

Operating and installation instructions

REMKO EM series

Electric heaters

EM 2000, EM 3000



This product is suitable only for well-insulated rooms or for occasional use.



Read these operating instructions carefully before commissioning / using this device!

These instructions are an integral part of the system and must always be kept near or on the device.

Subject to modifications; No liability accepted for errors or misprints!

Translation of the original

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1 Safety and usage instructions

1.1 General safety notes

Carefully read the operating manual before commissioning the units for the first time. It contains useful tips and notes such as hazard warnings to prevent personal injury and material damage. Failure to follow the directions in this manual not only presents a danger to people, the environment and the system itself, but will void any claims for liability.

Keep this operating manual and the refrigerant data sheet near to the units.

1.2 Identification of notes

This section provides an overview of all important safety aspects for proper protection of people and safe and fault-free operation. The instructions and safety notes contained within this manual must be observed in order to prevent accidents, personal injury and material damage.

Notes attached directly to the units must be observed in their entirety and be kept in a fully legible condition.

Safety notes in this manual are indicated by symbols. Safety notes are introduced with signal words which help to highlight the magnitude of the danger in question.



DANGER!

Contact with live parts poses an immediate danger of death due to electric shock. Damage to the insulation or individual components may pose a danger of death.



DANGER!

This combination of symbol and signal word warns of a situation in which there is immediate danger, which if not avoided may be fatal or cause serious injury.



WARNING!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may be fatal or cause serious injury.



CAUTION!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause injury or material and environmental damage.



NOTICE!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause material and environmental damage.



This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.

1.3 Personnel qualifications

Personnel responsible for commissioning, operation, maintenance, inspection and installation must be able to demonstrate that they hold a qualification which proves their ability to undertake the work.

1.4 Dangers of failure to observe the safety notes

Failure to observe the safety notes may pose a risk to people, the environment and the units. Failure to observe the safety notes may void any claims for damages.

In particular, failure to observe the safety notes may pose the following risks:

- The failure of important unit functions.
- The failure of prescribed methods of maintenance and repair.
- Danger to people on account of electrical and mechanical effects.

1.5 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

1.6 Safety instructions for the operator

The operational safety of the units and components is only assured providing they are used as intended and in a fully assembled state.

- The personnel tasked with operating the units must check the units for visible defects on the operating and safety devices as well as the presence and function of the protective devices prior to starting work.
If defects are discovered these must be reported to the supervisor!
- In the event of defects that endanger the operational safety of the unit, operation must be discontinued immediately.
- Do not operate units or components with obvious defects or signs of damage.
- The units must not be left unattended during operation.
- Observe the respective local regulations and the relevant electrical safety measures when using the units.
- The relevant safety guidelines of the Employer's Liability Insurance Association or property insurer must be observed.
- Safety devices must not be bypassed or disabled.
- The units may not be installed or operated in potentially flammable or explosive environments.
- **The units must not be operated in locations where:**
Combustible gaseous, air or dust-air mixtures could be produced; flammable small parts could be sucked in, set alight on the heating coil and blown out in a glowing state.
- Maintain safety distances to combustible materials;
0.5 m on the sides and suction side
2.0 m outlet side
- The units must be installed in a stable position and must not topple over or slide out of position during operation.
- Never insert foreign objects into the units.
- The units must not be covered during operation.
- An unobstructed air inlet and air outlet must be guaranteed at all times.
- The units must not be operated in the vicinity of bathtubs, showers, swimming pools etc.
- The units must not be operated directly below a wall socket.
- The units must not be operated in an environment with an ambient temperature of over 40 °C.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperatures.

- Never allow water to enter the units.
- Protective covers (grilles) over moving parts must not be removed from units that are in operation.
- Contact with equipment parts or components can lead to burns or injury.
- All housing parts and unit openings, e.g. air inlets and outlets, must be free from foreign objects.
- The air outlet must not be constricted or equipped with pipe or hose lines.
- All electrical cables for the units must be protected against damage, including damage caused by animals.
- Extensions to the connection cable must only be conducted by authorised specialist electricians, taking into consideration the unit capacity, cable length and local use.
- Flooring and ceilings must be fire retardant.
- The units must be inspected by a service technician to ensure that they are safe to use and fully functional at least once yearly. Visual inspections and cleaning may be performed by the operator when the units are disconnected from the mains.

1.7 Safety notes for installation, maintenance and inspection work

- The units and components may only be set up, installed and maintained by qualified personnel.
- Appropriate hazard prevention measures must be taken to prevent risks to people when performing installation, repair, maintenance or cleaning work on the units.
- The setup, connection and operation of the units and its components must be undertaken in accordance with the usage and operating conditions stipulated in this manual and comply with all applicable regional regulations.
- Regional regulations and laws must be observed.
- The units must be installed and operated in such a way that personnel are not endangered by warm air and radiant heat and that no fires can occur
- A safety zone of 1.5 m should be maintained around the units - including non-combustible items
- The power supply should be adapted to the requirements of the units.
- Mobile units must be set up securely on suitable non-combustible surfaces.
- The units and components should not be operated in areas where there is an increased risk of damage. Observe the minimum clearances.

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- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas.
- The units must not be installed or operated in atmospheres containing oil, sulphur or salt.
- The units must not be exposed to direct jets of water, e.g. pressure washers etc.
- Safety devices must not be bypassed or disabled.

1.8 Unauthorised modification and changes

Modifications or changes to units and components are not permitted and may cause malfunctions. Safety devices may not be modified or bypassed. Original replacement parts and accessories authorised by the manufacturer ensure safety. The use of other parts may invalidate liability for resulting consequences.

1.9 Intended use

The units are designed exclusively for heating and ventilation purposes in industrial or commercial use (no living space heating in private use) on the basis of their structural design and equipment. The units must only be operated by appropriately instructed personnel.

Any different or additional use is a non-intended use. The manufacturer/supplier assumes no liability for damages arising from a non-intended use. The user bears the sole risk in such cases. Intended use also includes working in accordance with the operating and installation instructions and complying with the maintenance requirements.

The threshold values specified in the technical data must not be exceeded.

1.10 Warranty

For warranty claims to be considered, it is essential that the ordering party or its representative complete and return the "certificate of warranty" to REMKO GmbH & Co. KG at the time when the units are purchased and commissioned.

The warranty conditions are detailed in the "General business and delivery conditions". Furthermore, only the parties to a contract can conclude special agreements beyond these conditions. In this case, contact your contractual partner in the first instance.

1.11 Transport and packaging

The devices are supplied in a sturdy shipping container. Please check the equipment immediately upon delivery and note any damage or missing parts on the delivery and inform the shipper and your contractual partner. For later complaints can not be guaranteed.



WARNING!

Plastic films and bags etc. are dangerous toys for children!

Why:

- Leave packaging material are not around.
- Packaging material may not be accessible to children!

1.12 Environmental protection and recycling

Disposal of packaging

All products are packed for transport in environmentally friendly materials. Make a valuable contribution to reducing waste and sustaining raw materials. Only dispose of packaging at approved collection points.



Disposal of equipment and components

Only recyclable materials are used in the manufacture of the devices and components. Help protect the environment by ensuring that the devices or components (for example batteries) are not disposed in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using certified firms and recycling specialists or at collection points.



2 Technical data

Unit data

Series	Symbol	Unit	EM 2000	EM 3000
Nominal heat capacity	P_{nom}	kW	2.0	3.2
Minimum heat capacity	P_{min}	kW	N/A	2.2
Maximum continuous heating power	$P_{max.c}$	kW	2.0	3.2
Switchable heating capacity		kW	2.0	2.2/3.2
Max. air flow rate		m ³ /h	220	350
Power supply		V/Ph/Hz	230/1~/50	
Max. rated current		A	9.5	13.9
Auxiliary current consumption				
at nominal heating power	$e_{l_{max}}$	kW	2.050	3.250
at minimum heating power	$e_{l_{min}}$	kW	N/A	2.250
in standby condition	$e_{l_{SB}}$	kW	0.000	
Electrical protection (provided by the customer, slow)		A	16	
Sound pressure level, LpA 1m ¹⁾		dB(A)	46	
Type of room temperature control			Room temperature control with mechanical thermostat	
Dimensions (L/W/H)		mm	300/200/315	400/200/335
Weight		kg	5.8	8.6
EDP no.:			1614500	1614505

¹⁾ Noise level measurement DIN 45635 - 01 - KL3

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

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3 Unit description

The units are portable electric heating units for industrial applications.

The units are operated exclusively with electric power and have been designed in such a way that they can be used fully automatically, universally and in a straightforward manner.

The units are equipped with specially enclosed electric heating resistors, low noise and low-maintenance axial fans, a safety and aftercooler thermostat, an integrated room thermostat and a power cable with protective contact plug.

The units conform to the fundamental health and safety requirements of the appropriate EU regulations.

The units are dependable and offer ease of operation.

The units may be used among other things for the following:

- Drying newly completed buildings
- Spot heating outdoor workspaces or fire-proof manufacturing facilities and halls
- Continuous or temporary room heating
- De-icing machines, vehicles and non-combustible warehoused goods while adhering to the relevant safety distances

Operating sequence

The units can be used in the respective operating modes for air heating and air circulation purposes (only EM 2000).

The units have a 3-stage operating switch with the functions:

EM 2000: Heating (I) / OFF (0) / Ventilation (II)

EM 3000: Heating 2.2 kW (I) / OFF (0) / Heating 3.2 kW (II)

In the heating settings, the heating resistor or heating resistors of the EM 3000 and the fan are switched on. Warm air is blown out.

The unit is equipped with an integrated thermostat to ensure that the room temperature is constant. Once the selected temperature has been reached, the thermostat stops the heating operation. If the room temperature falls below the selected temperature, the thermostat starts up the heating operation again.

The integrated thermal cutout switches off the unit if the temperature is excessively high and switches it on again automatically after it has cooled down.

EM 2000: In setting II (Fan), only the air circulating fan is switched on and the unit can only be used for air circulation.

4 Electrical wiring diagram

Wiring diagram EM 2000

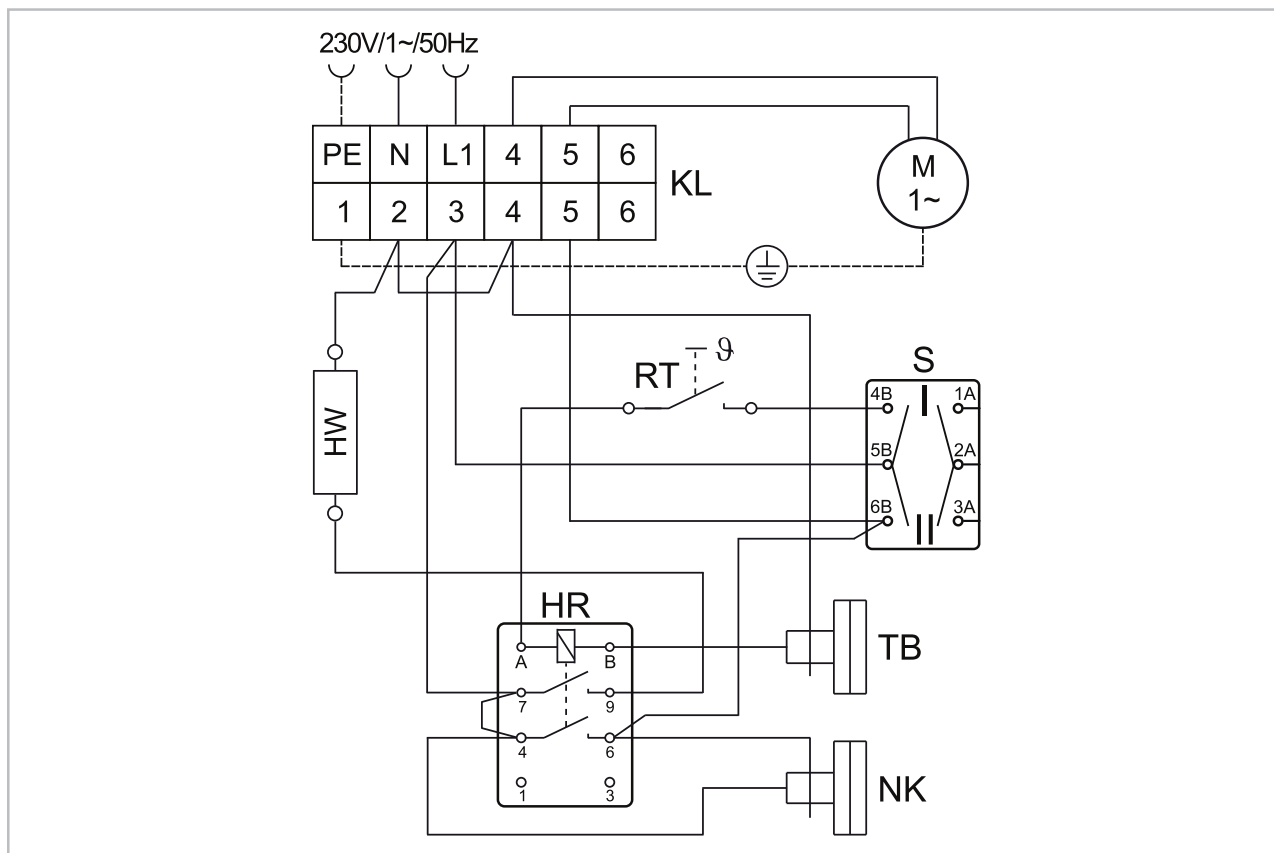


Fig. 1: Electrical wiring diagram

HR: Auxiliary relay

HW: Heating resistor

KL: Connection terminal strip

M: Fan motor

NK: Aftercooler thermostat

RT: Room thermostat

S: Operating switch

TB: Thermal cut-out

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

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Wiring diagram EM 3000

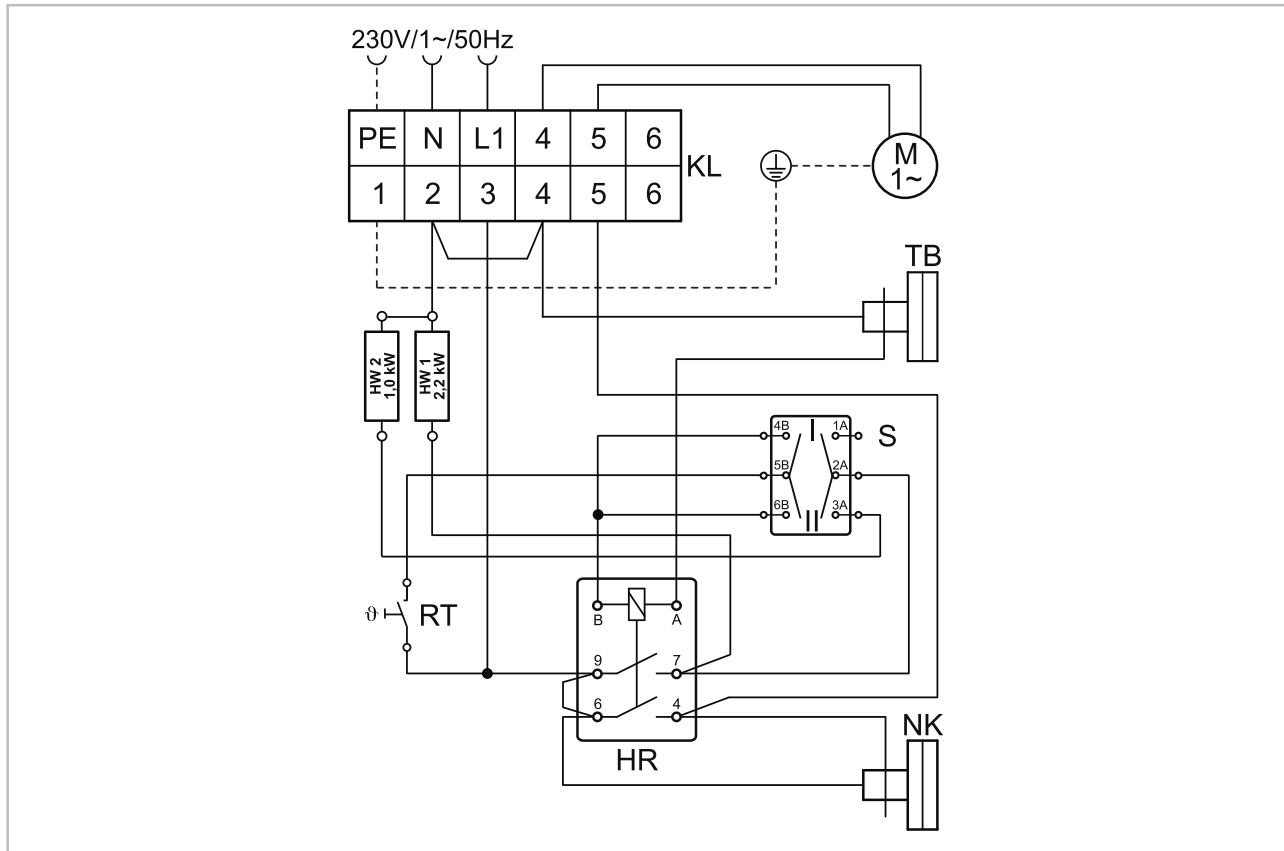


Fig. 2: Electrical wiring diagram

HR: Auxiliary relay

HW: Heating resistor

KL: Connection terminal strip

M: Fan motor

NK: Aftercooler thermostat

RT: Room thermostat

S: Operating switch

TB: Thermal cut-out

We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

5 Commissioning

One person, who has been adequately trained in the handling of the units, should be tasked with the operation and monitoring of the units.

1. → Check that the mains power supply matches the operating voltage of the unit 230V/1~/50 Hz.
2. → Move the operating switch to the "0" position.



3. → Connect the unit's power plug to a properly installed mains socket.



WARNING!

The electrical connection for the units must be made at a separate feed point with a residual current device in accordance with VDE 0100, Section 55.



NOTICE!

Extensions to the connection cable must only be conducted by authorised specialist electricians, taking into consideration the unit power consumption, cable length and local use.



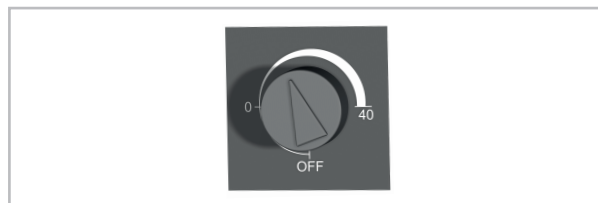
CAUTION!

All cable extensions must only be used in fully un-reeled or reeled off condition.

Heating

The units operate in a fully automatic manner subject to the temperature that is set on the thermostat.

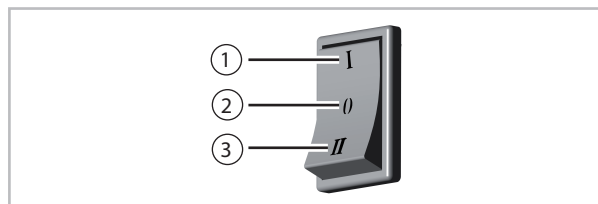
1. → Set the desired room temperature on the thermostat.



2. → EM 2000: Move the operating switch to the heating position "I".



3. → EM 3000: Move the operating switch to the desired position.



- 1: Heating 1st stage; 2,2 kW
- 2: Off
- 3: Heating 2nd stage; 3,2 kW



NOTICE!

For optimum operation the units should not be operated above an ambient temperature of 25 °C.

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Ventilation (only EM 2000)

Only the supply air fan operates in this setting. Thermostatic regulation and heating operation are not possible in this operating mode.

1. ➤ Move the operating switch to the "II" (Fan) position.



The units of type EM 3000 do not have a separate ventilation function

6 Shutdown

! NOTICE!

Adjustment and maintenance work may only be carried out by authorised qualified technicians.

1. ➤ Move the operating switch to the "0" (Off) position.



2. ➤ The supply air fan runs on to cool the units and only switches off after the cooling down phase is complete. The fan can switch on and run several times before the final shutdown.
3. ➤ If the units are inactive for long periods, disconnect them from the mains power supply.

! NOTICE!

Never interrupt the power supply prior to the completion of the follow-up cooling phase. There is no guarantee entitlement in case of damage to the units due to overheating.

7 Troubleshooting



DANGER!

Before undertaking any work on the units, the power plug must be removed from the mains socket.

All electrical installation work is to be performed by specialist companies. Disconnect the power supply when connecting the electrical terminals.

The unit and components are manufactured using state-of-the-art production methods and tested several times to verify that they function correctly. However, if malfunctions do occur, please check the functions as detailed in the list below. Please inform your dealer if the unit is still not working correctly after all function checks have been performed!

The unit (fan) does not start.

1. ➤ Check the mains fuses on site..
2. ➤ Check the power plug.
3. ➤ Check the operating switch.
4. ➤ Check that the fan can move freely.

The unit does not heat up

1. ➤ Set the thermostat to a value that is higher than the room temperature.
2. ➤ Check that the thermostat is functioning correctly.
3. ➤ Check the operating switch.
4. ➤ Check that the contactor is functioning correctly.
5. ➤ Check that the thermal cut-out is functioning correctly and check it for damage.

If all of the functional checks have been carried out without any findings, please contact an authorised service station.

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8 Care and maintenance

8.1 General

Regular care and observation of some basic requirements will ensure trouble-free operation and a long service life of the units.



DANGER!

Before undertaking any work on the units, the mains plug must be removed from the mains socket.



NOTICE!

Adjustment and maintenance work may only be carried out by authorised qualified technicians.

- Observe the regular care and maintenance intervals
- In accordance with the operating conditions, the units must, if necessary, be checked at least yearly by a specialist to ensure that they are in a condition that is safe to use


- Keep the units free of dust and other debris
- Only clean the units with a dry or moistened cloth
- Never subject to direct jets of water. **e.g. pressure washers etc.**
- Never use abrasive or solvent-based cleaners
- Check the inlet and outlet grille for contamination on a regular basis
- Check the safety equipment and protective devices on a regular basis
- Be careful not to damage the thermostat's probe or capillary tube when removing or mounting the rear panel of the unit



WARNING!

An electrical safety check must be carried out in accordance with VDE 0701 after any work on the units.

8.2 Maintenance protocol

Unit type:	Unit number:																			
	0 1	0 2	0 3	0 4	0 5	0 6	0 7	0 8	0 9	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	2 0
Unit cleaned - outside -																				
Unit cleaned - inside -																				
Fan blade cleaned																				
Protection grid cleaned																				
Safety equipment checked																				
Safety devices checked																				
Unit checked for damage																				
All fastening screws checked																				
Electrical safety check																				
Test run																				

Comments:

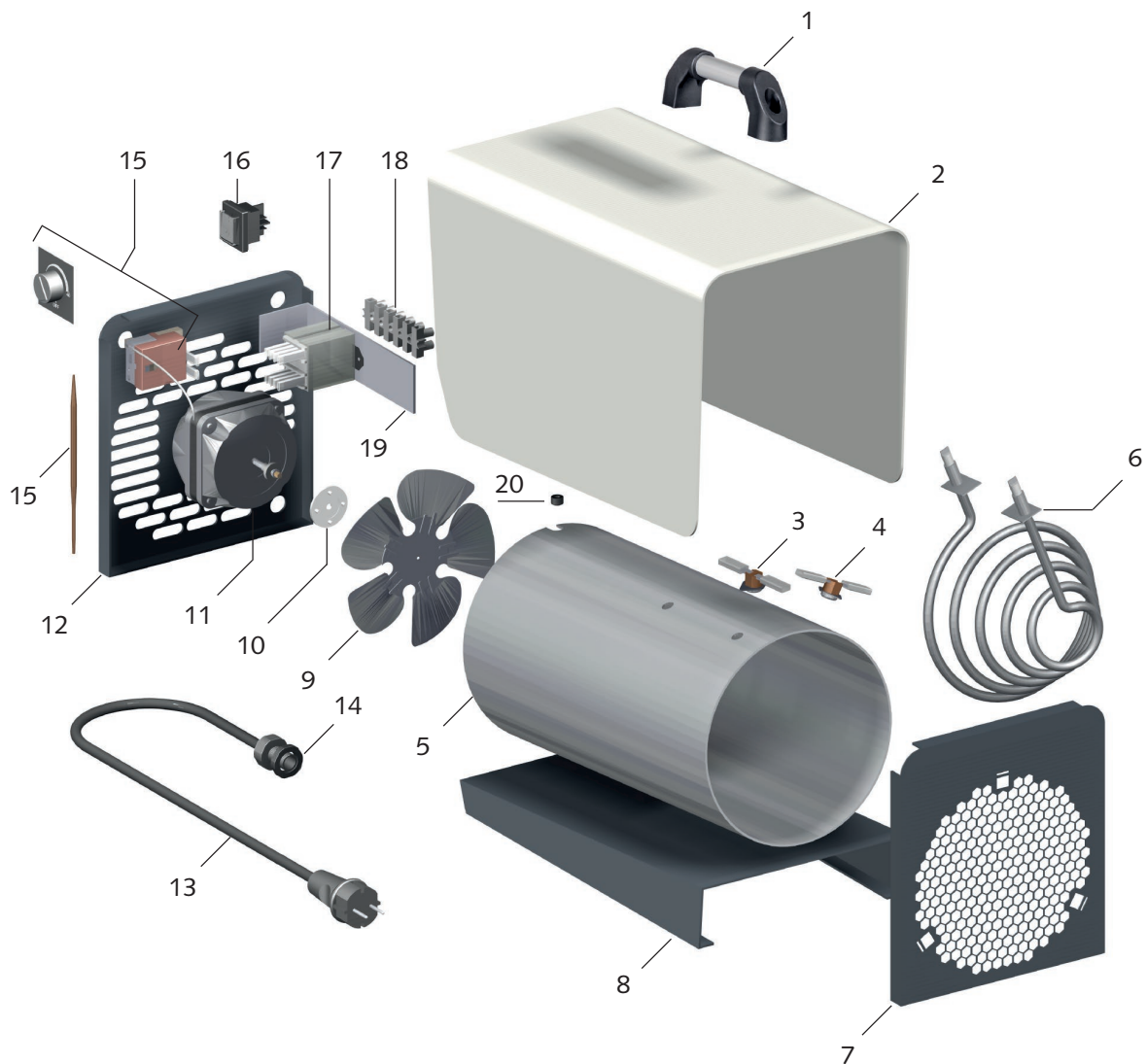
01. Date: Signature	02. Date: Signature	03. Date: Signature	04. Date: Signature	05. Date: Signature
06. Date: Signature	07. Date: Signature	08. Date: Signature	09. Date: Signature	10. Date: Signature
11. Date: Signature	12. Date: Signature	13. Date: Signature	14. Date: Signature	15. Date: Signature
16. Date: Signature	17. Date: Signature	18. Date: Signature	19. Date: Signature	20. Date: Signature

Unit to be maintained only by authorised specialists in accordance with the statutory regulations.

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9 Exploded view and spare parts lists

9.1 Exploded view EM 2000



We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

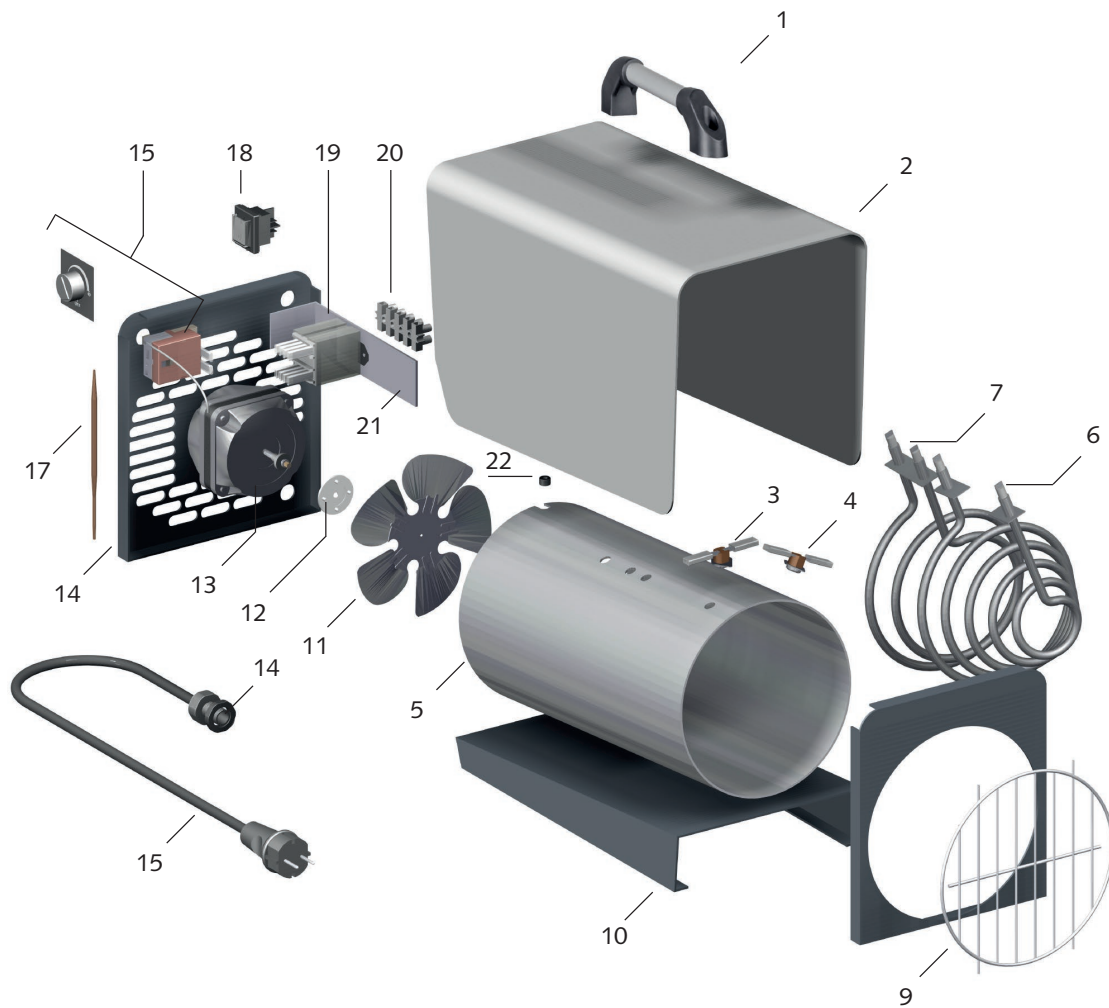
9.2 Spare parts list EM 2000

No.	Designation	EDP no.
1	Transport handle	1111970
2	Exterior cladding	1111971
3	Aftercooler thermostat	1104065
4	Thermal cut-out	1101161
5	Inner casing	1103931
6	Heating resistor	1111972
7	Front wall	1101063
8	Floor panel	1103932
9	Fan blade	1103819
10	Drive clutch	1103912
11	Fan motor	1103820
12	Back wall	1103915
13	Power cable with plug	1101320
14	Strain relief	1103904
15	Room thermostat cpl.	1101066
16	Operating switch cpl.	1101188
17	Auxiliary relay	1108038
18	Terminal block 6er	1101366
19	Mounting plate	1101067
20	Grommet	1101304

When ordering spare parts, please state the EDP no., unit number and type (see name plate)!

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9.3 Exploded view EM 3000



We reserve the right to modify the dimensions and design as part of the ongoing technical development process.

9.4 Spare parts list EM 3000

No.	Designation	EDP no.
1	Transport handle	1111970
2	Exterior cladding	1103941
3	Aftercooler thermostat	1104065
4	Thermal cut-out	1101161
5	Inner casing	1103907
6	Heating resistor 1,0 kW	1103908
7	Heating resistor 2,2 kW	1103908
8	Front wall	1103910
9	Protective outlet grille	1103803
10	Floor panel	1103911
11	Fan blade	1103902
12	Drive clutch	1108455
13	Fan motor	1103820
14	Back wall	1103913
15	Power cable with plug	1103901
16	Strain relief	1101267
17	Room thermostat cpl.	1101066
18	Operating switch cpl.	1101188
19	Auxiliary relay	1108038
20	Terminal block 6er	1101366
21	Mounting plate	1101067
22	Grommet	1101304

When ordering spare parts, please state the EDP no., unit number and type (see name plate)!

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REMKO QUALITY WITH SYSTEMS

Air-Conditioning | Heating | New Energies

REMKO GmbH & Co. KG
Klima- und Wärmetechnik

Im Seelenkamp 12
32791 Lage

Telephone +49 (0) 5232 606-0
Telefax +49 (0) 5232 606-260

E-mail info@remko.de
URL www.remko.de

Hotline within Germany
+49 (0) 5232 606-0

Hotline International
+49 (0) 5232 606-130

