GB

OPERATING INSTRUCTIONS
MIG/MAG inert gas welding systems

SYNERGIC.ARC 251-504

REHM SCHWEISSTECHNIK

Operating instructions

Name MIG/MAG welding systems

Type

SYNERGIC.ARC 251
SYNERGIC.ARC 311
SYNERGIC.ARC 351

SYNERGIC.ARC 304, 304 W, 304 S, 304 WS
SYNERGIC.ARC 404, 404 W, 404 S, 404 WS
SYNERGIC.ARC 504 W, 504 WS

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Doc. No.: 7303208

Date of issue: 05.2023

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1 Introduction

1.1 Foreword

Dear Customer,

You have purchased an inert gas welding system from REHM, a renowned German brand name.

We thank you for the confidence you have placed in our quality products.

Only components of the highest quality are used in SYNERGIC.ARC welding systems.

To allow long service life even under the toughest conditions, all REHM equipment is manufactured using only parts that comply with our strict quality demands.

SYNERGIC.ARC welding systems have been developed and designed according to the generally accepted rules for technology and safe operation. All relevant legal regulations have been observed and complied with. Conformity is declared and is marked with the CE symbol.

REHM welding systems are manufactured in Germany and therefore bear the "Made in Germany" quality label.

REHM strives to immediately take advantage of technical progress and reserves the right to adapt the design of the welding equipment at any time to the latest technical requirements.

These operating instructions are for various SYNERGIC.ARC devices. Depending on the type of machine purchased and its equipment and accessories, some functions may not be available on it. Those functions are indicated in the relevant section.

1.2 General description

Figure 1: SYNERGIC.ARC 504 WS
(Figure does not illustrate standard equipment)

1.2.1 The principle of the inert gas metal welding process

With the inert gas metal welding process an electric arc burns between a melting wire electrode and the workpiece. Argon, carbon dioxide (CO_2) or a mixture of these or other inert gasses are used.
The positive pole usually flows from the current contact tips to the wire electrode and the negative pole is connected to the workpiece. An electric arc forms between the wire electrode and the workpiece that melts both the wire electrode and the workpiece. The wire electrode is therefore the conductor for the arc and weld filler material.

The wire electrode and the weld pool are protected against the influence of ambient air by the inert gas, which flows continuously from the inert gas nozzle that is arranged concentrically around the electrode.

1.2.2 Intended use

SYNERGIC.ARC welding systems may be used for MIG/MAG welding only.

REHM welding units are designed for welding various different metallic materials such as unalloyed and alloyed steels, stainless steels, aluminium and CuSi3. Please also observe the special rules that apply to your applications.

REHM welding machines are designed for use in both hand-held and machine-guided operation.

REHM welding machines are, except when REHM expressly states otherwise in writing, for sale to commercial/industrial users only and are intended to be used by commercial/industrial users only. The machines may be operated only by persons trained in the use and maintenance of welding equipment.

Welding power sources may not be installed in areas with increased electrical risk.

These operating instructions contain rules and guidelines for the intended use of your system. Only compliance with these guidelines shall be considered as proper use. Risks and damage incurred due to any other use is the responsibility of the operator. Use under special requirements may necessitate the observance of particular regulations.

If in doubt, ask your responsible safety officer or contact the REHM customer service department. The special instructions listed in the supplier documentation for intended use must be observed.

National regulations also apply, without restriction, to system operation.

Welding power sources may not be used to defrost pipes.

Intended use also includes compliance with the prescribed assembly, disassembly and reassembly, commissioning, use, maintenance and disposal measures. Please pay particular attention to the information in Section 2, Safety instructions and Section 13.5, Proper disposal.

The system may be operated only under the aforementioned conditions. Any other use is considered unintended use. The operator bears the consequences of unintended use.

1.3 Symbols used

Typographic distinctions

- Enumerations preceded by a bullet point: General enumerations

❒ Enumerations preceded by a square: Work or maintenance steps that must be performed in the order listed.

➔ **Section 2.2, Warning symbols on the system** Cross reference: here to Section 2.2, Warning symbols on the system

Bold text is used for emphasis

Note!

... indicates practical tips and other particularly useful information.

Safety symbols

The safety symbols used in this manual: ➔ **Section 2.1**

2 Safety instructions

2.1 Warning symbols in these operating instructions

Warnings and symbols

This or a symbol that more accurately specifies the risk can be found in all of the safety instructions given in these operating instructions where there is danger to life and limb.

One of the signal words below (Danger!, Warning!, Caution!) is used to indicate the severity of the risk:

Danger! …warning of immediate danger.

Death or serious injury may result if the warning is not heeded. The hazard is illustrated with a pictogram in the margin.

Warning! ... of a potentially dangerous situation.

Death or serious injury may result if the warning is not heeded.

Caution! … warns of a potentially harmful situation.

Slight or minor injuries or property damage may result if the warning is not heeded.

Important!

Notice of a potentially harmful situation. The product or an object in the vicinity may be damaged if the warning is not heeded.

Materials that are hazardous to health and/or the environment. Materials/operating materials that must be handled and/or disposed of in a legally compliant manner.

2.2 Warning symbols on the system

Labelling of hazards and hazard sources on the system.

Danger!

Risk of electrical shock!

Non-observance mas result in death or injury.

2.3 Notes and requirements

Hazards of non-compliance

The system was developed and designed according to the generally accepted rules of technology.

Nevertheless, residual dangers to operator life and limb or the risk of damage to the system or other property may still arise during system use.

Safety equipment must never be dismantled or put out of operation, since doing so will result in hazards, and the intended use of the system will no longer be guaranteed. The dismantling of safety devices for equipping, repairing, and maintenance is described in detail. The safety devices must be refitted immediately on completion of such work.

When using external aids and agents (for example, solvents for cleaning) the user of the system is responsible for ensuring the safety of the unit.

All safety instructions and warnings and the nameplate on/near the system must be kept visible and legible.

Safety information

Safety information serves to promote occupational health and safety and prevent accidents. It must be adhered to.

In addition to the safety instructions listed in this section, the safety instructions contained in the current text must also be observed.

Beside the advice given in these operating instructions, the general safety and accident prevention regulations (in Germany, among others UVV BGV A3, TRBS 2131 and BGR 500 Section 2.26 (previously VGB 15): "Welding, cutting and allied processes" and particularly the conditions for arc welding and cutting contained therein or the corresponding national regulations) must be observed.

Also observe the safety information signs on the factory floor of the operator.

Applications

REHM welding machines are, except when REHM expressly states otherwise in writing, for sale to commercial/industrial users only and are intended to be used by commercial/industrial users only.

SYNERGIC.ARC welding systems are designed in accordance with EN 60974-1 Arc welding equipment - welding power sources for overvoltage category III and pollution degree 3 and in accordance with EN 60974-10 Arc welding equipment - electromagnetic compatibility (EMC) and may be used only on mains supply systems which have a three-phase four-wire system with earthed neutral conductor.

EMF measures:

Electromagnetic fields can be harmful to health in ways
that are as yet unknown:
- Effects on the health of those nearby, such as
those that need pacemakers or hearing aids
- Those who have pacemakers must consult their physician
spending time in areas near the device and the
welding process.
- Welding cables should be kept as far as possible from the welder’s head/trunk
- Do not carry welding cables or hose packs over your shoulder
or wrap them around your body.

This Class A equipment is not intended for use in residential areas in which power is supplied from a public low-voltage supply network. Such environments could entail difficulties ensuring electromagnetic compatibility because of interference from wires and radiation. The welding equipment does not comply with IEC 61000-3-12:2011. If the unit is to be connected to a public low-voltage supply network, it is the responsibility of the welding equipment constructor or user, after consultation with the supply network operator, to ensure that the installation can be connected.

SYNERGIC.ARC welding systems may be used only

- as intended
- in an absolutely perfect condition

Dangerous nature of this machine

WARNING

SYNERGIC.ARC welding systems have been subjected to a safety test and acceptance. In the event of incorrect operation or misuse, there is a danger to

- life and limb of the operator,
- the machine and other material assets of the operator
- the efficient work of the machine

All persons involved in the installation, commissioning, operation, maintenance and repair of the machine must

- be appropriately qualified
- strictly observe these operating instructions.

Your safety is at stake!

Qualification of the operating personnel

SYNERGIC.ARC welding systems may be operated only by persons who are trained and instructed in the use and maintenance of welding equipment. Only qualified, assigned and trained personnel may work on and with the system.

The operator is responsible for third parties in the work area. The responsibility for this machine must be precisely defined and adhered to. Unclear responsibilities are a safety risk.

The operating company must

- make the operating instructions accessible to the operator and
- ensure that the operator has read and understood them.

Connect a lockable switch in front of the machine to prevent unauthorised operation.

Purpose of the document

These operating instructions contain important information on how this unit can be operated safely, properly and economically. A copy of the operating instructions must be constantly at hand in a suitable place at the site of use of the system. Before using the system be sure to read the information compiled in these operating instructions. These include important instructions on use of the equipment that enable the full technical advantages of the REHM equipment to be exploited. See also the information on repair and maintenance, operating safety and functional reliability.

These operating instructions are not a substitute for practical instruction by REHM service personnel.

Documentation for any additional operation that may be present must also be observed.

Changes to the system

No mounting or incorporation of additional equipment or changes to the system are permitted. Doing so will invalidate any warranty and liability claims.

Third-party intervention and disabling of operation of safety devices invalidates all warranty claims.

Requirements of the mains supply

High-power units can affect the mains voltage due to their high power consumption. There may therefore be connection restrictions, requirements for maximum permissible mains impedance, or requirements for minimum necessary available power at the connection point to the general mains supply for certain unit types (see technical data). If this is the case, the unit's user – after consulting the power supplier if necessary – must ensure that the unit may be connected.

3 Unit description

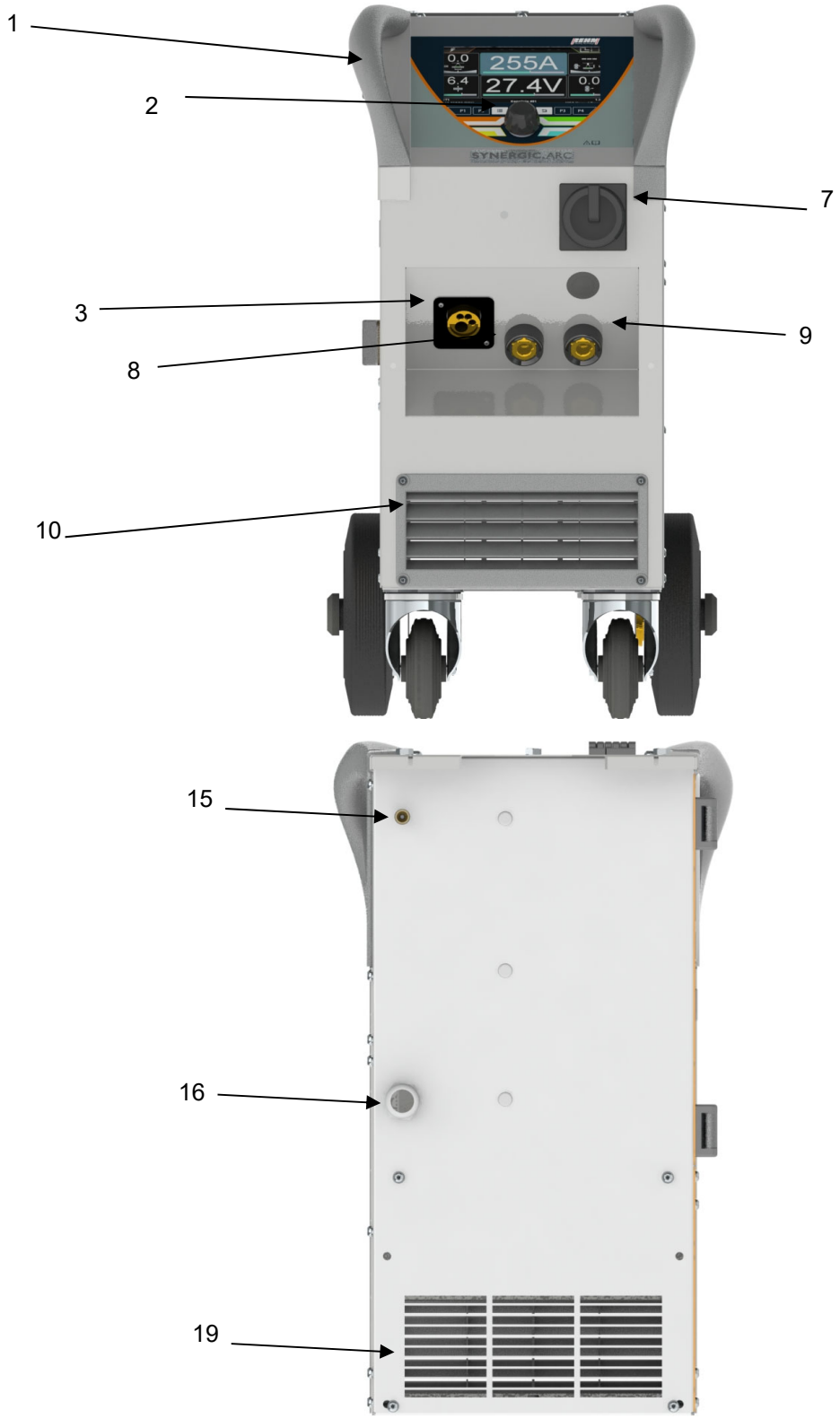


Figure 2: SYNERGIC.ARC 251, compact and gas-cooled
Front and rear view
(Figure does not illustrate standard equipment)

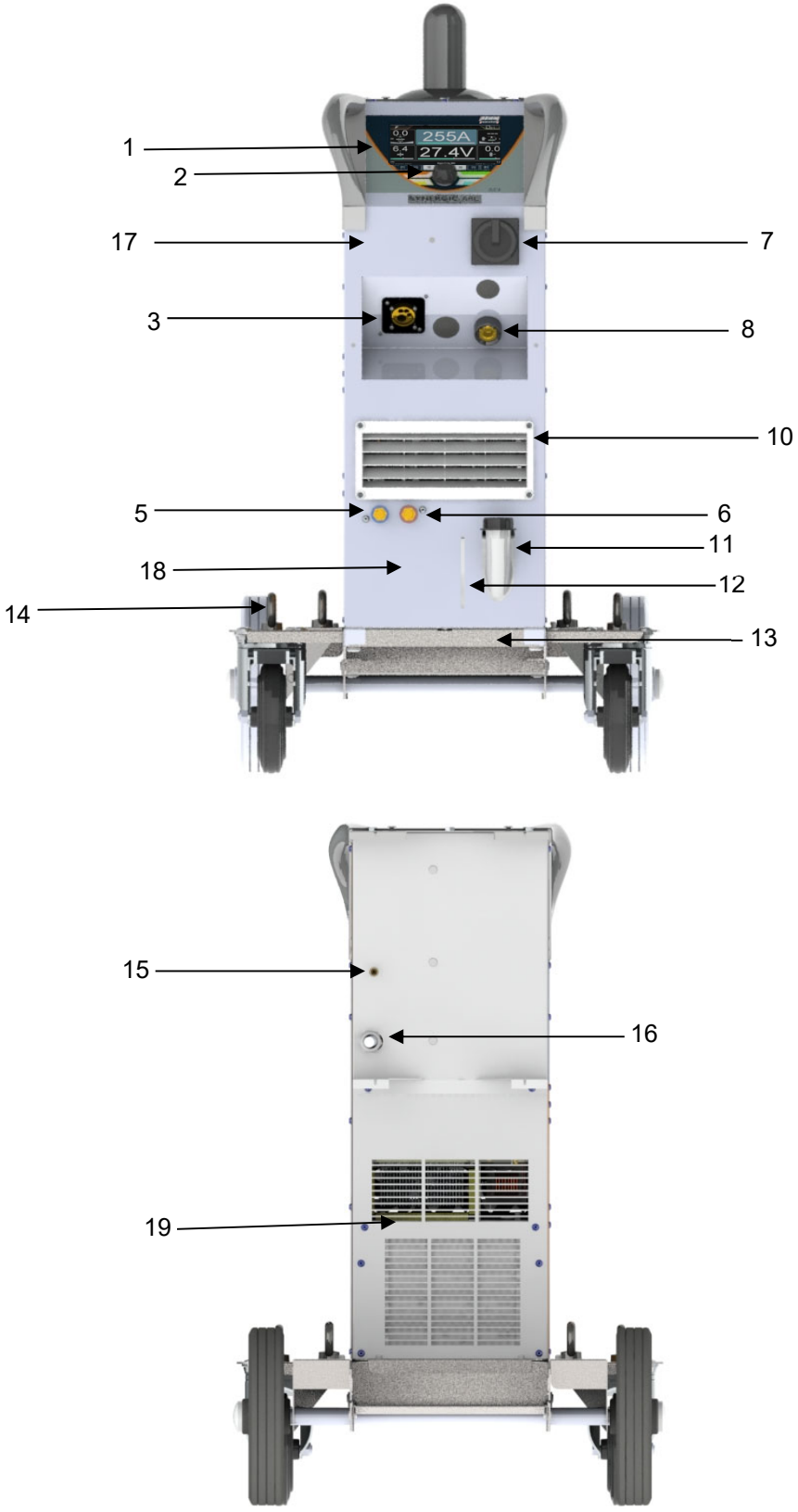


Figure 3: SYNERGIC.ARC 304 W, compact and water-cooled
View Front and rear view
(Figure does not illustrate standard equipment)

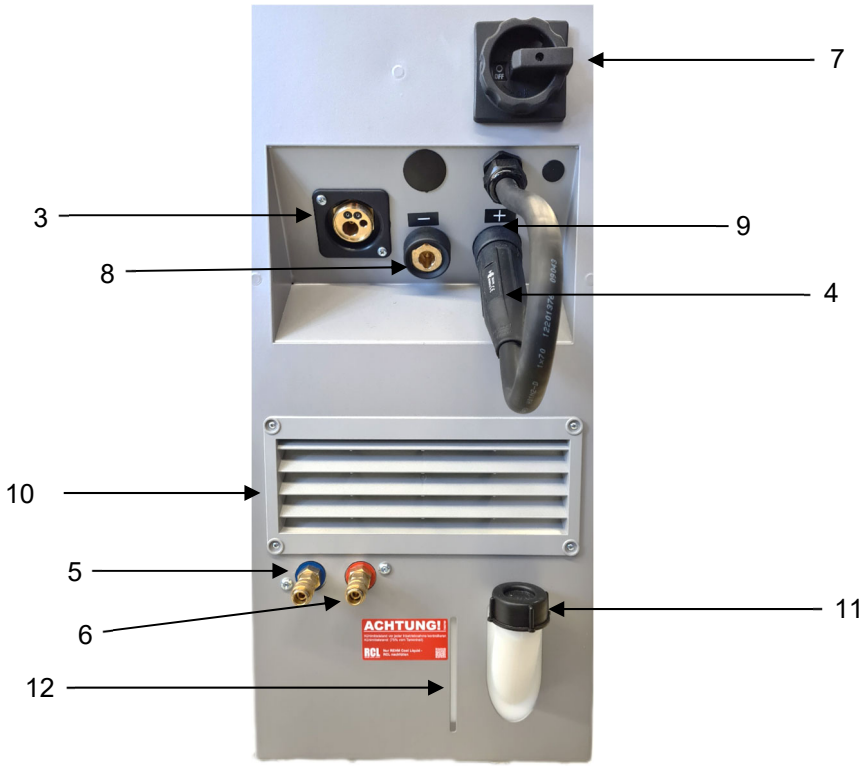


Figure 4: SYNERGIC.ARC 304 W, compact and water-cooled ***Pole-reversible option*** *(Figure does not illustrate standard equipment)*

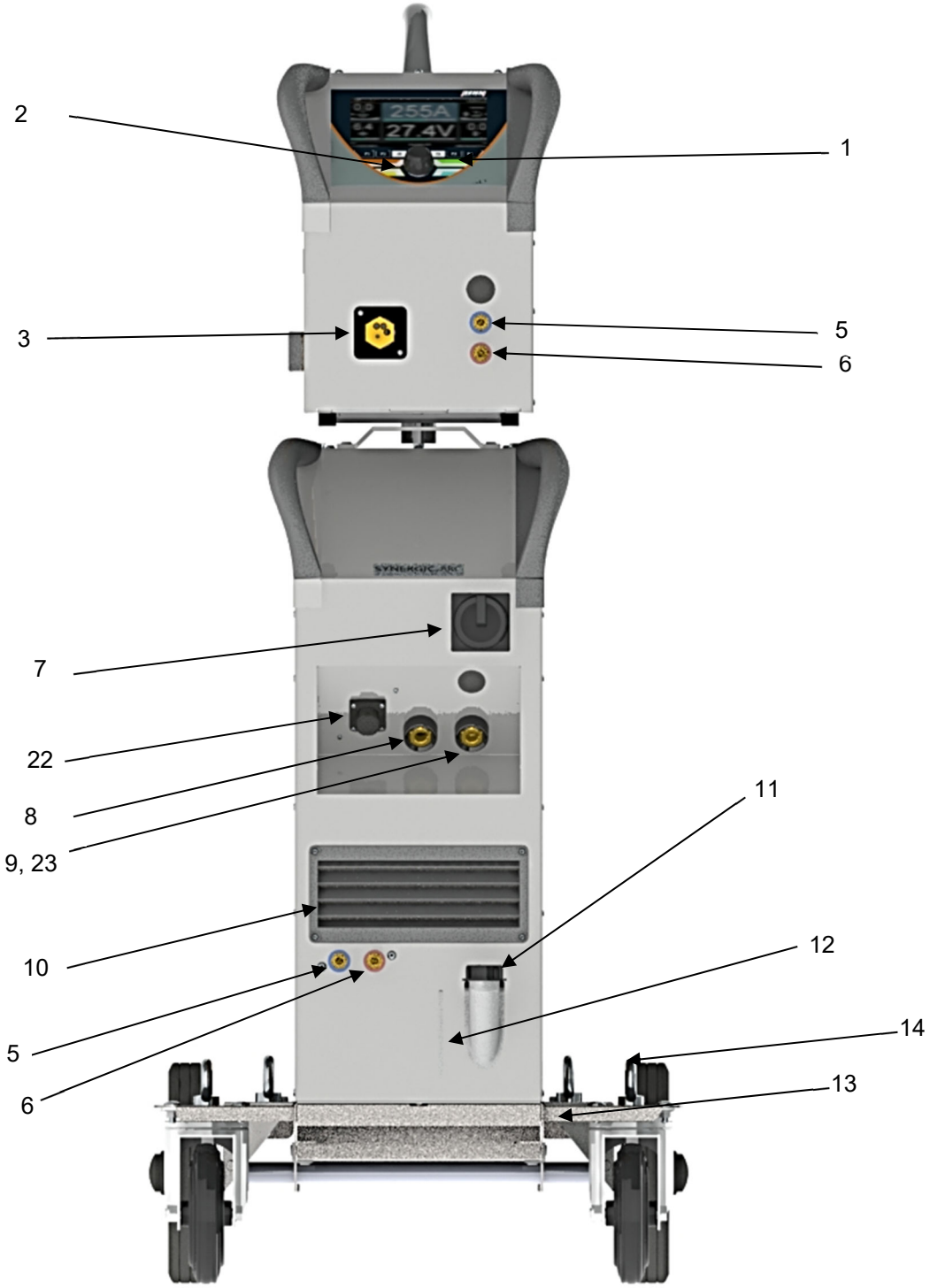


Figure 5: SYNERGIC.ARC 404 WS with case and water cooling unit Front view (Figure does not illustrate standard equipment)

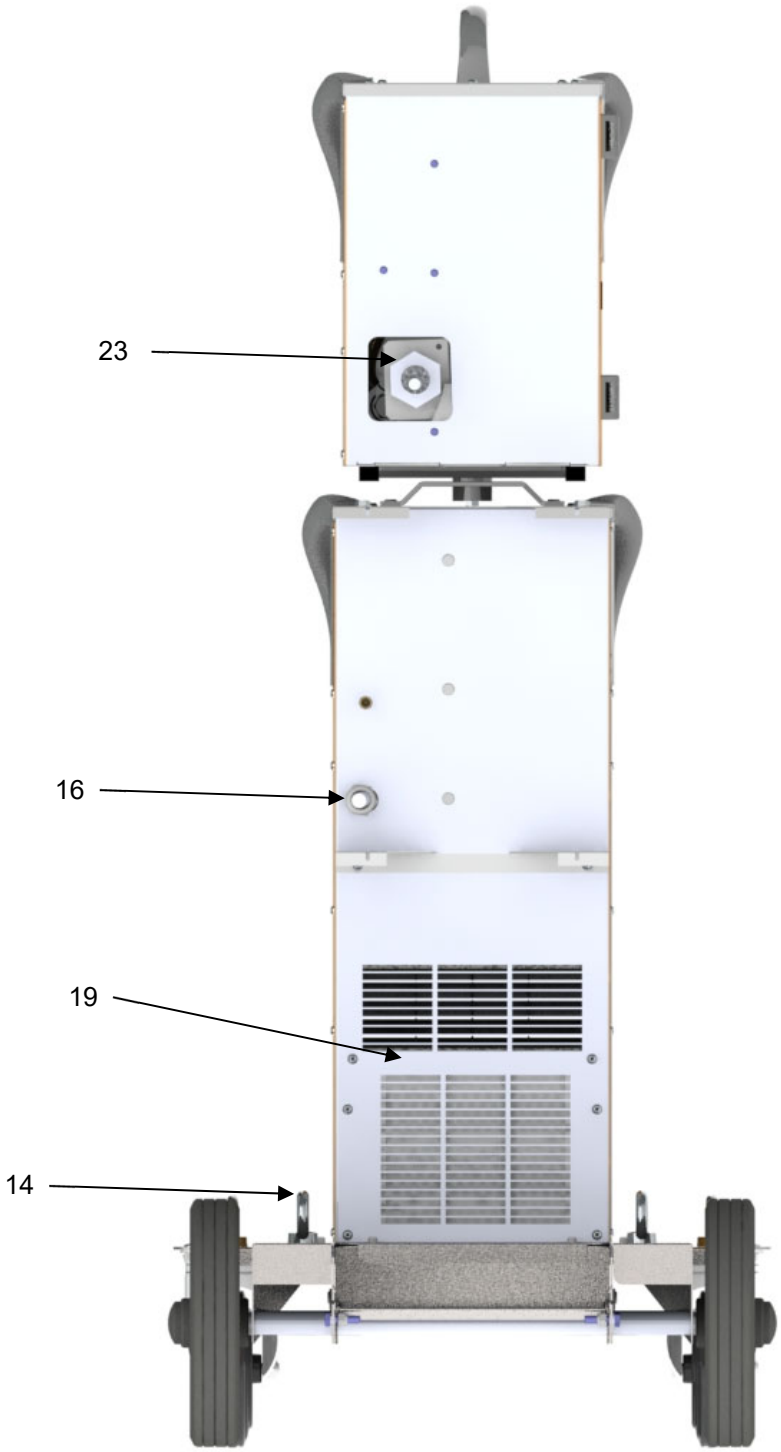


Figure 6: SYNERGIC.ARC 404 WS with case and water cooling unit
Rear view (Figure does not illustrate standard equipment)

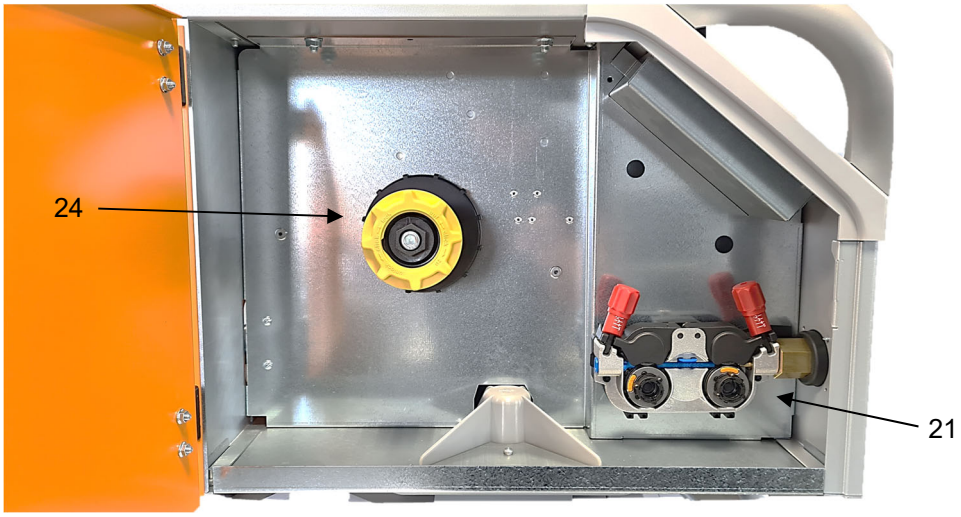


Figure 7: SYNERGIC.ARC wire feed case

No.	Symbol	Function/description
1		Control panel – See "Description of controls"
2		Control panel push and rotary encoder
3		Welding torch connection (Euro connection)
4		Polarity selection plug for the torch connection (optional)
5		Connection coolant supply (Blue)
6		Connection coolant return (red)
7		Main switch for switching on/off the welding power source
8	–	Current socket "negative"
9	+	Current socket "positive"
10		Cooling air inlet
11		Inlet Filling Coolant Water cooling unit
12		Viewing window Stand Coolant Water cooling unit
13		Advanced trolley (option, non-standard)
14		Crane eyelets (optional)
15		Inert gas connection
16		Power cable
17		Welding power sources
18		Water cooling unit (Option)
19		Cooling air outlet
20		Coil mandrel
21		Wire feed unit
22		Intermediate hose set – control cable connection
23		Intermediate hose set – welding current cable
24		Coil mandrel

Table 1 Legend for functional elements on the front and back

4 Functional description

4.1 Overview of operating elements

Figure 8: SYNERGIC.ARC operating elements and main screen

4.2 Control panel description

4.2.1 Operating elements

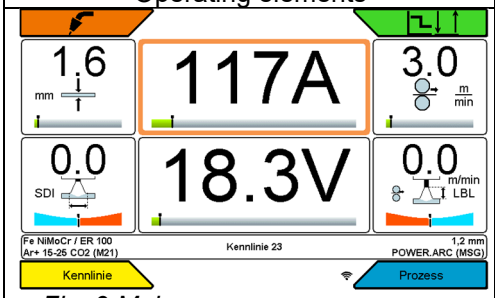
<table>
<tr><th>Operating elements</th><th>Function</th></tr>
<tr><td> 

Fig. 9 Main screen
Infinitely variable</td><td>Main screen

BDE mode view: Infinitely variable

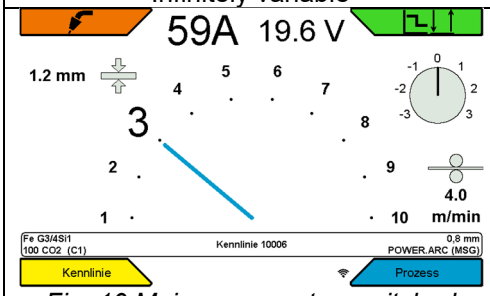
Operation via rotary encoder with push-knob and buttons for menu selection in the four corners of the screen</td></tr>
<tr><td> 

Fig. 10 Main screen, step switched</td><td>Main screen

BDE mode view: Step-switched

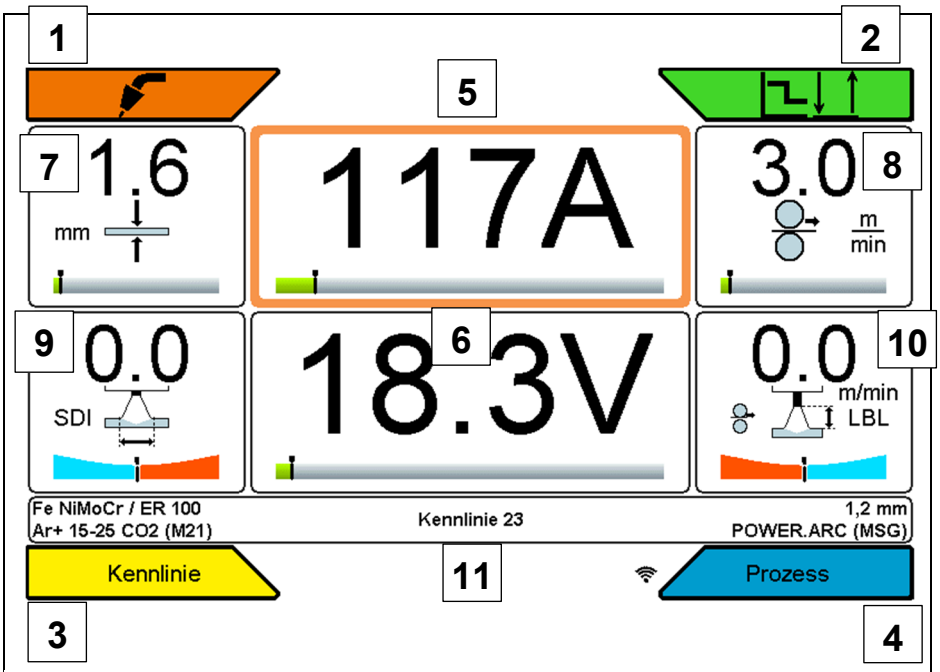
Operation via rotary encoder with push-knob and buttons for menu selection in the four corners of the screen</td></tr>
<tr><td> 

Fig. 11 Function buttons</td><td>Function buttons (from left to right)
<table>
<tr><td>P1</td><td colspan="2">Quick Choice</td></tr>
<tr><td>P2</td><td colspan="2">Quick Choice</td></tr>
<tr><td>≡</td><td>Submenu
“Submenu” (12)</td><td>List of all submenus</td></tr>
<tr><td>REHM</td><td>Main screen
“Home”</td><td>Jumps directly to the first screen page</td></tr>
<tr><td>↩</td><td>Back
“Back”</td><td>Always jumps back one level</td></tr>
<tr><td>P3</td><td colspan="2">Quick Choice</td></tr>
<tr><td>P4</td><td colspan="2">Quick Choice</td></tr>
</table></td></tr>
<tr><td> 
Fig. 12 Corner function buttons</td><td>Corner menu selection buttons

Direct menu buttons for the selection menus located in the four screen corners; arranged around the rotary encoder.</td></tr>
<tr><td> 
Fig. 13 Rotary encoder with push-knob</td><td>Rotary encoder with push-knob

Moves the pointer (cursor) on the screen clockwise or
anti-clockwise.
Positions reached are highlighted in colour and are activated by pressing the rotary encoder knob.</td></tr>
</table>

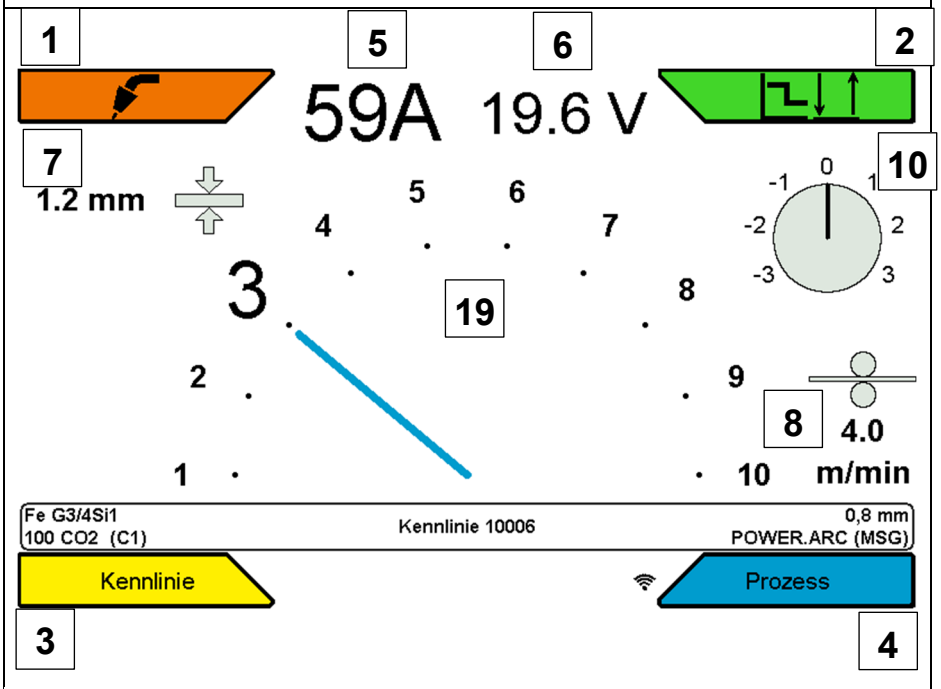
4.2.2 Operating elements



The infinitely variable adjustment screen can be selected from the setup screen.

=> Setup => Bildschirm =>

Stufenschaltung | Nein

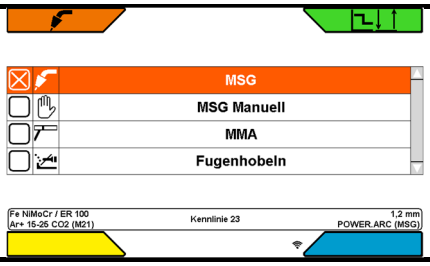
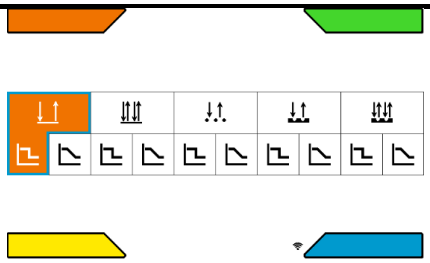


The step-switched adjustment screen can be selected from the setup screen.

=> Setup => Bildschirm =>

Stufenschaltung | Ja

Figure 14: Screen functions

No.	Symbols	Description/functions
BF1		Corner menu welding processes
		
BF2		Corner menu operating modes
		
		Two-cycle
		Two-cycle with slope-down
		Four-cycle
		Four-cycle with slope-down
		Spot
		Spot with slope-down
		Two-cycle interval
		Two-cycle interval with slope-down
		Four-cycle interval
		Two-cycle interval with slope-down

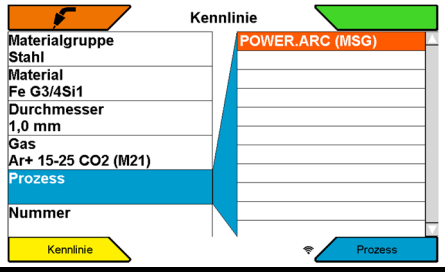
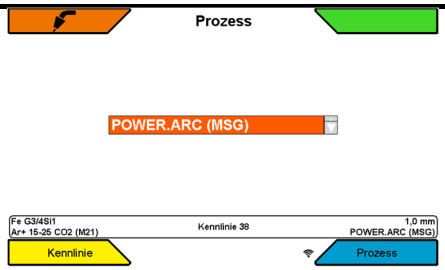
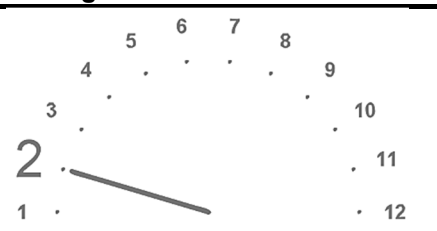
No.	Symbols	Description/functions
BF3		**Corner menu characteristic curve** 
		Material group Material Wire diameter Gas Process Number
BF4		**Corner menu welding process**
		 FOCUS.ARC POWER.ARC (MSG) (Selection dependent on filler material and system equipment)
BF5	42A	**Welding current display panel (A)**
BF6	18.5 V	**Display panel Voltage (V)**
BF7	0.9 mm	**Display panel Material thickness (mm)**
BF8	2.6 m/min	**Display panel Wire feed speed (m/min)**
BF9	0.0 SDI	**Display panel SDI**
BF10	0.0 V LBL	**Display panel LBL (Arc length)**
BF11		**Characteristic curve info bar**
Fe G3/4Si1 Ar+ 15-25 CO2 (M21)	Kennlinie 38	1,0 mm POWER.PULS
BF19		**Switching level**
		
BF20		

Table 2 Operating elements main screen

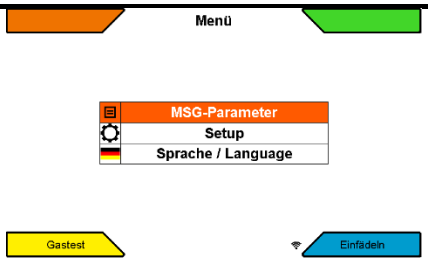
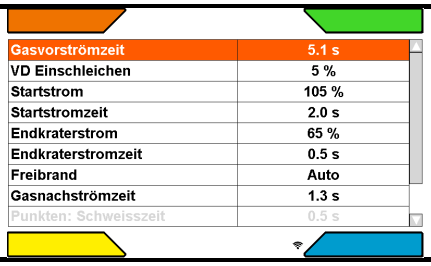
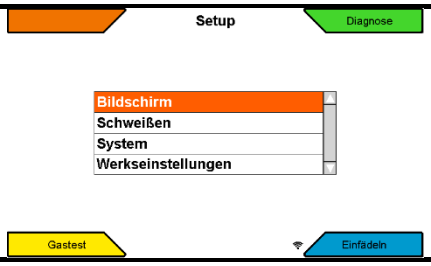
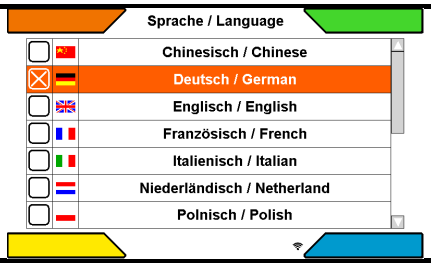
No.	Symbols	Description/functions
BF12		Submenu button
	14 15	
BF13		MSG parameters
		
BF14		Setup (Settings)
		
BF15		Language
		
BF16		Back button “Home” and “Back”
BF17		Fault message
BF18		Links in the characteristic curve info bar Operation and excess temperature display

Table 3 Other control functions and submenus

4.3 Switching on

SYNERGIC.ARC welding systems are started with the main switch. The screen shows the REHM logo and the unit type for about ten seconds. The display then switches to the main screen [Fig. 9 Main screen]. The last active welding parameters are set. The unit is then ready for operation.

4.4 Peculiarities of the operating panel

The processor control provides active support to facilitate faster and easier operation:

All set parameters are saved when the unit is switched off. When the unit is switched back on the stored parameters are automatically activated.

The currently set parameters and settings are always displayed.

Note! Due to equipment variants, functions may be available on your SYNERGIC.ARC that are not described in these operating instructions or that are not included in your welding system.

5 Corner menu functions

5.1 Corner menu welding processes (top left)

The corner menu [BF1] is used to select the welding processes

- MSG (metal inert gas arc welding with synergic characteristic curve)
- MSG manual (metal inert gas arc welding without synergic characteristic curve)
- MMA manual arc welding
- Gouging

Turning and pressing the rotary encoder [Fig. 13] selects and confirms the process. Pressing the button [**BF16**] "Back" or "Rehm" returns to the main screen [Fig. 9].

5.1.1 MSG

With infinitely variable MSG welding, very different material transitions and also different types of arc occur depending on the selected arc power and the inert gas used, see also Section 5.4 (welding process).

MSG welding uses synergic characteristic curves only. You choose the synergic characteristic curve that matches the filler material, wire diameter, inert gas, and welding process you are using.

5.1.2 MSG manual

Infinitely variable MSG manual welding is without a synergic characteristic curve. Use this welding process if no characteristic curve is available for your filler material.

You must then harmonize voltage and wire feed speed manually.

5.1.3 MMA

Use this welding process for MMA (manual metal arc welding). Connect the electrode holder and ground cable to the sockets according to the desired polarity. As soon as the welding process is activated, idle voltage is available for welding.

5.1.3 Gouging

Use this welding process for gouging. Connect the gouging torch and ground cable to the sockets according to the desired polarity. As soon as the welding process is activated, idle voltage is available for gouging. The gouging process is not available for all SYNERGIC.ARC welding system power classes.

5.2 Corner menu operating mode (top right)

The Operating modes menu [**BF2**] is activated by pressing the button at the top right of the keypad Fig. 13. This allows selection of the following operating modes:

1. Two-cycle
2. Two-cycle with slope-down
3. Four-cycle
4. Four-cycle with slope-down
5. Spot
6. Spot with slope-down
7. Two-cycle interval
8. 2 cycle interval with slope-down
9. Four-cycle interval
10. Four-cycle interval with slope-down

5.2.1 Two-cycle operating mode

Two-cycle mode is recommended for fast, controlled tack welding and manual spot welding.

❒ 1. Cycle – press the torch trigger
- ❒ The inert gas solenoid valve opens
- ❒ After the set gas pre-flow time has expired the power unit is switched on
- ❒ Welding voltage on
- ❒ Wire feed runs at the initial wire feed speed
- ❒ Arc is ignited after the welding wire contacts the workpiece
- ❒ The feed switches to the set wire feed speed of the welding process.
- ❒ The welding current flows with the set Hotstart value.
- ❒ After the Hotstart time has elapsed, the welding current is adjusted from the Hotstart value to the welding current over the duration of the Hotstart slope time.

❒ 2. Cycle – release the torch trigger
- ❒ Wire feed stops
- ❒ Burning off and burning off control are executed
- ❒ The inert gas is switched off after the gas post-flow time has expired.

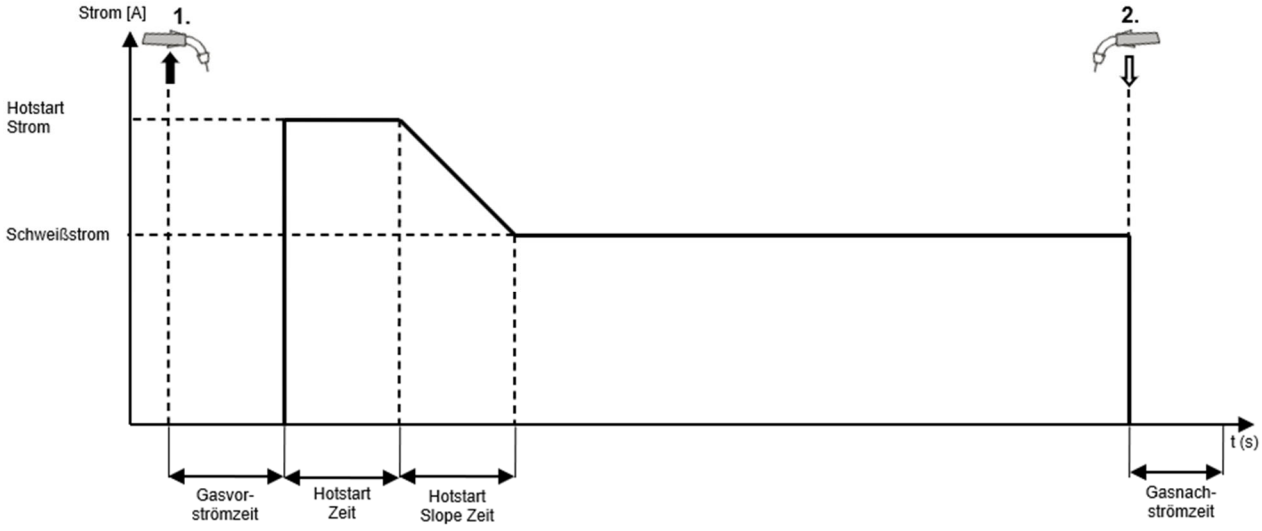


Figure 15: Two-cycle operating mode procedure with Hotstart

5.2.2 Two-cycle operating mode with slope-down

Two-cycle operating mode procedure with slope-down:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flows with the set Hotstart value.
  - ❒ After the Hotstart time has expired, the welding current is changed from the Hotstart value to the value set for welding over the duration of the Hotstart slope time.
- ❒ 2. Cycle – release the torch trigger
  - ❒ For the duration of the slope-down time, the welding current is reduced to the value set for the slope-down current.
  - ❒ The wire feed stops after the slope-down time has expired.
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

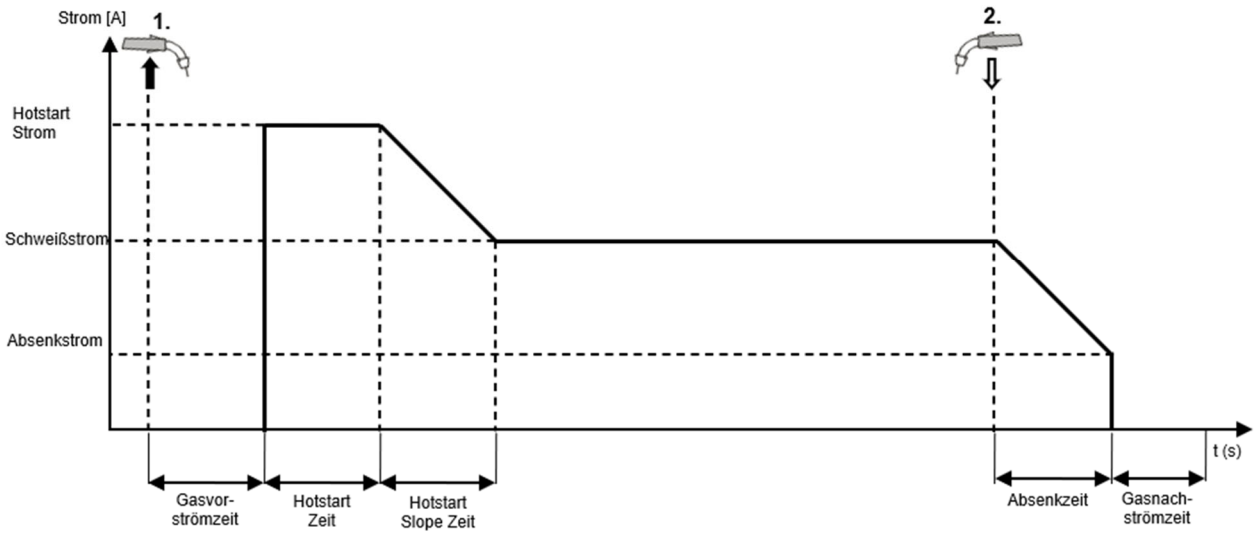


Figure 16: Two-cycle operating mode procedure slope-down with Hotstart

5.2.3 Four-cycle operating mode

Four-cycle welding is recommended for long welding seams.

Four-cycle operating mode procedure:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flow is at the Hotstart value set for welding
- ❒ 2. Cycle – release the torch trigger
  - ❒ The welding current is changed from the Hotstart value to the value set for welding.
- ❒ 3. Cycle – press the torch trigger
  - ❒ Actuating the torch trigger has no effect
- ❒ 4. Cycle – release the torch trigger
  - ❒ Wire feed stops
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

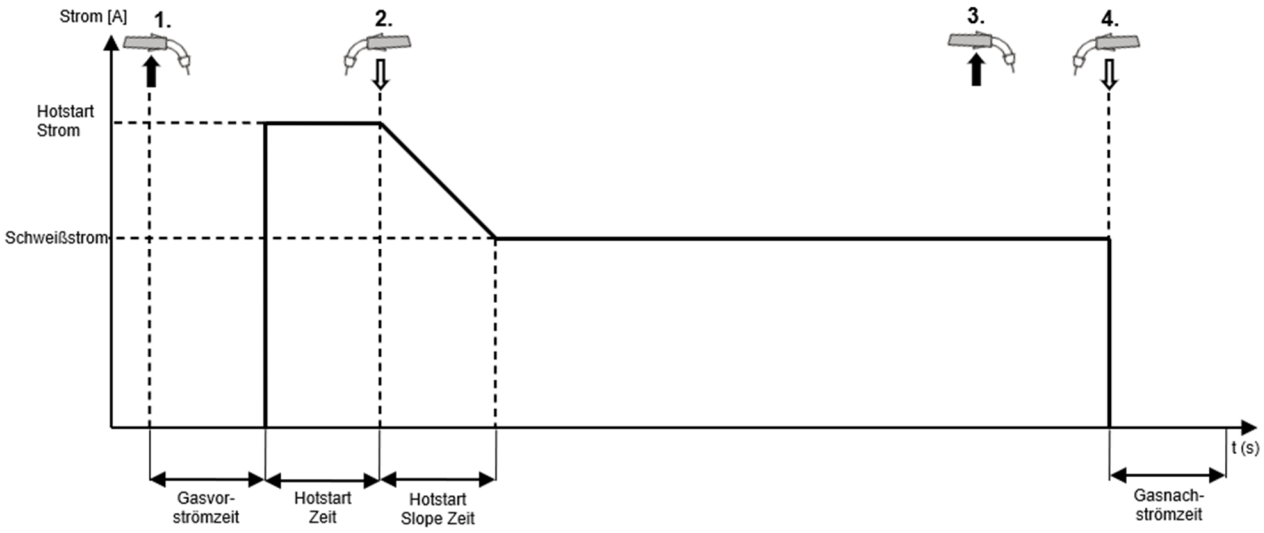


Figure 17: Four-cycle operating mode procedure with Hotstart

5.2.4 Four-cycle operating mode with slope-down

Four-cycle operating mode procedure with slope-down:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on.
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flows with the set Hotstart value.
- ❒ 2. Cycle – release the torch trigger
  - ❒ The welding current is changed from the Hotstart value to the value set for welding.
- ❒ 3. Cycle – press the torch trigger
  - ❒ For the duration of the slope-down time, the welding current is reduced to the value set for the slope-down current.
- ❒ 4. Cycle – release the torch trigger
  - ❒ Wire feed stops
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

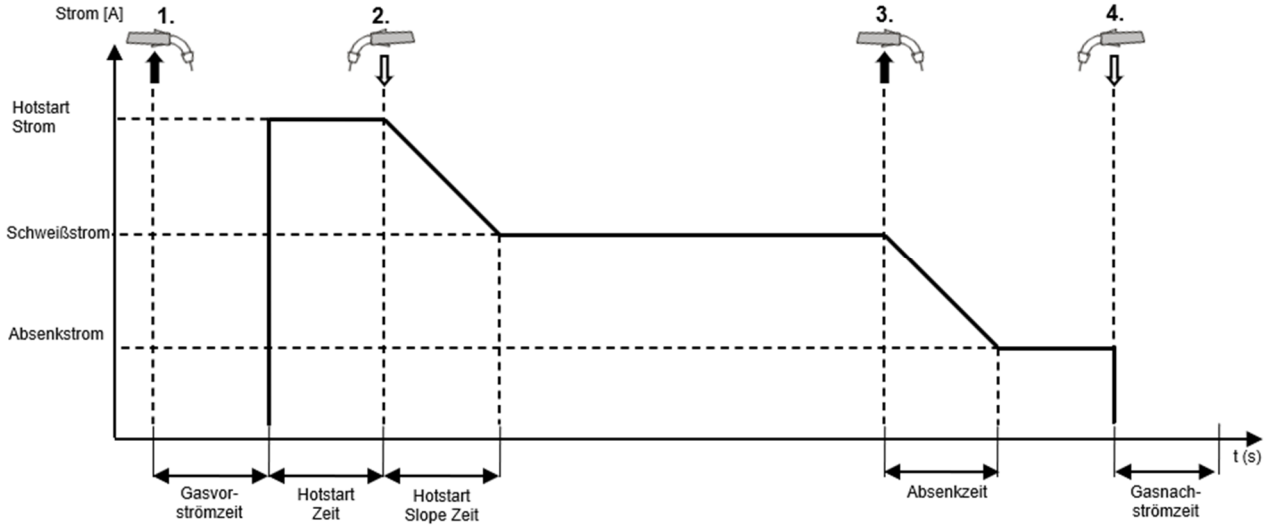


Figure 18: Four-cycle operating mode procedure slope-down with Hotstart

5.2.5 Spot

The spot welding mode is recommended for welding with a fixed spot welding time from 0.1 seconds.

The stationary welding process runs with a fixed spot welding time, unless the torch trigger is released prematurely during the welding.

The program runs to the end after expiry of the set spot welding time or after releasing the torch trigger during the welding.

Spot function procedure:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flow is at the set value set for welding
  - ❒ The spot time (welding time) is running
  - ❒ The welding process is automatically terminated after the set spot time has expired
  - ❒ Wire feed stops
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.
- ❒ 2. cycle - Release the torch trigger
  - ❒ By releasing the torch trigger during the spot time, the welding process is terminated immediately and the inert gas is switched off after the gas post-flow time has expired.

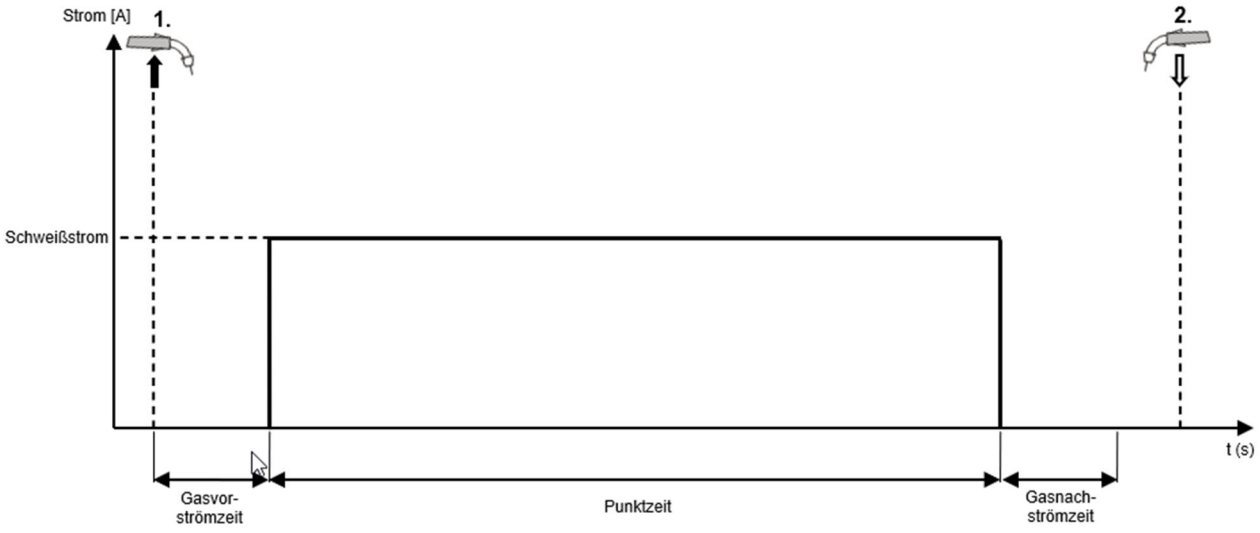


Figure 19: Spot operating mode procedure:

5.2.6 Spot with slope-down

Spot operating mode procedure with slope-down:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flow is at the set value set for welding
  - ❒ The spot time (welding time) is running
  - ❒ The welding process is automatically terminated after the set spot time has expired
  - ❒ The wire feed stops after the slope-down time has expired.
  - ❒ For the duration of the slope-down time, the welding current is reduced to the value set for the slope-down current.
  - ❒ The wire feed stops after the slope-down time has expired.
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.
- ❒ 2. cycle - Release the torch trigger
  - ❒ By releasing the torch trigger during the spot time, the welding process is terminated immediately and the inert gas is switched off after the gas post-flow time has expired.

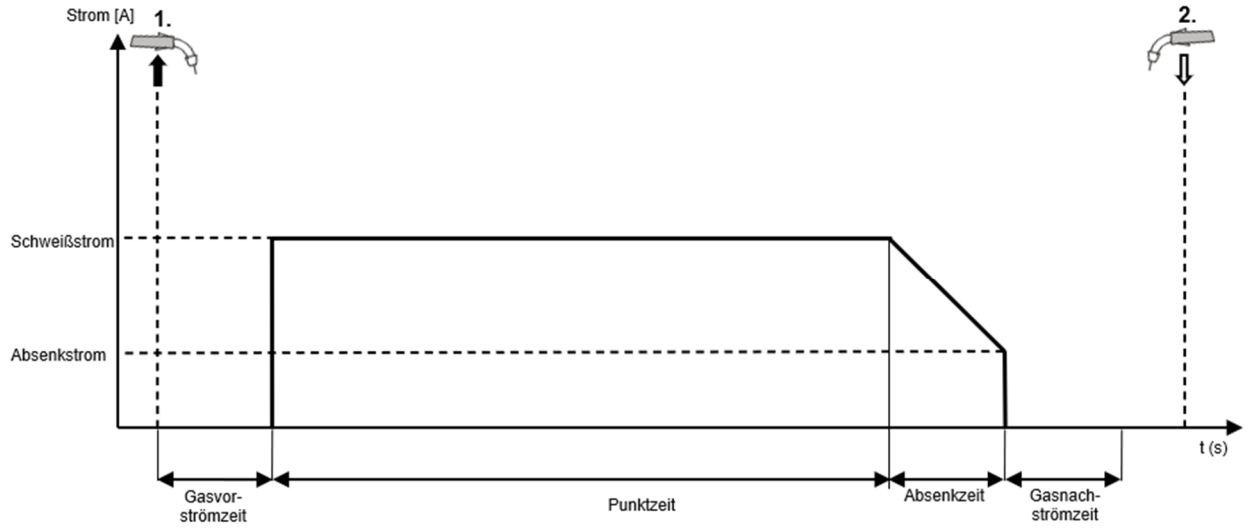


Figure 20: Spot operating mode procedure with slope-down

5.2.7 Two-cycle interval

Interval welding is defined as spot welding with defined pause times. This makes it possible to apply the thinnest filler materials. Interval welding is possible only in the two-cycle operating mode.

Welding in the interval welding mode is recommended for welding with a fixed break welding time from 0.1 seconds.

In interval mode the pause time between the single intervals can be adjusted and the cooling of the base material guaranteed, which means less warpage.

Two-cycle interval operating mode procedure:

❒ 1. Cycle – press the torch trigger
- ❒ The inert gas solenoid valve opens
- ❒ After the set gas pre-flow time has expired the power unit is switched on
- ❒ Welding voltage on
- ❒ Wire feed runs at the initial wire feed speed
- ❒ Arc is ignited after the welding wire contacts the workpiece
- ❒ The feed switches to the set wire feed speed of the welding process.
- ❒ The welding current flow is at the set value set for welding
- ❒ The welding time is running
- ❒ The welding process is automatically terminated after the set welding time has expired
- ❒ Wire feed stops
- ❒ Burning off and burning off control are executed
- ❒ The inert gas continues to flow
- ❒ The pause time is running
- ❒ After the pause time has expired, the welding process is restarted and the previously described procedure is repeated.

❒ 2. Cycle – release the torch trigger
- ❒ Wire feed stops
- ❒ Burning off and burning off control are executed
- ❒ The inert gas is switched off after the gas post-flow time has expired.

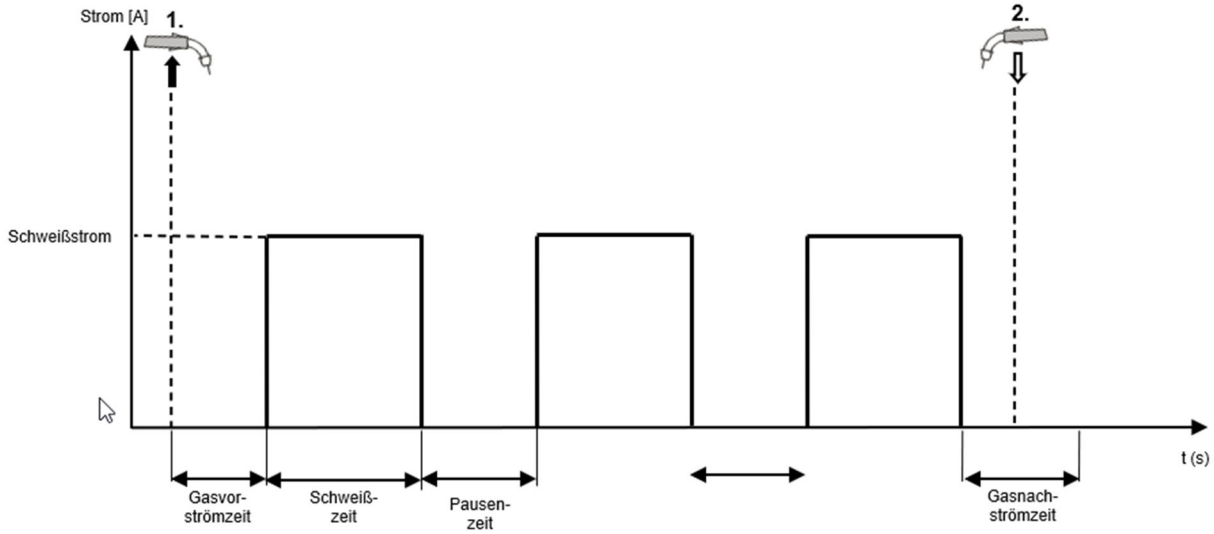


Figure 21: Two-cycle interval operating mode procedure

5.2.8 Two-cycle interval with slope-down

Two-cycle interval operating mode procedure with slope-down:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ After the set gas pre-flow time has expired the power unit is switched on
  - ❒ Welding voltage on
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited after the welding wire contacts the workpiece
  - ❒ The feed switches to the set wire feed speed of the welding process.
  - ❒ The welding current flow is at the set value set for welding
  - ❒ The welding time is running
  - ❒ After the set welding time has expired, the welding current is reduced to the value set for the slope-down current over the duration of the slope-down time
  - ❒ Wire feed stops after the slope-down time has expired
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas continues to flow
  - ❒ The pause time is running
  - ❒ After the pause time has expired, the welding process is restarted and the welding process runs again.
- ❒ 2. Cycle – release the torch trigger
  - ❒ For the duration of the slope-down time, the welding current is reduced to the value set for the slope-down current.
  - ❒ The wire feed stops after the slope-down time has expired.
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

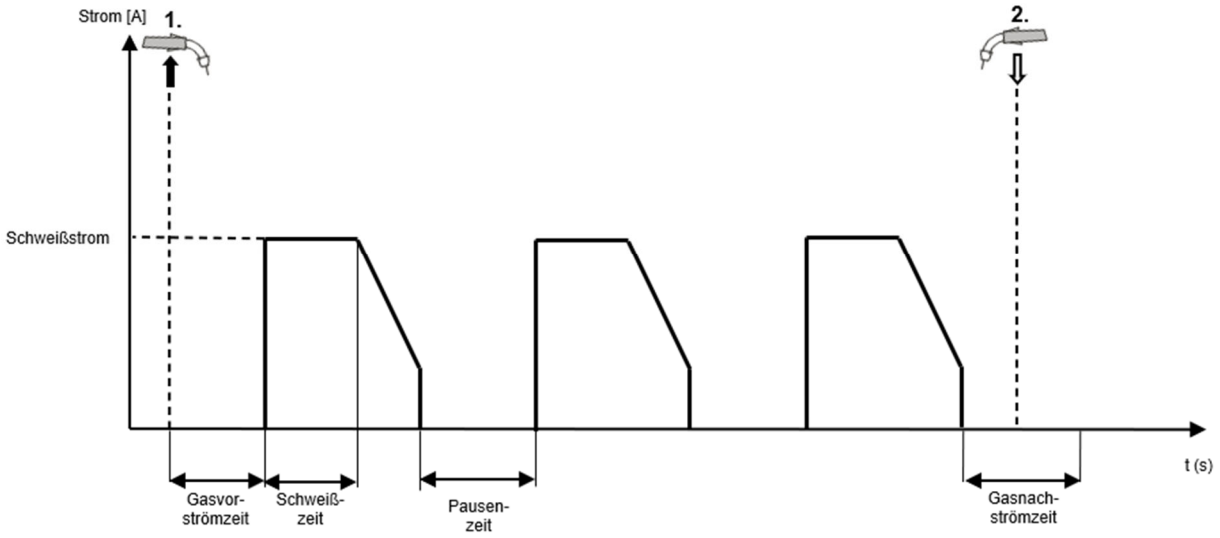


Figure 22: Two-cycle interval operating mode procedure with slope-down

5.2.9 Four-cycle interval

Four-cycle interval operating mode procedure:

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ Wehn the gas pre-flow time expires, the power unit is switched on.
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited when the welding wire contacts the workpiece
  - ❒ The welding current flows with the Hotstart value.
- ❒ 2. Cycle – release the torch trigger
  - ❒ The welding current is changed from the Hotstart value to the value set for welding.
  - ❒ The welding time is running
  - ❒ Wire feed stops when the welding time expires
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas continues to flow
  - ❒ The pause time is running
  - ❒ After the pause time has expired, the welding process is restarted and the welding process runs again.
- ❒ 3. Cycle – press the torch trigger
- ❒ 4. Cycle – release the torch trigger
  - ❒ The welding process ends
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

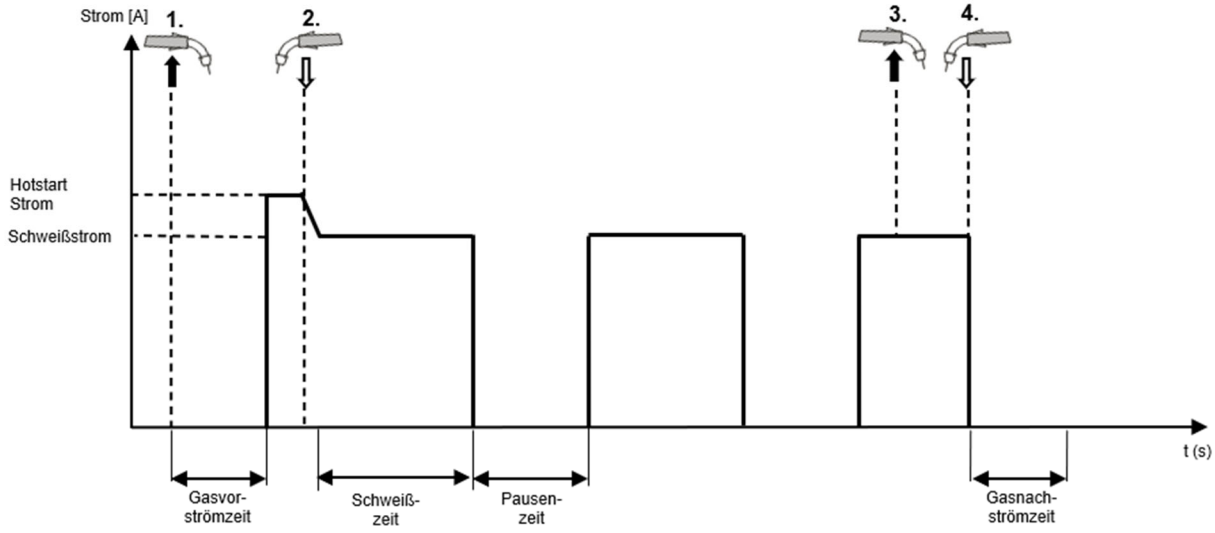


Figure 23: Procedure for four-cycle interval operating mode with Hotstart

5.2.9 Four-cycle interval with slope-down

Two-cycle interval operating mode procedure with slope-down (Slope):

- ❒ 1. Cycle – press the torch trigger
  - ❒ The inert gas solenoid valve opens
  - ❒ Wehn the gas pre-flow time expires, the power unit is switched on.
  - ❒ Wire feed runs at the initial wire feed speed
  - ❒ Arc is ignited when the welding wire contacts the workpiece
  - ❒ The welding current flows with the Hotstart value.
- ❒ 2. Cycle – release the torch trigger
  - ❒ The welding current is changed from the Hotstart value to the value set for welding.
  - ❒ The welding time is running
  - ❒ Wire feed stops when the welding time expires
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas continues to flow
  - ❒ The pause time is running
  - ❒ After the pause time has expired, the welding process is restarted and the welding process runs again.
- ❒ 3. Cycle – press the torch trigger
  - ❒ Welding current is reduced to slope-down current
- ❒ 4. Cycle – release the torch trigger
  - ❒ The welding process ends
  - ❒ Burning off and burning off control are executed
  - ❒ The inert gas is switched off after the gas post-flow time has expired.

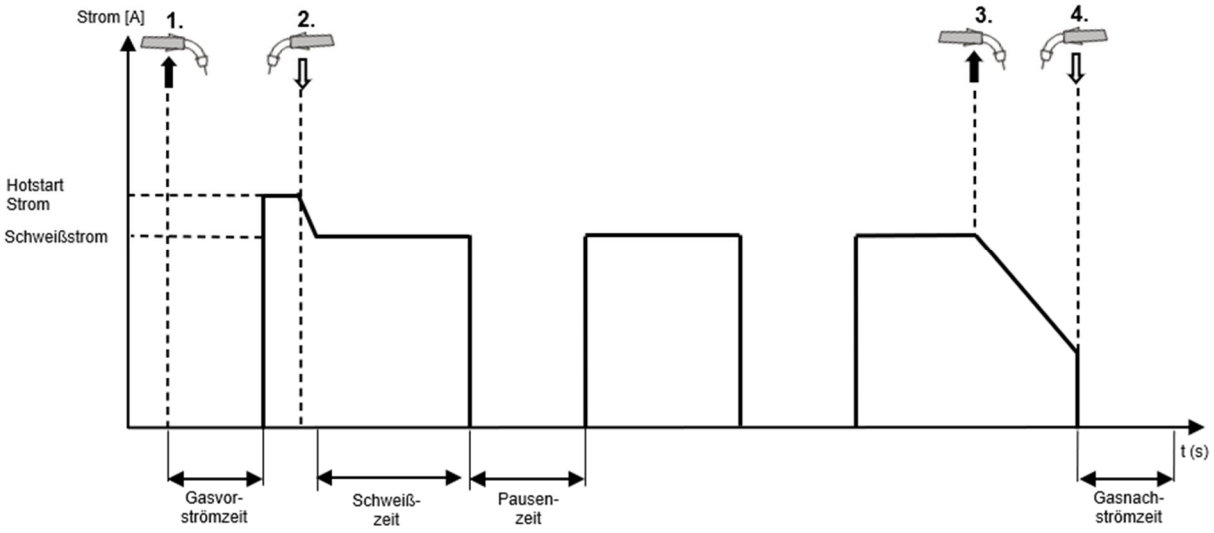


Figure 24: Four-cycle interval operating mode procedure with slope-down

5.3 Characteristic curve corner menu

The material group, filler material, diameter of the inserted welding wire, gas, and welding process can be selected and adjusted in the characteristic curve corner menu [BF3]. The selected characteristic curve is displayed on the main screen [BF11].

SYNERGIC.ARC welding systems provide various programmed characteristic curve data sets for effective processing of different materials. The setting is always made by turning and pressing the rotary encoder.

5.4 Welding process corner menu

Two additional welding processes are available for the MSG welding process. These differ fundamentally in the material transition of the filler material, the heat input and the arc length. Depending on welding system equipment and filler material, various processes are available.

The corner menu welding process [BF4] is used to select:

- FOCUS.ARC
- POWER.ARC (MSG)

5.4.1 FOCUS.ARC

The FOCUS.ARC welding process can be selected for conventional MIG/MAG welding with focussed arc.

- Conventional arc
- Welding with a short, powerful arc
- Reliable root formation
- Particularly deep penetration
- Secure edge formation
- Reduced undercuts
- Particularly for Fe

5.4.2 POWER.ARC (MSG)

The POWER.ARC welding process can be selected for conventional MIG/MAG welding.

- Conventional arc
- Optimised for the challenges of manual welding
- Safe handling
- Universal applications
- Robust, compensates for tolerances
- Flat weld seam geometry
- Standardised

Infinitely variable operating panel description 5.5-5.9

5.5 Welding current (A) display panel

The required "welding current" display panel [BF5] can be selected by actuating the rotary encoder. The welding current can be set by turning the rotary encoder.

The setpoint of the welding current is displayed in idle mode. The actual welding current is displayed during welding.

5.6 Voltage (V) display panel

The required "welding voltage" display panel [BF6] can be selected by actuating the rotary encoder. The welding voltage can be set by turning the rotary encoder.

The setpoint of the welding voltage is displayed in idle mode. The actual welding voltage is displayed during welding.

5.7 LBL correction display panel

The required "LBL correction" display panel [BF10] can be selected by actuating the rotary encoder. The arc length can be infinitely adjusted with the rotary encoder.

5.8 Material thickness display panel

The required "material thickness" display panel [BF7] can be selected by actuating the rotary encoder. The material thickness of the base material to be welded can be adjusted by turning the rotary encoder.

5.9 Wire feed speed display panel

The required "wire feed speed" display panel [BF8] can be selected by actuating the rotary encoder.

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

5.10 Characteristic curve info bar

In the main screen, the current settings of material, gas, wire thickness, welding process and the characteristic curve number are always displayed in the characteristic curve info bar [BF11].

5.11 Switching level display panel

The step-switched view in the main screen shows the switching levels [BF19] . The number of switching levels depends on the SYNERGIC.ARC welding system cable class. The switching levels allow quick, easy switching between the power ranges.

Pressing the push and rotary encoder once toggles between LBL correction and switching level.

6. Submenus

Pressing the "Submenus" button [**BF12**] accesses a selection list (drop-down list) for the existing submenu.

The following menus can be selected from this list:

1. MSG parameters
2. Setup
3. Language

The submenus can be exited in three ways with the return button [**BF16**]:

1. One level back by acknowledging a setting
2. One level back by pressing the "**Back**" button
3. Completely back to the main screen with the button "**Main menu**" (*Rehm*).

6.1 MSG parameters

With the welding parameters, the user can individually set the most important parameters for welding, such as: Gas pre-flow time, creep, etc.

Some welding parameters are active only when certain welding processes/functions are selected.

6.1.1 Parameter settings

Welding parameters are for the most part selected and processed directly in the illustrated welding curve with the push and rotary encoder [Fig. 13]. The representation and setting options depend on the unit type and the preselected welding process.

The cursor can be moved clockwise or anti-clockwise. The main display always shows the value and function of the cursor position.

6.1.2 Setting the MSG welding parameters

For processing, a parameter field is activated by rotating the rotary encoder to the value field [parameter field] in the screen display and activating this field by pressing the encoder.

The welding parameters are described in detail below in a sequence that follows the MSG parameter curve. Fewer parameters may be displayed, depending on functions or operating mode and welding system equipment.

6.1.3 Explanation of welding parameters

1 Gas pre-flow time

Time between switching on the gas valve and the start of the creep in. This parameter depends on the selected characteristic curve, i.e. the gas pre-flow time can be set individually for each characteristic curve.

2 VD creep

Adjustment of the creep speed. This parameter depends on the selected program, i.e. the creep speed can be set individually for each program.

3 Starting current

Start energy after ignition, based on the welding energy (100%). Depending on the application, the value can be set lower (setting lower than 100) or higher (setting higher than 100). This parameter depends on the selected characteristic curve; this means that the starting current can be set individually for each characteristic curve.

4 Starting current time

The start current time defines the duration of the Hotstart. This parameter depends on the selected characteristic curve, i.e. the start current time can be set individually for each characteristic curve.

5 End crater current

Slope-down current after the slope-down time has elapsed. The slope-down current refers to the welding current (100%). This parameter depends on the selected characteristic curve, i.e. the slope-down value can be set individually for each characteristic curve.

6 End crater current time

Time period in which the end crater current is maintained.

7 Burning off

Time between switching off the DV motor and switching off the power section. This parameter changes the burning off (characteristic value) predefined for each characteristic curve and allows individual adjustment of the length of the free wire end at the welding end.

A higher value for the burning off provides a shorter free wire end (as the wire burns back longer) and a lower value provides a longer wire end.

Burning off set too large: Wire end may burn to the contact tip.

8 Gas post-flow time

Time between the power unit being switched off (end of burning off time) and the gas valve being switched off. This parameter depends on the selected characteristic curve, i.e. the gas post-flow time can be set individually for each characteristic curve.

9 Spot welding time

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

10 Welding time

Welding time in interval mode if the torch trigger is not previously released.

11 Pause time

Pause time in interval mode (time between two welds).

6.2 Language menu

The available languages are displayed as flags in a selection list. Use the cursor to select a language and confirm by pressing the rotary encoder. The language becomes active immediately.

The selected language is illustrated by a box with cross.

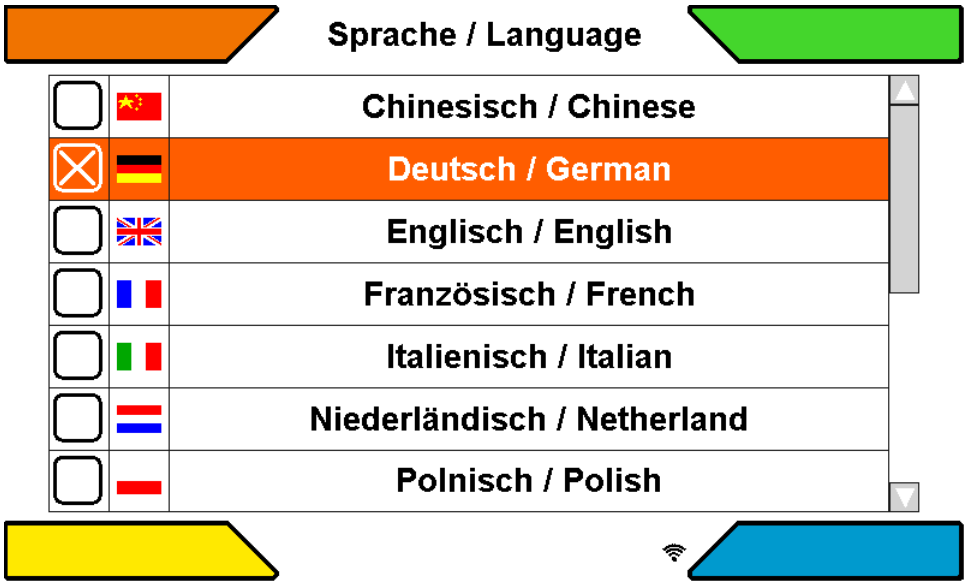


*Figure 25: Language selection submenu [**BF15**]*

6.3 Saving and loading jobs

SYNERGIC.ARC welding systems have four quick-storage keys (P1, P2, P3, P4) so that jobs can be easily saved and loaded. Once the unit settings for recurring welding tasks have been determined, they can thus be quickly recalled and reset on the welding unit.

Figure 26: Four quick-storage keys (P1, P2, P3, P4)

6.3.1 Save job

- ❒ Carry out the required machine setting
- ❒ Holding the desired quick-storage key for 3s stores the current machine settings at that location.
- ❒ Power set, arc length correction, and characteristic curve are all stored.

6.3.2 Load job

- ❒ Briefly pressing the desired quick-storage key calls up the saved settings for the SYNERGIC.ARC welding system.

6.4 Setup submenu

Functions and processes can be defined very conveniently and clearly in the Setup submenu.

❒ The required setting is selected by turning the push and rotary encoder [Fig. 13]. The settings are logically structured in various subfolders. Some settings depend on characteristic curve, process, welding system equipment, etc.

Name	Setting possibility	Description
Screen		
Display: Mirroring X	No/Yes	
Display: Mirroring Y	No/Yes	
Colour scheme	Light/Dark	
BDE mode	Step-switched/infinitely variable	
Welding		
Up/Down (Idle)	Inactive/AUT /Power/ Job/LBL correction/dynamic correction	
Up/Down (welding)	Inactive/AUT /Power/ Job/LBL correction/dynamic correction	
Up/Down: Speed	1-7	1: slow 7: very fast
System		
Hold: Mode	Inactive/Action/ Action and time	
Gas test: Time	10s-2:00 min	
Water cooling mode	Off/Auto/On	Off: Permanently off Auto: Activated with welding current On: Continuously on
Factory settings		
Factory setting		Welding parameters are reset to factory settings.

Table 4 Setup submenu

7 Control lamps

Symbol	Description
Operation/ excess temperature [**BF18**] 	The symbol **OPERATION** in black indicates that there is an idle voltage at the torch or electrode holder. The symbol is located on the left in the characteristic curve info bar The symbol illuminates red and flashes in the event of excess temperature.
	The power unit is switched off and no output voltage is available as long as this symbol flashes red. After the unit has cooled down, the LED is extinguished and welding can be resumed automatically.

8 Other functions

8.1 Threading

The threading function is used to thread the welding wire into the torch hose set without current. The welding wire is threaded into the torch hose set with the submenu [**BF12BF12BF12BF12BF12**]. When the "Threading" function button (Figure **28**) is pressed, threading is carried out for two seconds at reduced speed. The threading speed is then increased over a period of about two seconds to the set threading speed.

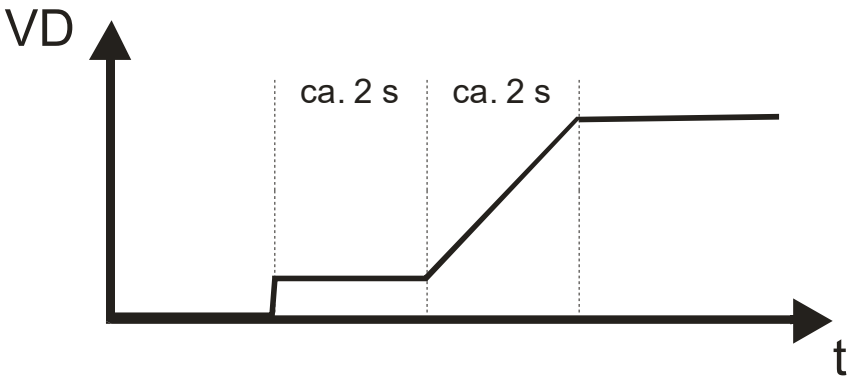


Figure 27: Threading procedure

8.2 Gas test

The "gas test" is used to set the required gas quantity at the pressure reducer. This enables the desired gas flow to be set without wire feeding and voltage.

The gas test can be started in the submenu [**BF12BF12BF12BF12BF12**]. Pressing the “Gas test” function button (Figure **28**) opens the gas valve, and inert gas flows out of the welding torch.

The gas test is automatically terminated after 20 seconds. The gas test can be aborted prematurely by pressing the "Gas test" button or the torch trigger.

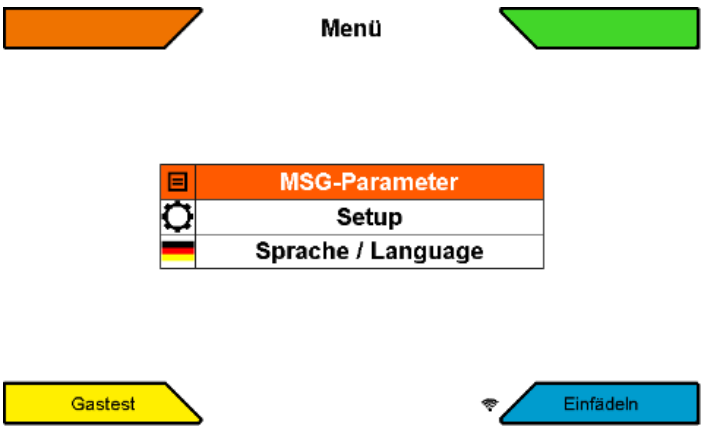


Figure 28: Submenu for “Threading” and “Gas test”

8.3 Water recirculation cooling

Depending on equipment variant, standard SYNERGIC.ARC welding system equipment includes a water recirculation cooling system for the welding torch.

8.4 Temperature monitoring of the power units

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

8.5 External cooling of the power units

SYNERGIC.ARC welding system power units are designed for high operational reliability. Optimum heat dissipation with minimum noise generation is achieved by the targeted placement of the cooling fan and the power components.

8.6 Fan and water pump control

Depending on equipment variant, SYNERGIC.ARC welding systems have a demand-oriented fan and water pump control. The fan and the water pump switch on immediately at the start of welding. After completion of the welding process, a follow-up time of 7 minutes is set, which can be changed in the Setup submenu. The fan and the water pump subsequently go into standby. This reduces noise emission, wear, and energy consumption.

To ensure perfect torch cooling during the first welding process, the water pump is automatically activated after switching on the mains switch until cooling water flows for 10 seconds in the return flow.

8.7 Polarity selection for self-protecting cored wires

Some SYNERGIC.ARC welding systems have a polarity selection plug. For welding self-protecting cored wires, the plug is plugged into the “MINUS” socket. For welding with MIG/MAG with inert gas, the plug is plugged into the “PLUS” socket. Ensure that the plug is well-seated to avoid overheating.

9 Accessories and options

These operating instructions are based on the accessories approved by REHM. Other accessories and wear parts are listed in the extensive welding accessories catalogue.

9.1 Unit versions, accessories and options

SYNERGIC.ARC welding systems unit versions	
Type	**Item number**
SYNERGIC.ARC 251	1122230
SYNERGIC.ARC 311	1122231
SYNERGIC.ARC 351	1122232
SYNERGIC.ARC 304	1122240
SYNERGIC.ARC 404	1122260
SYNERGIC.ARC 304 W	1122241
SYNERGIC.ARC 404 W	1122261
SYNERGIC.ARC 504 W	1122265
SYNERGIC.ARC 304 S	1122242
SYNERGIC.ARC 404 S	1122262
SYNERGIC.ARC 304 WS	1122243
SYNERGIC.ARC 404 WS	1122263
SYNERGIC.ARC 504 WS	1122267

Accessories: Intermediate hose set					
Length / Type	1.5 m	5.0 m	10.0 m	15.0 m	20.0 m
50 mm², gas-cooled	7505000	7505001	7505002	7505003	7505004
70 mm², gas-cooled	7505010	7505011	7505012	7505013	7505014
95 mm², gas-cooled	7505020	7505021	7505022	7505023	7505024
50 mm², water-cooled	7505030	7505031	7505032	7505033	7505034
70 mm², water-cooled	7505040	7505041	7505042	7505043	7505044
95 mm², water-cooled	7505050	7505051	7505052	7505053	7505054

Accessories: Torches, others upon request		
Length / Type	4.0m	
RC MAG-24 4m U/D torch	7601530	
RC MAG-26 4m U/D torch	7601532	
RC MAG-36 4m U/D torch	7601531	
RC MAG-240W 4m U/D torch	7601750	
RC MAG-401W 4m U/D torch	7601751	
RC MAG-555W 4m U/D torch	7601752	

Accessories: Torch wear parts sets					
	RC/MB 24D/240WD	RC/MB 26D	RC/MB 36D	RC/MB 401WD/501WD	RC/MB 555WD
RC/MB wear parts set box	7700416	7700418	7700419	7700421	7700429

Accessories: Miscellaneous	
Ground cable 35 mm² 4 m 13 mm 400 A clamp	7810102
Ground cable 50mm² 4 m 13 mm 500A clamp	7810109
Ground cable 70mm² 4 m 13 mm 600A clamp	7810104
Ground cable 95mm² 4 m 13 mm 600A clamp	7810106
Optimator Argon/CO2 20 pressure reducer	7967932
Pressure reducer with content and work pressure gauge, 200bar, 32l/min.	7530500
Industry basket spool adapter	7516000
Profi basket spool adapter	7516004
Gas hose	3250001
Inert gas filter 1/4" mounting between the gas hose and pressure reducer	7501111
Coolant RCL 5L	1680051
Coolant RCL 25L	1680251
Feed roller V 0.6/0.8 mm solid wire 4/2	7503054
Feed roller V 0.8/1.0 mm solid wire 4/2	7503055
Feed roller V 1.0/1.2 mm solid wire 4/2	7503053
Feed roller V 1.2/1.6 mm solid wire 4/2	7503056
Feed roller V 0.9/1.1 mm solid wire 4/2	7503065
Feed roller R 1.2/1.6 mm tubular wire 4/2	7503066
Feed roller A 1.0/1.2 mm aluminium 4/2	7503069
Feed roller A 1.2/1.6 mm aluminium 4/2	7503070
Feed roller A 1.6/2.4 mm aluminium 4/2	7503071
Protective tube for polyamide core up to 4 mm outside diameter	7503068

Retrofit equipment	
Case lifting (crane eyelets)	1381146
Retrofit kit for air filter attachment	1381353
Metal filter cell for air filter attachment	7501120
Retrofit kit torch and hose pack holder	7501129
Cart for wire feed case	7501502

Options	
Operation in the welding system machine	1381111
Welding system floor mounting	1381110
Advanced trolley (with loading ramp and parking brake)	1381119
Cart for wire feed case	1381150
Preparation for the welding system construction site wagon (floor mounting + handle)	1381112
Welding system upper control panel cover	1381113
Welding system lower control panel cover	1381114
Tool box for compact units	1381115
Air filter attachment	1381144
Adapter Euro ZA to Dinse ZA	4300318
Drum wire feed-through (in wire feed case)	1381147
Torch and hose pack holder	1180214

10 Commissioning

10.1 Safety instructions

Carefully read the operating instructions, in particular the ➔ **Section 2 Safety,** before commissioning and before beginning work with this welding power source.

WARNING

REHM welding equipment may be operated only by persons who are trained and instructed in its use and maintenance and in welding system safety regulations.

When welding, always wear protective clothing and ensure that other persons in the vicinity are not endangered by the UV radiation emitted by the welding arc.

10.2 Working under elevated electrical risk in accordance with the regulations from IEC 974, EN 60 974-1, TRBS 2131 and BGR 500 Section 2.26 (previously VGB 15) (S)

REHM - SYNERGIC.ARC welding systems comply with the above-mentioned regulations. It must be noted that for work under increased electrical hazard, the welding power source must not be placed in this area. Regulations EN 60 974-1, TRBS 2131 and BGR 500 Section 2.26 (previously VGB 15) must be observed.

10.3 Positioning the welding unit

CAUTION

Set up the REHM welding unit so that the welder has sufficient space in front of the unit to adjust and operate the controls.

Transport the unit only in compliance with the applicable accident prevention regulations.

During movement and set-up, the device can tip, injure personnel, or suffer damage. Safety against tipping is ensured up to an angle of 10° (in compliance with the IEC 60974-2).

- Set up or transport the device on a firm, level surface!
- Use suitable means to secure attachments!
- During transport, secure the external wire feed devices with lashing straps to prevent uncontrolled rotation!

Operating the device in a non-upright position may damage it!
Devices are designed for upright operation!
Operation in non-approved positions/orientations can damage the device.

- Transport and operate the device only when it is in the upright position!

WARNING

CAUTION: For suspended transport (on ropes or chains, for instance), SYNERGIC.ARC welding systems may be attached with crane eyelets only. Fastening to the handles or other parts of the system is not permitted.

Injury hazard during attachment to a crane!

When the device is attached to a crane, the possibility of the device or its attachments falling poses an injury hazard!

- Multiple system components (current source, wire feed device, cooling unit, etc.)
  must not be attached to a crane at the same time!
  Each system component must be attached separately!
- Remove all supply lines and cables and accessory components
  (hose pack, wire coil, inert gas bottle, tool box, wire feed device, remote, adjuster, etc.)
  before attaching the device to a crane!
- Properly close and lock housing covers or protective flaps
  before attaching the device to a crane!
- Use the proper position and a sufficient number of properly dimensioned load handling attachments! Observe the crane principle (see figure)!
- For devices with crane eyelets: Always attach all eyelets to the crane at the same time!
- Avoid jerky movement!
- Ensure that the load is evenly distributed! Ensure that all suspension gear is of the same length!
- No personnel may remain in the danger area below the device after it has been lifted!
- Comply with the occupational health and safety and accident protection regulations
  of the country in which you are working!

Unsuitable crane eyelets pose an injury hazard!

If crane eyelets are used improperly, or unsuitable eyelets are used, the possibility of the device or its attachments falling poses a severe injury hazard!

- The crane eyelets must be screwed in completely!
- The crane eyelets must be flat on their seating and contact it at all points!
- Check the crane eyelets for seating and noticeable damage (corrosion, deformation) before using them!
- Damaged crane eyelets must not be used or screwed in!
- Avoid lateral loading of the crane eyelets!

Danger! Electrical voltage!

Do not use the welding unit outside in the rain!

10.4 Connecting the welding unit

Connect the REHM welding power source to the power supply only in accordance with the applicable VDE regulations and observe the regulations of the relevant professional associations.

When connecting the unit observe the instructions concerning the power supply voltage and local mains fuse. Automatic circuit breakers and fuses must always be sized for the stated source current. The necessary information can be found in ➔ Section 16, Technical Data.

Always switch off the unit when not in use.

Place the inert gas bottle on the bottle bracket provided on the unit and secure with the safety chain. Screw the bottle pressure reducer tightly on the thread, attach the gas hose to the pressure reducer and check the connection for tightness. Always close the bottle valve after completing work. Observe the regulations of the respective professional associations.

10.5 Cooling the welding unit

Place the REHM welding unit so that the air entry and exit ports are not obstructed. The machine can achieve the specified duty cycle only with sufficient ventilation.

Ensure that no metal parts, grinding dust, dust or other foreign bodies can enter the unit.

10.6 Water cooling for MIG/MAG welding torches

In SYNERGIC.ARC welding systems with water cooling (W/WS), the torch is water-cooled.

The water level in the tank must be checked before commissioning. If the water level is lower than 3/4 of the tank capacity, the cooling water must be refilled. The special coolant "REHM - Coolant RCL" (Order No. 1680051, 5 litres and 1680251, 25 litres) developed and tested by *REHM* is specified as the coolant. The cooling water level must be checked at regular intervals.

10.7 Connecting the welding cables

REHM welding units are equipped with quick-connect plugs and sockets for connecting the ground cable. In order to achieve optimum welding results, ensure that all welding cable connections are tight and that the insulation is not damaged.

10.8 Connecting the torch

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

If water-cooled torches are used, the cooling water hoses are connected via quick couplings. These are colour-coded (red = return, blue = flow).

Important!

When using a gas-cooled torch on a water-cooled system, the water connections must be connected via a hose bridge or the water cooling must be set to "Off" in the Setup submenu so that the water pump is not damaged.

10.9 Inserting the wire

After inserting the wire on the coil mandrel, thread the wire manually through the guides to the feed rolls. Ensure that you use the appropriate drive rollers according to the wire diameter and wire type (solid). When the wire has been inserted into the guide of the torch hose set past the second drive roller, fold the pressure rollers onto the wire and fix them. The welding wire is threaded into the torch hose set

with the submenu [**BF12BF12BF12BF12BF12**]. When the "Threading" function button (Figure **28**) is pressed, threading is carried out for two seconds at reduced speed. The threading speed is then increased over a period of about two seconds to the set threading speed.

Ensure that the torch runs as straight as possible without kinks in order to avoid complicating threading and to prevent the wire from buckling or damaging the wire liner.

11 Operation

11.1 Safety instructions

Carefully read the operating instructions, in particular the ➔ **Section 2 Safety,** before commissioning and before beginning work with this welding power source.

Warning!

REHM welding equipment should be operated only by persons who are trained and instructed in the use, maintenance and the safety regulations concerning welding systems.

11.2 Checks before switching on

It is a requirement that

- the system is properly placed in accordance with ➔ **Section 10 Commissioning**
- all connections (inert gas, torch connection, ground cable, polarity selection plug) are properly made in accordance with ➔ **Section 10**, **Commissioning**,
- the scheduled periodic maintenance work has been performed in accordance with ➔ **Section** 13, **Maintenance**
- the safety equipment and the system components (in particular the torch connection hoses) have been checked by the operator and are functional and ready for use,

- the operator and assisting persons wear the appropriate protective clothing, and the work area is secured so that no uninvolved persons are placed in danger

11.3 Connecting the ground cable

Warning!

Ensure that welding current cannot flow through lifting device chains, crane cables, or other electrical conductors.

Ensure that ground cables are connected to the workpiece as close as possible to the welding site. Grounding cables that are connected to distant points reduce the efficiency and increase the risk of electrical shock and vagrant currents.

11.4 Serious risks during welding

Fire and explosion
Materials can be ignited by the electric arc, hot slag, secondary flames or thermal radiation.
So remove all combustible materials from the area where welding will be performed and keep a fire extinguisher handy as a preventative measure.
There is an explosion risk from the combustible materials particularly due to leaking hoses and containers.
Welding activities are forbidden if the risk of an explosion cannot be ruled out.

Harmful substances
Gasses, vapours, smoke and dust can be absorbed by the body through respiration, swallowing or through the skin.
In particular, avoid welding galvanised and coated workpieces or workpieces that have been treated with degreasing agent.
The workplace must be set up with respect to the process, materials, and conditions of use so that respiratory air is kept free of contaminants (see BGV A3).
If necessary, suitable ventilation or extraction must be provided to ensure that the permissible limits (MAK = maximum permissible concentrations of noxious compounds in the workplace) are not exceeded.

Noise
Noise is generated during welding work from grinding, the arc, slag being knocked off, and, to a lesser extent, by the welding system. Noise generated by the welding process depends heavily on the selected welding process, the position of the welding torch, the base material and the surroundings. The noise level can be reduced through noise insulating measures or encapsulation.

Important:
Noise pressure above 85dB(A) can result in damage to hearing and the human nervous system.
Therefore, is this noise level is exceeded personal hearing protection must be worn.

Optical radiation
Light emitted from the electric arc can glare and dazzle.
Ultraviolet radiation can result in conjunctivitis and burns to the skin. Therefore always wear the correct personal protective equipment. Ensure that the protective filter for the eyes conforms to the valid regulations (such as DIN EN 166, DIN EN 169 or DIN EN 379) and that the correct protection level has been selected for the intended work. The levels of protection stated in the tables must never be fallen short of. Selecting a protective filter that is too low causes flickering of the eyes and eye damage.

Electrical hazard
Contact with the welding current circuit can result in a dangerous electric shock. Always ensure sufficient protective measures against this risk.

Always wear:
- proper protective welding gloves
- closed, where possible dry protective clothing
- Safety shoes with an undamaged rubber sole

Always use only items of equipment and welding equipment that are in perfect condition.
Avoid direct contact with live parts.
Live parts (such as the welding torch and welding cable connections) are not free of current when operated in “rod electrode welding” mode, and in the “MSG welding” mode are free of current only depending on the welding torch trigger signal. Change the wire electrodes only with the current source disconnected.
Always switch off the welding system during longer breaks in the work and never leave the welding system unattended.

Mechanical hazard
Ensure that the welding unit is operated only with the housing closed. There is a risk of trapping fingers between the feed rollers or the rotating wire coil and parts of the housing.
The wire is threaded without the wire feed motor running. When the wire is threaded into the torch, the wire feed speed is reduced so that the wire can be threaded without risk.

Working under elevated electrical risk
All *REHM inert gas welding systems* are suitable for working under elevated electrical risk and therefore carry the S mark.
Increased electrical risk exists where:
- contact with electrical conducting parts by unprotected parts of the body is unavoidable (kneeling, lying, leaning),
- the room for free movement between electrically conducting parts is less than 2 m (accidental contact),
- the workplace is wet, damp, or hot, increasing the risk of electric shock.

Protective measures against increased electric risk:
- Use a *REHM* welding power source with the S mark,
- use insulating intermediate layers (such as rubber mats),
- do not place the welding system in restricted spaces,
- use only suitable personal protective equipment in perfect condition.

Handling errors
Handling errors can occur in welding systems or devices and protective equipment for inert-gas welding.
Only qualified or specially instructed persons who are familiar with the equipment and the process may be assigned welding work.
Errors can also occur during operation or handling of the welding system itself. This function and operating manual must therefore be carefully read and followed by all persons who work with this welding system. The function and operating manual must be kept so that it is immediately at hand for all welders and the maintenance personnel. The best suited place for keeping this manual is at the welding system itself. Improper handling invalidates the right to claim under the warranty.

11.5 Practical instructions for use

The following practical instructions for use can provide only an overview of the various applications of REHM SYNERGIC.ARC welding systems. If you have any questions about special welding tasks, materials, inert gases, or welding equipment, please refer to the relevant specialist literature or consult a REHM specialist dealer.

Weldable materials

REHM SYNERGIC.ARC welding systems can be used to weld a wide variety of materials, including unalloyed and alloyed steels, stainless steels, and aluminium.

Wire electrodes

Various different wire diameters and materials are offered and used for MIG/MAG welding. The wire diameter is based on the thickness of the base material and the required welding current. The wire electrode material is selected based on the base material and the desired quality of the weld seam. The most common materials with wire diameter and their respective specifications can be found in the relevant specialist literature.

Inert gas

Mixed gas consisting of argon with a content of 18% CO_2 is the main one used for welding **steels**.

Mixed gas consisting of argon with a content of 2% CO_2 is the main one used for welding **stainless steel**.

Pure argon serves as inert gas for **aluminium**.

The amount of **inert gas required** depends on the wire diameter, the gas nozzle size, the welding current height and the air movement at the workplace. The required gas quantity for mixed gases is about 7 ... 16 l/min, for argon at about 10 ... 18 l/min.

General principle for the gas adjustment:

For steel:	*Wire diameter x 10*	*= gas volume in litres*
For stainless steel:	*Wire diameter x 11*	*= gas volume in litres*
For aluminium:	*Wire diameter x 12*	*= gas volume in litres*

MIG/MAG welding torch

The MIG/MAG welding torches recommended by REHM are to be connected in gas-cooled design to gas-cooled REHM systems; water-cooled torches are to be connected to water-cooled types.

Torch equipment

The accessories for the torch depends on and must be matched to the particular welding task.

Contact tips

Contact tips are wear parts and must be replaced periodically. Care must be taken to select contact tips of the correct size for the respective wire diameter.

Special contact tips for different wire diameters are available for aluminium welding tasks, which can be found in the REHM welding accessories catalogue.

Gas nozzles

Gas nozzles in different versions can be found in the REHM welding accessories catalogue.

Wire liner

Wire liners must be selected to match the various different types of material and wire gauges. The range for this can be found in the REHM welding accessories catalogue.

In addition, please refer to the instructions of the torch manufacturer (see operating instructions).

Wire feed setting

The following points must be observed in order to achieve safe wire feeding:

Feed rollers must be selected to match the wire diameter.

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

Safe wire feeding is provided by the compact 4-roller system.

Care must be taken to ensure that the pressure on the wire is set correctly via the feed rollers. With aluminium, the pressure should be as low as possible, but still allow the wire to be transported safely. In the case of steel and stainless steel, the pressure should be so strong that the wire coil can still be stopped manually while the drive is running.

ATTENTION: In the welding shop, the side wall that protects the wire feed area from access must be closed to avoid the risk of injury (e.g. crushing)!

The wire feed speed must be set so that a smooth and stable arc is produced. When welding energy is increased, wire feed speed increases automatically and can be easily corrected with the wire feed speed correction button if necessary.

Uncoiling mandrel setting

The brake of the uncoiling mandrel must be adjusted so that the wire does not uncoil when the wire feed is switched off at the welding end.

Welding current levels

The power of the machine is adjusted via the welding energy rotary knob (and special parameters). The required welding power depends on the respective welding task.

Guide values for filler material and welding current and voltage for a wire diameter of 1.2 mm for representative welding tasks can be found in the following table:

Material	Sheet thickness	Wire feed speed	Welding current	Welding voltage
	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
Aluminium	2.0 - 4.0	6.8 - 11.6	104 - 189	14.8 - 21.3

12 Faults

12.1 Safety instructions

Warning!

If a fault occurs that represents a hazard to persons, systems, and/or the environment, switch off the system immediately and secure it against restarting.

Restart operations with the system only after the fault has been eliminated and there is no hazard for persons, machines, and/or the environment.

Faults must be eliminated only by qualified persons who observe all safety instructions. ➔ Section 2

Before restarting, the system must be approved by qualified personnel.

12.2 Table of faults

Control lamp TEMPERATURE is lit up

Cause:	Remedy:
Permitted temperature in the power unit has been exceeded. Leave to cool, ensure free air circulation, clean the machine if necessary	
Maximum duty cycle exceeded	Allow system to cool down
Ambient temperature too high	Provide cooling
Contamination of the air inlet or air outlet	Clean, ensure free air supply
Air inlet or air outlet covered	Remove cover, ensure free air
Fan defective	*Service required!*

Welding current does not reach the set value or does not occur

Cause:	Remedy:
Ground cable connected poorly or not at all	Check
Wrong characteristic curve selected	Select a characteristic curve the fits the filler material

No inert gas

Cause:	Remedy:
Bottle empty	Check
Pressure reducer defective	Check
Hose kinked	Check
Machine gas valve defective	*Service required!*

Arc sputters and jumps

Cause:	Remedy:
Contact tip worn	Replace contact tip
Feed rollers have incorrect diameter	Use feed rollers with correct diameter
Wire liner very dirty	Replace wire liner
Electrode and workpiece do not reach working temperature	Use thinner wire
Incorrect wire feed speed	Adjust speed

Arc has a strange colour

Cause:	Remedy:
Too little or no inert gas	Check inert gas supply
Incorrect inert gas	Use appropriate inert gas

Uncontrolled wire unwinding

Cause:	Remedy:
Wire coil brake is applied either too strongly or too weakly	Adjust wire coil brake
Wire feeding problems	Hose pack should be blown out at each wire change. Wire liner and feed rollers must match the wire diameter.
Control system defective	*Service required!*

Water-cooled torch gets too hot

Cause:	Remedy:
Water hoses kinked	Check water hoses for correct position
Too little or no cooling water in the tank	Check cooling water level
Water pump defective	*Service required!*

12.3 Error messages

Error number	Error	Cause	Elimination
1 000	Mains undervoltage	Mains voltage is below the tolerance range	Switch the unit off and check the mains voltage
2 000	Mains overvoltage	Mains voltage is above the tolerance range	Switch the unit off and check the mains voltage
22,000 to 22,009	Communication error control/power unit	The bus communication between controller and power unit is faulty	Switch the current source off and on again. If the error occurs again → Contact service
23,000 to 23,243	Communication error current source	Bus current source communication is faulty	Switch the current source off and on again. If the error occurs again → Contact service
30,000 to 30,400	Data record Welding characteristic curves	Data record for welding characteristic curves is not available or not compatible	Switch the current source off and on again. If the error occurs again → Contact service
35,000	Data record Job	Data record for Job is not available or not compatible	Load job again. If the error occurs again → Contact service
40,000 to 42,105	Permitted temperature in the power unit exceeded	Permitted temperature in the power unit has been exceeded	Allow the current source to cool down
77,000 to 77,001	Excess coolant temperature	Temperature of the coolant is too high	Let the water cooler cool down Top-up coolant
80,000 to 80,003	Wire feed Motor current	The current consumption of the wire feed motor is too high	Wire feeding does not run cleanly DV motor is defective
85,000	Wire feed speed	Actual diverges from the target speed no feed speed encoder signals Low wire feed motor power output	Check wire feed Check able connection to wire feed Check ZWIPA Check cable connection between ZWIPA and control system and/or between ZWIPA and control unit Check control system and/or control unit
> 100,000	Service call	An analysis of the cause can be made by the service technician	Contact service

13 Maintenance and repair

13.1 Safety instructions

Warning!

Maintenance and repair work may be performed only by persons who have been trained by REHM. Please contact your REHM dealer. When replacing parts, use only REHM original spare parts.

If maintenance or repair work is performed on this unit by persons who have not been trained and authorised to carry out the work by REHM, then claims against REHM become void.

Before cleaning work begins, the welding unit must be switched off and disconnected from the mains supply.

Before maintenance work the welding system must be switched off and disconnected from the mains supply and secured against unintended reconnection.

Supply lines must be shut off and vented free of pressure.

The warning notices listed in ➔ Section 2 “Safety” must be observed.

The welding system and its components must be maintained in accordance with the requirements of the maintenance table.

Insufficient or improper maintenance or repair may result in operating faults. Periodic maintenance of the system is therefore essential. No constructive change or additions may be made to the system.

13.2 Maintenance table

The maintenance intervals are recommended by REHM for standard requirements (for example, single shift operation, use in a clean and dry environment). The precise maintenance intervals are specified by your safety officer.

Activity	**Section**	**Interval**
Cleaning the inside of the unit	13.3	at least twice per year
Checking cooling water and the cooler	13.4	daily
Functional test of the safety equipment by operating personnel	-	daily
Visual system check with special focus on connection cables, torch hoses, ground cables, and polarity selection plugs	-	daily
Have the connecting lines and torch hoses checked by qualified personnel; log the checks in the logbook provided. **Perform checks more regularly depending on the country-specific laws.**	-	every six months
Have the complete welding system checked by qualified personnel; log the checks in the logbook provided. **Perform checks more regularly depending on the country-specific laws.**	-	annually

13.3 Cleaning the inside of the unit

If the REHM welding unit is used in a dusty environment the inside of the unit must be cleaned at regular intervals by blowing out or vacuuming.

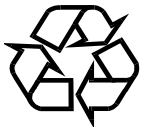
The frequency of this cleaning depends on the respective conditions of use, however, it should be carried out at least twice a year. Use only clean, dry air to blow out the unit or use a vacuum cleaner.

13.4 Cooling water check

The water level in the tank must be checked daily on machines with built-in water recirculation cooling.

If the water level is lower than 3/4 of tank capacity, cooling water must be refilled. The "REHM - Coolant" special coolant (Order No. 1680051, 5 litres and 1680251, 25 litres) developed and tested by REHM is specified as the coolant.

As part of this check, the degree of contamination in the cooling water should also be checked. To ensure the proper torch cooling, clean the cooler by blowing or sucking it out.



Coolants are hazardous to the environment; they must not be drained into the sewage system.
Dispose of these agents at appropriate collection points for hazardous substances.

If maintenance or repair work is performed on this unit by persons who have not been trained and authorised to carry out the work by REHM, then and claims against REHM become void.

13.5 Proper disposal

For EU countries only!

Do not dispose of electric appliances in domestic waste!

In accordance with the European Directive 2012/19/EU concerning old electrical and electronic devices and its transposition into national law, used electrical appliances must be collected separately and recycled in an environmentally friendly manner. Follow any regional regulations!

14 Circuit diagrams

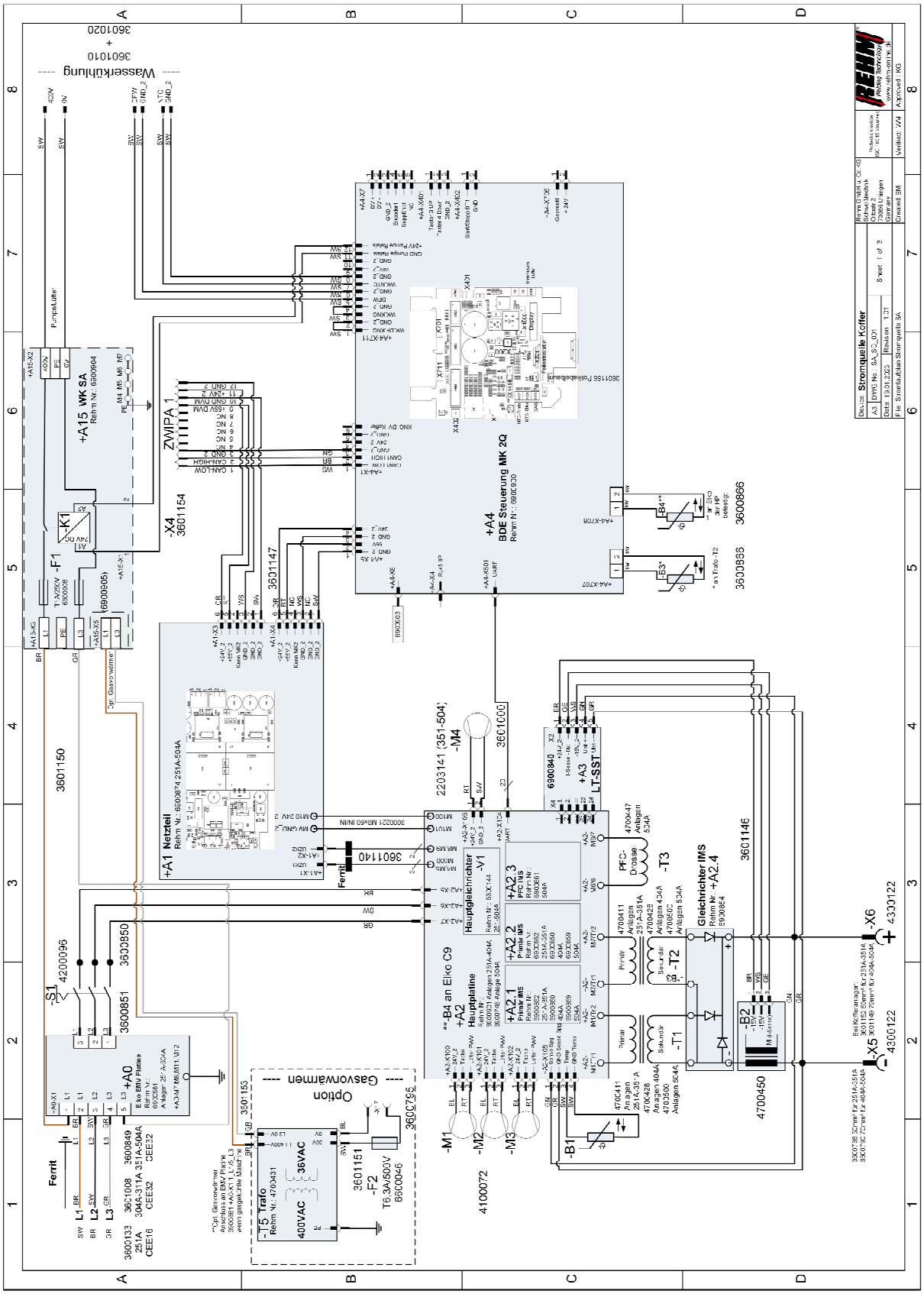


Figure 29: SYNERGIC.ARC case power source

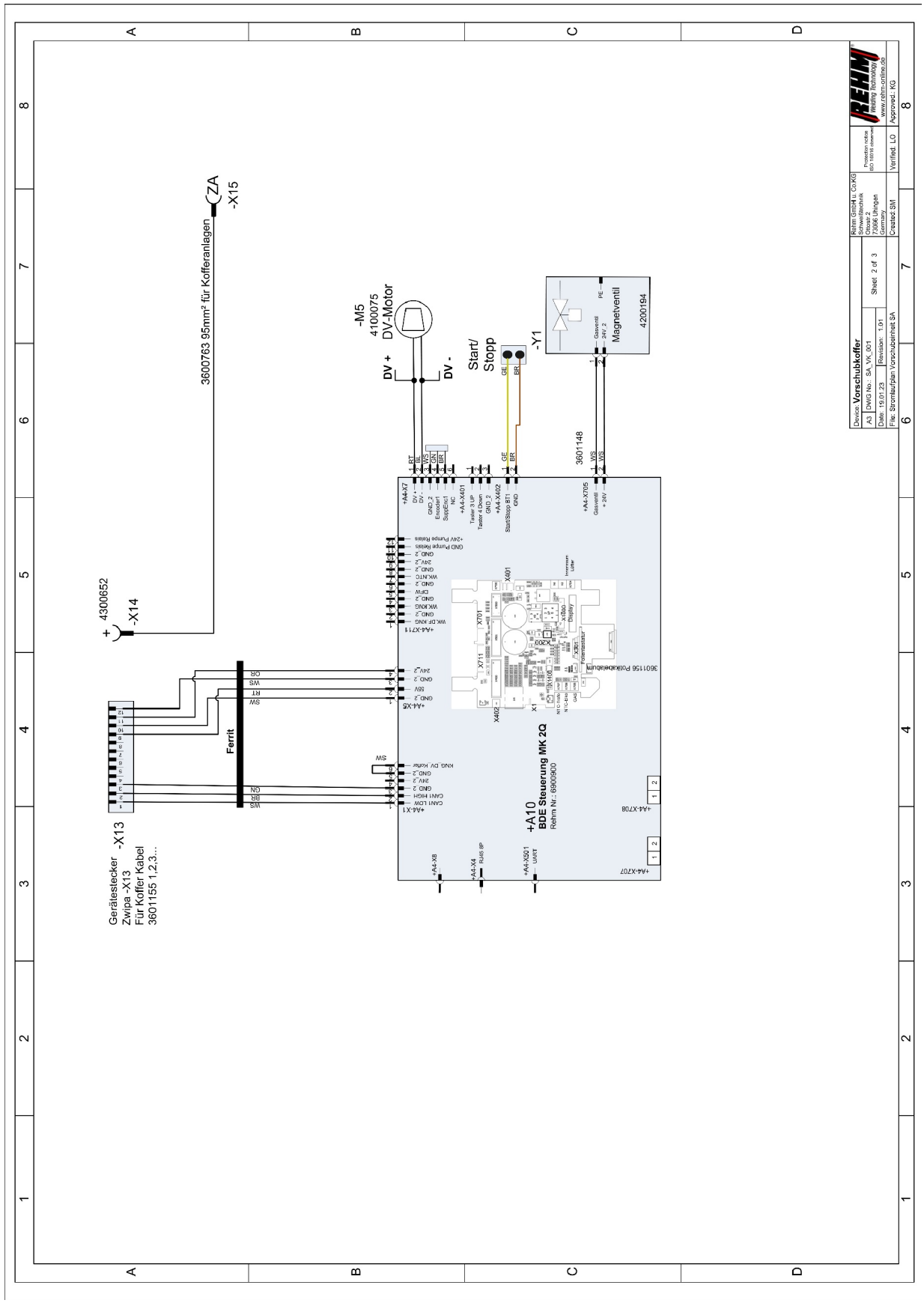


Figure 30: SYNERGIC.ARC wire feed case

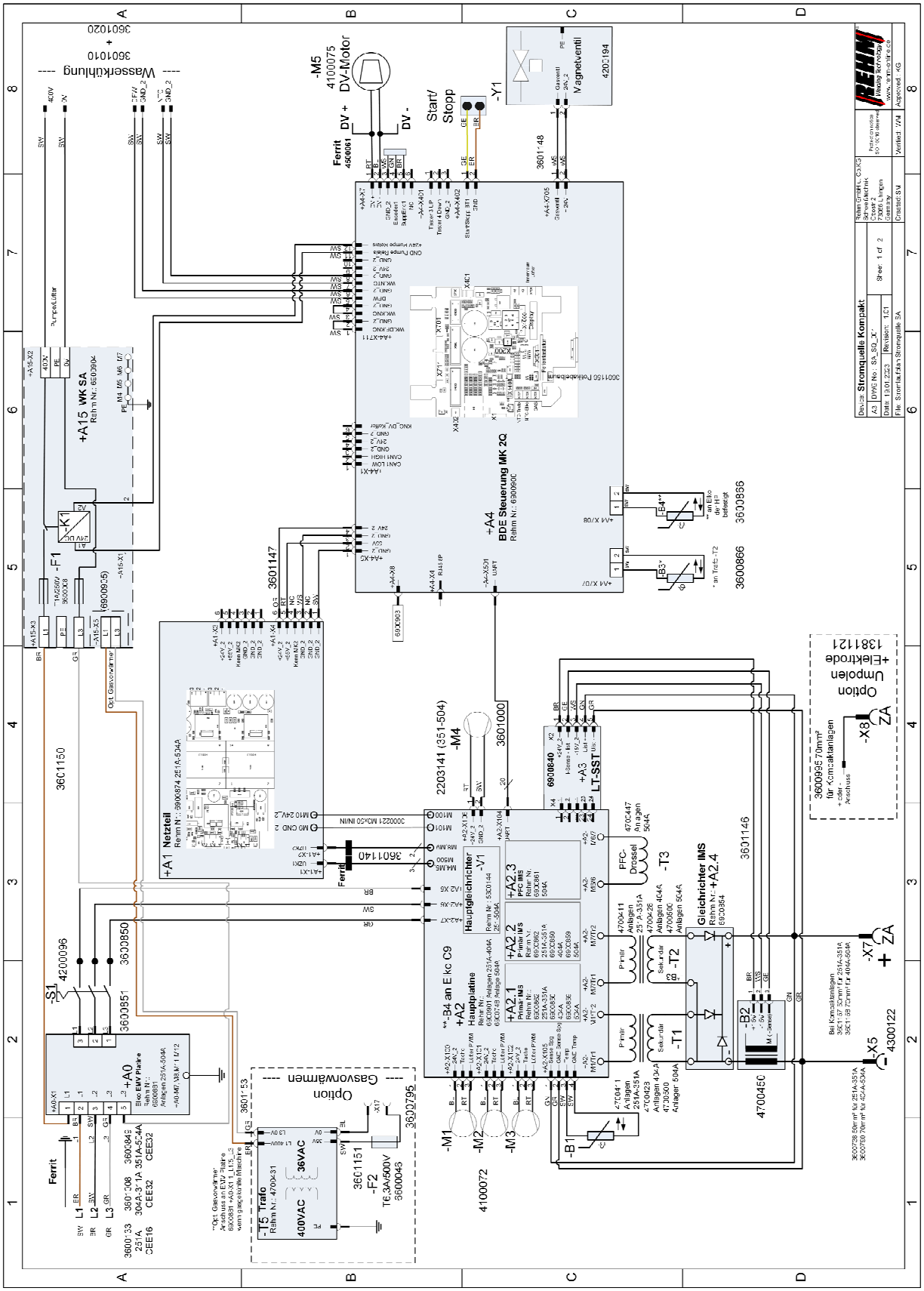


Figure 31: SYNERGIC.ARC compact power source

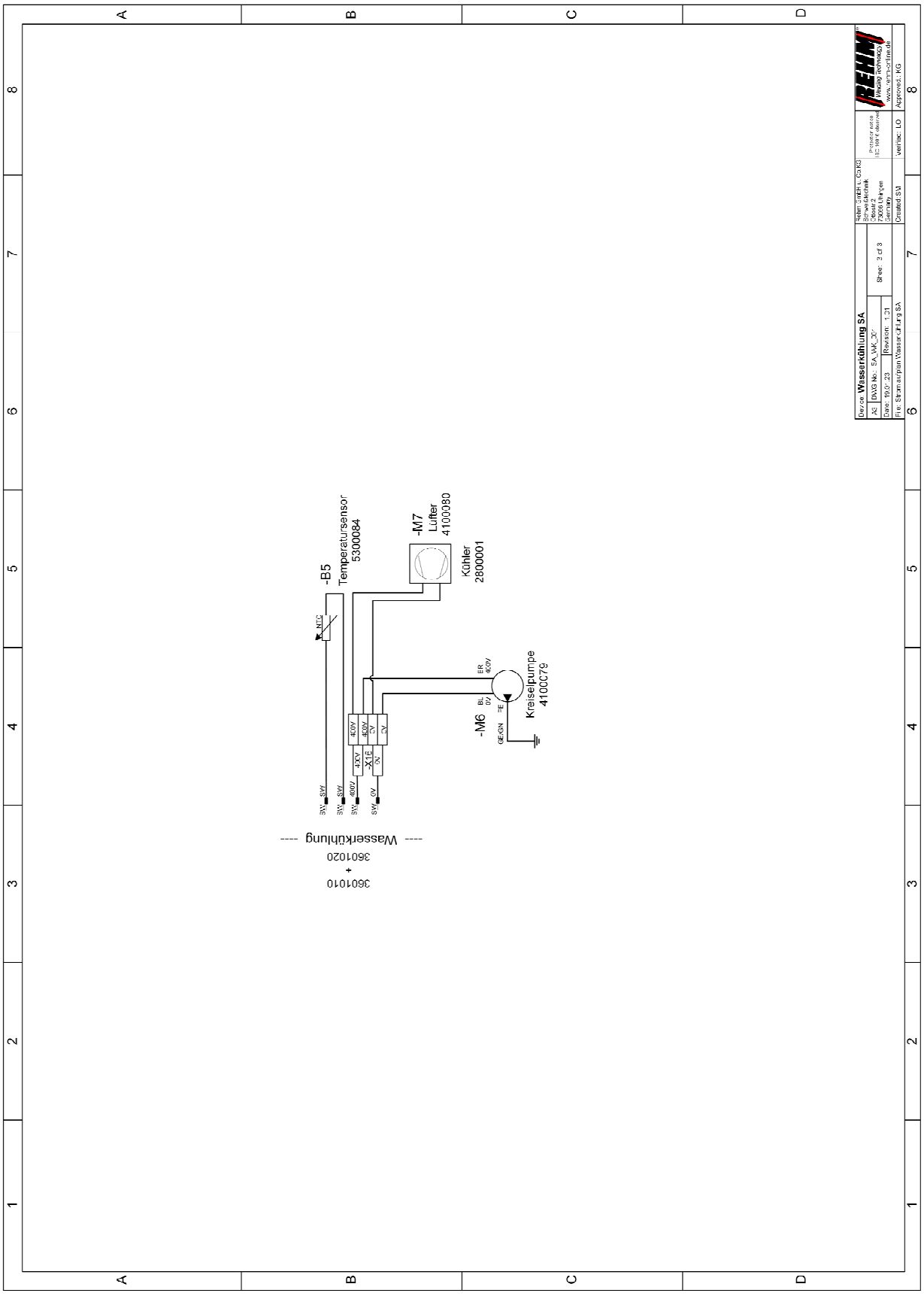


Figure 32: SYNERGIC.ARC water cooling

14.1 Components and spare parts

Item	Name	Part*	Comments	Item number
+ A0	ELKO EMV circuit board	E	251A-504A	690 0881
+ A1	Power supply	E	-	690 0874
+ A2	Main board	E	251A-404A 504A	690 0901 690 0748
+ A2.1/A2.2	Primary IMS	E	251A-351A 404A 504A	690 0862 690 0850 690 0859
+ A2.3	PFC IMS	E	504A	690 0861
+ A3	Power unit - control system	E	251A 304A 311A 351A 404A 504A	222 3274 222 3275 222 3276 222 3277 222 3278 222 3332
-	Complete 251A power unit	E	251A	222 3265
-	Complete 304A power unit	E	304A	222 3266
-	Complete 311A power unit	E	311A	222 3267
-	Complete 351A power unit	E	351A	222 3268
-	Complete 404A power unit	E	404A	222 3269
-	Complete 504A power unit	E	504A	222 3329
+ A4	MK BDE control system MK VK BDE control system	E	251A-404A 304A S/WS- 504A S/WS	690 0900 220 3334
-	BDE, complete 7-inch welding system	E	251A-351A	220 3264
-	BDE, complete 7-inch welding system	E	304A-504A	220 3287
-	BDE, complete 7-inch VK welding system	E	Case	220 3286
- B1	Temperature sensor	E	-	360 1146
- B2	Current converter	E	-	470 0450
- B3	Temperature sensor (T2)	E	-	360 0866
- B4	Temperature sensor (C9)	E	-	360 0866
- B5	Temperature sensor	E	-	530 0084
- F1	T 1A/250V	E	-	660 0008
- M1/M2/M3	Fan 80x80x38mm	V	24V/DC	410 0072
- M4	80x80x25 mm fan extension	V	24V/DC	220 3141

Item	Name	Part*	Comments	Item number
- M5	Wire feed motor	V	-	410 0075
- M6	Water pump	V	400V/AC	410 0079
- M7	Fan Ø 172mm	V	400V/AC	410 0080
- S1	Main switch	E	-	420 0096
- T1/T2	Transformer	E	251A-351A 404A 504A	470 0411 470 0428 470 0500
- T3	PFC choke	E	504A	470 0447
- V1	Main rectifier	E	251A-504A	530 0144
- X4	Device socket ZWIPA	E	Case systems	360 1154
- X5	Mounting socket Ground (workpiece)	E	-	430 0122
- X6	Mounting socket positive	E	-	430 0122
-X7/-X15	Welding torch central connection	E	ZA	400 0215
-	ZA housing	E	ZA	260 0410
- X13	ZWIPA device plug	E	Case	360 1155
- X14	Mounting socket positive	E	-	430 0652
- Y1	Solenoid valve	E		420 0194

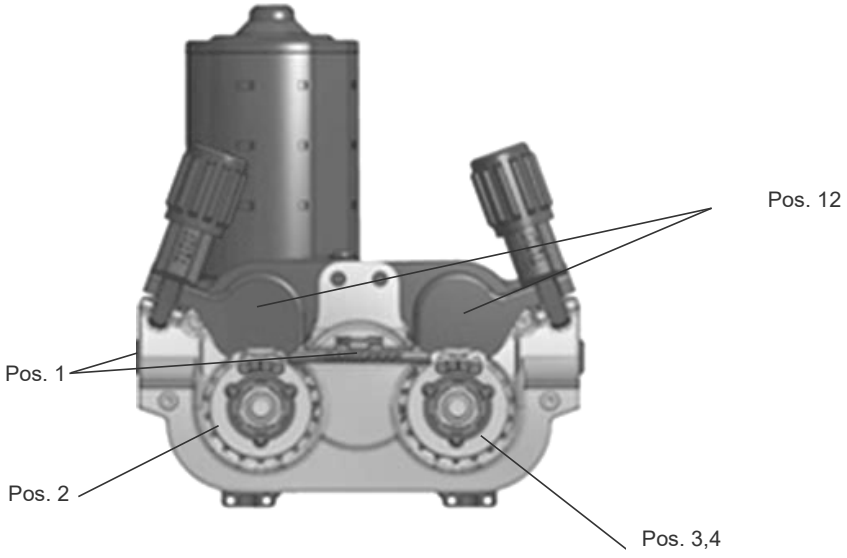
* E = spare part; V= wear part

15.1 Characteristic curve wire feeding unit

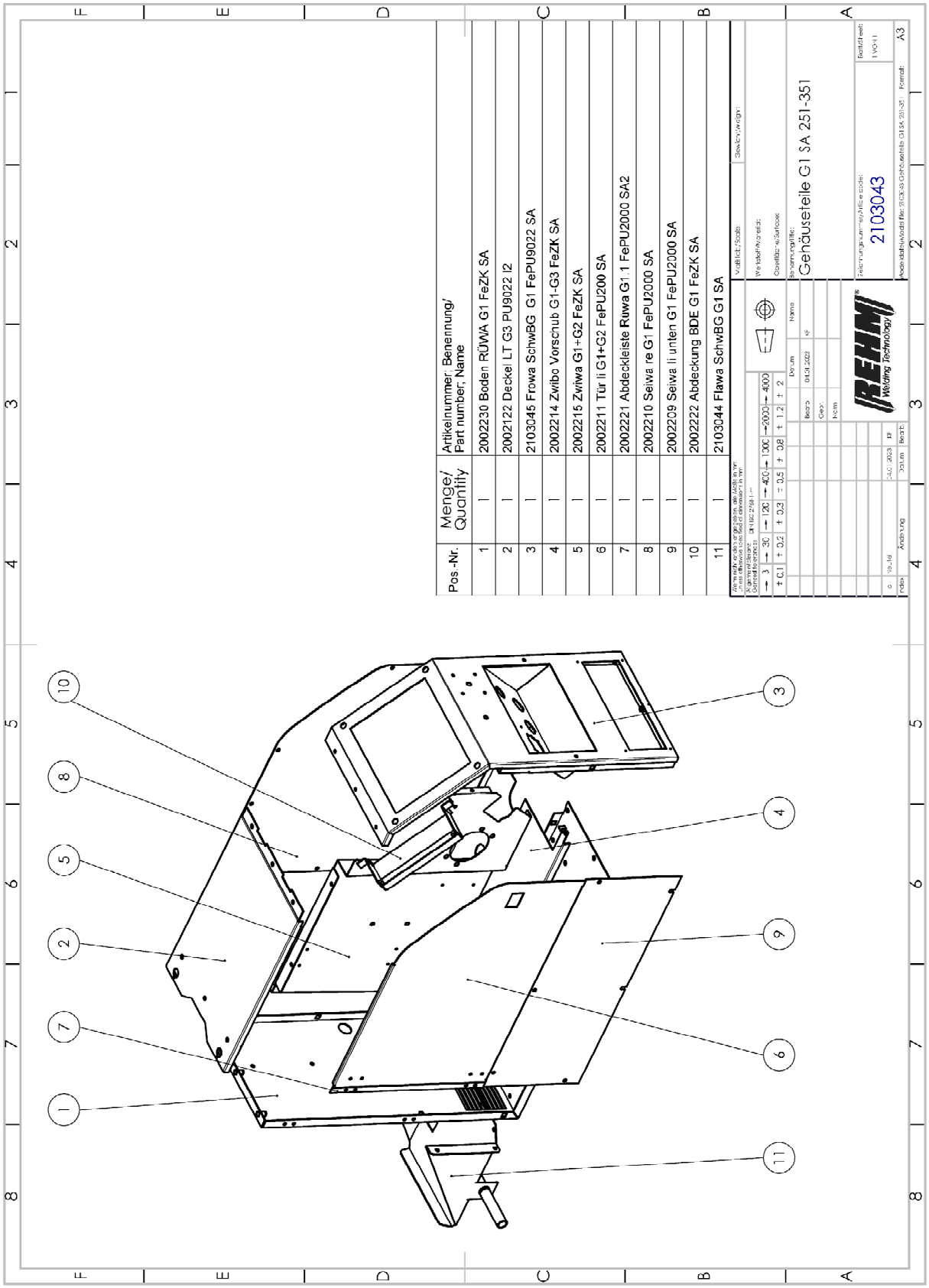
SF wire feed plate with accessories, REHM Item No. 4000230:

Item	Name	Part *	Comments	Item number
1	Wire infeed nipple - SET blue (Series)	V	Plastic/ Ø0.6-1.6	2600400
2	Feed roller V 0.6/0.8 mm solid wire	V	Ø 0.6/0.8	7503054
3	Feed roller V 0.8/1.0 mm solid wire	V	Ø 0.8/1.0	7503055
4	Feed roller V 0.9/1.1 mm solid wire	V	Ø 0.9/1.1	7503065
5	Feed roller V 1.0/1.2 mm solid wire	V	Ø 1.0/1.2	7503053
6	Feed roller V 1.2/1.6 mm solid wire	V	Ø 1.2/1.6	7503056
7	Feed roller R 1.2/1.6 mm tubular wire	V	Ø 1.2/1.6	7503066
8	Feed roller A 1.0/1.2 mm aluminium	V	Ø 1.0/1.2	7503069
9	Feed roller A 1.2/1.6 mm aluminium	V	Ø 1.2/1.6	7503070
10	Capillary tube up to 1.6 mm ø wire electrode	E	Ms	7503067
11	Protective tube for Teflon core up to 4 mm outside diameter	E	Ms	7503068
12	SF SS4 counterpressure roller SET, left and right	V	-	7504068

* E = spare part; V= wear part



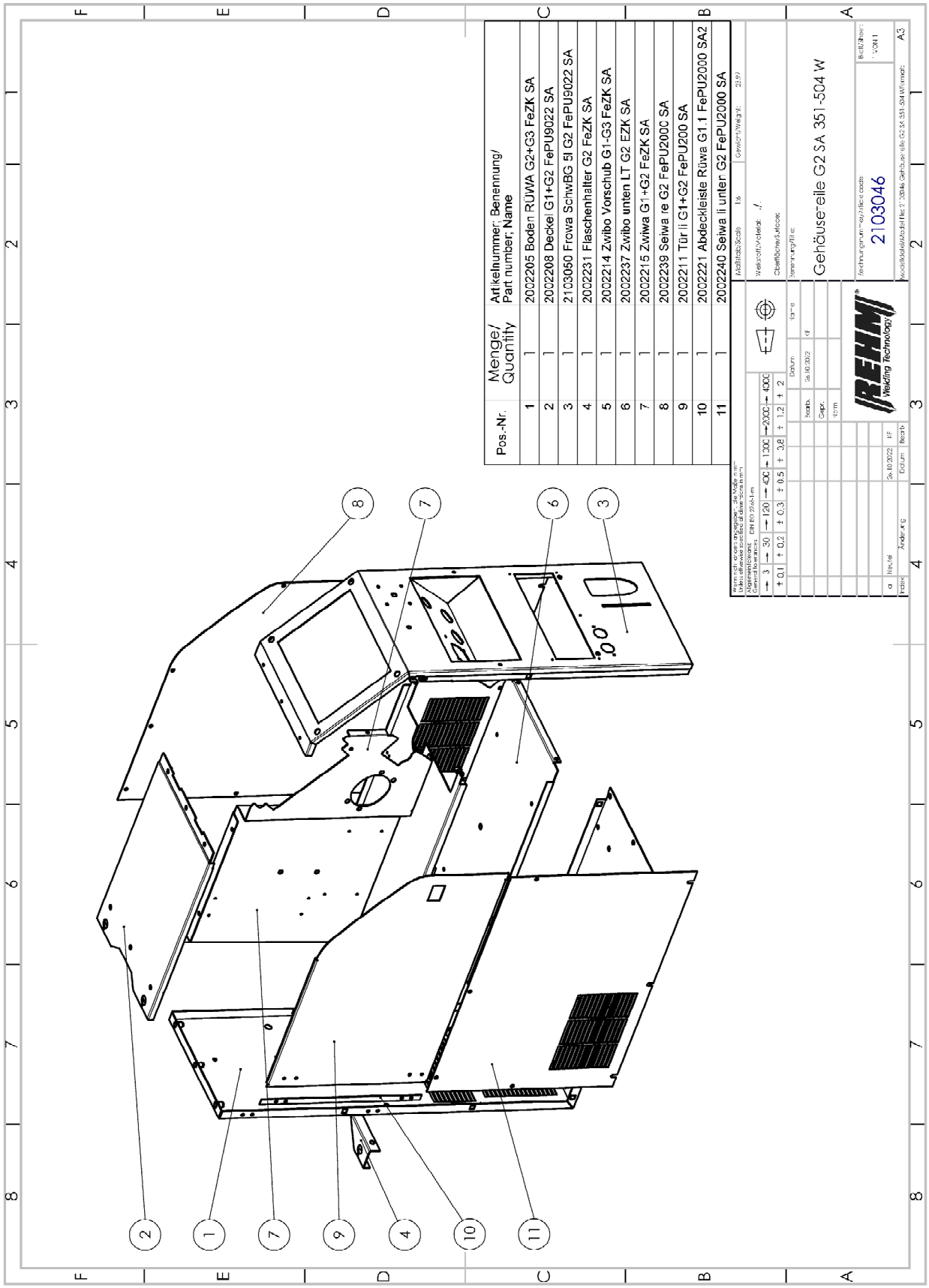
Similar to figure



Pos.-Nr.	Menge/ Quantity	Artikelnummer, Benennung/ Part number, Name
1	1	2002230 Boden RÜWA G1 FeZK SA
2	1	2002122 Deckel LT G3 PU9022 I2
3	1	2103046 Frowa SchwBG G1 FePU9022 SA
4	1	2002214 Zwibo Vorschub G1-G3 FeZK SA
5	1	2002215 Zwiwa G1+G2 FeZK SA
6	1	2002211 Tür li G1+G2 FePU200 SA
7	1	2002221 Abdeckleiste Ruwa G1 1 FePU2000 SA2
8	1	2002210 Seiwa re G1 FePU2000 SA
9	1	2002209 Seiwa li unten G1 FePU2000 SA
10	1	2002222 Abdeckung BDE G1 FeZK SA
11	1	2103044 Flawa SchwBG G1 SA

Gehäuseteile G1 SA 251-351

2103043


Pos.-Nr.
Menge/ Quantity
Artikelnummer; Benennung/ Part number; Name
1 1 2002205 Boden RÜWA G2+G3 FeZK SA
2 1 2002208 Deckel G1+G2 FePU9022 SA
3 1 2103050 Frcwa SchwBG 5l G2 FePU9022 SA
4 1 2002231 Flaschenhalter G2 FeZK SA
5 1 2002214 Zwibo Vorschub G1-G3 FeZK SA
6 1 2002237 Zwibo unten LT G2 EZK SA
7 1 2002215 Zwiwa G1+G2 FeZK SA
8 1 2002239 Seiwa re G2 FePU200C SA
9 1 2002211 Tür li G1+G2 FePU200 SA
10 1 2002221 Abdeckleiste Rüwa G1 1 FePU2000 SA2
11 1 2002240 Seiwa li unter G2 FePU2000 SA
Gehäuseteile G2 SA 351-504 W
2103046
A3
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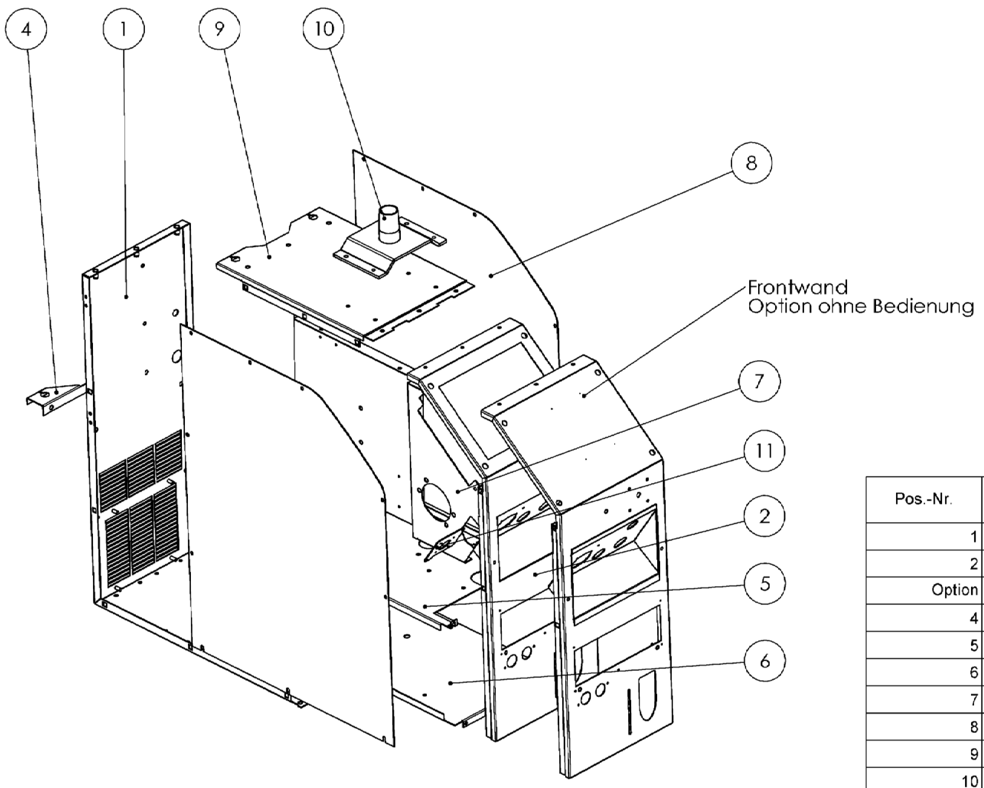
10
11



Pos.-Nr.		Artikelnummer; Benennung/ Part number; Name
1	1	2002205 Boden RÜWA G2+G3 FeZK SA
2	1	2103050 Frowa SchwBG 5l G2 FePU9022 SA
Option	1	2103048 Frowa SchwBG 5l ohne Bed. G3 FePU9022 SA
4	1	2002231 Flaschenhalter G2 FeZK SA
5	1	2002214 Zwibo Vorschub G1-G3 FeZK SA
6	1	2002237 Zwibo unten LT G2 EZK SA
7	1	2002215 Zwiwa G1+G2 FeZK SA
8	2	2002252 Seiwa li.re. G3 FePU2000 SA GK
9	1	2002250 Deckel G3 FePU9022 SA
10	1	2102294 Dorn G3 FePU9022 FP1
11	1	2002249 Anschlussblech Zwipa G3 FeZK SA

Benennung/Title: Gehäuseteile G3 SA 304-404 S

Zeichnungsnummer/Article code: 2103052

Maßstab/Scale: ./. Gewicht/Weight: 0,000

Bearb. 08.12.2022 KF

Blatt/Sheet: 1 VON 1 — Format: A3

a Neuteil 08.12.2022 KF

Beschreibung	BOM-ID	Menge
2001757 Abdeckleiste Rüwa VK FePU2000 FP1	1	1
2001774 Boden VK G3 ZK FP1	2	1
2001780 Tür li VK FePU2000 FP1	3	1
2001941 Seiwa re gesehl VK FePU2000 FP1	4	1
2001980 Zwiwa VK ZK FP1-115R	5	1
2001983 Rüwa VK G3 ZK FP1 +115R	6	1
2005002 Deckel VK G3 EZK FP1	7	1
2005007 Frowa VK BDE G3 EZK FP1	8	1
2500100 Griff Kunststoffdesign (RAL 9022)	9	2
2600458 Spulendorn groß D SYN RD RP RM 270D-	10	1
2600196 KOFFERHUELSE	11	1
2600207 Griff Koffer InvPro RAL 9022	12	1
2600397 Seitenbl. re PC_ABS RAL9022 FP1_2	13	1
3300006 Gummi-Metall-Puffer 20x15 1xM6x12a SH 60	14	1
2500128 Aufsatzscharnier	15	2
2600396 Seitenbl. li PC_ABS RAL9022 FP1	16	1

16 Technical data

Technical data		SYNERGIC.ARC series				
Power class		***251***	***304/311***	***351***	**404**	**504**
Setting range	[A]	20-255	20-305	20-355	20-405	20-505
Duty cycle (ED) at Imax. (40°C)	[%]	40	50/40	40	50	30
Welding current at 100% ED	[A]	200	270/240	280	330	400
Idle voltage, approximate	[V]	67	67/67	67	59	75
Mains connection	[V]	3x400	3x400	3x400	3x400	3x400
Mains voltage tolerance	[%]	+15/-25	+15/-25	+15/-25	+15/-25	+15/-25
Power consumption at I max	[kVA]	12.2	15.5	19.0	24.0	25.2
Open circuit power consumption	[W]	25	25	27	25	27
Power factor λ[a]		0.60	0.63	0.66	0.64	0.96
Efficiency at Imax (40 °C)	[%]	87	87	87	87	85
Fuse (slow-blow)	[A]	32	32	32	32	32
Protection type[b]	[IP]	23	23	23	23	23
Weight incl. trolley						
Compact gas-cooled	[kg]	42	64/42	43	66	-
Compact water-cooled (W)	[kg]	-	73/-	-	75	75
With separate wire feed case gas-cooled (S)	[kg]	-	91/-	-	93	-
With separate wire feed case water-cooled (WS)	[kg]	-	101/-	-	103	103
Current source dimensions (LxWxH)						
Compact (with floor stand)	[mm]	-	640x340x720 / -	-	640x340x720	640x340x720
With wire feed case (with floor stand)	[mm]	-	640x340x1.280 / -	-	640x340x1.280	640x340x1.280
Compact (with trolley)	[mm]	-	950x560x920 / -	-	950x560x920	950x560x920
With wire feed case (with trolley)	[mm]	-	950x560x1.480 / -	-	950x560x1.480	950x560x1.480
Compact	[mm]	830x340x710	-/ 830x340x710	830x340x710	-	-

Subject to technical changes through further development.

a) Power factor λ = Describes the ratio of active power to apparent power

b) Degree of protection = Extent of protection provided by the enclosure against ingress of solid foreign bodies and water (IP23 = protection against solid foreign bodies > 12.0 mm ∅ and against water spray 60° from above)

17 INDEX

R

S

T

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W

EC declaration of conformity

For the following named products

MIG/MAG welding systems
REHM SYNERGIC.ARC 251-311
REHM SYNERGIC.ARC 304-504 WS

it is hereby confirmed that they comply with the essential protection requirements which are laid down in the Directive **2014/30/EU** (EMC Directive) of the council on the approximation of the laws of the Member States relating to electromagnetic compatibility and in the Directive **2014/35/EU** relating to electrical equipment designed for use within certain voltage limits.

The above products comply with the requirements of this directive and with the safety requirements for arc welding units in accordance with the following product standards:

EN 60 974-1*
Arc welding equipment - Part 1: Welding power sources

EN 60 974-2*
Arc welding equipment - Part 2: Liquid cooling systems

EN 60 974-5*
Arc welding equipment - Part 5: Wire feed device

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

* in the production version

According to Directive **2006/42/EU** Article 1, Paragraph 2, the above-mentioned products fall exclusively within the scope of Directive **2014/35/EC** relating to electrical equipment designed for use within certain voltage limits. The named products have also been developed according to the Ecodesign Directive (**2009/125/EC**), Regulation **EU 2019/1784**, Directive **2011/65/EU** (RoHS), and Directive **2012/19/EU** (WEEE).

This declaration is given for the manufacturer:

REHM GmbH u. Co. KG Schweißtechnik
Ottostr. 2
73066 Uhingen

Uhingen, 8/2/2023

submitted by

R. Stumpp
Managing Director

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Date of issue 05/2023 | Item no. 7303208