Operating instructions

MIG/MAG welding machine

- PRO-MIG.ARC 251
- PRO-MIG.ARC 311
- PRO-MIG.ARC 351
- PRO-MIG.ARC 404 W
- PRO-MIG.ARC 404 WS

PRO-MIG.ARC 404 W

Foreword

Dear Customer,

Thank you very much for purchasing the schweißkraft-MIG/MAG welding machine.

schweißkraft Welding equipment offers the highest level of quality, technically optimal solutions and is convincing.
through outstanding value for money. Continuous development and product innovation.
Technology provides security at any time a current Status to and
Before commissioning, please read these operating instructions thoroughly and familiarize yourself with the product.
Familiarity with the welding machine. Also ensure that all persons operating the welding machine are always familiar with it.
Have read and understood the operating instructions beforehand. Keep these operating instructions carefully.
area of the welding machine.

information

The operating instructions contain information on safe and proper installation, operation and
Maintenance of the welding machine. Adherence to all instructions contained in this manual is essential.
This ensures the safety of people and the welding equipment.

The manual defines the intended purpose of the welding machine and contains all the necessary information for its economical operation and long service life.

The Maintenance section describes all maintenance work and functional tests that the user must perform.
must be carried out regularly.

The illustrations and information contained in this manual may be subject to change.
The current construction status of your welding machine may differ. As a manufacturer, we are constantly striving for improvement.
and strives for product renewal, therefore changes can be made without this
will be announced in advance. The illustrations of the welding machine may differ in some details from the actual product.
The illustrations in this manual may differ, however this does not affect the usability of the device.
Welding machine.

No claims can therefore be derived from the information and descriptions provided. Changes and
We reserve the right to correct errors!

Your suggestions regarding these operating instructions are an important contribution to optimizing our work.
which we offer our customers. Please contact us with any questions or suggestions for improvement.
our service.

Should you have any further questions after reading these operating instructions, or should you encounter a problem
If you cannot resolve the issue using these operating instructions, please contact your specialist dealer.
Connection.

Manufacturer information

schweißkraft - Stürmer Maschinen GmbH
Dr.-Robert-Pfleger-Straße 26
D-96103 Hallstadt/Bamberg

Fax (+49)0951 - 96555-55
Email: info@schweisskraft.de
Internet: www.schweisskraft.de

Product identification

MIG/MAG welding machine	Article number
PRO-MIG.ARC 251	1080625
PRO-MIG.ARC 311	1080631
PRO-MIG.ARC 351	1080635
PRO-MIG.ARC 404 W	1080740
PRO-MIG.ARC 404 WS	1080741

Original operating instructions
according to DIN EN ISO 20607:2019

Edition: December 15, 2025
version 1.02

Language: German
Author: CW/RL

1 Security

Conventions of representation

	provides additional information
	calls you to action
ÿ	Enumerations

This part of the operating instructions

ÿ explains the meaning and use of the terms used in this operating manual
Warning notices,

ÿ defines the intended use of the device,

ÿ points out the dangers that may arise for you and others if these instructions are not followed.
could

ÿ informs you about how to avoid dangers.

Please note the following in addition to the operating instructions.

the applicable laws and regulations,

the legal provisions for accident prevention ,

ÿ the prohibition, warning and mandatory signs.

Always keep the documentation near the device.

1.1 Safety instructions (warnings)

Hazard classification

We divide the safety instructions into different levels. The table below gives you an overview.
Overview of the assignment of symbols (pictograms) and signal words to the specific hazard and
the (possible) consequences.

pictogram	Signal word	Definition/Consequences
	**DANGER!**	Immediate danger that will result in serious injury or death.
	WARNING!	Risk: a dangerous situation could lead to serious injury or death.
	CAUTION!	Dangerous or unsafe procedures that could lead to personal injury or property damage.
	**DANGER!**	A situation that could lead to damage to the device as well as other damage. No risk of injury to people.
	**information**	Application tips and other important/useful information and advice. No dangerous or harmful consequences for persons or property.

Pictograms that indicate specific dangers

General
Warning signs

Warning about
electrical
Tension

Warning about
Hand injuries

Warning about hot
surface

Warning about
automatic
start

Warning of obstacles on the ground

Warning: Risk of tipping!

Warning: Suspended load!

Warning:
Flammable substances!

Pictograms indicating commands/prohibitions

No entry for persons with
pacemakers or implanted
defibrillators!

Use hearing protection!

Follow the instructions!

Unplug the power cord!

Use eye protection!

Use hand protection!

Use foot protection!

Use protective clothing!

1.2 Intended Use The MIG/MAG welding machines are

designed for arc welding using MIG (Metal Inert Gas) or MAG (Metal Active Gas) processes. These two processes allow the welding of similar metals, such as alloyed or unalloyed steels, stainless steels, or aluminum.

The MIG/MAG welding machines are designed for professional use and may therefore only be used by qualified personnel, in accordance with these operating instructions.

Part of the intended use is that you ÿ follow the operating

instructions, ÿ comply with the
inspection and maintenance instructions.

1.3 Reasonably foreseeable misuse : Use in areas with

hazardous materials, risk of explosion or fire. Use for heating objects or liquids. Use for processing non-metallic products. Use for igniting fuels.

WARNING!

This Class A welding machine is not intended for use in residential buildings powered by a public low-voltage supply system. Electromagnetic compatibility may be difficult to achieve in these areas due to both conducted and radiated interference.

If the PRO-MIG.Arc is used differently than described under “1.2 Intended Use”, or modified without the permission of Stürmer Maschinen GmbH, the PRO-MIG.Arc is no longer being used as intended.

WARNING!

Improper use of the welding equipment ÿ **creates dangers for personnel,** ÿ **endangers the welding equipment and other assets of the operator,** ÿ **may impair the function of the welding equipment.**

We accept no liability for damages resulting from improper use.

Any use beyond its intended purpose or in a manner other than that specified is considered misuse. To avoid misuse, the operating instructions must be read and understood before initial use. Operating personnel must be adequately qualified.

DANGER!

Modifications and alterations to the welding machine are prohibited! They endanger people and can damage the welding machine.

Improper use of the device, as well as disregard of safety regulations or the operating instructions, excludes the manufacturer's liability for resulting damage to persons or property and voids the warranty!

Danger if misused!

Misuse of the welding equipment can lead to dangerous situations.

- Only operate the welding machine within the power range specified in the technical data.
- Never bypass or disable the safety devices.
- Only operate the welding machine if it is in perfect working order.
- Use only original spare parts.

1.4 Residual risks

Even if all safety regulations are observed and the welding equipment is used correctly, residual risks remain, which are listed below: Eye damage from the use of defective or unsuitable eye protection. Respiratory damage from inhaling fumes . Electric

shock from defective electrical insulation or moisture . Burns to the upper extremities from the use of
unsuitable gloves . Damage to the workpiece due to insufficient qualifications
or experience of the user.

If the welding equipment is operated and maintained by insufficiently qualified personnel, hazards may arise from the welding equipment due to incorrect operation or improper maintenance.

INFORMATION!

All persons who handle the welding equipment must

ÿ possess the required qualifications, ÿ carefully
observe these operating instructions.

1.5 Staff qualifications

Target audience

This guide is intended for

ÿ the operators, ÿ the
operators, ÿ the
maintenance personnel.

Therefore, the warnings relate to both the operation and the maintenance of the welding machine.

Clearly and unambiguously define who is responsible for the various tasks on the welding machine (operating, maintaining and repairing).

Unclear responsibilities are a security risk!

This guide lists the qualifications of the individuals for the various tasks:

operator

The operator received instruction from the operator regarding their assigned tasks and potential hazards resulting from improper conduct. The operator may only perform tasks beyond normal operation if specified in these instructions and expressly authorized by the operator.

electrician

Due to their professional training, knowledge and experience, as well as knowledge of the relevant standards and regulations, qualified electricians are able to carry out work on electrical systems and to independently recognize and avoid potential hazards.

The electrical specialist is specifically trained for the work environment in which they work and is familiar with the relevant standards and regulations.

Specialist staff

Due to their professional training, knowledge and experience, as well as their knowledge of the relevant regulations, qualified personnel are able to carry out the tasks assigned to them and to independently recognize and avoid potential hazards.

Instructed person

The person being trained was instructed by the operator about the tasks assigned to them and the potential dangers of improper behavior.

Authorized persons

WARNING!

Improper operation and maintenance of the welding equipment can create hazards for people, objects and the environment.

Only authorized persons are allowed to operate the welding equipment!

Authorised persons for operation and maintenance are the instructed and trained specialists of the operator and the manufacturer.

The operator must

ÿ train the staff, ÿ instruct the staff
at regular intervals (at least once a year) about
- all safety regulations relating to the welding equipment, - operation, - the recognized rules of technology, ÿ check the staff's level of knowledge,

ÿ document the training/instructions, ÿ have participation
in the training/instructions confirmed by signature, ÿ check whether
the staff works in a safety-conscious manner and observes the operating instructions.

The operator must

ÿ have received training in the use of the welding equipment, ÿ know its function and operation, ÿ
before commissioning

- have read and understood the operating instructions, - be familiar with all safety devices and regulations.

1.6 General safety instructions

Only operate the device under the following conditions:
The technical condition of the device is flawless .
The device is used as intended. The operating instructions are
followed. All safety devices are present and active.

Eliminate malfunctions or have them rectified immediately. In case of malfunctions, immediately shut down the device and secure it against accidental or unauthorized activation.

PLEASE NOTE THE FOLLOWING:

The accident prevention regulations of the employers' liability insurance association responsible for your company or Please note other supervisory authorities!

Check the welding machine for externally visible damage and defects before use. Defects and damage must be repaired immediately.

Protect the welding machine from moisture. Never use the
welding machine in environments that ...
- containing unknown substances. - with a risk of explosion or fire. - with poor ventilation.

Never work under the influence of illnesses that impair concentration, fatigue, drugs, or alcohol.
or medication.

Keep the air inlet and outlet openings clear.

Do not use aggressive cleaning agents to clean the welding machine.

Repairs may only be carried out by qualified persons.

Use only original spare parts and accessories.

Electrical voltage

Do not touch any parts that are live.

Disconnect the generator from the power supply before performing any work on it.

ÿ Isolate yourself from the workpiece to be welded and from the ground; wear insulating gloves
and clothing.

Do not work with damaged or poorly connected cables or with loose connections
Clamp cables.

Keep your work clothes and body dry.

Do not work in damp or wet environments.

Do not lean your body against the workpiece being worked on.

Protect the power supply system with a thermo-magnetic switch of suitable power, if possible located near the generator.

Do not use the device if any components or protective devices have been removed.

ÿ Ensure that the supply system has proper grounding.

Make sure the welding machine is always stable so that it does not fall or tip over.
Can. Use a fall arrest system when working at heights.

ÿ Only switch on the welding machine when all cables are correctly connected.

Ensure that all accessories are correctly connected and always pay attention to a
correct ground connection.

Risk of explosion

ÿ Ensure that no ignitable materials are near the work area.

ÿ Take care to avoid flammable gas mixtures in the work area (ventilation and extraction).

Never weld containers that contain flammable or combustible materials.

When welding aluminum, be aware that hydrogen atoms can become trapped within the aluminum when using water
welding tables and underwater welding. Trapped hydrogen can lead to explosions.

Never mix the gases in the bottles.

Replace any gas lines that are damaged or show signs of damage.

Keep the pressure reducers in good working order .

Do not weld in environments containing dust, gas, or explosive fumes.

Fire hazard

ÿ Ensure that no flammable, ignitable materials are near the work area.
rich are.

Keep suitable extinguishing agents ready.

Avoid the spread of open flames due to sparks, slag, and glowing embers .
Material.

ÿ Ensure that fire protection devices are located near the work area.
Remove flammable materials and fuels from the work area.

Burns ÿ Protect

your body by wearing fire-resistant protective clothing (gloves,
Headgear, shoes and masks, etc.) against burns and ultraviolet radiation).

Moving or thermal parts can damage their body or cause harm to other people.

Keep the tip of the electrode away from your own body and that of other people.

Do not wear contact lenses. The intense heat from the arc could cause them to fuse to the cornea.

ÿ Ensure that first aid supplies are located near the work area.

Replace the mask's viewing window if it is damaged or unsuitable for the welding work being performed.

Wait until the machined parts have cooled down before handling them.

The electric arc throws splashes and sparks. Always wear oil-free protective clothing such as leather gloves, trousers without turn-ups, and high shoes. Cover your hair with a cap.

Pacemaker wearers ÿ Magnetic fields

from high-voltage circuits can impair the function of pacemakers influence.

People wearing vital electronic devices of this type must consult a doctor Consult before entering areas where such welding equipment is present.

Radiation ÿ

Welding radiation can lead to damage to eyesight and burns. Radiation produces strong ultraviolet and infrared light.

The arc emits radiation that can injure the eyes and cause skin burns; use appropriate protective equipment.

Fumes and gases ÿ

Welding produces gases that are hazardous to health:
Avoid inhaling the pollutants.

Keep your head as far away as possible during the welding process.

Ensure adequate ventilation, extraction or, if necessary, a supply of breathing air.

The type of fumes and gases produced is determined by the base material, coating , etc. Special care must be taken if the material to be welded contains the following elements:

- Antimony, chromium, mercury, beryllium, arsenic, cobalt, nickel, lead, silver, selenium, copper, barium, Cadmium, manganese and vanadium.

Ideally, use welding tables with extraction systems .

Chloride -containing cleaning agents can form phosgenetic gases (toxic gases) during welding. Ensure that no residues remain on the workpiece surface before welding.

Never weld in areas where there is a risk of fire or explosion.

Read and understand the operating instructions of the additive material manufacturers and read Carefully read the safety data sheets.

Electromagnetic interference ÿ The

welding machine complies with the standards for electromagnetic interference emission and is suitable for use in industrial environments.

However , it must be taken into account that the following disturbances can occur, and in Appropriate measures must be taken in these cases.

- Data transmission systems
- Communications
- Steering
- Safety devices
- Calibration and measuring instruments

1.7 EMC measure

In exceptional circumstances, the specified area may be affected, even though the standard of The radiation limit was adhered to (e.g., the device is easily affected by electromagnetism). It is affected, is used at the installation location, or there is a radio or television nearby. (of the installation location). Under these circumstances, the user should take some appropriate precautions to eliminate interference.

In accordance with domestic and international standards, the surrounding equipment must comply with the
The electromagnetic situation and anti-interference capabilities are checked:

ÿ fuse

ÿ Power line, signal transmission line and data transmission cable

ÿ Data processing equipment and telecommunications equipment

Inspection and calibration equipment

These effective measures prevent the EMC problem.

Power supply:

Even if the power supply source complies with the regulations, additional measures are always necessary.
Measures must be taken to remove the electromagnetic fields (e.g., a suitable power filter).

Welding cable length :

- Keep the cable length as short as possible.
- Lay the device cables side by side and place them with sufficient distance to other cables.

Ground the workpiece connection.

Shield if necessary:

- Shield the surrounding welding equipment
- Shield the entire welding machine

1.8 Safety marking on the MIG/MAG welding machine

A NOTICE:

Damaged or missing safety symbols on the MIG/MAG welding machine can lead to...
Misuse could result in personal injury or property damage. The safety symbols affixed to the device must not be removed.
Damaged safety symbols must be reported immediately.
substitute.

Please note the following:

The instructions on the safety label on the device must be followed under all circumstances .
If the safety markings fade or become damaged during the device's lifetime, new signs must be affixed immediately.

From the moment the signs are not immediately recognizable and understandable at first glance,
to take the device out of service until the new signs are installed.

1.9 Safety data sheets

Safety data sheets for dangerous goods can be obtained from your specialist dealer or by calling +49 (0)951/96555-0.

Specialist retailers can find safety data sheets in the download area of the partner portal.

2 Technical Data

2.1 Table

parameter	PRO-MIG.ARC 251	PRO-MIG.ARC 311	PRO-MIG.ARC 351	PRO-MIG.ARC 404 W	PRO-MIG.ARC 404 WS
Proceedings	MIG/MAG welding				
Length x Width x Height approx. (mm)	830x340x710			950x560x920	950x560x1480
Weight (net) approx.	50 kg	50 kg	50 kg	56 kg	70 kg
Connection voltage	400V	400V	400V	400V	400V
Phases / Current type / Mains frequency	3 / AC / 50 Hz	3 / AC / 50 Hz	3 / AC / 50 Hz	3 / AC / 50 Hz	
Protection class	IP23	IP23	IP23	IP23	IP23
Slow-acting hedging	16 A	32 A	32 A	32 A	32 A
Open circuit voltage	88 V	88 V	88 V	88 V	88 V
Setting range MIG/ MAG	20 - 250 A	20 - 300 A	20 - 350 A	20 - 400 A	20-400 A
Duty cycle at max Electricity 40°C	40%	40%	40%	50%	50%
Power at ED 100% 40°C	200 A	240 A	280 A	330 A	330 A
burner cooling	gas	gas	gas	Water	Water
Weldable wires Steel	0.6 - 1.2mm	0.6 - 1.2mm	0.6 - 1.2mm	0.6 - 1.2mm	
Weldable wires stainless steel	0.6 - 1.2mm	0.6 - 1.2mm	0.6 - 1.2mm	0.6 - 1.2mm	
Weldable wires aluminum	1.0 - 1.2mm	1.0 - 1.2mm	1.0 - 1.2mm	1.0 - 1.2mm	
Weldable wires CuSi	0.8 - 1.2mm	0.8 - 1.2mm	0.8 - 1.2mm	0.8 - 1.2mm	
Weldable wires Flux-cored wire	1.0 - 1.2mm	1.0 - 1.2mm	1.0 - 1.2mm	1.0 - 1.2mm	
wire feed unit	4 casters	4 casters	4 casters	4 casters	4 casters

3. Transport, packaging, storage

3.1 transport

Upon delivery, inspect the MIG/MAG welding machine for any visible transport damage. If you discover any damage to the gas-shielded welding machine, report it immediately to the transport company or the dealer.

3.1.1 Notes on transport

Improper transport, setup and commissioning is prone to accidents and can cause damage or malfunctions to the device, for which we assume no liability or warranty.

Transport the delivery, secured against shifting or tipping, to the installation site using a sufficiently sized forklift or crane.

WARNING!

Severe to fatal injuries can result from machine parts falling from the forklift or transport vehicle. Observe the instructions and information on the transport crate.

Note the total weight of the machine. The machine's weight is specified in the "Technical Data" section. When the machine is unpacked, the weight can also be found on the nameplate.

Only use transport equipment and lifting slings that can support the total weight of the machine.

Check the lifting equipment and load-bearing devices for sufficient load-bearing capacity and perfect condition.

Secure loads carefully. Never step under suspended loads!

3.1.2 General hazards during internal transport

WARNING: RISK OF TIPPING!

Secure the MIG/MAG welding machine against tipping over, rolling away and falling.

Employees must be outside the danger zone, the reach of the load.

Warn employees and point out the danger to them.

MIG/MAG welding equipment may only be transported by authorized and qualified persons.
Hazardous areas, uneven surfaces, and defects must be inspected before transport. Any attempt by other employees to remove hazards, defects, or uneven surfaces during transport poses significant risks.

Act responsibly during transport and always consider the consequences. Avoid daring and risky actions.

Transport by crane ÿ Attaching

lifting equipment for suspended transport of the devices is only permitted using the designated crane lifting eyes (accessories).

ÿ Attaching lifting equipment to handles, wheels, or other

components not designed for this purpose is not permitted and can lead to damage to the devices and endanger people.

Transport with a connected gas cylinder is not permitted!

3.2 Packaging

All packaging materials and packing aids used for the MIG/MAG welding machine are
They must be recyclable and, in principle, be recycled.

Shredded cardboard packaging components should be disposed of in the waste paper collection.

The films are made of polyethylene (PE) and the padding parts of polystyrene (PS). You can deliver these materials to a
Recycling center or the waste disposal company responsible for your area.

3.3 storage

The MIG/MAG welding machine must be set up in enclosed, dry and well-ventilated rooms.
It must not be exposed to moisture or intense sunlight.

4. Setup and connection

4.1 Installation conditions

ÿ Firm, level surface
Storage and transport temperature range: -20 to +55 °C
Operating temperature range: -10 to +40 °C
Relative humidity below 90% (at 20 °C)

The welding machine was designed for use in covered spaces and is suitable for use in dry environments.
to set up. The ambient air in which the welding machine is used should have a temperature below
The ambient temperature must be +40°C and the humidity low. The air must be free of dust, acids, and salts.
or concentrations of iron or metal powders.

Ensure sufficient clearance in front of the welding machine so that the controls can be easily accessed.
Ensure the device is easily accessible and visible. Position it so that air intake and exhaust are not obstructed.
(Minimum distance to the wall 40 cm). Do not cover the welding machine. Ensure that no
Metal parts, dust or other foreign objects can penetrate the welding machine.

The housing ensures the protection of the electrical components against external influences as well as
against direct contact. Depending on the situations in which they can be used, it indicates
Different levels of protection against the ingress of solid objects and water are available. The level of protection is
Indicated by the letters IP, followed by two digits: The first digit indicates the degree of protection against solid objects.
Body and the second indicates the level of protection against water.

The environmental conditions of the devices PRO-MIG.ARC 251, PRO-MIG.ARC 311, PRO-MIG.ARC 351, PRO-MIG.ARC 404 W and PRO-MIG.ARC 404 WS must be appropriate for protection class IP23!

1st digit	Description	2nd digit	Description
2	Protected against solid objects with Dimensions 12.5 mm	3	Protected against vertically falling dripping water

The environmental conditions of the PRO-MIG ARC 404-4 W and PRO-MIG ARC 404-4 WS devices must comply with the
Protection class IP23 should be appropriate!

1st digit	Description	2nd digit	Description
2	Protected against solid objects with dimensions ÿ 12.5 mm	3	Protected against falling spray water up to 60° from the vertical

A notice:

Position the welding machine so that the air intake and exhaust are not obstructed.
Only with sufficient ventilation can the specified duty cycle of the power components be achieved.
(see “Technical Data”). Ensure that no grinding chips, dust, or
other metal parts can penetrate the device.

4.2 Network connection

DANGER! Electrical voltage

Connection to the mains and maintenance must be carried out in accordance with VDE regulations!
Defective or damaged parts on the burner or the appliance must be replaced immediately!

Check that the voltage specified on the nameplate matches the rated voltage.
your electrical network.

The welding machine may only be used with sockets and extension cords with
Protective contact plugs must be used, installed by an authorized electrician. The circuit protection of the supply lines to the mains
sockets must comply with regulations. Only fuses or circuit breakers appropriate to the conductor cross-section may be used, according to
these regulations .

• Overcharging can lead to electrical fires or building fire damage. • Before plugging in the power
cord, the mains voltage selector switch must be set to zero.

Use of extension cables

Some applications require the use of extension cables. To ensure full functionality...
The following table must be observed regarding the performance of the welding machine, in which the cross-sections of the conductors in
The dependency on the length can be specified.

Length of the extension cable	Minimum cable cross-section
10 meters	2.5 mm²
20 meters	4.0 mm²
30 meters	6.0 mm²

A NOTICE:

For lengths that deviate from this, the cross-section must be adjusted proportionally.
The cable cross-section must not be less than 2.5 mm².

4.3 Connecting the welding machine

Connect the welding power source only in accordance with the applicable VDE regulations.
Connect to the power supply network, taking into account the regulations of the relevant authorities.
Employers' liability insurance associations.

When connecting the device, please observe the specifications regarding the supply voltage and the
Network protection. Circuit breakers and fuses must always be rated for the specified current.
It should be designed for this purpose. The necessary information can be found in the chapter "Technical Data".

Always switch the device off when it is not in use.

Place the shielding gas cylinder on the cylinder bracket attached to the device and secure it.
Gas cylinder with the safety chain. Screw the cylinder pressure regulator onto the cylinder thread and
Check the connection for leaks. Always close the bottle valve after use.
Please observe the relevant regulations of the employers' liability insurance associations.

Devices 251, 311 and 351 are only for placing a 20-liter gas cylinder on the trolley.
Designed. The 404 units allow for the installation of a 50-liter gas cylinder.

4.4 Water cooling for MIG/MAG welding torches

The PRO-MIG ARC W and WS device types have a water-cooled burner.

Before starting up the system, the water level in the tank must be checked. If the water level is lower than 3/4 of the tank's capacity, the water level should be checked.
The coolant level in the tank is too low; it must be topped up. The coolant used is the one from Schweißkraft.
The use of tested special coolants is required. The coolant level must be checked at regular intervals.
control.

4.5 Connecting the Welding Cables The

Schweißkraft welding machines are equipped with quick-connect plugs for connecting the ground cable and the MIG/MAG welding torch. To achieve optimal welding results, ensure that all welding cable connections are tightened securely and that the insulation is not damaged.

4.6 Connecting the burner

For connecting the MIG/MAG welding torch, there is a special connection (Euro central connection) on the housing, through which the connections for the welding current, the trigger lines and the gas are made.

When using water-cooled burners, the cooling water hoses are connected via quick-release couplings. These are color-coded (red = return, blue = supply).

DANGER!

When using a gas-cooled burner on a water-cooled system, the water connections must be connected via a hose bridge to prevent damage to the water pump.

4.7 Connecting the ground cable

WARNING!

Ensure that the welding current cannot flow through chains of lifting equipment, crane ropes, or other electrically conductive parts.

Ensure that the ground cable is connected to the workpiece as close as possible to the welding point. Ground connections made at distant points reduce efficiency and increase the risk of electric shocks and stray currents.

Connect the ground cable to the workpiece.

Switch on the welding machine using the ON/OFF switch.

4.8 Connecting the shielding gas cylinder

DANGER!

When handling gas cylinders, the relevant safety regulations must be observed.
In particular, gas cylinders must be secured against mechanical damage, tipping over and falling due to the dangerously high internal pressure (up to 200 bar), and protected from heating (max. 50 °C), prolonged exposure to sunlight and severe frost.

A NOTICE:

Due to the associated hazards, tampering with or repairing pressure reducers is not permitted. Defective pressure reducers must be sent to a service workshop.

Place the gas cylinder on the designated platform directly above the wheel axle and push the cylinder all the way against the retaining bracket. Secure the cylinder to the device using the enclosed tension strap.

After removing the protective cap, briefly open the cylinder valve in the direction away from your body to remove any potential contaminants. Screw the pressure regulator (not included) onto the threaded fitting of the shielding gas cylinder. Connect the hose between the pressure regulator and the gas supply connection. To do this, screw the gas hose onto the pressure regulator using the union nut. Then check the connections for leaks.

The pressure regulator is equipped with two pressure gauges. The first has a scale of 0–300 bar and displays the gas cylinder's fill pressure after the cylinder valve is opened. The second pressure gauge shows the gas flow rate in liters per minute. The gas flow rate can be adjusted directly on the pressure regulator below the pressure gauges using the adjusting screw marked "Plus" and "Minus". To read the correct flow rate, the burner button must be pressed while the machine is switched on.

5 General description

5.1 Security

Only operate the welding machine under the following conditions:

The technical condition of the device is flawless .

The welding machine is being used as intended .

The operating instructions are followed.

All safety devices are present and active.

Eliminate malfunctions or have them eliminated immediately. Do not use the welding machine when Immediately silence any malfunctions and secure it against unintentional or unauthorized activation.

Report any changes immediately to the responsible department.

5.2 Performance features of the PRO-MIG ARC MIG/MAG welding machine

SMC (Smart Machine Control)

The interconnected systems and control mechanisms of Smart Machine Control (SMC) react effectively to changes in the arc at all times and continuously monitor droplet transfer. SMC compiles and evaluates all user settings, characteristic curve specifications, setpoint settings, and actual value measurements, and coordinates the control interventions according to routines defined by welding experts.

SDI (Stepless Dynamic Induction)

Thanks to SDI, the PRO-MIG ARC features an electronically continuously variable throttle, guaranteeing excellent ignition characteristics and an even more stable arc.

RSC (Realtime Speed Control)

The wire feed rate is measured directly at the motor via incremental rotary encoders. This allows changes in arc length to be detected and corrected early. RSC guarantees reproducible, constant wire feed rates – regardless of motor temperature or dirty hose packages.

CCM (Characteristic Curve Memory)

With CCM, operating the PRO-MIG synergy is incredibly easy: The comprehensive, integrated welding parameter database (CCM) is populated with the knowledge of experienced experts. Based on the combination of material, wire diameter, and voltage level, all synergy parameters required for a successful welding process are preset from the database. During welding, the actual values are continuously compared with these process specifications and corrected immediately if necessary.

Case shape design

Improved ergonomics through consistent design refinement. Thanks to its robust and well-engineered construction, it achieves IP23 protection, allowing for outdoor welding.

Industrial control

The mains voltage is constantly monitored for fluctuations and compensated for accordingly, guaranteeing optimal, consistent welding results. 2-stroke and 4-stroke operating modes, spot and interval functions, a digital voltmeter and ammeter, and a material thickness indicator are all standard features.

creep-in automatic

The system reduces the wire feed speed until the arc is ignited. This ensures a reliable ignition process.

Automatic burn-off system

Ensures a constant wire end length for the user when the welding process is completed.

automatic threader

Adjusted wire feed speed during threading.

Powerful 4-roll wire feed

The 4-roll drive guarantees a safe wire feed, even with torches of extra length.

5.3 Principle of the metal inert gas welding process

In metal inert gas (MIG) welding, the electric arc burns between a consumable wire electrode and the workpiece. Argon, carbon dioxide (CO2) , or a mixture of these or other gases is used as the shielding gas.

The wire electrode is unwound from a coil by a feed motor and pushed through the torch assembly to the current contact nozzle.

The positive terminal of the power source is connected to the wire electrode via the contact tip, and the negative terminal is connected to the workpiece. An electric arc is created between the wire electrode and the workpiece, which melts the wire electrode and the workpiece. The electrode thus acts as both the arc carrier and the welding filler material.

The wire electrode and the melt pool are protected from atmospheric oxygen by the protective gas used, which exits from the protective gas nozzle arranged concentrically around the electrode.

5.4 Operating principle of the PRO-MIG ARC welding systems

The welding power shielded gas welding systems are MIG/MAG constant voltage sources where the welding voltage is set using a rotary switch. The wire feed speed is automatically determined by the pre-selected welding voltage. A correction knob is available for precise adjustment of the wire feed speed to achieve the desired arc length.

The PRO-MIG ARC gas-shielded welding systems can be used to weld unalloyed and alloyed steels, stainless steels, aluminum and galvanized sheets (MIG brazing).

During the design of these devices, particular emphasis was placed on optimal welding properties, high efficiency, a robust housing, and minimal noise generation through the cooling systems. All components were extensively tested under practical conditions for demanding industrial applications.

6 Device description

6.1 Operating and display elements

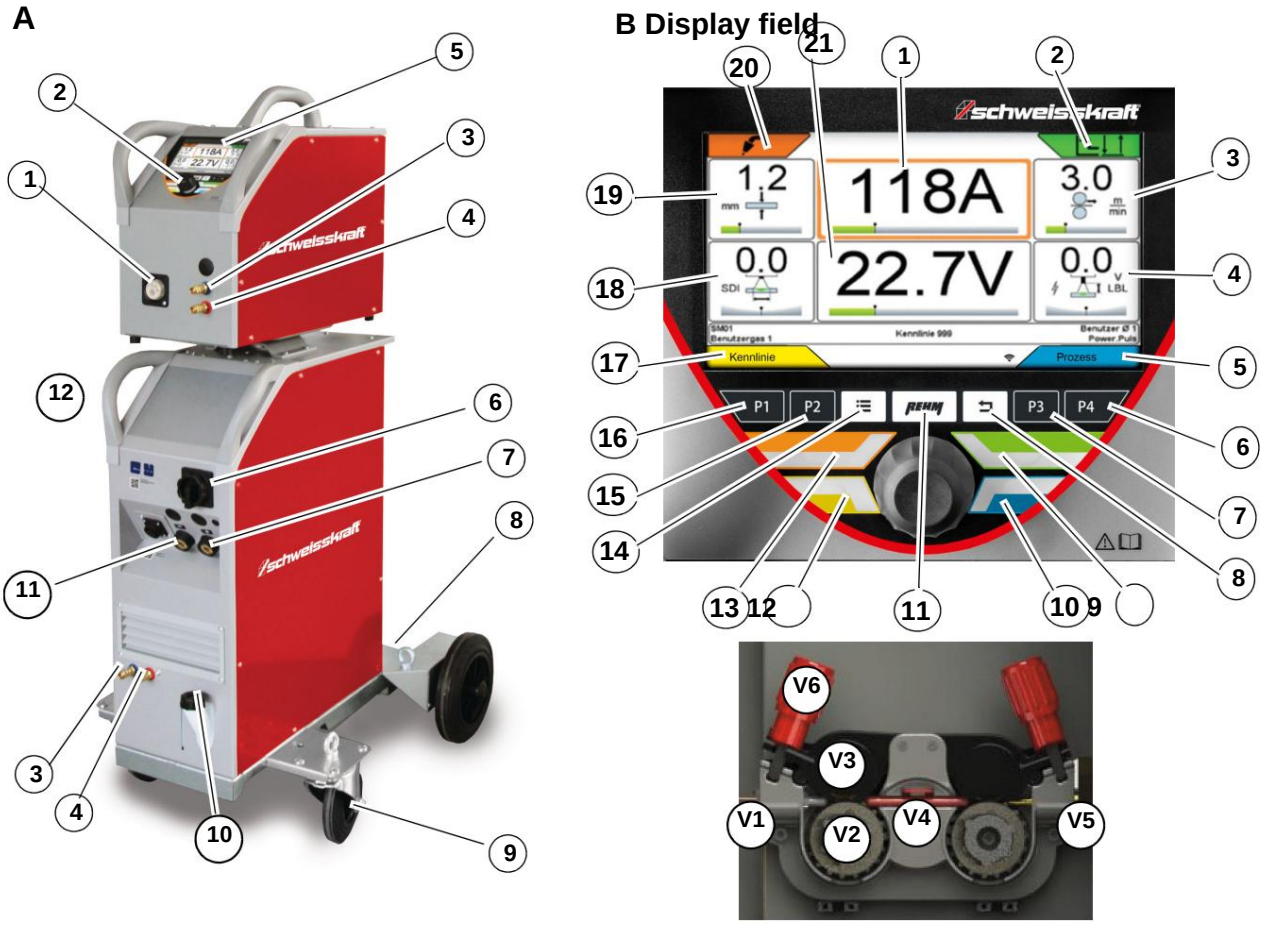


Fig. 6-1: Device description

A device description		B Display field description	
1	Burner central connection	1	Welding current (A) display
2	Control panel push and rotary encoder	2 Corner Menu Operating Modes	
3	Water supply “blue-cold”	3	Display field Wire feed speed (m/min)
4	Water return "red-hot"	4	LBL (arc length) display field
5	Display field	5 Corner Menu Process	
6	ON/OFF switch	6	Quick Choice
7	Welding power cable connection Power socket “Plus” +	7	Quick Choice
8	Standing area for gas cylinder	8	Back
9	Transport casters	9	Option key corner menu operating mode
10 Coolant tank inlet (water tank)		10 Option key Corner menu Process	
11 Power socket “Minus” -		11 Main screen “Home”	
12 Connection control line		12 Selection button Corner menu Characteristic curve	
		13 Selection button Corner menu Welding process	
		14 Submenu “Submenu”	

A device description		B Display field description
		15 Quick Choice
		16 Quick Choice
		17 Corner menu characteristic curve
		18 Display field SDI
		19 Display field material thickness
		20 Corner menu welding processes
		21 Display field Voltage (V)

6.2 Functional description (Fig. 6-1B)

6.2.1 Welding current (A) display (Pos.1):

By pressing the rotary encoder, the desired display field “Welding current” [1] can be selected.
The welding current can be adjusted by turning the rotary encoder. In idle mode, the setpoint value is displayed.
Welding current displayed. The actual welding current is displayed during welding.

6.2.2 Corner menu operating modes (Pos.2):

symbol	Designation	Description
	2-stroke	See chapter 7.1.1
	2-stroke with lowering	See chapter 7.1.2
	4-stroke	See chapter 7.1.3
	4-stroke with lowering	See chapter 7.1.4
	Points	See chapter 7.1.5
	Scoring points by lowering	See chapter 7.1.6
	2-beat interval	See chapter 7.1.7
	2-beat interval with drop	See chapter 7.1.8
	4-beat interval	See chapter 7.1.9
	4-beat interval with drop	See chapter 7.1.10

6.2.3 Wire feed speed display (Pos.3)

By pressing the rotary encoder, the desired display field "wire feed speed" [3] can be selected.

The selected wire feed speed is displayed and can be adjusted by turning and pressing the rotary encoder.

6.2.4 Display field LBL (arc length) (Pos.4)

By pressing the rotary encoder, the desired display field "LBL Correction" [4] can be selected. By turning the rotary encoder, the arc length can be continuously adjusted.

6.2.5 Corner menu process (Pos. 5)

In the MSG welding process, two additional welding processes are available.
These differ fundamentally in the material transfer of the filler material, the heat input, and the arc length. Depending on the equipment of the welding system and
Different processes are available depending on the selected additive material.

The selection is made in the corner menu welding process [5] :

• FOCUS.ARC

• POWER.ARC (MSG)

FOCUS.ARC

For conventional MIG/MAG welding with a focused arc, the FOCUS.ARC welding process can be selected. • Conventional arc • Welding with a short, high-pressure arc • Reliable root

penetration

• Particularly deep penetration

• Reliable flank detection

• Reduced burn marks

• Especially for Fe

POWER.ARC (MSG)

For conventional MIG/MAG welding, the POWER.ARC welding process can be selected. • Conventional arc • Optimized for the

challenges of manual welding • Safe

to handle

• Universally applicable

• Robust, compensates for tolerances •

Flat seam geometry

• Standardized

6.2.6 Quick-Choice Keys (Pos. 6, 7, 15, 16)

Make the desired machine settings.

Pressing the desired job save button for 3 seconds saves the current machine setting to that memory location.

In addition to the currently set power and arc length correction, the characteristic curve used is also saved.

Briefly pressing the desired job memory button recalls the stored settings of the welding system.

6.2.7 Menu buttons (Pos. 8, 11, 14)

The back button (position 8) is used to "jump back" to the previous menu when navigating through the submenus.

The main screen "Home" button (position 11) is used to access the main screen.

The submenu “Submenu” item 14

Pressing the “Submenus” button **[14]** takes you to a selection list (drop-down list) for the available submenus.

The following menus can currently be accessed from this list:

1. MSG parameters

2. Setup

3. Language The

submenus can be exited in 3 ways using the back buttons [8]: 1. Go back one level by

confirming a setting 2. Go back one level by pressing the

"Back" *button* 3. Go completely back to the main screen with the

"Main Menu" button .

6.2.8 Setup submenu

The Setup submenu allows you to define functions and processes in a highly convenient and clear manner.

The desired setting is selected by turning the push/rotary encoder. The settings are logically structured in various subfolders. Some settings depend on the selected characteristic curve, the chosen process, the welding system's configuration, etc.

Designation	Settings	Description
Screen		
Advertisement: Mirror: X	No / Yes	
Advertisement: Mirror: Y	No / Yes	
color scheme	Light / Dark	
BDE Mode	Step-shifted / Stepless	
welding		
Up/Down (Idle)	Inactive / AUTO / Performance / Job / LBL Correction / Dynamic correction	
Up/Down (Welding)	Inactive / AUTO / Performance / Job / LBL Correction / Dynamic correction	

Up/Down: speed	1-7	1: slowly 7: very fast
system		
Hold: Mode	Inactive / Action / Action and time	
Guest test: Time	10s-2:00min	
Water cooling mode	Off / Auto / On	From: Permanently from Car: With welding current activated One: Permanently one
Factory setting gene		
Factory settings		Welding parameters will be on Factory settings reset.

6.2.9 Corner menu characteristic curve (Pos.17)

In the corner menu, characteristic curve [17] , the material group, filler material, wire diameter of the inserted welding wire, gas, and welding process can be selected and set. The selected characteristic curve is displayed on the main screen. To enable the effective processing of different materials, various programmed characteristic curve data sets are available for the welding systems. The setting is always made by turning and pressing the rotary encoder.

6.2.10 Display field SDI (Pos.18)

6.2.11 Display field material thickness (Pos.19)

By pressing the rotary encoder, the desired display field "Material thickness" [19] can be selected. By turning the rotary encoder, the material thickness of the base material to be welded can be set.

6.2.12 Corner menu Welding process (Pos.20)

The welding process selection is made using the corner menu [20] : • MIG/MAG (Metal Inert Gas Welding with synergy curve) • MIG/MAG Manual (Metal Inert Gas Welding without synergy curve) • MMA Manual Arc Welding • Gouging. The process is selected and confirmed by turning and pressing the rotary encoder. The "Back" or "Home" buttons [8] return to the main screen.

MSG

In stepless MIG/MAG welding, very different material transitions and also different arc types result depending on the selected arc power and the shielding gas used; see also (welding process).

In MIG/MAG welding, only synergy curves are used. You select the synergy curve according to your filler material, wire diameter, shielding gas, and welding process.

MSG manually

In stepless MIG/MAG manual welding, welding is performed without a synergy curve. Use this welding process if you cannot find a suitable characteristic curve for your filler material. You must manually adjust the voltage and wire feed speed.

MMA

For MMA (manual metal arc welding), use this welding procedure. Connect the electrode holder and ground cable to the sockets according to the desired polarity. Once the welding procedure is activated, open-circuit voltage is available for welding.

Jointing

Use this welding process for gouging. Connect the gouge and ground cable to the sockets according to the required polarity. Once the welding process is activated, open-circuit voltage is available for gouging. The gouging welding process is not available on all power classes of welding machines.

6.2.13 Display field welding voltage (V) (Pos.21)

By pressing the rotary encoder, the desired display field “welding voltage” [21] can be selected.
The welding voltage can be adjusted by turning the rotary encoder. The target welding voltage is displayed when the machine is idle. During welding, the actual welding voltage is displayed.

6.3 feed unit

S-models: The feed unit is located in the case

All other models: The feed unit is located in the power source.

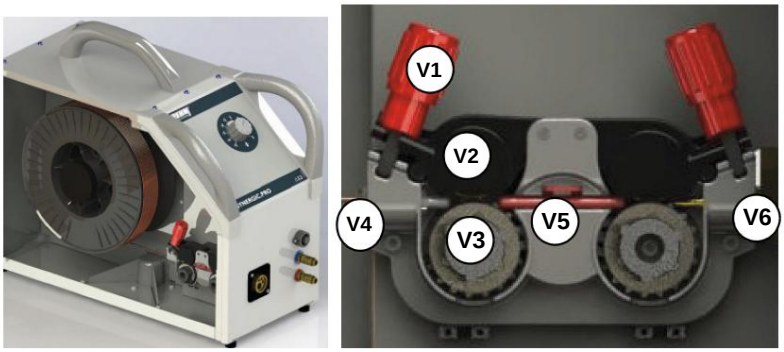


Fig. 6-2: Feed unit

V1: Contact pressure adjustment lever:

Adjust the contact pressure of the pinch rollers:

- Tilt the red adjustment levers forward to adjust the pressure rollers for threading or unthreading.
  unlock
- Turn the red adjustment levers to adjust the counter-pressure on the wire.

V2: Pressure rollers without drive

V3: Drive roller

The drive rollers can be changed and rotated by twisting the plastic cap. Each roller has two grooves with different wire diameters, e.g., 0.8/1.0.

The "active" wire diameter is shown on the reel in the top view.

The roller must be rotated to use the other groove.
The MIG/MAG welding machines are supplied with steel rollers 0.8/1.0.

V4: Wire feed opening (from the wire spool onto the spool mandrel)

V5: Middle wire guide

V6: Wire exit opening (transition to the central adapter (ZA))

6.4 Scope of delivery

PRO-MIG.ARC 251 PRO-MIG.ARC 311	PRO-MIG.ARC 351 | PRO-MIG.ARC 404 W PRO-MIG.ARC 404 WS | PRO-MIG ARC 404-4 W PRO-MIG ARC 404-4 WS
1x feed roller 0.8/1.0 mm	1x feed roller 1.0/1.2 mm

6.5 Accessories (optional)

Designation	1080525	1080531	1080535	1080536	1080542	1080544	1080545	Welding force Item No.
MIG/MAG welding torch, gas-cooled SMB15 3m	x							1091503
MIG/MAG welding torch, gas-cooled SMB15 4m	x							1091504
MIG/MAG welding torch, gas-cooled SMB15 5m	x							1091505
MIG/MAG welding torch, gas-cooled SMB15 3m Alu	x							1091513
MIG/MAG welding torch, gas-cooled SMB25 3m	x	x						1092503
MIG/MAG welding torch, gas-cooled SMB25 4m	x	x						1092504
MIG/MAG welding torch, gas-cooled SMB25 5m	x	x						1092505
MIG/MAG welding torch, gas-cooled SMB25 3m Alu	x	x						1092513
MIG/MAG welding torch, gas-cooled SMB36 3m		x	x					1093603
MIG/MAG welding torch, gas-cooled SMB36 4m		x	x					1093604
MIG/MAG welding torch, gas-cooled SMB36 5m		x	x					1093605
MIG/MAG welding torch, gas-cooled SMB36 3m Alu		x	x					1093613
MIG/MAG welding torch, water-cooled SMB400 3m				x	x	x	x	1094003
MIG/MAG welding torch, water-cooled SMB400 4m				x	x	x	x	1094004
MIG/MAG welding torch, water-cooled SMB400 5m				x	x	x	x	1094005

Designation	1080525	1080531	1080535	1080536	1080542	1080544	1080545	Welding force Item No.
MIG/MAG welding torch, water-cooled SMB400 3m Aluminum				x	x	x	x	1094013
ZWIPA MIG/MAG 70mm² 1.4m W 12p FA/MA/SP							x	1065040
ZWIPA MIG/MAG 70mm² 5m W 12p FA/MA/SP							x	1065041
ZWIPA MIG/MAG 70mm² 10m W 12p FA/MA/SP							x	1065042
ZWIPA MIG/MAG 70mm² 15m W 12p FA/MA/SP							x	1065043
ZWIPA MIG/MAG 70mm² 20m W 12p FA/MA/SP							x	1065044
ZWIPA MIG/MAG 95mm² 1.4m W 12p FA/MA/SP							x	1065050
ZWIPA MIG/MAG 95mm² 5m W 12p FA/MA/SP							x	1065051
ZWIPA MIG/MAG 95mm² 10m W 12p FA/MA/SP							x	1065052
ZWIPA MIG/MAG 95mm² 15m W 12p FA/MA/SP							x	1065053
ZWIPA MIG/MAG 95mm² 20m W 12p FA/MA/SP							x	1065054
Basket spool adapter KA 1	x	x	x	x	x	x	x	1110001
Basket spool adapter KA 2	x	x	x	x	x	x	x	1110005
Ground cable complete with terminal MK4/25 KS13 200A	x							1250225
Ground cable complete with terminal MK4/35 KS13 400A	x	x						1250235
Ground cable complete with terminal MK4/50 KS13 600A			x	x				1250250
Ground cable complete with terminal MK4/70 KS13 600A					x	x	x	1250270
Argon/CO2 pressure reducer, large	x	x	x	x	x	x	x	1700050
G1/4" RH shielding gas filter	x	x	x	x	x	x	x	1499003
Conveyor roller V 0.6/0.8mm solid wire 4/2	x	x	x	x	x	x	x	1063054
Conveyor roller V 0.8/1.0mm solid wire 4/2	x	x	x	x	x	x	x	1063055
Conveyor roller V 1.0/1.2mm solid wire 4/2	x	x	x	x	x	x	x	1063053
Conveyor roller V 1.2/1.6mm solid wire 4/2	x	x	x	x	x	x	x	1063056
Conveyor roller V 0.9/1.1mm solid wire 4/2	x	x	x	x	x	x	x	1063057
Conveyor roller R 1.2/1.6mm tubular wire 4/2	x	x	x	x	x	x	x	1063058
Conveyor roller A 1.0/1.2mm aluminium 4/2	x	x	x	x	x	x	x	1063059
Conveyor roller A 1.2/1.6mm aluminium 4/2	x	x	x	x	x	x	x	1063060
Conveyor roller A 1.6/2.4mm aluminum 4/2	x	x	x	x	x	x	x	1063061
Retrofit kit air filter attachment SP²+MA²250-450/ MPF M16/SP							x	1061353
Metal filter cell for air filter SP²+MA²250-450/MPF M16/SP/TIG COOL							x	1033671

Designation	1080525	1080531	1080535	1080536	1080542	1080544	1080545	Welding force Item No.
Retrofit kit for burner and hose package holder							x	1060270
Trolley for SP²/MA² feed case							x	1033667

7 functions

7.1 Function selector switch

7.1.1 Operating mode 2-stroke

The 2-stroke operating mode is recommended for fast, controlled stapling and
manual spot welding.

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the set hot start value.

After the hot start time has elapsed, the welding current is reduced from the hot start value over the duration of the hot start slope.
Time adjusted to the welding current

2nd stroke - Release the burner button

Wire feed stops

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

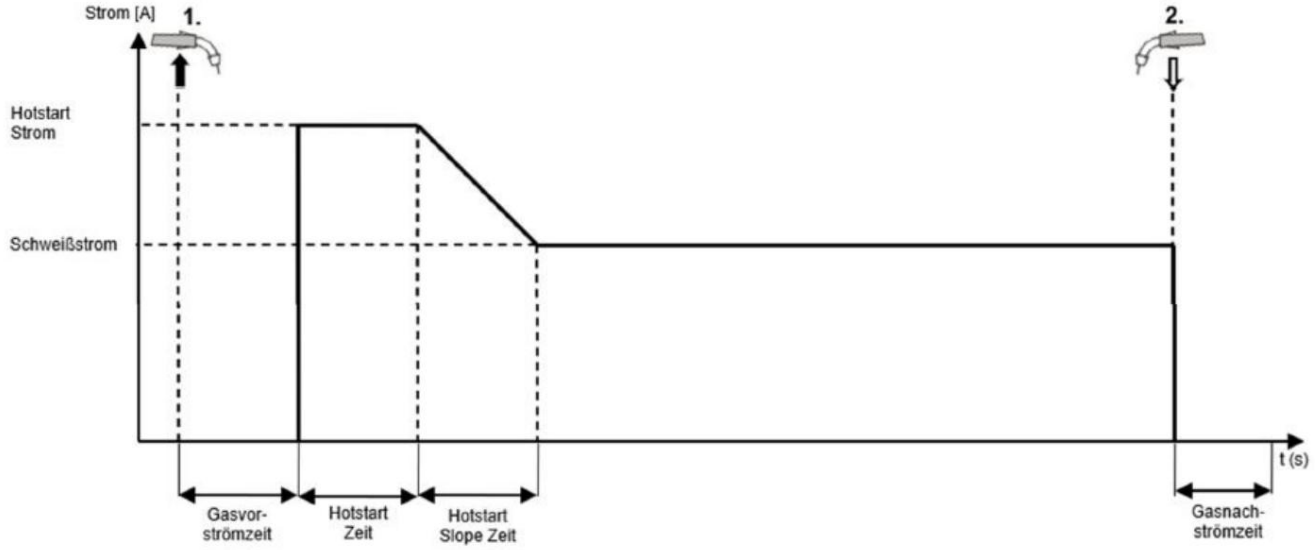


Fig. 7-1: Sequence of operation in 2-stroke mode with hot start

7.1.2 Operating mode 2-stroke with slope

1. Step - Press burner button

The solenoid valve for the shielding gas opens. The power
unit is switched on after the set gas pre-flow time has elapsed. Welding voltage is applied. The wire
feed runs at the creep speed. The
arc is ignited after contact of the welding wire with the workpiece. The
feed switches to the set wire feed speed of the welding process. The welding current flows at the set
hot start value. After the hot start time has elapsed, the welding current is changed from the hot start value to the value set for
welding over the duration of the hot start slope time.

2nd stroke - Release the burner button

During the lowering time, the welding current is reduced to the value set for the lowering current.
The wire feed stops after the lowering time has elapsed.
Free burning and free burning control are carried out.
The protective gas is switched off after the gas afterflow time has elapsed.

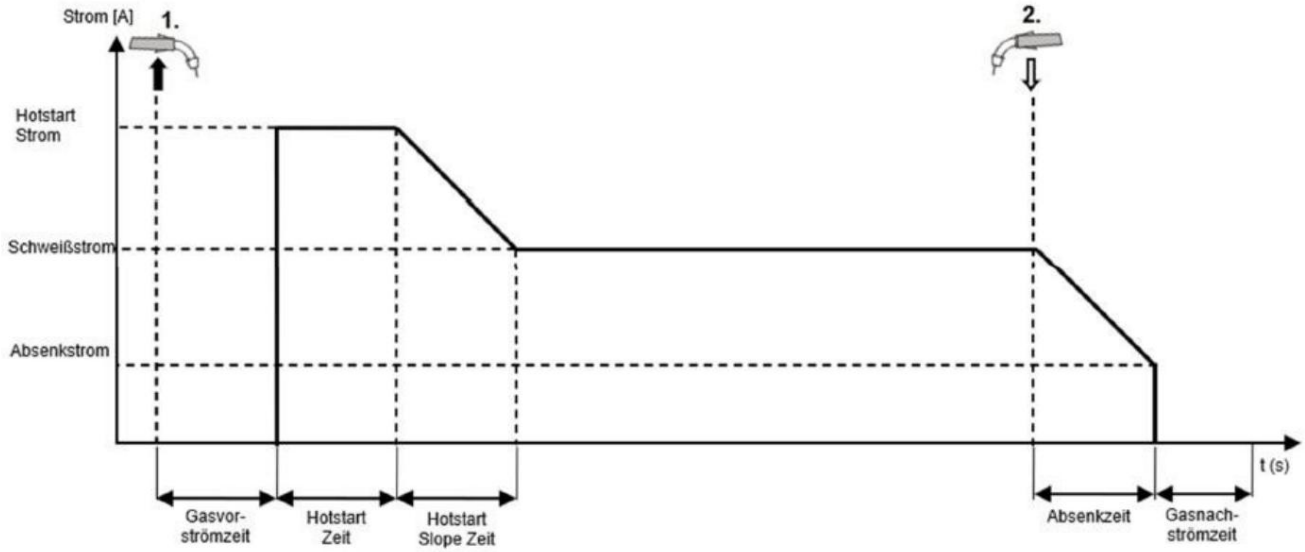


Fig. 7-2: Sequence of the 2-stroke lowering (slope) operating mode with hot start

7.1.3 4-stroke operating mode

Four-stroke welding is recommended for longer weld seams. Procedure of four-stroke operation:

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the hot start value set for welding.

2nd stroke - Release the burner button

The welding current is changed from the hot start value to the value set for welding.

3rd step - Press burner button

Pressing the burner button has no effect.

4th step - Release the burner button

Wire feed stops

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

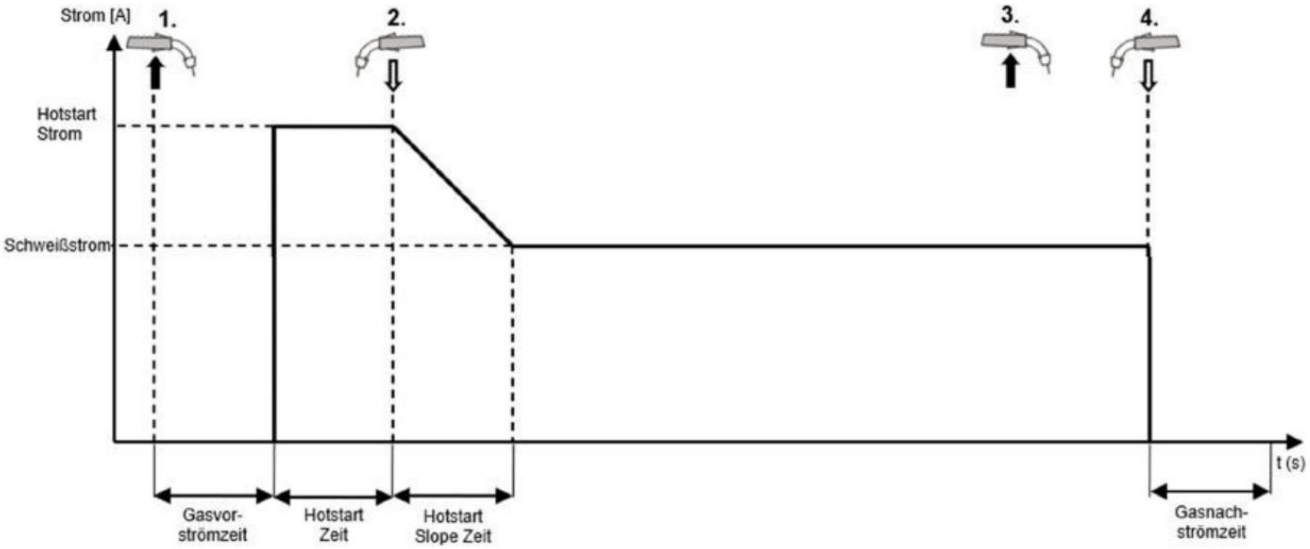


Fig. 7-3: Sequence of operation in 4-stroke mode with hot start

7.1.4 Operating mode 4-stroke with slope

Sequence of operation in 4-stroke mode with slope:

1. Step - Press burner button

The solenoid valve for the shielding gas opens. The power unit is switched on after the set gas pre-flow time has elapsed. Welding voltage is applied; wire feed runs at the creep speed; arc is ignited after contact of the welding wire with the workpiece; the feed switches to the set wire feed speed of the welding process; the welding current flows at the set hot start value

2nd stroke - Release the burner button

The welding current is changed from the hot start value to the value set for welding.

3rd step - Press burner button

During the lowering time, the welding current is reduced to the value set for the lowering current.

4th step - Release the burner button

Wire feed stops
Free burning and free burning control are carried out.
The protective gas is switched off after the gas afterflow time has elapsed.

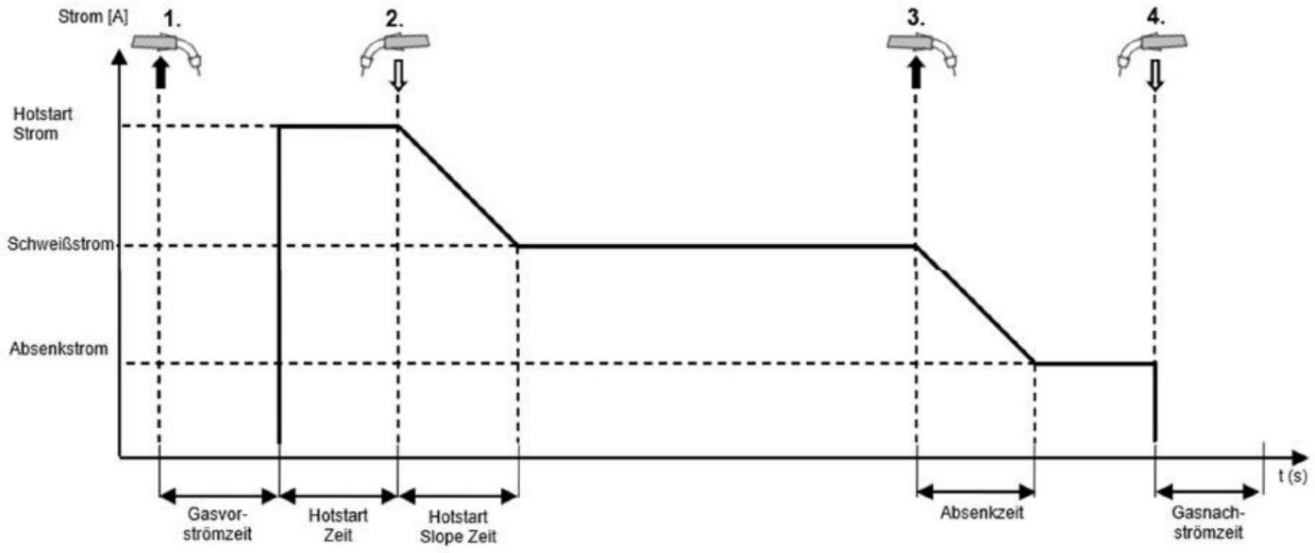


Fig. 7-4: Sequence of operation mode 4-stroke lowering (slope) with hot start

7.1.5 points

The spot welding mode is recommended for welding with a fixed spot time starting from 0.1 seconds. The stationary welding process runs for the set spot time, unless the torch trigger is released prematurely during welding. After the set spot time has elapsed or after the torch trigger is released during welding, the end program runs.

Procedure of the point function:

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the value set for welding.

The timing (welding time) is running

The welding process ends automatically after the set time has elapsed.

Wire feed stops

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

2nd stroke - releasing the burner button

Releasing the burner button during the specified time will cause the

Welding process terminated immediately and shielding gas switched off after the gas

post-flow time had elapsed.

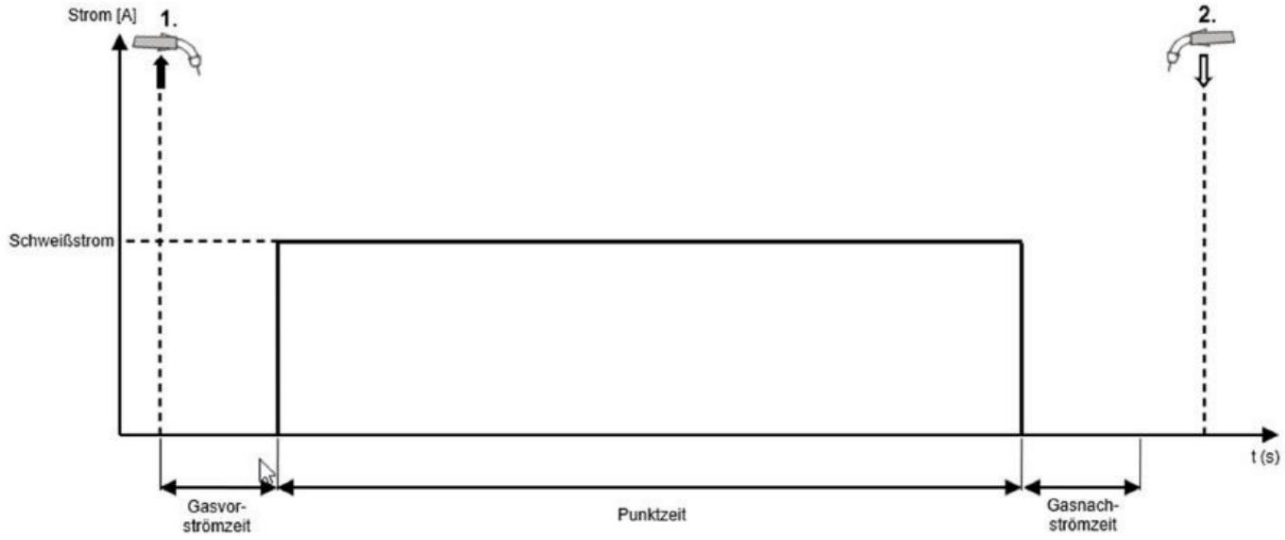


Fig. 7-5: Sequence of operation of the points mode

7.1.6 points with slope reduction

Procedure for the operating mode "Scoring with slope":

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the value set for welding.

The timing (welding time) is running

The welding process ends automatically after the set time has elapsed.

The wire feed stops after the lowering time has elapsed.

During the lowering time, the welding current is reduced to the value set for the lowering current.

The wire feed stops after the lowering time has elapsed.

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

2nd stroke - releasing the burner button

Releasing the torch trigger during the spot welding time immediately ends the welding process and shuts off the shielding gas after the gas post-flow time has elapsed.

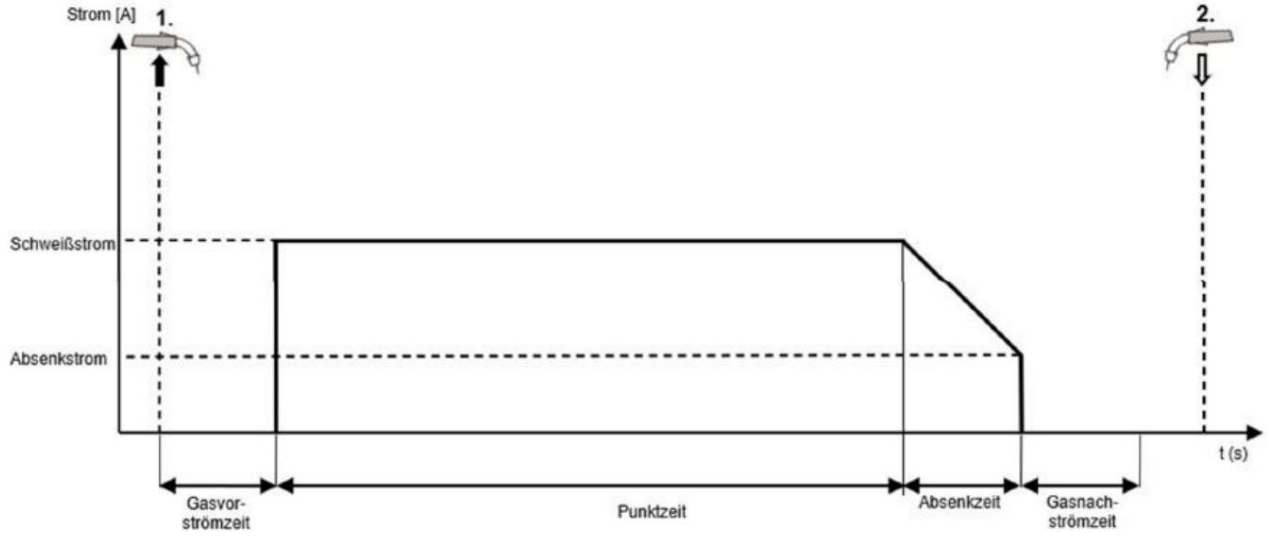


Fig. 7-6: Sequence of operations in the "Scoring with Slope" mode

7.1.7 2-beat interval

Interval welding means defined spot welding with defined pause times. This allows for the application of very thin filler materials. Interval welding is only possible in 2-stroke mode. Welding in interval mode is recommended for welding with a fixed pause time starting at 0.1 seconds. Within the interval, the pause time between individual intervals can be individually adjusted, thus ensuring the cooling of the base material and resulting in less distortion in the component.

Sequence of operating mode interval 2-stroke:

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the value set for welding.

The welding time is running.

The welding process ends automatically after the set welding time has elapsed.

Wire feed stops

Free burning and free burning control are carried out.

The protective gas continues to flow.

The break time is running

After the break period has elapsed, the welding process is restarted, and the previously described procedure is repeated.

2nd stroke - Release the burner button

Wire feed stops

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

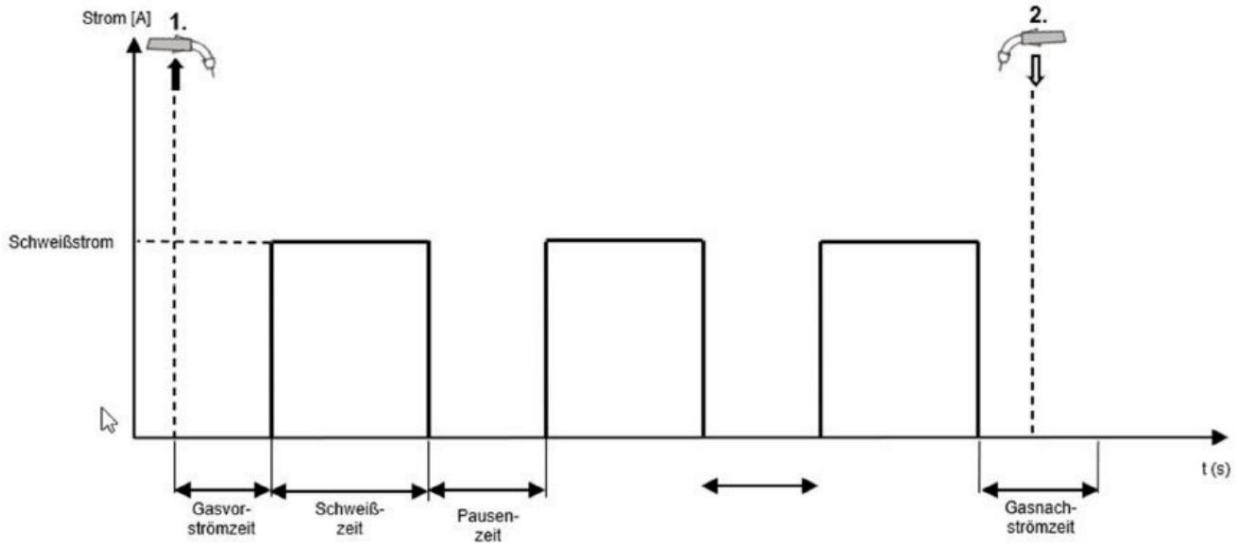


Fig. 7-7: Sequence of operation in interval 2-stroke mode

7.1.8 2-beat interval with slope

Sequence of operating mode interval 2-stroke with slope:

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the set gas pre-flow time has elapsed.

Welding voltage is applied

Wire feed runs at the creep speed

The arc is ignited after the welding wire makes contact with the workpiece.

The feed mechanism switches to the set wire feed speed of the welding process.

The welding current flows at the value set for welding.

The welding time is running.

After the set welding time has elapsed, the welding current is reduced to the desired level for the duration of the lowering time.

Reduced set current value

Wire feed stops after the lowering time has elapsed.

Free burning and free burning control are carried out.

The protective gas continues to flow.

The break time is running

After the break time has elapsed, the welding process is restarted and the welding process runs again.

2nd stroke - Release the burner button

During the lowering time, the welding current is reduced to the value set for the lowering current.

The wire feed stops after the lowering time has elapsed.

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

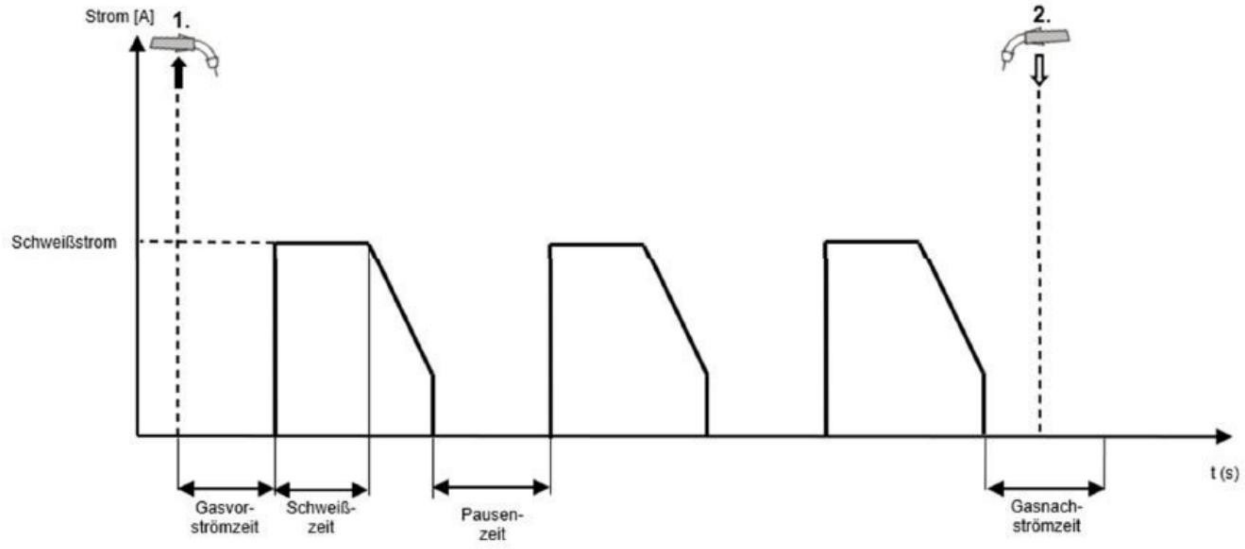


Fig. 7-8: Sequence of operation in interval 2-stroke mode with slope (lowering)

7.1.9 4-beat interval

Sequence of operating mode interval 4-stroke :

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the gas pre-flow time has elapsed.

Wire feed runs at the creep speed

The arc is ignited when the welding wire comes into contact with the workpiece.
The welding current flows with hot start value

2nd stroke - Release the burner button

The welding current is changed from the hot start value to the value set for welding.
The welding time is running.

Wire feed stops after the welding time has elapsed.

Free burning and free burning control are carried out.

The protective gas continues to flow.
The break time is running

After the break time has elapsed, the welding process is restarted and the welding process runs again.

3rd step - Press burner button

4th step - Release the burner button

The welding process is completed.

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

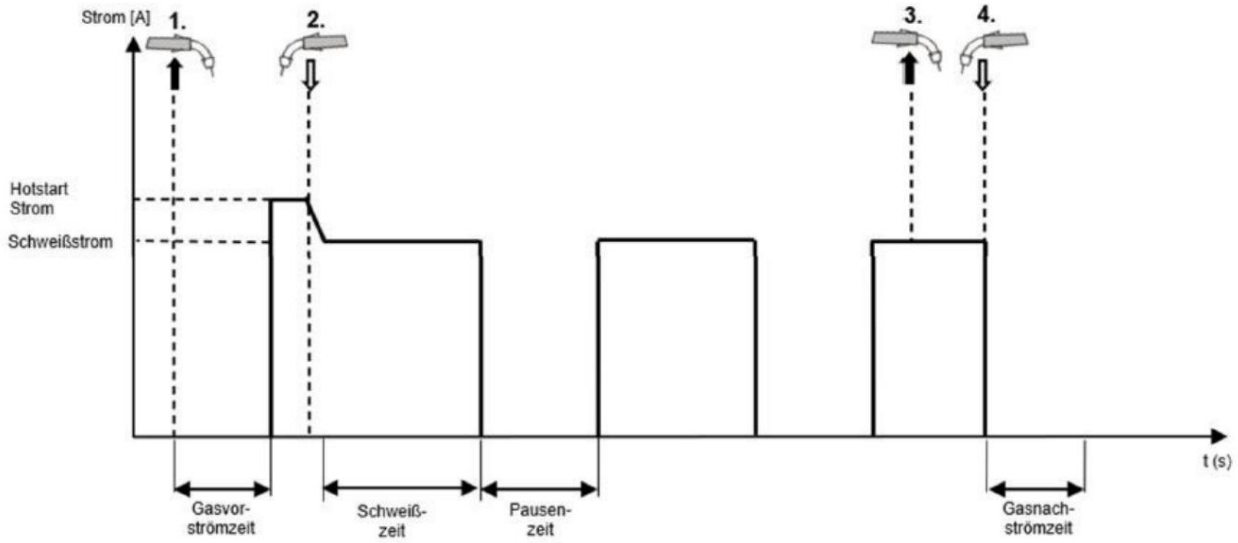


Fig. 7-9: Sequence of operation in interval 4-stroke mode with hot start

7.1.10 4-beat interval with drop

Sequence of operating mode interval 2-stroke with slope:

1. Step - Press burner button

The solenoid valve for the protective gas is opened.

The power section is switched on after the gas pre-flow time has elapsed.

Wire feed runs at the creep speed

The arc is ignited when the welding wire comes into contact with the workpiece.

The welding current flows with hot start value

2nd stroke - Release the burner button

The welding current is changed from the hot start value to the value set for welding.

The welding time is running.

Wire feed stops after the welding time has elapsed.

Free burning and free burning control are carried out.

The protective gas continues to flow.

The break time is running

After the break time has elapsed, the welding process is restarted and the welding process runs again.

3rd step - Press burner button

The welding current is reduced to the downslope current.

4th step - Release the burner button

The welding process is completed.

Free burning and free burning control are carried out.

The protective gas is switched off after the gas afterflow time has elapsed.

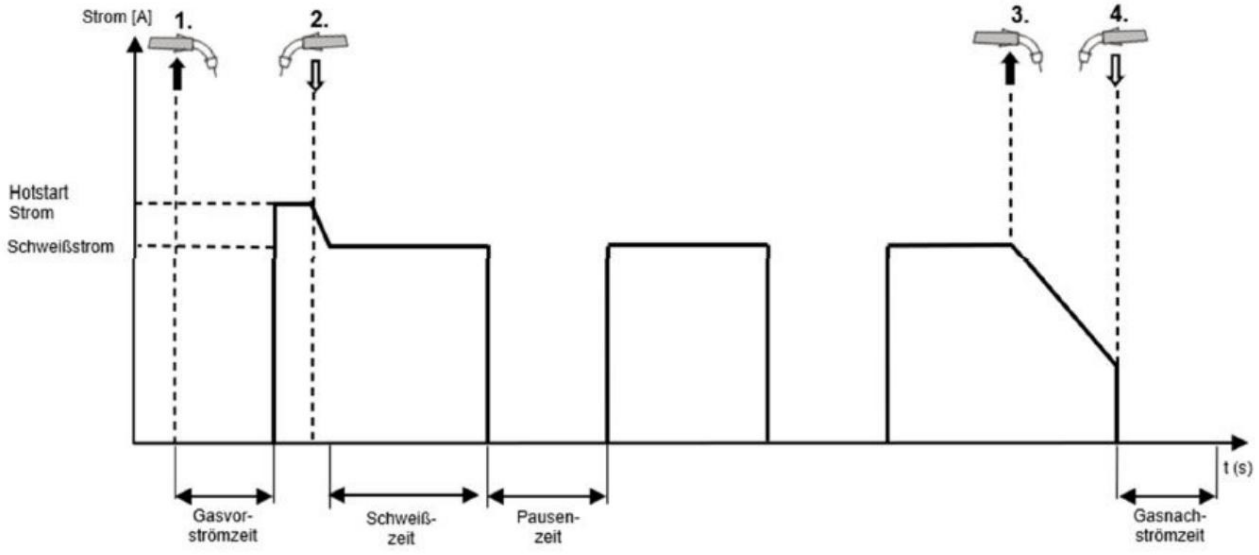


Fig. 7-10: Sequence of operation in interval 4-stroke mode with slope (lowering)

7.2 Welding parameters

7.2.1 Parameter Settings

The push and rotary encoder allows for the selection and editing of welding parameters primarily directly within the displayed welding curve. The display and available settings depend on the device type and the selected welding process. The cursor can be moved clockwise or counterclockwise. The main display always shows the value and function of the cursor position.

7.2.2 MSG parameters

The welding parameters allow the user to individually adjust the most important welding parameters, such as pre-gas flow time, creep rate, etc. Some welding parameters are only active when certain welding processes/functions are selected. A parameter field is activated for editing by rotating the cursor (using the rotary encoder) to the value field [parameter field] in the screen display and then pressing the encoder to activate the field. The welding parameters are described in detail below in the order of the MIG/MAG parameter curve. Depending on the activated functions or operating modes, as well as the welding system's configuration, fewer parameters may be displayed.

Gas pre-flow time

Time between the gas valve being switched on and the start of the gas inlet process. This parameter depends on the selected characteristic curve; that is, the gas pre-flow time can be individually set for each characteristic curve.

VD Sneaking In

Setting the creep speed. This parameter depends on the selected program; that is, the creep speed can be set individually for each program.

Starting current

Starting energy after ignition, relative to the welding energy (100%). This value can be set lower (less than 100) or higher (greater than 100) depending on the application. This parameter depends on the selected characteristic curve; that is, the starting current can be set individually for each curve.

Starting current time

The start current time defines the duration of the hot start. This parameter depends on the selected characteristic curve; that is, the start current time can be set individually for each characteristic curve.

terminal crater stream

The current reduction after the setback time has elapsed. The setback current is based on the welding current (100%). This parameter depends on the selected characteristic curve; that is, the setback value can be individually adjusted for each characteristic curve.

terminal crater flow time

Time period during which the terminal crater flow is retained.

open fire

Time between switching off the DV motor and switching off the power section. This parameter modifies the predefined burn-back value for each characteristic curve and allows for individual adjustment of the free wire end length at the end of the weld. A higher burn-back value results in a shorter free wire end (because the wire burns back for a longer time), and a lower value results in a longer wire end. If the burn-back value is set too high, the wire end can burn onto the contact tip.

Gas flow time

Time between switching off the power section (end of free-burn time) and switching off the gas valve.
This parameter depends on the selected characteristic curve, i.e., the gas afterflow time can be individually set for each characteristic curve.

Point time

Welding time in spot welding mode if the torch trigger is not released prematurely.

Welding time

Welding duration in interval mode if the torch trigger is not released prematurely.

Break time

Pause time in interval operating mode (time between 2 welds).

7.3 Language menu

The available languages are displayed as flags in a selection list. Select a language with the cursor and confirm by pressing the rotary encoder. The language will be activated immediately. The selected language is indicated by a box with a cross.

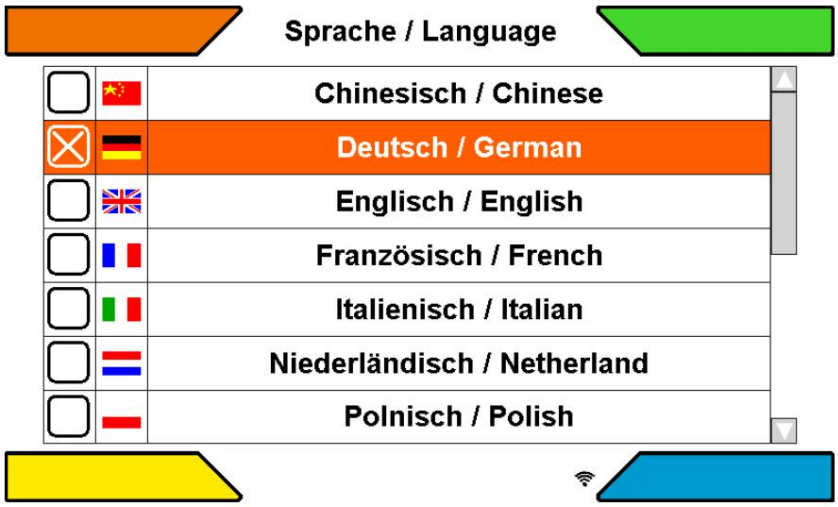


Fig. 7-11: Language setting

7.4 Additional functions

7.4.1 Threading

The threading function is used to thread the welding wire into the torch hose assembly without current. Threading the welding wire into the torch hose assembly is done via the submenu. Pressing the "Threading" function button initiates a 2-second threading process at a reduced speed. The threading speed is then gradually increased over approximately 2 seconds until it reaches the set threading speed.

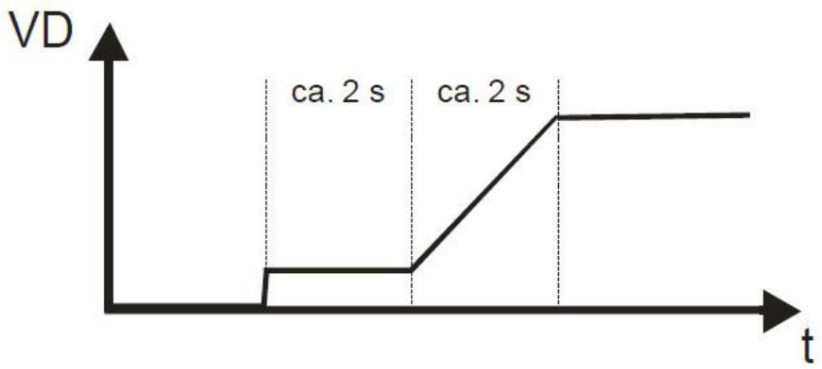


Fig. 7-12: Threading process

7.4.2 Gas test

The "Gas Test" is used to adjust the required gas flow rate at the pressure regulator. This allows the desired gas flow rate to be set without power or wire feed at the pressure regulator. The gas test is performed via the submenu. Pressing the "Gas Test" function button opens the gas valve and shielding gas flows from the welding torch. The gas test ends automatically after 20 seconds. The gas test can be prematurely terminated by pressing the "Gas Test" button or the torch trigger.

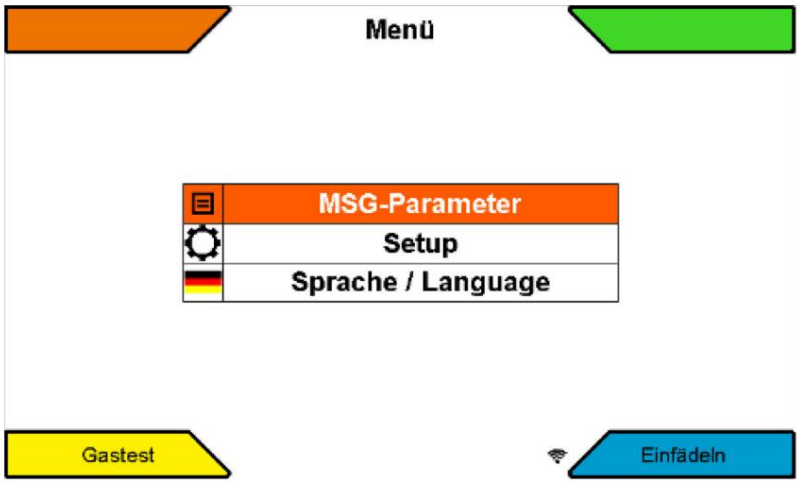


Fig. 7-13: Submenu for threading and gas test

7.4.3 Water circulation cooling

Depending on the equipment variant, the welding systems are equipped as standard with a water circulation cooling system for the welding torch.

7.4.4 Temperature Monitoring of Power Components If the

permissible temperature of the power components (transformer and transistor switch) is exceeded, the welding current is automatically switched off. This is indicated by the over-temperature symbol and an error message on the main screen. After the power components have cooled down, the system automatically switches back to operating mode (without power).

7.4.5 External cooling of the power components

The power components of the SYNERGIC.ARC welding systems are designed for high operational reliability. Optimal heat dissipation with minimal noise is achieved through the targeted placement of the cooling fan and power components.

7.4.6 Fan and water pump circuit

Depending on the configuration, the welding systems feature demand-based fan and water pump control. The fan and water pump switch on immediately when welding begins. After the welding process is complete, a 7-minute run-on time is set; this can be adjusted in the submenu.

The setup can be changed. Afterwards, the fan and water pump go into standby mode. This reduces noise emissions, wear and tear, and energy consumption.

To ensure proper torch cooling during the first welding process, the water pump is automatically activated after the power switch is turned on until cooling water flows in the return line for 10 seconds.

7.4.7 Polarity selection for self-shielding flux-cored wires

Some SYNERGIC.ARC welding systems are equipped with a polarity selector plug. For welding self-shielding flux-cored wires, the plug is inserted into the "MINUS" terminal. For MIG/MAG welding with shielding gas, the plug is inserted into the "PLUS" terminal. Always ensure the plug is securely connected to prevent overheating.

8 Operation

The SYNERGIC.ARC welding systems are put into operation using the main switch. For approximately 10
For a few seconds, the screen displays the company logo and device type. Then the display switches to the
The main screen is now open. The last active welding parameters are set. The device is now ready for operation.

8.1 Tests before switching on

It is assumed that the system has

been properly installed in accordance with the chapter "Installation and Connection".

ÿ all connections (shielding gas, burner connection) properly according to the chapter “Installation and Connection”
were manufactured ÿ

the work due according to the maintenance interval was carried out (Chapter “Maintenance”)

ÿ the safety devices and components of the system (especially the burner connection hoses)
have been checked by the operator and are ready for use

ÿ the operator and the persons involved have put on the appropriate protective clothing and the
The work area was secured so that no uninvolved persons were endangered.

8.2 Select operating mode

Function selection

Use the function selection to preselect the desired operating mode:

ÿ 2-stroke function

ÿ 2-stroke function with lowering

ÿ 4-stroke function

ÿ 4-stroke function with lowering

ÿ Point function

ÿ Point function with lowering

ÿ Interval-2-beat function

ÿ Interval 2-beat function with lowering

ÿ Interval 4-beat function

ÿ Interval 4-beat function with lowering

8.3 Practical application instructions

The practical user instructions listed below can only be an excerpt of the various
PRO-MIG applications from Welding force
Synergy welding systems are represented. For questions regarding specific welding tasks, materials, shielding gases.
or welding equipment refers to relevant specialist literature or to the welding equipment specialist dealer.
referred.

Weldable materials

The PRO-MIG ARC gas-shielded welding systems can be used to weld a wide variety of materials.
e.g. unalloyed and alloyed steels, stainless steels, aluminium and galvanised sheets (MIG brazing).

wire electrodes

Various wire diameters and materials are offered and used for MIG/MAG welding.
The wire diameter depends on the thickness of the base material and the required
Welding current. The material of the wire electrode is chosen according to the base material and the desired quality of the weld.
Weld seam selected. The most common materials with wire diameter and their respective specifications.
You can find this information in the relevant specialist literature.

Inert gas

Argon with a CO2 content of 18% is used in this process. **steels** primarily Mixed gas consisting out of

When welding **stainless steel,** mainly mixed gas consisting of argon with a proportion of 2% is used.
CO2 is used.

In the case of **aluminum,** pure argon serves as a protective gas.

The **required amount of shielding gas** depends on the wire diameter, the gas nozzle size, the Welding current level and workplace-related air movement. The required gas quantity for mixed gases at approximately 7 ... 16 l/min, for argon at approximately 10 ... 18 l/min.

Rule of thumb for gas setting:

Steel: Wire diameter x 10 = gas volume in liters

Stainless steel: Wire diameter x 11 = Gas volume in liters

Aluminum: Wire diameter x 12 = Gas volume in liters

MIG/MAG welding torch

The MIG/MAG welding torches recommended by Schweißkraft are available in a gas-cooled version at the To connect PRO-MIG ARC 251-4 AM, 311-4 and 351-4 type welding machines, water-cooled Burners for types 352-4 W, 402-4 W, 404-4 W and 404-4 WS.

Burner equipment

The accessories for the torch depend on the specific welding task and must be adapted accordingly.

Power nozzles

Power nozzles are wear parts and must be replaced from time to time. It is important to ensure that... that the power nozzles are selected according to the chosen wire diameter.

For aluminum welding tasks, special contact tips for various wire diameters are available. Available, which you can find in the Schweißkraft catalog.

Gas jets

Please refer to the Schweißkraft catalog for gas nozzles in various designs.

Wire guide spirals

Wire guide spirals must be selected according to the different material types and wire thicknesses. The product range for this can be found in the Schweißkraft catalog. Furthermore, the instructions of the burner manufacturer (see operating instructions).

Wire feed setting

To achieve safe wire feeding, the following points must be observed (see chapter). (Adjust wire feed):

Feed rollers must be selected to match the wire diameter.

Precise speed control of the feed motor ensures a constant wire feed speed.

Uncoiler setting

The brake of the unwinding mandrel must be adjusted so that the wire stops when the [unclear text] is switched off. The wire feeder does not unwind at the end of the welding process.

Welding voltage levels

The welding machine's power output is adjusted via the position of the step switch(es). The required Welding performance depends on the specific welding task.

Guideline values for filler material consumption as well as welding current and voltage for wire diameters of The following table shows the dimensions for representative welding tasks: 1.2mm

material	Sheet thickness, wire feed speed, welding current, welding voltage			
Unit	mm	m/min	A	V
Unalloyed steel	2.0 - 4.0	3.1 – 4.6	125 - 169	19.5 – 21.0
Unalloyed steel	8.0 - 12.0	8.0 – 9.8	254 - 296	29.4 – 30.9
high-alloy steel	2.0 - 4.0	3.6 – 8.5	122 - 252	15.7 – 25.0
aluminum	2.0 - 4.0	6.8 – 11.6	104 - 189	14.8 – 21.3

9 Notes on device settings and welding techniques

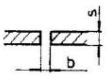
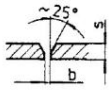
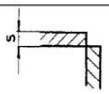
9.1 weld preparation

The weld joint describes the weld point and the specific position of the parts being welded relative to each other.
A specific type of joint requires a corresponding type of weld, which also depends on the sheet thickness and the weld preparation.
(joint shape), the material and the welding process are determined.

Stoßart	Lage der Teile	Beschreibung
Stumpfstoß		Die Teile liegen in einer Ebene und liegen stumpf gegeneinander.
Überlappstoß		Die Teile liegen parallel aufeinander und überlappen sich.
T-Stoß		Die Teile stoßen rechtwinklig (T-förmig) aufeinander.
Eckstoß		Zwei Teile stoßen in beliebigen Winkel aneinander. (Ecke)

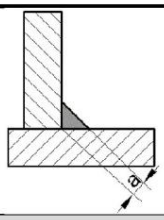
9.2 Joint Types The

workpieces to be welded should be free of paint, metallic coatings, dirt, rust, grease, and moisture in the weld area. Weld preparation must be carried out in accordance with welding regulations.

Benennung	Fugenform	Ausführung	Blechdicke s [mm]	Spalt b [mm9
I-Naht einseitig			bis 1,5 ab 1,5	0 bis 2
I-Naht beidseitig			2 bis 4	bis 2
V-Naht			3 bis 6	bis 1
			3 bis 6	bis 1
Kehl-Naht			ab 0,6	-
			0,6 bis 1,5	-
Doppel-Kehl-Naht			ab 0,6	-
Ecknaht			ab 1	-

9.3 Seam planning

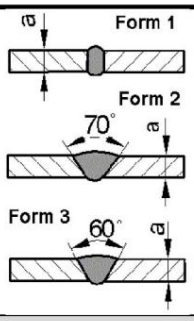
Guidelines for MAG welding



Nahtplanung			Einstellwerte			Leistungswerte		
Naht-dicke a [mm]	Draht-durch-messer [mm]	Anzahl der Lagen	Spannung [V]	Strom [A]	Draht-vorschub-geschw. [m/min]	Schutz-gas [l/min]	Schweiß-zusatz [g/m]	Haupt-nutzungs-zeit [min/m]
2	0,8	1	20	105	7	10	45	1,5
3	1,0	1	22,5	215	11	10	90	1,4
4	1,0	1	23	220	11	10	140	2,1
5	1,0	1	30	300	10	15	215	2,6
6	1,2	1	30	300	10	15	300	3,5
7	1,2	3	30	300	10	15	390	4,6
8	1,2	3	30	300	10	15	545	6,4
10	1,2	4	30	300	10	15	805	9,5

Werkstoff: unlegierter Baustahl
Schweißposition: PB (h)
Schweißzusatz: Drahtelektrode DIN 8559 - SG2, Schutzgas DIN 32526 - M21

Guidelines for MIG welding



Nahtplanung				Einstellwerte				Leistungswerte	
Nahtform	Naht-dicke a [mm]	Draht-durch-messer [mm]	Anzahl der Lagen	Span-nung [V]	Strom [A]	Draht-Vor-schub-geschw. [m/min]	Schutz-gas [l/min]	Schweiß-zusatz [g/m]	Haupt-nutzungs-zeit [min/m]
Form 1	4	1,2	1	23	180	3	12	30	2,9
Form 1	5	1,6	1	25	200	4	18	77	3,3
Form 1	6	1,6	1	26	230	7	18	147	3,9
Form 2	5	1,6	1	22	160	6	18	126	4,2
Form 2	6	1,6	2	22	170	6	18	147	4,6
Form 2	8	1,6	2	26	220	7	18	183	5,0
Form 3	10	1,6	1	26	220	6	20	190	5,4
Form 3	10	1,6	2	24	200	6	20	190	5,4
Form 3	10	1,6	1G[1)]	26	230	7	20	190	5,4
Form 3	12	2,4	1	27	260	4	25	345	7,6
Form 3	12	2,4	2	27	280	4	25	345	7,6

[1)] **G** Gegenlage
Werkstoff: Aluminium, Aluminiumlegierungen
Schweißposition: PA (w)
Schweißzusatz: DIN 1732 - S AlMg5, Schutzgas DIN 32526 - I1

10 Fault Table

DANGER:

Only authorized personnel may service and maintain the MIG/MAG welding machine. Repair! Always switch off the welding machine when troubleshooting malfunctions.

Disturbance	possible cause	remedy
Temperature indicator light is on	Overheating in the power section	Allow to cool down, ensure free air circulation, possibly clean the machine
	Exceeding the maximum power-on time duration	Allow the system to cool down.
	Excessive ambient temperature	Provide cooling
	Pollution of the air intake or exhaust occurs	Cleaning, ensuring free air supply
	Cover for the air inlet and/or outlet	Remove the cover, ensure free airflow.
	Fan defective	Service case
Welding current is not reached the set value or it does not occur	Ground cable poorly connected or not connected at all	Control
	Incorrect characteristic curve selected	Select a characteristic curve suitable for the additive material. len
No protective gas	Empty bottle	Control
	Pressure reducer defective	Control
	Hose kinked	Control
	Gas valve of the machine defective	Service case
The arc of light flutters and jumps.	Power nozzle worn	Replace power nozzle
	Conveyor rollers have the wrong diameter. Conveyor rollers with the correct diameter are needed. turn around	
	Guide spiral heavily soiled	Exchange leadership spirals
	Electrodes and workpiece do not reach the operating temperature	Use thinner wire
	Incorrect wire feed speed	Adjust speed
An arc has strange properties. Color	Too little or no shielding gas	Check the supply of inert gas.
	Incorrect shielding gas	Use a suitable shielding gas
The wire unwinds uncontrollably.	Wire spool brake set too tight or too loose	Adjusting the wire spool brake
	Wire feed problems	The hose assembly should be blown out every time the wire is changed. The knives match.
	Control unit defective	Service case
Water-cooled burner gets too hot	Water hoses kinked	Check water hoses for correct positioning. ren
	No or too little coolant in the tank	Check the coolant level
	Water pump defective	Service case

11 error messages

"Err": "001"

Mistake number	Mistake	Caused	Fix
1000	Network undervoltage	Mains voltage is below the tolerance range.	Switch off the device and check the mains voltage.
2000	Power grid overvoltage	Mains voltage is above the tolerance range.	Switch off the device and check the mains voltage.
22000 to 22009	Communication error control rung/power section	The BUS communication between- The control/power section is malfunctioning.	Switch the power source off and on again. If the error occurs again... -> Contact service
23,000 to 23,243	Communication error power source	Bus communication of the Power source is faulty	Power source off and on turn it on. If the error occurs anew ÿ Notify service
30,000 to 30,400	data set Welding characteristics	data set Welding characteristics is not available or not compatible	Power source off and on turn it on. If the error occurs anew ÿ Notify service
35,000	Job record	The data record job is not present or not compatible	Reload job. (The following appears to be unrelated and possibly nonsensical: "Occurrence the Mistake again ÿ Service communicate
40,000 to 42,105	Overtemperature Power section	Overtemperature in Power section	Allow the power source to cool down
77,000 to 77 001	Overtemperature coolant	temperature of the The coolant level is too high.	water cooling unit cool Refill coolant
80,000 to 80 003	wire feed Motor current	The power consumption of the wire feed motor is to high	Wire feeder is not running clean The DV motor is defective.
85,000	wire feed speed keit	Actual rotational speed deviates from Should- Speed from no encoder signals from feed rate available Low power output of the wire feed motor	Check wire feed cable connection to wire feed check ZWIPA check Cable connection between ZWIPA and Control and/or ZWIPA and Check control unit steering and/or Control unit check

Mistake number	Mistake	Caused	Fix
>100,000 service cases		Analysis of the cause only by service technicians possible	Contact service

12 Care and Maintenance

Regular and conscientious maintenance of the device is a basic requirement for a long service life.
for good working conditions and maximum productivity of the equipment. Ensure that the
Maintenance work is carried out regularly.

Warning! Danger if personnel are insufficiently qualified:

Insufficiently qualified persons can cause damage through improper repair work on
They fail to assess the risks to the user arising from the device and impose their own and
others pose the risk of serious injury.

All maintenance work should only be carried out by qualified personnel.

Before any maintenance work is carried out, the device must be switched off and
You must wait at least 5 minutes until the device has cooled down.
Supply lines must be shut off and depressurized.

After cleaning, maintenance and repair work, check that all covers and
The protective devices are properly reinstalled on the MIG/MAG welding machine.
Damaged protective devices and device parts must be repaired or replaced by customer service.
will be exchanged.

12.1 Maintenance of the welding machine

The feed roller, the counter-pressure roller and the inlet nozzle must be checked regularly for contamination.
and clean if necessary. The entire burner hose assembly should be checked at appropriate intervals.
It needs to be cleaned because abrasion and dust accumulate inside.

The burner's contact nozzle is a wear part. If the bore has become too large, it must be replaced.
Metal splashes can become lodged in the inner walls of the burner's plug-in gas cap. These may be...
to remove. A release agent makes the work easier and prevents new splashes from sticking.
Damaged pipes must be replaced immediately.

12.2 Maintenance intervals

The maintenance intervals are a recommendation from Stürmer Maschinen GmbH for normal standard requirements
(e.g., single-shift operation, use in a clean and dry environment). The exact intervals
will be determined by your security officer.

Task	interval
Cleaning the inside of the device	at least twice a year
Coolant and radiator check	before each use
Functional test of the safety devices by the Service staff	before each use
Visual inspection of the system, especially the burner hoses, Ground cable and polarity selector plug	before each use
Have connecting cables and burner hoses checked by qualified personnel; record the test in the designated test log. *Depending on state law, the examination may also be conducted more frequently.*	semi-annually
Have the entire welding system inspected by qualified personnel; record the inspection in the designated inspection log. *Depending on state law, the examination may also be conducted more frequently.*	yearly

12.3 Cleaning the inside of the device

If the welding machine is used in a dusty environment, the inside of the machine must be cleaned at regular intervals. They can be cleaned by blowing or vacuuming. The frequency of this cleaning depends on the
The frequency depends on the specific operating conditions, but it should be carried out at least twice a year. Use
Use only clean, dry air to blow out the device, or use a vacuum cleaner. Avoid
Direct blowing on electronic components from a short distance to avoid damage.

A NOTICE:

Always disconnect the MIG/MAG welding machine from the power supply before use.
Perform maintenance work or replace components of the device.

If maintenance and repair work on this device is carried out by persons who are not
If the parties are authorized to perform these works, the warranty claim against the company becomes void. schweißkraft .

12.4 Coolant and radiator check

For machines with built-in water circulation cooling, the water level in the tank must be checked daily.

If the water level is lower than 3/4 of the tank capacity, coolant must be added.
The coolant must be the special coolant tested by Schweißkraft.

This inspection should also include checking the level of contamination in the water cooler. To ensure a
To ensure optimal burner cooling, the cooler may need to be cleaned by blowing or vacuuming.
become.

13 spare parts

Risk of injury from using incorrect spare parts!

Using incorrect or faulty spare parts can pose dangers to the operator.
This can result in damage and malfunctions.

Stürmer Maschinen GmbH accepts no liability or warranty for damages and
Malfunctions may occur as a result of failure to follow these operating instructions. Use the following for repairs:
Only flawless and suitable tools, original spare parts or parts from Stürmer Maschinen GmbH.
Explicitly approved serial parts.
The manufacturer's warranty is void if unauthorized replacement parts are used.

Information about technical customer service

Repairs covered by the warranty may only be carried out by technicians.
those authorized by us. Use only original spare parts.

13.1 Spare parts order

Spare parts can be obtained from specialist retailers.

Send a copy of the spare parts drawing with the marked components to the specialist dealer and
Please provide the following information:

Article number

ÿ Device designation

ÿ Date of manufacture

ÿ Position numbers of the components and, if applicable, the associated spare parts drawing number

ÿ Quantity

Desired shipping method (post, freight, sea, air, express)
Shipping address

Information about the device type, article number and year of manufacture can be found on the type plate, which is located on the
Welding equipment is attached.

Example

The front panel for the PRO-MIG.ARC 251 MIG/MAG welding machine must be ordered. The front panel has
in the spare parts drawing 1, number 3

When ordering spare parts, please send a copy of spare parts drawing 1 with the component marked.
(front panel) and marked position number 3 to the authorized dealer and provide the following information
with:

Article number	1080625
ÿ Model designation ÿ Drawing	PRO-MIG.ARC 251
number ÿ Position number	1
	3

The article number of your device:

PRO-MIG.ARC 251	1080625
PRO-MIG.ARC 311	1080631
PRO-MIG.ARC 351	1080635
PRO-MIG.ARC 404 W	1080740
PRO-MIG.ARC 404 WS	1080741
PRO-MIG ARC 404-4 W	1080544
PRO-MIG ARC 404-4 WS	1080545

13.2 Spare parts drawings

Spare parts drawing 1: Housing PRO-MIG ARC 251, 311, 351

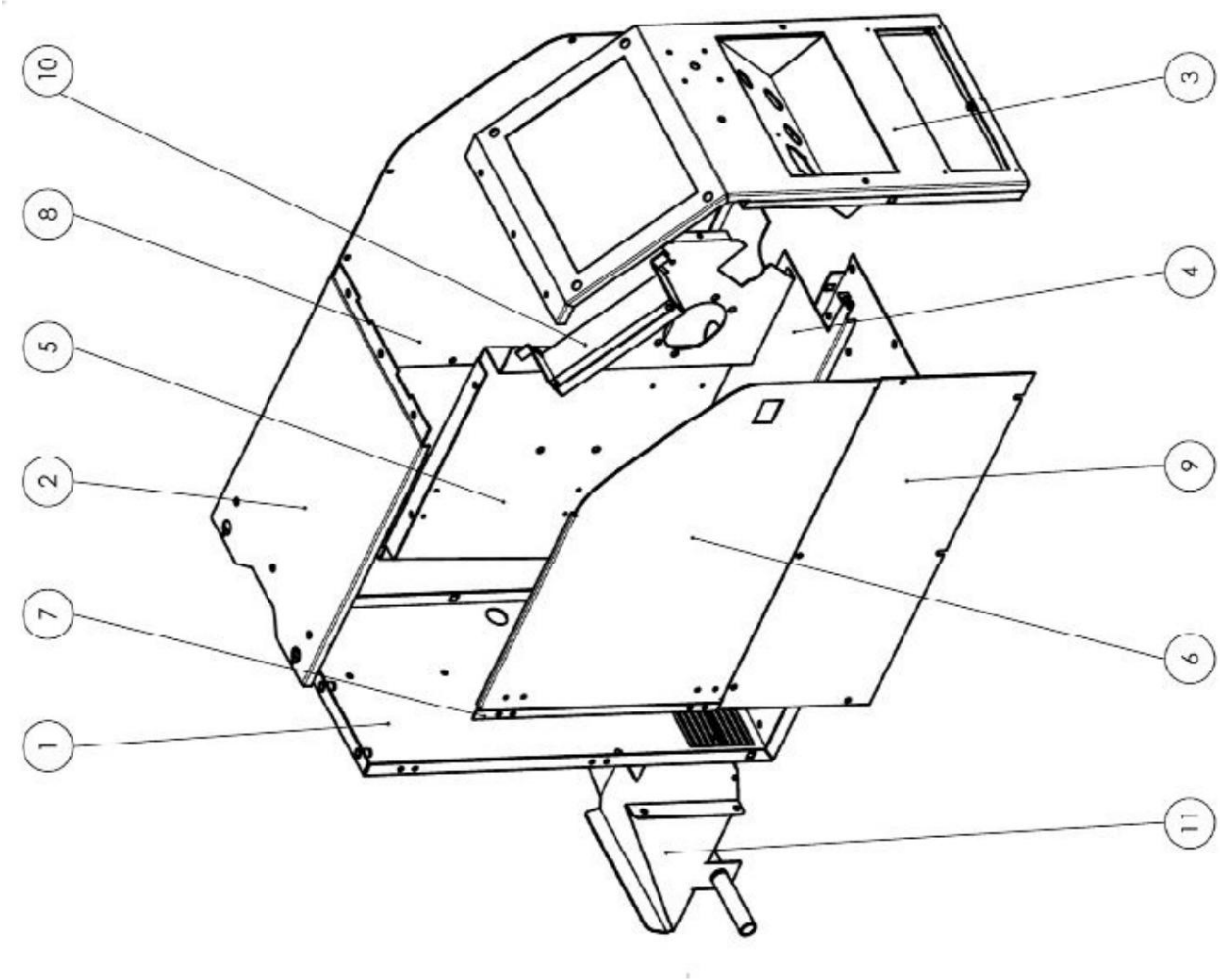


Fig. 13-1: Spare parts drawing 1 - Housing PRO-MIG ARC 251, 311, 351

Spare parts drawing 2: Housing PRO-MIG ARC 404W

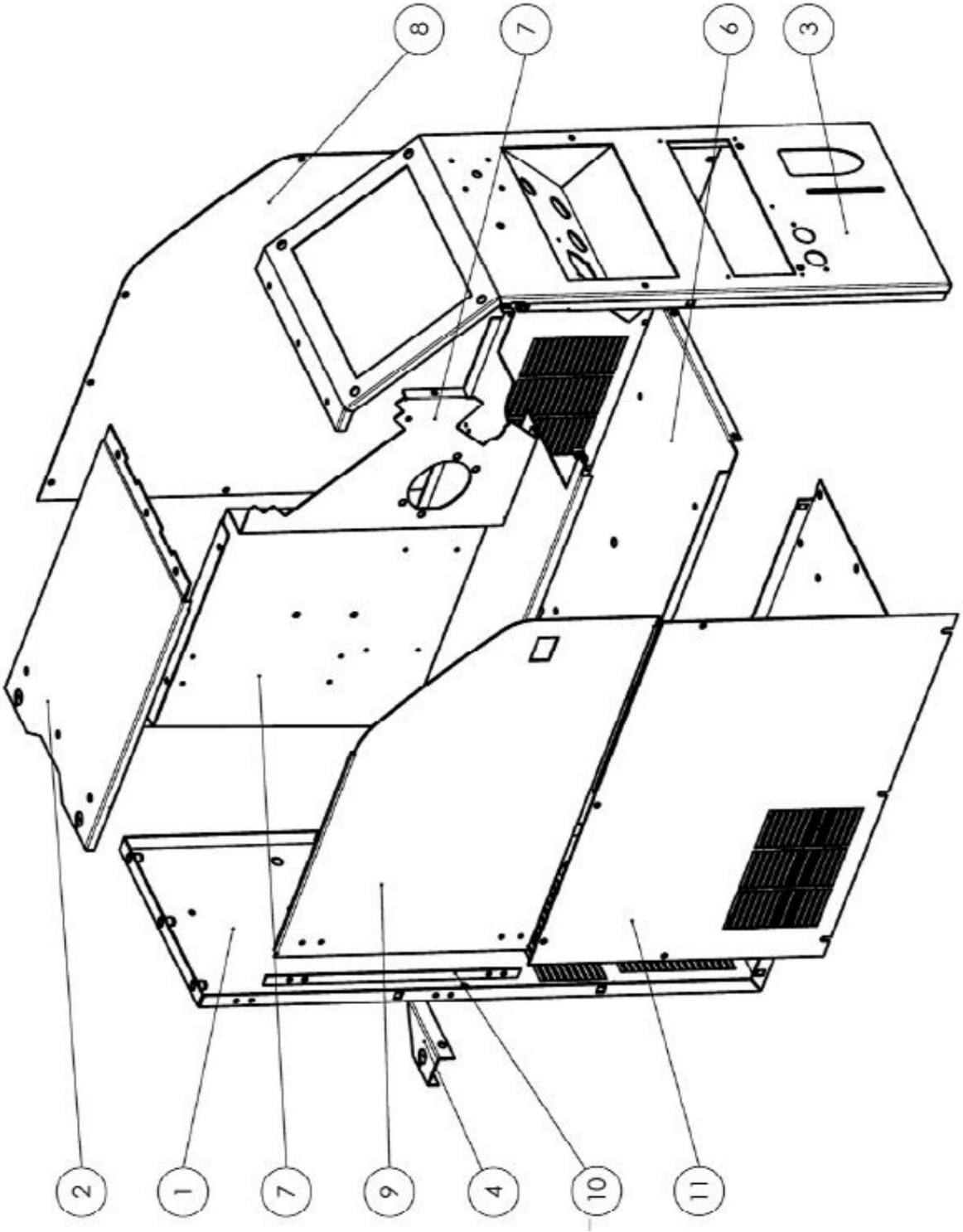


Fig. 13-2: Spare parts drawing 2 - Housing PRO-MIG ARC 404W

Spare parts drawing 3: Housing PRO-MIG ARC 404 WS

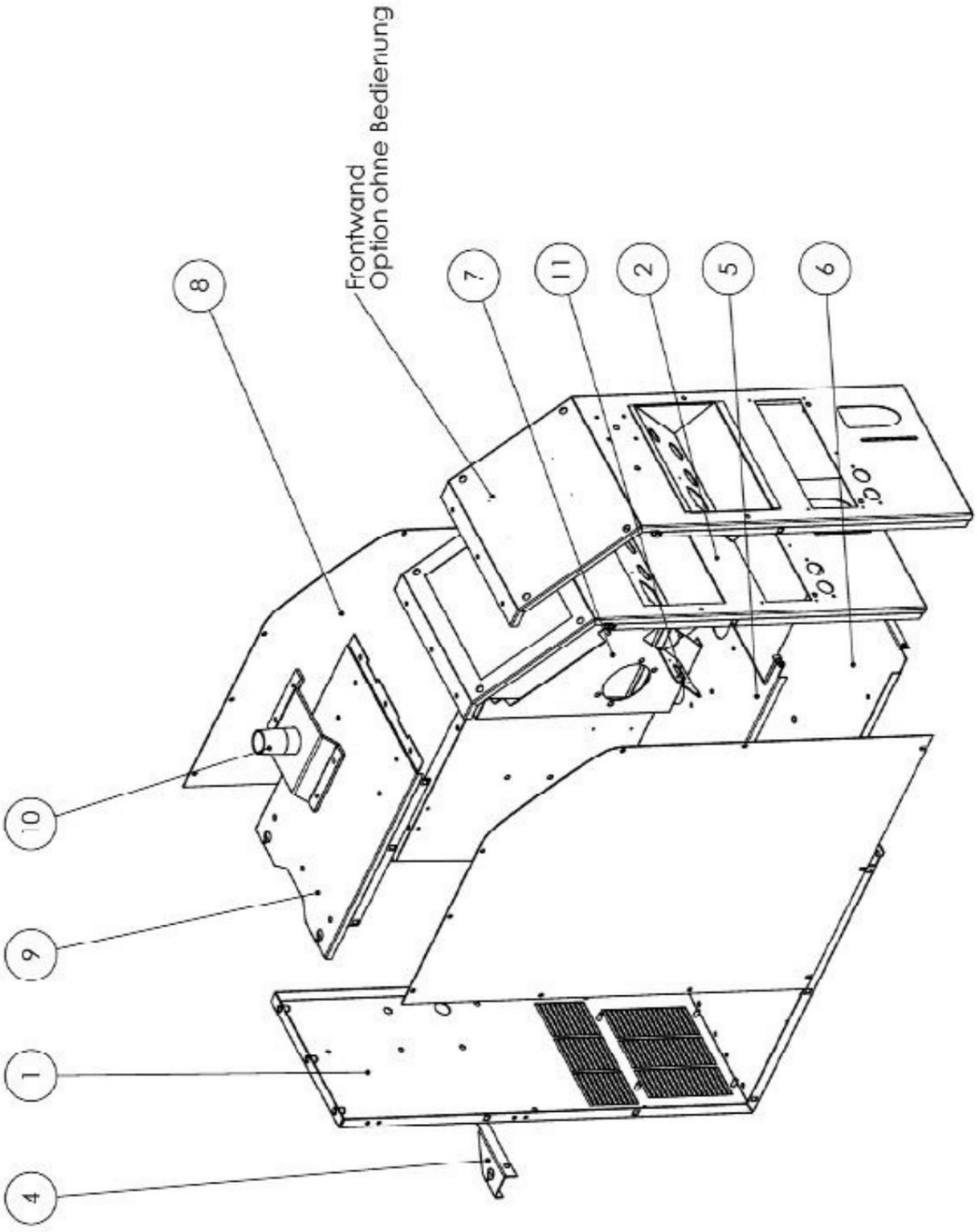


Fig. 13-3: Spare parts drawing 3 - Housing PRO-MIG ARC404WS

Spare parts drawing 4: Feed case PRO-MIG ARC 404 WS

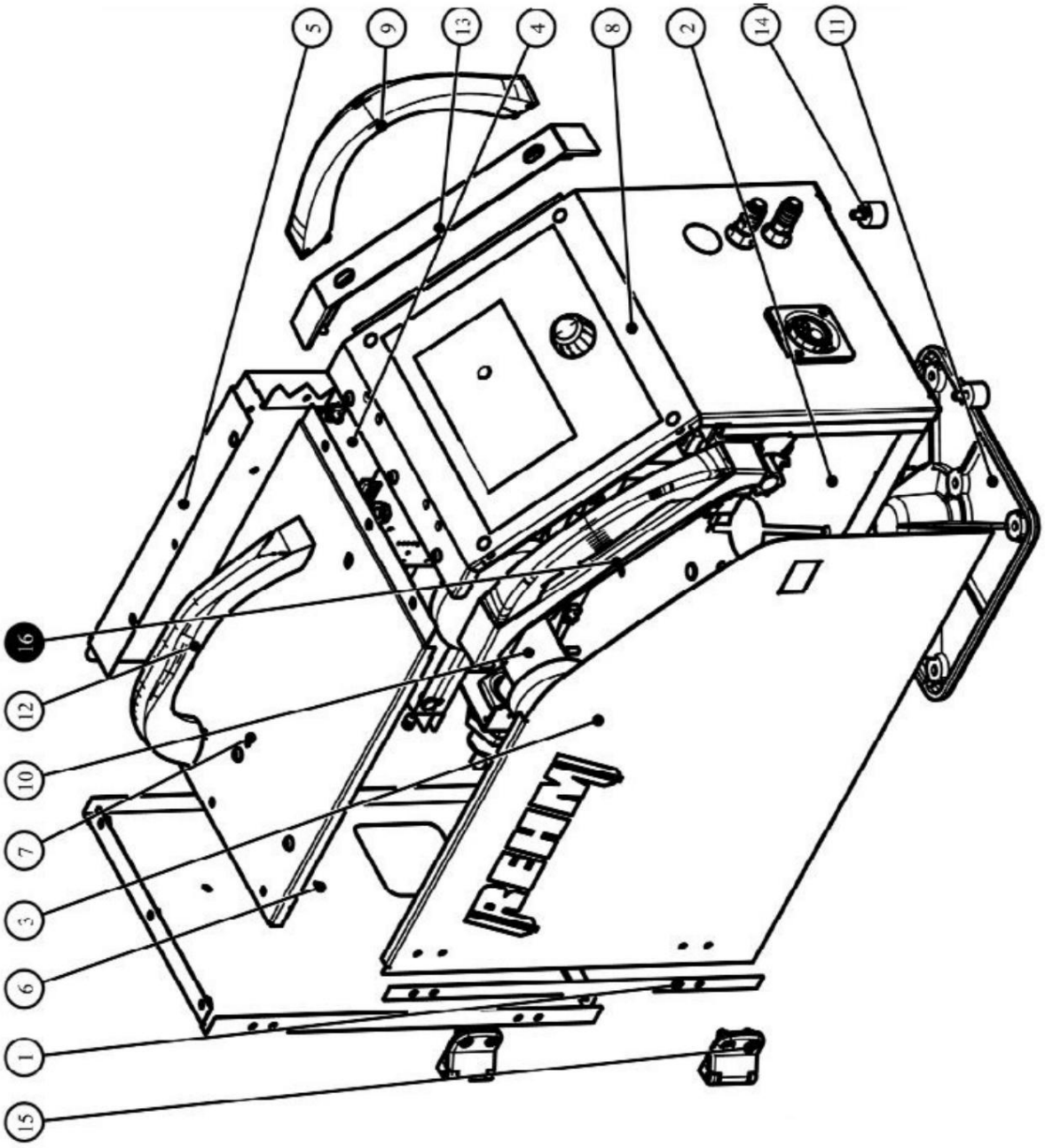


Fig. 13-4: Spare parts drawing 4 - Feed case PRO-MIG ARC 404 WS

Spare parts list PRO-MIG ARC 251, 311, 351

Item	Description	Crowd
1	floor back wall	1
2	Lid	1
3	front wall	1
4	intermediate floor	1
5	partition wall	1
6	door	1
7	Cover strip back panel	1
8	Right side wall	1
9	Left side wall	1
10	cover	1
11	Bottle holder	1

Spare parts list PRO-MIG ARC 404W

Item	Description	Crowd
1	floor back wall	1
2	Lid	1
3	front wall	1
4	Bottle holder	1
5	intermediate floor	1
6	intermediate floor below	1
7	partition wall	1
8	Right side wall	1
9	door	1
10	Cover strip back panel	1
11	bottom side wall	1

Spare parts list PRO-MIG ARC 404WS

Item	Description	Crowd
1	floor back wall	1
2	front wall	1
3	Front panel (Optional)	1
4	Bottle holder	1
5	Intermediate floor feed	1
6	intermediate floor below	1
7	partition wall	1
8	Left/right side wall	2
9	Lid	1
10	mandrel	1
11	Connection plate Intermediate plate	1

Spare parts list PRO-MIG ARC 404 WS feed box

Item	Description	Crowd
1	Cover strip back panel	1
2	Floor	1
3	door	1
4	Right side wall	1
5	partition wall	1
6	back panel	1
7	Lid	1
8	front wall	1
9	Handle	2
10	coiling mandrel	1
11	suitcase sleeve	1
12	Case handle	1
13	Right side panel	1
14	Rubber-metal buffer	1
15	Surface-mounted hinge	2
16	Left side panel	1

Spare parts drawing for wire feeder, 4-roll drive

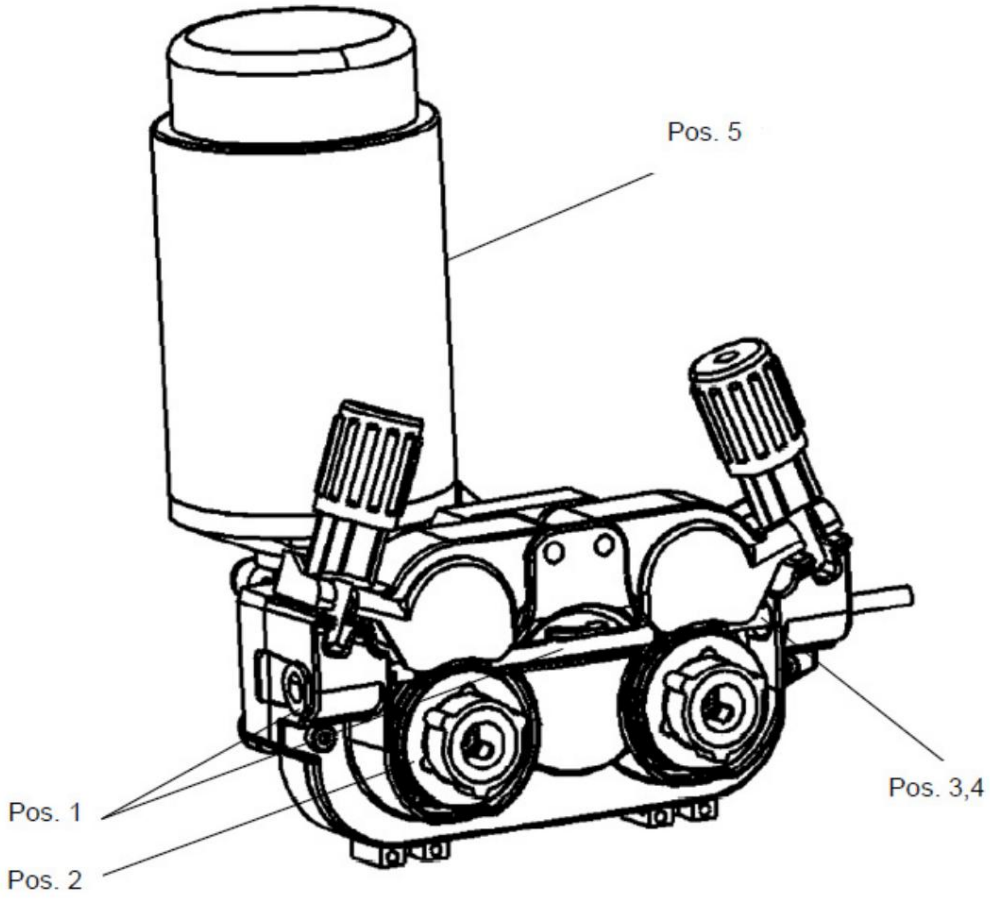


Fig. 13-5: Spare parts drawing for wire feeder, 4-roll drive

Spare parts list 1

Position	Designation	Crowd	Size
1	wire inlet nipple	1	Ø0.6-1.6 Plastic
2	Solid wire feed rollers	1	Ø0.6/0.8
		1	Ø0.8/1.0
		1	Ø0.9/1.1
		1	Ø1.0/1.2
		1	Ø1.2/1.6
	cored wire feed rollers	1	Ø1.2/1.6
	counter-pressure roller		
3	Capillary tube up to Ø1.6 mm wire electrode	1	
4	Support tube for Teflon liner up to 4 mm Outer diameter	1	
5	feed motor	1	

14 electrical circuit diagrams

Electrical circuit diagram 1: Power source suitcase

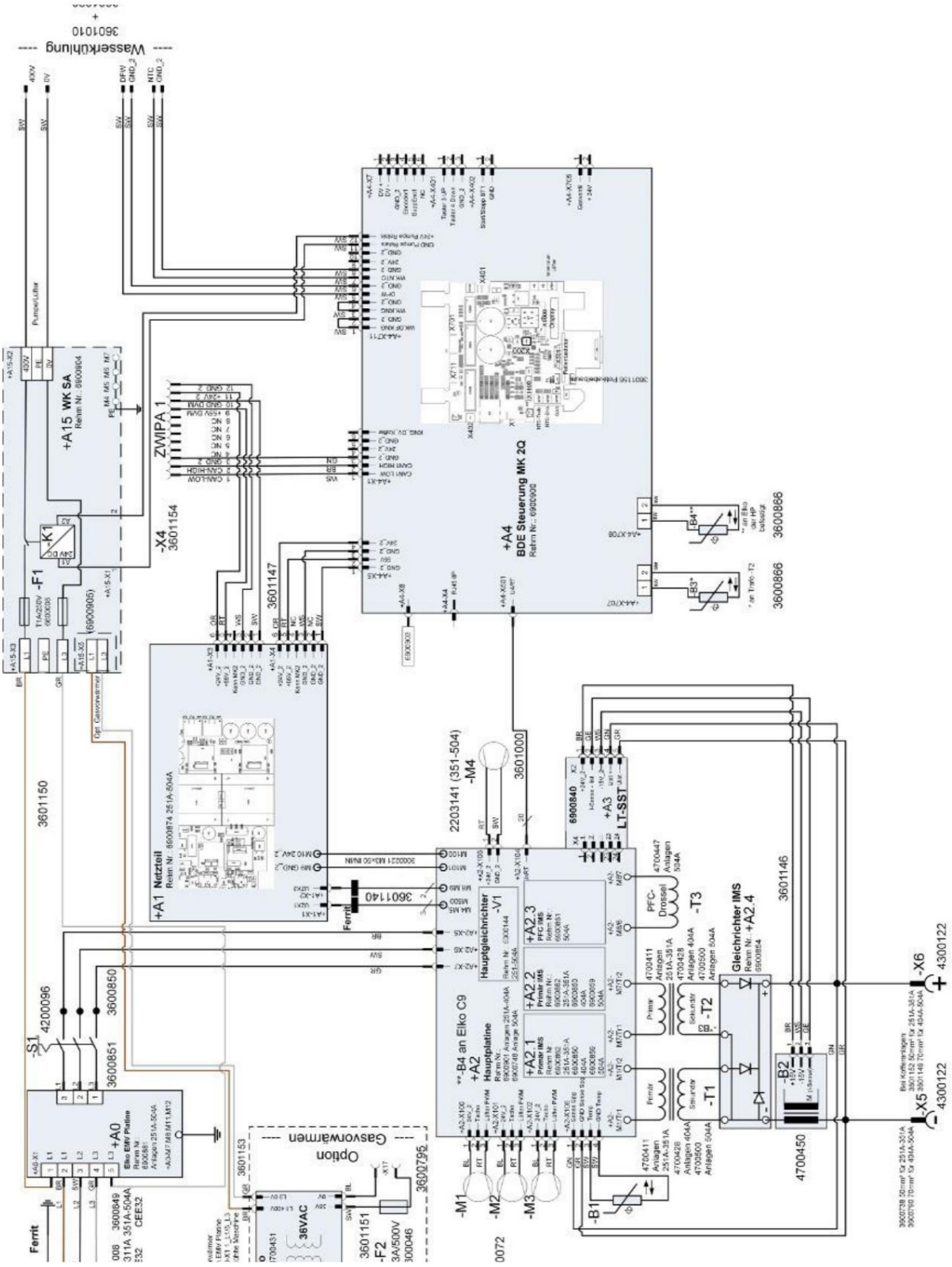


Fig. 14-1: Electrical circuit diagram 1 Power source case

Electrical circuit diagram 2: Feed case

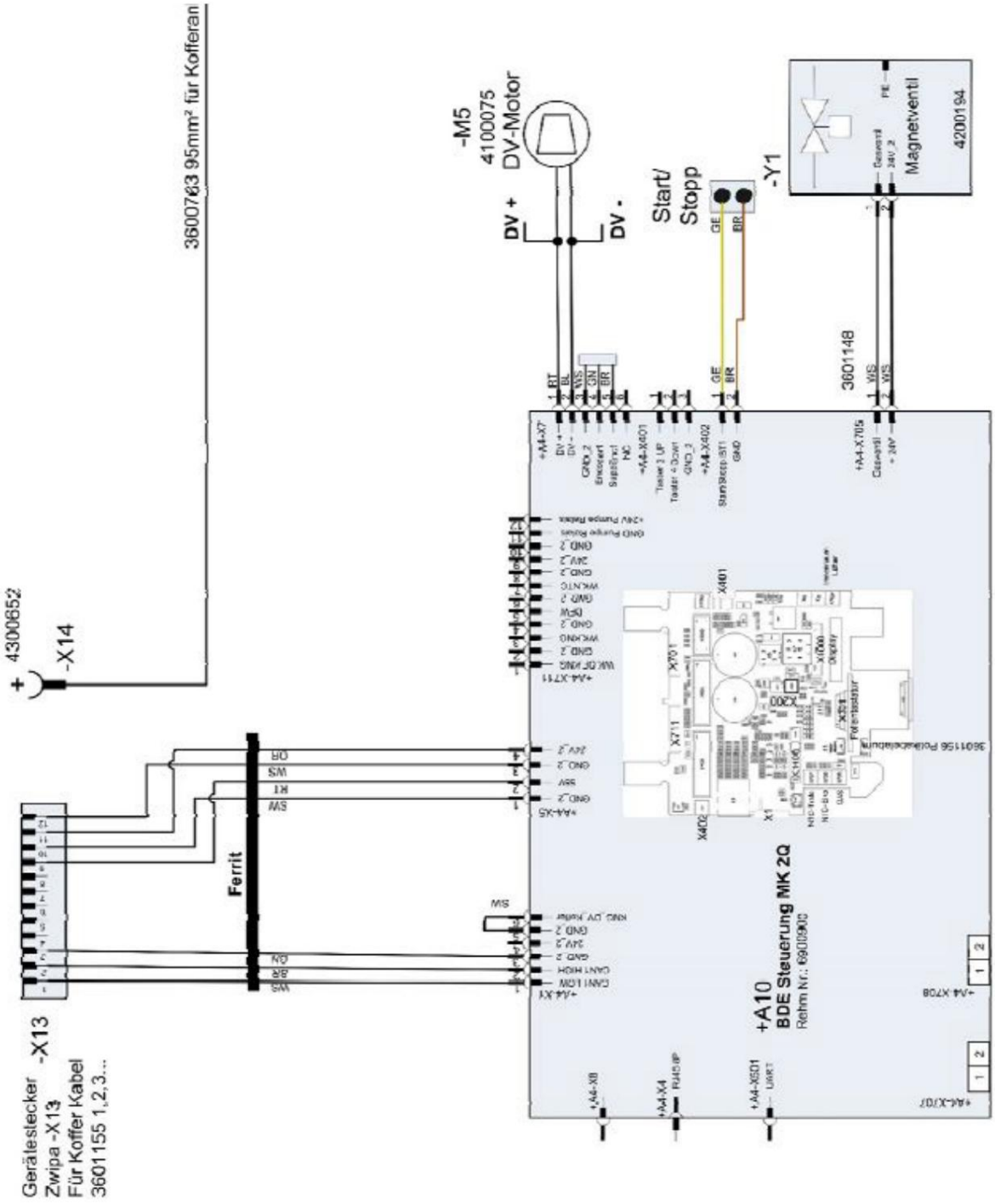


Fig. 14-2: Electrical circuit diagram 2 feed case

Electrical circuit diagram 3: Compact power source

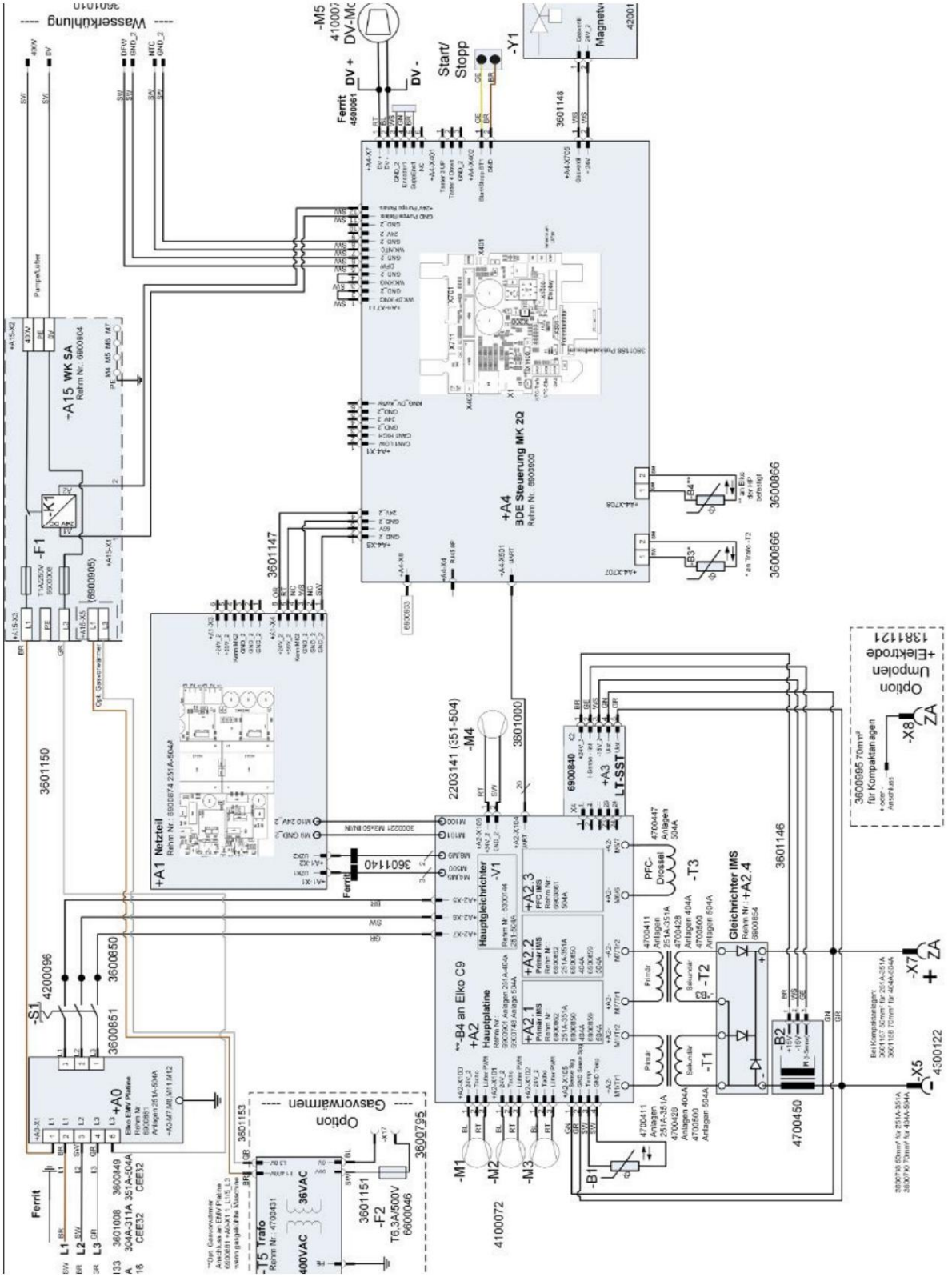


Fig. 14-3: Electrical circuit diagram 3 Compact power source

Electrical circuit diagram 4: Water cooling

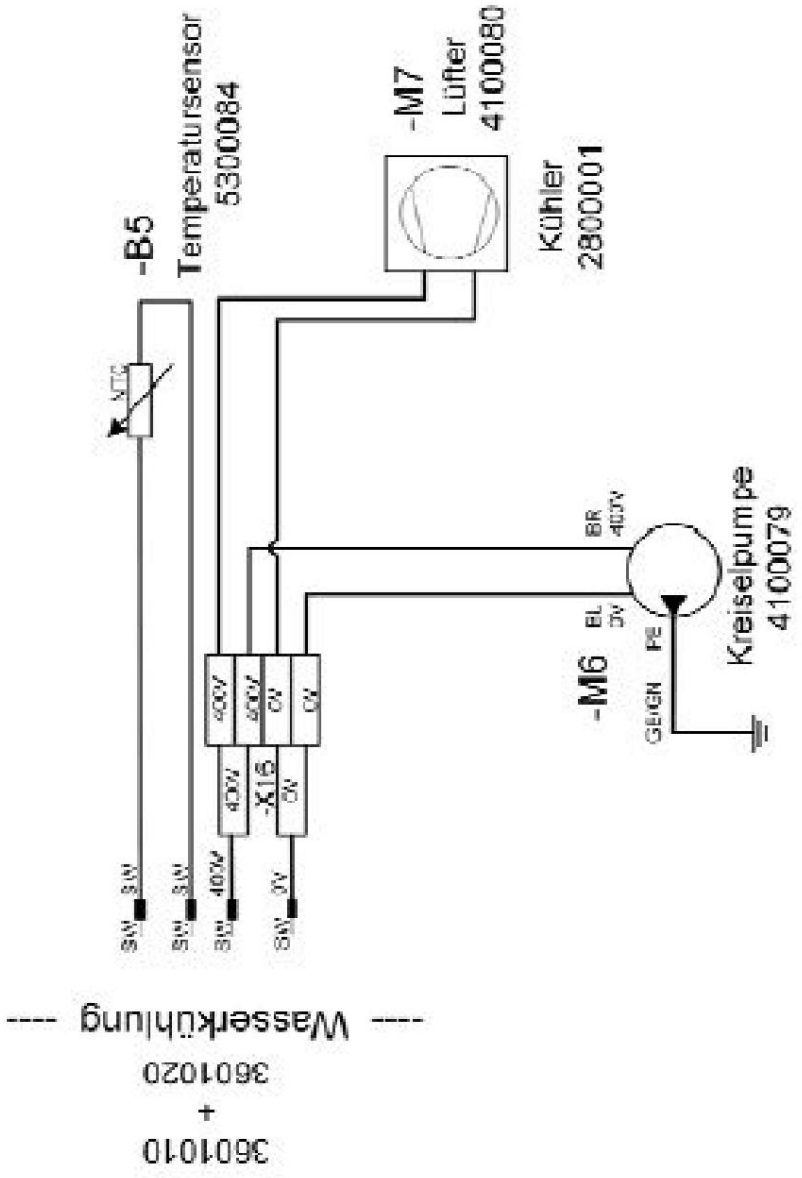


Fig. 14-4: Electrical circuit diagram: Water cooling

14.1 Component and spare parts list

Position	Naming	Part	remark
+ A0	ELKO EMC board	E	251
+ A1	power supply	E	-
+ A2	motherboard	E	251A-404A 504A
+ A2.1/A2.2	Primary IMS	E	251A-351A 404A 504A
+ A2.3	PFC IMS	E	504A

+ A3	Power section control	E	251A 304A 311A 351A 404A 504A
-	Complete power unit 251A	E	251A
-	Complete power unit 304A	E	304A
-	Complete power unit 311A	E	311A
-	Complete power unit 351A	E	351A
-	Complete power unit 404A	E	404A
-	Complete power unit 504A	E	504A
+ A4	BDE control MK BDE control MK VK	E	251A-404A 304A S/WS - 504A S/WS
-	BDE complete 7 inch SA	E	251A-351A
-	BDE complete 7 inch SA	E	304A-504A
-	BDE complete 7 inch VK SA	E	Suitcase
- B1	temperature sensor	E	-
- B2	Current transformer	E	-
- B3	Temperature sensor (T2)	E	-
- B4	Temperature sensor (C9)	E	-
- B5	temperature sensor	E	-
- F1	T 1A / 250V	V	-
- M1/M2/M3	Fan 80x80x38mm	V	24V/DC
- M4	Fan 80x80x25mm extension	V	24V/DC
- M5	wire feed motor	V	-
- M6	water pump	V	400V/AC
- M7	Fan Ø 172mm	E	400V/AC
- S1	Main switch	E	-
- T1/T2	transformer	E	251A-351A 404A 504A
- T3	PFC throttle	E	504A
- V1	Main rectifier	E	251A-504A
- X4	ZWIPA device socket	E	luggage compartment
- X5	Mounting socket ground (Workpiece)	E	-
- X6	Flush-mount socket plus	E	-

- X7/- X15	welding torch Central connection	E	ZA
-	ZA housing	E	ZA
- X13	ZWIPA device connector	E	Suitcase
- X14	Flush-mount socket plus	E	-
- Y1	solenoid valve	E	

15 EU Declaration of Conformity

For the following products

Manufacturer / Distributor:	Stürmer Maschinen GmbH Dr.-Robert-Pfleger-Str. 26 D-96103 Hallstadt	
Product group:	schweißkraft ® Welding equipment	
Type designation:	MIG/MAG welding machine	Article number
Product name: *	☐ PRO-MIG.ARC 251 ☐ PRO-MIG.ARC 311 ☐ PRO-MIG.ARC 351 ☐ PRO-MIG.ARC 404 W ☐ PRO-MIG.ARC 404 WS	1080625 1080631 1080635 1080740 1080741
Serial number: *	_____	
* Year of construction:	20_____	
	* Fill in these fields using the information on the type plate.	

It is hereby confirmed that they meet the essential protection requirements set out in the directive.
Council **Directive 2014/30/EU (EMC Directive)** on the approximation of the laws of the Member States relating to electromagnetic compatibility and in Directive **2014/35/EU** on electrical equipment for
Use is defined within certain voltage limits.

Applicable EU regulations:

Regulation (EC) No 1907/2006 (REACH Regulation)

Regulation (EU) 2019/1784 laying down ecodesign requirements for mains-powered welding equipment pursuant to Directive 2009/125/EC

The above-mentioned products comply with the provisions of these directives and with RoHS 2011/65/EU and Regulation 1907/2006/EC and meet the safety requirements for arc welding equipment according to the following product standards:

The following harmonized standards were applied:	
DIN EN 60974-1:2023-08	Arc welding equipment - Part 1: Welding power sources
DIN EN IEC 60974-2:2019-11	Arc welding equipment - Part 2: Liquid cooling systems
DIN EN IEC 60974-5:2019-12	Arc welding equipment - Part 5: Wire feeders
DIN EN 60974-10:2022-11	Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements

The devices are built and tested according to standard EN 60974-10 in Class A. This Class A welding equipment is not intended for use in residential areas where the power supply is provided by a public low-voltage supply system.

According to EU Directive 2006/42/EC Article 1, the above-mentioned products fall exclusively within the scope of Directive 2014/35/EU on electrical equipment designed for use within certain voltage limits.

Name and address of the person authorized to compile the technical documentation:
Kilian Stürmer, Stürmer Maschinen GmbH, Dr.-Robert-Pfleger-Str. 26, D-96103 Hallstadt

Kilian Stürmer (Managing Director)

Hallstadt, December 15, 2025

CE

16 Appendix

16.1 Copyright

The contents of this manual are protected by copyright. Its use is permitted only within the scope of using the device. Any further use is prohibited without the manufacturer's written consent.

To protect our products, we register trademark, patent, and design rights where possible. We strongly oppose any infringement of our intellectual property.

Technical specifications are subject to change without notice.

16.2 Storage

DANGER!

Incorrect and improper storage can damage and destroy electrical and mechanical components.

Store the packaged or already unpacked parts only under the intended environmental conditions.

Consult your specialist dealer if the device and accessories need to be stored for longer than three months and under environmental conditions other than those prescribed.

16.3 Disposal instructions / Recycling options: Please dispose of

your device in an environmentally friendly manner by disposing of waste properly and not in the environment.

Please do not simply throw away the packaging and later the used device, but dispose of both in accordance with the guidelines established by your city/municipal administration or the responsible waste disposal company.

16.3.1 Take out of service

CAUTION!

Disused devices must be taken out of service immediately and professionally to prevent future misuse and endangering the environment or people. Remove any batteries

and rechargeable batteries. If necessary, disassemble the device

into manageable and recyclable components. Dispose of the device components according to the designated disposal procedures .

16.3.2 Disposal of the new appliance packaging

All packaging materials and packing aids used for the device are recyclable and must, in principle, be recycled.

The packaging wood can be disposed of or recycled.

Cardboard packaging components can be shredded and placed in the waste paper collection.

The films are made of polyethylene (PE) or the cushioning parts of polystyrene (PS). These materials can be reused after processing if they are taken to a recycling center or your local waste disposal company.

Only pass on packaging material in its purest form so that it can be reused directly.

16.3.3 Disposal of the old appliance

INFORMATION

Please ensure, for your own sake and in the interest of the environment, that all components of the
The device must only be disposed of via the designated and approved channels.

Please note that electrical appliances contain a variety of recyclable materials as well as environmentally harmful components. Please help ensure that these components are separated and disposed of properly.
Dispose of properly. If in doubt, please contact your local waste disposal authority.
If necessary, the assistance of a specialized waste disposal company may be required for processing.

16.3.4 Disposal of electrical and electronic components

Please ensure that the electrical components are disposed of properly and in accordance with legal regulations.

The device contains electrical and electronic components and must not be disposed of as household waste.
In accordance with the European Directive on Waste Electrical and Electronic Equipment and its implementation into national law,
Used power tools, electrical equipment and machinery must be collected separately and disposed of in a
be recycled in an environmentally sound manner.

As an operator, you should obtain information about the authorized collection and disposal system that
valid for you.

Please ensure that the batteries are disposed of properly and in accordance with legal regulations.
and/or the batteries. Please only dispose of discharged batteries in the collection boxes at retailers or the
municipal waste disposal companies.

16.4 Disposal via municipal collection points

Disposal of equipment from used, electric and electronic
(To be applied in the countries of the European Union and other European countries with a separate
Collection system for these devices).

The symbol on the product or its packaging indicates that this product is not
It should not be treated as normal household waste, but rather taken to a recycling collection point.
must be discharged from electrical and electronic devices.

By contributing to the correct disposal of this product, you are protecting the environment and the
The health of your fellow human beings. The environment and health are endangered by improper disposal.
at risk. Material recycling helps reduce the consumption of raw materials. More
Information on recycling this product can be obtained from your local council.
municipal waste disposal companies or the store where you purchased the product.

17 Product observation

We are obligated to monitor our products even after delivery.

Please tell us anything that is of interest to us:

Changed settings data.

ÿ Experiences with the device that are important to other users.
Recurring disturbances.

Stürmer machines GmbH
Dr.-Robert-Pfleger-Str. 26
D-96103 Hallstadt

Fax: (+49)0951 96555-55
Email: info@craftweld.de

18 notes

Stürmer
WELT DER MASCHINEN

Stürmer Maschinen GmbH
Dr.-Robert-Pfleger-Straße 26
D-96103 Hallstadt
+49 951 96 555 - 0
info@stuermer-maschinen.de
www.stuermer-maschinen.de