

Operating and installation instructions

REMKO CLK series

Oil heating unit

CLK 80-RV, CLK 170-RV





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 units and components may only be set up, installed and maintained by qualified personnel.
- Protective covers (grills) over moving parts must not be removed from units that are in operation.
- Do not operate units or components with obvious defects or signs of damage.
- Contact with equipment parts or components can lead to burns or injury.
- The units and components must not be exposed to any mechanical load, extreme levels of humidity or extreme temperatures.
- All housing parts and device openings, e.g. air inlets and outlets, must be free from foreign objects.
- The units must be inspected by a service technician to ensure that they are safe to use and fully functional at least once annually. 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

- 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 as well as the Water Ecology Act must be observed.
- The units must be installed and operated in such a way that personnel are not endangered by exhaust gases, hot air and radiant heat and no fires may occur
- The units must then only be operated in areas where the units can be supplied with an adequate amount of air for the combustion
- If the units are being operated without exhaust gas routing then they may only be operated in well ventilated areas. Under such circumstances it is forbidden for personnel to remain in these areas for extended periods. Appropriate prohibition signs should be put up at the entrances
- A safety zone of 1.5 m should be maintained around the units - incl. 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 equipment and components should not be operated in areas where there is a heightened risk of damage. Observe the minimum clearances.
- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas.
- The units must not be exposed to direct jets of water, e.g. pressure washers etc.
- Portable fuel containers must only be set up and used in observance of the technical rules for combustible liquids "TRbF 20".
- Safety devices may not be modified or bypassed.

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.

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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

2.1 Unit data

Unit type		CLK 80-RV	CLK 170-RV
Max. nominal heating capacity	kW	84	155
Nominal heating capacity	kW	77	143
Nominal air flow ¹⁾	m ³ /h	6140	10340
(Max. total) pressure	Pa	410	520
Fuel		EL heating oil, diesel fuel, biodiesel B7/B10 ⁵⁾ , biofuel HVO ⁶⁾	
Max. fuel consumption	l/h	8.3	15.5
Danfoss oil nozzle ²⁾	USG	1.75 / 60°S	3.00 / 80°S
Pump pressure, approx. ²⁾	bar	12	13
Max. exhaust gas loss	%	9	9
Exhaust gas flow, approx.	kg/h	136	240
Combustion chamber resistance, app.	Pa	100	110
Required flue draft	Pa	0	0
Power supply	V/Hz	230/1~/50	400/3~N / 50
Plug		Schuko plug 16A	CEE 16A
Max. power consumption (complete unit)	kW	1.75	3.4
Max. nominal current (complete unit)	A	9.5	8.0
Max. power consumption (Multiflex oil preheating)	W	---	30
El. protection (provided by the customer)	A	16	16
Temperature increase (Δt)	K	48	54
Sound pressure level, LpA 1m ³⁾	dB(A)	62	65
Air outlet Ø	mm	400	500
Air intake Ø ⁴⁾	mm	2 x 400	2 x 500
Exhaust gas nozzles Ø	mm	150	200
Dimensions (length/width/height)	mm	2000/800/1160	2380/920/1350
Weight with forced-air oil burner	kg	234	385

¹⁾ At Δt 45K / 1.2 kg/m³. / ²⁾ The specified nozzle sizes and pump pressures are based on test bench results. The oil flow rate was derived from this. Based on the product-specific nozzle and pressure tolerances as well as the oil temperature, the specifications should only be considered guidelines.

³⁾ Noise level measurement (with hose and without burner operation) DIN 45635 - 01 - KL 3.

⁴⁾ Only with intake ports (accessories, EDP: 1072355) for recirculating or mixed air operation.

⁵⁾ Maximum biodiesel admixture (FAME) of 10%.

⁶⁾ Hydrogenated vegetable oils that satisfy the requirements of DIN EN 590.

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3 Standards and regulations

3.1 Specifications for fan-assisted heaters

When using the units the respective applicable guidelines must always be observed.

- Combustion plant order (FeuVo) for the individual state
- Accident prevention regulations (UVV) "Heating, flaming and melting devices for construction and installation work" (VBG 43)
- Workplace directives ASR 5
- Workplace regulations §§ 5 and 14
- Ordinance for implementation of federal emission control regulations (BImSchG) and the subsequently issued legislation (ENEG).

Extract from the accident prevention regulations (VBG 43)

§ 37 Operating personnel

The units may only be operated by persons that have been instructed in the operation of the equipment

§ 38 Installation

(1) The units must be installed in a stable position.

(2) The units must be installed and operated in such a way that personnel are not endangered by exhaust gases and radiant heat and no fires may occur.

(3) The units must then only be installed and operated in areas where the units can be supplied with an adequate amount of air for the combustion and the exhaust gases can be routed to the outside via exhaust gas ducting. There is enough natural air supply for the combustion if, for example, the space in m³ is at least 10 times the nominal heating capacity in kW of all of the units operating in the space and if the natural change of air is guaranteed by windows and doors.

(4) In derogation from point 3, the units may be operated in a space without exhaust gas routing if this is well ventilated (both incoming and outgoing air) and the proportion of health endangering substances in the breathing air does not reach a detrimental concentration. There is good natural ventilation if, for example,

1st. the room volume in m³ is at least 30 times the nominal heating capacity of all of the units operating in the space and if the natural change of air is guaranteed by windows and doors or

2nd. there are non-closable openings for incoming and outgoing air in the vicinity of the ceiling and floor whose size in m² is at least 0.003 times the nominal heating capacity of all of the units operating in the space.

(5) The units may not be installed or operated in potentially flammable or explosive environments or areas.

§ 44 Space drying

(2) In derogation from § 38 section 3 heating units can be used for drying areas with adequate air supply for combustion without having to route the exhaust gases through exhaust gas ducting to the outside. It is forbidden for personnel to remain in these areas for extended periods. Appropriate prohibition signs should be put up at the entrances.

§ 53 Testing

(2) 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. The exhaust gas values for the burners must be checked.

§ 54 Monitoring

(1) 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 of the protective devices at the start of work.

(2) If defects are discovered these must be reported to the supervisor.

(3) In the case of defects that endanger the operational safety of the unit, it must be taken out of service immediately.

§ 55 Infringements

Infringements in the sense of § 710 section 1 of the Imperial Insurance Code (RVO) pertain to an intentional or negligent breach of the provisions of VBG 43.

4 Design and function

4.1 Unit description

The units are portable, directly fired fan-assisted heaters (WLE) with heat exchanger and exhaust gas connections exclusively for commercial applications.

The units can be directly fired with EL heating oil or Diesel fuel.

The units can be operated with or without exhaust gas pipe. They have been designed for universal and straightforward use.

The units are exclusively operated with separate type-approved forced-air burners.

The units are equipped with a noise-optimised and low-maintenance, high performance radial fan, a room thermostat receptacle and a main cable with 400 V CEE connector.

The units are equipped with a device for automatically checking the turning direction of the fan motor, as standard.

With factory fitted forced-air oil burners the units have integrated Multiflex oil pre-heating fitted as standard.

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



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



! NOTICE!

The units may never be disconnected from the mains prior to the completion of the follow-up cooling phase (except in emergencies).



! NOTICE!

Only type-approved forced-air oil burners in WLE design per DIN EN 230 and DIN EN 267 should be used.

Locations at which units are used

As mobile, directly fired fan-assisted heaters, the units deliver instant heat. They are designed exclusively for commercial use.

The units may be used for the heating, temperature adjustment or drying of:

- Warehouses
- Exhibition halls
- Trade fairs
- Lightweight construction halls
- Large tents / marquees
- Large construction sites

Operating sequence

If the units are set to heating mode, then the forced-air burner starts automatically. In fully automatic heating mode with room thermostat the forced-air burner starts only when heat is required.

After the burner has run for a short time the temperature controller "TR" (target temperature 35 to 40°C) switches the supply air fan on automatically. Warm air is blown out.

When operating with a room thermostat this process is repeated automatically depending on the heat demand.

The temperature monitor "TW" (target temperature 80 to 85°C) monitors the internal temperature of the unit.

After switching off the units via the operating switch or the room thermostats the supply air fan runs to cool the combustion chamber with the heat exchanger for a certain time and then switches off. This process may be repeated several times if necessary.

4.2 Installation instructions

The safety regulations of the accident prevention and insurance associations, the respective regional building regulations and the combustion appliances regulations apply in principle to the operation of the unit.



Overpressure and underpressure in the installation area should be avoided as this will inevitably lead to combustion-related faults.

- Make sure that there is an adequate fresh air supply appropriate to the respective forced-air burner capacity (see type plate). The forced-air oil burner may need to be fitted with a separate air supply for combustion

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Installation outside

- The operation of the units must not present a hazard or unreasonable loading
- The unit operator must ensure that it is not possible for unauthorised persons to be able to manipulate either the unit or the power supply.
- Precipitation such as rain or snow can be sucked in through the supply air fan. For this reason suitable weather protection should be provided.

DANGER!

The units must only be installed in well ventilated spaces and not in living areas or similar recreational areas.

Installation in closed, well ventilated areas without exhaust gas connection

- The operation of the units is permissible if the minimum air quantity cited in § 38 section 4 for combustion is supplied.
- Reliable extraction of the combustion gases must be guaranteed in all cases in order to exclude impermissible contamination of the room air with hazardous substances.

Fresh air is fed from below.

Exhaust gases are routed upwards.

Room heating

- The units may only be operated for room heating with a room thermostat (accessory).
- The fresh air supply required for trouble-free combustion must be guaranteed. It is practical to have the fresh air supply provided by windows and doors or through appropriately dimensioned openings in the outside wall

Safety distances

- In order to guarantee safe operation and maintenance of the units, 1.5 m safety distance should be maintained around the unit.
- Flooring and ceilings must be fire retardant
- Intake and outlet diameters must not be narrowed or blocked with foreign objects.

4.3 Safety equipment

Safety temperature limiter (STB)

The heating function is permanently interrupted by the safety temperature limiter (STB) in the event of the units overheating or malfunctioning.

Manually resetting of the STB can only be implemented after the units have cooled down.

The resetting of the STB is implemented by actuating the reset button 2.

NOTICE!

If the safety temperature limiter has been tripped then the cause of the fault should be identified and rectified before resetting it.

1. ➤ Unscrew protective cap [1].
2. ➤ Carefully press in the reset button [2] with a suitable tool.
3. ➤ Screw the protective cap [1] back on again.



Fig. 1: Safety temperature limiter (STB)

NOTICE!

Safety devices must not be bypassed or disabled.



In order to prevent a renewed exceedance of the triggering temperature the operating conditions of the unit should be checked before resetting the STB.

Regulating device

The temperature sensor of the controller is self-monitoring.

The sensors are cold-resistant to -25 °C. At temperatures below -25 °C the controller current flow will be interrupted - if the temperature rises above -25 °C the current flow will be released again.

In the event of the sensor or the capillary tube being damaged, as well as if an overtemperature of ca. 220 °C is reached, the fill medium will be emptied and the safety device is permanently triggered. Resetting is no longer possible. The controller is no longer fully functional and must be replaced.

! NOTICE!

Only "REMKO original replacement parts" must be used when replacing safety devices.

- Ensure that the device is fitted properly
- The capillary tubes must not be kinked or bent in the immediate vicinity of the soldering points
- The capillary tubes must not be damaged or kinked during installation
- The sensors must only be fitted at the fastening points provided by the factory
- The sensors must always be free of dust and dirt in order to be sure of their correct functioning

The units have the following control or safety equipment:

Temperature controller (TR)

The temperature controller controls the switching on and off of the recirculating fan. The switch point is set via the "Scale 21-60°" controller in the switching cabinet. Target value ca. 35 - 40 °C.

Temperature monitor (TW)

The temperature monitor limits the unit or outlet temperature in heating mode via the burner. The switch point is set via the "Scale 34-110°" controller in the switching cabinet. Target value ca. 80 - 85 °C.

Safety temperature limiter (STB)

The unit is permanently switched off by the safety temperature limiter (STB) in the event of the unit overheating or a temperature monitor malfunction. Manual resetting is required.

Automatic burner

The unit is permanently switched off by the automatic burner through the optical flame monitoring in the event of irregularities in the combustion, the flame extinguishing, fuel deficiencies etc.

Manual resetting is required.

4.4 Exhaust ducting

It is also possible to operate the units outside or in open spaces without exhaust gas routing. However, we recommend fitting a 1m exhaust gas duct with a rain hood on top (example 2), in order to exclude the ingress of rainwater and dirt.

If the units are used for room heating then the combustion gases must be routed away, to the outside if necessary.

- The exhaust gas routing must be designed such that the thermal lift of the exhaust gases is guaranteed at all times
- The exhaust gas routing must be designed such that there can be no counter-pressure
- Fault-free operation is guaranteed if the exhaust gas routing is fitted in a rising arrangement and with a vertical end pipe
- The exhaust gas routing should end at least above the height of the eaves but ideally above the height of the ridge, in order to prevent any counter-pressure being caused by poor weather conditions (e.g. wind)
- The minimum distance of 0.6 m to combustible parts must not be infringed
- Exhaust gas ducting parts and fastening materials are available as accessories
- All parts of the exhaust gas routing must be reliably fastened. Its diameter must not be smaller than the outlet nozzle of the unit.

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Notes for implementing the 1st. BImSchV

Units that are not expected to be operated for longer than 3 months in the same location are not subject to any approvals or monitoring per the 1st. BImSchV. (§1, section 3)

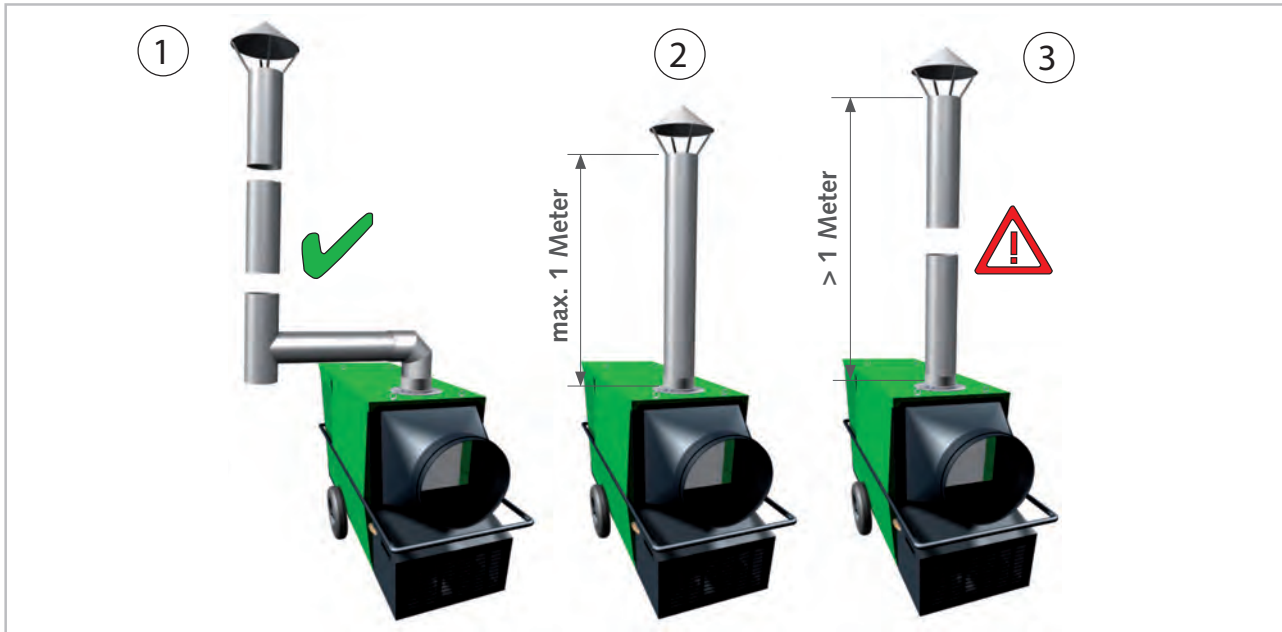


Fig. 2: Examples of permissible and impermissible exhaust gas ducting

Example 1

Operation with extended exhaust gas ducting

Condensate trap required.

Example 2

Operation without extended exhaust gas ducting.

Max. 1 metre

Example 3

Impermissible layout

In order to avoid the combustion chamber being damaged due to condensation of moisture (condensate) in example 3, make sure that the exhaust gas ducting is correctly installed with a condensate trap as shown in example 1.

WARNING!

There must be no counter pressure arising from incorrect installation of exhaust gas ducting under any circumstances.



After installing an exhaust gas system the settings on the burner should be adapted to suit the new conditions.

5 Electrical wiring

5.1 Electrical wiring diagram CLK 80-RV

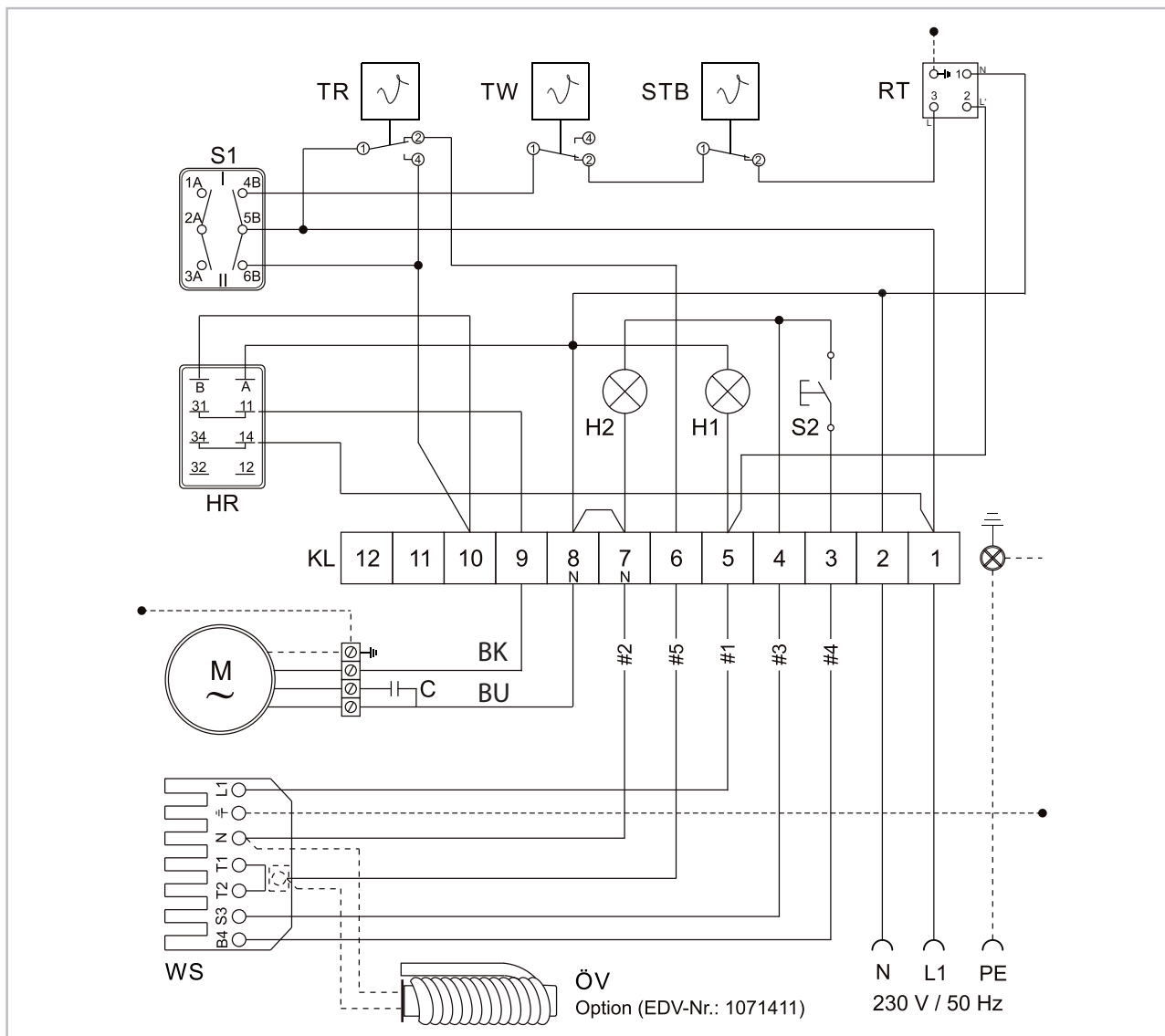


Fig. 3: Electrical wiring diagram

C:	Capacitor	S1:	Operating switch
H1:	Operating lamp (green)	S2:	Reset button (burner relay)
H2:	External burner fault lamp (red)	STB:	Safety temperature limiter
HR:	Auxiliary relay	TR:	Temperature controller
KL:	Terminal block	TW:	Temperature monitor
M:	B3 Fan motor	WS:	Burner plug, 7-pole (only fitted with factory burner delivery)
ÖV:	Multiflex oil pre-heating (option)		
RT:	Thermostat receptacle		

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

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5.2 Electrical wiring diagram CLK 170-RV

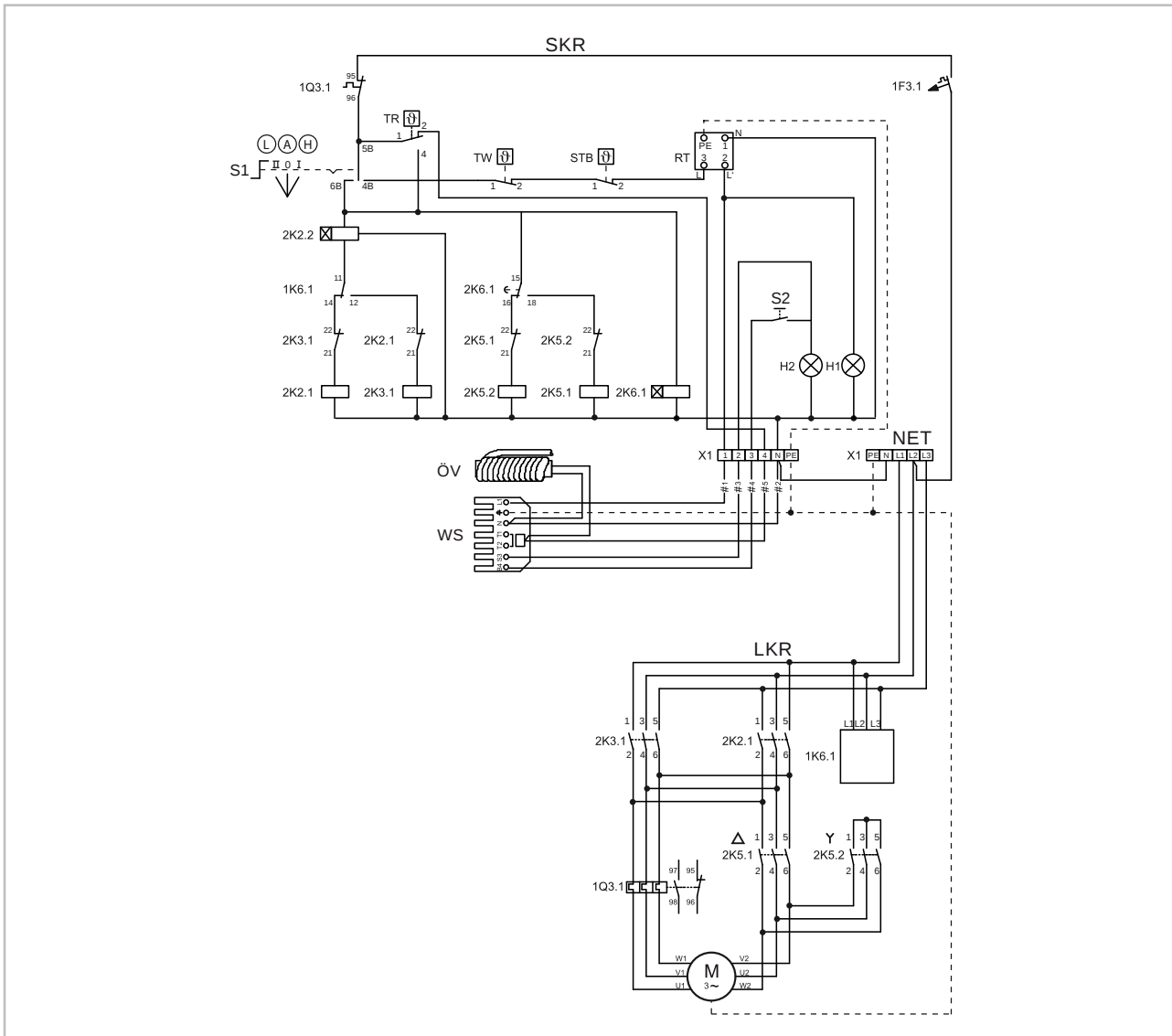


Fig. 4: Electrical wiring diagram (see next page for legend)

NET:	Power supply	WS:	Burner connector, 7-pole
L, A, H:	Ventilate, Off, Heat	RT:	Thermostat socket
LKR:	Load circuit	ÖV:	Multiflex oil pre-heating
SKR:	Control circuit	1F3.1:	Controller fuse
S1:	Operating switch	2K2.1:	Mains contactor
S2:	Reset button (burner)	2K2.2:	Time relay
H1:	Operating lamp (green)	2K3.1:	Mains contactor
H2:	External burner fault lamp (red)	2K5.1:	Delta contactor
TR:	Temperature controller	2K5.2:	Star contactor
TW:	Temperature monitor	1K6.1:	Phase sequence relay
STB:	Safety temperature limiter	2K6.1:	Star-delta relay
X1:	Terminal block	1Q3.1:	Motor protection switch
M:	Fan motor		

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

6 Before commissioning

The units should be checked for visible defects on the operating and safety devices as well as proper installation and correct electrical connections before commissioning.

It is essential that the following points be observed:

- Set up the units in a stable position
- Ensure there is sufficient supply of combustion air
- Check that the inlet and outlet are free
- Prevent overpressure or underpressure in the installation area
- Ensure that there is sufficient fuel supply and that it complies with the respective local regulations
- Only use clean EL heating oil or Diesel fuel. **Do not use Bio-Diesel!**
- The suction line in the base of the tank must be fitted with a foot valve as a matter of principle



After fulfilling the respective local regulations as well as a professional installation of the unit, the exhaust values for the forced-air burner must be checked and adjusted if necessary by authorised specialists.

Air distribution

The units are equipped with a high performance radial fan, which has been designed to transport the heated air efficiently and effectively over large distances.

The distribution of the air is preferably implemented via ducting or special hot air or membrane hoses.

- Use hot air hoses approved by us (accessories) exclusively
- Observe the air flow direction of the hoses with this! The inner overlapping on the seams of the hot air hoses must point in the direction of the air flow.
- Make sure that the hose or ducting is securely fastened onto the unit outlet nozzle and any connection pieces that may be being used
- Only suitable air distributors or air distributors approved by ourselves should be used for the air distribution



The hot air hoses must only be used in fully extended form and without any constrictions.

- Enclosed spaces being heated via hoses must not present any overpressure
- The forced-air burner can be switched off briefly during operation by the temperature monitor (TW) in the event of there being increased intake temperatures or resistance at the unit's outlet.

After the temperature drops again the burner starts anew automatically!



Air feeds on the intake side must always be implemented by means of non-distorting hoses/ducts (no unstable hoses).

- If the cycle intervals are too short the length and layout of the hot air routing should be checked

! NOTICE!

Cycled operation of the forced-air burner with run times under 5 min. should certainly be avoided.

- There should be no kinks or bends in the layout of the hoses in order to prevent hot-spots forming. Membrane hoses must not be twisted



If a build-up of heat should occur then the heating operation will be interrupted by the STB permanently.

Suction air

Fresh air, mixed air or circulated air operating modes can be selected on the unit. The following information refers to the installation of the unit outside the space to be heated.

Fresh air operation:

The air intake is implemented in the factory through 2 intake grills, right / left.

Mixed air operation:

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For operation of the unit in mixed air mode it is necessary to fit the intake nozzles, available as accessories. In order to guarantee adequate air throughput the second intake grill must not be covered.

Circulated air operation:

For operation of the unit with 100% recirculated air it is necessary to fit two intake nozzles, available as accessories, in place of the 2 factory-fitted intake grills.

Paraffin formation with low outside temperatures

Even at low outside temperatures it is necessary to ensure that there is an adequate supply of heating oil that is capable of flowing.

- Paraffin formation can start with temperatures as high as 5 °C
- To avoid this appropriate preventative measures must be implemented.
e.g. winter-proof EL heating oil or winter Diesel, heated oil tank, insulated oil lines etc.
- Note that fault-free operation of the Multiflex oil pre-heating can only be guaranteed if the unit has been supplied with electrical power for a long period of time before starting
- It is not possible to rectify paraffin separation that has already occurred with the heating. If paraffin has already formed it is necessary to clean out the complete fuel system



Paraffin formation can start with temperatures as high as 5 °C. To avoid this appropriate preventative measures must be implemented, e.g. winter Diesel.

7 Commissioning

7.1 Commissioning the unit

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

Connecting the units to the electrical power supply

The electrical connection is made using a built-in mains cable with plug.

Power supply:

CLK 80-RV: 230V/1~/50Hz

CLK 170-RV: 400V/3~N/50Hz



The units are equipped with a device for automatically checking the turning direction of the fan motor, as standard.

1. ➤ Move the operating switch to the "0" (off) position. (see fig. [A] in Fig. 5)
2. ➤ Connect the power plug to a properly installed and appropriately safeguarded mains socket



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

3. ➤ Open all of the oil supply shut-off devices.
With the initial commissioning, air in the lines can lead to a fault shut-down of the burner.



CAUTION!

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

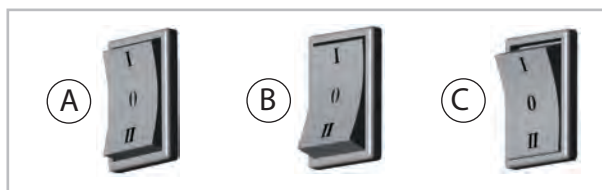


Fig. 5: Operating mode switch positions

Control panel

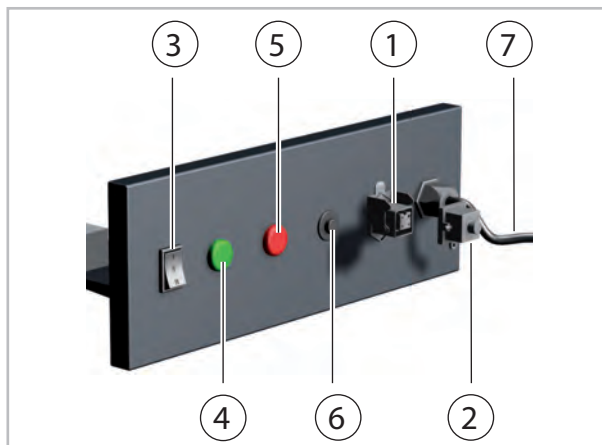


Fig. 6: Control panel

- 1 Thermostat socket
- 2 Strapping plug
- 3 Operating switch
- 4 Green "Operation" indicator light
- 5 Red "Burner fault" indicator light
- 6 Reset button "Burner"
- 7 Mains cable with plug

Heating without room thermostat

The units are operating in permanent operating mode.

1. ➤ Connect the strapping plug supplied [2] with the thermostat receptacle [1] on the unit. (See Fig. 7)
2. ➤ Move the operating switch to the "I" (on) position. (see fig. [B] in Fig. 5)

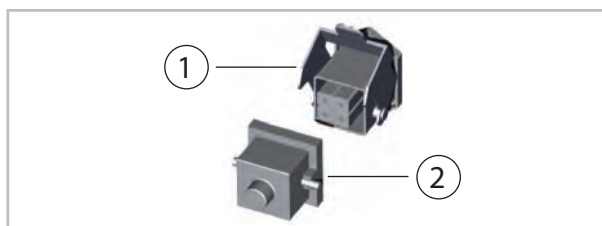
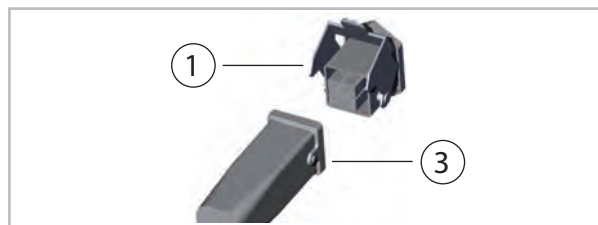


Fig. 7: Strapping plug and thermostat receptacle

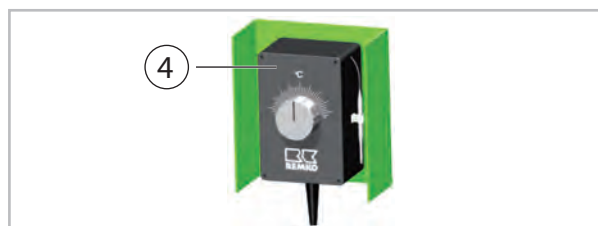
Heating with room thermostat (accessory)

The units operate fully automatically and according to the room temperature.

1. ➤ Pull out the strapping plug [2].
2. ➤ Connect the room thermostat [4] plug [3] with the thermostat receptacle [1] on the unit.



3. ➤ Place the room thermostat [4] at a suitable location in the room. The thermostat sensor must not be located directly in the warm air flow and must not be placed directly on a cold floor.
4. ➤ Set the desired temperature on the room thermostat [4].



5. ➤ Move the operating switch to the "I" (Heating) position. (see fig. [B] in Fig. 5)

The unit starts automatically after a brief burner pre-ventilation if heat is required and then runs fully automatically.

Ventilate

In this switch position, the supply air fan runs permanently. The units can be used for air recirculation or ventilation purposes.

Set the operating mode switch to the "II" (Ventilate) position (see fig. [C] in Fig. 5).

Thermostatic control and heating operation are not possible in this operating mode.

Indicator lamp "Operation"

The indicator lamp signals the "Heating" operating mode. There is no display in the "Ventilate" operating mode or with the room thermostat switched off and when the STB has been triggered.

REMKO CLK series

7.2 Commissioning of forced-air oil burners

Preparatory tasks

! NOTICE!

The commissioning of the forced-air oil burner may only be carried out by trained specialists.

! NOTICE!

The commissioning of the gas burner may only be carried out by a licensed gas/water installation technician.

After loosening the 6 fastening screws (note marking arrows) the mounting baseplate [M] is pulled off the housing [G] (see Fig. 8).



Because the air flap is sprung this should be closed beforehand with the help of the adjustment screw [3] (turn adjusting screw approx. as far as scale value 1).

The most important functional parts for the installation / maintenance are now immediately accessible, as per the respective requirements.

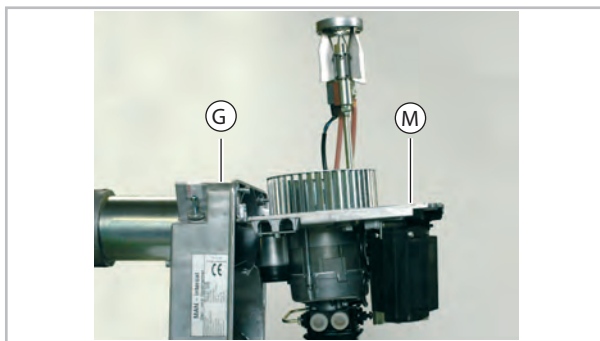


Fig. 8: Removing the fastening screws

For maintenance work or for installing / replacing the oil nozzle, the mounting baseplate [M] can be positioned on the burner housing [G] in 2 ways (see Fig. 8 and Fig. 9).

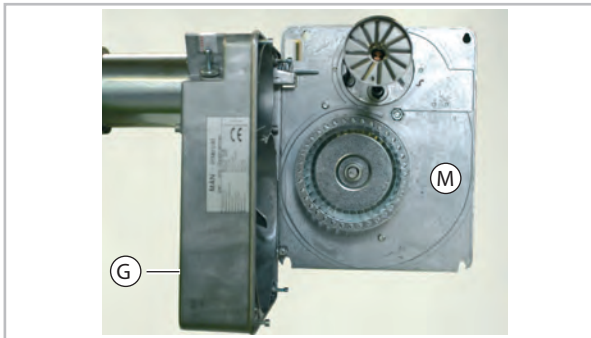


Fig. 9: Positioning the mounting baseplate on the burner housing

The baseplate can be positioned in the desired / possible position on the special mounting points in accordance with the unit-specific options.

Adjusting the ignition electrode and baffle plate

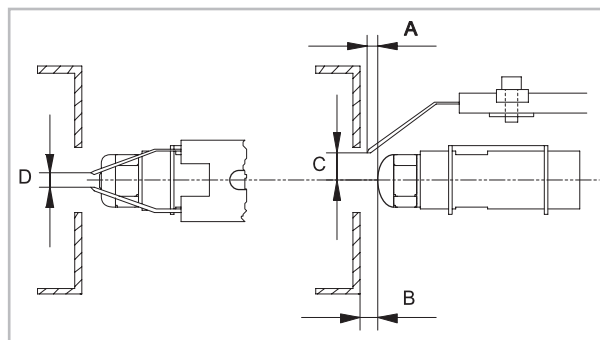


Fig. 10: Adjusting the ignition electrode and baffle plate

Size / dimensions	A	B	C	D
CLK 80-RV	5	5	7	3
CLK 170-RV	7	8	5	3

All sizes are approximate values and are in mm. The optimum setting must be adapted to the unit-specific and structural conditions.

Required nozzle sizes

The selection of the required oil nozzle is dependent on the pump pressure and the unit capacity. Only a nozzle that is approved for the respective combustion chamber geometry with corresponding spray angle and cone characteristics may be used. Refer to the technical data for the required oil nozzle size.

Air inlet nozzle

The required blower pressure can be adjusted with the adjustable air inlet nozzle [A] in accordance with the combustion chamber resistance and chimney draft, without having to change the output diameter.

1. ➔ Loosen the Allen screw [B].
2. ➔ Turn the air inlet nozzle [A] to the desired position (note arrows!).

"min" = Smaller blower pressure

"max" = Larger blower pressure

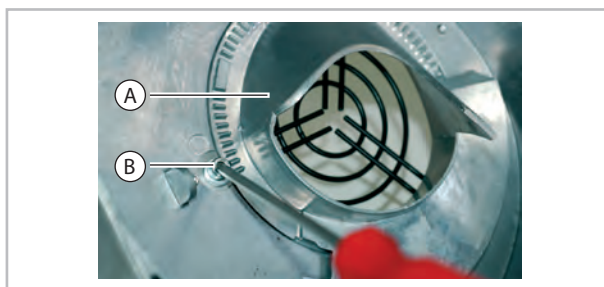


Fig. 11: Adjustment of the blower pressure by means of the air inlet nozzle

Mounting baseplate

After having replaced the nozzle and carried out any adjustments required to the air inlet nozzle [A], the mounting baseplate [M] is re-fitted in reverse order.

Adjusting the secondary air (nozzle fitting adjustment)

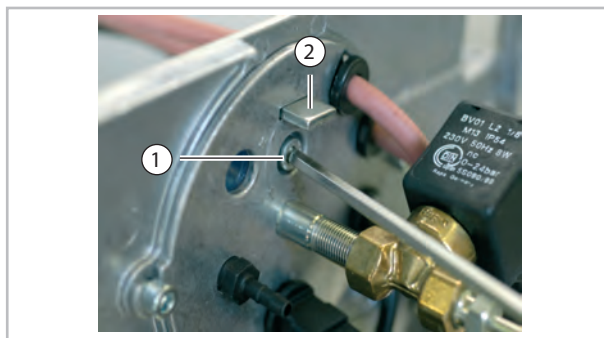


Fig. 12: Adjustment of the secondary air

Carry out the presetting of the secondary air as follows:

Set the nozzle fitting [2] to the desired value with the adjusting screw [1].

(Turns see Fig. 14)

CLK 80-RV

Turning to the left (-)

= smaller scale value **larger** pressure behind the baffle plate **lower** capacity range

Turning to the right (+)

= larger scale value **smaller** pressure behind the baffle plate **upper** power range

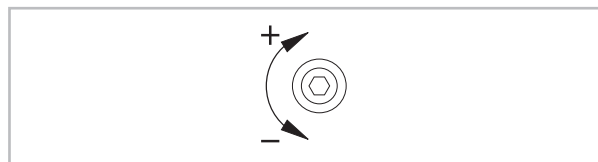


Fig. 13: Turns of the adjusting screw

CLK 170-RV

Turning to the left (+)

= larger scale value **smaller** pressure behind the baffle plate **upper** capacity range

Turning to the right (-)

= smaller scale value **larger** pressure behind the baffle plate **lower** capacity range

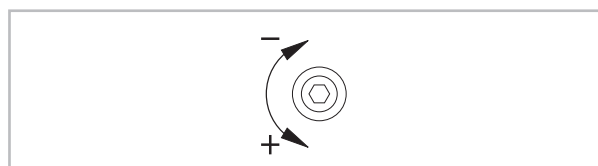


Fig. 14: Turns of the adjusting screw

Air flap

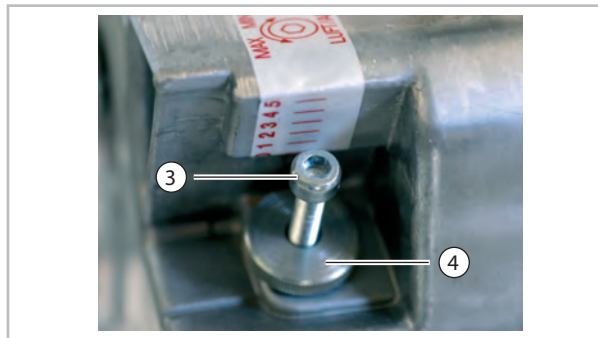


Fig. 15: Adjustment of the air flap by means of the adjusting screw

The quantity of combustion air required is adjusted by means of the adjusting screw [3]. The air flap is set according to the unit capacity and the further burner settings.

REMKO CLK series

Adjustment of the air flap

Adjust the air flap as follows:

1. ➤ Loosen the knurled nut [4].
2. ➤ Set the adjusting screw [3] accordingly.
Turn to the right = Less air
Turn to the left = More air
3. ➤ After having set the adjusting screw [3] lock it again with the knurled knob [4].

Additional notes

- If the flame should give off sooty smoke or break away with a fully opened air flap, reduce the pressure behind the baffle plate with the help of the secondary air setting
- It may also be necessary to open the air inlet nozzle further

Adjustment of the pump pressure

The pump pressure should be adjusted, and checked if necessary, during burner commissioning and during every maintenance.

! NOTICE!

Never let the pump run for extended periods without any fuel. Never leave the units for extended periods with a pump that has run dry.

Adjust the pump pressure as follows:

1. ➤ Remove the stopper on the measurement nozzle "P".
2. ➤ Fit a suitable oil pressure manometer here.
3. ➤ Open all oil shut-off devices.
4. ➤ Switch on the burner.
5. ➤ Set the required oil pressure in accordance with the nozzle size and the unit capacity.
6. ➤ Switch off the burner after completing the adjustments.
7. ➤ Remove the oil pressure manometer again. Re-fit stopper incl. seal.

! NOTICE!

If the burner should carry out a fault shut-down once again after the start phase, then another reset should be carried out after a waiting period of 5 minutes has passed. **Further reset procedures must be prohibited as there is a danger of deflagration.**

All values provided are only preliminary settings and must be adapted or calibrated in accordance with the exhaust gas analysis.

8 Decommissioning

1. ➤ Set the operating mode switch to the "0" (Off) position (see fig. [A] in Fig. 16).
2. ➤ Shut off fuel supply (see fig. [B] in Fig. 16).
3. ➤ With longer periods of inactivity, disconnect the units from the mains power supply (see fig. [C] in Fig. 16).



Fig. 16: Decommissioning

The supply air fan runs on to cool the combustion chamber and the heat exchanger and only switches off after the cooling down phase is complete. The fan can switch on and run several times before the final shutdown.

! NOTICE!

Never interrupt the mains connection prior to the completion of the follow-up cooling phase. There is no warranty claim for damage to the units from overheating.



The burner setting should be checked after every change of location and adapted to the new environmental conditions and atmospheric conditions if necessary.

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9 Troubleshooting and customer service



DANGER!

Vor allen Arbeiten an den Geräten muss der Netzstecker aus der Netzsteckdose gezogen werden.

Reparaturen bzw. Änderungen an der Elektroinstallation sowie der Zuleitung dürfen aus sicherheitstechnischen Gründen ausschließlich durch autorisiertes Fachpersonal ausgeführt werden.

The unit has been manufactured using state-of-the-art production methods and has been tested several times to ensure that it works properly. However, in the event that malfunctions should occur, the unit should be checked against the following list. Please inform your dealer if the unit is still not working correctly after all of the functional checks have been performed.

The unit does not start

1. ➤ Check power supply.
2. ➤ Move the operating switch to the "I" (Heating) position.
3. ➤ The "Operating" indicator light on the control panel must illuminate.
4. ➤ Check the strapping connector or the room thermostat plug, if fitted, is seated properly and making good contact.
5. ➤ Check the setting of the room thermostat. The temperature set must be higher than the current room temperature.
6. ➤ Check whether the safety temperature limiter (STB) has tripped. To do so, remove the protective cap next to the control panel.
7. ➤ Before an STB reset ensure that the causes have been analysed and rectified. The following causes are possible:
 - The units were not able to cool down because the electrical connection was interrupted.
 - Too high an outlet temperature due to incorrectly implemented air routing when operating with hoses.
 - Air inlets or outlets are not free or are inadequate.
8. ➤ Check whether the "Burner fault" indicator light on the control panel is illuminated. If this is the case, then reset the automatic burner.

9. ➤ Move the operating switch to the "II" (Ventilate) position. If the supply air fan now starts up the fault may well be in the burner area.

Forced-air burner and power supply

1. ➤ Check the oil filter(s) for contamination. Replace contaminated oil filter(s).
2. ➤ Check whether the shut-off cock on the oil filter is open.
3. ➤ Check the fuel tank for sufficient fuel level.
4. ➤ Check the heating oil for paraffin separation. **Possible even from 5 °C!**
5. ➤ Check the oil hoses for damage.
6. ➤ Check the safety devices' capillary tubes and probes for damage or contamination.
7. ➤ Use appropriate means to check that the temperature monitor (TW) is functioning properly.
8. ➤ Check the forced-air burner for possible damage to the nozzles, baffle plate, filter etc.

The supply air fan does not start

1. ➤ Check the fan can move freely.
2. ➤ Check the controller fuse in the switching cabinet (only on the CLK 170-RV).
3. ➤ Check whether the motor protection switch in the switching cabinet has tripped (only on the CLK 170-RV).
4. ➤ Use appropriate means to check that the temperature controller (TR) is functioning properly.

Phase sequence relay has tripped (only on the CLK 170-RV)

If the phase sequence relay has been triggered in the supply line to the unit, two of the phases have been connected in the wrong order. To rectify this error, it is necessary to check the supply line for correct connection and, if necessary, exchange two of the phases in order to restore the correct phase sequence. Do not transpose the phases at the unit plug.

10 Care and maintenance

10.1 General

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

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.

- 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. **such as high-pressure cleaners etc.**
- Never use abrasive or solvent-based cleaners
- Even with heavy contamination, use only suitable cleaners
- Only use clean EL heating oil or Diesel fuel. Watch for paraffin formation!
- Check the fuel filter for contamination at regular intervals. Replace contaminated filter if necessary
- Check the units for mechanical damage and have defective parts properly replaced
- Check the fan blades and combustion chamber with heat exchanger for contamination at regular intervals and clean these if necessary
- Check the on-site oil tank regularly for contamination and foreign bodies and clean this if necessary
- Inspect V-belt pre-tensioning. The press-down deflection depth for the V-belts should be approx. 10 mm (a thumb width)
- Check that the safety devices are operating correctly at regular intervals
- Keep the probe for the safety devices free of dust and dirt
- Have the exhaust gas values for the forced-air burner checked by authorised specialists at regular intervals. For safety reasons we recommend the conclusion of a maintenance contract.
- Observe maintenance and care intervals

Cleaning tasks

The units, including the heat exchanger, combustion chamber and forced-air burner must be cleared of dust and dirt after every heating period, or possibly earlier depending on the operating conditions. Wearing parts, such as exhaust gas suppressors, seals, V-belts, oil filter inserts and oil nozzles, for example, should be checked and replaced if necessary.

Cleaning the heat exchanger

1. ➤ Set the operating switch to the "0" position and remove the power plug from the mains socket.
2. ➤ Take off the exhaust hood [1] after removing the 4 fastening screws. Hot air hoses present need not necessarily be removed.
3. ➤ Remove the inspection cover [2] and withdraw the exhaust gas suppressors [4].
4. ➤ Clean the flue [5]. A special cleaning brush is available as an accessory with EDP no. 1103110.

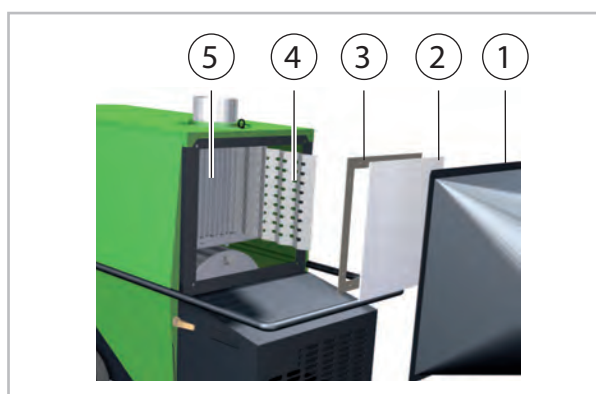


Fig. 17: Cleaning the heat exchanger

5. ➤ Clean the exhaust gas suppressors or replace damaged exhaust gas suppressors.
6. ➤ Check the seal [3] for the inspection cover and replace any damaged seals.
7. ➤ After the maintenance work is complete all parts should be carefully re-fitted in reverse order.

NOTICE!

Always check that the seal is correctly seated in the inspection cover. When fitting the inspection cover ensure that the fastening screws are tightened evenly.

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Cleaning the combustion chamber

1. ➤ Set the operating switch to the "0" position and remove the power plug from the mains socket.
2. ➤ Remove the burner cladding [1] after opening the two quick-release couplings [2].
3. ➤ Loosen the 2 lower fastening screws on the burner flange [6].
4. ➤ Loosen the clamping screw [7] on the burner flange [6] and withdraw the burner towards the front.

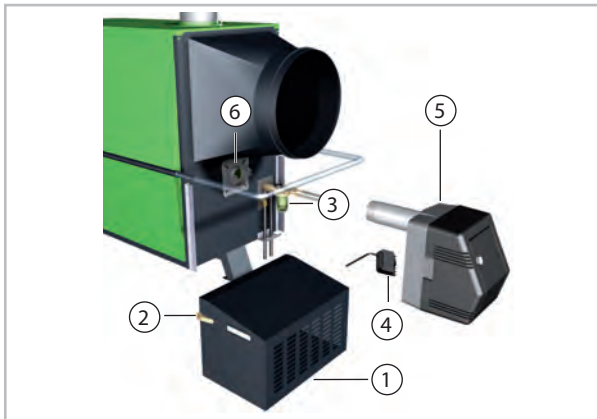


Fig. 18: Cleaning the combustion chamber

5. ➤ Withdraw the burner and carefully set it down beside the unit.
6. ➤ Remove the burner flange [6].
7. ➤ Take care not to damage the flange seals as far as possible.

! NOTICE!

Damaged flange seals can result in incorrect air induction.

8. ➤ Clean the combustion chamber through the burner opening with a vacuum cleaner. A special boiler cleaning set for the REMKO industrial vacuum cleaner is available as an accessory.

Installation of the burner flange and the burner

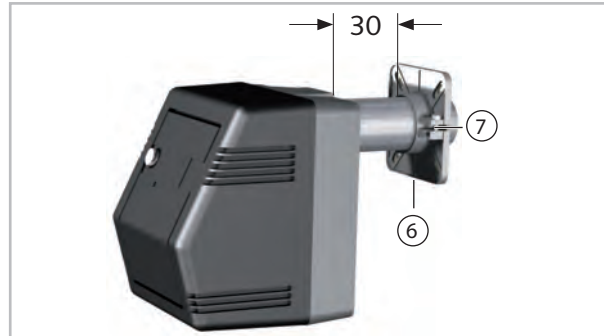


Fig. 19: Installation of the burner flange and the burner

1. ➤ Check the flange seal and replace if necessary.
2. ➤ Fix the burner flange to the unit housing with the four fastening screws.
Note the "OBEN" (UP, HAUT) sign!
3. ➤ Firmly tighten the top 2 fastening screws.
4. ➤ Gently tighten the lower 2 fastening screws with only light force so that the burner flange can still be pulled together.
5. ➤ Push the flame tube of the burner into the burner flange.

Observe the dimensions in Fig. 19!

6. ➤ Clamp the flame tube firmly into place with the clamping screw [7] whilst lifting the burner slightly (3° tilt).
7. ➤ Lastly, also firmly tighten the bottom 2 fastening screws.
8. ➤ Check the fuel filter insert [3] for leaks and replace if necessary.
9. ➤ Re-fit the burner cladding and fasten with the quick couplings.

Additional notes for unit maintenance

- All work must be carried out exclusively by authorised specialists with the appropriate equipment. A log should be created and kept safely by the operator
- It is essential that the forced-air burner is serviced and adjusted by authorised specialists



WARNING!

Repair work on the electrical installation and on the burner must be performed exclusively by authorised specialists for safety reasons.

⚠ WARNING!

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

! NOTICE!

The thermal overcurrent relay must be operated exclusively in the "Manual resetting" position. It is not permitted for the relay to be able to switch itself back on again after the cooling down phase.

⚠ WARNING!

The restrictions on exhaust gas losses per §11 of the ordinance on small furnace systems (1st. BImSchV) must be observed.

! NOTICE!

If the overcurrent relay is operated in the "Automatic resetting" position, then motor damage cannot be excluded. **Warranty claims are voided!**

! NOTICE!

Check the function and setting of the thermal overcurrent relay in the switching cabinet. (Setting CLK 170-RV = 3.6 A)

Tensioning the V-belt

1. ➔ Remove the two air intake grilles.
2. ➔ Loosen the screws [7]. The screw on the opposite side is not shown.
3. ➔ Set the pre-tension of the V-belt with the (size 17) nuts [8] and [9].
4. ➔ The press-down deflection depth for the V-belts should be approx. 10 mm (a thumb width)
5. ➔ Counter-lock the nuts [8] and [9] and then tighten the two fastening screws [7] again.
6. ➔ Re-fit the two air intake grilles.

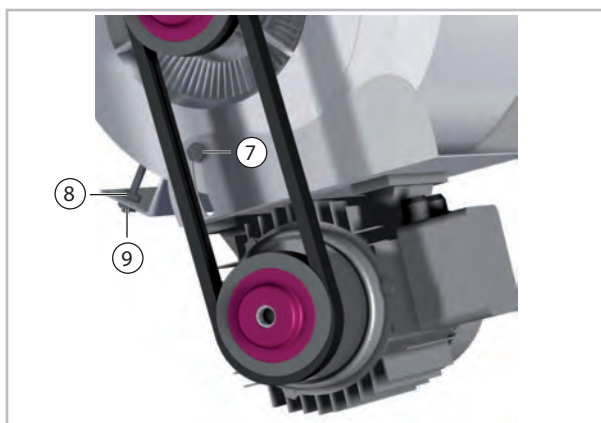


Fig. 20: Tensioning the V-belt

REMKO CLK series

10.2 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																				
Combustion chamber cleaned																				
Heat exchanger cleaned																				
Exhaust gas suppressors replaced																				
Inspection cover seal replaced																				
Fuel filter insert replaced																				
Safety equipment checked																				
Safety devices checked																				
Unit checked for damage																				
Electrical safety check																				
Burner maintenance *)																				
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

*) Have the forced-air burner maintained and adjusted only by authorised specialists and in accordance with the legal provisions (1st BImSchV.). A corresponding measurement log should be generated.

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

10.3 Exploded view of the unit

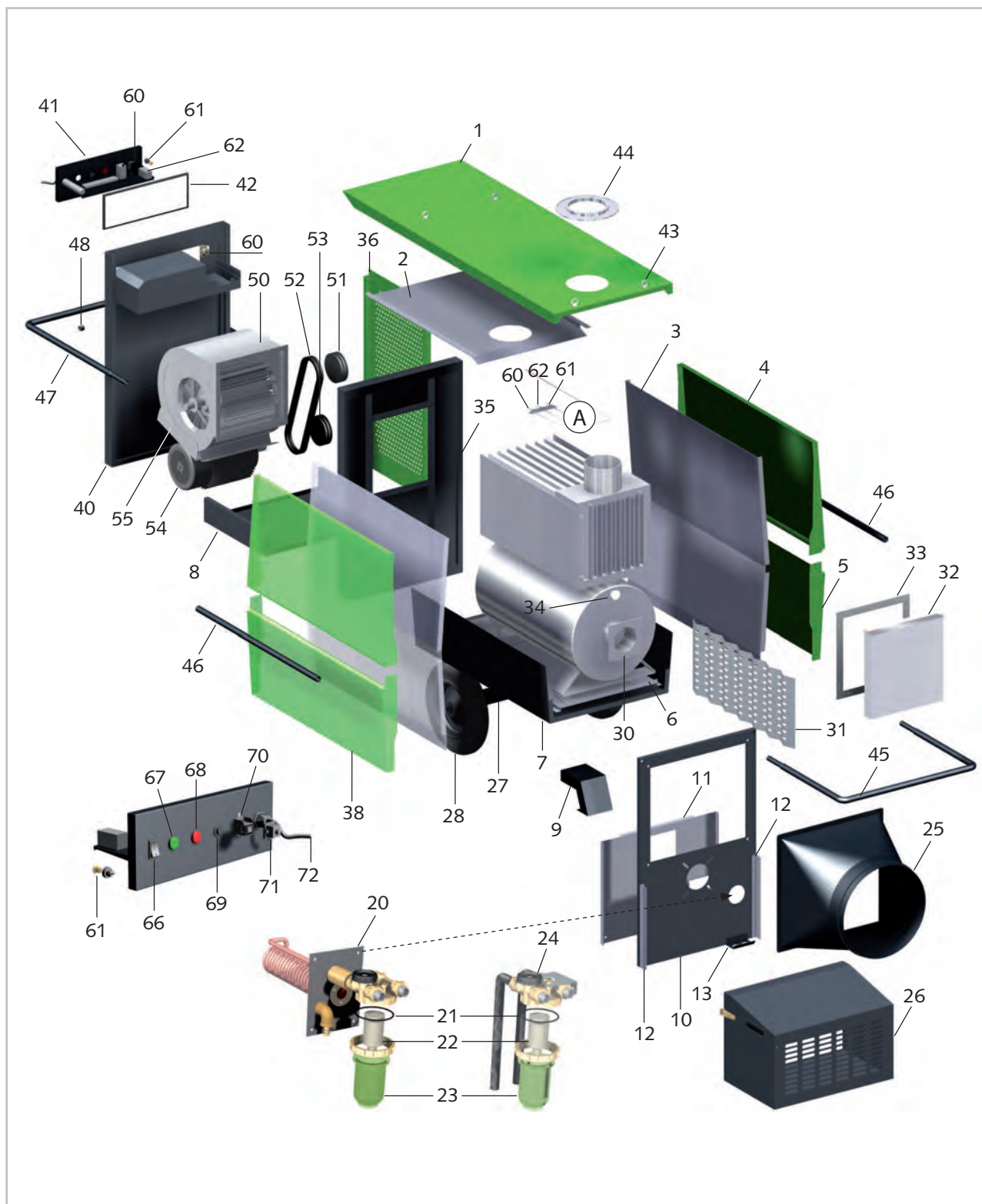


Fig. 21: Exploded view of the unit CLK 80-170-RV

A Temperature probe

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

REMKO CLK series

10.4 Spare parts list

No.	Designation	CLK 80-RV	CLK 170-RV
1	Cover panel	1104740-1	1104851
2	Upper insulation	1104741-1	1104852
3	Insulation right / left	1104742	1104853
4	Upper side cover (right / left)	1104743	1104854
5	Lower side cover (right / left)	1104744-1	1104855
6	Lower insulation	1104746	1104872
7	Front base plate	1104745	1104856
8	Rear base plate	1104836	1104857
9	Support foot	1104790	1104790
10	Front wall compl.	1104755	1104858
11	Front wall insulation	1104756	1104786
12	Guide bracket	1104757	1104787
13	Hose pass-through	1104722	1104722
20	Multiflex oil pre-heating	Depending on the respective device version	
21	O-ring		
22	Filter insert		
23	Oil filter cup		
24	Oil filter, compl.		
25	Outlet nozzle	1104758	1104788
26	Burner cladding compl.	1104759	1104789
27	Axle	1104760-1	1104791
28	Wheel	1108369	1108369
30	Combustion chamber, compl.	1104761-2	1104806
31	Exhaust gas suppressor (set)	1104793	1104809
32	Inspection cover	1104763	1104794
33	Seal for inspection cover	1104764	1104795
34	Sealing cap	1104728	1104784
35	Centre wall	1104841	1104862
36	Intake grill, right / left	1104842	1104863
40	Back wall	1104843	1104864
41	Switching cabinet compl.	1104783-1	1104865
42	Seal for switching cabinet	1104754	1104866
43	Crane eye	1102554	1102554
44	Exhaust gas nozzle collar	1104732	1104796

No.	Designation	CLK 80-RV	CLK 170-RV
45	Transportation bracket, front	1104765	1104867
46	Transportation bracket, middle	1104767	1104868
47	Transportation bracket, rear	1104766-1	1104869
48	Spacing roller	1104849	1104849
50	Radial fan	1108603	1108607
51	Fan belt pulley	1113111	1102831
52	V-belt	1113112	1102802
53	Motor belt pulley	1113110	1102784
54	Electric motor IE2	1102737	1102733
55	Motor bracket with clamp	1104850	1104870
60	Temperature controller (TR)	1103166	1103166
61	Safety temperature limiter (STB)	1101197	1101197
62	Temperature monitor (TW)	1103146	1103146
66	Operating switch	1101188	1101188
67	Indicator light, green (Operation)	1105514	1105514
68	Indicator light, red (Burner fault)	1105363	1105363
69	Reset button (Burner)	1103408	1103408
70	Thermostat socket	1101018	1101018
71	Strapping plug	1101019	1101019
72	Mains cable with plug CEE 16A	1104701	1105100
Spare parts not illustrated			
	Burner connector, 7-pole	1102537	1102537
	Cleaning brush, compl.	1103110	1103110
	Locking ring	1101622	1101622
	Hubcap	1101623	1101623
	Combination reversing contactor	---	1105101
	Contactor	---	1105104
	Overcurrent relay	---	1102979
	Controller fuse (Automat)	---	1105105
	Controller fuse (Neozet)	---	1108182
	Time relay	---	1105106
	Phase sequence relay	---	1105415

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

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