



SHORT MANUAL

SYNERGIC.PRO
251, 311, 351, 352, 402, 304, 404, 504

REHM SCHWEISSTECHNIK

This short manual does not substitute the original operator manual.
Please read this document carefully before your start operating the welding power source.



1 Safety Instructions

This models of welding power sources have been developed according to the generally recognized rules of technology. Nevertheless, their use can lead to a risk for life and limb of the user or third parties or might lead to damages of the system or other property. You should therefore read this document completely and thoroughly before starting up the welding machine.

- Safety and warning notices are used for occupational safety and accident prevention. They must be observed. Not only the general safety instructions listed here must be observed but also the safety and warning information in the original manual.
- In addition to the information in these brief instructions, the general safety and accident prevention regulations have to be considered. They differ from country to country (German: UVV BGV A3, TRBS 2131, BGR 500 Chapter 2.26 „Welding, cutting and allied processes“). In addition the specific regulations for welding are relevant.
- Please notify also the safety information signs in this document.
- As a matter of principle, no safety devices may be dismantled or put out of operation, as this poses a risk and the intended use of the system is no longer guaranteed. Dismantling of safety devices when setting up, repairing and maintaining is specially described. The safety devices must be reassembled immediately after this work has been completed.
- Changes to the system, the attachment or installation of additional equipment and external the use of safety devices is not permitted. This invalidates the guarantee and the reliability claim.
- If external agents are used (e.g. solvents for cleaning), the operator of the system must guarantee the safety of the system during use.
- Except when this is expressly stated in writing by REHM, REHM welding systems are only intended for sale to commercial / industrial users and only for their use.

The MIG/MAG welding systems are designed according to EN 60974-1 arc welding equipment - welding power sources for overvoltage category III and pollution degree 3 and according to EN 60974-10 arc welding equipment - electromagnetic compatibility (EMC) for group 2 class A and are suitable for use in all areas, except residential areas that are directly connected to a public low-voltage supply system. Both conducted and radiated interference can make it difficult to ensure electromagnetic compatibility in these areas. For this purpose, the observance of suitable measures to meet the requirements (filters for mains connection, shielding such as the use of shielded lines, welding lines that are as short as possible, earthing of the workpiece, equipotential bonding) as well as the assessment of the environment (such as computers, control equipment, sound and television broadcast transmitters, neighboring Persons, e.g. when using a pacemaker). The user is responsible for faults.

Qualification of the operating personnel

REHM welding systems may only be used by persons who are trained in the use, operating and maintenance of the welding systems.

Only qualified, authorized and instructed personnel may work on and with the systems.

Personal protective equipment (PPE)

Personal protective equipment (PPE) is mandatory when working with a welding system:

- Welding protection filter, protection level 10-15
- Protective shield, screen or hood
- Welding gloves
- Leather apron

The company is obliged to provide the operator with the necessary PPE.

Intended Use

The MIG / MAG welding systems are only to be used

- for MIG / MAG or manual electrode welding for hand-guided and machine-guided operation (see original operating instructions)
- for welding metallic materials (such as steels, copper, titanium and aluminum)
- in a perfectly safe condition

Environmental conditions

- Temperature range of the ambient air:
 - In operation: -10 ° C to + 40 ° C (14 ° F to 104 ° F)
 - During transport and storage: -20 ° C to + 55 ° C (-4 ° F to 131 ° F)
- Relative humidity
 - up to 50% at 40 ° C (104 ° F)
 - up to 90% at 20 ° C (68 ° F)
- Ambient air:
 - Free of unusual amounts of dust, acids, corrosive gases or substances, etc. as long as these do not arise during welding.

Symbols and sign at the welding machine or system



Attention - danger or damage



Attention - high voltage
Disregarding might cause injure or dead.

2 Design and Connections

Compact welding machine 251, 311, 351



Compact machine 352, 402

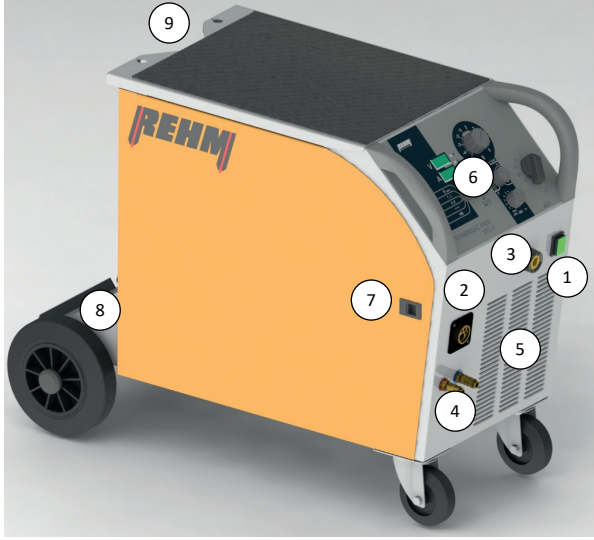



Compact machine 304, 404, 504

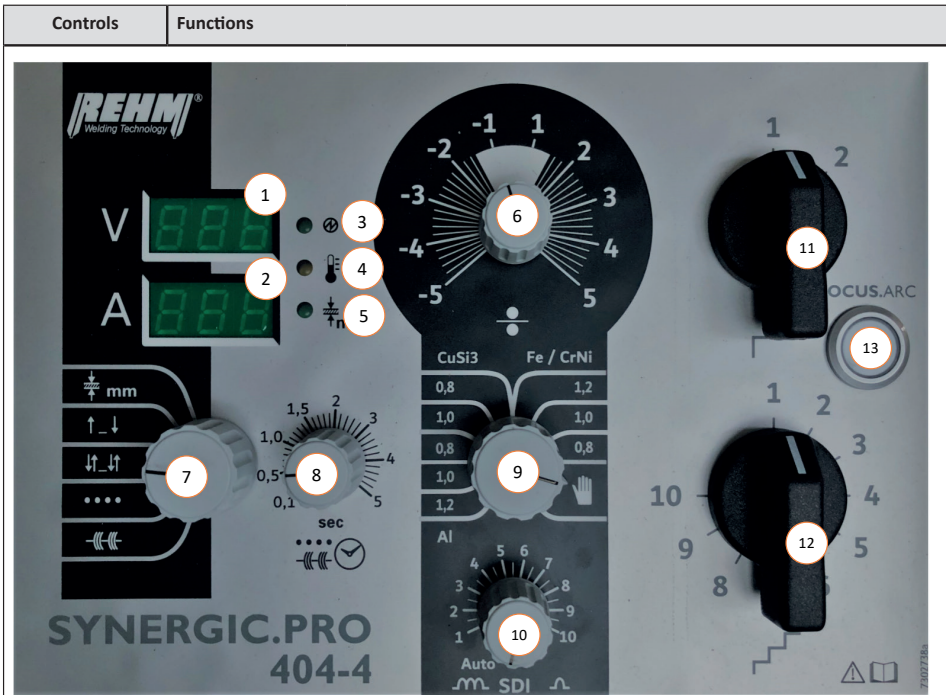


Welding machine with separate wire feeder unit
304S, 404S, 504S


















No.	Detail
	
1	Main switch
2	Central torch adapter (ZA)
	3 Welding ground socket (-) Attention: Take care that there is a as short as possible and reliable connection between machine and material. Otherwise current flow is uncontrolled and is searching a path to potential earth. Damages are possible.
4	Cooling water connections (blue = Cold water; red = hot water)
5	Air entrance area for air cooling. Air exit area is on the rear side.
6	HMI
7	Access door to wire feeder unit
8	Place for the gas bottle
9	Chain to secure the gas bottle

3 HMI



Controls	Functions	
1	Operation Boot 1.) 2.)	Indication of arc voltage Indication of software version e.g. P2.4 Indication of product version e.g. 404
2	Operation Boot 1.) 2.)	Indication of welding current or material thickness Version of welding characteristic e.g.1.2 „on“ shows power source ready
3	Control LED „ Operation “ (grün) Standby voltage is connected to the torch. Arc ignition will be activated if wire touches material.	
4	Control LED „ Temperature “ (gelb) If temperature gets too high the machine switches off the power to protect internal power components. Cooling stays active. If temperature comes under a certain level, machine is reactivated and LED switched off.	
5	Control LED „7-Segment indicates material thickness“ (grün) If switch (position 7) is placed on the symbol $\frac{1}{32}$ mm the HMI on 7-segment indicator 2 shows material thickness. The value is related to the machine adjustments you did. In that mode no welding is possible.	

Controls	Function										
6	<p>Correktion of wire speed Fine adjustment for wire speed in addition to the machine calculated speed by adjustments of you did with the rotary cam switches 11 and 12. The correction value stays active even if you change steps. Negative correction = reduces wire speed => arc gets longer Positive correction = increases wire speed => arc gets shorter If arc energie gets too low and welding result isn't convinient you need to change output voltage by the rotary switches.</p>										
7	<p>Mode switch</p> <table border="1" data-bbox="281 459 1056 916"> <tr> <td data-bbox="281 459 423 612">  mm </td> <td data-bbox="423 459 1056 612"> Auxiliary function to find the right adjustment for a certain material thickness. 7-Segment indicator 2. For control reason value of calculated material thickness is show shortly when activating the torch button. If arc is established indicator show welding current. </td> </tr> <tr> <td data-bbox="281 612 423 679">  </td> <td data-bbox="423 612 1056 679">2-Step mode</td> </tr> <tr> <td data-bbox="281 679 423 746">  </td> <td data-bbox="423 679 1056 746">4-Step mode</td> </tr> <tr> <td data-bbox="281 746 423 813">  </td> <td data-bbox="423 746 1056 813">Spot welding - time adjust with potentiometer 8</td> </tr> <tr> <td data-bbox="281 813 423 916">  </td> <td data-bbox="423 813 1056 916"> Pulse welding - Interval welding Pulse time can be adjusted with regulator 8, the pause time is half the pulse time. </td> </tr> </table>	 mm	Auxiliary function to find the right adjustment for a certain material thickness. 7-Segment indicator 2. For control reason value of calculated material thickness is show shortly when activating the torch button. If arc is established indicator show welding current.		2-Step mode		4-Step mode		Spot welding - time adjust with potentiometer 8		Pulse welding - Interval welding Pulse time can be adjusted with regulator 8, the pause time is half the pulse time.
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8	<p>Time setting for functions spot and pulse welding [0.1 ... 5.0 sec]</p>										
9	<p>Material selection switch Selection of material like aluminium, copper (CuSi3), steel and stainless steel (CrNi) and wire thickness like 0.8, 1.0, 1.2 mm</p>										
10	<p>SDI adjustment Stepless adjustable DC choke to allow hard or soft welding arc. If potentiometer is in the left stop position Automatic SDI is switched on. Now application controller is calculating adjustment according to position of rotary switches.</p>										
11	<p>Rotary cam switch - coarse adjustment Not available in all products. Big increase of output voltage and welding current.</p>										
12	<p>Rotary cam switch - fine adjustment Stepwise increase of voltage and current.</p>										
13	<p>FOCUS switch Arc will be focussed. Available only at products 304, 404 und 504 and only for steel and stainless steel welding.</p>										

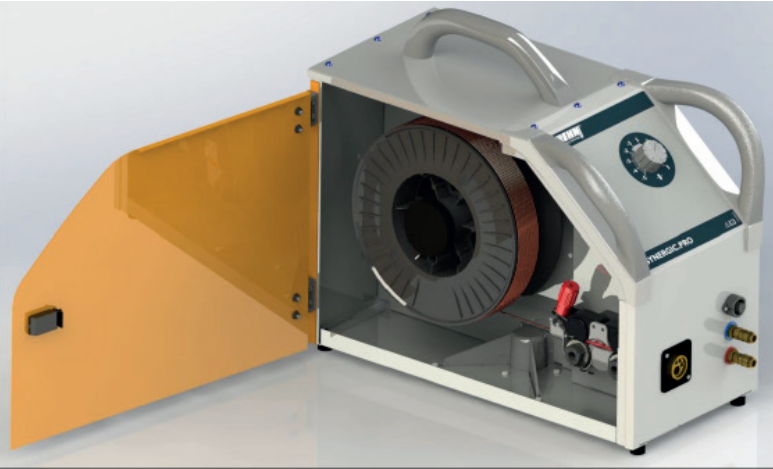
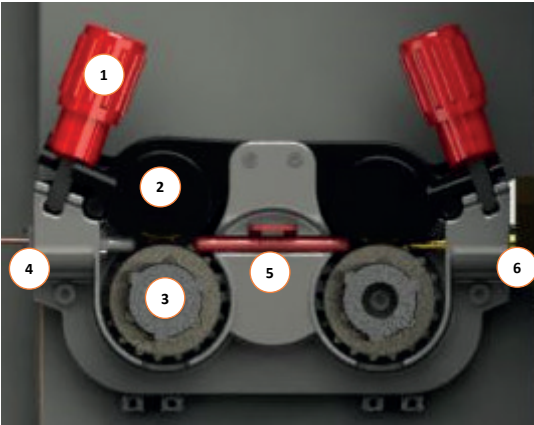

4 Automatic Functions


Function	Description, Details
Creep automatic	Without active arc, the control unit reduces wire speed until wire end touches material. With touch, ignition starts automatically. After ignition, the automatic system accelerates the wire speed to setpoint.
Wire speed automatic	The synergic control unit calculates wire speed based on the welding power set by the rotary switches 11, 12. Fine adjustment is done with regulator 6.
Burn back automatic / Free burn automatic	Intense of this automatic function is to prevent wire sticks to material when welding is stopped. The welding control unit calculates the time required to avoid the wire sticking in relation to the actual wire speed and braking phase.
Gas post-flow time	The default value is 0,2 sec after releasing torch trigger button.
Thread in automatic	With press and hold torch button in 2 step mode, the automatic phase to thread the wire starts if system detects no arc after 3 sec. Speed is set with regulator 6.
Welding stop automatic	The output voltage is automatically switched off in 4 step mode if there is no current for 3 seconds.
Data hold automatic	After welding stop, the last current is stored and shown in 7 segment display 2 (data hold).
SDI automatic	Steplessly controllable choke. Active if regulator 10 is in stop position on the left side.
Water cooling	All products with extension W are water cooled. The cooling starts automatically with the welding and stops with a delay time after welding stop.
Gas flow test	With the torch button pressed and without an arc for 3 seconds, the gas valve opens automatically for maximum 25 seconds. It stops when the button is released.

5 Special settings (Specialists only)

Function	Description, details
<p>Specialists can use the R59, R60 and R61 trim resistors to change the settings for the following functions:</p> <ul style="list-style-type: none"> - Burn wire free time - Creep speed - Gas post-flow time 	

6 Wire feeder unit

<p>Separate feeder unit for S Types</p> <p>altern.</p> <p>wire drive unit is part of the compact machine</p>	
<p>Wire drive unit 4/2</p>	 <p>Wire feeder with 4 rolls. The rolls under the wire are driven, the rolls on top of the wire are free running pinch rollers</p>
<p>1</p>	<p>Adjust contact pressure to the wire: Use the red screws.</p> <ul style="list-style-type: none">- Unlock and tilt pinch roller to the side of the door for threading wire- Turn the screws left and right to tighten or loosen pinch roller.
	<p>Attention:</p> <p>When opening locks of pressure roller there is a risk of squeezing!</p>

2	Pressure unit - arm with free running pressure rolls. The rolls are smooth and free running.
3	<p>Geared rolls The geared rolls can be unlocked by turning the plastic ring so that the cams fit with the ring. Each roller has two grooves for different wire diameter e.g. 0.8/1.0 mm. Quick release system. In mounted position a label with active diameter in different colors is visible. To use the other groove please turn the roller. Standard from manufacturer side is 0.8/1.0 with grooves for steel. Rollers are sold by Rehm.</p> 
4	Entrance of drive train. Mechanical wire guide into the wire drive unit.
5	Plastic wire guide in the middle
6	Brass wire guide between feeder and central adapter

7 Maintenance

Step	Activity	Cycle
Check cool water level	For products with water cooling, please check level of cooling liquid	Daily
Check damages	Please check if hoses are damaged or if hoses are kinked.	Daily
Check noise of pump	When you press torch button at systems with water cooling you should hear the noise of the pump.	Daily
Check cooling air channel	The air must circulate freely for cooling. Do not place obstacles in the air flow.	Daily
Blow out filters	Clean air paths and filters with compressed air.	every 6 month
Check Electric and Isolation	Checkup of electric system and protective insulation at an authorized repair facility. The checkup must be done according to the national regulations.	once per year
Maintenance	Recommended maintenance in an authorized repair facility.	once per year

8 Error Handling



Safety Instructions

If an error occurs, causing danger to human or machine or ambient around the machine, switch off main switch immediate.

Take care that no one is able to switch on again.

- Only authorized personnel is allowed to eliminate mal functions. Safety instructions must be observed!
- Do not restart device before reason for mal function is eliminated. There should be no more danger to human or machine.
- Before restart of device a release by authorized personnel is required.

Error No.	Type of error	Reason	Measure
	Control light „Grid On“ is off.	A line is missing	Check fuse F1 and F2 on power supply and filter board
	Control light „temperature too high“ is on	Thermal protection is active	Let it cool down
	Control light „Operation“ is off	Operation is blocked by temperature too high or torch is not proper connected	Let it cool down or check connection
001	Internal error	Wrong machine type	Service
002	Internal error	Storage error	Service
003	Internal error	Selfcheck control board	Service
004	Internal error	EEPROM not recognized	Service
005	---	---	---
006	Internal error	Wrong data set	Service
007	Water flow control	---	---
008	---	---	---
009	Water flow control	---	---
noP	No programm	No program on that position of switch	There should be no empty program position. Ask service for further information.



**EC-Declaration of Conformity
for following listed products**

Synergic.Pro 251	1031125	Synergic.Pro 304	1122200
Synergic.Pro 311	1031126	Synergic.Pro 304 S	1122201
Synergic.Pro 351	1031127	Synergic.Pro 304 W	1122202
Synergic.Pro 352 W	1031130	Synergic.Pro 304 WS	1122203
Synergic.Pro 402 W	1031131	Synergic.Pro 404	1122210
		Synergic.Pro 404 S	1122211
		Synergic.Pro 404 W	1122212
		Synergic.Pro 404 WS	1122213
		Synergic.Pro 504	1122220
		Synergic.Pro 504 S	1122221
		Synergic.Pro 504 W	1122222
		Synergic.Pro 504 WS	1122223



EC-Declaration of Conformity

It is hereby confirmed that this welding power sources 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 comply with the safety requirements for arc welding units in accordance with the following product standards:

EN 60 974-1: 2018-12

Arc welding equipment – Part 1: Welding power sources

EN 60 974-2: 2013-11

Arc welding equipment – Part 2: Liquid cooling systems

EN 60 974-5: 2014-9

Arc welding equipment – Part 5: Wire feeders

EN 60974-10: 2016-10

Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements

This declaration is given for the manufacturer:

REHM GmbH u. Co. KG Schweißtechnik

Ottostr. 2

73066 Uhingen

Uhingen, 2020/12/04

submitted by

R. Stumpp

REHM – The benchmark for modern welding and cutting

REHM-product range

- MIG/MAG inverter up to 450A
- TIG inverter up to 450A
- Portable TIG inverter up to 230A
- Portable MMA inverter up to 230A
- Plasma Cutter
- Welding equipment
- Welding filler metals
- Welding extraction systems
- Rotating tables
- Cobot systems
- Consulting
- Repair service
- Service

Development, construction and production - all under one roof - in our factory in Uhingen. Thanks to this central organization and our forward-looking commitment, new findings can quickly flow into production. The wishes and demands of our customers form the basis for a progressive one
Product development. Numerous patents and Awards stand for the precision and quality of our products. Customer proximity and competence are the principles that are our top priority when it comes to advice, training and service

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