing with a kind of pendulum motion in impulse welding. With the pulse duty, we now set how long the “pendulum”, also the welding current, takes the current intensity of the pulse current before it returns to the normal welding current.

The setting **"long pulse"** is particularly suitable for thicker metal plates from 3.0mm. The weld becomes wider, the heat input is higher and the penetration is deeper.

The setting **"fast pulse"** is particularly suitable for thinner metal plates up to 3.0mm. The heat input is lower, the penetration is not too deep. This makes it easier to control the weld pool and the danger of welding a hole in the sheet is lower.
The **pulse frequency** determines how often the current changed back and forth between the two set values within a fixed time interval.

TIG Welding is best taken with a comfortable, sitting posture. A right-handed person takes the cable-hose assembly into the right hand and the filler material into the left. The filler material should consist to the same material as the workpiece.

In DC mode, the tungsten electrode is sharpened, with the cross-section towards the tip. A red tungsten needle or a gray universally usable tungsten needle is used.

In the case of aluminum welding in AC mode, the electrode is refined half-round. A green tungsten needle or a gray universally usable tungsten needle is used.

Welding example from practice:

We now weld V2A pipe 42.2 mm with 2 mm wall thickness.
The individually chosen amperage is around 39-45 A. The tungsten electrode must be circularly round the tube, which requires some practice. The best welding results are obtained when the pipe is also filled with gas from the inside. The seam will then look just as good on the inside as inside of the tube. Inclusions by ambient air are thus avoided.
TIG welding is very well suited to weld vertical up.

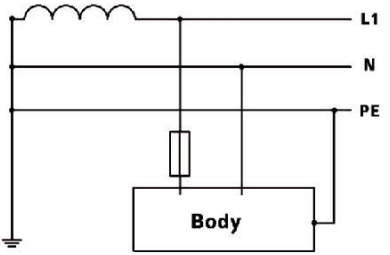
MAINS SUPPLY / NETWORK CONFIGURATION

DANGER

Danger due to improper mains connection!
Incorrect mains connection can lead to persons or property damage!
• Only operate the appliance at a socket with a protective grounding conductor.
• If a new mains plug has to be connected, this installation must only be carried out by a qualified electrician according to the respective national laws national regulations (any phase sequence for three-phase current generators)!
• Mains plug, plug and socket must be checked at regular intervals by an electrician!

NOTE

The device may only be connected and operated on a single-phase 2-wire system with a grounded neutral conductor.



Pos.	Marking	Id. color
L1	Outer conductor 1	brown
N	Neutral conductor	blue
PE	Protective conductor	Green-yellow

ATTENTION

Operating voltage – Mains voltage!
The operating voltage must correspond to the mains voltage in order to avoid damage to the device!
• Plug the mains plug of the disconnected device into a suitable socket.

MAINTENANCE

NOTE
Proper, regular maintenance and cleaning of the device is a prerequisite for the maintenance of your warranty claims.

Daily maintenance

- General visual inspection
- Check the mains plug
- Correct connection

Weekly maintenance

- External relief from dust

Monthly maintenance

- The device must be cleaned from the inside, depending on the degree of use

Yearly maintenance

Repeat inspection according to standard IEC 60974-4 „Periodic inspection and testing during operation“. Further information can be found in DIN VDE 0544-4.

CHECK

Procedure

Visual inspection

Electrical test

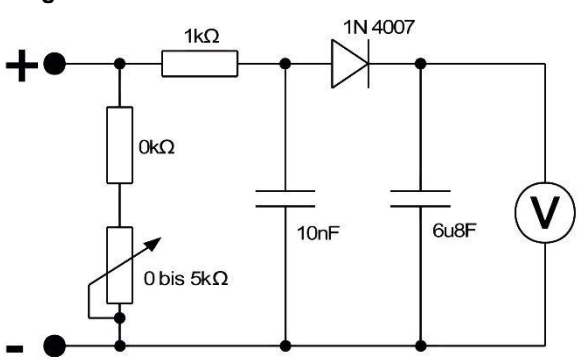
- *Open-circuit voltage*
- *Isolating resistance*
- *Protective conductor resistance*

Functional Test

Documentation

Measurement of open-circuit voltage

According to DIN EN 60974-1



The permissible tolerance of the components of the circuit is ± 5%.

The voltmeter has an internal resistance of at least 1 M-Ohm and measures voltage values with a measuring accuracy of ± 1% of the measuring range

In order to obtain the highest peak value – measured with the load from 0.2 to 5.2 k-ohms – the potentiometer must be adjusted from 0 to 5 k-ohms during the measurement.

Repeat the measurement with the opposite polarity. The higher measured value applies.

Effective value is measured with a load of 5 ± 0.25 k-ohm in the outer welding circuit with a device of the accuracy class 1 for measuring true effective value.

Isolating resistance
Mains circuit against welding circuit and electronics 5 M-ohm.
Welding circuit and electronics against protective conductor circuit (PE) 2.5 M-ohm.
Mains circuit against protective conductor circuit (PE) 2.5 M-ohm.

Protective conductor resistance
Is between the contact´s protective contact and conductive parts, such as housing screws, housing covers, etc. during the measurement, the connection cable must be moved along its entire length.
The resistance must not exceed 0.3 ohm for a mains connection cable up to 5m length. For longer lines, the permissible value is increased by 0.1 ohm for each 75 m line. However, the maximum permissible value is 1 oh

CLEANING

DANGER

Risk of electric shock!
The device must be cleaned only when the device is disconnected from the mains.
1. Turn the unit off.
2. Disconnect the device from the mains: pull the mains plug!

Use compressed air to blow off or vacuum the current source and electronics, depending on the type of dust.

Frequently asked questions / Problem handling

Machine-dependent

The device you purchased is subject to careful final control and multiple final checks. If a fault occurs, please check whether one of the statements below applies to your case and whether the solutions possible provide a remedy.

? There is no gas and the HF ignition does not work.
Check whether the device has actually been switched to TIG and is not set to MMA.

? A hissing sound comes from my device.
Some customers are thinking of a leak in the pressure system. In fact, however, this is confused with the noise of the HF ignition.

? *My tungsten needle burns to fast.*
Please check the gas supply.

? *My fuse flies out continuously.*
The device must be fused with a 16 A fuse. If this fuse is possibly overloaded by other consumers, it may be not able to withstand the additional load of the welding device and thus triggers. Please bear in mind that we cannot change this.

? The device ignites late.
Check if you have set the Gas pre-flow.

Automatic helmet fades up in between use or no longer darkens properly
Sensitivity for the sensitivity always set to maximum, otherwise the helmet is deflected by other light sources. Replace button cells with new ones.

STANDARD VALUES / WELDING PARAMETER / ARC - MMA

Welding rods- Diameter (mm)	Material (mm)	Welding current Ampere
1,6	1-1,5	40-50
2,0	1,5-3	60-80
2,5	2,5-6	75-100
3,2	4-8	95-125
4,0	from 6 mm	120-160
5,0	from 6-8 mm	150-200

STANDARD VALUES / WELDING PARAMETER / TIG

Material (mm)	Tungsten electrode Diameter (mm)	Gas nozzle size No.	Welding rods- Diameter (mm)
1	1	4	1,6
2	1,6	4 to 6	2
3	1,6	6	2,4
4	2,4	6 to 8	3
5	2,4 to3,0	6 to 8	3,2
6	3,2	8	4
8	4	8 to 10	4
Material (mm)	Welding current Ampere Steel	Welding current Ampere Stainless steel	Welding current Ampere Aluminum
1	30 to35	35 to 50	55 to75
2	40 to60	55 to 75	80 to95
3	65 to 100	80 to 120	100 to125
4	105 to135	125 to 145	130 to160
5	140 to165	150 to 170	165 to170
6	170 to190	175 to 200	175 to185
8	195 to220	205 to 230	190 to210

Identification color green	Only Aluminum
Identification color gray	Universal for all materials