

AL-KO

QUALITY FOR LIFE

GB



VENTILATION AND CENTRAL AIRCONDITIONING DEVICES

OPERATING AND INSTALLATION INSTRUCTIONS

**AIR HEATER / AIR COOLER
DESIGN**

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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 / air cooler:



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 / air cooler 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 / air coolers 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 / air coolers must always be adhered to.

The implementation and design of the air heater / air cooler 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 / air cooler!

2.1 Appropriate use

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

The air heaters / air coolers 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 / air coolers 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 / air coolers 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 / air cooler 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 / air coolers are delivered in cardboard boxes or on pallets incl. film packaging!

2.5 Storage, transport



Warning!



Caution!

- Store the air heaters / air coolers in their original packaging in a dry place and protected against the weather.
- Cover open pallets with tarpaulins and protect the air heaters / air coolers 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 / air cooler 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 / air cooler.
- 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 / air coolers of the DESIGN series have a stable, fitted and optically appealing plastic housing. The materials of the plastic housing are self-extinguishing according to Fire Class V-0 in the event of a fire. The inner, load-bearing construction is made of galvanised steel sheeting. The plastic housing can be completely removed from the supporting component by using quick fasteners. The integrated support belt prevents the hood from falling down. Individually adjustable fins are integrated in the upper area and jointly adjustable fins are integrated in the bottom area of the housing to ensure optimal air flow. A maintenance-free axial fan ensures low-noise operation. The drives of the AL-KO air heaters / air coolers 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 / cooling is installed in the housing next to the fan. It is made of copper pipes with attached aluminium fins. The air heating/cooling devices can be extended by various attachment and electronic accessories.

The DESIGN series has been developed for low as well as high rooms.

The device can be used for cooling as well as heating by changing the direction of rotation (change of polarity). This allows universal application of the DESIGN series.

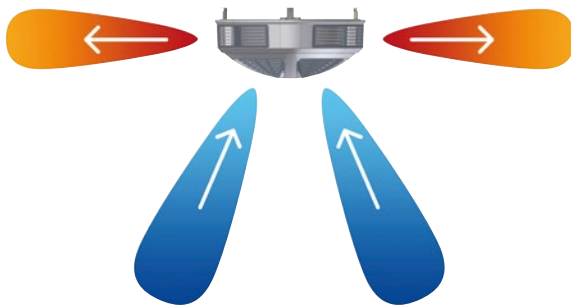


Fig. Heating of low rooms

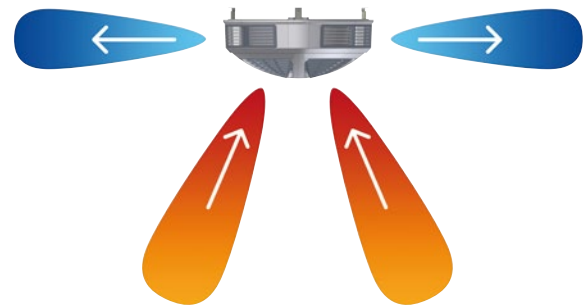


Fig. Cooling of low rooms

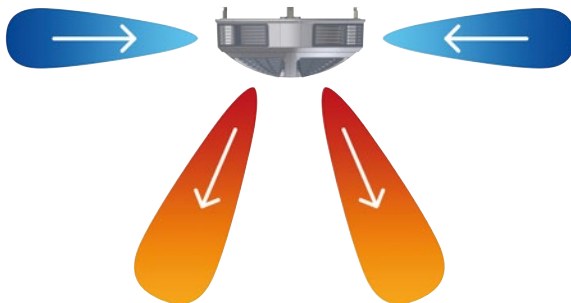


Fig. Heating of high rooms

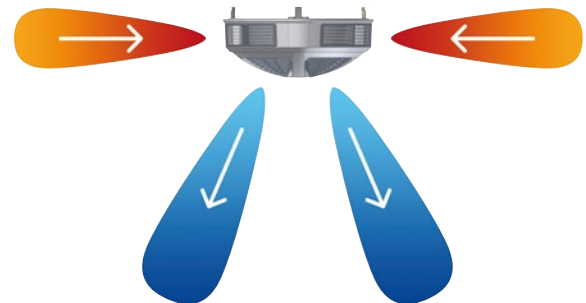


Fig. Cooling of high rooms

Type key DESIGN:

E D	-	H 1	-	C 2	-	400	-	L
-----	---	-----	---	-----	---	-----	---	---

Device type

- E EuroLine
- D DESIGN

Device size

- H Heating
- K Cooling

- 1 Design Size 1
- 2 Design Size 2
- 3 Design Size 3

Heat exchanger type

- C Cu/Al

- 1 1 row of pipes, distance of fins 2.5 mm
- 2 2 rows of pipes, distance of fins 2.5 mm
- 3 3 rows of pipes, distance of fins 2.5 mm

Motor version

- 400 400 V

Supplementary text for additional options

- O without control
- L level 4 control

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 / air cooling devices without control

Series: DESIGN ED- H...; ED – K...

Type: ED-H1; ED-H2; ED-H3;
ED-K1; ED-K2; ED-K3;

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
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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 / air cooling devices with control**Series:** DESIGN ED- H...; ED - K...**Type:** ED-H1; ED-H2; ED-H3
ED-K1; ED-K2; ED-K3;

complies with the following applicable standards and directives.

EC Directive 2006/42/EG	Machinery Directive
EC Directive 87/23/EC	Pressure Equipment Directive
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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. Stück, CEO

3.3 Technical data

3.3.1 TYPE ED-.....

Type	Dimensions in mm					Heat exchanger connection		
	A mm	B mm	C mm	d mm	e mm	1 RR	2 RR	3 RR
ED-1...	984	986	464	875	229	1"	1"	1"
ED-2...	1085	1073	484	963	229	1"	1"	1"
ED-3...	1178	1160	504	1043	229	1"	1"	1"

Type	Weight in kg			Water content in l		
	1 RR	2 RR	3 RR	1 RR	2 RR	3 RR
ED-H1...	31	35	38	1.0	1.6	2.5
ED-H2...	32	36	39	1.0	1.8	2.9
ED-H3...	43	46	48	1.1	2.0	3.3
ED-K1...	32	36	39	1.0	1.6	2.5
ED-K2...	33	37	40	1.0	1.8	2.9
ED-K3...	44	47	49	1.1	2.0	3.3

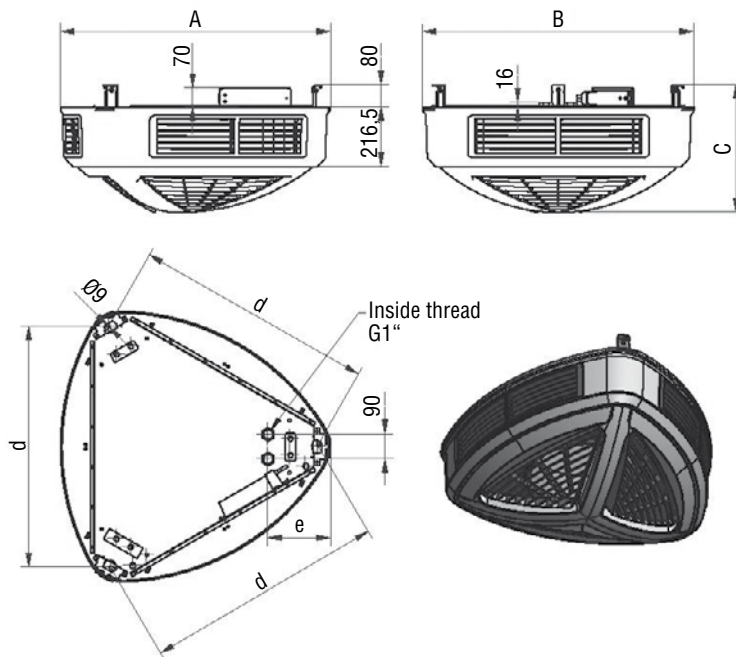
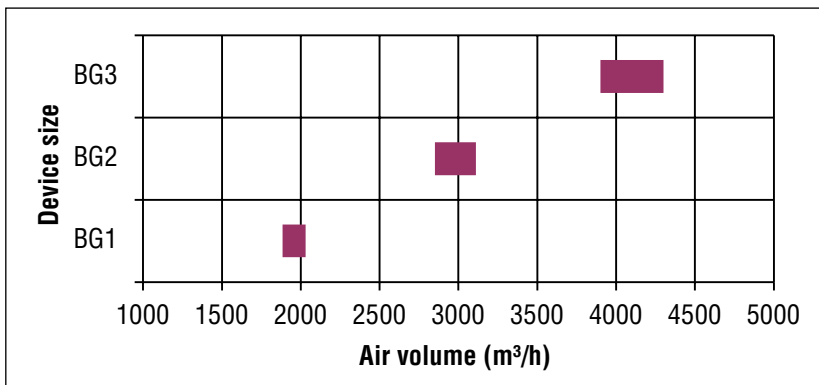
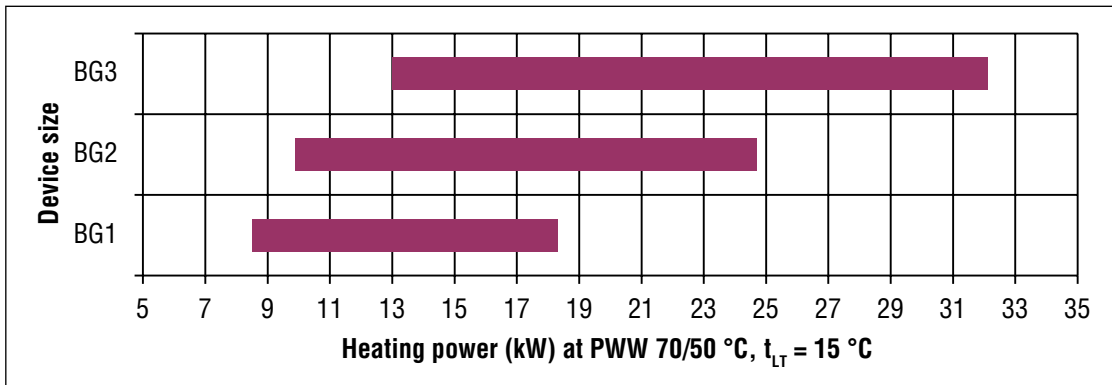
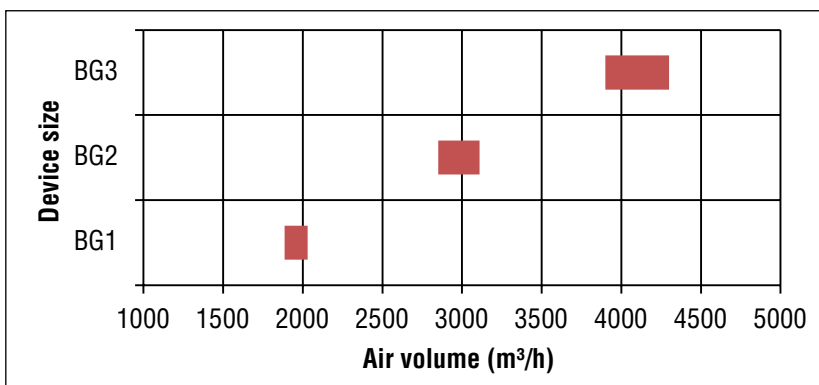
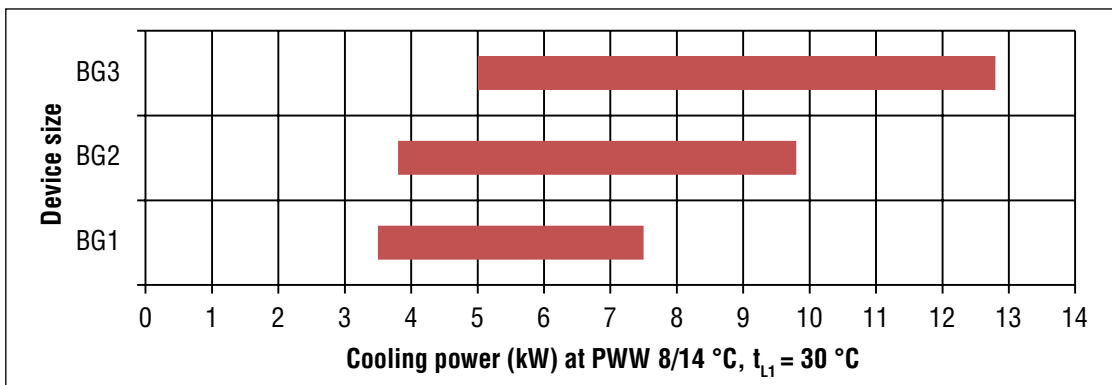


Fig.: Type LH...-N device series

DESIGN Type ED-H...



DESIGN Type ED-K...



3.3.2 Noise in connection with rotation speed adjustment

Type ED-_1

Control (%)	Noise level (dB A)	Noise pressure 1 m distance (dB A)	Noise pressure 3 m distance (dB A)
100	66	59	56
80	66	59	56
60	59	48	45
40	48	37	34

Type ED-_2

Control (%)	Noise level (dB A)	Noise pressure 1 m distance (dB A)	Noise pressure 3 m distance (dB A)
100	73	64	61
80	73	64	61
60	67	60	57
40	52	45	42

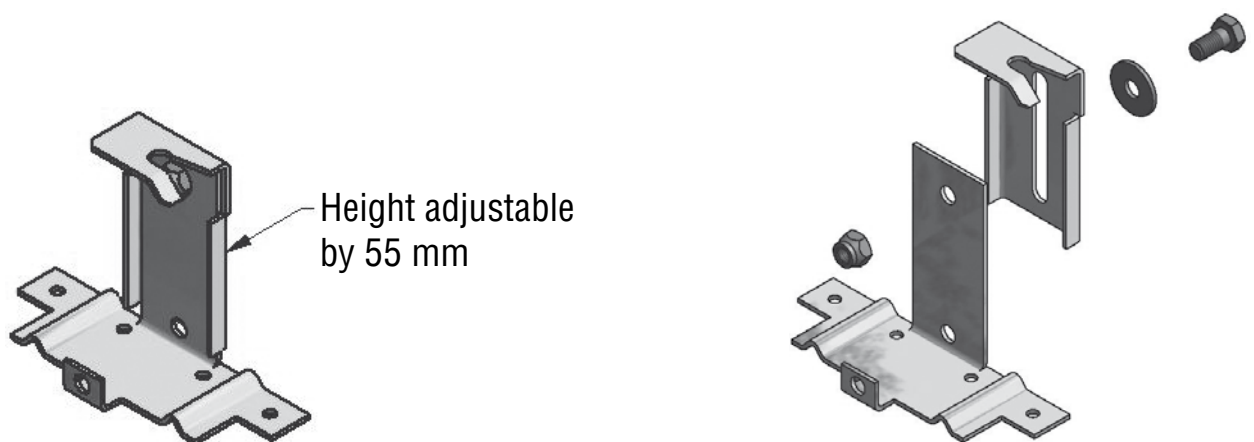
Type ED-_3

Control (%)	Noise level (dB A)	Noise pressure 1 m distance (dB A)	Noise pressure 3 m distance (dB A)
100	76	69	66
80	76	69	66
60	71	64	61
40	63	56	50

3.4 Accessory

Bracket a

Bracket a is particularly suited for adjustable ceiling mounting of the DESIGN air heaters / air coolers. The bracket set consists of three brackets.



Weight of a bracket set = approx. 0.36 kg

3.5 Condensate pump

The compact condensate pump is suited for removing accumulated condensate. The condensate pump is a self-priming rotation membrane pump with condensate sensor.

The condensate is pumped through a flexible condensate pipe with an internal diameter of 6 mm.



Please take note of the installation and safety instructions in the chapter assembly.

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 / air coolers 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



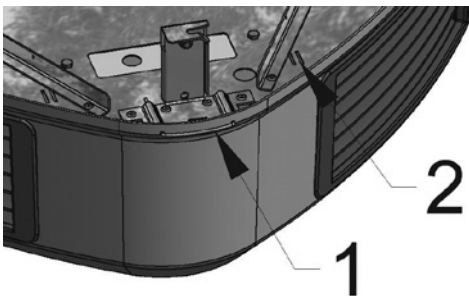
Warning!

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 must be checked by a structural engineer, if required.
- AL-KO air heaters / air coolers are delivered in pre-assembled form.
- The manufacturer documentation must be considered before installation or removal.
- The air heaters / air coolers must be levelled during installation!

5.1 Ceiling installation of the devices

- Mark the fastening points with the template provided in the packaging.
- Drill fastening holes into the ceiling.
- The installation distance between the device and the ceiling must be at least 80 mm. The factory mounts standard brackets that ensure the minimum distance.
- It must be ensured that there is sufficient space for the media connections!
- Individually adjustable brackets (optional order) can be used to create larger distances or for adjustment.
- Attach the air heater / air cooler to the ceiling.
- Attach the media connections.
- Fasten the hood with the fastening straps to the supporting part and then close and fasten it with the quick-release clips.



1	Quick-release clip
2	Slot for fastening straps

Cooling

The maximum throwing distances apply for an air outlet temperature of 10 K below room temperature and ideal conditions for the primary air stream.

Design size	Max. throwing distance in m
ED-K1...	4.0
ED-K2...	10.0
ED-K3...	9.1

Heating

The maximum throwing distance and installation heights apply to an air outlet temperature of 20 K above the room temperature and ideal conditions for the primary air stream.

Design size	Max. installation height in m Vertical air outlet	Max. installation height in m Horizontal air outlet
ED-H1...	4.0	2.5
ED-H2...	5.5	3.8
ED-H3...	6.5	5.7

* Installation height = Floor to lower edge of the device

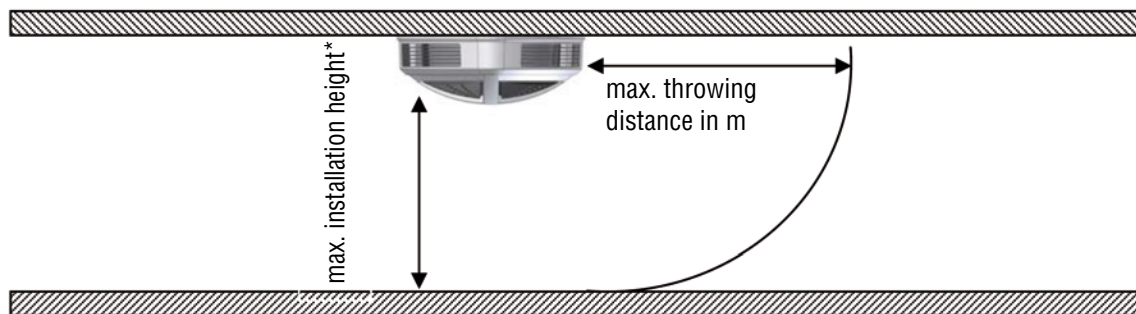


Fig.: Installation height

5.2 Installation of accessory components

Installation on adjustable brackets:

- The adjustable brackets must be installed before the device is attached to the ceiling.
- Remove the plastic hood by removing the quick-release clips at the corners.
- Remove the rigid brackets by drilling through the fastening rivet.
- Attach the adjustable brackets by riveting and reattach the plastic hood.

5.3 Heat exchanger connection



Heat exchangers with 1 row of pipes are not sensitive to the way feed and reflux are connected. Heat exchangers with 2 or 3 rows of pipes must be connected according to the counter-current principle and depending on the air outlet direction (vertical or horizontal).



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: 95°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!

5.4 Condensate pump

Pump control:

Electricity supply:	230 V / 50 Hz
Blue:	neutral to N
Brown:	live to L
Green/yellow:	to ground

The mains cable that supplies the pump must be fused with a 1A fine fuse.

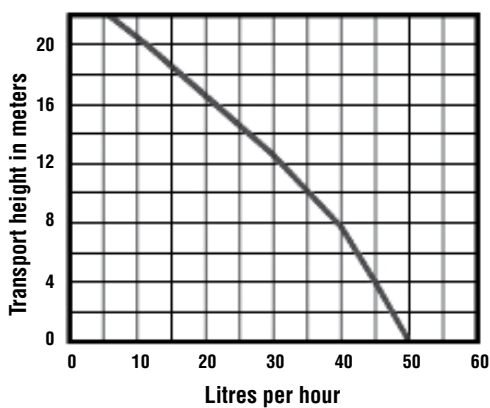
Floating alarm contact:

Black:	common line
Yellow:	contact closed during operation, opens during alarm
Red:	contact open during operation, closes during alarm


The alarm function only works when the pump is supplied with voltage and the sensor is connected to the pump.

Performance data:

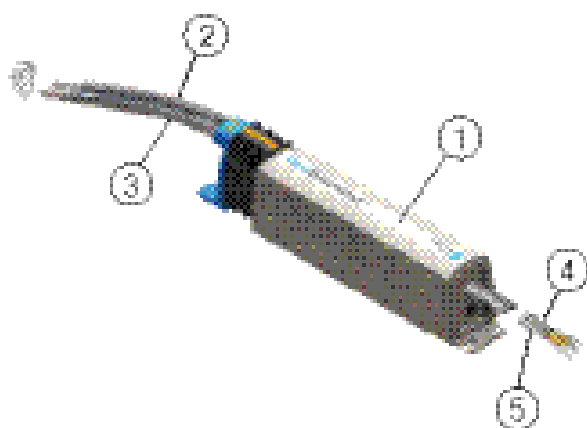
Max. transport volume:	50 l/h
Max. suction height:	7 m
Max. transport height:	20 m
Connection Ø:	6 mm
Dimensions:	273 x 52 x 62 (L x W x H)



Safety information:

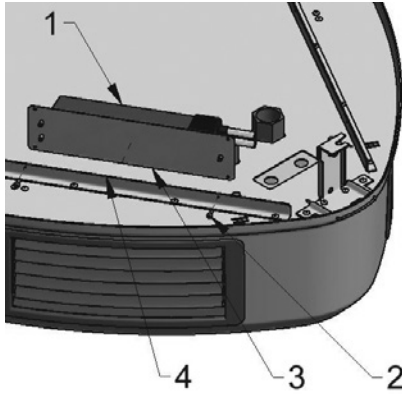
 **Warning!**  **Caution!**

- Ensure that the power supply is interrupted at the fuse box before connecting, removing or replacing the condensate pump.
- Do not use the pump to remove flammable or explosive liquids.
- Do not operate the pump in an explosive atmosphere.
- The pump may only be used for pumping liquids that do not attack the pump material.
- Do not touch the pump with wet hands or while standing on a wet floor.
- The pump is not suitable for outside areas. It may not be dipped into water or exposed to frost.
- Ensure that the pump is not more than 7 m (max. suction height) above the drip tray exit and not more than 20 m (max. transport height) below the highest point of the condensate drain.
- Connect a flexible condensate drain pipe (internal Ø6 mm) to the pump outlet sleeve and duct it into an appropriate drain. Ensure that the flexible condensate drainage line does not have sharp kinks, is not twisted and does not touch any moving or sharp-edged objects.
- We recommend testing the function of the pump in relation to the transport height before the initial operation of the system. Fill the water into the collecting container of the device and check the function of the pump. Ensure that the pump switches on after the starting point has been reached and switches off once pumping has been completed.
- The air cooling system must switch and the media supply must be stopped once the alarm contact has been reached or in the event of a fault.



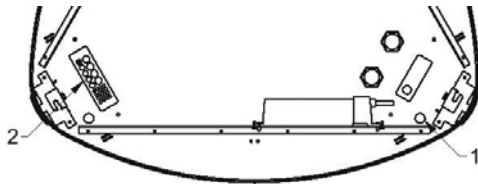
1	Condensate pump
2	Suction pipe
3	Pressure pipe
4	Floating alarm contact
5	Connection cable 3-core

Fig.: Condensate pump

Retrofitting of a heating-only heater for cooling operation requires the following:

1	Condensate pump
2	Fastening screw
3	Fastening plate
4	Reinforcement of cover panel

- Fasten the condensate pump (Pos. 1) and the fastening plate (Pos. 3) with the fastening screw (Pos. 2) to the reinforcement of the cover panel (Pos. 4).
- Thereafter, insert the filling level sensor (DrainStick) with the condensate extraction hose and the cable through the cover sheet.
- Electrical connection according to the regulations.



1	Filling level sensor with condensate extraction hose and cable
2	Electrical connection

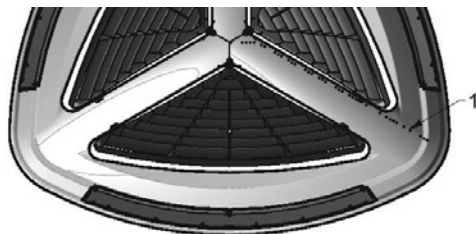
- Cut the attached hose to a length of 60 mm and push it over the DrainStick.



- The filling level sensor with the condensate extraction hose and the cable must be fastened on the inside of the hood with the fastening bases and cable binders supplied.
- The extraction opening of the condensate hose must be fastened at the deepest part of the hood and as close as possible to a vertical position.

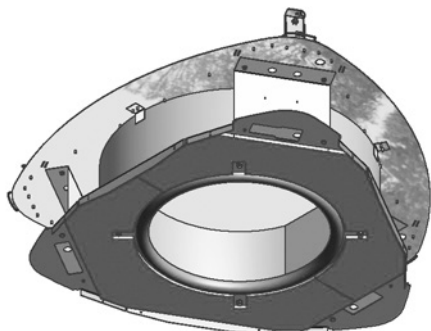


- The alarm contact must be located below the level of the (full) hood.
- The installation should be arranged as shown in the figure below.



1	Filling level sensor with condensate extraction hose and cable
---	--

- The insulation (Armaflex) supplied must be glued to the base plate as shown in the figure.



5.5 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 / air cooler must be performed according to the connection plans. Only use the device-specific circuit diagram to connect the device.
- The air heaters / air coolers 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.

5.5.1 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 of fan:

Type	BS 1		BS 2		BS 3	
Operating voltage in V	3~400 V/50 Hz		3~400 V/50 Hz		3~400 V/50 Hz	
Power uptake in kW	0.11	0.07	0.22	0.13	0.36	0.22
Nominal current in A	0.27	0.13	0.56	0.29	0.83	0.46
Operating speed rpm	900	750	900	680	890	630
Insulation class	THCL 155 (F)		THCL 155 (F)		THCL 155 (F)	
Protection type	IP 54		IP 54		IP 54	
Motor contactor	Thermal contact		Thermal contact		Thermal contact	

Terminal strip heating without AL-KO rotation speed control

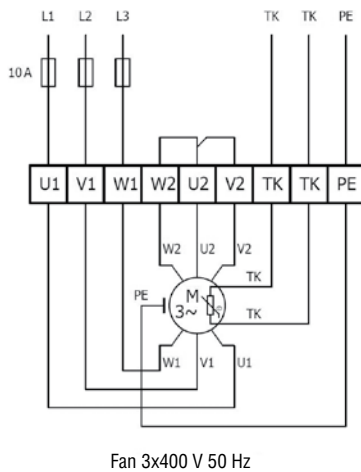


Fig.: Connection scheme for 1-level operation
Low rotation speed (star connection)

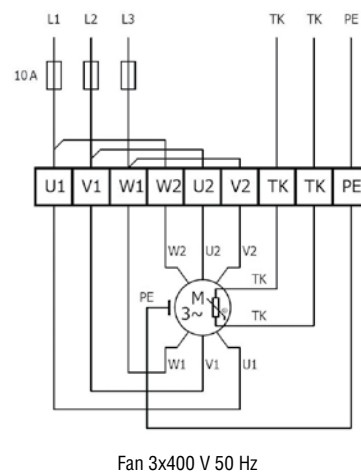


Fig.: Connection scheme for 1-level operation
High rotation speed (delta connection)

Terminal strip cooling without AL-KO rotation speed control

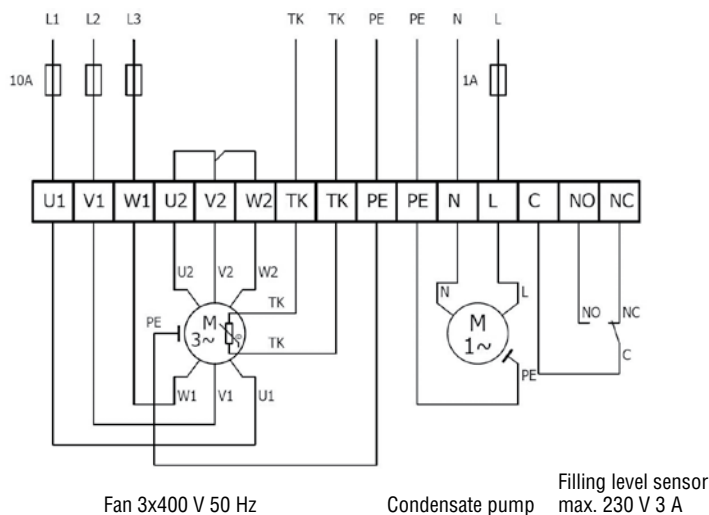


Fig.: Connection scheme for 1-level operation
Low rotation speed (star connection)

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!

Cooling

The air outlet temperature during cooling should be at most 6 - 8°C below the environmental temperature to prevent unpleasant draft effects. Too high temperature differences (>8°C) may lead to the formation of cold-air zones.

Heating

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 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 / air coolers can be optionally extended with various control accessories.

Connection of a third-party frequency converter by the customer 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 95°C require the heating agent supply to be cut off when the fan is switched off and the fan continuing to operate 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	Action / comment	Inspections to be performed at n-month intervals as specified below:		
			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	
	Check the steps of the function	Clean as required			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		
	Check the wet cooler and the condensate tray (hood) for dirt, corrosion and appropriate function	Repair	X		
	Check the function of the condensate drain	Repair	X		
	Control of the state of hygiene				X
	Heater				
	Check the air-side for dirt, damage and corrosion	Clean and repair			X
	Cleaning to retain function (air side)				X
	Check the function of the feed and reflux				X
	Bleed				X
	Cooler	The condensate drain (customer side) must be appropriately dimensioned and arranged to allow the condensed water to escape without delay.			
	Check for dirt, damage and corrosion	Clean and repair	X		
	Clean the wet cooler and tray (hood)			X	
	Check the function of the feed and reflux				X
	Bleed				X
	Check the hygiene state				X
	Condensate pump				
	Check the function of the condensate pump			X	
	Check the condensate hose for dirt and damage	Clean or replace		X	
	Check the filling level sensor for appropriate function and dirt	Clean and repair		X	
4.	Air guidance fins				
	Check for dirt and damage	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.
- Check the function of the water drains and condensate drain.

8.4.2 Checking the condensate pump

- Check the condensate pump for dirt, damage and appropriate function.
- Check the condensate hose for dirt and damage.
- Check the filling level sensor (DrainStick) for dirt, damage and appropriate function.
- Check the condensate tray (hood) for dirt and damage.

8.4.3 Check the air guidance fins

- Check the finds for dirt and damage.
- Check the mechanical function of the fins.

8.4.4 Check the fan

- 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 be immediately 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 condensate pump

- Regularly clean the condensate pump, condensate hose, condensate sensor (DrainStick) and condensate tray (hood).

8.5.3 Cleaning the air fins

- Regularly clean the fins.

8.5.4 Cleaning the fan

- 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.
- Remove the hood by removing the quick-release clips and the fastening straps.
- Disconnect the electricity connections
- Disconnect the medium connectors of the heat exchanger.
- Remove the device
- Fasten the cover plate to the end pieces.
- Remove the heat exchanger by pulling it upwards.



Warning!

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

- Install the heat exchanger in reverse order!

8.6.2 Exchanging the condensate pump

- Switch the device to a voltage-free state.
- Remove the hood by removing the quick-release clips and the fastening straps.
- Disconnect the electricity connections.
- Loosen the condensate hoses and unplug the connector for the sensor.
- Loosen the fastening screws for the condensate pump.
- The condensate pump is installed in reverse order!

8.6.3 Exchanging the air guidance fins

- Remove the hood by removing the quick-release clips and the fastening straps.
- Remove the lateral fins by loosening the safety rings.
- Remove the bottom fins by loosening the latch spring and the bearing pins.
- The fins are installed in reverse order!

8.6.4 Exchanging the fan

- Switch the device to a voltage-free state.
- Remove the hood by removing the quick-release clips and the fastening straps.
- Disconnect the fan cables in the fan terminal box.
- Carefully pull out the fan cable.
- Loosen the fastening screws of the fan.
- Install the fan in reverse order!

9. Help with faults



Warning!

Diagnosis, fault removal and re-operation 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
Condensate collects although the system is switched off	Cold water supply continues ■ Stop the cold water supply as soon as the device is switched off

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 / air cooler, the operating materials and the accessories.

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