GB

OPERATING INSTRUCTIONS
MIG/MAG GAS-SHIELDED WELDING UNITS

SYNERGIC.PRO² 170-2 – 600-4 WS

REHM SCHWEISSTECHNIK

Product identification

Designation MIG/MAG inert gas metal arc welding units

Type

SYNERGIC.PRO^2 170-2	SYNERGIC.PRO² 350-4 W
SYNERGIC.PRO^2 190-2	SYNERGIC.PRO^2 350-4 S
SYNERGIC.PRO^2 230-2 AM	SYNERGIC.PRO^2 350-4 WS
SYNERGIC.PRO^2 230-4 AM	SYNERGIC.PRO^2 450-4
SYNERGIC.PRO^2 280-2	SYNERGIC.PRO^2 450-4 W
SYNERGIC.PRO^2 280-4	SYNERGIC.PRO^2 450-4 S
SYNERGIC.PRO^2 310-4	SYERGIC.PRO^2 450-4 WS
SYNERGIC.PRO^2 250-4	SYNERGIC.PRO² 500-4 S
SYNERGIC.PRO^2 300-4	SYNERGIC.PRO² 500-4 WS
SYNERGIC.PRO^2 300-4 S	SYNERGIC.PRO² 600-4 S
SYNERGIC.PRO² 350-4	SYNERGIC.PRO² 600-4 WS

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1 Introduction

1.1 Preface

Dear Customer,

You have purchased a REHM inert gas welding unit, a branded German product We would like to take this opportunity to thank you for putting your trust in our quality products.

Only components of the highest quality are used in the development and manufacture of REHM SYNERGIC. PRO^2 inert gas metal arc welding units. In order to guarantee high durability, even under the toughest of conditions, all REHM welding units contain components that live up to strict REHM quality requirements. SYNERGIC. PRO^2 MIG/MAG inert gas metal arc welding units have been developed and manufactured in accordance with generally recognised safety and technical regulations. All of the relevant legal requirements have been taken into account and are supported by the conformity declaration and the CE mark.

REHM inert gas metal arc welding units are produced in Germany and carry the "Made in Germany" quality mark.

Since REHM is constantly developing its products in line with technical progress, we reserve the right to adapt and modify this welding unit at any time, in order to meet the latest technical requirements.

Areas of use

REHM welding units are, unless explicitly permitted in writing by REHM; only for sale to commercial and industrial users and only for use by such.

SYNERGIC.PRO^2 MIG/MAG inert gas metal arc welding units should only be used

- for the specified uses
- in a safe state

Qualifications of the operating personnel

REHM welding units may only be operated and maintained by persons who have been educated and trained to operate and maintain welding units. Only qualified, authorised and trained staff may work on and with the equipment.

Purpose of the document

These operating instructions contain important notes regarding how to operate this unit safely, correctly and economically. A copy of the operating instructions should always be kept on site in a suitable location. Please make sure that you read the information summarised in this operating manual before using the equipment. It contains important notes regarding use of the device which enables you to fully use the technical advantages of this REHM devices. In addition, you will also find information regarding maintenance and upkeep of the units as well as the operational and functional safety.

These operating instructions do not replace instructions given by REHM's service personnel.

The documentation for any additional options must also be taken into consideration.

Changes to the unit

Changes to the unit or the addition or installation of further elements is not permitted. This would invalid the guarantee and warranty claims.

Any third-party changes or deactivation of the safety mechanisms renders all guarantee claims invalid.

1.2 General description

Diagram 1 SYNERGIC.PRO^2 230-4 , SYNERGIC.PRO^2 350-4 WS (picture similar)

1.2.1 Performance characteristics of SYNERGIC. PRO^2 MIG/MAG inert gas metal arc welding units

- **REHM SMC (Smart Machine Control)**
  The integrated systems and regulatory mechanisms of the Smart Machine Control (SMC) react effectively, at all times, to changes in the arc, and also constantly control the droplet transfer. SMC summarizes all user settings, characteristic curve definitions, target value settings and actual value measurements, evaluates them and coordinates the regulator actions in accordance with the routines defined by the welding experts
- **REHM SDI (Stepless Dynamic Induction)**
  The REHM-SDI provides the SYNERGIC. PRO^2 with a choke which is electronically and steplessly controlled, thus guaranteeing excellent ignition characteristics and an even more stable arc.
- **REHM RSC (Realtime Speed Control)**
  The incremental rotary encoder is used to monitor the feed rate directly at the motor. This ensures that changes in the arc length can be recognised and corrected as early as possible. RSC guarantees reproducible, constant wire feed rates – regardless of motor temperature or dirty hose bundles.
- **REHM CCM (Characteristic Curve Memory)**
  CCM makes it extremely easy to operate the SYNERGIC.PRO^2 . The comprehensive, integrated welding parameter database (CCM) is filled with the knowledge of experts with many years of practical experience. The combination of material, wire diameter and voltage level is used to pre-select the synergy parameters required for a successful welding process. During the welding process, the actual values are constantly compared to the process specifications and corrected immediately when required.
- **REHM housing form design**
  Increased ergonomics thanks to the constant further development of the REHM design. The protected and well thought out construction achieves the IP23 protection class. This enables welding outside.
- **REHM Industrial control**
  Mains voltage is permanently monitored for fluctuations and compensated appropriately, ensuring optimum, uniform welding results. The 2-step and 4-step modes, spot and pulse function, digital voltmeter and ammeter, and display of material thickness, are installed as standard features.
- **REHM automatic creep**
  The unit reduces the wire feed rate until the arc has ignited. This ensures a safe ignition process.
- **REHM automatic burn back**
  Ensures that the user has a constant wire end length when they complete the welding process.
- **REHM automatic threading**
  Adjusted wire feed rate during threading.
- **Powerful 2/4 roller wire feed drive**
  Both the 2 and 4 roller drives guarantee safe wire feeding, even when used with torches with excess length.

1.2.2 Principle of the metal inert gas welding procedure

During the metal inert gas welding process, the arc burns between a melting wire electrode and the work piece. Argon, carbon dioxide (CO_2) or a mix of these or other gases are used as the inert gas.

The wire electrode is unwound from a spool by a feed motor and pushed through the torch bundle to the contact tip.

The positive pole of the current source is attached to the current contact nozzle, to the wire electrode and the negative pole on the work piece. An arc is formed between the wire electrode and the work piece which melts the wire electrode and fuses it to the work piece. The electrode is thus both arc carrier and welding material at the same time.

The wire electrode and the pool crater are protected from the oxygen in the air by the inert gas that is released from the nozzles which are arranged concentrically around the electrode.

1.2.3 Functioning principle of REHM SYNERGIC. PRO^2 welding units

REHM inert gas metal arc welding units are MIG/MAG constant voltage sources with the welding voltage adjusted by step switches. The wire speed is determined automatically by the pre-selected welding voltage. A correction knob to set the wire speed precisely is used to control the individual arc length.

Alloyed and non-alloyed steel, stainless steel and aluminium and galvanised sheet can be welded (MIG brazing) with *REHM -SYNERGIC.PRO^2* inert gas metal arc welding units.

These units are designed for optimum welding performance and high efficiency, are equipped with robust housings and feature cooling systems designed for minimum noise output. All the components have been extensively tested under practical conditions for heavy-duty and industrial usage.

1.2.4 Correct use

REHM welding units are designed to be used to weld various metals such as non-alloyed and alloyed steel, stainless steel and aluminium. You should also pay attention to the special regulations pertaining to your area of application. If anything is unclear, consult your safety officer or contact REHM's customer service department.

REHM welding units are, unless explicitly permitted in writing by REHM; only for sale to commercial and industrial users and only for use by such. They may only be operated by persons trained in the use and maintenance of welding units.

Welding current sources may not be set up in areas with increased electrical risk.

These operating instructions contain rules and guidelines for the correct use of your unit. Only when these are adhered to can it be described as correct use. Risks and damages caused as a result of a different type of use is the responsibility of the operator. In the event of special requirements, it may be necessary for additional special conditions to also be taken into account.

If anything is unclear, consult your safety officer or contact REHM's customer service department.

You should also pay attention to the special notes regarding correct use as set out in the delivery documentation.

National regulations regarding the operation of the unit are valid with no restrictions .

Correct use also covers the observation of the correct measures with regard to mounting, removal and remounting, taking into service, operation and maintenance as well as disposal.
Please heed, in particular, the information in the safety instructions chapter.

The unit may only be operated under the conditions set out above. Any other use is not correct. The consequences are the responsibility of the operator.

1.3 Symbols used

Typographic symbols

- Lists with bullets: General lists

❒ Lists with a square: Work or operational steps that much be carried out in the sequence listed.

➔ Chapter 2.2, Warning symbols on the unit
Cross-references: In this case, to Chapter 2.2 Waning symbols on the unit

Bold is used for emphasis

Note!

... Indicates user tips and other particularly useful information.

Safety symbols

The safety symbols used in this manual: **➔ Chapter 2.1.**

2 Safety notes

2.1 Safety symbols used in these operating instructions

Warning notes and symbols

This or a symbol more specific to the danger can be found with all safety notes in these operating instructions which carry a risk to life and limb.

One of the following signalling words (Danger! Warning! Caution!) indicates the degree of danger:

Danger! ... indicates immediate threat of danger.

If this is not avoided it may lead to death or serious injury.

Warning! ... indicates a potentially dangerous situation.

If this is not avoided it may lead to death or serious injury.

Caution! ... indicates a situation in which damage may occur.

If this is not avoided it may lead to slight or minor injuries and damage to property.

Important!

Indicates a potentially damaging situation. If this is not avoided it may lead to damage to the product or to something in the vicinity.

Materials that may be hazardous to health or environment. Materials that must be treated/disposed of in accordance with the law.

2.2 Warning symbols on the unit

indicate hazards and sources of danger on the equipment.

Danger!

Dangerous electrical voltage!

Ignoring may lead to death or injury,

2.3 General

Dangers of non-observation

The unit has been developed and constructed in accordance with recognised technical knowledge.

However, using the unit may hold dangers for the life and limb of the user or third parties or influence the unit or cause damage to other property.

None of the safety measures may be removed or put out of action, as this causes risks and correct use of the unit cannot be guaranteed. Removing the safety features during set up, repairs and maintenance is described separately. As soon as this work is completed, the safety features must be replaced.

When using additional products (for example, solution for cleaning) the operator of the unit is to ensure that the unit is safe for the product to be used.

All safety and danger notes as well as the type plate on the unit are to be maintained, kept in a readable state and observed.

Safety instructions

Safety notes serve to protect when working and to prevent accidents . They must be observed.

The safety notes listed in this chapter must be observed along with the special notes made in running text.

In addition to the instructions in these operating instructions, general safety and accident prevention regulations (in Germany including UVV BGV A3, TRBS 2131 and BGR 500 Chapter 2.26 (formerly VGB15): "Welding, cutting and associated processes" and in particular the references to arc welding and cutting and the appropriate national regulations) must be observed.

Please also note the safety notices in the workplace of the operator.

Requirememts made of the power supply

High performance units may affect the main power supply thanks to their high power consumption. For certain units types, there may be connection restrictions, requirements regarding the maximum permitted net impedance or requirements regarding the minimum required available power at the point of connection to the main power supply (see Technical data) In these casese, the user of such a unit must ensure, if necessary by consulting the power suppliers, whether the unit may be connected.

3 Functional description

3.1 Switching on

The main switch on the *SYNERGIC.PRO*^{2} is used to activate the main power. The MAINS ON control lamp comes on. The upper digital display for welding voltage shows the software version number (e.g. "P1.0") and the lower display for welding current shows the data record number for the arc (e.g. " d0.1"). After this, the upper display shows the machine type (e.g. "450" for a SYNERGIC.PRO2 450-4 and the lower displays shows "on". The welding unit is now ready to operate.

3.2 Description of the operating elements

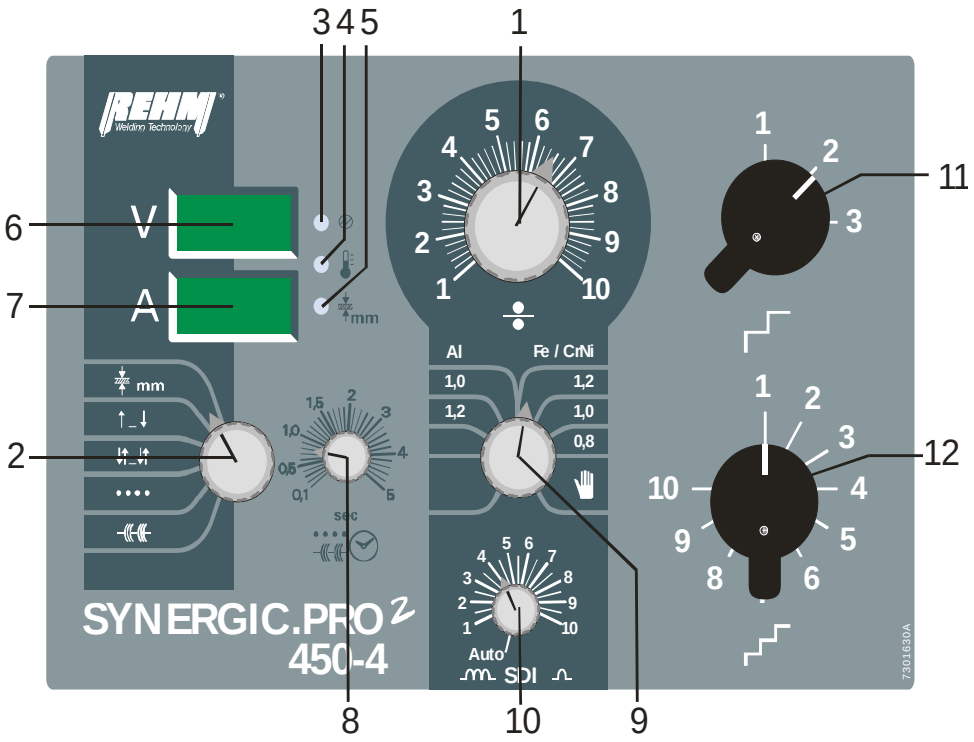


Diagram 2:1 *Correction knob for wire feed rate*
2 *Function selector switch for*
- *Material thickness (welding not possible in this position)*
- *2-step*
- *4-step*
- *Spots*
- *Pulse*

3 *Control lamp for OPERATION*
4 *Control lamp for TEMPERATURE*
5 *Control lamp for MATERIAL THICKNESS*
6 *Digital display for welding voltage or no-load voltage*
7 *Digital display for welding current or material thickness*
8 *Knob for setting spot and pulse time*
9 *Selector switch for program selection*
10 *SDI, steplessly controllable choke*
11 *Coarse step switch*
12 *Fine step switch*

3.3 Control LEDs

Control lamp	Location	Colour	Functions
MAINS ON	in the mains switch	Green	Power supply voltage applied, control on.
OPERATION	on control panel	Green	The no-load voltage is available at the wire electrode. The electrode is pushed out of the contact tip of the torch. The arc is ignited when the workpiece is touched.
TEMPERATURE	on control panel	Yellow	The welding current is switched off when the maximum operating temperature of the power components has been exceeded. After it has cooled down, the unit is automatically switched back to operating mode.
MATERIAL THICKNESS	on control panel	Green	With the switch set to “material thickness”, the material thickness is shown on the digital display

3.4 Function selection switch

3.4.1 Material thickness mm

The material thickness function allows rapid selection of the correct step switch suitable for the welding job in question.

To do this, the processor controller accesses the characteristic curves stored on the machine and displays the material thickness of the workpiece as determined using the settings for material type, wire diameter (see Diagram 2 Selector switch for program selection), wire feed rate and the step switch.

The digital displays (see Diagram 2) show when this function is selected the no-load voltage and the material thickness. (see Chapter 3.13.5)

Sequence of material thickness function

❒ Program selection

The program selection switch (see Diagram 2) is used to set the material type and the wire diameter.

❒ Press the torch button

No-load voltage is applied, wire feed is switched off.
The upper digital display shows the value of the no-load voltage
The lower digital display shows the suggested material thickness resulting from the other machine settings selected

❒ Set step switch

Turning the step switch changes the no-load voltage and hence also the subsequent welding voltage.
The material thickness shown in the lower digital display changes accordingly. Set the step switch so that the material thickness corresponds to the welding job in question.

❒ Release torch button and select welding function

When the torch button is released, voltage is no longer applied at the outlet. With the function selector switch (see Diagram 2) the function required for welding – 2-step, 4-step, spot or pulse – can be selected.

Welding is not possible when the function selection switch is set to the material thickness function.

The material thickness cannot be displayed when the selection switch for program selection is set to manual (since the material thickness is dependant on the material type and the wire diameter and both of these are not specified when using the manual setting).

While the torch button is pressed, no-load voltage is applied to the welding wire. Ensure that you do not touch the free wire end and that there is no contact to conductive materials.

The characteristics have been set for horizontal (position PB), one-sided fillet welds. For other weld types or welding positions, it may be necessary to adjust the power (step switch) and/or the feed rate to obtain your preferred setting.

3.4.2 2-step function ⇧–⇩

2-step welding is recommended for fast, controlled affixing and manual spot welding.

How the 2-step function works:

❒ 1. Step – Press torch button

- Magnet valve for inert gas is opened.
- Welding voltage is applied
- Wire feed starts at reduced speed
- (automatic creep)
- Arc is ignited, the welding current flows
- Feed switches over to the set wire feed rate.

❒ 2. Step – Release torch button

- Wire feed stops
- Welding current is switched off after the burn back time has expired
- The inert gas is switched off after the gas post flow time has elapsed.

3.4.3 4-step function

The 4-step welding function is suitable for longer welds.

How the 4-step function works:

❒ 1. Step – Press torch button

- Magnet valve for inert gas is opened.
- Welding voltage is applied
- Wire feed starts at reduced speed
- (automatic creep)
- Arc is ignited, the welding current flows
- Feed switches over to the set wire feed rate.

❒ 2. Step – Release torch button

- After the arc has been successfully ignited:
- welding process continues without any changes
- If the arc has not been ignited within 3 seconds, the unit automatically switches back to the basic situation (safety shut-down)

❒ 3. Step – Press torch button

- Wire feed stops
- Welding current is switched off after the burn back time has expired
- The inert gas is switched off after the gas post flow time has elapsed.
- The length of time the gas continues to flow can be increased by holding the torch button down

❒ 4. Step – Release torch button

- Unit is ready for a new welding process

3.4.4 Spot function

The spot function enables precisely-timed spot welding, e.g. for consistent tacking. Once the torch button has been pressed, the welding process is ended automatically by the processor control once the pre-set spot time has expired. The spot time can be freely selected using the rotary knob provided (see Diagram 2).

How the spot function works:

❒ Press the torch button

- Magnet valve for inert gas is opened.
- Welding voltage is applied
- Wire feed runs at reduced speed (automatic creep feed)
- Arc is ignited
- Feed switches over to the set wire feed rate.
- The spot time pre-set expires
- When the set spot time is completed, the current source is deactivated automatically.
- Gas flows as long as the torch button is pressed.

❒ Release the torch button

- The inert gas is switched off after the gas post flow time has elapsed.
- Releasing the torch button during the spot time ends the welding process immediately and switches off the inert gas after the gas post flow time is completed.

3.4.5 Pulse function

The pulse function permits precisely-timed pulse welding, e.g. for reduced heat input when welding thin sheets. While the torch button is pressed, the processor control automatically switches welding on and off. The on time can be freely selected using the rotary knob provided (see Diagram 2). The pause time is in each case half as long as the on time.

Sequence of pulse function:

❒ Press the torch button

- Magnet valve for inert gas is opened.
- Welding voltage is available
- Wire feed starts at reduced speed
- (automatic creep)
- Arc is ignited
- When welding begins, the wire feed is switched on for the set time
- After this time has expired, the feed stops for the duration of the set pause time. The wire feed is then re-activated etc.

❒ Release torch button to end the welding process

- Wire feed stops
- Welding current is switched off after the burn back time has expired.
- Inert gas is switched off after the gas post-flow time has expired.

3.5 Step switch

The welding voltage required is set using the step switch.
The various types of unit offer different voltage steps which you will find under
➔ **Chapter 12, Technical data**.

3.6 Automatic feed

A specific wire feed rate is set for the wire feed motor by the step switch. The "wire feed" potentiometer is used to fine tune in accordance with the material used, the wire diameter and the inert gas. After this adjustment, the same setting can be used to weld in several voltage steps, as the wire feed is automatically adjusted.

3.7 Program selection

The REHM program selection function enables you to immediately set your *SYNERGIC.PRO*^{2} unit to the required welding task, without carrying out time-consuming tryouts, simply by presetting the material type and the wire diameter. The wire feed rate, the choke setting and the start and end phases are optimally adjusted to the respective welding job electronically. To do this, the *SYNERGIC.PRO*^{2} stores characteristic curves which determine the allocation of these values to the material type set, to the wire diameter and to the welding voltage constantly measured during welding. In addition, the material thickness function (see Chapter 3.4.1) can be used to ascertain the suitable step switch setting.

The correction knob for wire feed rate (see Diagram 2) should be set to 5 for steel and aluminium, and to 6.5 for CrNi.

If the selector switch for program selection is set to manual, these characteristic curves are not used. The most suitable setting of the machine (including wire feed rate, step switch) can be set by the user himself over the entire range.

The characteristic curves have been set for horizontal (position PB), one-sided fillet welds. For other weld types or welding positions, it may be necessary to adjust the voltage (step switch) and/or the feed rate.

3.7.1 Gouging (only available with SynPro² 500 and 600)

1. The program selection switch is switched to the "gouging" position.
2. On the rear wall:
   - ❒ The intermediate hose bundle is unplugged and the welding current cable of the gouging torch is plugged in,
   - ❒ Remove the 16-pin plug and plug in the short circuit plug,
     Caution! When the short circuit plug is plugged in, there is output voltage available!
   - ❒ **Please ensure that either the water hoses of the torch remain connected, or a water bridge is specifically connected!**
3. The "Operation" LED lights up, the protection is activated and the output voltage is displayed.
4. The motor, the gas valve and the SDI are out of operation.
5. The function switch is not evaluated.
6. As soon as the output current starts to flow, the current value is also displayed,
7. To switch back to welding operation, carry out points 1-2 in reverse order. This means:
   - ❒ Unpulug the short circuit plug and plug in the 16-pin plug,
   - ❒ Unplug the welding current cable of the gouging torch and plug in the intermediate hose bundle.
   - ❒ The program selection switch must be switched to the required welding program.

   Recommended settings with the carbon electrode 8 mm and "+" pole

Unit type	Program	Stage	Wprking pressure	Current ca. A
SynPro² 500	Manual	3-7	7 bar	400
SynPro² 600	Fe 1.6	3-1	7 bar	400

3.8 SDI – steplessly controllable choke

All *SYNERGIC.PRO²* units are equipped with an electronically controllable choke. The throttle characteristics are dynamically adapted by the processor controller to the relevant task. As a result, the optimum adjustment of the choke is set, taking into account the material selection made when welding is started and during welding.

The *SYNERGIC.PRO²* also offers the opportunity to adapt this choke effect to suit the users' style and thus making the arc harder or softer. When the rotary knob SDI (see Diagram 2) is at the left-hand stop (switch setting *Auto*), the function is set to automatic and the choke has the soft arc setting recommended by the manufacturer for every material selected. By turning the rotary knob to the right, the arc can be set increasingly harder.

3.9 Automatic creep

Safe ignition is guaranteed by the automatic creep function. This reduces the wire feed rate when the wire end is cold. After igniting the arc, the system switches to the preset wire feed rate. Individual adjustment of the creep speed is possible by modifying the "creep speed" potentiometer (see Chapter 11, R60) on the circuit board (this can only be carried out by an authorised expert and requires the unit to be opened).

3.10 Automatic burn back function

An appropriate burn back time is automatically set to match the wire feed rate depending on the motor brake phase. Individual adjustment of the burn back time is possible by modifying the "burn back time" potentiometer (see Chapter 11, R59) on the circuit board (this can only be carried out by an authorised expert and requires the unit to be opened).

3.11 Gas post-purge time

The gas post-flow time is set to 0.2 s as standard. The gas post-flow time can be adjusted by up to 5 seconds by modifying the "post-flow gas" potentiometer (see Chapter 11, R61) on the circuit board (this can only be carried out by an authorised expert and requires the unit to be opened).

3.12 Forced switch off

If the welding process is not started within 3 seconds while pressing the torch button, the welding voltage is switched off automatically in 4-step operation with models SYNERGIC.PRO² 170-450 and in 2-step or 4-step operation with models SYNERGIC.PRO² 500/600. If the welding current is interrupted for more than 3 seconds during welding in 2-step or 4-step operation, then the welding voltage is switched off automatically with all models.

The machine is thus put into the basic state. This provides the user of *REHM-SYNERGIC.PRO²* units additional protection from electrical voltages and fire, as standard.

3.13 Additional functions

3.13.1 Water circulation cooling

The *SYNERGIC.PRO^2 350-4 W, SYNERGIC.PRO^2 350-4 WS, SYNERGIC.PRO^2 450-4 W, SYNERGIC.PRO^2 450-4 WS, SYNERGIC.PRO² 500-4 WS and SYNERGIC.PRO² 600-4 WS* units are fitted, as standard, with water circulation cooling for the welding torch.

3.13.2 Temperature monitoring of power elements

If the permitted temperature of the power components is exceeded, the welding current is switched off automatically. This is indicated by the TEMPERATURE control lamp on the operating panel. After the power components have cooled down, the unit is automatically switched back to operating condition and the control lamp goes out.

3.13.3 Third party cooling of the power elements

The power components of *SYNERGIC.PRO^2* units are designed for a high level of operational safety. The targeted placement of the ventilator and the power elements achieve an optimal removal of heat with a minimum of noise development.

3.13.4 Fan and water pump operation

The fan and the water pump switch on immediately at the start of welding. When the welding process is over, the fan continues to run for a set time of 7 minutes. The fan and the water pump then revert to standby.

3.13.5 Digital voltmeter and ammeter

The digital voltmeter and ammeter is provided as a standard feature in all SYNERGIC.PRO welding unit.

During welding, the upper display shows the welding voltage and the lower display the welding current. The Data-Hold-Function means that these values can also be displayed, and read in peace, after welding has been completed.

The material thickness function (see Chapter 3.4.1) is activated by briefly pressing the torch button in no-load or by setting "Material thickness" at the function selection switch. As a result, the recommended material thickness is shown in the upper display (depending on the program selection, see Chapter 3.7). The *Material thickness* control lamp comes on here.

In addition, the displays are used for showing the machine parameters when switching on (see Chapter 3.1) and in the event of faults (see Chapter 7).

3.13.6 REHM automatic threading

The threading of the welding wire into the torch hose package is carried out by pressing the torch button in 2-step operation with models SYNERGIC.PRO² 170-450 and in 2-step or 4-step operation with models SYNERGIC.PRO² 500/600, if the welding process is not started within 3 seconds. During the threading process, the threading speed can be adapted with the help of the correction knob for wire feed rate [1] (see Diagram 2).

4 Accessories

The basis of these operating instructions are the accessories released by REHM.

4.1 Standard accessories

- Function and operating instructions

4.2 Overview of options

In order to cater to the wide variety of welding requirements, we offer the following options.

For all Synergic.Pro^2 units

- Through-flow monitor (Order number. 1180550)
- Push-Pull (Order number 1180149)
- Torch with hose bundle holder (Order number 1180214)
- Tool set including tool rest, torch holder and crane lugs except for Synergic.Pro² 500/600 (Order number:1180212)
- Crane lugs with shelf except for Synergic.Pro² 500/600 (can only be mounted at the factory, Order number 1180213)

Für Synergic.Pro^2 230 tthrough 450-4

- 230/400V clamping bar (Order number 230: 1180229, 250: 1180241, 280: 1180240, 300: 1180233, 310: 1180231, 350: 1180234, 450: 1180235)
- Surge current limiter only for 230 and 280 (Order number 1180244 and 1180245)
- DINSE central adapter (Order number1181247)

For Synergic.Pro^2 250-4 / 300-4 / 350-4 / 450-4

- Air filter attachment (Order number 1180211)
- 500V version (Order number 250: 1180236, 300: 1180237, 350:1180238, 450: 1180239)

For Synergic.Pro² 300-4 through 450-4 case systems

- Construction Water / Gas (Order number 1180242 / 1180230)
- Shipyard Water / Gas (Order number 1180243/1180232)
- Crane lugs on case (Order number 1180167)
- Trolley for case (Order number 1381329)

For Synergic.Pro^2 500-4 and 600-4

- Air filter attachment (Order number 1180555)
- Case hanger (Order number 1180560)
- Trolley for case (Order number 1180565)
- Spool wire execution (Order number 1180570)
- DINSE central adapter (Order number 1180575)
- Aluminium central adapter (Order number 1180580)

4.2.1 Wire feed case with trolley

For the *SYNERGIC.PRO² 300-4 - SYNERGIC.PRO² 600-4* case machines, there is an option which allows a wire feed case to be affixed to a trolley with 4 steering castors. This assures maximum mobility in a large working area.

4.2.2 Intermediate hose bundles for SYNERGIC.PRO²

For the *SYNERGIC.PRO² 300-4 - SYNERGIC.PRO² 600-4* case machines, intnermediate hose bundles are available from the factory with the lengths 1.4 m, 5 m, 10 m, 15 m und 20m. The hose bundles are always plug-in type.

4.2.3 Torch connection

On request, the *SYNERGIC.PRO²* units can be provided ex works with different torch connection systems.

4.2.4 Special voltages

The welding units can be supplied for a variety of mains voltages. Please ask your supplier or the manufacturer for further details.

4.2.5 Air filter attachment

A retrofittable air filter attachment is available for all *SYNERGIC.PRO²* units. This effectively helps to reduce dirtying of the inside of the unit.

4.2.6 Crane lugs

For *SYNERGIC.PRO² 170-2 through SYNERGIC.PRO² 450-4, retro-fittable crane lugs are available*.

CAUTION: Attachment of the SYNERGIC.PRO units for suspended transport, for example with ropes or chains, is only permitted when crane lugs are used. Attachment to the handles or at other points of the unit is dangerous and hence not permitted.

5 Putting into operation

5.1 Safety notes

Read the operating instructions, in particular, ➔ **Chapter 2, Safety,** carefully before starting work on this current power source.

Warning!

REHM welding units may only be operated and maintained by persons who have been educated and trained to operate and maintain welding units.

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

5.2 Working under increased electrical risks in accordance with the regulations of IEC 974, EN 60 974-1, TRBS 2131 and BGR 500 Chapter 2.26 (previously known as VGB 15)

The *REHM - SYNERGIC.PRO*^{2} inert gas metal arc welding units comply with the regulations mentioned above. You should ensure that when working under increased electrical risk, the power source is not set up in this area. Observe the regulations set out in EN 60 974-1, TRBS 2131 and BGR 500 Chapter 2.26 (previously known as VGB 15).

5.3 Setting up the welding unit

Set the REHM welding unit in such a way that the welder has sufficient space in front of the unit to control the setting elements and to operate it.

Pay attention to the relevant accident regulations when transporting the unit.

CAUTION: Attachment of the SYNERGIC.PRO units for suspended transport, for example with ropes or chains, is only permitted when crane lugs are used. Affixing to handles or other parts of the unit is not permitted.

Danger! Electrical voltage!

Do not use the welding unit outside in the rain!

5.4 Connecting the welding unit

Connect the REHM welding current source in accordance with the valid VDE regulations to the power supply network and ensure that you meet all the regulations stipulated by the appropriate professional associations.

When connecting the unit, pay attention to the specifications regarding the supply voltage and network fuses. Safety mechanisms and fuses must always be set out for the specified current. The required specifications can be found in ➔ **Chapter 11, Technical data**.

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

Place the inert gas bottle on the console affixed to the unit and secure with the securing chain. Screw the cylinder pressure regulator onto the cylinder and check the connection for tightness. Always close the bottle valve after completely work. Observe the regulations of the appropriate professional associations.

5.5 Cooling the welding unit

Erect the REHM welding unit so that the air intake and outlet are not obstructed. The duty cycle of the power components indicated can be reached only with adequate ventilation.

Ensure that no metal parts, sanding dust, dust or any other foreign objects are able to enter the unit.

5.6 Water cooling for MIG/MAG welding torch

The torch is water-cooled for the units *SYNERGIC.PRO^2 350-4 W, SYNERGIC.PRO^2 350-4 WS, SYNERGIC.PRO^2 450-4 W, SYNERGIC.PRO^2 450-4 WS, SYNERGIC.PRO^2 500-4 WS* and *SYNERGIC.PRO^2 600-4 WS*.

Before initial operation, check the water lever in the tank. If the water level drops below ¾ of the tank contents, additional water should be added. The special cooling medium developed and tested by REHM is specified for use as cooling medium (order 1680075, 5 litres). The level of cooling water must be checked at regular intervals.

5.7 Connecting the welding hoses

REHM welding units are fitted with rapid plug and socket connections for the connection of the earthing cable and the MIG/MAG welding torch. In order to achieve optimum welding results, ensure that all welding hose connections have been tightened and that the insulation has not been damaged.

5.8 Connecting the torch

There is a special connector (euro central connector) on the housing for connecting the MIG/MAG torch. This forms the connections for welding current, button hoses and gas.

When water-cooled torches are used, the cooling water hoses are connected using quick couplings. These are identified by colour (red=back flow, blue=advance flow).

Important!

If a gas-cooled torch is used with a water-cooled unit, the water connections must be connected using a hose protection ramp to prevent damage to the water pump.

6 Operation

6.1 Safety notes

Read the operating instructions, in particular, ➔ **Chapter 2, Safety,** carefully before starting work on this current power source.

Warning!

REHM welding units may only be operated and maintained by persons who have been educated and trained to operate and maintain welding units.

6.2 Checks before starting

The prerequisites that

- The unit is set up correct in accordance with ➔ **Chapter 5, Putting into operation**
- All connections (inert gas, torch connection) have been made in accordance with ➔ **Chapter 5, Putting into operation**
- The appropriate maintenance has been carried out in accordance with the maintenance interval ➔ **Chapter 8**, **Maintenance**
- The safety mechanisms and the components of the unit (in particular the torch connector hoses) are checked by the operator and are functional.
- The operator and other persons involved have put on the appropriate protective clothing, and the working area has been shielded so that no bystanders are at risk.

6.3 Connection of the earthing cable

Warning!

Make sure that the welding current is not able to flow through chains of lifting machinery, crane lines or other current carrying parts.

Make sure that the earth cable is connected to the work piece as close as possible to the welding area. Earth connections affixed to points further apart reduce the effectiveness and increase the risk of electrical shocks and stray current.

6.4 Switching on

Power switch

The main switch on the *SYNERGIC.PRO*^{2} is used to activate the main power. The MAINS ON control lamp comes on. The upper digital display for welding voltage shows the software version number (e.g. "P2.3") and the lower display for welding current shows the data record number for the arc (e.g. " d0.2"). After this, the upper display shows the machine type (e.g. "450" for a SYNERGIC.PRO2 450-4 and the lower displays shows "on". The welding unit is now ready to operate.

Control lamps

Control lamp	Location	Colour	Functions
MAINS ON	in the mains switch	Green	Power supply voltage applied, control on.
OPERATION	on control panel	Green	The no-load voltage is available at the wire electrode. The electrode is pushed out of the contact tip of the torch. The arc is ignited when the workpiece is touched.
TEMPERATURE	on control panel	Yellow	The welding current is switched off when the maximum operating temperature of the power components has been exceeded. After it has cooled down, the unit is automatically switched back to operating mode.
MATERIAL THICKNESS	on control panel	Green	With the switch set to “material thickness”, the material thickness is shown on the digital display

6.5 Select mode

Function selection switch

❒ Select the desired type of operation using the function selection switch:

- Material thickness
- 2-step function
- 4-step function
- Spot function
- Pulse function

6.6 Set welding voltage

Step switch

The welding voltage required is set using the step switch. The various types of units offer different voltage steps, which are described in more detail in **Chapter 12, Technical Data**.

6.7 Set wire feed rate

Feed rollers must be selected to suit the wire diameter. Precise control of the feed motor speed ensures constant wire feed rate. Safe wire handling is ensured by the compact 2 and 4-roller systems.

You must ensure that the pressure on the wire exerted by the feed rollers is set correctly. The pressure should be as low as possible for aluminium, but still permit the wire to be transported safely. When using steel and stainless steel, the pressure should be such that the wire spool can still be halted by hand even during operation.

The wire feed rate must be set in such a way as to ensure a smooth and stable arc. When the step switch is turned up, the speed increases automatically and can be corrected simply using the wire feed potentiometer, if necessary.

Automatic feed

A specific wire speed is set for the wire feed motor using the step switch. The "wire feed" potentiometer is used to fine tune, in accordance with the material used, the wire diameter and the inert gas. After this adjustment, the same setting can be used to weld in several voltage steps, as the wire feed is automatically adjusted.

Automatic creep feed

The automatic creep feed ensures safe ignition. It reduces the wire feed rate when the tip of the wire end is cold. After the arc has been ignited, the wire feed rate is then increased to the set value

Automatic burn back

A burn back time designed to suit the wire speed is set automatically depending on the motor brake phase. Individual adjustment of the burn back time is possible using the burn back potentiometer on the circuit board ➔ **Chapter 9, Circuit diagram**.

Warning!

The work which is necessary to set the automatic burn back must be carried out only by persons who have been trained by REHM. Contact your REHM representative.

6.8 Gas post-flow time

The gas post-flow time is set to 0.2 seconds as standard. The gas post-flow time can be increased to a maximum of 5 seconds using the gas post-flow potentiometer on the circuit board ➔ **Chap. 9, Circuit diagrams**.

Warning!

This work may be only carried out by persons who have been trained by REHM. Contact your REHM representative.

6.9 Practical notes

The practical user tips below represent just a few of the wide range of applications of *REHM* SYNERGIC.PRO^2 welding units. For questions regarding specific welding tasks, materials, inert gases or welding equipment, see the professional literature or speak to your *REHM* representative.

Weldable materials

The REHM SYNERGIC.PRO^2 inert gas welding units can be used to weld a wide variety of components, e.g. non-alloyed and alloyed steel, stainless steel and aluminium and galvanised sheets (MIG brazing).

Wire electrodes

Various wire diameters and materials are available and can be used for MIG/MAG welding. The wire diameter should be chosen to suit the material thickness of the basic material used and the welding current required. The material of the wire electrode is selected in accordance with the basic materials and the required quality of the weld itself. The most frequently used materials and diameters and their specifications can be found in the professional literature.

Inert gas

When welding **steels**, a mixed gas is generally used, this is made up of Argon with 18 % CO_2.

When welding **stainless steels**, a mixed gas is generally used, this is made up of Argon with 2 % CO_2.

When welding **aluminium**, pure Argon is used as inert gas.

The **required amount of inert gas** will depend on the wire diameter, the size of the gas nozzle, the level of current used and the movement of air within the work place. The required volume of gas for mixed gases is approx. 7… 16 l/min, for Argon approx. 10 ... 18 l/min.

Rough formula for estimating gas settings:

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

MIG/MAG torches

The MIG/MAG torches recommended by REHM may be connected in gas-cooled format to the REHM units, *SYNERGIC.PRO^2 170-2 through 310-4, 250-4, 300-4, 300-4 S, 350-4, 350-4 S, 450-4, 450-4 S, 500-4 S and 600-4 S* or in water-cooled format to the *350-4 W, 350-4 WS, 450-4 W, 450-4 WS, 500-4 WS and 600-4 WS* units.

Torch-equipment

The accessories selected for the torch will depend on the welding task in hand and must be chosen accordingly.

Current nozzles

Current nozzles are consumable parts and must be replaced from time to time. You should ensure that the current nozzles are selected to suit the wire diameter you are using.

Special current nozzles are available for aluminium welding tasks, these are available in various wire diameters and can be found in the *REHM* welding accessory catalogue.

Gas nozzles

Gas nozzles are available in various forms and can be found in the *REHM* welding accessory catalogue

Wire feed spirals

Wire feed spirals must be selected in accordance with the material type and wire thickness used. The range can be found in the REHM welding accessory catalogue

The notes given by the torch manufacturer should also be taken into account (see instructions).

Wire feed setting

The following information must be taken into account in order to ensure secure wire feeding:

Feed rollers must be selected to match the wire diameter.

Precise control of the feed motor rate ensures constant wire feed rate.

➔ **Chapter 6.7, Setting wire feed rate**

Spool bolt setting

The brake on the spool bolt must be set in such a way that the wire does not unwind at the welding end when the wire feed is switched off.

Welding voltage levels

The welding performance of the machine is determined by setting the step switch(es). The welding performance required depends on the welding task.

Recommended wire diametersand materials

SYNERGIC.PRO^2	Steel	Stainless steel	Aluminium	CuSi3
170-2	0.8...1.0	0.8...1.0		
190-2	0.8...1.0	0.8...1.0		
230-2 AM	0.6...1.0	0.8...1.0		0.8...1.0
230-4 AM	0.6...1.0	0.8...1.0	0.8…1.0	0.8...1.0
280-2	0.8...1.0	0.8...1.0		
280-4	0.8...1.0	0.8...1.0		
310-4	0.8...1.0	0.8...1.0		
250-4	0.8...1.0	0.8...1.0	1.0	
300-4	0.8...1.2	0.8...1.2	1.0...1.2	
350-4	0.8...1.2	0.8...1.2	1.0...1.2	
450-4	0.8...1.2	0.8...1.2	1.0...1.2	
500-4	0.8...1.6	0.8...1.6	1.0...1.2	
600-4	0.8...1.6	0.8...1.6	1.0...1.2	

7 Faults

7.1 Safety notes

Warning!

In the event of a fault occurring which may endanger persons, machinery or the surrounding area, deactivate the unit immediately and ensure that it cannot be reactivated.

Only restart the unit when the cause of the fault has been eliminated and no further risk is posed to people, machinery and/or surrounding area,

Faults should only be eliminated by qualified personnel and all safety notes should be observed. ➔ Chapter 2.

The unit must be released for use by qualified personnel before being restarted.

7.2 Table of faults

MAINS ON control lamp not on - no function	
Cause:	Solution:
Mains or phase voltage is missing	Check fuses and voltage
Defect in the mains power cord or connector	Check

Fans are not rotating	
Cause:	Solution:
Fuse defective	Change fuse
Fan defective	*Call service*
Controller defective	*Call service*
Cable break	*Call service*

OPERATION control lamp not on - no welding voltage	
Cause:	Solution:
Operation blocked by	see 3.2. Control lamps
Excessive temperature	
(yellow control lamp on)	
Torch plug not plugged in	Plug in
Faulty torch button or cable	*Service required; if necessary replace torch !*
Control fuse in machine has failed	Check fuse or replace it
Controller defective	*Call service*

OPERATION control lamp is on constantly

Cause:	Solution:
Torch button defective	Check torch button and possibly replace torch
Short circuit in torch button circuit	Check, possibly replace torch
Controller defective	*Call service*

TEMPERATURE control lamp on

Cause:	Solution:
Excessive temperature in power component.	Allow to cool, ensure that air can circulate freely, if necessary clean machine
Maximum duty cycle exceeded	Allow unit to cool down
Too high ambient temperature	Provide cooling
Clogging of the air inlet/outlet	Clean to ensure a free air supply
Covering up of the air inlet/outlet	Remove covering, provide free air supply
Fan defective	*Call service*

Welding current does not achieve the set value/does not occur

Cause:	Solution:
Earth cable is defective or not connected	Check

No inert gas

Cause:	Solution:
Tank is empty	Check
Pressure reducer defective	Check
Hose bent	Check
Gas valve on machine defective	*Call service*

Arc flickers and jumps

Cause:	Solution:
Electrode and work piece do not reach working temperature	Use thinner wire
Incorrect wire feed rate	Modify rate to suit

Arc is a strange colour

Cause:	Solution:
Not enough/no inert gas	Check inert gas supply
Incorrect inert gas	Use the correct inert gas

Wire unwinds in uncontrolled fashion

Cause:	Solution:
Wire spool brake is set too high or too low	Set wire spool brake
Wire feed problems change	Hose package should be inflated with every wire
	. Feeder spiral and rollers must match the wire diameter
Controller defective	*Call service*

Water-cooled torch gets too hot

Cause:	Solution:
Water hoses kinked	Check water hoses for correct position
Too little or no cooling water in tank	Check cooling water level
Water pump defective	*Call service*

Error messages "Err" and "noP"

Cause:	Solution:
"Err" "001" is displayed	Incorrect machine model selected Set the machine type at the controller (see Chapter 11). Otherwise, call service!
"Err" "002" is displayed	*Call service* Saving to memory faulty
"Err" "003" is displayed	*Call service* Control self-test recognises error
"Err" "004" is displayed	*Call service* EEPROM on the controller cannot be programmed
"Err" "005" is displayed	No signal from revolution measurer of feed motor Check connections to feed motor or replace feed motor. Otherwise, *call service*!
"Err" "006" is displayed	*Call service* EEPROM on the controller is not for SYNERGIC.PRO² (-->SYNERGIC.PRO)
"Err" "007" is displayed	No water throughput! This is only a case for service if the torch is OK and the water hoses are connected.
"Err" "009" is displayed	Call service Throughput monitor is faulty
"noP" is displayed	This stands for "no programm" and indicates that no characteristic data is stored for the selected position of the program selection switch. This is only a case requiring service, when the switch is at the material/diameter setting on the control panel. "noP" will continue to be displayed if a welding voltage is recognised that is too high. Check the set machine type or mains voltage for overvoltage. Otherwise, *call service*!

8 Repairs and maintenance

8.1 Safety notes

Warning!

Repair and maintenance work may only be carried out by personnel who have been trained by REHM. Contact your REHM representative. When replacing parts, only use original REHM parts.

If maintenance or repair work is carried out on this unit by personnel who have not been trained by REHM and thus are not authorised to carry out the work, this will void your guarantee and warranty claims over REHM.

Before starting to clean the welding unit, it must be switched off and taken from the power network!

Before starting maintenance work on the welding unit, it must be switched off and taken from the power network and secured against accidental reactivation.

Supply lines must be capped and switched to without pressure.

The warning notes given in ➔ Chapter 2 "Safety" must be taken into account.

The welding unit and its components are to be maintained in accordance with the specifications made in the maintenance table.

Insufficient or incorrect maintenance or repairs can lead to disruptions in operation. Regular maintenance of the unit is thus essential. No structural changes or additions may be made to the unit.

8.2 Maintenance table

The maintenance intervals given are a recommendation made by REHM whilst assuming normal circumstances (e.g. single-shift operation, in a clean and dry environment). The exact intervals will be specified by your safety officer.

Task	**Chapter**	**Interval period**
Cleaning the inside of the unit	8.3	Minimum of 2 x a year
Cooling water and cooler checking	8.4	Daily
Function testing of safety devices by operating staff		Daily
Observational check of the unit, with special attention to the torch hoses		Daily
Have supply cables and torch hoses inspected by qualified staff; inspection noted in the appropriate test book. **Check may need to be carried out more often in order to meet local regulations.**		Every six months

Task	Chapter	Interval period
Have entire welding equipment inspected by qualified staff; inspection noted in the appropriate test book. **Check may need to be carried out more often in order to meet local regulations.**		Once a year

8.3 Cleaning the inside of the unit

If the REHM welding unit is used in a dusty environment, then the inside of the unit must be cleaned regularly by vacuuming or blasting. The frequency of this cleaning process will depend on the actual conditions under which the unit is used, but should take place at least twice a year. Use clean, dry air to clean the unit or a vacuum cleaner.

8.4 Cooling water and cooler inspection

With machines that have built-in water circulation cooling, the water level in the tank must be checked daily.

If the water level drops below ¾ of the tank contents, additional water should be added. The special cooling medium developed and tested by REHM is specified for use as cooling medium (order 1680075, 5 litres). When carrying out this check, you should also check the cleanliness of the water cooler. The cooler may need to be cleaned with compressed air or vacuumed in order to ensure optimum torch cooling.

Cooling solutions are not environmentally friendly and may not be released into the sewage system.
Dispose of these solutions using the correct methods.

If maintenance or repair work is carried out on this unit by personnel who have not been trained by REHM and thus are not authorised to carry out the work, this will void your guarantee and warranty claims over REHM.

8.5 Correct disposal

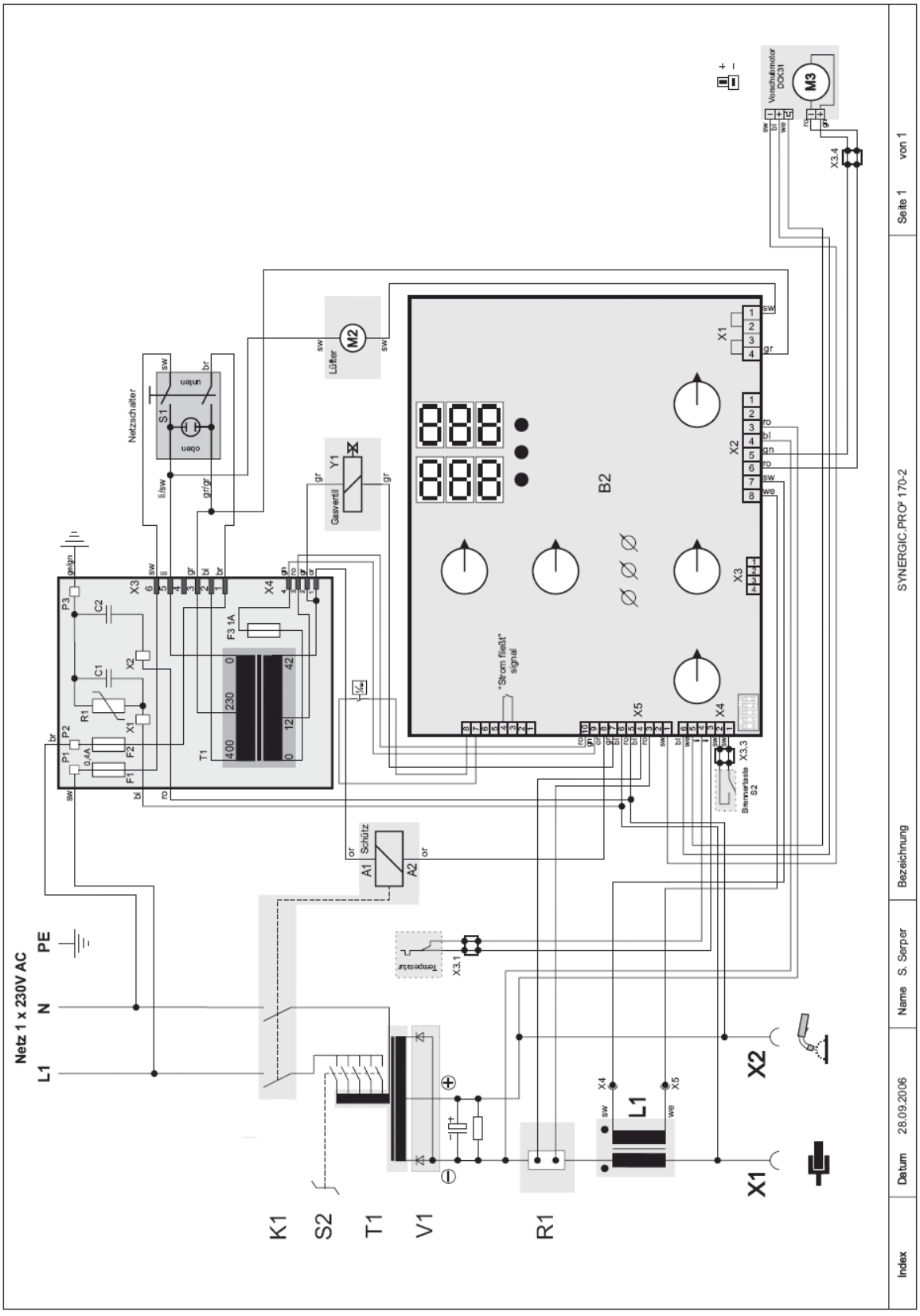
Only applies to countries in the EU.

Do not put electrical tools in the household rubbish.

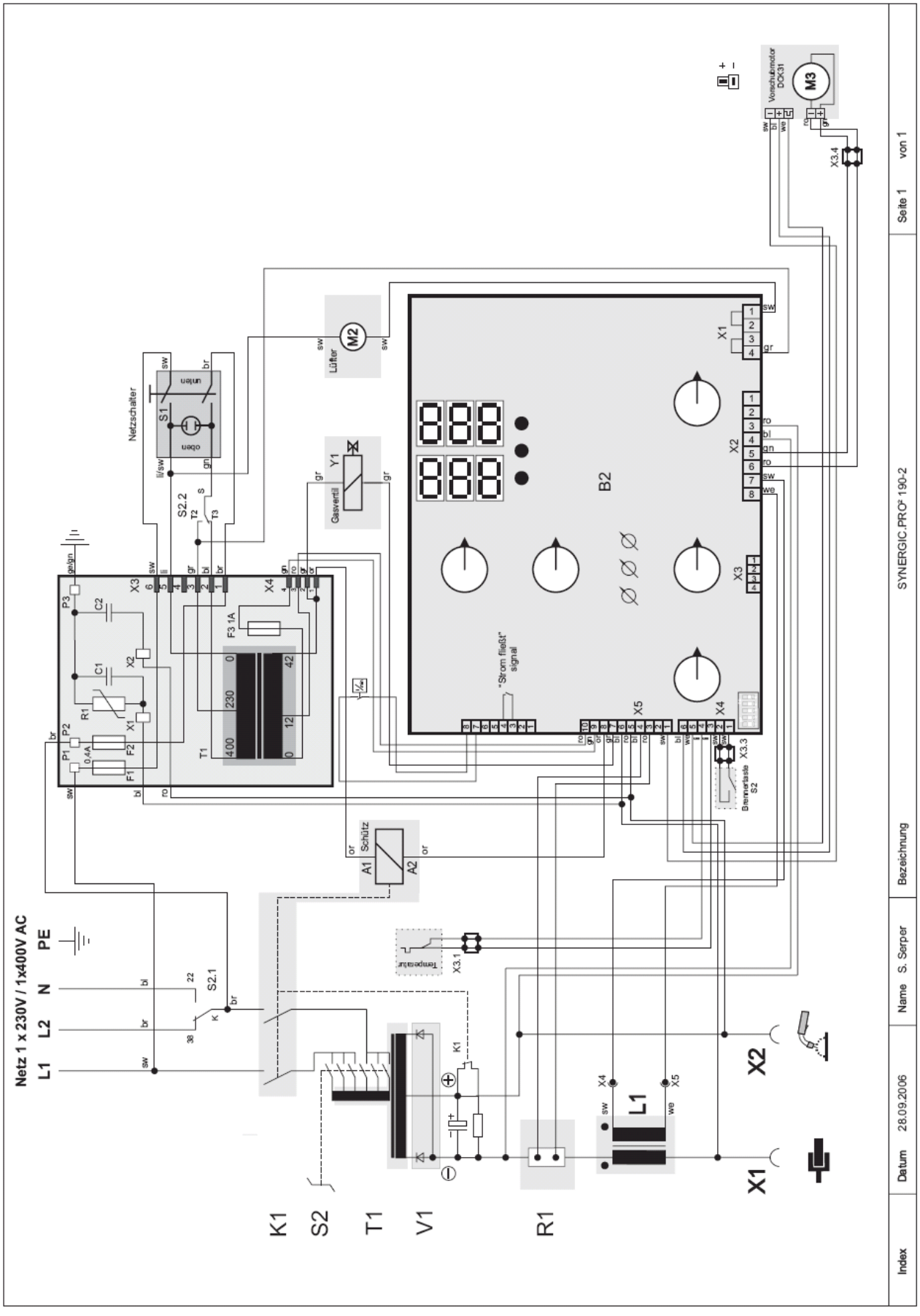
The European directive 2002/96/EG regarding the disposal of electronic an electrical goods and the implementation of such in national law means that used electrical tools must be collected separately and sent for environmentally-friendly recycling.

9 Circuit diagrams

SYNERGIC.PRO^2 170-2

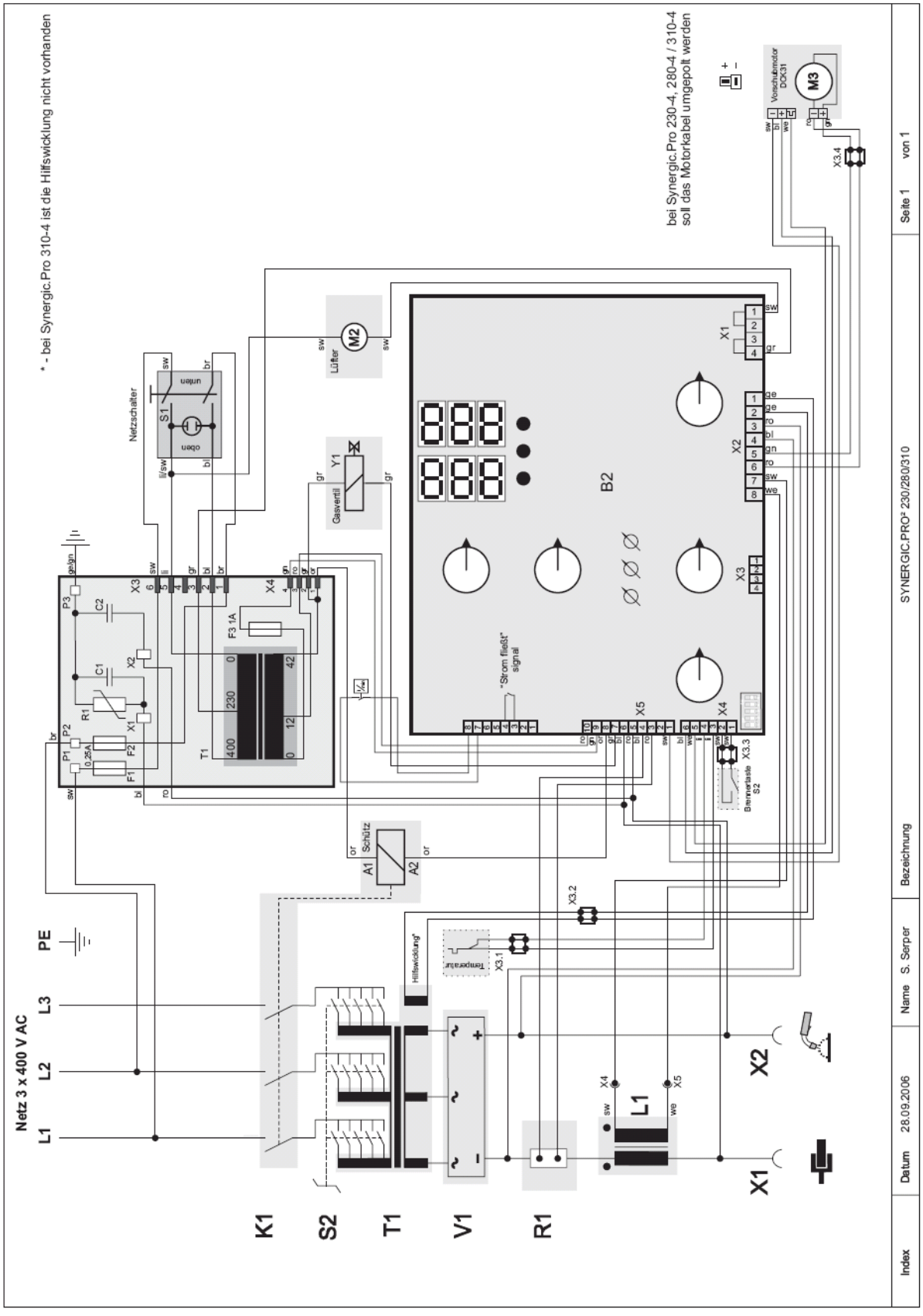


SYNERGIC.PRO^2 190-2

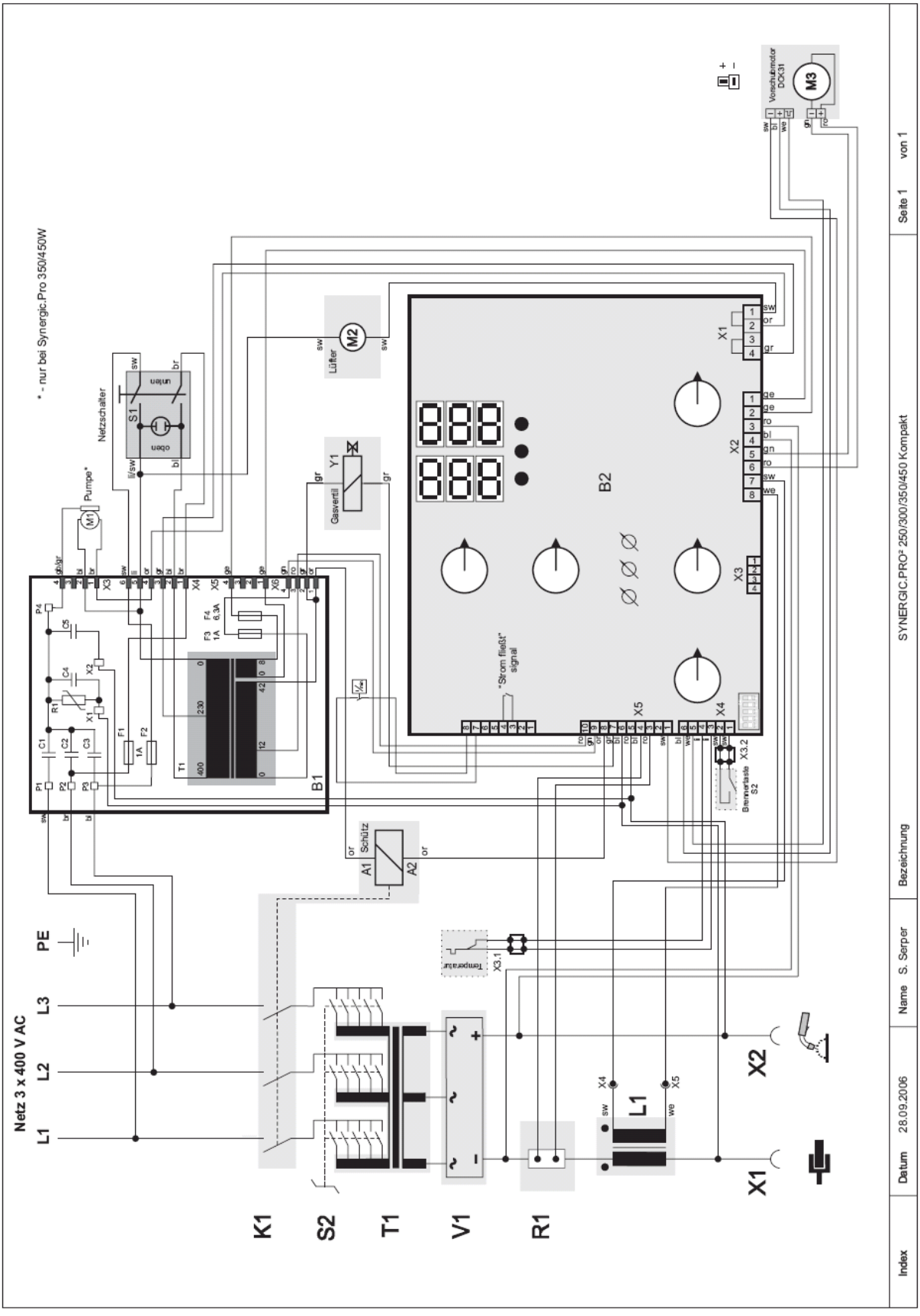


SYNERGIC.PRO^2 230-2 AM
SYNERGIC.PRO^2 280-2
SYNERGIC.PRO^2 310-4

SYNERGIC.PRO^2 230-4 AM
SYNERGIC.PRO^2 280-4

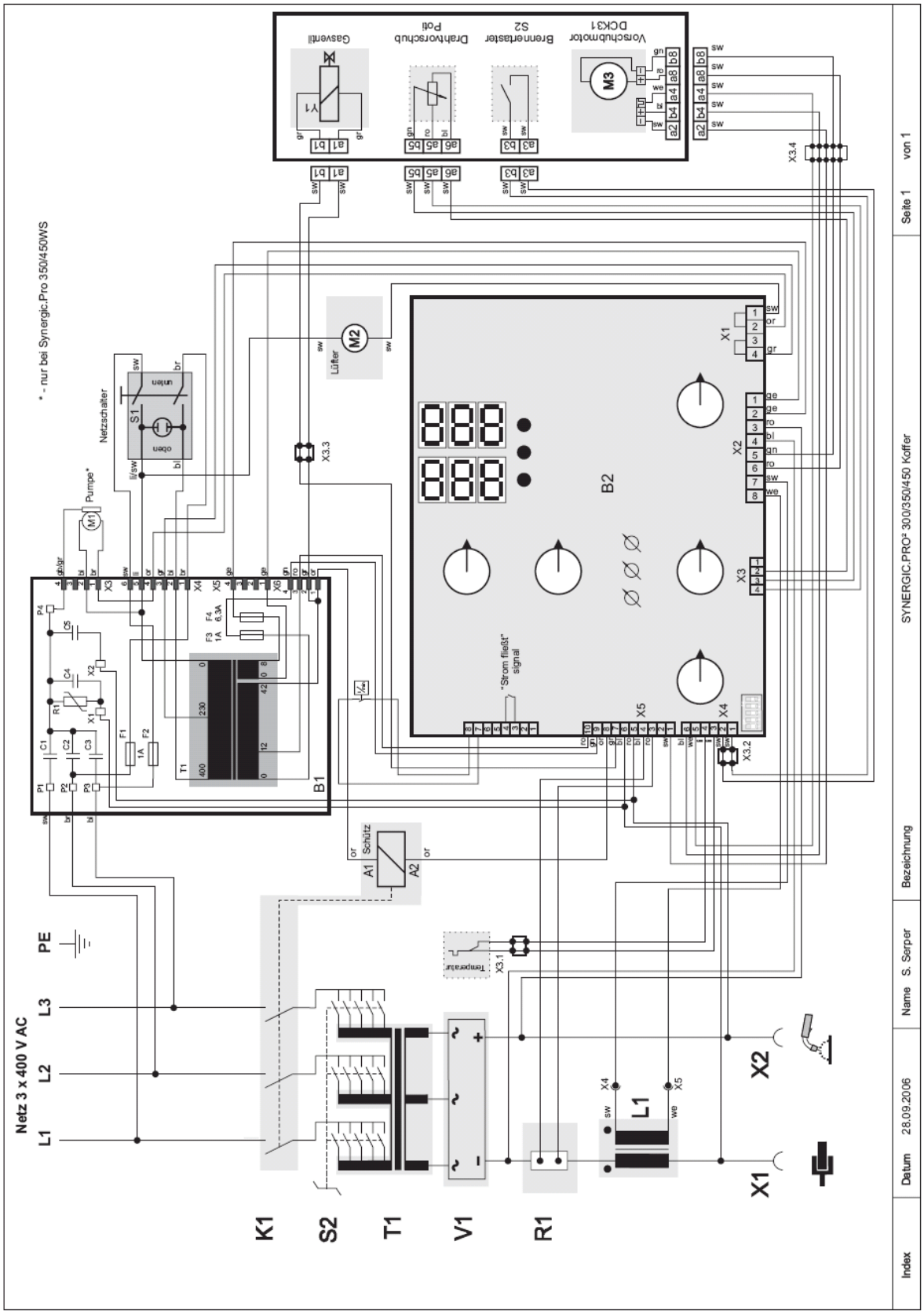


SYNERGIC.PRO^2 250-4 SYNERGIC.PRO^2 300-4
SYNERGIC.PRO^2 350-4 SYNERGIC.PRO^2 450-4
SYNERGIC.PRO^2 350-4 W SYNERGIC.PRO^2 450-4 W

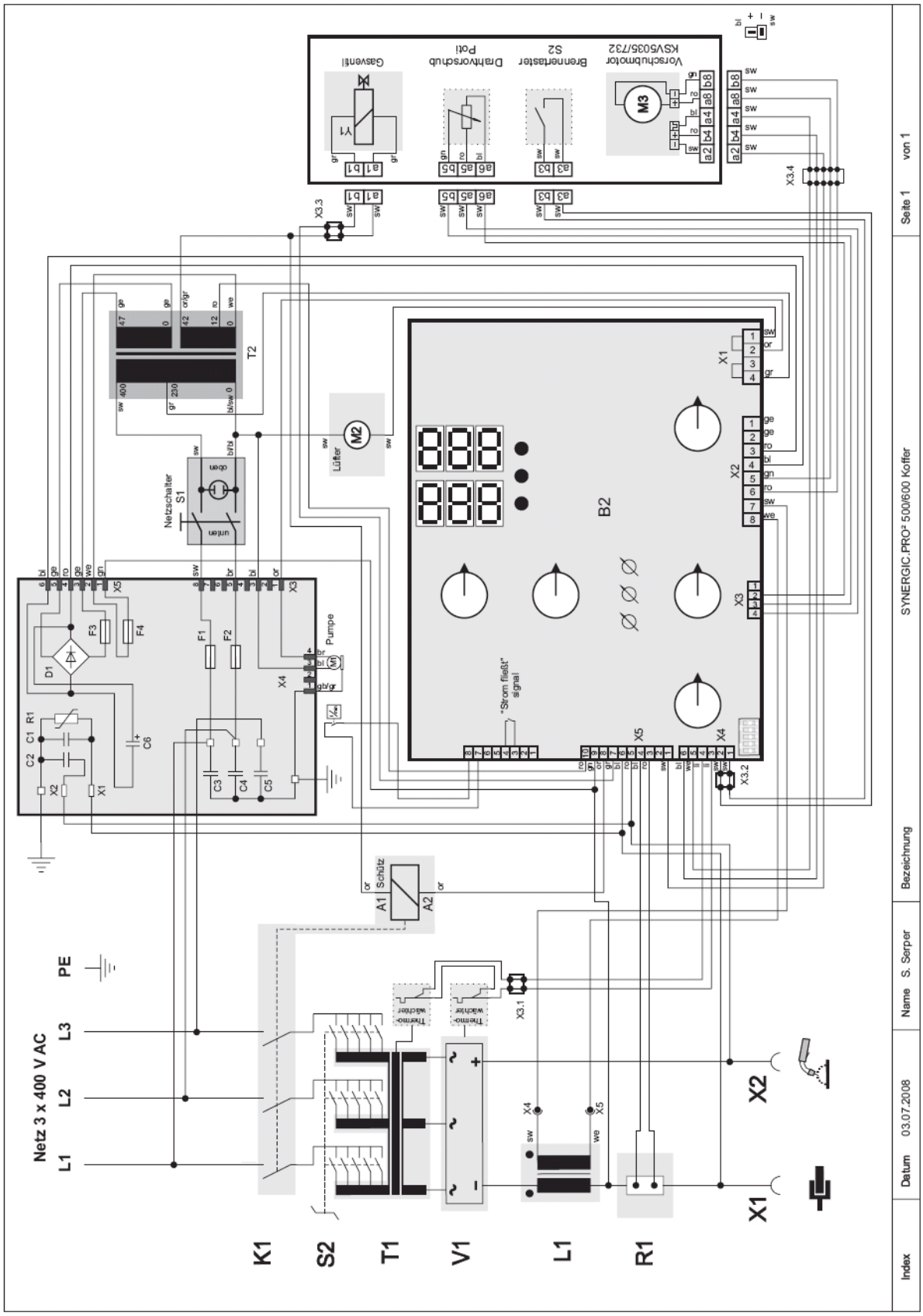


SYNERGIC.PRO^2 300-4S
SYNERGIC.PRO^2 350-4S
SYNERGIC.PRO^2 350-4WS

SYNERGIC.PRO^2 450-4S
SYNERGIC.PRO^2 450-4WS



SYNERGIC.PRO^2 500-4WS
SYNERGIC.PRO^2 600-4WS



10 Components of the SYNERGIC.PRO^2 units

10.1 List of components with *REHM* Order numbers

● = Series/Standard
■ = only if water-cooled
O = Optional/customer request
□ = only if air-cooled

No.	Description	170-2	190-2	230-2	280-2	230-4	280-4	310-4
1.	Side panel right	2101854	2101854	2101854	2101854	2101854	2101854	2101854
2.	Side panel left	2101855	2101855	2101855	2101855	2101855	2101855	2101855
3.	Tank trolley	2101853	2101853	2101853	2101853	2101853	2101853	2101853
4.	Floor/rear panel	2101850	2101850	2101850	2101850	2101850	2101850	2101850
5.	Cover	2101852	2101852	2101852	2101852	2101852	2101852	2101852
6.	Front panel	2101857	2101857	2101857	2101857	2101857	2101857	2101857
7.	Snap lock	2500035	2500035	2500035	2500035	2500035	2500035	2500035
8.	Graphic sheet	7301620	7301621	7301622	7301624	7301623	7301625	7301626
9.	Finely profiled mat	3300199	3300199	3300199	3300199	3300199	3300199	3300199
10.	Chain	2500014	2500014	2500014	2500014	2500014	2500014	2500014
11.	Wheel	2500012	2500012	2500012	2500012	2500012	2500012	2500012
12.	Steering castor	2500003	2500003	2500003	2500003	2500003	2500003	2500003
13.	Closure cap	2500047	2500047	2500047	2500047	2500047	2500047	2500047
14.	Handle right/left	2500100	2500100	2500100	2500100	2500100	2500100	2500100
15.	Spool bolt, large	2600051	2600051	2600051	2600051	2600051	2600051	2600051
16.	Nut for spool bolt	2600049	2600049	2600049	2600049	2600049	2600049	2600049
17.	Controller unit **B1**	2201075	2201074	2201073	2201073	2201073	2201073	2201073
18.	Control transformer	4700284	4700284	4700284	4700284	4700284	4700284	4700284
19.	Main contactor **K1**	4200159	4200109	4200108	4200108	4200108	4200108	4200108
20.	Fuse insert **F1/2**	6600054	6600054	6600053	6600053	6600053	6600053	6600053
21.	Fuse insert **F3**	6600008	6600008	6600008	6600008	6600008	6600008	6600008
22.	Fan **M2**	4100007	4100007	4100008	4100008	4100008	4100008	4100008
23.	Magnetic valve **Y1**	4200073	4200073	4200073	4200073	4200073	4200073	4200073
24.	Main switch **S1**	4200051	4200051	4200051	4200051	4200051	4200051	4200051
25.	Choke **L1**	4700331	4700332	4700333	4700334	4700333	4700334	4700356
26.	Main recifier **V1**	5300032	5300032	5300034	5300035	5300034	5300035	5300049
27.	Main transformer **T1**	2201980	2201981	2201982	2201983	2201982	2201983	2201985
28.	Installation socket **X1**	4300023	4300023	4300023	4300023	4300023	4300023	4300023
29.	Controller **B2**	6900665	6900665	6900665	6900665	6900665	6900665	6900665
30.	Potentiometer knob size 1	2600053	2600053	2600053	2600053	2600053	2600053	2600053
31.	Potentiometer knob size 2	2500054	2500054	2500054	2500054	2500054	2500054	2500054
32.	Potentiometer knob size 3	2600055	2600055	2600055	2600055	2600055	2600055	2600055
33.	Step switch	4200020	4200011	4200097	4200097	4200097	4200097	4200100
34.	Switch handle	4200156	4200156	4200156	4200156	4200156	4200156	4200156
35.	Central adapter **X2**	7500446	7500446	7500446	7500446	7500446	7500446	7500446
36.	Central adapter screen 7° angle	2600194	2600194	2600194	2600194	2600194	2600194	2600194
37.	Capillary tube	7502049	7502049	7502049	7502049	7502049	7502049	7502049
38.	Support pipe for Teflon seals	7502053	7502053	7502053	7502053	7502053	7502053	7502053
39.	Gas hose 1.4m	2200100	2200100	2200100	2200100	2200100	2200100	2200100
40.	Power cable	3600065	3600138	3600101	3600101	3600101	3600101	3600134
41.	Cord grip	3700085	3700085	3700085	3700085	3700085	3700085	3700085
42.	Feed motor **M3**	4100003	4100003	4100003	4100003	4100003	4100003	4100003
43.	Insulating plate	2600195	2600195	2600195	2600195	2600195	2600195	2600195

No.	Description	170-2	190-2	230-2	280-2	230-4	280-4	310-4
44.	Securing ring for shaft of feed unit	2900123	2900123	2900123	2900123	2900123	2900123	2900123
45.	Drive gear wheel					4000092	4000092	4000092
46.	Feed plate					4000091	4000091	4000103
47.	Wire guide					4000012	4000012	4000012
48.	Locking lever					4000118	4000118	4000118
49.	Angle lever no drilled hole for locking lever					4000120	4000120	4000120
50.	Angle lever drilled hove for locking lever					4000121	4000121	4000121
51.	Shim, PVC					4000102	4000102	4000102
52.	Shim, metal					4000101	4000101	4000101
53.	Gear rim					4000112	4000112	4000112
54.	Conveyor roller pair, 0.6mm					7502034	7502034	7502034
55.	Conveyor roller pair, 0.8mm					7502030	7502030	7502030
56.	Conveyor roller pair, 1.0mm					7502031	7502031	7502031
57.	Conveyor roller pair, 1.2mm					7502032	7502032	7502032
58.	Conveyor roller pair, 1.6mm					7502033	7502033	7502033
59.	Locking cap					4000002	4000002	4000002
60.	Holding rail					4000122	4000122	4000122
61.	Woodruff key					4000109	4000109	4000109
62.	Feed unit, complete					2201092	2201092	2201091
63.	Feed plate, complete					4000091	4000091	4000103
64.	Feed unit, complete	2200835	2200835	2200835	2200835			
65.	Feed plate, complete	4000155	4000155	4000155	4000155			
66.	Attaching screw for protective cover SF	**2900333**	**2900333**	**2900333**	**2900333**			
67.	Feed roller 0.6/0.8mm	4000151	4000151	4000151	4000151			
68.	Feed roller 0.8/1.0mm	4000153	4000153	4000153	4000153			
69.	Feed roller 1.0/1.2 mm	4000152	4000152	4000152	4000152			
70.	Pressure arm, left complete	4000156	4000156	4000156	4000156			
71.	Pressure roller 30 mm	**7502069**	**7502069**	**7502069**	**7502069**			
72.	Pressure unit, complete	4000158	4000158	4000158	4000158			
73.	Compression spring	4000159	4000159	4000159	4000159			
74.	Wire inlet nipple	**2600142**	**2600142**	**2600142**	**2600142**			
75.	Torch	7601555	7601555	7601555	7602543	7601555	7602543	7602543
76.	Earth cable	7810100	7810101	7810101	7810102	7810101	7810102	7810102
77.	Pressure reducer	7830100	7830100	7830100	7830100	7830100	7830100	7830100

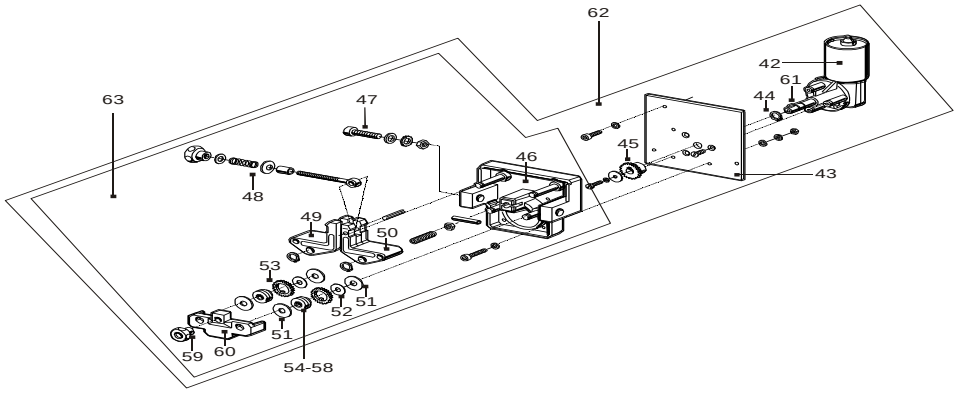


Diagram 3:Exploded view of the 4-roller drive unit

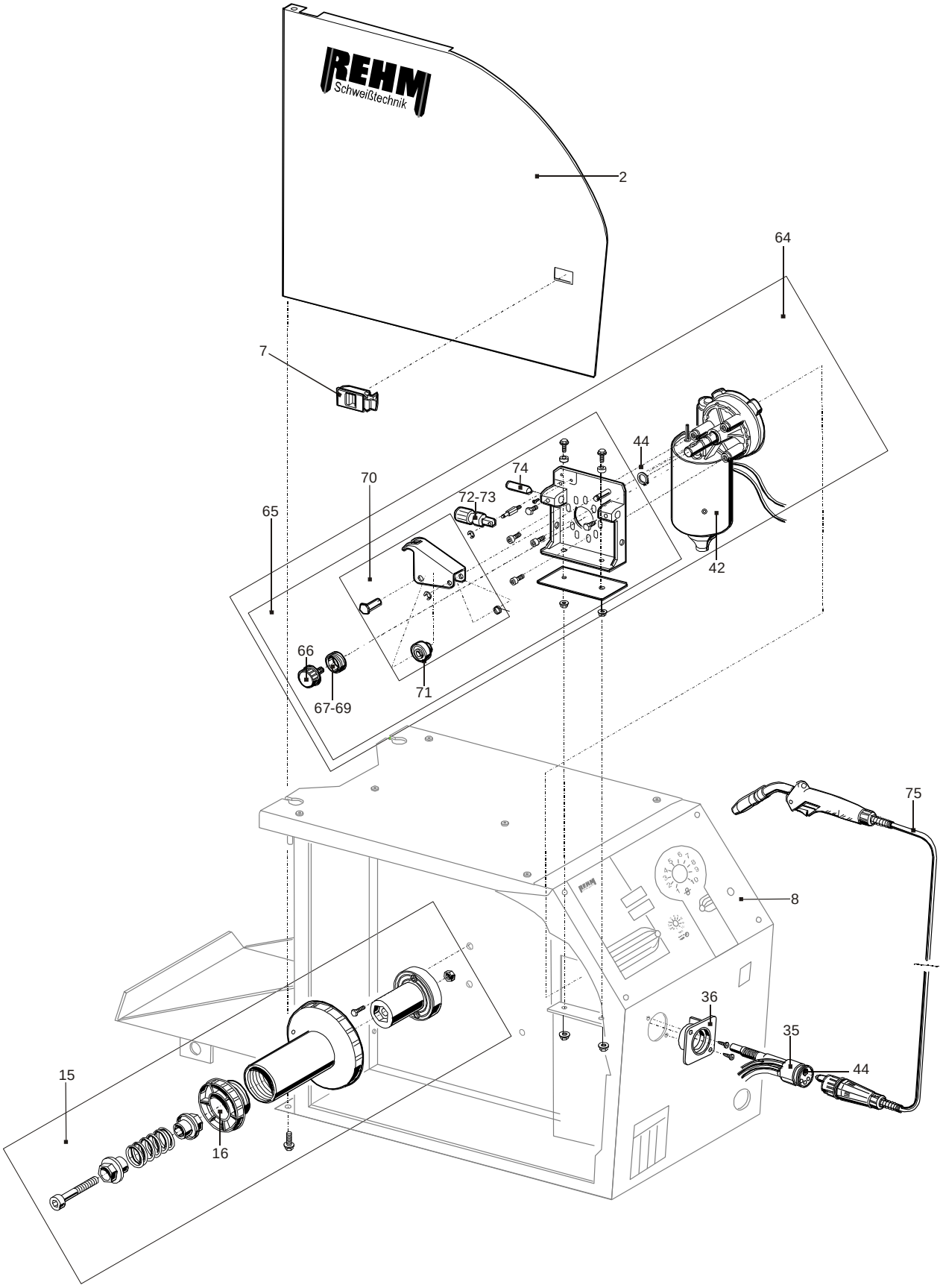


Diagram 4:Exploded view of SYNERGIC.PRO² 170-2 – 310-4 (left)

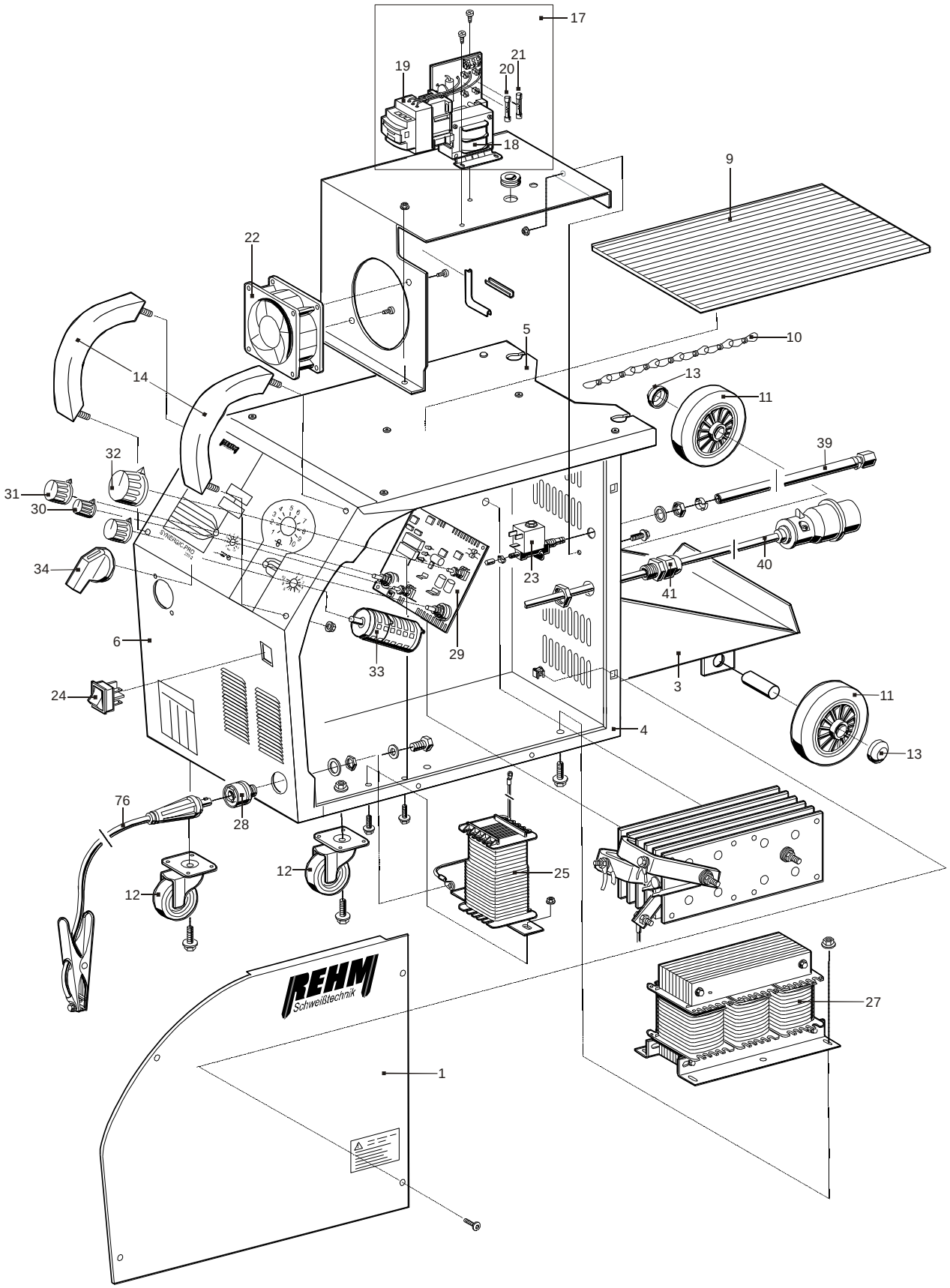


Diagram 5:Exploded view of SYNERGIC.PRO² 170-2 – 310-4 (right)

● = Series/Standard
■ = only if water-cooled
O = Optional/customer request
□ = only if air-cooled

			250-4	300-4	300-4S	350-4 350-4 W	350-4 S 350-4 WS	450-4 450-4 W	450-4 S 450-4 WS	500-4 S 500-4 WS	600-4 S 600-4 WS
1.	●	Cover	2101818	2101818	2101819	2101818	2101819	2101818	2101819	2101757	2101757
2.	●	Side panel left top	2101815	2101815	**2101817**	2101815	**2101817**	2101815	**2101817**	2101764	2101764
3.	●	Side panel left bottom	2101814	2101814		2101814		2101814			
4.	●	Side panel right	2101816	2101816	2101816	2101816	2101816	2101816	2101816	2101761	2101761
5.	●	Front panel	2101825	2101825	2101827	2101825	2101827	2101825	2101827	2101756	2101756
6.	●	Rear panel	2101823	2101823	2101823	2101823	2101826	2101823	2101826	2101758	2101758
7.	●	Handle section left/right	2500100	2500100	2500100	2500100	2500100	2500100	2500100	2500100	2500100
8.	●	Handle shell	2500101	2500101	2500101	2500101	2500101	2500101	2500101	2500101	2500101
9.	●	Graphic film, front	7301627	7301628	7301628	7301629	7301629	7301630	7301630	7301639	**7301638**
10.	●	Wheel	2500013	2500013	2500013	2500013	2500013	2500013	2500013	2500015	2500015
11.	●	Closure cap	2500047	2500047	2500047	2500047	2500047	2500047	2500047	2500046	2500046
12.	●	Steering castor	2500071	2500071	2500071	2500071	2500071	2500071	2500071	2500008	2500008
13.	●	Chain	2500014	2500014	2500014	2500014	2500014	2500014	2500014	2500014	2500014
14.	●	Snap lock	2500035	2500035	2500035	2500035	2500035	2500035	2500035	2500035	2500035
15.	●	Spool bolt, complete	2600051	2600051	2600051	2600051	2600051	2600051	2600051	2600051	2600051
16.	●	Nut for spool bolt	2600049	2600049	2600049	2600049	2600049	2600049	2600049	2600049	2600049
17.	●	Central adapter **X2**	**7500446**	**7500446**	7500446	**7500446**	7500446	**7500446**	7500446	7500443	7500443
18.	●	Central adapter screen	3400126	3400126	2600194	3400126	2600194	3400126	2600194	2600194	2600194
19.	●	Step switch, fine **S2**	4200097	4200100	4200100	4200097	4200097	4200101	4200101	4200180	4200178
20.	●	Step switch, coarse **S3**				4200099	4200099	4200103	4200103	4200179	4200177
21.	●	Switch handle	4200156	4200156	4200156	4200156	4200156	4200156	4200156	4200156	4200156
22.	●	Main transformer **T1**	**2201986**	**2201987**	**2201987**	**2201988**	**2201988**	**2201989**	**2201989**	**2201990**	**2201991**
23.	●	Main rectifier **V1**	5300034	5300035	5300035	5300049	5300049	5300037	5300037	**5300138**	**5300139**
24.	●	Welding choke **L1**	4700357	4700358	4700358	4700337	4700337	4700338	4700338	4700316	4700318
25.	●	Fan **M2**	4100007	4100008	4100008	4100008	4100008	4100008	4100008	4100008	4100008
26.	●	Fan cable	3600069	3600069	3600069	3600069	3600069	3600069	3600069	3600069	3600069
27.	●	Magnetic valve **Y1**	4200073	4200073	4200113	4200073	4200113	4200073	4200113	4200113	4200113
28.	●	Power switch	4200051	4200051	4200051	4200051	4200051	4200051	4200051	4200051	4200051
29.	●	Control unit complete **B1**	2201070	2201070	2201070	2201071	2201071	2201072	2201072	**2201087 ***	**2201087 ***
30.	●	Control transformer	4700360	4700360	4700360	4700360	4700360	4700360	4700360	4700390	4700390
31.	●	Main contactor **K1**	4200108	4200108	4200108	4200109	4200109	4200063	4200063	4200063	4200056
32.	●	Fuse insert 1A **F3**	6600008	6600008	6600008	6600008	6600008	6600008	6600008	6600008	6600008
33.	●	Fuse insert 1A **F1/2**	6600041	6600041	6600041	6600041	6600041	6600041	6600041	6600057	6600057
34.	●	Fuse insert 6.3A **F4**	6600016	6600016	6600016	6600016	6600016	6600016	6600016	6600016	6600016
35.	●	Controller **B2**	6900665	6900665	6900665	6900665	6900665	6900665	6900665	6900665	6900665
36.	●	Potentiometer knob size 3	**2600055**	**2600055**	**2600055**	**2600055**	**2600055**	**2600055**	**2600055**	**2600055**	**2600055**
37.	●	Potentiometer knob size 2	2600054	2600054	2600054	2600054	2600054	2600054	2600054	2600054	2600054
38.	●	Potentiometer knob size 1	**2600053**	**2600053**	**2600053**	**2600053**	**2600053**	**2600053**	**2600053**	**2600053**	**2600053**
39.	●	Shunt **R1**	6700040	6700040	6700040	6700040	6700040	6700040	6700040	6700010	6700010
40.	●	Installation socket	4300023	4300023	4300023	4300122	4300122	4300122	4300122	**4300118**	**4300118**
41.	●	Gas hose	2200100	2200100		2200100		2200100			
42.	●	Power cable	3600110	3600134	3600134	3600134	3600134	3600135	3600135	**3600091**	3600093
43.	●	Cable connector	3700085	3700085	3700085	3700085	3700085	3700085	3700085	**3700088**	3700093
44.	●	Water pump **M1**				■ 4100022	■ 4100022	■ 4100022	■ 4100022	■ 4100052	■ **4100052**
45.	●	Water tank				■ 2800018	■ 2800018	■ 2800018	■ 2800018	■ 2800018	■ 2800018
46.	●	Cooler				■ 2800001	■ 2800001	■ 2800001	■ 2800001	■ 2800000	■ 2800000
47.	●	Barometric cell				■ 3100080	■ 3100080	■ 3100080	■ 3100080		
48.	●	Coupling, blue				■ **3100099**	■ **3100099**	■ **3100099**	■ **3100099**	■ **3100099**	■ **3100099**
49.	●	Coupling, red				■ **3100098**	■ **3100098**	■ **3100098**	■ **3100098**	■ **3100098**	■ **3100098**
50.	●	Coolant (5l can)				■ 1680075	■ 1680075	■ 1680075	■ 1680075	■ 1680075	■ 1680075
51.	●	Side panel left ***Case***			2101874		2101874		2101874	2101874	2101874
52.	●	Side panel right ***Case***			2101875		2101875		2101875	2101875	2101875
53.	●	Graphic film, front ***Case***			7301633		7301633		7301633	7301633	7301633
54.	●	Cover ***Case***			2101873		2101873		2101873	2101873	2101873
55.	●	Rear panel ***Case***			2101870		2101870		2101870	2101870	2101870
56.	●	Front panel ***Case***			2101872		2101872		2101872	2101772	2101772
57.	●	Handle RAL9022 ***Case***			**2600207**		**2600207**		**2600207**	**2600207**	**2600207**
58.	●										
59.	●	Hinge ***Case***			2500066		2500066		2500066	2500066	2500066
60.	●	Surface-mounted housing			4300303		4300303		4300303	4300303	4300303
61.	●	Socket connector			4300302		4300302		4300302	4300302	4300302
62.	●	Water supply hose					■ 3200030		■ 3200030	■ 3200030	■ 3200030
63.	●	Water return hose					■ 3200031		■ 3200031	■ 3200031	■ 3200031
64.	●	Covering hose			3200007		3200007		3200007	3200007	3200007

			250-4	300-4	300-4S	350-4 350-4 W	350-4 S 350-4 WS	450-4 450-4 W	450-4 S 450-4 WS	500-4 S 500-4 WS	600-4 S 600-4 WS
65.	●	Welding cable coupling			4300128		4300128		4300128	**4300116**	**4300116**
66.	●	Control lead 14*1.0mm²			**3500067**		**3500067**		**3500067**	3500067	3500067
67.	●	Potentiometer			5000213		5000213		5000213	5000213	5000213
68.	●	Flange socket			4300304		4300304		4300304	4300304	4300304
69.	●	Multipoint plug			4300301		4300301		4300301	4300301	4300301
70.	●	Rubber and metal buffer			3300006		3300006		3300006	**3300006**	**3300006**
71.	●	Built-in plug			4300138		4300138		4300138	4300130	4300130
72.	●	Pipe clip			**2600026**		**2600026**		**2600026**	**2600026**	**2600026**
73.	●	Cage nut			2100105		2100105		2100105	2100105	2100105
74.	●	Welding cable			**3500005**		**3500005**		**3500006**	**3500008**	**3500008**
75.	●	Gas hose			3200041		3200041		3200041	3200041	3200041
76.	●	Feed unit, complete	2201092	2201091	2201091	□ 2201091 ■ 2201090	□ 2201091 ■ 2201090	2201090	2201090	2200937	2200937
77.	●	Feed plate	4000091	4000103	4000103	4000103 4000115	4000103 4000115	4000115	4000115	**4000016**	**4000016**
78.	● O	Capillary tube Support tube (for Teflon core)	**7502046** **7502052**	**7502046** **7502052**	**7502049** **7502053**	**7502046** **7502052**	**7502049** **7502053**	**7502046** **7502052**	**7502049** **7502053**	**7502049** **7502053**	**7502049** **7502053**
79.	●	Pressure unit, complete, red								**4100039**	**4100039**
80.	●	Feed motor **M3**	4100003	4100003	4100003	4100003	4100003	4100003	4100003	4100036	4100036
81.	●	Drive gear wheel	4000092	4000092	4000092	4000092	4000092	4000092	4000092	**4000015**	**4000015**
82.	●	Feed plate, complete	4000091	4000091	4000091	4000091	4000091	4000091	4000091	**4000127**	**4000127**
83.	●	Wire guide (inlet nipple)	4000012	4000012	4000012	4000012	4000012	4000012	4000012	● **2600142** O **4100040**	● **2600142** O **4100040**
84.	●	Insulating plate	2600195	2600195	2600195	2600195	2600195	2600195	2600195		
85.	●	Locking lever	4000118	4000118	4000118	4000118	4000118	4000118	4000118		
86.	●	Angled lever with no drilled hole for locking lever **Pressure arm, left complete**	4000120	4000120	4000120	4000120	4000120	4000120	4000120	**4100062**	**4100062**
87.	●	Angle lever drilled hole for locking lever **Pressure arm, right complete**	4000121	4000121	4000121	4000121	4000121	4000121	4000121	**4100063**	**4100063**
88.	●	Shim, PVC	4000102	4000102	4000102	4000102	4000102	4000102	4000102		
89.	●	Shim, metal	4000101	4000101	4000101	4000101	4000101	4000101	4000101		
90.	●	Woodruff key	4000109	4000109	4000109	4000109	4000109	4000109	4000109		
91.	●	Gear rim (feed groove)	4000112	4000112	4000112	4000112	4000112	4000112	4000112	**4000003**	**4000003**
92.	O	Conveyor roller pair, 0.6mm	O7502034	O7502034	O 7502034	O 7502034	O 7502034	O 7502034	O 7502034		
93.	O	Conveyor roller pair, 0.8mm	●7502030	O7502030	O 7502030	O 7502030	O 7502030	O 7502030	O 7502030		
94.	O	Conveyor roller pair, 1.0mm	O7502031	●7502031	●7502031	□●7502031	□●7502031	O 7502031	O 7502031	O**7502054**	O**7502054**
95.	O	Conveyor roller pair, 1.2mm	O7502032	O7502032	O 7502032	■●7502032	■●7502032	●7502032	●7502032	●**7502055**	●**7502055**
96.	O	Conveyor roller pair, 1.6mm	O7502033	O7502033	O 7502033	O 7502033	O 7502033	O 7502033	O 7502033	O**7502056**	O**7502056**
97.	●	Locking cap	4000002	4000002	4000002	4000002	4000002	4000002	4000002		
98.	●	Bearing bush	4000113	4000113	4000113	4000113	4000113	4000113	4000113		
99.	●	Holding rail/cover plate	4000122	4000122	4000122	4000122	4000122	4000122	4000122	**4100056**	**4100056**
100	O	Filter frame	2101840	2101840	2101840	2101840	2101840	2101840	2101840	2101759	2101759
101	O	Air filter insert	7501118	7501118	7501118	7501118	7501118	7501118	7501118	7501119	7501119
102	●	Torch	7602543	7602543	**7602543**	□□7602606 ■□7604155	□□7602606 ■□7604155	□□760360 6 ■□760415 5	□□760360 6 ■□760415 5	**7604146**	**7605140**
103	●	Earth cable	7810102	7810102	7810102	7810109	7810109	7810109	7810109	**7810115**	**7810115**
104	●	Pressure reducer	7830100	7830100	7830100	7830100	7830100	7830100	7830100	7830100	7830100
105	●	**Counter pressure roller**								**7502039**	**7502039**
106	●	**Pressure axis**								**4100061**	**4100061**
107	●	**Distancing sockets 7.9 mm rear & 1 mm front**								**4100060**	**4100060**
108	●	**Fixing screw for drive groove**								**2900332**	**2900332**
109	●	**Centre wire guide**								**4000154**	**4000154**
110	●	**Fixing screw for protective cover**								**2900315**	**2900315**

* - only fitted boards

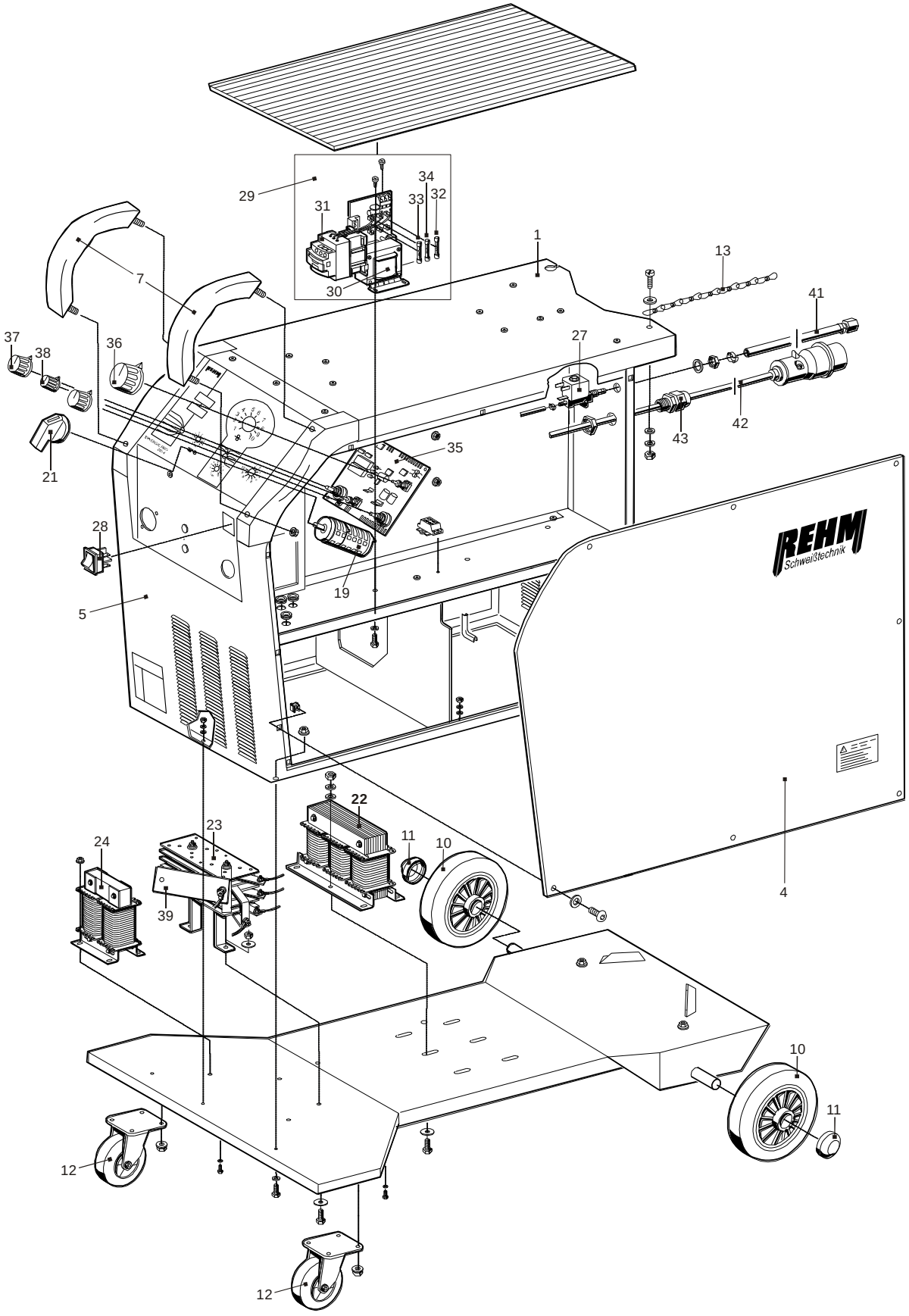


Diagram 6 Exploded view of SYNERGIC.PRO² 250-4 – 450-4W (right)

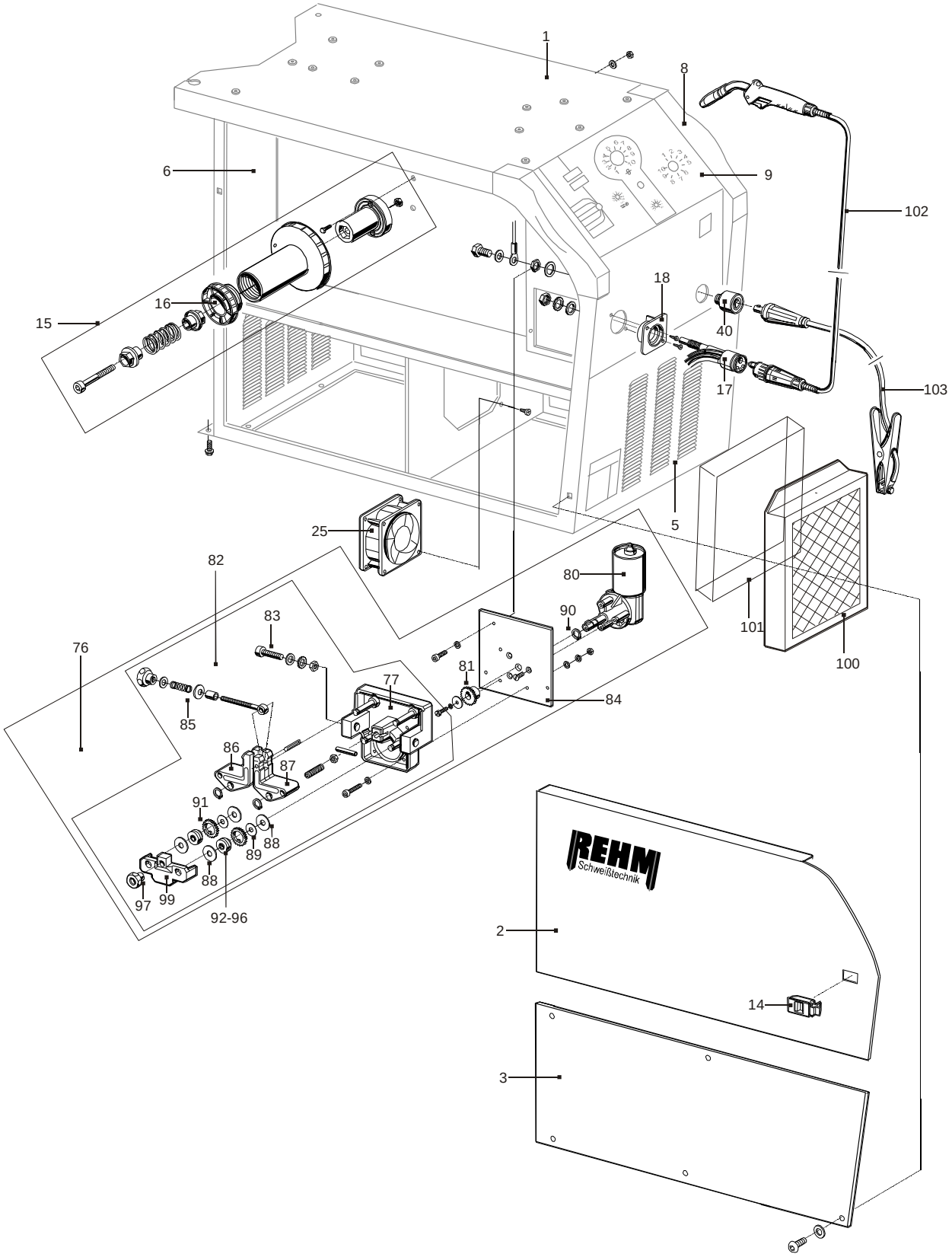


Diagram 7:Exploded view of SYNERGIC.PRO² 250-4 – 450-4W (left)

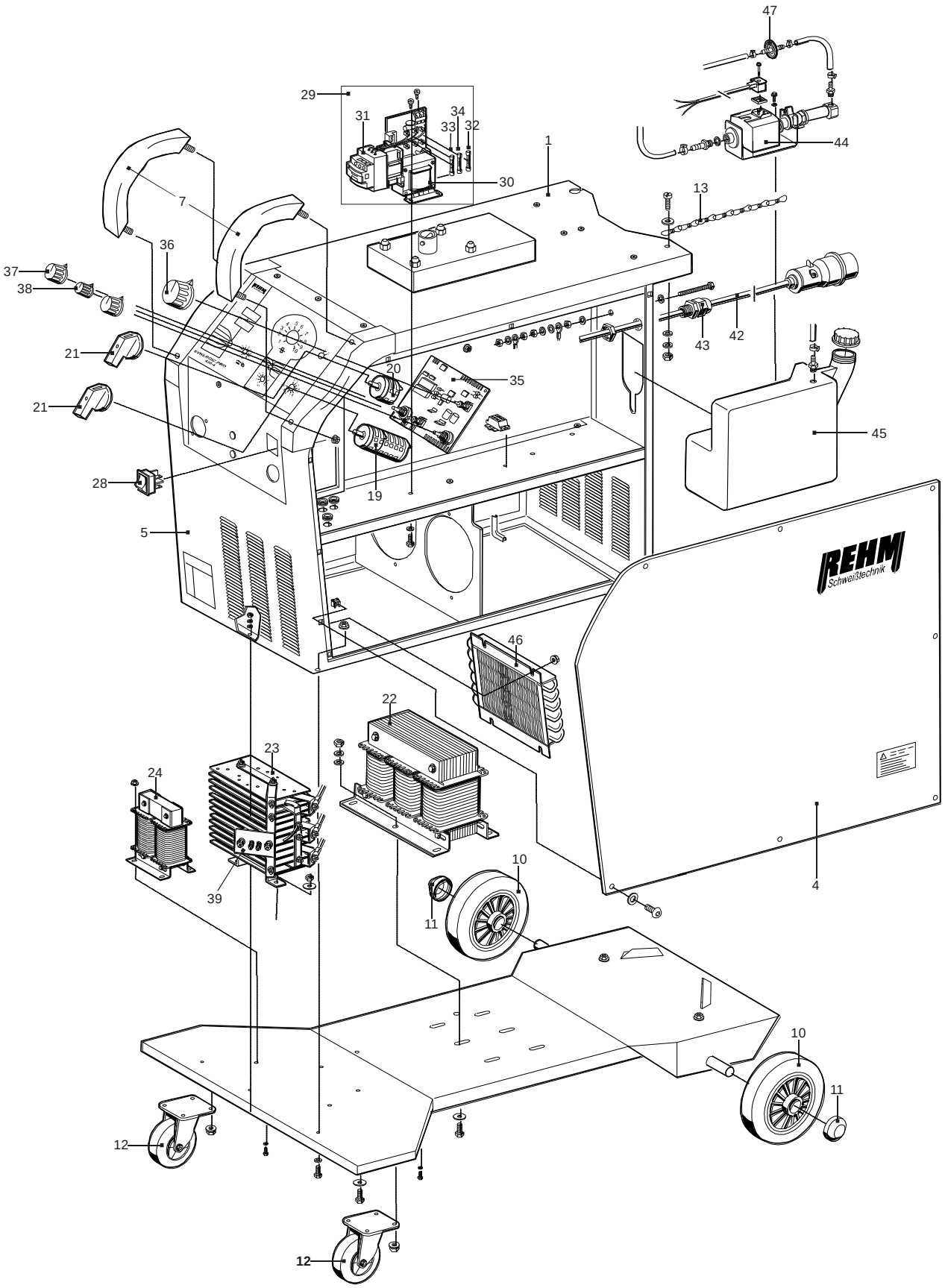


Diagram 8: Exploded view of SYNERGIC.PRO² 300-4S – 450-4WS (right)

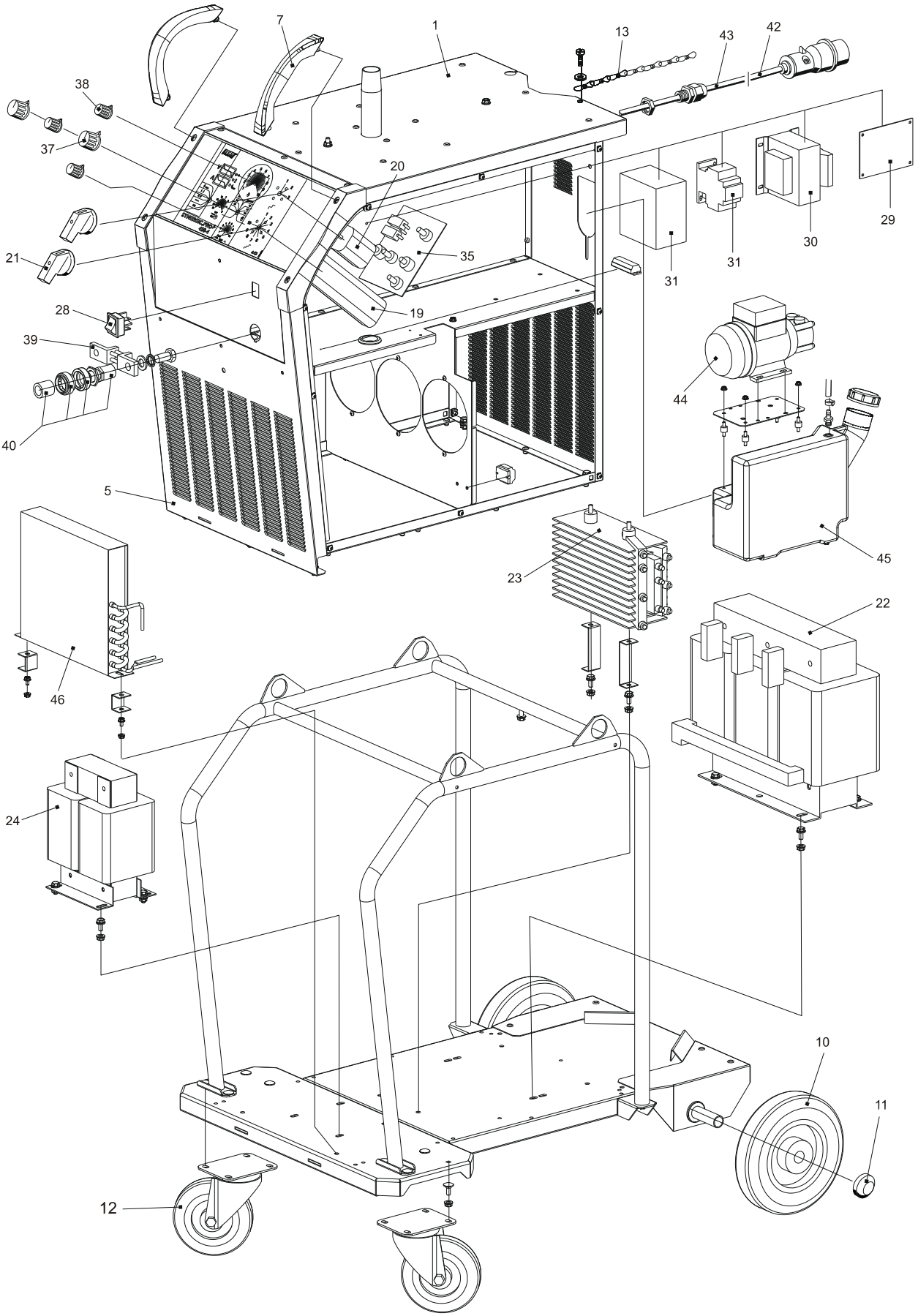


Diagram 9: Exploded view of SYNERGIC.PRO² 500-4S – 600-4WS (right)

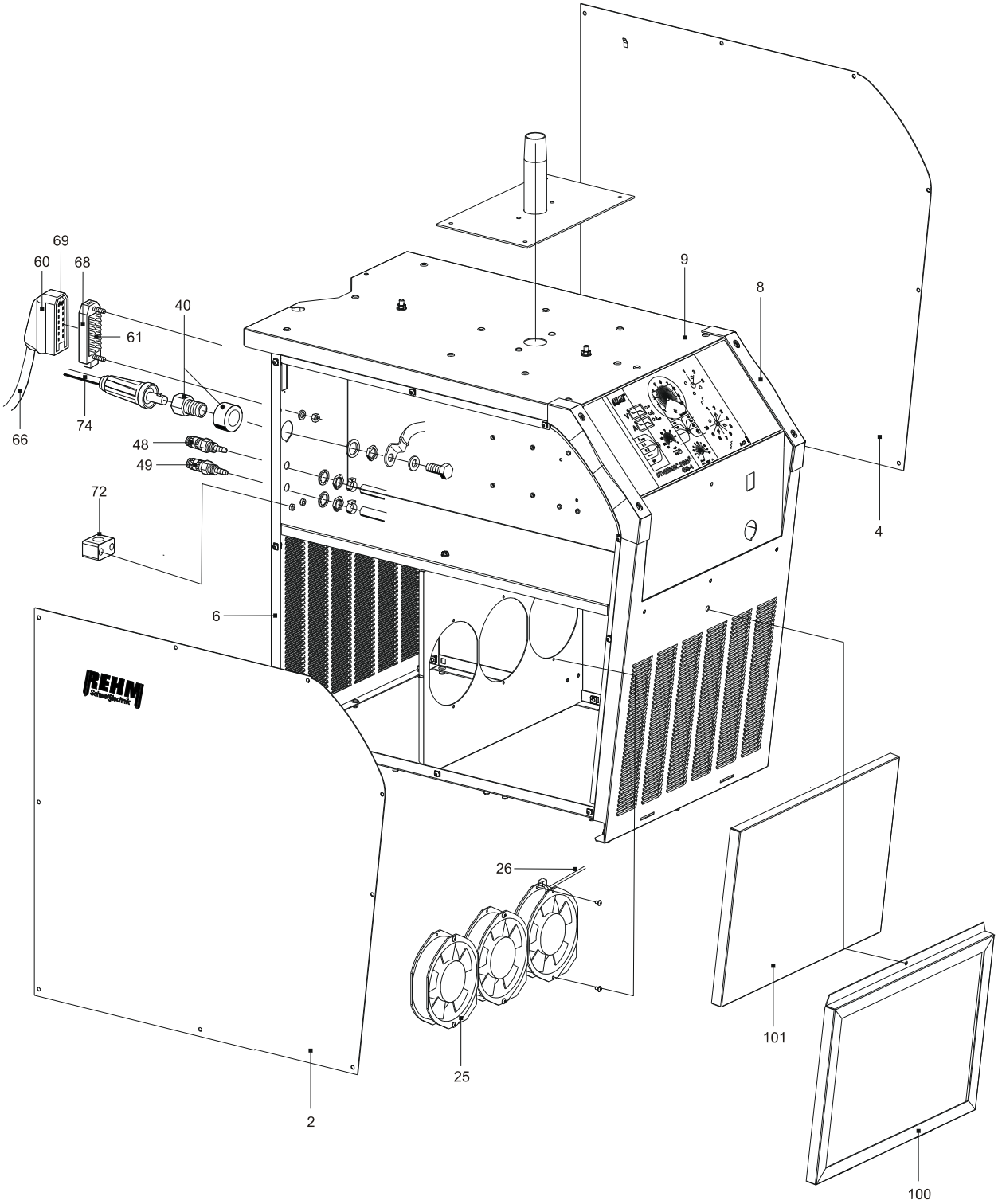


Diagram 10: Exploded view of SYNERGIC.PRO² 300-4S – 600-4WS (left)

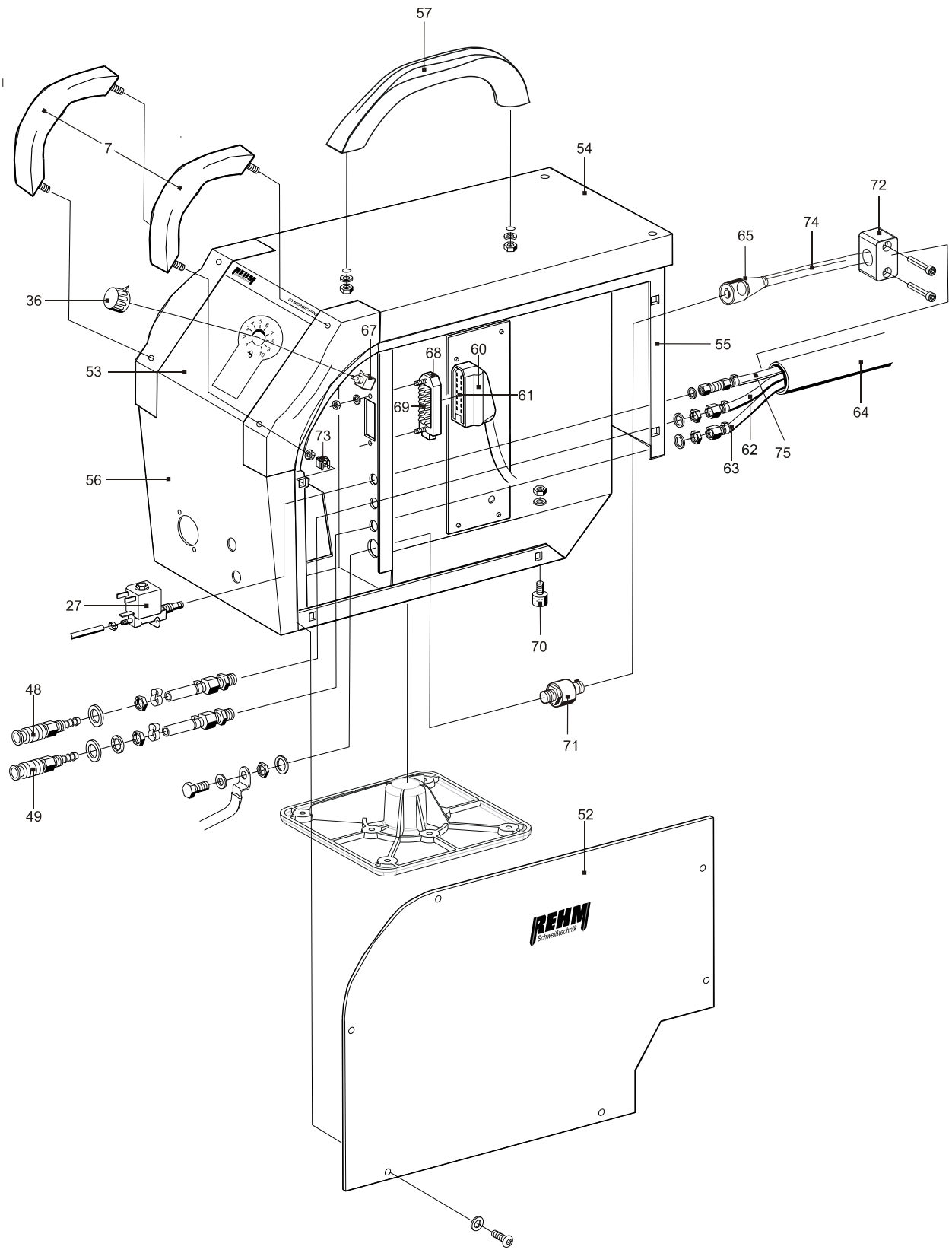


Figure 11: Exploded view of SYNERGIC.PRO² feed case (right)

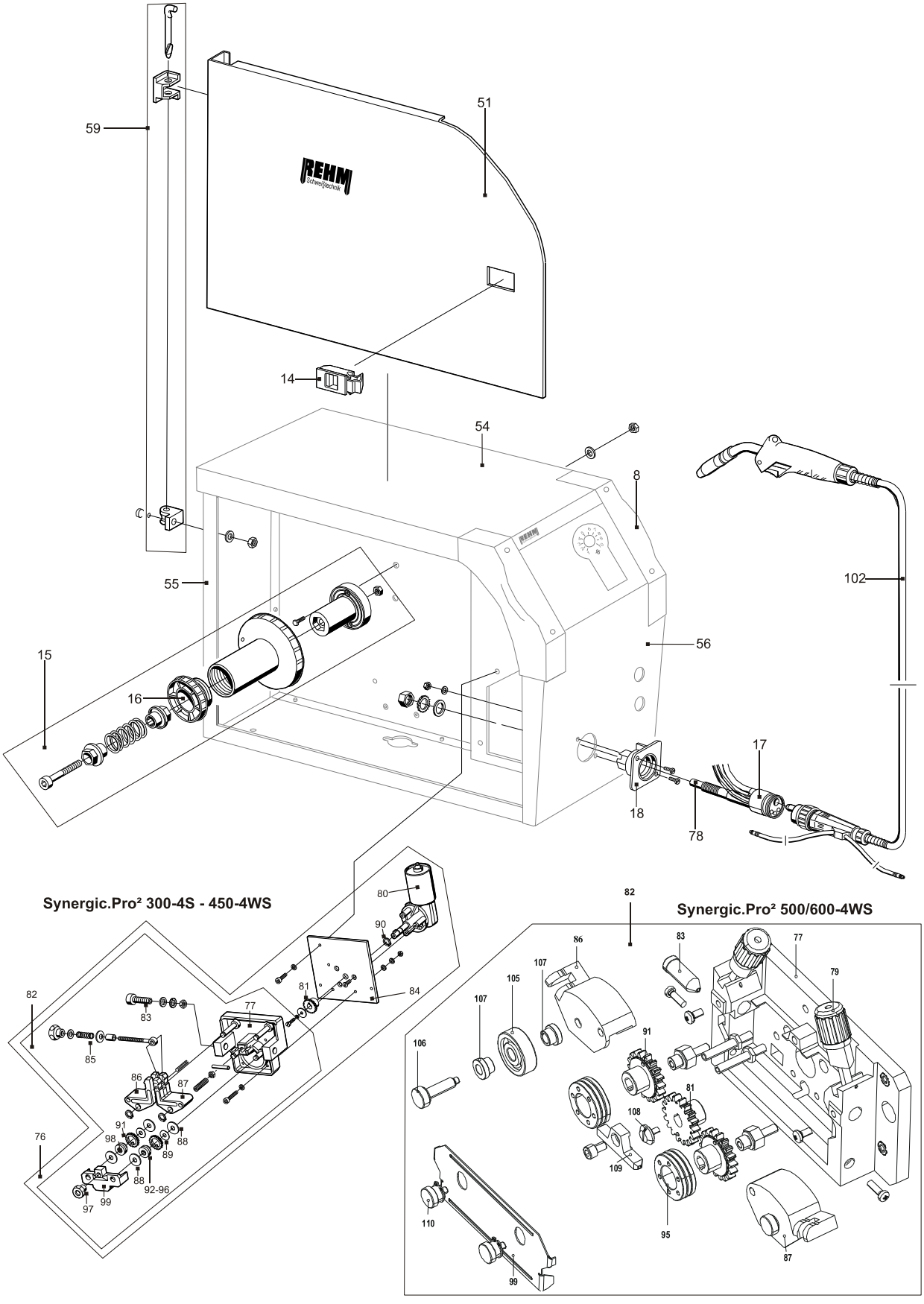


Figure 12: Exploded view of SYNERGIC.PRO² feed case (left)

11 Setting of control module

The control module is designed in such a way that it can be used with all types of machine from SYNERGIC.PRO^2 170-2 through to SYNERGIC.PRO^2 600-4 WS. If the control must be replaced, it can be adjusted very easily to the respective model. To do so, the DIP switches on the control (see Diagram 3) must be adjusted in accordance with the following table.

DIP switch 1	2	3	4	5	Machine model
-	-	-	-	-	SYNERGIC.PRO² 170-2
ON	-	-	-	-	SYNERGIC.PRO² 190-2
-	ON	-	-	-	SYNERGIC.PRO² 230-2 AM
-	-	ON	ON	-	SYNERGIC.PRO² 230-4 AM
ON	ON	-	-	-	SYNERGIC.PRO² 280-2
	-	ON	-	-	SYNERGIC.PRO² 280-4
ON	-	ON	-	-	SYNERGIC.PRO² 310-4
-	ON	ON	-	-	SYNERGIC.PRO^2 250-4
ON	ON	ON	-	-	SYNERGIC.PRO^2 300-4
ON	-	ON	ON	-	SYNERGIC.PRO^2 300-4 S
-	-	-	ON	-	SYNERGIC.PRO^2 350-4 SYNERGIC.PRO^2 350-4 W
ON	-	-	ON	-	SYNERGIC.PRO^2 350-4 S SYNERGIC.PRO^2 350-4 WS
-	ON	-	ON	-	SYNERGIC.PRO^2 450-4 SYNERGIC.PRO^2 450-4 W
ON	ON	-	ON	-	SYNERGIC.PRO^2 450-4 S SYNERGIC.PRO^2 450-4 WS
-	ON	-	-	ON	SYNERGIC.PRO² 500-4 S SYNERGIC.PRO² 500-4 WS
ON	ON	-	-	ON	SYNERGIC.PRO² 600-4 S SYNERGIC.PRO² 600-4 WS
-	-	ON	-	ON	SYNERGIC.PRO² 500-4 SYNERGIC.PRO² 500-4 W
ON	-	ON	-	ON	SYNERGIC.PRO² 600-4 SYNERGIC.PRO² 600-4 W

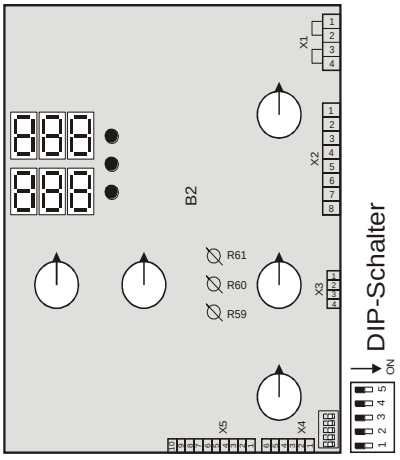


Figure 12: Control with DIP switches

Setting the DIP switch:

R59 burn back time

R60 automatic creep speed function

R61 gas post-flow time

12 Technical data

Overview of types

SYNERGIC.PRO²		170-2	190-2	230-2 AM 230-4 AM	280-2 280-4	310-4	250-4	300-4	350-4	450-4	500-4	600-4
Setting range	A	30-170	30-140 50-190	15-230	35-280	35-300	35-250	40-300	40-350	45-450	40-500	40-600
Duty ratio (DR) at I max (40°C)	%	30	50 30	40	40	40	50	50	50	50	60	60
Welding current at 100 % duty cycle (40°C)	A	80	100 105	150	180	210	180	210	260	320	375	450
Switching levels		6	6	10	10	12	10	12	20	30	36	36
Open circuit voltage	V	22-37	22-34 23-37	15-37	17-37	17-40	18 - 37	17- 42	18 - 43	18 - 51	17-52	17-60
Power supply	V	1 x 230	1 x 230 3 x 400	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400	3 x 400
Maximum effective current I1max	A	28	22 20	14	17	19	16	20	25	35	41	56
Effective current I1eff	A	16	16 11	9	11	12	11	14	18	25	32	43
Fuse (slow)	A	20	20 16	16	16	32	16	32	32	32	32	63
Performance factor λ a)	%	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96	0,96
Type of cooling b)		AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF
Torch cooling type		Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas Water	Gas Water	Water	Water
Protection type c)		IP 21	IP 21	IP 21	IP 21	IP 21	IP 23	IP 23	IP 23	IP 23	IP 23	IP 23
Isolation class d)		H	H	H	H	H	H	H	H	H	H	H
Weight (with case)	[kg]	54	60	68	72	78	100	110 (134)	123 (147)	136 (160)	234	255
Dimensions LxWxH (with case)	mm	800 x 330 x 620					1040 x 560 x 850 (1040 x 560 x 1400)				1090x710x1085 (1090x710x1550)	

We reserve the right to make technical changes to reflect further development.

a) Performance factor = describes the relationship of effective power to apparent power

b) Type of cooling = Cooling of the current source, AF signifies cooling carried out by fan (Air Forced)

c) Protection class = Extent of the protection afforded by the housing with regard to the entry of foreign bodies and of water (IP21, IP23 = protection against solid foreign bodies > 12.5 mm ∅; IP23 = protection against water splashes, IP21 = protection against dripping water)

d) Insulation class = Class of the insulation materials used and their highest permitted constant temperature (H = highest permitted constant temperature 180°)

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EC Declaration of Conformity

We hereby confirm that the following products

MIG/MAG inert gas metal arc welding units

SYNERGIC.PRO^2	**170-2 / 190-2 / 230-2 AM / 230-4 AM /**		**280-2**
SYNERGIC.PRO^2	**280-4**	**–**	**310-4**
SYNERGIC.PRO^2	**250-4**	**–**	**450-4**
SYNERGIC.PRO^2	**300-4 S**	**–**	**600-4 S**
SYNERGIC.PRO^2	**350-4 W**	**–**	**450-4 W**
SYNERGIC.PRO^2	**350-4 WS**	**–**	**600-4 WS**

meet all the major protection requirements laid down in the Council Directive **2004/1087EEC** on the approximation of the laws of the member states relating to electromagnetic compatibility and in the Directive **2006/95/EEC** relating to electrical equipment designed for use within certain voltage limits
The above products conform to the regulations in this Directive and meet the safety requirements for equipment used for arc welding in accordance with the following product standards.

EN 60 974-1: 2006-07
Arc welding equipment – Part 1: Welding power sources

EN 60 974-2: 2003-09
Arc welding equipment – Part 2: Liquid cooling systems

EN 60 974-5: 2003-02
Arc welding equipment – Part 5: Wire feeders

EN 60974-10: 2004-01
Arc welding equipment – Part 10: Electromagnetic compatibility (EMC) requirements

In accordance with the EU: Directive **2006/42/EG** Article 1, Section. 2, the above products come exclusively under the scope of Directive **2006/95/EWG** relating to electrical equipment designed for use within certain voltage limits.

This declaration is made on behalf of the manufacturer:
REHM GmbH u. Co KG Schweißtechnik
Ottostr. 2
73066 Uhingen, Germany

Uhingen, 18.03.2014

Declaration made by

R. Stumpp

Managing Director

REHM – Setting the pace in welding and cutting

The REHM range

- **REHM MIG/MAG inert gas welding units**
  SYNERGIC.PRO² gas- and water-cooled to 450 A
  SYNERGIC.PRO² water-cooled 500 A to 600 A
  MEGA.ARC stepless regulation to 450 A
  RP REHM Professional to 560 A
  PANTHER 202 PULS pulse welding unit with 200 A
  MEGA.PULS *FOCUS* pulse welding units to 500 A
- **REHM TIG inert gas welding units**
  TIGER, portable 100 KHz inverter
  INVERTIG.PRO TIG welding unit
  INVERTIG.PRO *digital* TIG welding unit
- **REHM MMA inverter technology**
  TIGER and BOOSTER.PRO 100 KHz electrode inverter
- **REHM plasma cutting units**
- **Welding accessories and additional materials**
- **Welding smoke extraction fans**
- **Welding rotary tables and positioners**
- **Technical welding consultation**
- **Torch repair**
- **Machine Service**

REHM WELDING TECHNOLOGY –
German Engineering and Production at its best

Development, construction and production – all under one roof – in our factory in Uhingen. Thanks to this central organisation and our forward-thinking policies, new discoveries can be rapidly incorporated into our production. The wishes and requirements of our customers form the basis for our innovative product development. A multitude of patents and awards represent the precision and quality of our products. Customer proximity and competence are the principles which take highest priority in our consultation, training and service.

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