





AIR HEATER

**OPERATING AND ASSEMBLY INSTRUCTIONS** 

# AIR HEATER/AIR COOLER INDUSTRY EC

# Legal

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# **Revision history**

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#### 1 About this manual

- The German version is the original operating instructions. All further language versions are translations of the original operating instructions.
- Readthese 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 overtothe buyer if the product is sold.
- In these operating and assembly instructions, the air heater/air cooler will be referred to as a "unit".

## 1.1 Explanation of symbols

## 1.1.1 Safety instructions



#### **A** DANGER

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





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

# **A** 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.

#### **NOTICE**



Special instructions for ease of understanding and handling.

# 1.2 Safety signs

GENERAL DANGER SIGNS If the required safety instructions are not observed, this can lead to death, severe injuries and serious 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.	

# 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.	No.
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.	4
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.	-ETS-
Warning of sharp objects If the required safety instructions are not observed, this can lead to death or severe injuries due to sharp objects.	



Meaning	Warning sign
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
PPE	Personal protective equipment, such as cut-proof gloves, safety goggles, work gloves, ear protection, safety helmet, breathing mask
BMS	Building management system

# 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

AL-KOTHERM air heaters/air coolers are intended exclusively for air heating and air cooling and, optionally, for ventilation (air heaters) and purification of outdoor and indoor air in rooms and buildings with a normal climate and normal atmosphere.

The units may only be operated in the ambient temperature range of  $-20^{\circ}$ C to  $+40^{\circ}$ C and in the relative humidity range of 50% to 85% without condensation.

Use of the units at elevations over 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.

#### Cooling

The air outlet temperature of air coolers should be a maximum of  $6-8^{\circ}$ C below the ambient temperature to avoid unpleasant drafts. Excessive temperature differences (>  $8^{\circ}$ C) may result in "cold-air pools".

#### Heating

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

At outlet temperatures below  $34^{\circ}$ C, there is a risk of unpleasant drafts occurring at work stations. If the outlet temperature is greater than  $40^{\circ}$ 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 Foreseeable misuse

AL-KO THERM air heaters/air coolers may only be operated within the scope 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 8 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.
- Installation in an environment with aggressive media (e.g. sea air) or heavily dust-containing media (desert).



#### 2.3 General safety instructions

# **A** 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 additional protective equipment according to the work to be carried out.







# **M** WARNING



Risk of severe injuries or death!

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

Allowassembly, installation, commissioning, repair, maintenance and servicing work to be 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 additional protective equipment according to the work to be carried out.

## **A** WARNING



Risk of injury due to falling, and falling modules.

 $When in stalling the units or installation work on platforms, persons may fall off and/or modules \ may fall \ down.$ 



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

## **A** WARNING



Risk of injury due to unauthorised opening.

- Keep the inspection covers closed during operation.
- Never open the unit during operation.
- You can only open the inspection covers using a tool.
- Observe the hazard warning on the inspection covers.

#### **A** WARNING



Risk of poisoning when working with sealants, adhesives and pre-treatment agents.

- Do not touch the sealant, adhesive or pre-treatment agent.
- Work with care.
- Do not swallow the sealant, adhesive or pre-treatment agent.
- Ensure that there is adequate ventilation at the workplace.
- Observe the safety data sheets and operating procedures in accordance with the Ordinance on Hazardous Substances.
- Use personal protective equipment at all times when working on the installation.

#### **A** WARNING



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

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

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:

- Theversionanddesignoftheunitcomplies with the standards listed in the Declaration of Conformity or Declaration of Incorporation. A potential hazard can only be extensively ruled out if the other applicable standards for the overall system to be completed and installed by the plant manufacturer are adhered to.
- Ifinstallationisperformedcontrarytoourregulations, 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.
- Allauthorised 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 dangers during operation, all of the user's plant, operating and working instructions apply in addition to these operating and assembly 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-KOTHERM.
- The unit must be installed properly and used subject to close adherence to the AL-KOTHERM operating and assembly instructions.
- Only operate the unit 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 Incorporation.
- Avoid sparking in the vicinity of the unit.
- Wear personal protective equipment (e.g. hearing protection) during operation of the unit.



#### 2.3.2 Safety instructions for maintenance

- Damaged parts are only permitted to be replaced with original spare parts.
- During repair and maintenance work, the unit must be disconnected from the mains on all poles and locked out against being restarted.
- General maintenance instructions in the operating and assembly instructions from AL-KOTHERM must be observed under all circumstances.
- Observe the delay times 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!
- Toavoiddangers during operation, all of the operator's plant, operating and working instructions applyinaddition 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 unit may pose hazards if it is not operated by trained personnel and/or is operated improperly or not 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 misconduct: non-observance of 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.
- Observance of all company, operating and working instructions at the owner's/operator's installation site.
- What to do in an emergency.

# 3 Product description

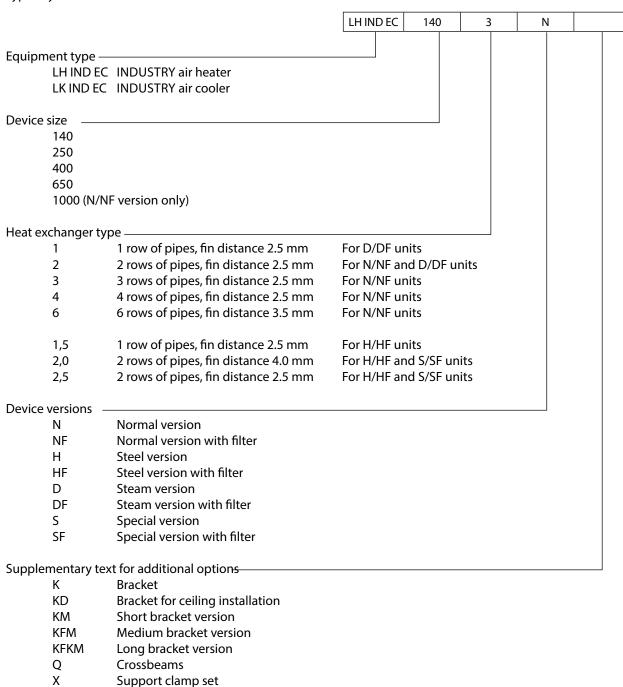
AL-KO THERM air heaters/air coolers of the INDUSTRY series consist of a sturdy, self-supporting housing made of Sendzimir-galvanizedsheetsteelwithadditionalpowdercoating. Standard equipment includes a galvanized, adjustable diffusion grid with fins mounted and preset at the air outlet. A maintenance-free axial fan ensures low-noise operation. The drives of the AL-KOTHERM units 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/cooling is installed in the housing next to the fan. It is implemented as a finned heat exchanger and varies by type (type N/NF of Cu/Al, type H/HF of FeZn/FeZn, type D/DF of FeZn/Fe, type S/SF of FeZn/Fe). The air heaters/air coolers can be enhanced by various attachment and electronic accessories.

#### **NOTICE**



 $AL\text{-}KOTHERM\ products\ are\ subject to\ continuous\ quality\ control\ and\ comply\ with\ the\ applicable\ regulations.$ 

Type key IND:





Z	Ceiling suspension (Z-profile)						
ZZ	Ceiling suspension (angle bracket)						
В	Broad air outlet						
AD	Outlet nozzle with louvres						
D1	Outlet nozzle (gate air curtain ou	ıtlet, narrow side)					
D2	Outlet nozzle (gate air curtain ou	ıtlet, broad side)					
V	Four-sided outlet						
IJ	Injection louvre						
	IJWA	Wall-mounting + automatic adjustment					
	IJWH	Wall-mounting + manual adjustment					
	IJDA	Ceiling-mounting + automatic adjustment					
	IJDH	Ceiling-mounting + manual adjustment					
TA	Droplet eliminator (type LK only)						
FK	Filter box						
V4A	Stainless steel housing						
Р	Condensate pump						

# 3.1 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.

#### Type plate

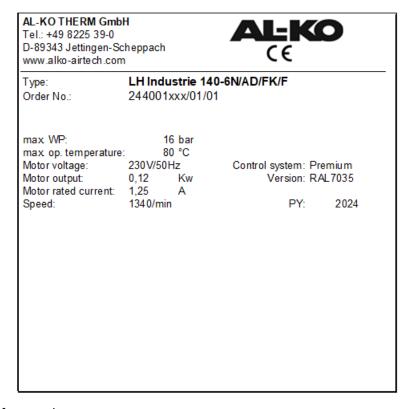


Fig. 1 Example of a type plate

# 3.2 Technical data

# 3.2.1 Type LH-... N/NF

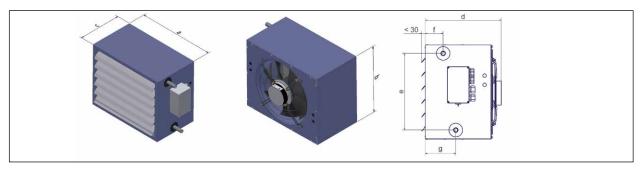


Fig. 2 Unit series type LH-... N BASIC

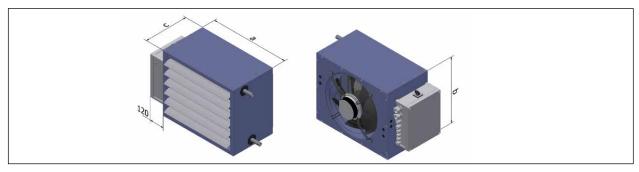


Fig. 3 Unit series type LH-... N PREMIUM

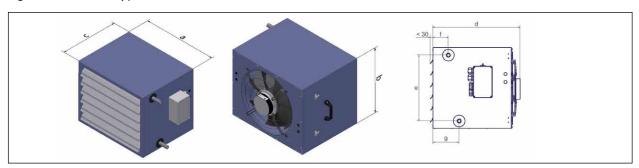


Fig. 4 Unit series type LH-... NF BASIC

Туре			Dime	nsions in m	Hea	at exchang	er connect	ion			
								2	3	4	6
	a	b	С	d	e	f	g	Type	Type	Type	Type
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	N/NF	N/NF	N/NF	N/NF
LH-140 N/NF	560	440	360/500	399/539	344	98	167	3/4"	1"	1 1/4"	1 1/4"
LH-250 N/NF	640	515	360/500	402/542	419	98	167	3/4"	1"	1 1/4"	1 1/4"
LH-400 N/NF	800	630	360/500	427/567	534	98	167	1"	1 1/4"	1 1/4"	1 1/4"
LH-650 N/NF	880	740	390/500	501/611	644	98	167	1 1/4"	1 1/4"	1 1/2"	1 1/2"
LH-1000 N/NF	1040	890	390/500	465/575	794	98	167	1 1/4"	1 1/2"	1 1/2"	1 1/2"

Туре		Weigl	nt in kg		Water content in I				
	2	3	4	6	2	3	4	6	
	Type	Type	Type	Type	Type	Type	Type	Type	
	N/NF	N/NF	N/NF	N/NF	N/NF	N/NF	N/NF	N/NF	
LH-140 N/NF	24/27	25/28	28/31	30/32	1.8	2.5	2.0	2.6	
LH-250 N/NF	31/34	33/37	36/39	39/41	3.0	3.9	2.7	3.6	
LH-400 N/NF	42/46	46/50	48/52	54/58	4.6	6.2	4.4	6.0	
LH-650 N/NF	55/59	59/67	64/67	71/75	5.6	8.4	6.4	8.6	
LH-1000 N/NF	74/79	79/84	85/90	94/98	10.0	12.7	9.0	12.3	



# 3.2.2 Type LH-... H/HF

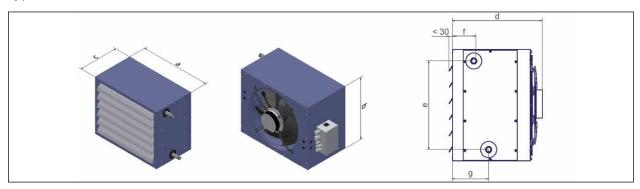


Fig. 5 Unit series type LH-... H BASIC

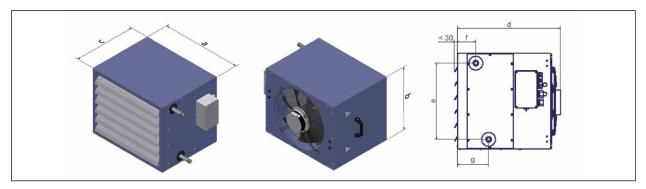


Fig. 6 Unit series type LH-... HF BASIC

Type			Dime	ensions in m	Heat ex	xchanger conr	nection			
	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	1,5 Type H/HF	2,0 Type H/HF	2,5 Type H/HF
LH-140 H/HF	560	440	360/500	399/539	335	98	167	3/4"	1"	3/4"
LH-250 H/HF	640	515	360/500	402/542	410	98	167	3/4"	1"	3/4"
LH-400 H/HF	800	630	360/500	427/567	524	98	167	1"	1 1/4"	1"
LH-650 H/HF	880	740	390/500	501/611	634	98	167	1"	1 1/4"	1 1/4"

Type		Weigh	Water co	ntent in I		
	1,5 Type H/HF	2,0 Type H/HF	2,5 Type H/HF	1,5 Type H/HF	2,0 Type H/HF	2,5 Type H/HF
LH-140 H/HF	44/47	59/62	61/64	4.0	8.0	8.0
LH-250 H/HF	59/62	74/78	84/87	5.0	11.0	11.0
LH-400 H/HF	84/88	108/112	125/129	7.0	15.0	15.0
LH-650 H/HF	108/112	138/142	159/162	9.0	19.0	19.0

# 3.2.3 Type LH-... D/DF

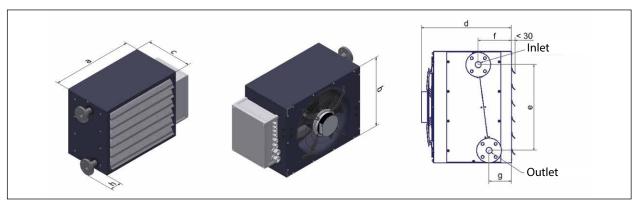


Fig. 7 Unit series type LH-... D PREMIUM

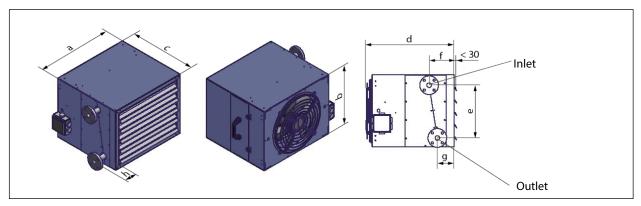


Fig. 8 Unit series type LH-... DF PREMIUM

Type		Dimensions in mm							Heat exchang	er connection
	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	h [mm]	1,0 Type D/DF	2,0 Type D/DF
LH-140 D/DF	560	440	360/500	399/539	321	153	103	88	1"	1 1/2"
LH-250 D/DF	640	515	360/500	402/542	396	153	103	88	1"	1 1/2"
LH-400 D/DF	800	630	360/500	427/567	513	148	103	88	1 1/4"	2"
LH-650 D/DF	880	740	390/500	501/611	621	143	103	88	1 1/2"	2"

Туре	Weigh	t in kg	Water content in I	
	1,0 Type D/DF	2,0 Type D/DF	1,0 Type D/DF	2,0 Type D/DF
LH-140 D/DF	47/50	54/57	4.0	9.0
LH-250 D/DF	60/63	88/91	6.0	12.0
LH-400 D/DF	84/87	106/109	8.0	16.0
LH-650 D/DF	105/108	146/149	10.0	21.0



# 3.2.4 Type LK-... N/B/K; N/B/K/P

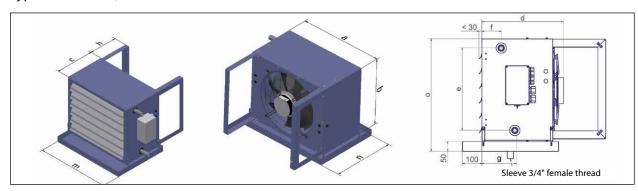


Fig. 9 Unit series type LK-... N/B/K

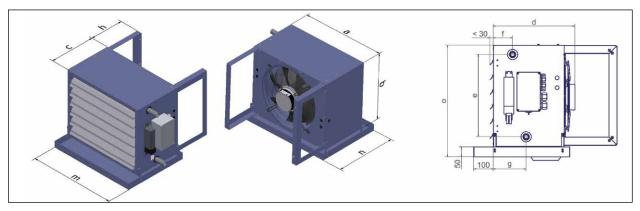


Fig. 10 Unit series type LK-... N/B/K/P

Туре		Dimensions in mm									
	a [mm]	b [mm]	c [mm]	d [mm]	e [mm]	f [mm]	g [mm]	h [mm]	m [mm]	n [mm]	o [mm]
LK-140 N/B/K; N/B/K/P	560	440	360	399	344	98	167	270	591	490	497/492
LK-250 N/B/K; N/B/K/P	640	515	360	402	419	98	167	270	671	490	572/567
LK-400 N/B/K; N/B/K/P	800	630	360	427	534	98	167	270	831	490	687/682
LK-650 N/B/K; N/B/K/P	880	740	390	501	644	98	167	340	911	520	797/792
LK-1000 N/B/K; N/B/K/P	1040	890	390	465	794	98	167	390	1071	520	947/942

Туре	Heat exc	hanger co	nnection		Weight in kg	
	3 Type N	4 Type N	6 Type N	3 Type N/B/K Type N/B/K/P	4 Type N/B/K Type N/B/K/P	6 Type N/B/K Type N/B/K/P
LK-140 N/B/K; N/B/K/P	1"	1 1/4"	1 1/4"	35/36	36.5/37.5	37.5/39
LK-250 N/B/K; N/B/K/P	1"	1 1/4"	1 1/4"	43/44	45/46.5	48/49.5
LK-400 N/B/K; N/B/K/P	1 1/4"	1 1/4"	1 1/4"	61/62	62.5/64	69/70
LK-650 N/B/K; N/B/K/P	1 1/4"	1 1/2"	1 1/2"	79/80	83/84	89.5/91
LK-1000 N/B/K; N/B/K/P	1 1/2"	1 1/2"	1 1/2"	102/103.5	108/109	117/118.5

Water content in I						
3 Type N/B/K Type N/B/K/P	4 Type N/B/K Type N/B/K/P	6 Type N/B/K Type N/B/K/P				
2.5	2.0	2.6				
3.9	2.7	3.6				
6.2	4.4	6.0				
8.4	6.4	8.6				
12.7	9.0	12.3				

## 3.3 Condensate pump

The compact condensate pump is suitable for removing accumulated condensate. The condensate pump is a self-priming rotary diaphragm pump with a condensate sensor.

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





Note the assembly and safety instructions; see chapter "5 Assembly" on page 29.

#### 3.4 Accessories

#### Bracket K

BracketsetKissuitedforwall-mountingandceiling-mountingoftheairheatersandforwall-mountingoftheaircoolers. It consists of two brackets and the fastening screws for the air heater.

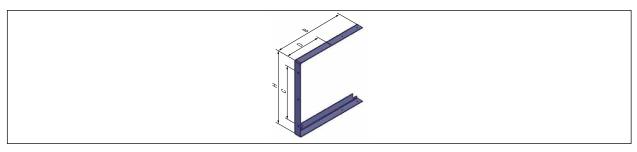


Fig. 11 Bracket K

Туре	B [mm]	H [mm]	C [mm]	D* [mm]	Weight** [kg]
K-140	420	432	310	270	2.1
K-250	420	507	385	270	2.2
K-400	420	622	500	270	2.4
K-650	490	732	610	340	2.9
K-1000	540	882	760	390	3.3

<sup>\*</sup> Distance between wall and air heater

<sup>\*\*</sup> Weight of one bracket



#### **Bracket KD**

The KD bracket set is suitable for ceiling-mounting of the air heaters of type N and NF with MLK mixed air box. The bracket is attached directly to the mixed air box. The distance from the mixed air box to the ceiling is approx. 10 mm. The set consists of two brackets and the fastening screws for the mixed air box.

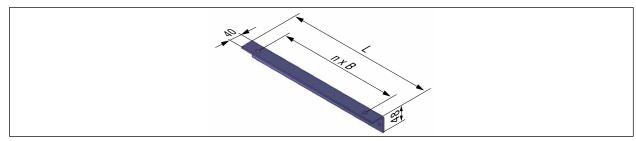


Fig. 12 Bracket KD

Туре	L [mm]	n	B [mm]	Weight* [kg]
KD-140	437	1	357	1.2
KD-250	512	1	432	1.3
KD-400	627	2	273.5	1.6
KD-650	737	2	328.5	1.9
KD-1000	887	3	269	2.3

<sup>\*</sup> Weight of one bracket

#### Brackets KM and KFM

The KM bracket set is suitable for wall-mounting of the air heaters of type N with MLK mixed air box.

The KFM bracket set is suitable for wall-mounting of the air heaters of type NF with MLK mixed air box.

It consists of two brackets and the fastening screws for the air heater. The mixed air box is mounted approx. 100 mm from the wall to allow easy installation of an STW canvas nozzle.

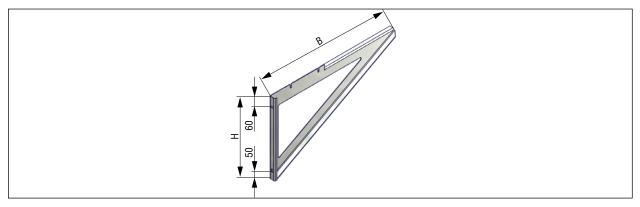


Fig. 13 Bracket KM

Туре	B [mm]	H [mm]	Weight* [kg]
KM-140	760	450	4.1
KM-250	810	500	4.4
KM-400	860	550	4.8
KM-650	940	580	5.2
KM-1000	990	600	5.4
KFM-140	900	490	6.2
KFM-250	950	590	6.9
KFM-400	1000	690	7.7
KFM-650	1050	690	7.9
KFM-1000	1100	690	8.2

<sup>\*</sup> Weight of one bracket

#### **Bracket KFKM**

The KFKM bracket set is suitable for wall-mounting the type Nair heater with FK filter box and MLK mixed air box or for wall-mounting the type Nair heater with FK filter box. It consists of two brackets and the fastening screws for the air heater.

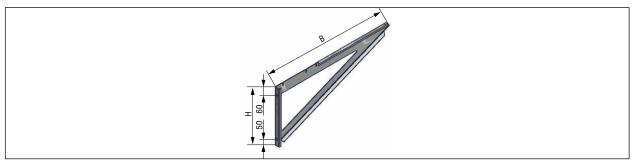


Fig. 14 Bracket KFKM

Туре	B [mm]	H [mm]	Weight* [kg]
KFKM-140	1115	490	7.2
KFKM-250	1165	590	8.0
KFKM-400	1215	690	8.7
KFKM-650	1295	690	9.1
KFKM-1000	1345	690	9.3

<sup>\*</sup> Weight of one bracket

#### Crossbeams O

When the units are mounted in places where the mounting surface is narrower than the distance between the brackets, an additional cross beam Q is required with bracket K (e.g. concrete pillars, support beams, lintels). A cross beam set consists of two angleirons with appropriate holes (fitting the inner dimensions of the mounted brackets) including the necessary bolts and nuts to fasten them to the brackets.

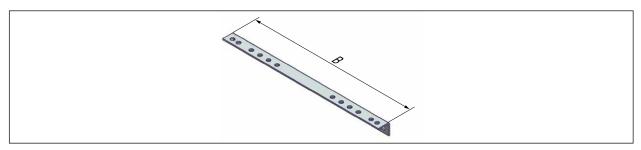


Fig. 15 Crossbeams

Туре	B [mm]	Weight* [kg]
Q-140	400	2.1
Q-250	400	2.2
Q-400	400	2.4
Q-650	470	2.9
Q-1000	520	3.3

<sup>\*</sup> Weight of one bracket



#### Support clamp set X

The support clamp set X is used, for example, to mount the crossbeam Q to a steel girder (see also chapter 5.1). The support clamp set X has an adjustment screw for continuous adjustment to different flange sizes. The adjusted cam height must correspond to the thickness of the flange to be clamped (max. 30 mm).

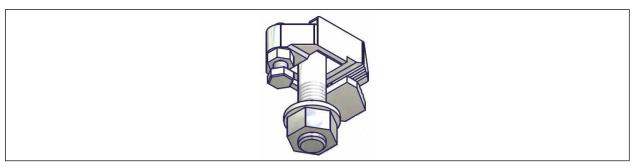


Fig. 16 Support clamp set X

#### Ceiling suspension Z

The ceiling suspension Z is suitable for horizontal installation of INDUSTRY air heaters/air coolers directly below the ceiling. The ceiling suspension Z is premounted on the unit. The distance from the ceiling is 40 mm. The set consists of two suspensions and the fastening screws.

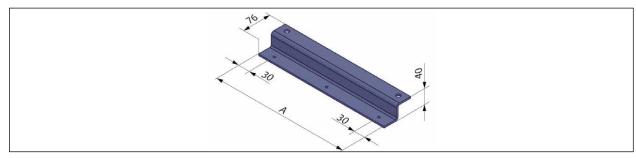


Fig. 17 Ceiling suspension Z

Туре	A [mm]	Weight* [kg]
Z-140-400	360	1.2
Z-650-1000	390	1.3

<sup>\*</sup> Weight of one suspension

#### Ceiling suspension ZZ

The ceiling suspension ZZ is suitable for horizontal installation of INDUSTRY air heaters with an MLK mixed air box directly below the ceiling. The ceiling suspension ZZ is premounted on the air heater and on the MLK. The distance from the mixed air box to the ceiling is 25 mm. The set consists of six angle brackets and the fastening screws.

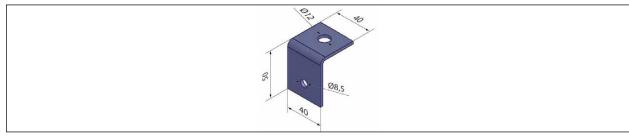


Fig. 18 Ceiling suspension

Туре	Weight* [kg]
ZZ-140-1000	0.076

<sup>\*</sup> Weight of one suspension

#### Broad air outlet B

When a broader, lateral spread of the air stream is desired, the units can be equipped with a broad air outlet louvre B. The diffusion grid with the vertical guide fins is mounted immediately before the horizontal outlet louvres. The outside dimensions of the units do not change. The spread of the air stream can be optimally adjusted to the installation conditions.

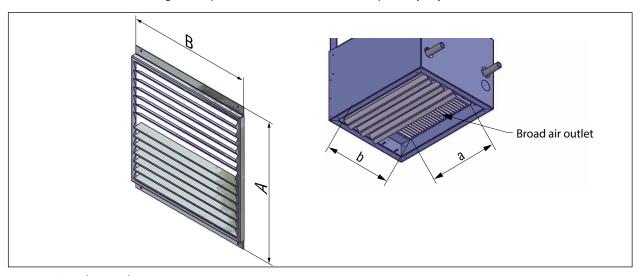


Fig. 19 Broad air outlet

Туре	a [mm]	b [mm]	A [mm]	B [mm]	Weight [kg]
B-140	360	358	405	358	3.9
B-250	440	438	485	438	5.8
B-400	600	558	645	558	9.6
B-650	680	670	725	670	12.9
B-1000	840	820	885	820	19.1

#### Outlet nozzle with louvres AD

The outlet nozzle AD is used in high halls to increase the throwing distance. The reduced outlet area increases the air flowspeed and therefore the vertical penetration depth of the air stream. Secondary air is pulled along. The outlet nozzle AD can also be used with wall-mounted systems. The integrated air direction louvres can be adjusted to draw a larger amount of secondary air.

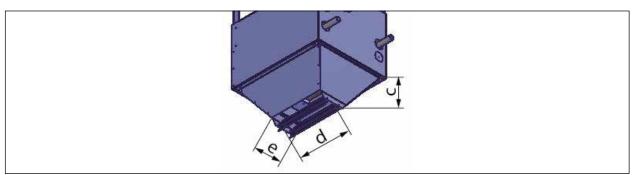


Fig. 20 Outlet nozzle with louvres

Туре	c [mm]	d [mm]	e [mm]	Weight [kg]
AD-140	185	310	165	3.7
AD-250	230	385	200	5.2
AD-400	270	500	270	8.4
AD-650	300	580	320	10.2
AD-1000	350	740	380	15.6



#### Outlet nozzle D1 (gate air curtain)

Air heaters with a D1 or D2 outlet nozzle are suitable as air curtain devices at gates. When mounting the units, care must be taken that the air stream is directed against the gate towards the outside. The D1 outlet nozzles have the same cross-section reduction as the AD outlet nozzles. The outlet temperature of air heaters, when used as an air curtain at gates, should be selected at approx.  $10-15^{\circ}$ C above the room temperature. If the gates are broad, the D2 nozzle shape is used. This nozzle is wider than D1 nozzles.

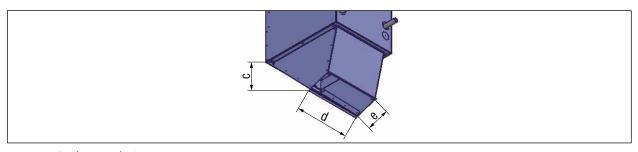


Fig. 21 Outlet nozzle D1

Туре	c [mm]	d [mm]	e [mm]	Weight [kg]
D1-140	330	370	144	5.5
D1-250	385	445	180	7.5
D1-400	485	560	240	11.4
D1-650	590	670	275	15.8
D1-1000	690	820	340	22.1

#### Outlet nozzle D2 (gate air curtain)

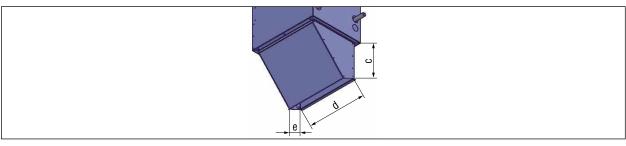


Fig. 22 Outlet nozzle D2

Туре	c [mm]	d [mm]	e [mm]	Weight [kg]
D2-140	335	500	105	6.0
D2-250	395	580	135	8.0
D2-400	485	735	185	12.2
D2-650	590	815	227	16.5
D2-1000	690	975	285	22.9

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#### Four-sided outlet V

Air heaters in low rooms can be equipped with a four-side air outlet that can be adjusted on all sides. The flat air outlet stream can be set to blow out on four, three or two sides. This prevents unpleasant draft effects immediately below the unit.

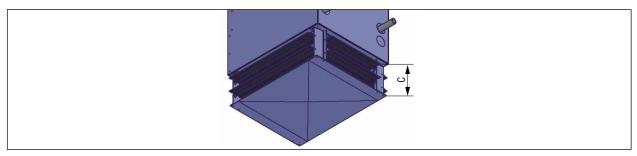


Fig. 23 Four-sided outlet V

Туре	С	Throwing di	Weight	
	[mm]	At n <sub>o</sub>	At n <sub>u</sub>	[kg]
V-140	170	9	6	7.1
V-250	170	11	8	8.9
V-400	170	13	10	12.4
V-650	240	15	12	18.0
V-1000	240	16	13	23.7

The throwing distance is measured at a room air temperature of  $t=20^{\circ}$ C.  $n_u=$  lowest speed,  $n_o=$  highest speed

#### Injection louvre IJ – wall-mounting

The fins in wall-mounted systems are directed downwards during heating-up mode. During normal operation, the air stream is ducted straight into the room. All fins move in parallel.

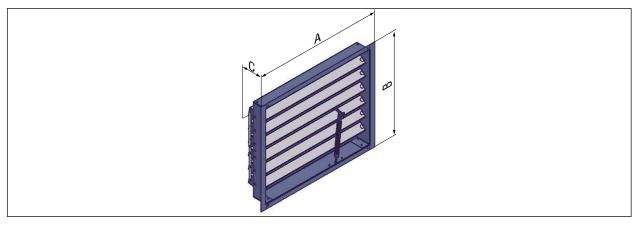


Fig. 24 Wall-mounted injection louvre

Туре	A [mm]	B [mm]	C [mm] WH/WA	Weight [kg]
IJ-140-W	555	434	71/105	4.9
IJ-250-W	635	509	71/105	5.8
IJ-400-W	795	624	71/105	8.2
IJ-650-W	875	734	71/105	9.6
IJ-1000-W	1035	884	71/105	13.1

#### Versions

For wall-mounted air heaters + automatic adjustment IJ-...-WA

For wall-mounted air heaters + manual adjustment IJ-...-WH



#### Injection louvre IJ - ceiling-mounting

The finsince iling-mounted systems are directed vertically downwards during heating-up mode. During normal operation, the air stream can be distributed towards the right and left sides of the room.

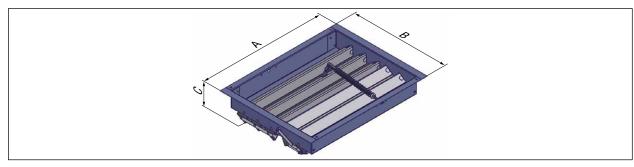


Fig. 25 Injection louvre for ceiling-mounting

Туре	A [mm]	B [mm]	C [mm] DH/DA	Weight [kg]
IJ-140-D	555	434	71/105	4.9
IJ-250-D	635	509	71/105	5.8
IJ-400-D	795	624	71/105	8.2
IJ-650-D	875	734	71/105	9.6
IJ-1000-D	1035	884	71/105	13.1

#### Versions

For ceiling-mounted air heater + automatic adjustment IJ-...-DA For ceiling-mounted air heater + manual adjustment IJ-...-DH

#### Droplet eliminator TA

The drop let eliminator is used in connection with the INDUSTRY air cooler. Specially shaped fins catch the humidity and drain it downwards. The outlet louvres normally attached to the air cooler and the broad air outlet are attached to the droplet eliminator!

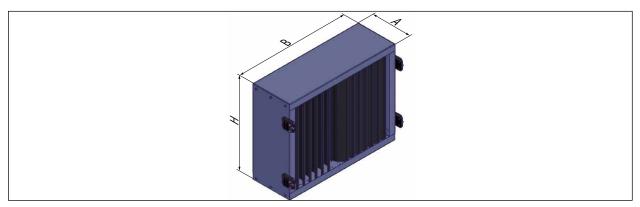


Fig. 26 Droplet eliminator

Туре	B [mm]	H [mm]	A [mm]	Weight [kg]
TA-140	560	440	195	9.8
TA-250	640	515	195	12.0
TA-400	800	630	195	15.2
TA-650	880	740	195	17.5
TA-1000	1040	890	195	22.2

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# 4 Delivery, transport, storage

#### 4.1 Delivery

- AL-KO THERM air heaters/air coolers 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 (- $20^{\circ}$ C to  $+40^{\circ}$ C).

#### 4.2 Transport

# **MARNING**



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.
- Only use suitable lifting equipment.

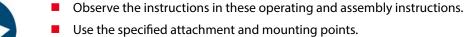
# **A** CAUTION



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.



- Ose the specified attachment and mounting
- Observe the weight specifications.
- Only work 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 unit must only be transported by trained and qualified personnel and in observance of the safety aspects.
- When using transport devices requiring a driving licence, ensure that the personnel has a valid driving licence.



- Duringtransport, observe the instructions in these operating and assembly instructions and the relevant regulations on occupational safety and environmental protection.
- Only transport the unit upright and secure the unit against tipping and slipping.
- Avoid distorting the housing or other damage.
- Damage that results from improper packaging and transport are at the expense of the initiator.
- As described in chapter "4.2.2 Forklift/industrial truck" on page 27, 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).

## 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 Forklift/industrial truck

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

#### **ATTENTION**



Always place the lifting forks of the forklift on the square timbers. Pay attention to any protruding objects (e.g. media 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

#### **A** 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.
- Only use suitable lifting equipment.
- Only use suitable industrial trucks and lifting equipment (crane).
- Only use 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.
- The lifting gear must be inspected for load-bearing capacity and damage before use.

#### 4.3 Storage prior to assembly

- Store the units in their original packaging in a dry and weatherproof location.
- Cover open pallets with tarpaulins, and protect the units from dirt (e.g. chips, stones, wire, etc.).
- Constantand, above all, abrupt temperature changes must be prevented during storage. In this case, there is a danger that moisture may condense. As a result, mould can form.

- 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 distorting the housing or other damage during storage.
- The costs of damage resulting from improper packaging and storage must be borne by the initiator.

## 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 Assembly

# 5.1 Safety instructions for assembly

# **M** WARNING



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

- Have installation, commissioning, servicing and maintenance work carried out by qualified staff only!
- 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 (cut-proof gloves).

#### WARNING



Risk of injury when mounting units on walls or ceilings.

When mounting the units, the tool/housing material may fall off in the event of carelessness. Due to the working height, there is a danger of falling.



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

## **A** CAUTION



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

Have installation, commissioning, servicing and maintenance work carried out by qualified staff only!



- Use assembly aids when installing the modules and components.
- Work with care.
- Wear personal protective equipment (cut-proof gloves).

# **ATTENTION**



Before installation and commissioning, it is essential to read and observe the operating and assembly instructions.

- 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.
- Assemblyordisassemblyworkmayonlybecarriedoutbypersonswithappropriatetraining,knowledgeandexperience.
- The units must be levelled during installation.

# 5.2 Wall-mounting of the units

- Attach the bracket set to the unit if it was not pre-installed at the factory.
- Drill fastening holes into the wall.
- Attach the unit to the wall.

## Examples of wall-mounting:

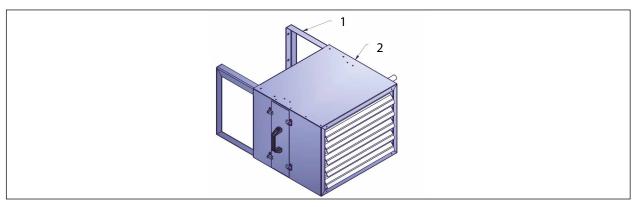


Fig. 27 Wall-mounting of the air heater (LH)

1 Bracket K for wall/ceiling-mounting	2	Air heater LH IND type NF
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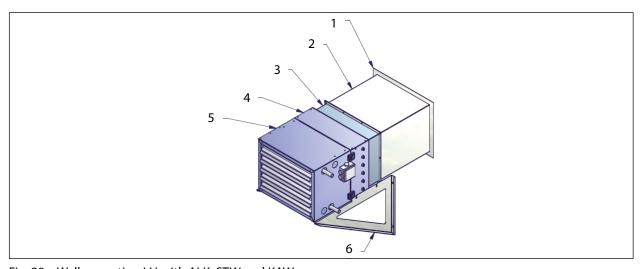


Fig. 28 Wall-mounting LH with ALK, STW and KAW

	1	Weather protection grid	4	Outside air box ALK
	2	Duct connection piece KAW5	5	LH IND type N
Ī	3	Canvas nozzle SGW	6	Bracket KFM

■ The unit can alternatively also be mounted on steel girders by using the crossbeams Q and the support clamp set X that are available as accessories.



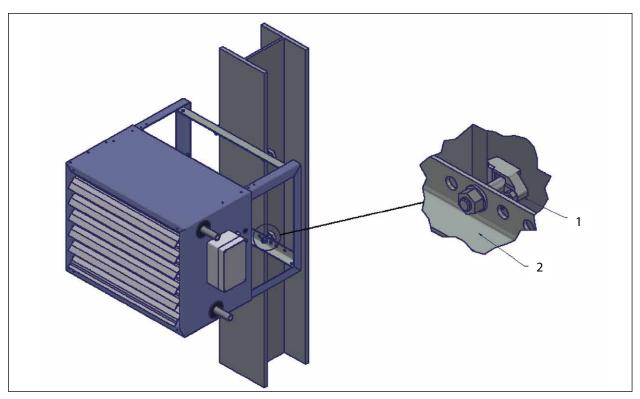


Fig. 29 Attachment to steel girder

1	Support clamp X	2	Crossbeam Q

Attach the supply connections according to chapter "5.4 Heat exchanger connection" on page 33 and chapter "5.5 Electrical connection" on page 34.

# 5.3 Ceiling-mounting of the units

- Attach the bracket set to the unit if it was not pre-installed at the factory.
- Drill fastening holes into the ceiling.
- Attach the unit to the ceiling.

Examples of ceiling-mounting:

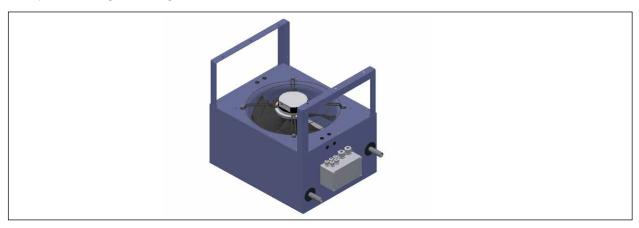


Fig. 30 Ceiling-mounting LH

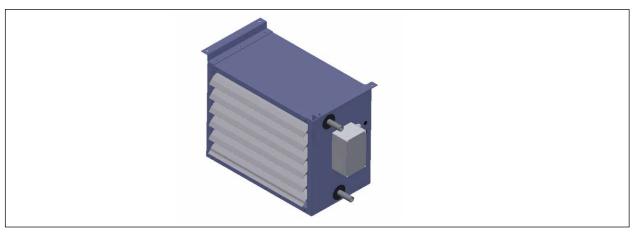


Fig. 31 Ceiling-mounting LH with ceiling suspension Z



#### 5.4 Heat exchanger connection

#### **NOTICE**



Do not mix up the feed and return lines when connecting the pipes. The medium inlet is located on the air outlet side (Fig. 32 Countercurrent principle). This does not apply to the steam heat exchanger!

For the connection of the steam heat exchanger, see the technical data.

#### **ATTENTION**



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

In stall 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 withcompressedair, or filled with a commercially available antifreeze with corrosion inhibiting additive due to the risk of freezing and corrosion!

#### Copper/aluminium (Cu/Al) heat exchanger:

Maximum working pressure: 16 bar

Maximum flow temperature:Unit size 140 and 250 max. 80°C
 Unit size 400 to 1000 max. 120°C

#### Galvanized steel (FeZn/FeZn) heat exchanger:

Maximum working pressure: 10 bar

Maximum flow temperature: Unit size 140 and 250 max. 80°C
 Unit size 400 to 1000 max. 120°C

#### Steam heat exchanger (FeZn/Fe):

Maximum working pressure: 4.5 bar

Maximum flow temperature:Unit size 140 and 250 not available
 Unit size 400 to 1000 max. 150°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!
- Thermal condensate drains are not suitable as condensate drains with steam heat exchangers. Please only use float condensate drains.
- Valves and actuators must be installed professionally.
- 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.

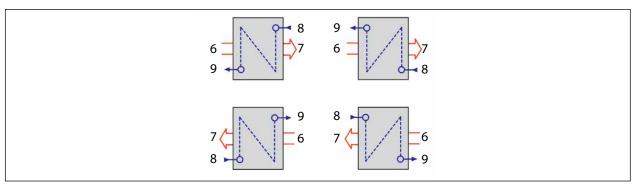


Fig. 32 Countercurrent principle

6	Air inlet	8	Media inlet
7	Air outlet	9	Media outlet

#### 5.5 Electrical connection

# **A** DANGER



Hazard due to electric current.

Incorrect connection to the energy supply or incorrect installation of electrical components can result in electric shock.

- Have the electrical connection carried out only by an approved electrician.
- Performtheconnectionexactlyaccordingtothecircuitdiagramandtheassignmentplan.
- 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 additional 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.
- The electrical connection of the AL-KOTHERM air heaters/air coolers must be performed according to the wiring diagrams. When connecting, only use the circuit diagram specific to the unit.
- The units must be grounded.
- 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.
- All electric motors of the fans have a thermal contact as standard equipment. It must be integrated into the controller.



#### 5.5.1 Condensate pump

# **A** DANGER



Hazard due to electric current.

Incorrect connection to the energy supply or incorrect installation of electrical components can result in electric shock.

- 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 additional 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.

#### **ATTENTION**



The condensate pump is not suitable for outdoor operation. It must not be dipped into water or exposed to frosty conditions.

The condensate pump is only permitted to be used for pumping liquids against which the pump material is resistant.

- Do not use the condensate pump to remove flammable and explosive liquids.
- Do not operate the condensate pump in an explosive atmosphere.
- Ensure that the pump is not more than 7 m (max. suction head) above the drip pan exit and not more then 20 m (max. pumping head) below the highest point of the condensate drain.
- Connectaflexiblecondensatedrainpipe (insideØ6mm) to the pump outlet nozzleand insertit into an appropriate drain. Ensure that the flexible condensated rain agelinedoes not have sharp kinks, is not twisted and does not touch any moving or sharp-edged objects.
- AL-KOTHERM recommends testing the function of the pump in relation to the pumping head before the installation is commissioned. Fill water into the collecting container of the unit and check the function of the condensate pump. Ensure that the condensate pumps witches on after the starting point has been reached and switches of fonce pumping has been completed.

#### Condensate pump control:

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

The mains cable that supplies the condensate pump must be protected with a 1-A microfuse.

#### Floating alarm contact:

Black: Common line

Yellow: Contact closed during operation – opens during alarm Red: Contact open during operation – closed during alarm

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

## **ATTENTION**

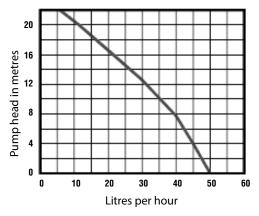


The air cooler must switch off and the media supply must be stopped once the alarm contact has been reached or in the event of a malfunction.

#### Performance data:

Max. flow rate 50 l/h
Max. suction head: 7 m
Max. pump head: 20 m
Connection Ø: 6 mm

Dimensions: 273 x 52 x 62 (L x W x H)



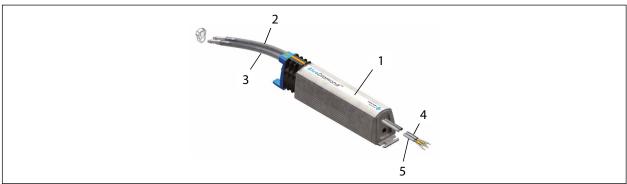


Fig. 33 Condensate pump

1	Condensate pump	4	Floating alarm contact	
2	Suction line	5	3-core connection cable	
3	Pressure line			

#### 5.5.2 Fan

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

#### Technical data of 230-V fan:

Туре	140	250	400	650	1000
Operating voltage [V]	1~200-240 V/ 50-60 Hz				
Nominal output [kW]	0.12	0.19	0.36	0.41	0.61
Nominalcurrent[A]	1.26	1.64	1.79	2.65	3.01
Operating speed [rpm]	1660	1315	940	900	890
Insulation class	THCL 155 (F)				
Protection class	IP 54				
Motor protection	Electronicoverload protection with alarm output				



### 5.5.3 Fan wiring diagram

Depending on the type of control, please use the appropriate wiring diagram in the documentation "Controls for air heaters/air coolers".

### 5.5.4 Cable list





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
Basic control type version Lines to field devices	Supply line 1.5 mm <sup>2</sup> to 2.5 mm <sup>2</sup> 0.5 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
Premium control type version Lines to pump, valve and BMS	Supply line 1.5 mm <sup>2</sup> to 16 mm <sup>2</sup> 0.5 mm <sup>2</sup> to 2.5 mm <sup>2</sup>
Field devices	0.5 mm <sup>2</sup> to 1.5 mm <sup>2</sup>
Condensate pump	0.5 mm <sup>2</sup> to 1.5 mm <sup>2</sup>

# 6 Control system

The connection and operation of the Premium control variant is described in the operating manual "Controls for air heaters/air coolers".

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



## 7 Servicing and maintenance

The owner 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 servicing and maintenance

### **MARNING**



Risk of injuries.

- Beforestartinganyrepairormaintenancework, disconnect the unit from the main spower supply on all poles and lock it out to prevent it from being restarted.
- Observe the applicable safety regulations.



Have installation, commissioning, servicing and maintenance work carried out by qualified staff only!

To be carried out by the person responsible:

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

### **A** WARNING



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

- Opentheinspectioncovers only when the fans have been switched off and have come to a standstill.
- Observetherun-ontimes 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.

### **A** 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

# 0

### **ATTENTION**

 $Only use {\it original} \, consumables \, and \, spare \, parts. This is the {\it only way} \, to \, ensure \, safe \, operation.$ 

Otherwise the warranty will be voided!

A spare parts list can be found as part of the unit documentation.

**Customer Service** 

Phone: +49 8225 39 - 2574

E-mail: service.center@alko-air.com Web: www.alko-airtech.com

# 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	Clean and repair				X	
	on the air side					^	
	Check for water formation (condensate, leaks)	Clean and identify the cause			х		
	Check function of drains	Clean, if necessary				Х	
	Flexible connections	Check leaktightness				Х	
3.	Air filter						
	Check for impermissible contamination and damage (leakages) and odours (the air filter must have the separation efficiency corresponding to the filter class for its entire period of use)	If there is noticeable contamination or leakage, the affected filter must be replaced. Replace the entire filter if the last replacement was more than 6 months ago		х			
	Latest filter change					Х	
	Check the state of hygiene					Х	
4.	Heat exchanger						
	If cleaning in the installed state is not suffi out or de-installed and cleaned in an app						
	Check for soiling, damage and corrosion	Clean and repair		Х			
	Checkthe wet cooler, condensate pan and droplet eliminator for soiling, corrosion and correct functioning	Repair		Х			
	Check function of siphon	Repair		Х			
	Check the state of hygiene	nepuii .				Х	
	Heater						
	Inspect on the air side for soiling, damage and corrosion	Clean and repair				х	
	Clean to preserve function (air-side)					Х	
	Check that the supply and return flows are functioning					Х	
	Bleed					Х	
	Cooler	The siphon (on-site) must be appropriately dimensioned and arranged to allow the condensed water to drain without delay.					
	Check for soiling, damage and corrosion	Clean and repair		Х			
	Clean the wet cooler, droplet eliminator and pans				Х		
	Check that the supply and return flows are functioning					Х	
	Bleed					Х	
	Check the state of hygiene					Х	
5.	Dampers						
	Check for soiling, damage and corrosion	Clean, if necessary				Х	
	Check the mechanical function	·				Х	
	Damper motors	Check the function				Х	
<u>5.</u>	Fans						
	Check the fan for soiling, damage and corrosion	Clean and repair			Х		
	Check the impeller for soiling, unbalance and running noises	Switch on the motor briefly				Х	
7.	Control system						
	Visually inspect the clamping and plug-in connections	Clean as required and check for firm attachment				Х	



### 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 unitarea for deficiencies such as soiling, rust formation, calcium 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.
- Inspect the siphon and top up, if necessary.
- Inspect water drains for correct function.

### 7.4.1.2 Cleaning

Only methods that do not damage the fins may be used for cleaning of the heat exchanger registers.

Cleaning methods	Can be used for all types of finned heat exchanger		
Compressed air	All heat exchanger registers		
Steam cleaners	Steel galvanised heat exchanger registers only		
High-pressure water cleaner only with THD multi-jet method	All heat exchanger registers		

### **ATTENTION**



When using compressed air and steam cleaners, ensure a sufficient distance and that the jet is aligned parallel to the fins!

### **NOTICE**



Complete removal of the deposits in heat exchangers is not possible using compressed air. Thorough cleaning cannot be guaranteed, particularly in deep registers, by using only compressed air and steam cleaners.

As a result, the dirt deposits are compacted in the depths of the heat exchangers instead of being removed. The consequences are increased pressure losses, a lack of hygiene, odours, material attack, etc.

- The use of high-pressure watercleaners using conventional spray nozzles is not permitted as these can damage the
  delicate fins and thorough cleaning, particularly in the deeper heat exchange registers, cannot always be achieved.
- Heat exchanger registers should therefore only by cleaned with high-pressure water cleaners using the THD multi-jet method. This ensures damage-free deep cleaning of the heat exchanger registers. This applies to all heat exchanger register types.
- The cleanability of the AL-KOTHERM heat exchanger registers using the THD multi-jet method was demonstrated by the Institute for Air Hygiene Berlin during the hygiene conformity evaluation for the AL-KOTHERM air handling units (see Fig. 34 THD multi-jet method).
- The use of the THD multi-jet method includes the correction of any bent fins to restore the optimum flow and performance of the heat exchangers ("fluidic renovation").



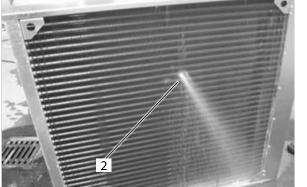


Fig. 34 THD multi-jet method

1	THD multi-jet method/front	2	THD multi-jet method/back
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For further information on the THD multi-jet method:

THD

Technischer Hygiene Dienst GmbH

Am Kleingewerbegebiet 3 15745 Wildau, Germany

Phone: +49 / (0)30 / 66 76 57 75-0 Fax: +49 / (0)30 / 66 76 57 75-5

E-mail: info@thd-berlin.de Web: www.thd-berlin.de

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 Condensate pump

### 7.4.2.1 Maintenance

- Inspect the condensate pump for soiling, damage and appropriate function.
- Check the condensate hose for soiling and damage.
- Check the filling level sensor (DrainStick) for soiling, damage and appropriate function.
- Check the condensate pan for soiling and damage.

### 7.4.2.2 Cleaning

Regularly clean the condensate pump, condensate hose, filling level sensor (DrainStick) and condensate pan.



### 7.4.3 Dampers

### 7.4.3.1 Maintenance

- Check the multi-leaf dampers for soiling, damage and corrosion.
- Check the mechanical function of the multi-leaf dampers.
- Check the end position of the damper motors and adjust, if necessary.

### 7.4.3.2 Cleaning

Clean the multi-leaf dampers at regular intervals.

### 7.4.4 Fans

### 7.4.4.1 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.

### 7.4.4.2 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.

### **ATTENTION**



Humid atmosphere:

Itisrecommended to run the fans for at least two hours permonth during prolonged stands till periods in humid at mospheres to ensure that accumulated moisture is evaporated.

### 7.4.5 Checking the filter

The filter must be checked for soiling and damage at regular intervals.

### 7.5 Replacing components

### 7.5.1 Replacing filter bags

### **A** WARNING



Risk to health when changing the filters due to dust load and microbial contamination.

- Switch off the unit on all poles and secure it against restart.
- Adhere to the maintenance plan.
- Wear your personal protective equipment (dust mask) when changing the filter.
- Use additional protective equipment according to the work to be carried out.

### NOTICE



Do not wash and reuse used air filters; always replace them. Otherwise, the hygienic requirements will not be met!

- Open the clamps and remove the maintenance panel.
- Take the filter element out of the unit.
- Install a new filter element.
- Replace the maintenance panel and close the clamps.

### **ATTENTION**



Only use original 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 as part of the unit documentation.

The filter bags must be disposed of in accordance with the currently valid and applicable local regulations!

After Sales

Phone: +49 8225 39 - 2600

E-mail: airtech.after-sales@alko-air.com

Web: www.alko-airtech.com

### 7.5.2 Replacing the heat exchanger

- De-energize the unit.
- Disconnect the electrical connections.
- Remove the media connections of the heat exchanger.
- Remove the unit.
- Disconnect the fan cables in the fan terminal box.
- Carefully pull out the fan cables.
- Unscrew the rear wall with the fan.
- Release the fastening screws of the heat exchanger.
- Pull out the heat exchanger towards the back or, after removing the lateral cover sheet, towards the side.
- Install the heat exchanger in the reverse order!



### 7.5.3 Exchanging the condensate pump

- De-energize the unit.
- Disconnect the electrical connections.
- Release the condensate hoses and unplug the connector for the sensor.
- Release the fastening screws of the condensate pump.
- Install the condensate pump in the reverse order!

### 7.5.4 Exchanging the outlet louvre

- Push the outlet louvre to the side.
- Unhook the bolt and remove the outlet louvre.
- Install the outlet louvre in reverse order!

### 7.5.5 Exchanging the fan

- De-energize the unit.
- Disconnect the fan cables in the fan terminal box.
- Carefully pull out the fan cables.
- Release the fastening screws of the fan.
- Install the fan in the reverse order!

# 8 Help in the event of malfunctions

### **MARNING**



Risk of injury due to incorrectly implemented measures.

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

- Only allow work on electrical equipment inside the switch cabinet (e.g. inspection and testing, replacement of fuses) to be carried out by qualified staff!
- Onlyallowdiagnosis, troubleshooting and recommissioning to be carried out by authorised persons.
- Use personal protective equipment at all times when working on the installation.
- Use additional protective equipment according to the work to be carried out.

### 8.1 Contacts

AL-KO THERM GMBH	Phone:	(+49) 82 25 / 39 - 0	
Hauptstraße 248-250	Fax:	(+49) 82 25 / 39 - 2113	
89343 Jettingen-Scheppach	E-mail:	klima.technik@alko-air.com	
Germany	Web:	www.alko-airtech.com	
Customer Service	Phone:	(+49) 82 25 / 39 - 2574	
	E-mail:	service.center@alko-air.com	

### 8.2 General malfunctions

Malfunction	Possible cause of fault/action
Only cold air is blown out	There is air in the circuit
	■ Bleed the heating system
Condensate collects although the system is switched off	Cold water is still being supplied
	Stop the cold water supply as soon as the unit is switched off



### 9 Shut-down

### 9.1 Decommissioning

De-energize the installation before beginning work (all-poles hutdown) and lock it out to prevent unauthorise dreactivation.

### **A** WARNING



Risk of injury due to pressurised parts.

- When decommissioning, note that certain parts of the installation are still pressurised.
- Observe the safety regulations!

### **ATTENTION**



In winter, there is a general freezing hazard for all components. If necessary, take suitable measures such as fully 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 unit is to be 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 Servicing and maintenance" on page 39 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.

### **MARNING**



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

- Only use suitable and tested ladders, steps, scaffolding and work platforms.
- Work with care.

### **A** WARNING



Risk of poisoning when draining the media.

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

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

### **A** WARNING



Risk of injury when dismantling electrical and thermal components.

- Have disassembly 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.

### **A** WARNING



Danger to health when removing the filter inserts.

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



### 9.3 Disposal

### **A** 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.
- Avoidskin and eye contact with the media, do not swallow media and observe the safety data sheets.
- Wear personal protective equipment.
- Whendisposingofthemedia, 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 expired machines in conventional waste!

When disposing of the unit, process media and accessories, comply with the relevant local environmental and recycling regulations in your country and municipality 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

LH IND ...N EC, H EC, D EC, E EC, NF EC, HF EC, DF EC, EF EC, INDUSTRIF BASIC / PREMIUM

LK IND ...N EC, NF EC LH IND ...N EC, H EC, D EC, E EC, NF EC, HF EC, DF EC, EF EC, INDUSTRIE BASIC / PREMIUM LK IND ...N EC, NF EC
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

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. Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung

2011-03 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, Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen

2019-06 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 Sicherheit von Maschinen - Mindestabstände zur Vermeidung des Quetschens von Körperteilen

2020-01 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, Sicherheit von Maschinen - Sicherheitsabstände gegen das Erreichen von Gefährdungsbereichen mit den oberen und unteren Gliedmaßen

2020-04

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, Störfestigkeit für Wohnbereich, Geschäfts- und Gewerbebereiche sowie Kleinbetriebe

2019-11 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, Störfestiakeit für Industriebereiche Immunity standard for industrial environments 2019-11

Résistance au brouillage pour les zones industrielles Störaussendung von Geräten in Wohnbereichen Emission standard for equipment in residential environments

2022-06 Norme sur l'émission relative aux appareils utilisés dans les environnements résidentiels

- DIN EN IEC 61000-6-4, Störaussendung für Industriebereiche Emission standard for industrial environments Émission d'interférences pour les zones industrielles 2020-09

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

techniques, utilisées supplémentaires

- DIN EN IEC 61000-6-3,

- VDMA 24167, Ventilatoren - Sicherheitsanforderungen / Fans - Safety requirements / Ventilateurs - Exigences de sécurité

1994-10

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 Entwickluna Head of Development Department

Chef du département de développe

Stephan Hafrier

Geschäftsführer/Managing Director/Directeur géné



# Notes

Notes



# Notes



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We reserve the right to make technical changes that do not impair the function.

3912012/December 2024