AL-KO

QUALITY FOR LIFE

GB

VENTILATION AND CENTRAL AIRCONDITONING DEVICES

OPERATING AND INSTALLATION INSTRUCTIONS

AIR HEATER COMFORT

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1. Information concerning this handbook

- Read this documentation before installation and commissioning. This is a requirement for safe working and fault-free operation.
- Adhere to the safety and warning notes in this documentation and on the product.
- This documentation is a permanent part of the product described and should be handed to the buyer in the event of a sale!

1.1 Description of symbols

Warning!
This symbol refers to safety procedures that are required to prevent injuries!

Caution!
This symbol refers to safety procedures that are required to prevent damage to goods!

Special information to improve comprehension and handling.

1.2 Regulations and standards

The following standards and regulations were applied during the design phase and also apply to installation, commissioning, operation and maintenance:

DIN EN ISO 12100	Safety of machinery – General principles for design – Risk assessment and risk reduction
DIN EN 60204-1	Safety of machinery – Electrical Equipment of machines – Part 1: General requirements
DIN EN 349	Safety of machinery – Minimum gaps to avoid crushing of parts of the human body
DIN EN ISO 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
VDMA 24167	Fans - Safety requirements
2006/42/EC	Machinery Directive
97/23/EC	Pressure Equipment Directive
2004/108/EC	Electromagnetic Compatibility

1.3 Legal information

All data provided are only intended to describe the product. They do not guarantee a certain composition of the system or its suitability for a specific application. This information does not release the user from his obligation to perform evaluations and tests.

2. Safety information

Please take note of these issues to prevent injuries, fires and other hazards caused by inappropriate use and operation of the air heater:

Warning!
Installation, electrical connection, media supply connection, maintenance, commissioning, repair, etc. may only be performed by trained staff.

Before any work on the air heater is undertaken, it must be ensured that the power supply is switched off (all-pole separation) and secured against unauthorised re-operation!

Only operate the air heaters once they have been completely assembled and provided with appropriate reach-in protection.

All claims for damages or warranties become void when the installation does not comply with our stipulations or when the fault/damage is causally related to inappropriate alterations, processing or other treatment. The user must prove that the fault is not due to inappropriate installation.

The general maintenance instructions in the operating and installation instructions for the AL-KO air heaters must always be adhered to.

The implementation and design of the air heater corresponds to the standards listed in the declaration of conformity and declaration of incorporation to minimise the risk potential posed by the air heater. The potential risk can only be minimised when these additional, applicable standards for the installation-ready system are adhered to by the system builder.

It must be ensured that all authorised persons have read and understood all of the operating and installation instructions and adhere to them!

All plant, company and work instructions of the user apply in addition to these operating instructions to prevent hazards within the company.

Personal protective equipment is required for work on the air heater!

2.1 Appropriate use

The application range for AL-KO air heaters is exclusively air heating of the air in rooms and buildings with normal climate and normal atmosphere.

The air heaters may only be operated in an environmental temperature range between -20 °C and +40 °C and a humidity range between 50% and 85% relative humidity without condensation.

Installation of the air heaters at a location more than 800 m above sea level may lead to a drop in performance and has to be investigated on a case-by-case basis.

Different areas of application should be discussed with the manufacturing plant.

2.2 Possible inappropriate uses

AL-KO air heaters may only be operated within the range specified in the technical data provided by AL-KO. Any other or further use that deviates from the description in Point "2.1" Appropriate use" is deemed inappropriate use. The manufacturer is not liable for damage resulting from such use.

Possible inappropriate use includes, for example:

- Transport of media with temperatures above or below the permitted range, aggressive media or media containing a lot of dust.
- Use in an explosive atmosphere.
- Use in wet areas with a high humidity content (e.g. washing system)

2.3 Residual risks

The air heater may pose risks when it is used by untrained persons or in an incorrect or inappropriate way.

Residual risks are potential risks that are not obvious, e.g.:

- Injuries due to not adhering to the safety instructions, standards, guidelines or regulations
- Injuries due to uncoordinated work.
- Risk due to working on the electrical system, the cables and the connections

2.4 Delivery

AL-KO air heaters are delivered in cardboard boxes or on pallets incl. film packaging!

2.5 Storage, transport

 **Warning!**  **Caution!**

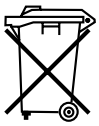
- Store the air heaters in their original packaging in a dry place and protected against the weather.
- Cover open pallets with tarpaulins and protect the air heaters against dirt (e.g. chips, stones, wire, etc.)
- Additional, protective packaging must be used for transport under harsh conditions, (e.g. on open vehicles, exposed to unusual vibration, transport by sea or in subtropical countries).
- Prevent repeated and, in particular, sudden temperature changes. They are particularly harmful when the humidity can condense.
- Check the ease of movement of the fan bearings (turn them by hand) after storage periods longer than 1 year.
- The device can be transported with a fork lift or and industrial truck as described in Point 4.1 "Fork lift / industrial truck transport".
- Clear vision must be ensured during the transport
  (use support staff as required)
- No persons may remain in the transport area.
- The relevant worker safety and environmental protection regulations must be adhered to during transport.
- The air heater may only be transported by educated, trained and instructed personnel and with appropriate consideration of safety issues.
- It must be ensured that drivers have appropriate driving licences when transporting devices requiring a driving licence.
- Avoid twisting of the housing or other forms of damage.
- Damage caused by in appropriate packaging, storage or transport are to be borne by the party that caused them.
- When the system stands still for more than one month, the fan must be turned once a month to prevent damage to the bearings.

2.6 Duties of the operating company

The operator of the AL-KO products must regularly train his staff with regard to the following:

- Adherence to and use of the operating and installation instructions as well as the legal regulations.
- Appropriate operation of the air heater.
- Adhere to the instructions of the company security and the operating instructions of the operating company as required.
- Conduct in emergencies

2.7 Disposal of the packaging



Disposal of the packaging must be performed according to the currently valid, local environmental and recycling regulations of your country and your municipality.

3. Product description

AL-KO air heaters of the COMFORT series consist of a stable, self-supporting steel sheet housing which is sendzimir-galvanised and has additional powder coating. Individually adjustable fins are arranged on all four sides. A maintenance-free axial fan ensures low-noise operation. The drives of the AL-KO air heaters are external rotor motors. They have a permanently lubricated deep-groove ball bearing and the fan forms a single unit with the rotor. A heat exchanger for air heating will be installed in the housing next to the fan. This is implemented as a finned heat exchanger (made of Cu / Al). The air heaters can be extended with various electrical accessories.

Type key COMFORT:

LH KOMF	140	3	K	

Device type

LH KOMF Air heater COMFORT

Device size

140
250
400
650

Heat exchanger type

1	1 row of pipes, distance of fins 2.1 mm
2	2 row of pipes, distance of fins 2.5 mm
3	3 row of pipes, distance of fins 2.5 mm

Device versions

K	for low room heights (intake at the bottom)
K/o	for low room heights (intake at the top)
K/h	for medium room heights (intake at the side)
K/TA	for gate air curtain systems (intake at the side)
KE/TA	for gate air curtain systems (intake at the side)

Supplementary text for additional options

a	Console (adjustable)
c	Console (bracket)

3.1 Declaration of incorporation

Manufacturer's Name and Address:

AL-KO THERM GMBH
Hauptstraße 248-250
D-89343 Jettingen-Scheppach (Germany)

EC Declaration of Incorporation

According to EC Machinery Directive 2006/42/EC, Appendix II, Part 1, Section B of May 17, 2006.

We hereby declare that by design and construction the following machine

Partly completed machine:	Air heating devices without control
Series:	Komfort K, K/o, K/h, K/TA, KE/TA
Type:	140; 250; 400; 650;

complies with the following applicable standards and directives.

EC Directive 2006/42/EC	Machinery Directive
EC Directive 97/23/EC	Pressure Equipment Directive
EC Directive 2004/108/EC	Electromagnetic Compatibility (EMC)

Applicable Harmonized Standards, in particular:

DIN EN ISO 12100	Safety of Machinery; General Design Principles – Risk Assessment and Risk Containment
DIN EN 349	Safety of Machinery; Minimum Clearances to Avoid the Crushing of Body Parts
DIN EN 60204-1	Safety of Machinery; Integration of Electrical Devices into Machinery
DIN EN ISO 13857	Safety of Machinery; Safety Clearances to Keep the Arms and Legs away from Hazardous Areas

Applied National Standards and Technical Specifications:

VDMA 24167	Ventilators – Safety Requirements

We compiled the specific technical documents according to Appendix VII, Part B. Upon justified request, the specific technical documents shall be submitted to the official authorities. The documents may be submitted electronically or as hard copies. The above named manufacturer reserves all property rights.

Our product is not cleared for use until it has been determined that the product is going to be integrated into a facility/machine and/or is used as part of an assembly, which complies with all applicable laws and regulations.

Authorized Representative in Charge of the Technical Document Compilation:

Leo Kohl
Address: see manufacturer's address

This declaration shall be null and void in case the machine is altered or modified without the manufacturer's prior written permission.

Jettingen-Scheppach, May 01, 2012

C. Stuck, CEO

3.2 Declaration of conformity

Manufacturer's Name and Address:

AL-KO THERM GMBH
Hauptstraße 248-250
89343 Jettingen-Scheppach (Germany)

EC Declaration of Conformity

According to EC Machinery Directive 2006/42/EC, Appendix II, Part 1, Section A of May 17, 2006.

We hereby declare that by design and construction the following machine

Machine:	Air heating devices with control
Series:	Komfort K, K/o, K/h, K/TA, KE/TA
Type:	140; 250; 400; 650;

complies with the following applicable standards and directives.

EC Directive 2006/42/EG	Machinery Directive
EC Directive 97/23/EC	Pressure Equipment Directive
EC Directive 2004/108/EC	Electromagnetic Compatibility (EMC)

Applicable Harmonized Standards, in particular:

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Applied National Standards and Technical Specifications:

VDMA 24167	Ventilators – Safety Requirements

Authorized Representative in Charge of the Technical Document Compilation:

Leo Kohl
Address: see manufacturer's address

This declaration shall be null and void in case the machine is altered or modified without the manufacturer's prior written permission.

Jettingen-Scheppach May 01 2012

C. Stuck, CEO

3.3 Technical data

3.3.1 TYPE LH-KOMF... K

Type	Dimensions in mm				Heat exchanger connection			Noise pressure level 3 m distance	
	L mm	b mm	c mm	d mm	1 RR	2 RR	3 RR	Max. rotation speed dB(A)	Min. rotation speed dB(A)
LH-KOMF 140 K	600	572	40	420	1“	1“	1“	51	45
LH-KOMF 250 K	700	672	46	520	1“	1“	1“	54	47
LH-KOMF 400 K	800	772	52	620	1“	1“	1“	57	50
LH-KOMF 650 K	900	872	76.9	720	1“	1“	1“	60	53

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
LH-KOMF 140 K	23	24	26	1.2	1.9	2.6
LH-KOMF 250 K	30	31	34	1.3	2.3	3.1
LH-KOMF 400 K	36	38	40	1.5	2.6	3.6
LH-KOMF 650 K	48	50	53	1.6	2.9	4.1

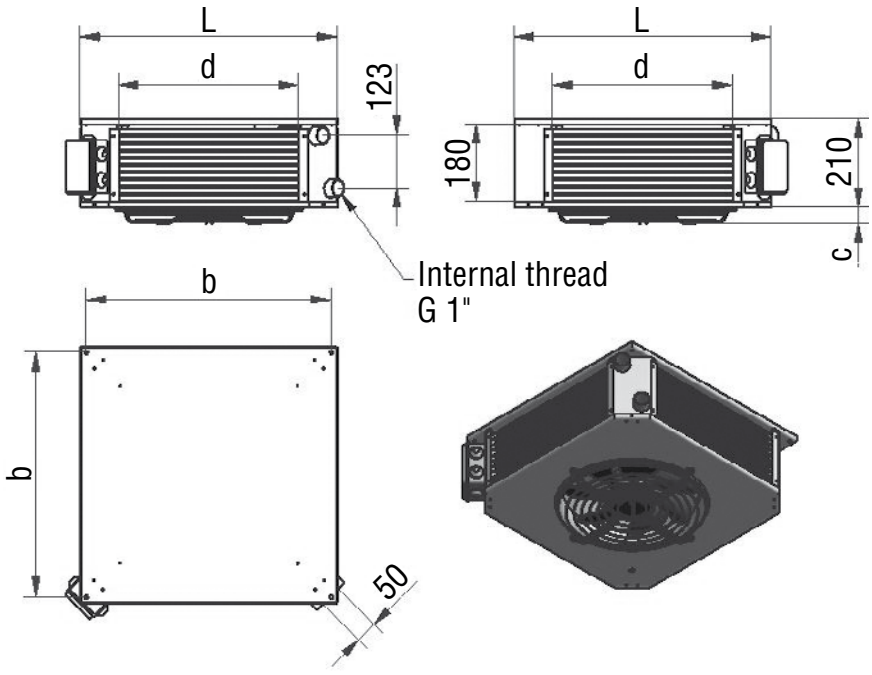


Fig.: Type LH-KOMF...-K device series

3.3.2 TYPE LH-KOMF... K/h

Type	Dimensions in mm				Heat exchanger connection			Noise pressure level 3 m distance	
	L mm	b mm	c mm	d mm	1 RR	2 RR	3 RR	Max. rotation speed dB(A)	Min. rotation speed dB(A)
LH-KOMF 140 K/h	600	572	108.2	420	1“	1“	1“	51	46
LH-KOMF 250 K/h	700	672	108.2	520	1“	1“	1“	56	49
LH-KOMF 400 K/h	800	772	108.2	620	1“	1“	1“	58	51
LH-KOMF 650 K/h	900	872	108.2	720	1“	1“	1“	61	54

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
LH-KOMF 140 K/h	28	30	32	1.2	1.9	2.6
LH-KOMF 250 K/h	37	38	41	1.3	2.3	3.1
LH-KOMF 400 K/h	45	47	49	1.5	2.6	3.6
LH-KOMF 650 K/h	59	61	64	1.6	2.9	4.1

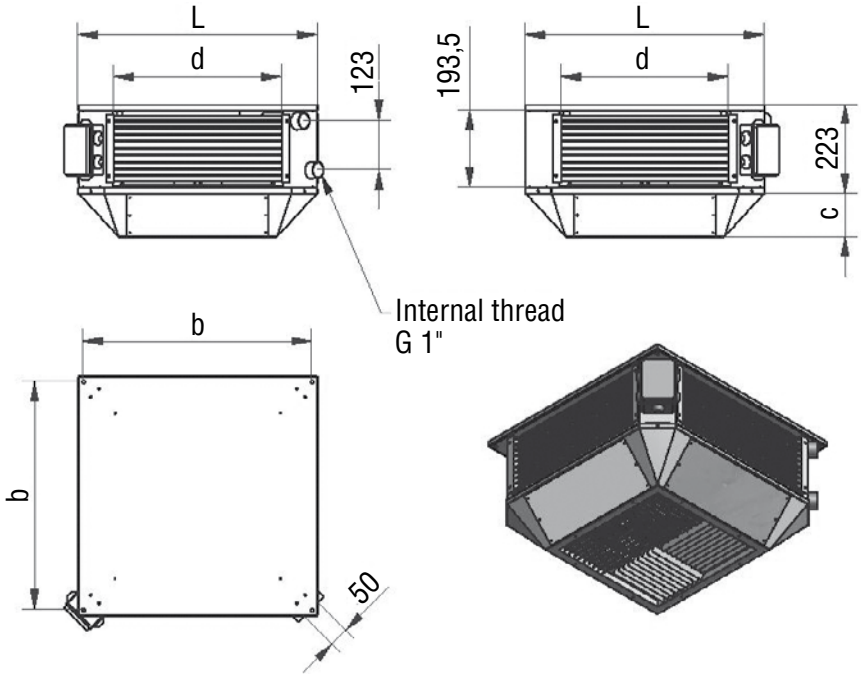


Fig.: Type LH-KOMF...-K/h device series

3.3.3 TYPE LH-KOMF… K/o

Type	Dimensions in mm				Heat exchanger connection			Noise pressure level 3 m distance	
	L mm	b mm	c mm	d mm	1 RR	2 RR	3 RR	Max. rotation speed dB(A)	Min. rotation speed dB(A)
LH-KOMF 140 K/o	600	572	26.9	420	1“	1“	1“	51	45
LH-KOMF 250 K/o	700	672	32.9	520	1“	1“	1“	54	47
LH-KOMF 400 K/o	800	772	38.9	620	1“	1“	1“	57	50
LH-KOMF 650 K/o	900	872	63.8	720	1“	1“	1“	60	53

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
LH-KOMF 140 K/o	22	24	26	1.2	1.9	2.6
LH-KOMF 250 K/o	29	31	33	1.3	2.3	3.1
LH-KOMF 400 K/o	36	38	40	1.5	2.6	3.6
LH-KOMF 650 K/o	44	46	49	1.6	2.9	4.1

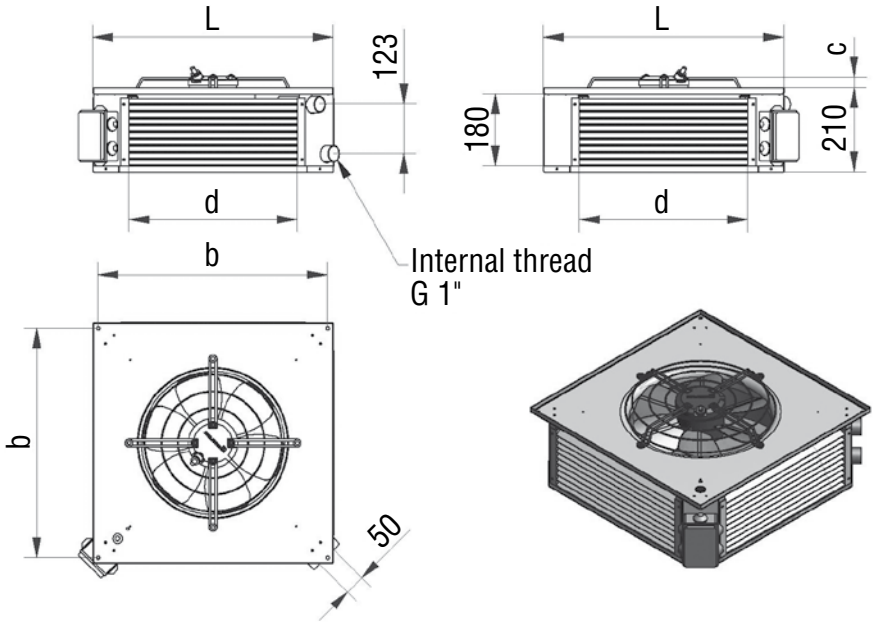


Fig.: Type LH-KOMF…-K/o device series

3.3.4 TYPE LH-KOMF... K/TA

Type	Dimensions in mm				Heat exchanger connection			Noise pressure level 3 m distance	
	L mm	b mm	c mm	d mm	1 RR	2 RR	3 RR	Max. rotation speed dB(A)	Min. rotation speed dB(A)
LH-KOMF 140 K/TA	600	572	193	420	1“	1“	1“	51	45
LH-KOMF 250 K/TA	700	672	210	520	1“	1“	1“	54	47
LH-KOMF 400 K/TA	800	772	233	620	1“	1“	1“	57	50
LH-KOMF 650 K/TA	900	872	257	720	1“	1“	1“	60	53

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
LH-KOMF 140 K/TA	30	31	33	1.2	1.9	2.6
LH-KOMF 250 K/TA	39	40	43	1.3	2.3	3.1
LH-KOMF 400 K/TA	49	51	53	1.5	2.6	3.6
LH-KOMF 650 K/TA	62	64	67	1.6	2.9	4.1

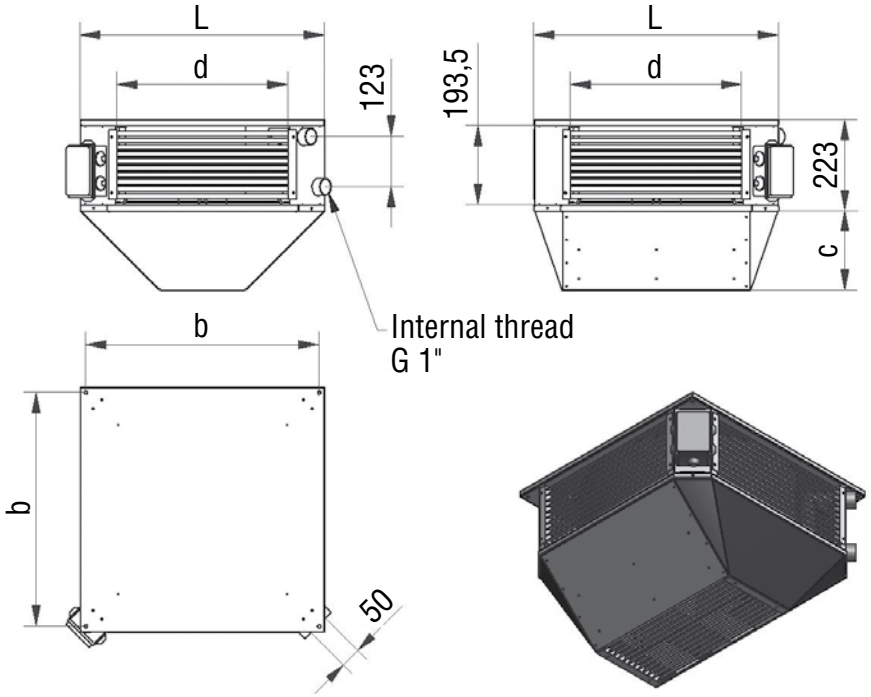


Fig.: Type LH-KOMF...-K/TA device series

3.3.5 TYPE LH-KOMF… KE/TA

Type	Dimensions in mm				Heat exchanger connection			Noise pressure level 3 m distance	
	L mm	b mm	c mm	d mm	1 RR	2 RR	3 RR	Max. rotation speed dB(A)	Min. rotation speed dB(A)
LH-KOMF 140 KE/TA	600	572	193	420	1“	1“	1“	52	46
LH-KOMF 250 KE/TA	700	672	210	520	1“	1“	1“	55	50
LH-KOMF 400 KE/TA	800	772	233	620	1“	1“	1“	57	50
LH-KOMF 650 KE/TA	900	872	257	720	1“	1“	1“	60	54

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
LH-KOMF 140 KE/TA	29	31	33	1.2	1.9	2.6
LH-KOMF 250 KE/TA	38	40	42	1.3	2.3	3.1
LH-KOMF 400 KE/TA	49	51	54	1.5	2.6	3.6
LH-KOMF 650 KE/TA	61	63	66	1.6	2.9	4.1

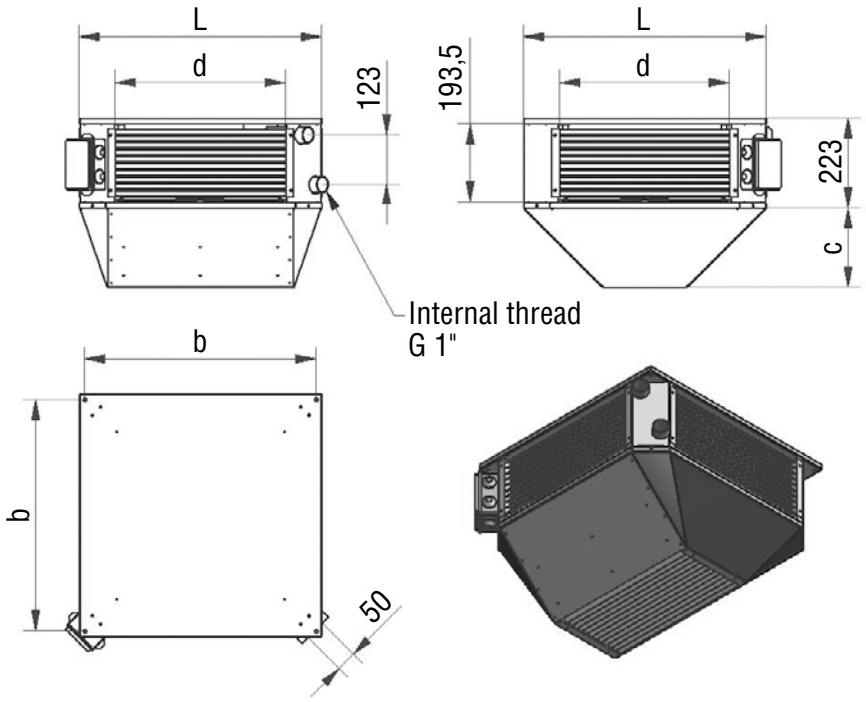


Fig.: Type LH-KOMF…-KE/TA device series

3.4 Performance diagrams

Air heaters LH-KOMFORT

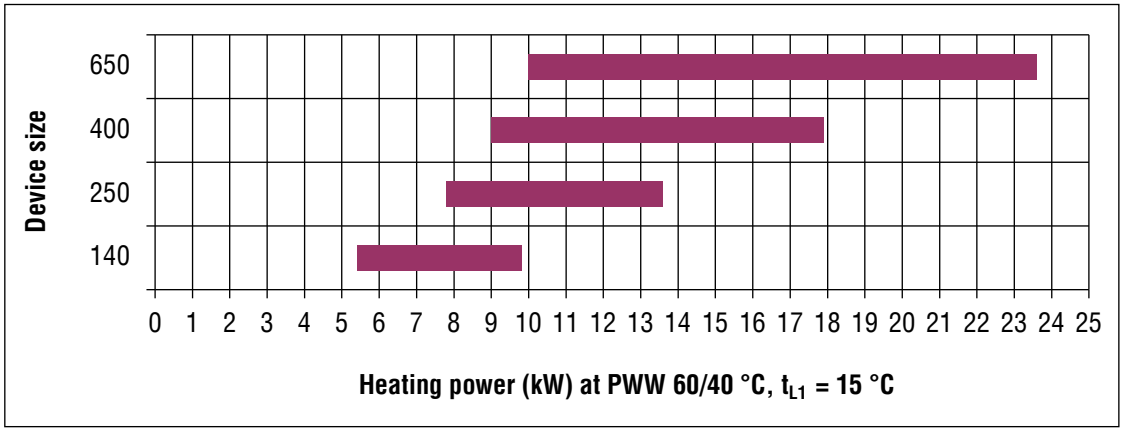


Fig.: Heat performance diagram

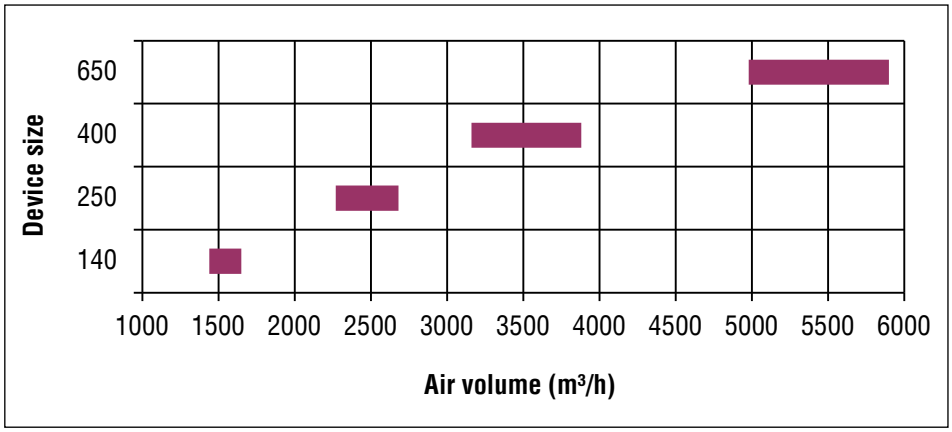
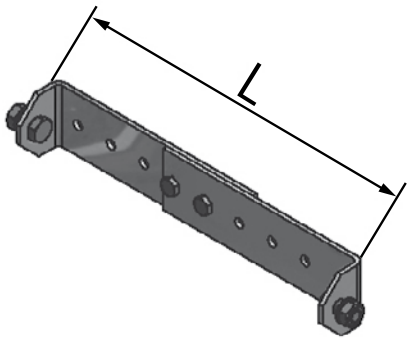


Fig.: Air volume diagram

3.5 Accessory

Console a

The Console Set a is suited for ceiling installation of the air heaters on suspended or inclined ceilings. The distance of the air heater to the ceiling is freely adjustable from 150 – 250 mm. It consists of four consoles and the fastening screws.

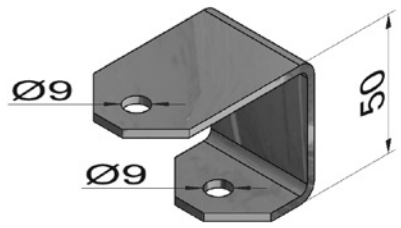


Type	L mm	Weight kg*
a	160 - 260	1.4

* Weight of the console set

Console c

The Console Set c is suited for ceiling installation of the air heaters. The distance of the air heater to the ceiling is about 40 mm. The set consists of four consoles and the fastening screws.



Type	Weight kg*
c	0.35

* Weight of the console set

4. Transport

Caution!

- The individual components of the system may only be moved with the transport devices intended for this purpose.
- Do not step or work under suspended loads.
- Only permitted lifting tools with sufficient carrying capacity may be used.
- The lifting tools must be fault-free.
- The load-handling equipment must be checked for carrying capacity and damage before use.
- Protective gloves should be worn during transport and installation of the devices (risk of cutting).
- Only remove the packaging immediately before installation.

4.1 Fork lift / industrial truck transport

AL-KO air heaters can be transported in their original packaging with a fork lift or an industrial truck!

Caution!
Always place the lifting forks of the fork lift against the timbers.
Pay attention to any objects that may protrude (e.g. media connections)

- Use suitable fork lengths to prevent damage to the device.
- Use suitable intermediate timber layers.

5. Assembly

Warning!
Installation, electrical connection, media supply connection, maintenance, commissioning, repair, etc. may only be performed by trained staff.

- The place of installation as well as the installation structure must provide permanent and vibration-free support of the devices.

  The place of installation and the installation structure has to be checked by a structural engineer, if required.
- AL-KO air heaters are delivered in pre-assembled form.
- The manufacturer documentation must be considered before installation or removal.
- The air heaters must be levelled during the installation!

5.1 Ceiling installation of the devices

Device Version K

The Device Version K is intended for low rooms. The recirculated air is sucked in at the bottom centre of the device. The heated air is distributed in four directions. The outlet louvres should be directed slightly downwards. The air heater can either be mounted directly under the ceiling or fastened at a distance to the ceiling with Console Set a or c (optional).

Max. permitted distance from the floor to the bottom edge of the device:

Type 140-K	=	2400 mm
Type 250-K	=	2500 mm
Type 400-K	=	2700 mm
Type 650-K	=	3400 mm

Device Version K/h

The K/h device version is intended for medium-high rooms. The recirculated air is taken in at the ceiling on all four sides, heated and blown downwards into the room in a cone-shaped stream. The air heater can either be mounted directly under the ceiling or fastened at a distance to the ceiling with Console Set a or c (optional).

Max. permitted distance from the floor to the bottom edge of the device:

Type 140-K/h	=	3500 mm
Type 250-K/h	=	4000 mm
Type 400-K/h	=	4500 mm
Type 650-K/h	=	5000 mm

Device Version K/o

The K/o device version is intended for low rooms. The recirculated air is sucked in at the centre top of the device. The heated air is distributed in four directions. The outlet louvres should be directed slightly downwards. The air heater must be mounted to leave at least a distance of 150 mm from the fan to the ceiling. Console set a (optional) can be used for this purpose.

Max. permitted distance from the floor to the bottom edge of the device:

Type 140-K/o	=	2400 mm
Type 250-K/o	=	2500 mm
Type 400-K/o	=	2700 mm
Type 650-K/o	=	3400 mm

Device Version K/TA and KE/TA

The K/TA and KE/TA device version is well suited for gate air curtain systems, due to its conical outlet hood. This device version should be mounted as close as possible to the gate openings. The recirculated air is taken in at the ceiling on all four sides, heated and blown downwards into the room against the intake direction. The air heater can either be mounted directly under the ceiling or fastened at a distance to the ceiling with Console Set a or c (optional).

Max. permitted distance from the floor to the bottom edge of the device:

Type 140-K/TA =	2500 mm	Type 140-KE/TA =	4000 mm
Type 250-K/TA =	3000 mm	Type 250-KE/TA =	4500 mm
Type 400-K/TA =	3500 mm	Type 400-KE/TA =	5000 mm
Type 650-K/TA =	4000 mm	Type 650-KE/TA =	5500 mm

- Mount the bracket set on the air heater (if it was not pre-installed at the factory)
- Drill fastening holes into the ceiling.
- Attach the air heater to the ceiling.
- Establish the media connections.

Example for ceiling mounting:

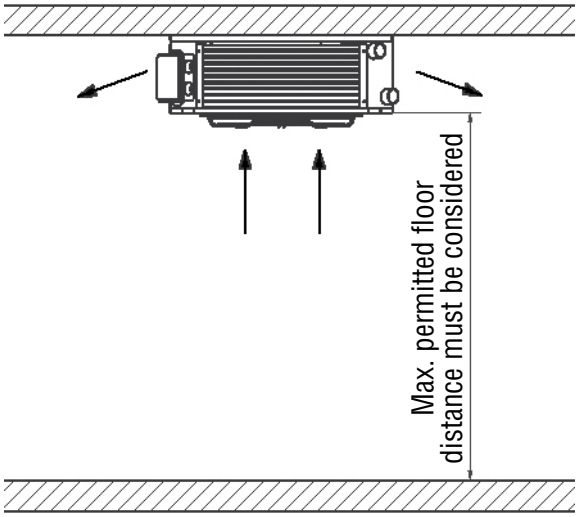


Fig.: Installation example for Device Version K

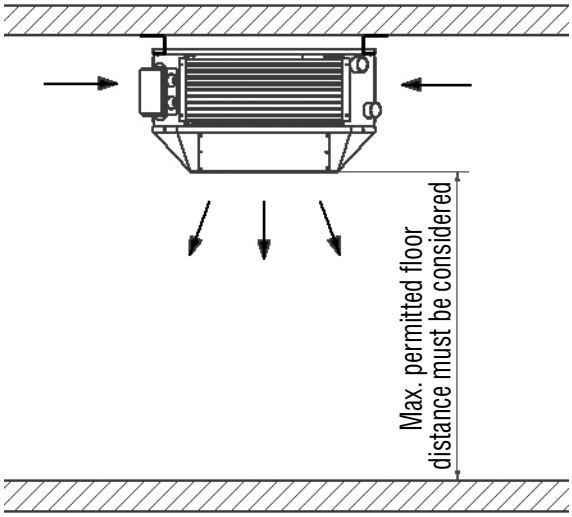


Fig.: Installation example for Device Version K/h with Console Set c

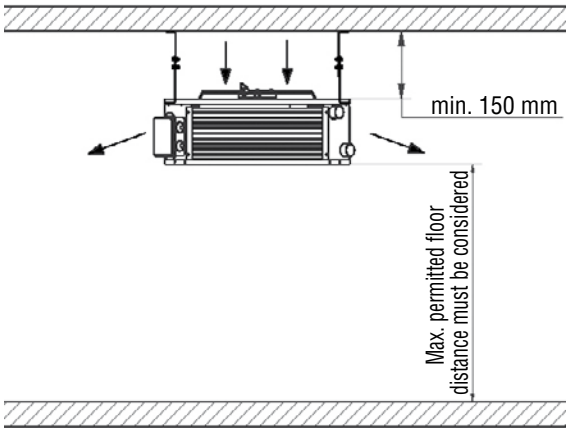


Fig.: Installation example for Device Version K/o with Console Set a

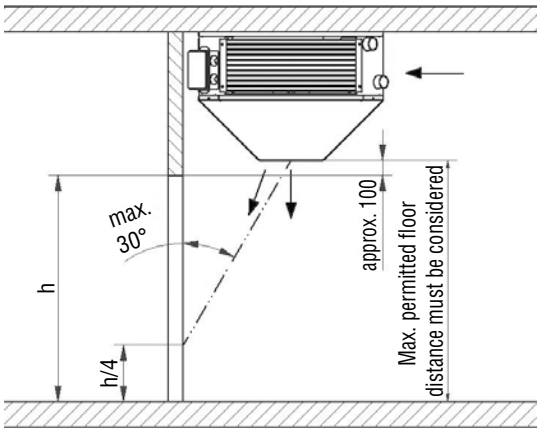


Fig.: Installation example for Device Version K/TA; KE/TA

5.2 Heat exchanger connection

Take care not to mix up the feed and reflux pipe during the pipe installation.
The feed line must be connected at the bottom and the reflux line at the top of the devices to ensure optimal warm water distribution within the finned heat exchanger.

Caution!
Hold the connectors in place with a suitable tool (e.g. pipe wrench) when connecting the heat exchanger to prevent damage.
Attach pipes and connectors to ensure free access to the heat exchangers for maintenance purposes.
When temperatures below the freezing point occur, the heat exchanger must either be emptied and blown out with compressed air or a standard anti-freeze with corrosion protection must be filled in to prevent damage due to frost or corrosion!

CU/AL heat exchanger:

- Maximum operating pressure: 16 bar.
- Maximum flow temperature: 120 °C.

- Feed and reflux pipes must be connected according to the professional regulations.
- May only be operated with water that has no corrosive properties (e.g. no high-purity water) and that contains neither oxygen or carbon dioxide!
- Valves and actuators must be professionally mounted (provided by customer).
- Carefully bleed the heat exchanger.
- The bleeding and draining facilities for the heat exchanger must be provided by the customer.
- The complete piping must be checked for leaks!

5.3 Electrical connection

Warning!
The electrical connection may only be performed by a registered electrician and with consideration of the DIN and VDE regulations and the directives of the local energy supply company.

- The electrical connection of the AL-KO air heater must be performed according to the connection plans. Only use the device-specific circuit diagram to connect the device.
- The air heaters must be grounded.
- It must be possible to switch off all poles of the supply line with a maintenance switch.
- Fluctuations or deviations from the mains voltage may not exceed the tolerances specified in the technical data, as malfunction can otherwise not be excluded.
- All electrical motors of the fans have a thermal contact as standard equipment. It must be integrated into the controller.

5.3.1 Fan

Check the rotation direction of the fan.

The rotation direction must correspond with the rotation direction arrow on the fan blade or the fan housing.

Technical data for 400-V fan:

Type	140-K…		250-K…		400-K…		650-K…	
Operating voltage in V	3~400 V/50 Hz		3~400 V/50 Hz		3~400 V/50 Hz		3~400 V/50 Hz	
	Δ	Y	Δ	Y	Δ	Y	Δ	Y
Power consumption in kW	0.05	0.03	0.11	0.07	0.13	0.08	0.35	0.21
Nominal current in A	0.13	0.07	0.28	0.15	0.29	0.15	0.78	0.39
Operating speed rpm	910	720	890	710	660	500	660	500
Insulation class	THCL 155 (F)		THCL 155 (F)		THCL 155 (F)		THCL 155 (F)	
Protection type	IP 54		IP 54		IP 54		IP 54	
Motor contactor	Thermal contact		Thermal contact		Thermal contact		Thermal contact	

Type	140-KE…		250-KE…		400-KE…		650-KE…	
Operating voltage in V	3~400 V/50 Hz		3~400 V/50 Hz		3~400 V/50 Hz		3~400 V/50 Hz	
	Δ	Y	Δ	Y	Δ	Y	Δ	Y
Power consumption in kW	0.19	0.14	0.29	0.21	0.35	0.25	0.75	0.47
Nominal current in A	0.40	0.23	0.50	0.32	0.80	0.46	1.50	0.83
Operating speed rpm	1390	1170	1330	1020	890	660	880	680
Insulation class	THCL 155 (F)		THCL 155 (F)		THCL 155 (F)		THCL 155 (F)	
Protection type	IP 54		IP 54		IP 54		IP 54	
Motor contactor	Thermal contact		Thermal contact		Thermal contact		Thermal contact	

Terminal strip 400 V without AL-KO rotation speed control

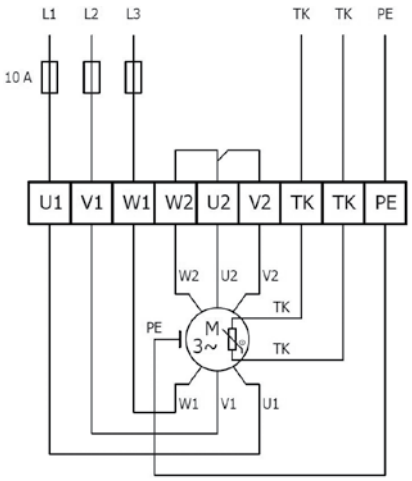


Fig.: Connection scheme for 1-level operation
Low rotation speed (star connection)

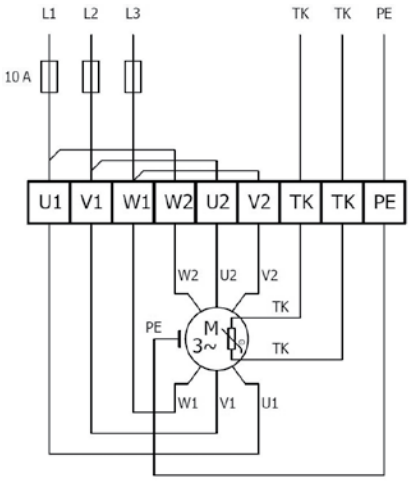


Fig.: Connection scheme for 1-level operation
High rotation speed (delta connection)

5.3.2 Cable list

The cable cross-sections are specified without guarantee.
The type of installation and possible cumulation are not considered!

Devices with three-phase motor: Supply line (400 V, AC/3 Ph)

Device type	**Cable**
LH KOMF-140 - 650;	6 G 1.5 mm^2 (1-level); 9 G 1.5 mm^2 (2-level)

Cable for optional field devices:

see "Controllers and regulators for air-heating devices / air-cooling devices" documentation

6. Operation / general information

The total air volume recirculated by the devices should correspond to 4 or 5 times per hour of the air volume in the room. The system responds slowly and heat is trapped when the air recirculation volume is insufficient. A higher recirculation volume is welcome. It makes the system more responsive!

The air outlet temperature of the air heater should not be below 34 °C or above 42 °C.

An air outlet temperature below 34 °C poses the risk of unpleasant draft effects in the area of the work stations. An air outlet temperature above 42 °C results in a strong thermal air movement. The penetration depth of the warm air stream is reduced. The cold air in the occupied area is only insufficiently penetrated by and mixed with the heated air. A "cold air zone" forms in the occupied area while more pent-up heat collects in the ceiling area (heat loss).

7. Switch cabinet

AL-KO air heaters can be optionally extended with various control accessories.

Connecting a third-party frequency converter at the customer side constitutes a change to the device and is therefore not permitted!

Further details and information are provided in the "Controllers and regulators for air-heating devices / air-cooling devices" documentation.

Caution!
Heating media temperatures of more than 120°C require that the heating agent supply should be cut when the fan is switched off and that the fan continues operation for approx. 3-4 minutes.

8. Maintenance

The operator is obliged to have the system regularly maintained by specialised staff.

AL-KO undertakes this task when a maintenance contract has been concluded.

8.1 Safety

Warning!
Maintenance, repair, work on the electrical system, etc. may only be performed by educated, trained and instructed specialist personnel.

Warning!
The device must be switched to a voltage free state and the main switch and/or the maintenance switch must be switched off (all poles) and secured against unauthorised re-operation before any work is performed.

The impeller continues running for approx. 1 to 3 minutes after switching off the device. The impeller may never be slowed down by hand or another object.

Once work on the device has been completed, the person responsible must ensure that all protective devices installed in the factory are fully functional before the device is re-operated.

8.2 Consumables and spare parts

Caution!
Only use original consumables and spare parts. This is required to ensure safe operation. The warranty might otherwise become invalid!

8.3 Maintenance plan

No.	Component / activity	Measures	Inspections to be performed at n-month intervals as specified below:			
			1	3	6	12
1.	**Air inlet and outlet**					
	Check for dirt, damage and corrosion	Completely clean and repair				X
2.	**Device housing**					
	Check for dirt, damage and corrosion on the air inlet side	Clean and repair				X
	Check for water (condensate, leaks)	Clean and determine the cause			X	
	Flexible connections	Check for leaks				X
3.	**Heat exchanger**					
	When cleaning in the installed state is not sufficient, the heat exchanger must be de-installed and cleaned in an appropriate manner					
	Check for dirt, damage and corrosion	Clean and repair		X		
	Control of the state of hygiene					X
	Cleaning to retain function (air side)					X
	Check the function of the feed and reflux					X
	Bleed					X
4.	**Outlet blinds**					
	Check for dirt, damage and corrosion	Clean as required				X
	Check mechanical function					X
5.	**Fans**					
	Check the fan for dirt, damage and corrosion	Clean and repair			X	
	Check the impeller for dirt, imbalance and running noises	Briefly switch on the motor				X
6.	**Switch cabinet**					
	Visually inspect terminal and plug-in connections	Check for firm attachment and clean as required.				X

8.4 Checking the components

Components must be regularly checked to detect and repair faults at an early stage.

The regular controls include the following and other measures:

Visual control of the relevant device area for faults such as dirt, rust formation and damage.

8.4.1 Checking the heat exchanger

- Check the heat exchanger form pollution at the air side, damage and corrosion.
- Check connectors and screw connections.
- Check the bleeding valve and the filling of the heat exchangers.
- Check the anti-freeze concentration.

8.4.2 Checking outlet jalousies

- Check outlet vents for dirt, damage and corrosion.
- Check the mechanical function of the vents.

8.4.3 Checking the fans

- The fan is maintenance free, due to its ballpoint bearing with life-long lubrication. An exchange of the bearings is required at the end of the fat lifespan (for standard applications approx. 30 – 40.000 h).
- Check the fans for dirt, damage and corrosion.
- Check the fan attachment and fasten all attachment screws.
- Check the function of the protective devices.
- Take note of atypical bearing noises and vibration-free running.

Caution!
Humid atmosphere:
It is recommended to run the fans at least for two hours per month during prolonged standstill periods to ensure that accumulated humidity is evaporated.

8.5 Cleaning the components

Components identified as dirty during the inspection must immediately be cleaned.

No aggressive, paint-dissolving cleaning agents may be used for cleaning.

8.5.1 Clean the heat exchangers

- The heat exchangers can be cleaned with compressed air.

Caution!
The use of high-pressure water cleaners with conventional one-jet nozzles is not permitted due to the risk of damage!

After a prolonged standstill, corrosion due to sulphate-reducing bacteria may occur in the heat exchangers. These sulphides mainly attack the soldering seams, but also the basic copper material.

We recommend the following steps to reduce this type of corrosion:

- Use sulphate-free water in the cycle.
- Ensure that the cycle is tight
- Avoid frequent topping-up with fresh water.
- Use material-compatible inhibitors or biocides.

8.5.2 Cleaning the outlet vents

- Regularly clean the outlet vents.
- The outlet louvres can easily be removed for cleaning purposes.

8.5.3 Clean the fans

- Regularly clean the fan impeller, motor and grid.
- The whole fan can be cleaned with a damp cleaning cloth.
- Do not use high-pressure cleaners or water beams for cleaning.
- Avoid penetration of water into the motor and the electrical installation.
- After the cleaning process, the motor must be operated for 30 minutes at 80-100% max. rotation speed to evaporate any water that may have entered.

8.6 Exchanging components

Warning!
Maintenance, repair, work on the electrical system, etc. may only be performed by educated, trained and instructed specialist personnel.

8.6.1 Exchanging the heat exchanger

- Switch the device to a voltage-free state.
- Disconnect the electricity connections.
- Remove the media connections of the heat exchanger.
- Remove the device.
- Unscrew the air outlet hood. (For K/h, K/TA, KE/TA version)
- Remove the rear panel with the fan and fold it sideways.
- Loosen the fastening screws for the mounting brackets.
- Take out the heat exchanger.

Warning!
Risk of cutting! Use appropriate protective equipment (protective gloves).

- Install the heat exchanger in reverse order!

8.6.2 Exchange the outlet vents

- Loosen the screws in the outlet louvre.
- Remove the outlet vents.
- Install the outlet vents in reverse order!

8.6.3 Exchanging the fan

- Switch the device to a voltage-free state.
- Disconnect the fan cables in the fan terminal box.
- Carefully remove the fan cable.
- Unscrew the air outlet hood. (For K/h, K/TA, KE/TA version)
- Remove the rear wall with the fan. (For K/h, K/TA, KE/TA version)
- Loosen the fastening screws of the fan.
- Install the fan in reverse order!

9. Help with faults

Warning!
Diagnosis, fault removal and reoperation may only be performed by duly authorised persons. This applies, in particular, to work on the electrical devices within the switch cabinet (e.g. test work, exchange, etc.).

9.1 Contact person

Please address all questions in connection with our products to the installer of your air system, to one of our branches or directly to:

AL-KO THERM GMBH		Tele-phone:	(+49) 8225/ 39-0
Hauptstraße 248-250		Fax:	(+49) 8225/ 39-2113
89343 Jettingen-Scheppach		E-mail:	luftheizung@al-ko.de
Germany		Web:	www.al-ko.com

9.2 General faults

Fault	Possible cause of fault / action
Only cold air is blown out	There is air in the cycle ■ Bleed the heating system

10. Shut-down

10.1 Decommissioning

Switch the system to a voltage-free state (all poles disconnected) and secure it against unauthorised switching on before any work is performed.

Caution!
Some parts of the system are pressurised.

Caution!
In winter, there is a risk that individual components might freeze.
Take appropriate steps, e.g. fill in anti-freeze, as required.

The system must always be bled before re-operation and the points listed in the Maintenance chapter must be adhered to.

10.2 Dismantling

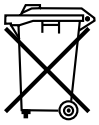
Switch the system to a voltage-free state (all poles disconnected) and secure it against unauthorised switching on before any work is performed.

Caution!
Some parts of the system are pressurised.

The dismantling may only be performed by trained specialist staff.

The dismantling must be performed according to the relevant work and accident prevention regulations valid at the time.

10.3 Disposal



Do not dispose of work out devices as domestic waste!
The relevant, local environmental and recycling regulations valid in your country and your municipality at the time must be adhered to when disposing of the air heater, the operating materials and the accessories.

QUALITY FOR LIFE

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