AL-KO

QUALITY FOR LIFE

EN

AIR HEATER

OPERATING AND ASSEMBLY INSTRUCTIONS

AIR HEATER COMFORT EC

Legal

AL-KO THERM GMBH
Hauptstraße 248 - 250
89343 Jettingen-Scheppach
Germany
Fon: +49 8225 39 - 0
Fax: +49 8225 39 - 2113
E-mail: klima.technik@alko-air.com

Revision history

Version	Description	Date
1.0	First edition	7.1.25

Table of contents

1 About this manual

- The German version is the original operating instructions. All further language versions are translations of the original operating instructions.
- Read these operating and assembly instructions carefully before assembly, commissioning and maintenance. This is the prerequisite for safe work and trouble-free handling.
- Observe the safety instructions and warnings in this documentation and on the product.
- This documentation is a permanent part of the described product, and must be handed over to the buyer if the product is sold.

1.1 Explanation of symbols

1.1.1 Safety instructions

⚠ DANGER

This signal word is used to indicate an imminently dangerous situation which, if not avoided, will result in death or severe injury.

⚠ WARNING

This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in death or severe injury.

⚠ CAUTION

This signal word is used to indicate a potentially dangerous situation which, if not avoided, could result in a minor injury.

ATTENTION

This signal word is used to indicate a potential risk of property damage.

NOTE

Special instructions for ease of understanding and handling.

1.2 Safety signs

Meaning	Symbol
GENERAL DANGER SIGNS If the required safety instructions are not observed, this can lead to death, serious injuries and considerable property damage.	
IMPORTANT NOTICE Failure to observe this notice may result in problems with the unit.	
OBSERVE THE OPERATING AND ASSEMBLY INSTRUCTIONS If you do not heed the notices in the operating and assembly instructions, this can lead to problems with the unit.	
INFORMATION Heeding this information makes working with the machine easier.	

Warning sign

The warning signs used in these operating and assembly instructions draw attention to specific hazards.

Meaning	Warning sign
Warning of danger of falling If the required safety instructions are not observed, this can lead to death or severe injuries due to falling.	
Warning of danger of slipping If the required safety instructions are not observed, this can lead to death or severe injuries due to slipping.	
Warning of electrical voltage If the required safety instructions are not observed, this can lead to death or severe injuries due to dangerous electrical voltage.	
Warning against suspended loads If the required safety instructions are not observed, this can lead to death or severe injuries due to a suspended load.	
Warning of falling objects If the required safety instructions are not observed, this can lead to death or severe injuries due to falling objects.	
Warning of hot surfaces If the required safety instructions are not observed, this can lead to death or severe injuries due to hot surfaces.	
Warning of danger of crushing If the required safety instructions are not observed, this can lead to death or severe injuries due to crushing.	

Meaning	Warning sign
Warning of sharp objects If the required safety instructions are not observed, this can lead to death or severe injuries due to sharp objects.	
Warning of hand injuries If the required safety instructions are not observed, this can lead to death or severe injuries.	
Warning of poisonous substances If the required safety instructions are not observed, this can lead to death or severe injuries due to poisonous substances.	

Mandatory signs

The mandatory signs in these operating and assembly instructions draw attention to instructions to be observed.

Meaning	Mandatory signs
Wear eye protection If you do not wear eye protection, there is a risk of eye injuries.	
Wear foot protection If you do not wear foot protection, there is a risk of foot injuries.	
Wear hand protection If you do not wear hand protection, there is a risk of hand injuries.	
Wear head protection If you do not wear head protection, there is a risk of head injuries.	
Wear a mask If you do not wear respiratory protection, this can lead to poisoning and chemical burns to the lungs.	
Isolate before maintenance or repair Failure to disconnect the unit from all energy sources before starting maintenance or repair work can result in serious injuries.	

1.2.1 Abbreviations

Abbreviation	Meaning
LH	Air heater
NN	Sea level
PPE	Personal protective equipment, such as cut-proof gloves, safety goggles, work gloves, ear protection, safety helmet, breathing mask

1.3 Legal notices

All specified data serve solely to describe the product. No statement on a specific characteristic or suitability for a specific purpose can be derived from these data. The data do not exempt the user from his own judgement and checks.

2 Safety instructions

2.1 Intended use

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

The air heaters may only be operated in the ambient temperature range from -20°C to +40°C and in the relative humidity range from 50% to 85% without condensation.

Installation of the air heaters at altitudes more than 800 m above sea level must be examined on a case-by-case basis, as performance degradation is likely to occur.

Other areas of application must be clarified with the manufacturer.

The rate of total air circulation of the units should be 4 to 5 times the room air volume per hour. A lower rate of air circulation results in a sluggish response from the installation and heat accumulation. A higher rate of air circulation is advantageous. The installation will be more dynamic in its response.

The air outlet temperature of the air heater should not be less than 34°C or more than 40°C.

At outlet temperatures below 34°C, there is a risk of unpleasant drafts occurring at work stations. If the outlet temperature is greater than 40°C, this will result in a large thermal. The penetration depth of the warm air stream will be shorter. The cold air in the space being heated will be insufficiently penetrated by the heated air and mixed. A “cold-air pool” will form in the work area and heat will accumulate at the ceiling (heat loss).

2.2 Possible misuse

AL-KO THERM air heaters may only be operated within the range of the technical data specified by AL-KO THERM. Any use other or more extensive than that described in chapter “2.1 Intended use” on page 9 is regarded as not in accordance with the intended use. The manufacturer assumes no liability for damage resulting from this.

Possible misuse includes:

- Non-horizontal setup of the unit.
- Conveying media with impermissibly high or low temperatures.
- Conveying aggressive or heavily dust-containing media.
- Use in an explosive atmosphere.
- Use in wet areas with high humidity (e.g. car wash).

2.3 General safety instructions

⚠ WARNING

Risk of serious injury or death by working without personal protective equipment!

Working on the unit without personal protective equipment can result in serious injury or death.

- Observe the safety instructions in this operating and assembly instructions.
- Use personal protective equipment at all times when working on the unit.
- Use further protective equipment according to the work to be carried out.

⚠ WARNING

Risk of severe injuries or death!

Working on the unit can result in serious injury or death.

- Have assembly, installation, commissioning, repair, maintenance and service work carried out only by qualified staff.
- Before starting repair or maintenance work, disconnect the unit from the mains power supply on all poles and lock it out to prevent it from being restarted.
- Avoid naked flames and sparks in the intake area of the unit.
- Observe the working instructions and these operating and assembly instructions.
- Work with care.
- Use personal protective equipment at all times when working on the installation.
- Use further protective equipment according to the work to be carried out.

⚠ WARNING

Risk of injury due to falling from height and falling modules.

When installing the units or installation work on platforms, persons may fall off and/or modules may fall down.

- Have assembly, installation, commissioning, repair, maintenance and service work carried out only by qualified staff.
- Observe the assembly instructions in these operating and assembly instructions.
- Use only tested ladders, scaffolding or suitable platforms.
- Use only suitable lifting equipment.
- Use only approved fasteners when installing the units.
- Use personal protective equipment at all times when working on the units.

Observe the safety instructions in these operating and assembly instructions to avoid injuries, fires and other hazards due to improper use and improper operation of the unit:

- The design and construction of the air heater conform to the standards listed in the declaration of conformity or declaration of incorporation in order to minimise any potential hazards caused by the air heater. A potential hazard can only be effectively ruled out if the other applicable standards for the overall installation to be completed and installed by the plant manufacturer have been observed.
- If installation is performed contrary to our regulations, and the defect/damage which has occurred is attributable to improperly modification, processing or any other treatment, all damage compensation or warranty claims are ruled out. The orderer must prove that improper installation did not cause the defect which has occurred.
- Safety and monitoring equipment must not be removed, bridged or disabled in any other way.
- All authorised persons must have read and understood the operating and assembly instructions in full before starting work on the unit and must observe them at all times!
- To avoid hazards within the plant, all the operator's plant, operating and working instructions apply in addition to these operating instructions.

2.3.1 Safety instructions for operation

- The unit may only be operated in the performance range specified in the technical documents from AL-KO THERM.
- The unit must be installed properly and operated in strict observance of our operating and assembly instructions.
- Operate the unit only when it is fully assembled and with correctly fitted contact protection.
- The unit may only be operated in a technically flawless condition. Malfunctions and damage that can affect safety must be rectified immediately and professionally.
- The version and design of the unit complies with the standards listed in the Declaration of Conformity or Declaration of Incorporation.
- Avoid sparking in the vicinity of the unit.

2.3.2 Safety instructions for maintenance

- Damaged parts may only be replaced with OEM spare parts.
- During repair and maintenance work, the unit must be disconnected from the mains on all poles and locked out against being restarted.
- The general maintenance instructions in the operating and assembly instructions for AL-KO THERM air heaters must be strictly observed.
- Observe the delay time of the fans. Wait at least 3 minutes for the fan impellers to come to a standstill before opening the inspection covers.

2.3.3 Personal safety instructions

- The unit may only be operated by persons who are trained in operating it and expressly authorised to use it.
- Personal protective equipment is required for work on the unit!
- To avoid dangers during operation, all of the operator's plant, operating and working instructions apply in addition to these operating and assembly instructions.
- The operating and assembly instructions must be kept at a suitable, known place in the workplace.
- The operator of the unit must draw up operating procedures in an understandable form and in the language of the employees, taking the operating and assembly instructions and the operating conditions into consideration.

2.4 Residual dangers

The air heater may pose dangers if it is not operated by trained personnel and/or is not used properly or according to its intended use.

Residual dangers are potential hazards that are not immediately apparent, such as:

- Injuries due to failure to observe the safety instructions, standards, directives or regulations.
- Injuries caused by uncoordinated work.
- Danger caused by working on the electrical installation, cables and connections.
- Transporting, unpacking and setting up the unit: injuries can occur during these procedure due to crushing, cutting, stabbing or collisions.
- There is a risk of stumbling, slipping, falling and falling down when setting up the unit and the accessory parts.
- There is a danger of electric shock due to damaged and defective electrical components.
- Electrical connection cable: Danger due to stumbling, falling and slipping.
- Noise (hearing damage).
- Human error: failure to observe safety instructions, standards and regulations.

2.5 Training

The operator of the unit must regularly train their personnel on the following topics:

- Compliance with the operating and assembly instructions as well as the legal regulations.
- Intended used of the unit.
- Compliance with all company, operating and working instructions at the owner’s/operator's installation site.
- What to do in an emergency.

3 Product description

AL-KO THERM COMFORT Series air heaters comprise a sturdy, self-supporting housing made of Sendzimir-galvanized sheet steel with 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 THERM air heaters are designed as external rotor motors. They are equipped with permanently lubricated deep groove ball bearings, with the fan and rotor comprising a single unit. A heat exchanger for air heating is installed in the housing next to the fan. This is designed as a finned heat exchanger (made of Cu / Al). The air heaters can be expanded with a variety of electrical accessories.

NOTE

Our products are subject to continuous quality control, and comply with the applicable regulations.

Type code COMFORT:

LH COMF EC	140	3	K	

Equipment type

LH COMF EC	COMFORT air heater

Device size

140
250
400
650

Heat exchanger type

1	1 row of pipes, fin spacing 2.1 mm
2	2 rows of pipes, fin spacing 2.5 mm
3	3 rows of pipes, fin spacing 2.5 mm

Device versions

K	for low rooms (intake from below)
K/o	for low rooms (intake from above)
K/h	for average room heights (intake from the side)
K/TA	for air curtain systems (intake from the side)

Supplementary text for additional options

a	Bracket (adjustable)
c	Bracket (clamp)

3.1 Technical data

3.1.1 TYPE LH-COMF EC … K

Type	Dimensions in mm				Heat exchanger connection			Sound pressure level at 3 m distance	
	L [mm]	b [mm]	c [mm]	d [mm]	1 RR	2 RR	3 RR	Upper speed dB(A)	Lower speed dB(A)
LH-COMF EC 140 K	600	572	40	420	1"	1"	1"	51	45
LH-COMF EC 250 K	700	672	46	520	1"	1"	1"	54	47
LH-COMF EC 400 K	800	772	52	620	1"	1"	1"	57	50
LH-COMF EC 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-COMF EC 140 K	23	24	26	1.2	1.9	2.6
LH-COMF EC 250 K	30	31	34	1.3	2.3	3.1
LH-COMF EC 400 K	36	38	40	1.5	2.6	3.6
LH-COMF EC 650 K	48	50	53	1.6	2.9	4.1

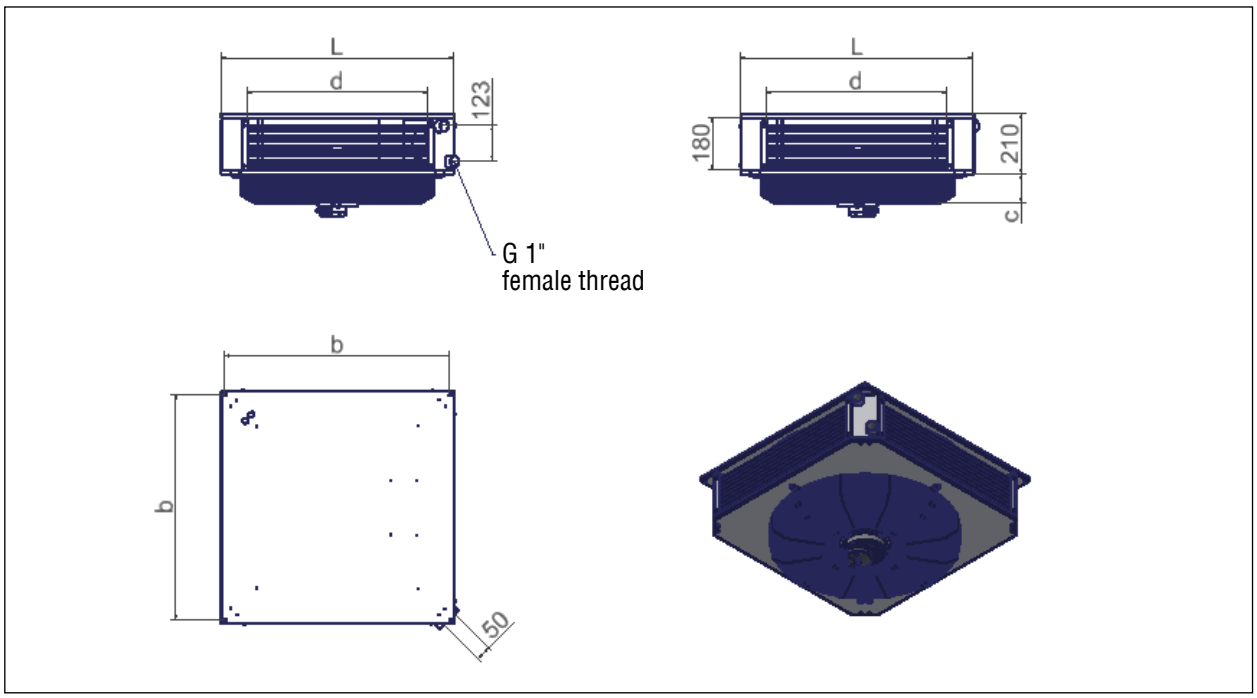


Fig. 1 Device series Type LH-COMF EC … -K

3.1.2 TYPE LH-COMF EC … K/h

Type	Dimensions in mm				Heat exchanger connection			Sound pressure level at 3 m distance	
	L [mm]	b [mm]	c [mm]	d [mm]	1 RR	2 RR	3 RR	Upper speed dB(A)	Lower speed dB(A)
LH-COMF EC 140 K/h	600	572	108.2	420	1"	1"	1"	51	46
LH-COMF EC 250 K/h	700	672	108.2	520	1"	1"	1"	56	49
LH-COMF EC 400 K/h	800	772	108.2	620	1"	1"	1"	58	51
LH-COMF EC 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-COMF EC 140 K/h	28	30	32	1.2	1.9	2.6
LH-COMF EC 250 K/h	37	38	41	1.3	2.3	3.1
LH-COMF EC 400 K/h	45	47	49	1.5	2.6	3.6
LH-COMF EC 650 K/h	59	61	64	1.6	2.9	4.1

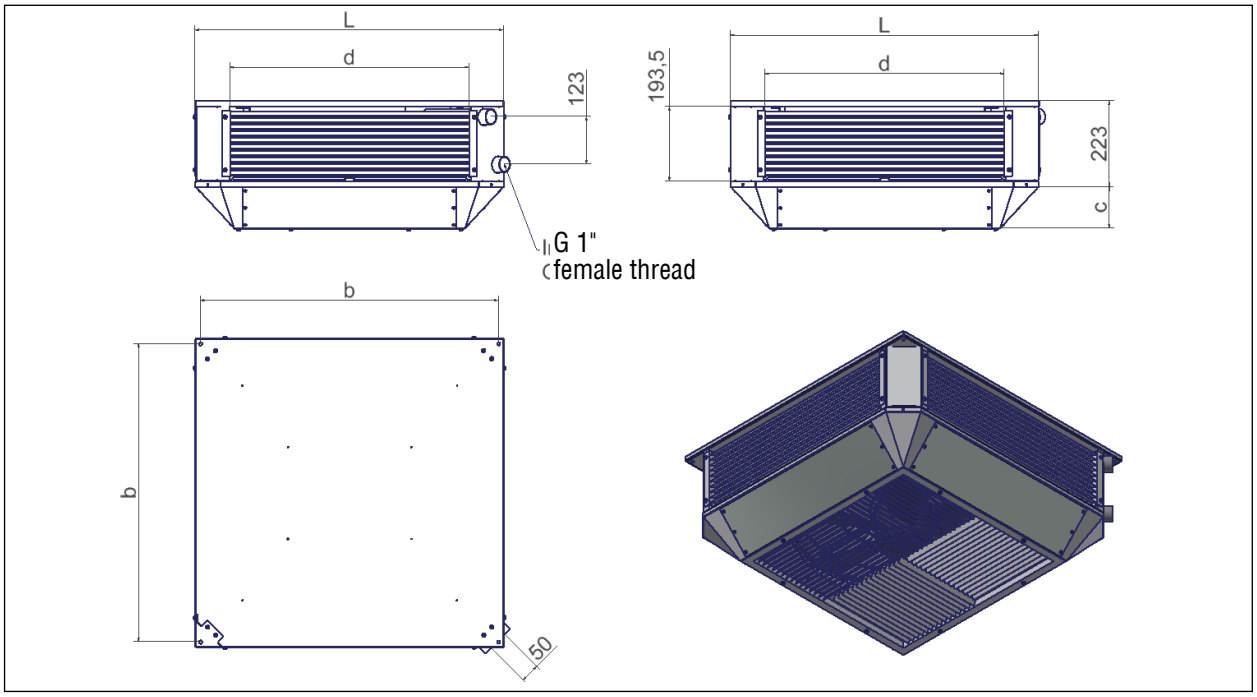


Fig. 2 Device series Type LH-COMF EC … -K/h

3.1.3 TYPE LH-COMF EC … K/o

Type	Dimensions in mm				Heat exchanger connection			Sound pressure level at 3 m distance	
	L [mm]	b [mm]	c [mm]	d [mm]	1 RR	2 RR	3 RR	Upper speed dB(A)	Lower speed dB(A)
LH-COMF EC 140 K/o	600	572	26.9	420	1"	1"	1"	51	45
LH-COMF EC 250 K/o	700	672	32.9	520	1"	1"	1"	54	47
LH-COMF EC 400 K/o	800	772	38.9	620	1"	1"	1"	57	50
LH-COMF EC 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-COMF EC 140 K/o	22	24	26	1.2	1.9	2.6
LH-COMF EC 250 K/o	29	31	33	1.3	2.3	3.1
LH-COMF EC 400 K/o	36	38	40	1.5	2.6	3.6
LH-COMF EC 650 K/o	44	46	49	1.6	2.9	4.1

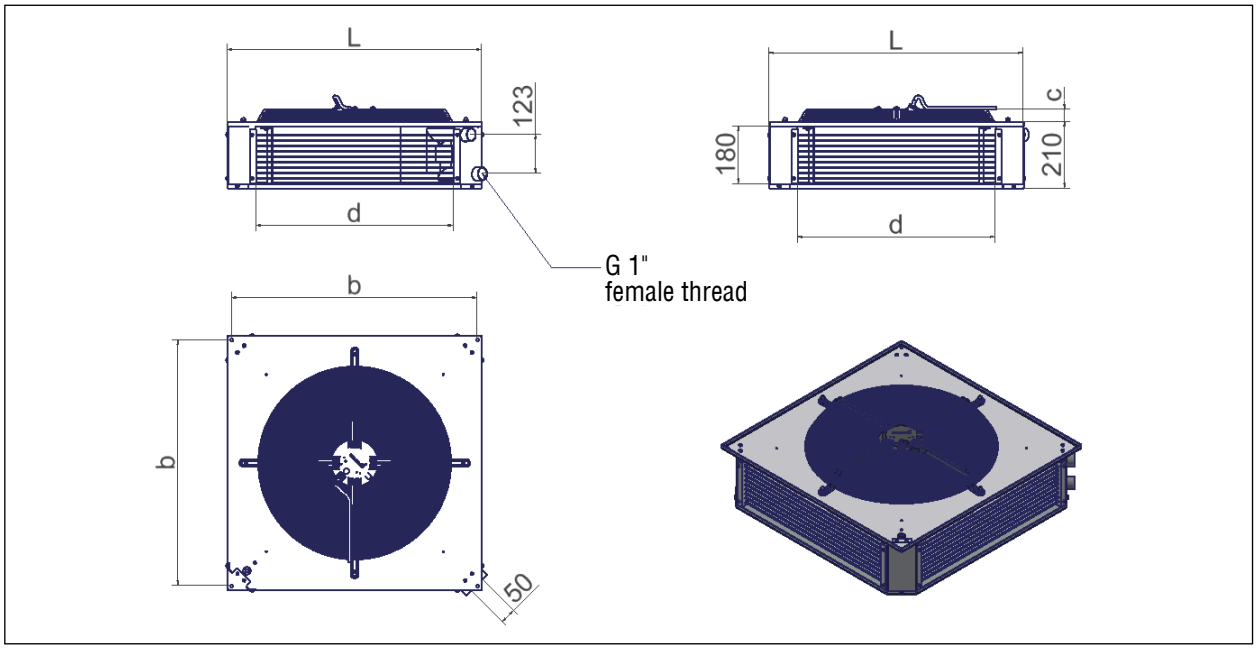


Fig. 3 Device series Type LH-COMF EC … -K/o

3.1.4 TYPE LH-COMF EC … K/TA

Type	Dimensions in mm				Heat exchanger connection			Sound pressure level at 3 m distance	
	L [mm]	b [mm]	c [mm]	d [mm]	1 RR	2 RR	3 RR	Upper speed dB(A)	Lower speed dB(A)
LH-COMF EC 140 K/TA	600	572	193	420	1"	1"	1"	51	45
LH-COMF EC 250 K/TA	700	672	210	520	1"	1"	1"	54	47
LH-COMF EC 400 K/TA	800	772	233	620	1"	1"	1"	57	50
LH-COMF EC 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-COMF EC 140 K/TA	30	31	33	1.2	1.9	2.6
LH-COMF EC 250 K/TA	39	40	43	1.3	2.3	3.1
LH-COMF EC 400 K/TA	49	51	53	1.5	2.6	3.6
LH-COMF EC 650 K/TA	62	64	67	1.6	2.9	4.1

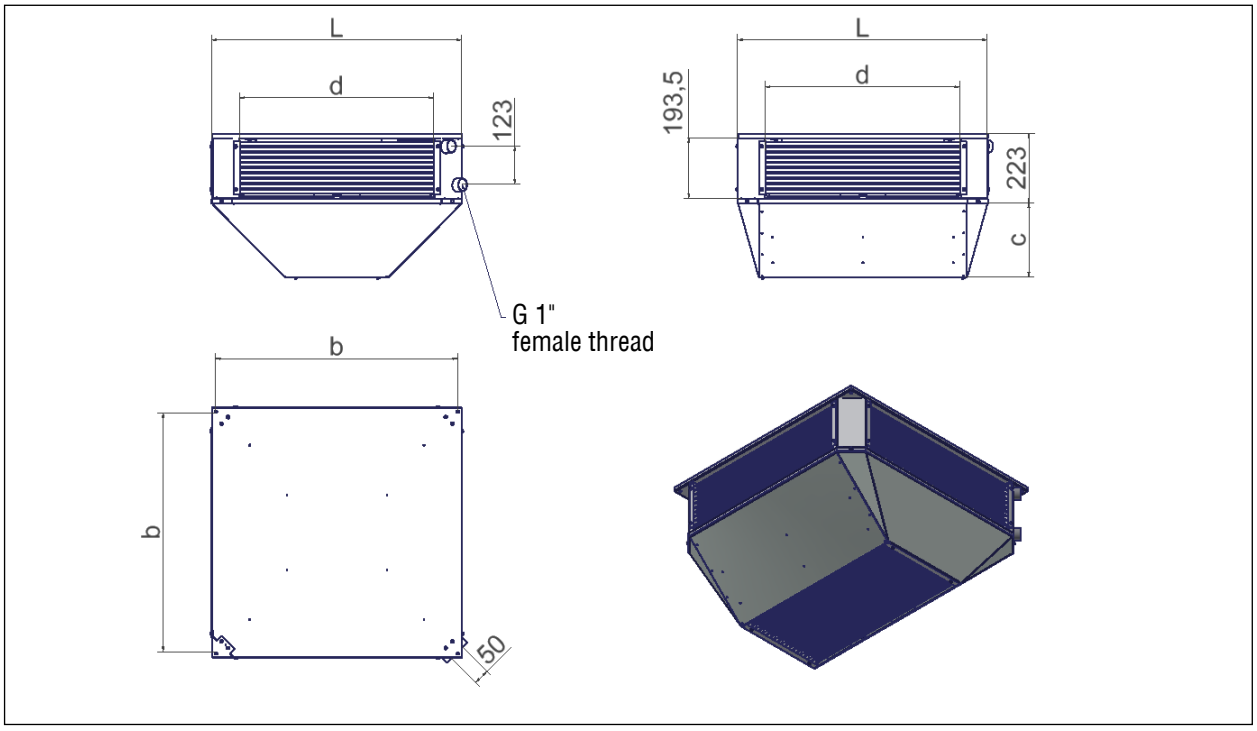


Fig. 4 Device series Type LH-COMF EC … -K/TA

3.2 Performance diagrams

LH-COMFORT EC air heaters

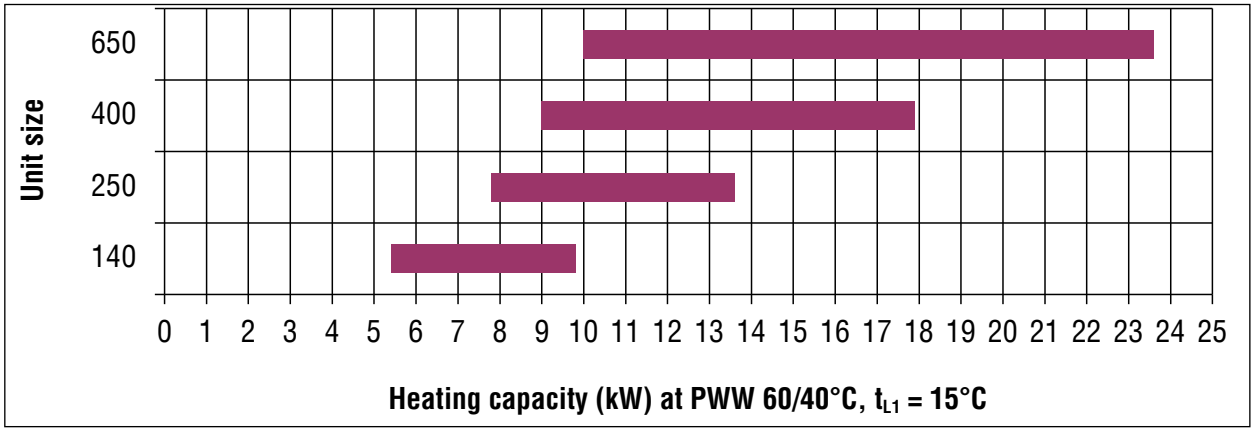


Fig. 5 Heating capacity diagram

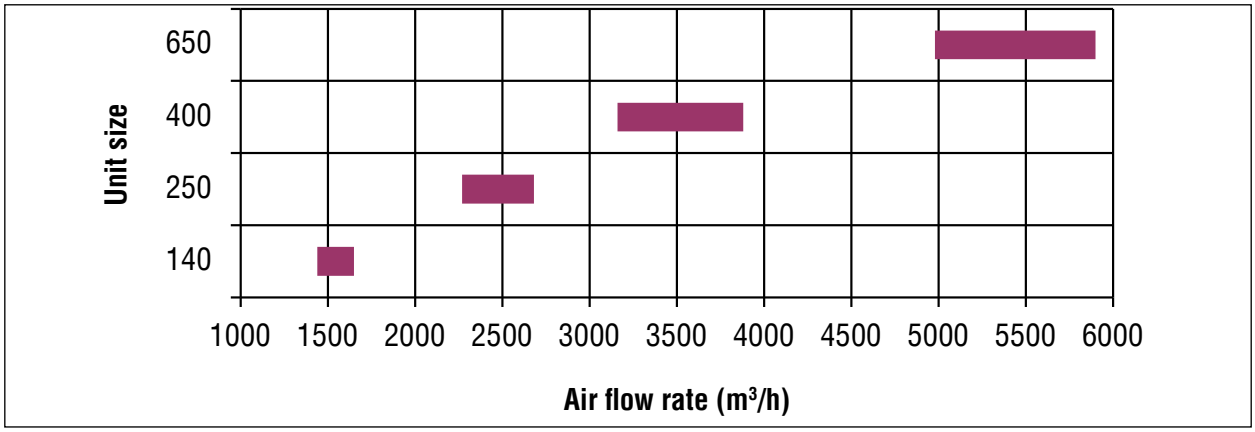


Fig. 6 Air flow rate diagram

3.3 Accessories

Bracket a

Bracket set a is suitable for ceiling mounting of the air heaters with suspended ceilings. The distance between the air heater and the ceiling can be adjusted from 150 to 250 mm. It consists of four brackets and the fastening screws.

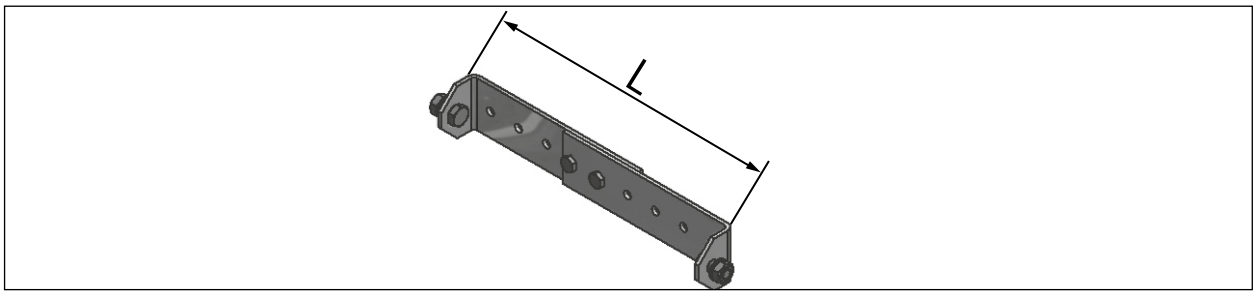


Fig. 7 Bracket a

Type	L [mm]	Weight [kg]*
a	160 - 260	1.4

* Weight of bracket set

Bracket c

Bracket set c is suitable for ceiling mounting of the air heaters. The distance between the air heater and the ceiling is approx. 40 mm. The set consists of four brackets and the fastening screws.

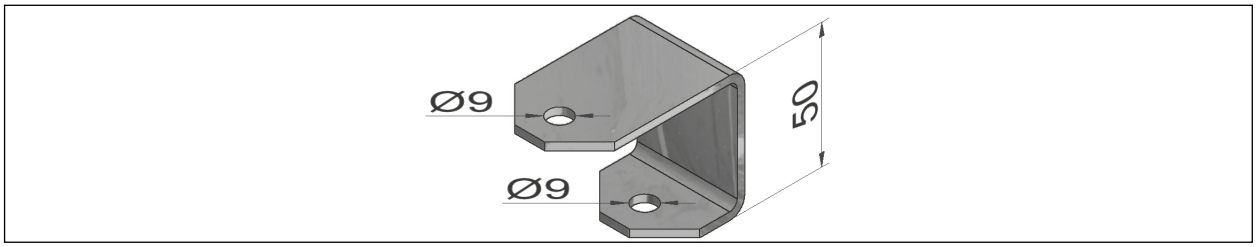


Fig. 8 Bracket c

Type	Weight kg*
c	0.35

* Weight of bracket set

3.4 Specimen type plates

Each functional unit is assigned a separate type plate. The type plates contain the order number, year of manufacture, manufacturer's data as well as the design data. These type plates are attached to the outside of the unit.

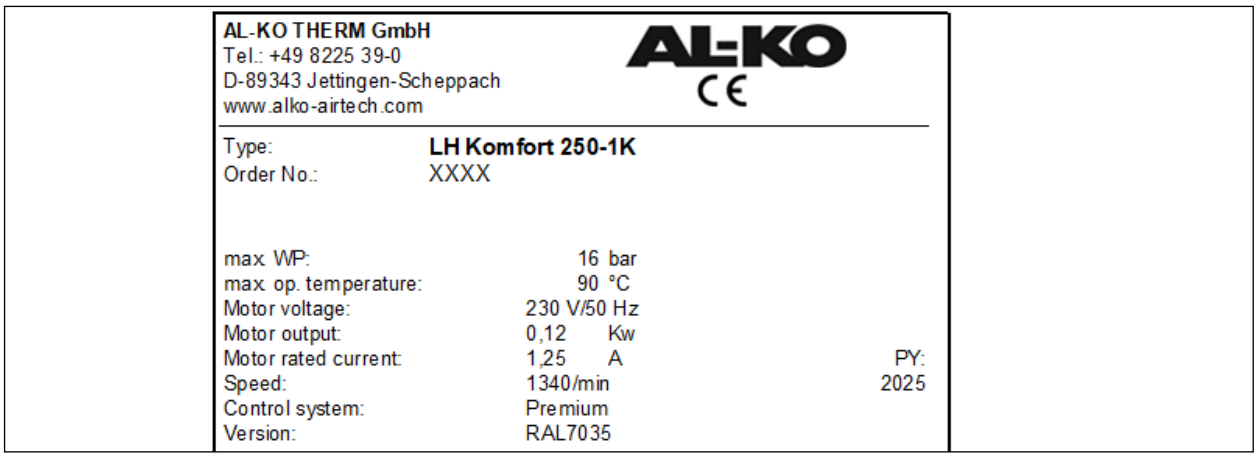


Fig. 9 Example of a type plate

4 Delivery, transport, storage

4.1 Delivery

- AL-KO air heaters are delivered in cardboard boxes or on pallets incl. film packaging!
- The unit must only be transported, lifted and set up within the standard limitations of use (-20°C to +40°C).

4.2 Transport

⚠ WARNING

Risk of death – Suspended loads.

For crane transport, all valid safety conditions according to DGUV regulation 52 Cranes and DGUV Control unit 100-500 chapter 2.8 must be observed.

- Do not walk under suspended loads!
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Use only suitable lifting equipment.

⚠ CAUTION

Risk of injury due to the units falling or tipping over.

Failure to observe the safety instructions, standards, directives and regulations leads to a risk of injury due to the unit tipping over.

- Observe the relevant standards, directives and regulations.
- Observe the instructions in these operating and assembly instructions.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Work only on on-site surfaces that are suitable for installation preparations and lifting.

ATTENTION

- Uniform lifting of the unit components must be ensured!
- Only approved lifting equipment with a sufficient load capacity may be used.
- The lifting equipment must be in perfect condition.
- The lifting gear must be inspected for load-bearing capacity and damage before use.
- Secure the load during transport.
- Use only suitable transport locks.
- If the maximum weights to be lifted are exceeded (per person), plan for a second person to help.
- The individual components of the installation may only be moved with the transport equipment provided for this purpose.
- Use only suitable transport devices and suitable industrial trucks.
- Inspection doors must be kept closed at all times during transport.

- Ensure sufficient visibility during transport (accompanying persons, if necessary).
- No persons must be allowed to remain in the transport area.
- The air heater may only be transported by trained and qualified staff in observance of the safety aspects.
- When using transport devices requiring a driving licence, ensure that the personnel has a valid driving licence.
- During transport, observe the instructions in these operating and assembly instructions and the relevant regulations on occupational safety and environmental protection.

- Transport the unit only upright and secure the unit against tipping and slipping.
- Avoid distorting the housing or other damage.
- Damage resulting from improper packaging and transport is at the expense of the initiator.
- As described in chapter “4.2.2 Fork lift truck / pallet truck” on page 20, the unit can be transported using a forklift or industrial truck.
- The unit must only be transported, lifted and set up within the standard limitations of use (-20°C to +40°C).
- Wear protective gloves during transport and installation of the units to avoid the risk of cutting.
- Remove the packaging only immediately prior to installation.

4.2.1 Transport under challenging conditions

- When transporting under aggravated conditions (e.g. on open vehicles, under unusual vibration stresses, transport by sea or in subtropical countries), additional packaging must be used that will protect the unit from these particular influences.

4.2.2 Fork lift truck / pallet truck

AL-KO THERM air heaters can be transported in their original packaging with a forklift or industrial truck!

ATTENTION

Always position the forks of the forklift on the square timbers. Pay attention to any protruding parts (e.g. medium connections, condensate drain).

- Suitable fork lengths must be used to prevent damage to the unit.
- Use suitable wood intermediate layers.

4.2.3 Crane transport

⚠ WARNING

Risk of death – Suspended loads and crane transport!

Observe the local and legal regulations and the rules of the professional associations.

- Do not walk under suspended loads!
- Do not work under suspended loads.
- Use the specified attachment and mounting points.
- Observe the weight specifications.
- Use only suitable lifting equipment.
- Use only suitable industrial trucks and lifting equipment (crane).
- Use only suitable positioning tools.
- Attach suitable load securing equipment before lifting the load.
- Wear personal protective equipment.

- Only approved lifting equipment with a sufficient load capacity may be used.
- The lifting equipment must be in perfect condition.

4.3 Storage prior to assembly

- Store the air heaters in their original packaging in a dry and weatherproof location.
- Cover open pallets with tarpaulins, and protect the air heaters from dirt (e.g. chips, stones, wire, etc.).
- Constant and, above all, abrupt temperature changes must be prevented during storage. This is especially harmful if moisture is able to form condensation.
- To avoid bearing damage, the fan must be rotated monthly if at a standstill for more than one month.

- For storage periods of more than 1 year, check the ease of movement of the fan bearings (by turning manually) before assembly.
- Avoid distortion of the housing or other damage during storage.
- Damage resulting from improper packaging and storage is at the expense of the party responsible.

4.4 Disposal of the packaging

When disposing of the packaging, comply with the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.

5 Installation

5.1 Safety instructions for assembly

⚠ WARNING

Risk of injury due to impact, cutting or stabbing during assembly/installation of the modules.

- Have installation, commissioning, maintenance and repair work carried out only by qualified staff.
- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Observe the working instructions and these operating and assembly instructions.
- Work with care.
- Use personal protective equipment at all times when working on the installation.
- Use other protective equipment according to the work carried out (cut-proof gloves).

⚠ WARNING

Risk of injury and explosion when installing the unit modules on platforms or on the roof.

When assembling the unit modules, the tool/housing material can fall off in the event of careless operation.

Due to the working height, there is a risk of falling.

- Use only suitable industrial trucks and lifting equipment (crane) and suitable positioning aids.
- Use only suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.
- Wear personal protective equipment.

⚠ CAUTION

Risk of crushing limbs and cutting injuries on sharp edges during mounting/installation of the modules.

- Have installation, commissioning, maintenance and repair work carried out only by qualified specialist personnel!
- Use assembly aids when installing the modules and components.
- Work with care.
- Wear personal protective equipment (cut-proof gloves).

ATTENTION!

It is essential to read and observe the operating and assembly instructions before installation and commissioning.

- The place of installation as well as the installation structure must provide permanent and vibration-free support of the units. The place of installation and the installation structure must be checked by a structural engineer, if required.
- The units are delivered by AL-KO THERM in pre-assembled form.
- Assembly or disassembly work may only be carried out by persons with appropriate training, knowledge and experience.
- The air heaters must be levelled during installation!

5.2 Ceiling-mounting of the units

5.2.1 Device version K

Device version K is designed for low rooms. The circulating air is drawn in at the centre of the unit underside. The heated air is discharged on four sides. The discharge louvres should face slightly downwards. Alternatively the air heater can be installed directly under the ceiling, or possibly using bracket set a or c (available as options) to achieve a certain distance from the ceiling.

Max. permissible ground clearance to the underside of the unit:

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

5.2.2 Device version K/h

Device version K is designed for average-sized rooms. The circulating air is drawn in at the ceiling on four sides and discharged into the room in a cone shape on the underside after heating. The air heater can be either installed directly under the ceiling or can be installed using bracket set a or c (available as options). This creates a clearance from the ceiling.

Max. permissible ground clearance to the underside of the unit:

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

5.2.3 Device version K/o

Device version K/o is designed for low rooms. The circulating air is drawn in at the centre of the unit upper side. The heated air is discharged on four sides. The discharge louvres should face slightly downwards. The air heater must be installed with a clearance between the fan and the ceiling of at least 150 mm. Bracket set a (available as an option) can be used to achieve this clearance.

Max. permissible ground clearance to the underside of the unit:

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

5.2.4 Device version K/TA

With its conical discharge hood, device version K/TA is ideally suited for use for creating an air curtain. The device version should be installed as close as possible to the door openings. The circulating air is drawn in at the ceiling on four sides and discharged downwards into the room opposite the intake direction after heating. The air heater can be either installed directly under the ceiling or can be installed using bracket set a or c (available as options). This creates a clearance from the ceiling.

Max. permissible ground clearance to the underside of the unit:

Type 140-K/TA	=	2500 mm
Type 250-K/TA	=	3000 mm
Type 400-K/TA	=	3500 mm
Type 650-K/TA	=	4000 mm

- Install the bracket set on the air heater (if it was not pre-installed at the factory).
- Drill fastening holes into the ceiling.
- Secure the air heater to the ceiling.
- Make the medium connections.

Examples of ceiling-mounting:

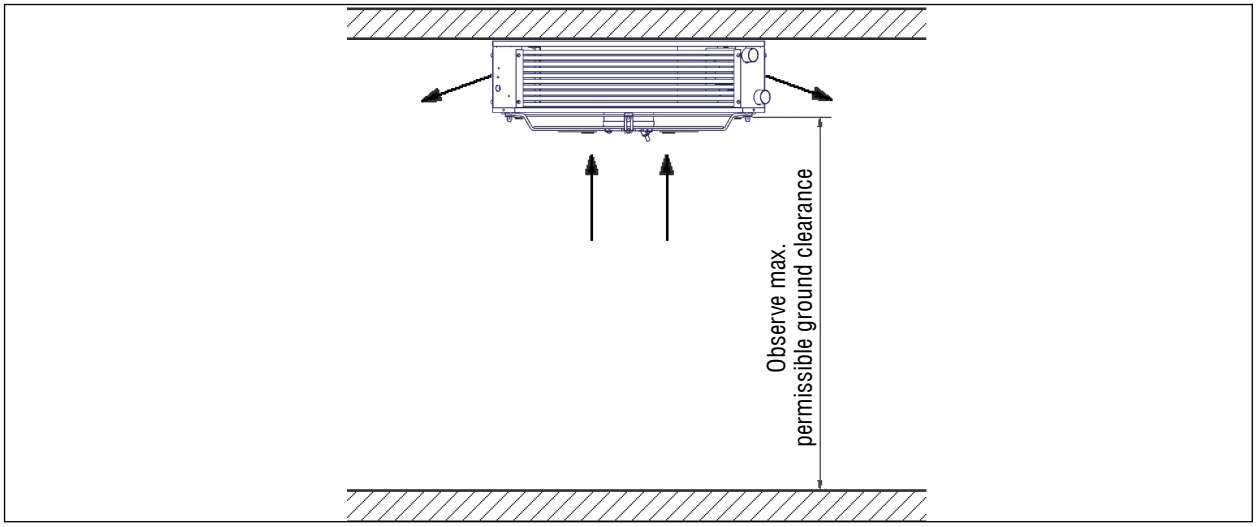


Fig. 10 Installation example – device version K

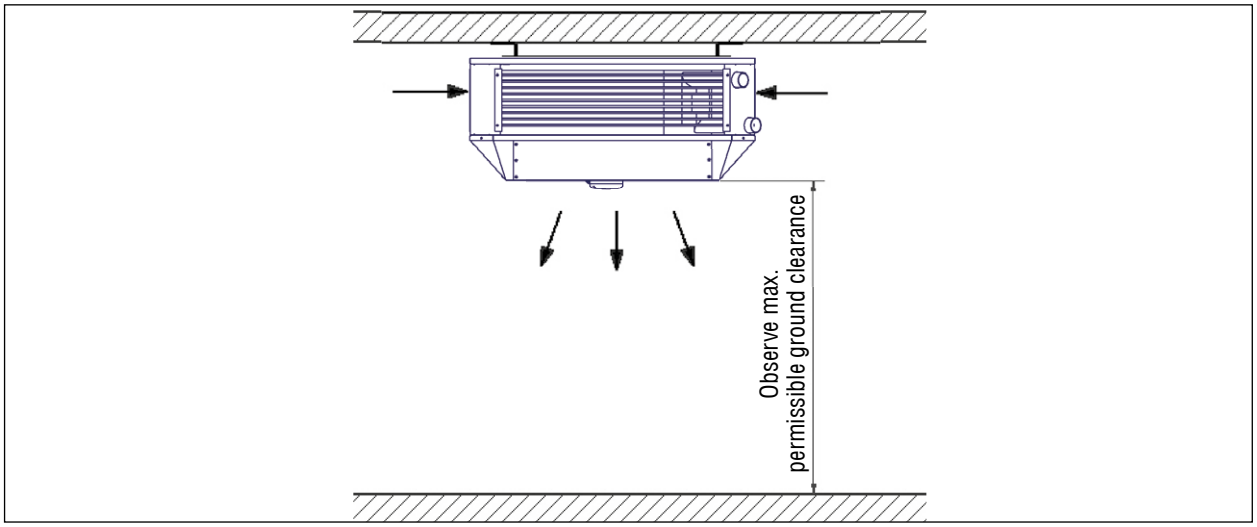


Fig. 11 Installation example – device version K/H with bracket set c

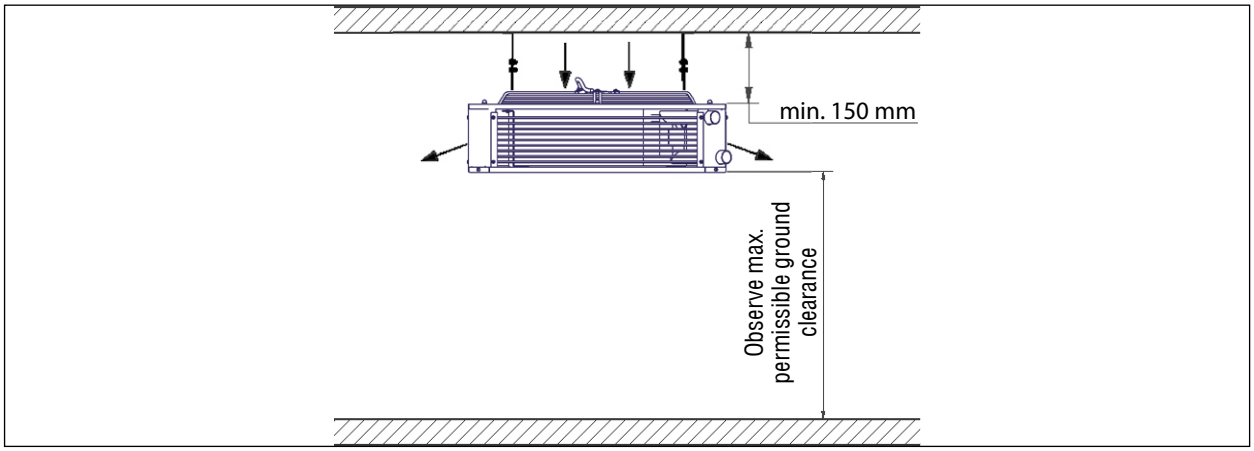


Fig. 12 Installation example – device version K/o with bracket set a

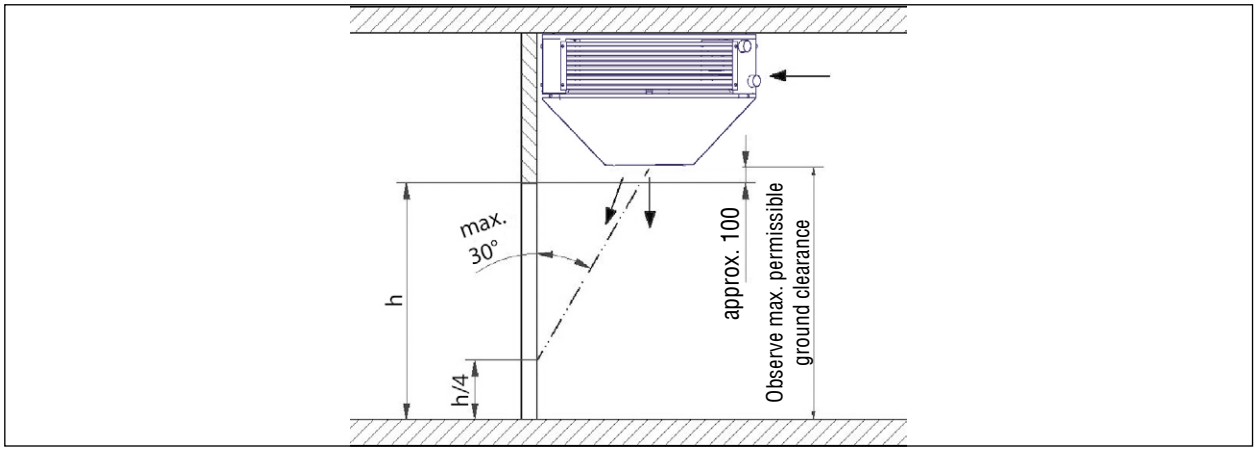


Fig. 13 Installation example – device version K/TA

5.3 Heat exchanger connection

NOTE

Do not mix up the feed and return lines when connecting the pipes.

To achieve an optimum hot water distribution in the finned heat exchanger, the inlet line must be connected at the bottom and the return line at the top of the unit.

ATTENTION

Counter-hold using a suitable tool (e.g. pipe wrench) when connecting the heat exchangers to avoid damage.

Install pipes and connections in such a way that the heat exchangers remain freely accessible for maintenance.

At temperatures below freezing, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion!

Heat exchanger Cu/Al:

- Maximum working pressure: 16 bar.
- Maximum flow temperature: 120°C.
- Supply and return lines must be connected according to professional regulations.
- May only be operated with water that has no corrosive properties (e.g. no high-purity water) and in particular contains neither oxygen nor carbon dioxide!
- Valves and actuators must be installed professionally (supplied on site).
- Carefully bleed the heat exchanger.
- The bleeding and draining facilities for the heat exchanger must be provided by the customer.
- The complete piping system must be checked for leak-tightness.

5.4 Electrical connection

⚠ DANGER

Hazard due to electric current and explosion hazard due to electric current.

Electric shocks or an explosion can occur in the event of incorrect connection to the power supply or incorrect installation of electrical components.

- Have the electrical connection carried out only by an approved electrician.
- Perform the connection exactly according to the circuit diagram and the assignment plan.
- Observe the valid DIN and VDE regulations.
- Observe the directives of the local energy supply company.
- Use personal protective equipment at all times when working on the installation.
- Use further protective equipment according to the work to be carried out.
- Do not operate the unit with defective or damaged cables or plugs.
- Regularly check the connection cables for damaged areas.
- Use only the permissible tool.
- Shut off the energy supply for maintenance work and secure it to prevent restart.
- Observe the electrical safety regulations.

⚠ WARNING

Risk of injuries due to incorrect or faulty electrical connection work.

- Electrical connections must only be undertaken by a certified electrician under consideration of the valid DIN and VDE regulations as well as the directives of the local energy supply company.
- Have assembly, maintenance and repair carried out only by qualified staff.
- Wear personal protective equipment.

- Make the electrical connection of the AL-KO THERM air heaters according to the wiring diagrams. When connecting, only use the circuit diagram specific to the unit.
- It must be possible to perform an all-pole shutdown of the supply line with a repair switch.
- Fluctuations or deviations in the mains voltage may not exceed the tolerances specified in the technical data, or else malfunctions cannot be ruled out.
- The EC fans have an internal temperature switch. A fault is signalled via a floating contact.

5.4.1 Fan

The EC motors are permanently electronically limited. The performance data therefore are not fully in accordance with the type plate of the fan.

5.4.1.1 Technical data of 230-V fan:

Type	140	250	400	650
Operating voltage in V	1~ 220-253 V/ 50-60 Hz	1~200-253 V/ 50-60 Hz	1~200-240 V/ 50-60 Hz	1~230-240 V/ 50-60 Hz
Power consumption in kW	0.16	0.14	0.24	0.25
Nominal current in A	1.25	1.05	1.68	1.65
Operating speed rpm	950	920	800	640
Insulation class	THCL 155 (F)	THCL 155 (F)	THCL 155 (F)	THCL 155 (F)
Protection class	IP 54	IP 54	IP 54	IP 54
Motor protection	Electronic overload protection with alarm output	Electronic overload protection with alarm output	Electronic overload protection with alarm output	Electronic overload protection with alarm output

5.4.1.2 Fan wiring diagram

Depending on the type of control selected, please refer to the wiring diagram in the “AL-KO EC Air Heaters PREMIUM Controller or BASIC Controller” documentation.

5.4.2 Cable list

NOTE

The cable cross-sections are provided with no liability.

The type of installation and possible cumulations have not been taken into account!

Depending on the control type, the following cable cross-sections can be connected:

	Cable
Controller type BASIC	Supply line 1.5 mm^2 to 2.5 mm^2
Lines to field devices	0.5 mm^2 to 2.5 mm^2
Controller type PREMIUM	Supply line 1.5 mm^2 to 16 mm^2
Lines to pump, valve and GLT	0.5 mm^2 to 2.5 mm^2
Field devices	0.5 mm^2 to 1.5 mm^2
Condensate pump	0.5 mm^2 to 1.5 mm^2

6 Control system

AL-KO THERM air heaters can be optionally equipped with a variety of control accessories.

Further details and information can be found in the “AL-KO EC Air Heaters PREMIUM Controller or BASIC Controller” documentation.

7 Service and maintenance

The operator is obliged to have the installation maintained regularly by qualified staff. Upon conclusion of a maintenance contract, AL-KO THERM undertakes these tasks.

7.1 Safety instructions for service and maintenance

⚠ WARNING

Risk of injuries.

- Before starting any repair or maintenance work, disconnect the unit from the mains power supply on all poles and lock it out to prevent it from being restarted.
- Observe the applicable safety regulations.
- Have installation, commissioning, maintenance and repair work carried out only by qualified specialist personnel!

To be carried out by the person responsible:

- Make sure that all factory-fitted safety units are functional before switching the units on again.

⚠ WARNING

Risk of injuries due to the run-on of fans.

- Open the inspection covers only when the fans have been switched off and have come to a standstill.
- Observe the delay time of the fans. Wait at least 3 minutes for the fan impellers to come to a standstill before opening the inspection covers.
- Never brake the impellers of the fans by hand or using an object.

⚠ CAUTION

Risk of burns due to contact with hot surfaces and media (heat exchanger).

- Wait until the hot surfaces have cooled down.
- Wear personal protective equipment.

7.2 Consumables and spare parts

ATTENTION

Use only OEM consumables and spare parts. This is the only way to ensure safe operation.
Otherwise the warranty will be voided.
A spare parts list can be found in the section below.

ATTENTION

If third-party spare parts are installed or changes are made without consultation with the manufacturer, a new conformity assessment must be carried out by a qualified person. After carrying out the evaluation, it must be documented in accordance with the Machinery Directive.
The Declaration of Conformity and Declaration of Incorporation will be invalidated in the event of a modification to the air heater controller or air heater not approved by AL-KO THERM.
The warranty may also be invalidated.

AL-KO THERM GMBH	Phone:	(+49) 82 25 / 39 - 0
Hauptstraße 248-250	Fax:	(+49) 82 25 / 39 - 2113
89343 Jettingen-Scheppach, Germany	E-mail:	klima.technik@alko-air.com
Germany	Web:	www.alko-airtech.com
Air Heater	Phone:	(+49) 82 25 / 39 - 2145
	E-mail:	Luftheizung@alko-air.com

	Article No.	Designation
Terminal box		
	3911662	BASIC Terminal box with power supply unit
Repair switch		
	3912026	Repair switch for BASIC terminal box
Terminal box		
	3911635	PREMIUM Terminal box with power supply unit

7.3 Maintenance schedule

No.	Component/activity	Measures	Inspections to be performed at these monthly intervals			
			1	3	6	12
1.	**Air inlet and air outlet**					
	Check for soiling, damage and corrosion	Completely clean and repair				X
2.	**Unit housing**					
	Check for soiling, damage and corrosion on the air side	Clean and repair				X
	Check for water formation (condensate, leaks)	Clean and identify the cause			X	
	Flexible connections	Check leak-tightness				X
3.	**Heat exchanger**					
	If cleaning while installed is not sufficient, the heat exchanger must be removed and cleaned in an appropriate manner					
	Check for soiling, damage and corrosion	Clean and repair		X		
	Check the state of hygiene					X
	Clean to preserve function (air-side)					X
	Check that the supply and return flows are functioning					X
	Bleed					X
4.	**Discharge louvres**					
	Check for soiling, damage and corrosion	Clean, if necessary				X
	Check the mechanical function					X
5.	**Fans**					
	Check the fan for soiling, damage and corrosion	Clean and repair			X	
	Check the impeller for soiling, unbalance and running noises	Switch on the motor briefly				X
6.	**Control system**					
	Visually inspect the clamping and plug-in connections	Clean as required and check for firm attachment				X

7.4 Maintaining and cleaning components

The objective of the regular inspections of the components is to identify and rectify deficiencies at an early stage.

The regular checks include the following measures:

Visual inspection of the relevant area of the unit for deficiencies such as soiling, rust formation, lime deposits and damage. If soiled components are detected during the checks, these must be cleaned immediately. No aggressive, paint-dissolving agents may be used for cleaning.

7.4.1 Heat exchanger

7.4.1.1 Maintenance

- Inspect the heat exchangers on the air side for soiling, damage and corrosion.
- Check connections and screw fittings.
- Check the venting valve and filling of the heat exchangers.
- Check the antifreeze concentration.

7.4.1.2 Cleaning

- The heat exchanger can be cleaned using compressed air.

ATTENTION

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

During prolonged standstills, corrosion can be caused in the heat exchangers by sulphate-reducing bacteria. These sulphides primarily attack the solder seams as well as the copper base material.

We recommend the following measures to reduce this type of copper corrosion:

- Use of sulphate-free water in the circuit.
- Ensure that the circuit has no leaks.
- Avoid frequent topping up of fresh water.
- Use of material-compatible inhibitors or use of biocides.

7.4.2 Discharge louvres

7.4.2.1 Maintenance

- Inspect the discharge louvres for soiling, damage and corrosion.
- Check the mechanical function of the discharge louvres.

7.4.2.2 Cleaning

- Clean the discharge louvres at regular intervals.
- The discharge louvres can be easily removed for cleaning.

7.4.3 Fans

7.4.3.1 Maintenance

- The fan is maintenance-free thanks to the use of ball bearings with “lifetime lubrication”. After expiry of the grease service life (for standard applications approximately 30 - 40,000 h), a bearing replacement is required.
- Check the fans for soiling, damage and corrosion.
- Check fan mounting and retighten all fastening screws.

- Check the function of the protective devices.
- Take note of atypical running noises and vibration-free running.

ATTENTION

Humid atmosphere:

It is recommended to run the fans for at least two hours per month during prolonged standstill periods in humid atmospheres to ensure that accumulated moisture is evaporated.

7.4.3.2 Cleaning

- Regularly clean the fan impeller, motor and grid.
- The entire fan unit may be cleaned with a damp cloth.
- Do not under any circumstances use a high-pressure cleaner or water jet for cleaning.
- Avoid the ingress of water into the motor and electrical installation.
- After the cleaning process, the motor must be dried by operating it for 30 minutes at 80-100% of the max. speed so that any water which has entered the inside can evaporate.

7.5 Replacing components

7.5.1 Replacing the heat exchanger

- De-energize the unit.
- Disconnect the electrical connections.
- Disconnect the medium lines from the heat exchanger.
- Remove the unit.
- Unscrew the discharge hood (on version K/h, K/TA).
- Unscrew the rear panel with fan and fold to one side.
- Release the fastening screws of the mounting bracket.
- Pull out the heat exchanger.
- Install the heat exchanger in the reverse order!

7.5.2 Exchanging the outlet louvre

- Loosen the screws of the discharge louvre.
- Remove the discharge louvre.
- Install the discharge louvre in the reverse order!

7.5.3 Exchanging the fan

- De-energize the unit.
- Disconnect the fan cable in the terminal box.
- Pull out the fan cable.
- Unscrew the discharge hood (on version K/h, K/TA).
- Unscrew the rear panel with the fan (on version K/h, K/TA).
- Release the fastening screws of the fan.
- Install the fan in the reverse order!

8 Help in the event of malfunctions

8.1 Emergency

ATTENTION

In case of fire, used building materials can develop toxicologically hazardous substances.

As protection against any released pollutants, the rooms may only be entered with breathing masks!

Safety of persons has priority over safety of property.

8.2 Help in the event of malfunctions

⚠ WARNING

Risk of injury due to incorrectly implemented measures.

Incorrect or incorrectly executed measures can put the installation in a potentially dangerous state. There is then a risk of injuries and even electric shock.

- Have work on electrical equipment inside the switch cabinet (e.g. test work, replacement of fuses) carried out only by qualified staff.
- Have diagnosis, troubleshooting and recommissioning carried out only by authorised persons.
- Use personal protective equipment at all times when working on the installation.
- Use further protective equipment according to the work to be carried out.

ATTENTION

Diagnostics, fault elimination and recommissioning may only be carried out by authorised persons. This applies in particular to work on electrical equipment inside the switch cabinet (e.g. testing, replacement, etc.)!

8.3 General malfunctions

Malfunction	Possible cause	Remedy
Only cold air is blown out	There is air in the circuit	Bleed the heating system

8.4 Contact for malfunctions

For all questions that you have in connection with our products, please contact the manufacturer of your ventilation installation, one of our branches or directly to:

AL-KO THERM GmbH	Phone:	(+49) 82 25 / 39 - 0
Hauptstraße 248-250	Fax:	(+49) 82 25 / 39 - 2113
89343 Jettingen-Scheppach, Germany	E-mail:	klima.technik@alko-air.com
Germany	Web:	www.alko-airtech.com
Air Heater	Phone:	(+49) 82 25 / 39 - 2145
	E-mail:	Luftheizung@alko-air.com

9 Shut-down

9.1 Decommissioning

Before starting work, de-energize the installation (all-pole shutdown) and secure it against unauthorised restarting.

⚠ WARNING

Risk of injury due to pressurised parts.

- During decommissioning, note that certain parts of the installation are pressurised.
- Observe the safety rules!

ATTENTION

In winter, there is a risk of all the components freezing. If necessary, take suitable measures such as completely draining the liquid media. At temperatures below freezing point, the heat exchanger must be either drained and blown out with compressed air, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion.

- If the installation is decommissioned for a long period of time, the instructions for the individual components must be observed.
- The information from the component manufacturers must also be followed (request this information if necessary).
- The system must always be bled before operation is resumed and the points listed in chapter “7 Service and maintenance” on page 29 must be adhered to.

9.2 Dismantling

- Dismantling must be carried out according to the currently valid and applicable occupational safety and accident prevention regulations.

⚠ WARNING

Risk of injury from falling from ladders, scaffolding or work platforms.

- Use only suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

⚠ WARNING

Risk of poisoning when draining the media.

The unit may contain media that are hazardous to health, such as antifreeze.

- The drained media may only be filled and stored in approved containers.
- Work with care.
- Avoid skin contact with the media, do not swallow media and observe the safety data sheets.
- Wear personal protective equipment.
- Absorb spills immediately.

⚠ WARNING

Risk of injury when dismantling electrical and thermal components.

- Have dismantling work carried out only by trained and qualified staff.
- Before starting work, disconnect the installation from the central supply line.
- When dismantling, note that certain parts of the installation are pressurised.
- Fix the impellers of the fans.
- Work with care.
- Use only suitable means of transport when transporting installation parts.
- Use personal protective equipment at all times when working on the installation.
- Absorb spills immediately.

⚠ WARNING

Danger to health when removing the filter inserts.

- When removing filters, wear the personal protective equipment (dust mask).
- Use further protective equipment according to the work to be carried out.
- Avoid contact with the dust.

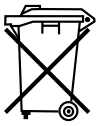
9.3 Disposal

⚠ WARNING

Risk of poisoning when disposing of the media.

The unit may contain media that are hazardous to health, such as coolants.

- Work with care.
- Avoid skin and eye contact with the media, do not swallow media and observe the safety data sheets.
- Wear personal protective equipment.
- When disposing of the media, comply with the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.
- The drained media may only be filled and stored in approved containers.



Do not dispose of worn-out units, spent batteries or rechargeable batteries in domestic waste.
When disposing of the unit, operating equipment and accessories, proceed according to the relevant local environmental and recycling regulations in your country and community that are applicable at the time when the activity is undertaken.

10 Certifications

The following EG declaration of conformity is issued individually for each order, depending on its validity.

If both the order number and the position of the unit are specified, the issued document must be assigned to the respective unit.

10.1 EC Declaration of Conformity in accordance with 2006/42/EC

EG-KONFORMITÄTSERKLÄRUNG

EC DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ CE

Hersteller / *Manufacturer* / *Fabricant:* **AL-KO THERM GMBH I Hauptstraße 248-250 I 89343 Jettingen-Scheppach I Germany**

Im Sinne der EG- Maschinenrichtlinie 2006/42/EG, Anhang II, Teil 1, Abschnitt A
As defined in EC Machinery Directive 2006/42/EC, Annex II, Part 1, Section A
Au sens de la directive Machines CE 2006/42/CE, annexe II, partie 1, section A

Maschine / *Machine* / *Machine :* Luftheiz- / Luftkühlgeräte, Deckenlüfter EC BASIC / EC PREMIUM
Air heating / air cooling devices, Ceiling fan EC BASIC / EC Premium
Aérotherme / refroidisseur d'air, ventilateur de plafond EC BASIC / EC PREMIUM

Serie / *Series* / *Série :*

KOMFORT BASIC / PREMIUM	*K EC, K/H EC, K/O EC*
COMFORT BASIC / PREMIUM	*K EC, K/H EC, K/O EC*
COMFORT BASIC / PREMIUM	*K EC, K/H EC, K/O EC*
Typ / type / Type: 140, 250, 400, 650	
DL ENERGIE BASIC / PREMIUM	DL ENERGIE …EC
DL ENERGY BASIC / PREMIUM	*DL ENERGIE …EC*
DL ÉNERGIE BASIC / PREMIUM	*DL ÉNERGIE …EC*
Typ / type / Type: 140, 250, 400, 650	
INDUSTRIE BASIC / PREMIUM	LH IND …N EC, H EC, D EC, E EC, NF EC, HF EC, DF EC, EF EC, LK IND …N EC, NF EC
INDUSTRIE BASIC / PREMIUM	*LH IND …N EC, H EC, D EC, E EC, NF EC, HF EC, DF EC, EF EC, LK IND …N EC, NF EC*
INDUSTRIE BASIC / PREMIUM	*LH IND …N EC, H EC, D EC, E EC, NF EC, HF EC, DF EC, EF EC, LK IND …N EC, NF EC*
Typ / type / Type: 140; 250; 400; 650; 1000	

Hiermit erklären wir, dass die oben genannte Maschine alle sicherheitstechnischen Anforderungen der folgenden anwendbaren EG/EU- Richtlinien erfüllt:
We hereby declare that the above-mentioned machine conforms to all relevant safety-provisions of the following EG/EC directives:
Nous déclarons par la présente que la machine susmentionnée corresponde à toutes les des exigences de sécurité pertinentes de la directive CE/UE suivante:

Maschinenrichtlinie 2006/42/EG / *Machinery Directive 2006/42/EC / Directive Machines CE 2006/42/CE*
Elektromagnetische Verträglichkeit 2014/30/EU / *Electromagnetic Compatibility 2014/30/EU / Compatibilité électromagnétique 2014/30/UE*
Druckgeräterichtlinie 2014/68/EU / *Pressure Equipment Directive 2014/68/EU / Directive sur les appareils sous pression 2014/68/UE*
(gilt nur für die Geräteausführungen/*applicable only for instrument version/applicable seulement pour la version de l'appareil:* LH-IND..-D EC;-DF EC)

Angewandte harmonisierte Normen / *Applied harmonized standards / Normes harmonisées appliquées:*

- DIN EN ISO 12100, 2011-03	Sicherheit von Maschinen – Allgemeine Gestaltungsleitsätze – Risikobeurteilung und Risikominderung *Safety of machinery – General principles for design – Risk assessment and risk reduction* *Sécurité des machines – Principes généraux de conception – Appréciation et réduction du risque*
- DIN EN 60204-1, 2019-06	Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen *Safety of machinery - Electrical equipment of machines - Part 1: General requirements* *Sécurité des machines – Equipement électrique des machines – Partie 1 : exigences générales*
- DIN EN ISO 13854, 2020-01	Sicherheit von Maschinen - Mindestabstände zur Vermeidung des Quetschens von Körperteilen *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body* *Sécurité des machines – Distances minimales de prévention des contusions de parties du corps humain*
- DIN EN ISO 13857, 2020-04	Sicherheit von Maschinen – Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs* *Sécurité des machines – Distances de sécurité empêchant l'entrée dans les zones dangereuses des membres supérieurs et inférieurs*
- DIN EN IEC 61000-6-1, 2019-11	Störfestigkeit für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe *Immunity standard for residential, commercial and light-industrial environments* *Résistance au brouillage pour le domaine d'habitation, les locaux commerciaux et professionnels ainsi que les petites exploitations*
- DIN EN IEC 61000-6-2, 2019-11	Störfestigkeit für Industriebereiche *Immunity standard for industrial environments* *Résistance au brouillage pour les zones industrielles*
- DIN EN IEC 61000-6-3, 2022-06	Störaussendung von Geräten in Wohnbereichen *Emission standard for equipment in residential environments* *Norme sur l'émission relative aux appareils utilisés dans les environnements résidentiels*
- DIN EN IEC 61000-6-4, 2020-09	Störaussendung für Industriebereiche *Emission standard for industrial environments* *Émission d'interférences pour les zones industrielles*

Zusätzlich angewendete nationale Normen und techn. Spezifikationen / *Additional applied national standards and technical specifications / Les normes nationales et spécifications techniques. utilisées supplémentaires*

- VDMA 24167, 1994-10	Ventilatoren – Sicherheitsanforderungen / *Fans - Safety requirements / Ventilateurs – Exigences de sécurité*

Bei einer mit uns nicht abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit.
Any modification of this machine without confirmation shall automatically annul this declaration.
En cas de modification de la machine non convenue avec nous, la présente déclaration perd sa validité.

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen:
Authorized representative in charge of the technical document compilation:
Personne autorisée à constituer le dossier technique
Anschrift siehe Hersteller / *see manufacturer's address above / Adresse, voir fabricant*

Jettingen-Scheppach, 02.12.2024

Leiter der Abteilung Entwicklung
Head of Development Department
Chef du département de développement

Stephan Hafner
Geschäftsführer/*Managing Director/Directeur géné*

NOTES

QUALITY FOR LIFE

3912013/January 2025

AL-KO THERM GMBH I Head Quarter I Hauptstraße 248 - 250 I 89343 Jettingen-Scheppach I Germany
Phone +49 8225 39-0 I Fax +49 8225 39-2113 I klima.technik@alko-air.com I **www.alko-airtech.com**