Article group
1.53

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TOP unit heaters

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Innovative, professional, international

In over 35 years, Kampmann GmbH has grown from being a family-led company to become an internationally renowned group of companies. Kampmann systems for heating, cooling and ventilation are today market leaders in a number of different market sectors. Innovation and the highest standards of quality guarantee this success into the future.

We have an "ear on the market" and the knowledge and expertise gained from 35 years of experience in development, production and sales. This, combined with a professionally-manned research and development department, is the basis for our continuous product development. This is what allows us to provide our customers with the best technical product at any time.

Traditionally, Kampmann's skills and expertise have been in the production of standard products with an extraordinary range of adapted products, as well as in the production of technically and visually high-quality tailor-made design solutions. Our specialist staff deal with the building in its entirety and develop unique and efficient system solutions. Our entire range is reflected in mix of standard, non-standard and tailor-made products for project-orientated solutions.

We set ourselves very high standards in production. Today an exceptionally well-trained specialist workforce manufactures high-quality Kampmann products in three plants for customers throughout the world. A number of different certificates are evidence of our high standards of quality, which have become the standard at Kampmann. Our products are characterised by the high guaranteed DIN EN-tested heat outputs. In terms of quality management the requirements of TÜV certification according to DIN EN ISO 9001 have been met since 1996.

For decades, Kampmann customers have valued our excellent service. Local external engineers and technicians, in-house measuring engineers and the Kampmann customer service team are available to customers. Kampmann good air quality is now to be found across the globe. Our sales engineers now cover the whole of Germany and Europe.

This TOP unit heater brochure provides you with an insight into our wide product range. Take a look and make up your own mind – do not hesitate to arrange a personal visit with us. It is our aim to meet your high quality expectations, right down to the last detail..

Well-being is our product - Quality is our benchmark!

Hendrik Kampmann
Managing Director

Peter Kaß
Managing Director

Unit heaters
Manufactured in the Kampmann plant in Lingen

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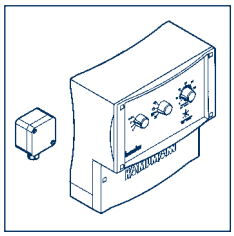
Product description / Accessories



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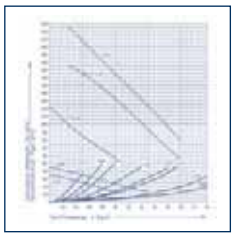
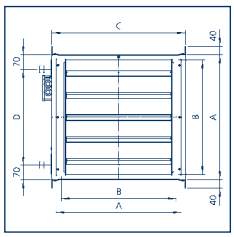


Design information



Technical data

Specifications/Ordering

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Product description
Accessories

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A design-orientated range of wall- and ceiling-mounted units

TOP Unit heaters – "TOP" in price and performance

These units perfectly meet the demand for efficient, cost-effective and controllable air handling. TOP unit heaters can be ideally fitted in any location - on the wall or suspended from the ceiling.
With a wide range of modular accessories, it is possible to design a system to meet technical demands and spatial requirements in every respect.
The attractive self-supporting housing is sendzimir galvanised and can be powercoated on request.

Ideal for the decentralised heating and ventilation of

- Production plants,
- Warehouses,
- Retail and industrial premises,
- Sports halls,
- Salesrooms,
- Greenhouses,
- Buildings with a district heating supply or with high temperature spreads (barracks etc.),
- Areas at risk of explosion,
- Buildings with steam heating plants.

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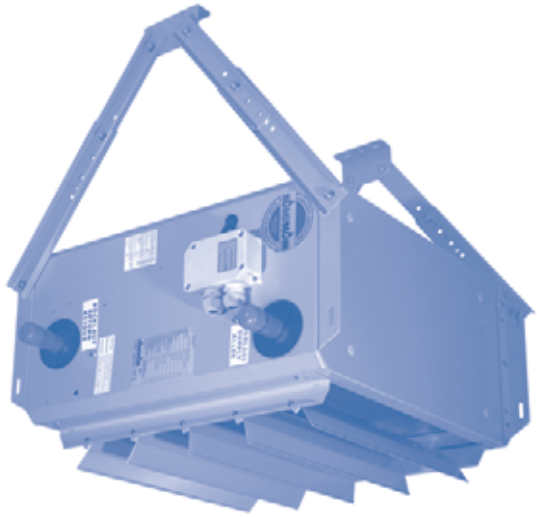
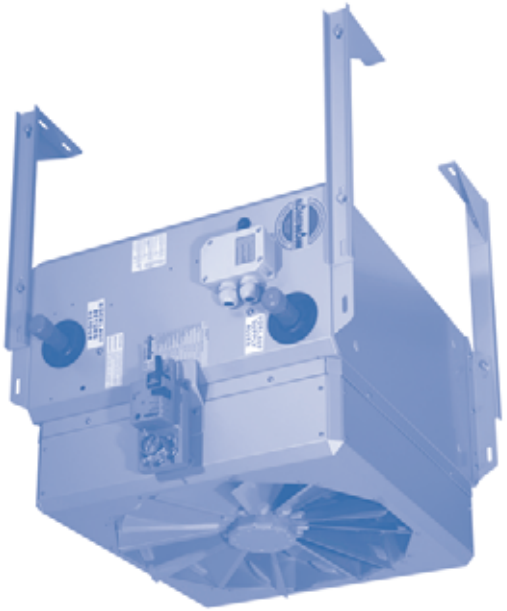
Wall-mounted on wall brackets, suspended
Air outlet: single row louvre (supplied as standard)



Ceiling-mounted on universal 2-point brackets
Air outlet: single row louvre (supplied as standard)

Ceiling-mounted on universal 2-point T-brackets
Air outlet: 4-way diffuser



Ceiling-mounted on universal 4-point brackets
Air outlet: KaMAX and servomotor

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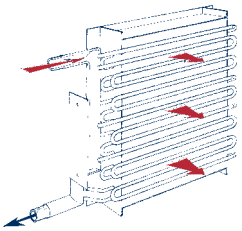
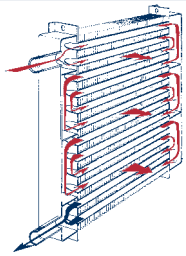
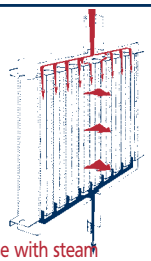
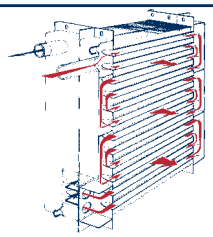
TOP Unit heaters

Heat exchanger	Dimensions • Model		Type key Example 44 20 31 FR
 Copper/aluminium	Housing dimensions W x H x D	540 x 500 x 320 mm	44
		640 x 600 x 320 mm	45
		740 x 700 x 320 mm	46
		840 x 800 x 360 mm	47
	Heat exchanger (capacity figure)	Model	
		low	20
		medium	30
		high	40
 Galvanised steel	Housing dimensions W x H x D	540 x 500 x 320 mm	44
		640 x 600 x 320 mm	45
		740 x 700 x 320 mm	46
		840 x 800 x 360 mm	47
	Heat exchanger (capacity figure)	Model	
		low	21
		medium	31
		high	41
 Galvanised steel, for use with steam	Housing dimensions W x H x D	540 x 500 x 320 mm	44
		640 x 600 x 320 mm	45
		740 x 700 x 320 mm	46
		840 x 800 x 360 mm	47
	Heat exchanger (capacity figure)	Model	
		medium	22
		high	32
 Galvanised steel, crossflow	Housing dimensions W x H x D	540 x 500 x 320 mm	44
		640 x 600 x 320 mm	45
		740 x 700 x 320 mm	46
		840 x 800 x 360 mm	47
	Heat exchanger (capacity figure)	Model	
		medium	33
		high	43
Supply air or extract air units (without heat exchanger)	For description/dimensions, refer to page 76		00

Fan (motor figure)	1-stage, 1-phase sickle-blade whisper-quiet fan 230 V/50 Hz	31
	3-stage, 3-phase sickle-blade whisper-quiet fan 400 V/50 Hz	35
	2-stage, 3-phase sickle-blade whisper-quiet fan 400 V/50 Hz	36
	2-stage, 3-phase wide-blade fan 400 V/50 Hz, explosion-proof	37
Accessories, factory-fitted (not required with KaBUS electronic controller)	Frost protection thermostat	F *
	Repair switch, (only for 2-stage motor 36 or 3-stage motor 35)	R *
	Frost protection thermostat and repair switch (2-stage or 3-stage)	FR *
KaBUS electronic controller (only for use with motor 36)	Recirculating air 2 A, 3-phase	KA *
	Recirculating air 2 A, 3-phase with KaMAX control module	KE *
	Mixed air 2 A, 3-phase	KJ *
	Mxed air 2 A, 3-phase with KaMAX control module	KM *
	Extract air 2 A, 3-phase, only for use with extract air units	KQ *

*Optional suffix to unit heater type no. for factory-fitted accessories

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Heat exchanger

There are four models of heat exchanger available - all of which, with the exception of the steel heat exchanger for use with steam, have same end connections.

Copper/aluminium heat exchanger

This model of heat exchanger is noted for its lightweight design and high levels of heat output. Aluminium fins, expansion-joined to copper pipes, guarantee long-term heat transfer;

- Steel headers and manifolds
- Suitable for use with LPWW/LPHW up to 120 °C and 16 bar continuous operating pressure
- Lightweight yet provides a high heat output

Copper/aluminium heat exchangers are not suitable for use with steam or thermal oil.

Copper/aluminium heat exchangers cannot be used in areas where there is a high concentration of dust or oil in the air and where throughout cleaning is constantly required.

Galvanised steel heat exchanger

The robust and hard-wearing design of this steel heat exchanger means that dirty heating elements can be cleaned with high-pressure cleaning equipment or pressurised air without this damaging the heat exchanger.

- Optimum protection against corrosion
- Elliptical galvanised pipe with galvanised steel fins
- Suitable for use with LPWW/LPHW up to 120 °C and 16 bar continuous operating pressure
- High-pressure model for use with temperatures in excess of 120 °C is available on request

Fin spacing/Galvanised steel heat exchangers

Type				Heat exchanger model	Fin spacing [mm]
4421**	4521**	4621**	4721**	single row	2.4
4431**	4531**	4631**	4731**	double row	4.4
4441**	4541**	4641**	4741**	double row	2.4

Galvanised steel heat exchanger for use with steam

The specification of this design of heat exchanger is similar to the previous model, with the exception that it is designed specifically for use with steam.

- Optimum protection against corrosion
- Elliptical galvanised pipe with galvanised steel fins
- The robust and hard-wearing design of this steel heat exchanger means that dirty heating elements can be cleaned with high-pressure cleaning equipment or pressurised air without this damaging the heat exchanger.
- Suitable for use with steam up to 200 °C and 12 bar continuous operating pressure
- High-pressure model for use with temperatures in excess of 200 °C is available on request

Fin spacing/Galvanised steel heat exchangers for use with steam

Type				Heat exchanger model	Fin spacing [mm]
4422**	4522**	4622**	4722**	single row	2.4
4432**	4532**	4632**	4732**	double row	4.4

**Enter motor figure

Galvanised steel heat exchanger, cross-flow

This design of heat exchanger is especially suitable for use where there are wide spreads of temperature. The route taken by the water crosses the air flow and flows against it, in order to then warm up the air stream in the area facing the air inlet. This produces a low return temperature, which is necessary for use with systems supplied by district heating. The design of the heat exchanger is such that both heat exchangers can expand freely.

- Suitable for use with LPWW/LPHW up to 120 °C and 16 bar continuous operating pressure
- High-pressure model for use with temperatures in excess of 120 °C is available on request

Cross-flow heat exchangers are recommended for use with water temperature spreads of greater than 30 K and are essential with water temperature spreads of greater than 40 K.

Applications:
Specifically designed for use with systems that have high spreads of temperature, such as barracks, industrial plants, sales-rooms, sports halls, greenhouses, areas at risk from explosion, areas with a high concentration of dust or oil in the air and in which thorough cleaning is constantly required or systems supplied by district heating.

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Fan designs

2-stage and 3-stage three-phase fan motors

Kampmann TOP units heaters are fitted with axial fans and 3-phase external rotor motors, designed to operate as standard with a voltage of 400 V/3 phase/50 Hz. Motor protection is provided by integral thermal contacts, which, in conjunction with the stage switch, switch off the unit heater motor at a winding temperature of 155 °C.

- Several unit heaters of different sizes can be switched in parallel. The total output of the unit heaters connected may not exceed the maximum switching capacity. When several unit heaters are controlled in parallel, the thermal contacts of all motors have to be switched in series.
- Please observe national regulations when fitting the protective earth conductor. It should also be fitted in compliance with the wiring diagram supplied.
- The switches and controllers are not suitable for use in areas at risk from explosion.

Single-phase fan motors

Kampmann 230V TOP units heaters are fitted with single-phase fans, comprising an asynchronous external rotor motor with an operating capacitor. Group operation is possible. Motor protection is the same as with three-phase motors.

Non-standard voltages: Motors for use with other voltages, such as 500 V, 110 V or 60 Hz are available on request.

Nominal data · Rated values

The "nominal fan speeds" listed in the table below and in the technical data (pages 60 onwards) are estimated figures, which are based on the construction of the fan motor. The actual fan speeds may differ from these figures, depending on the design of fan motor and heat exchanger and on the location of the units.

The electrical power and power consumption figures, in contrast , are rated values, that is to say the maximum figures that will occur in unfavourable operating conditions. The sizing of electrical equipment, such as stage switches, electrical cables and fuses, should be based on these rated values.

In practice and particularly in free-blowing mode, the figures for power consumption and capacity may be below these rated values. The actual power consumption depends on the location of the unit and the ductwork components fitted.

Motor protection

Thermal contacts are embedded in the windings of the motor. These thermal contacts (temperature monitors) open as soon as the maximum permissible winding temperature of 155 °C has been exceeded. When controlling several unit heaters in parallel, all the thermal contacts have to be switched in series. This means that any number of units can be protected by a single motor protection device. In practice, the number of unit heaters is limited by the switching capacity of the switching equipment.

Should the system malfunction (e.g. 2-phase operation, mechanical blockage, damage to the bearings) then it has to be ensured that the system cannot start up again automatically.

There is a manual reset in all Kampmann stage switches. Conventional motor protection switches or bi-metal trip swiches are not suitable for use as motor protection switches with motors that can be switched between several stages. A louvre should be fitted between the motor and the heat exchanger (see page 49) when very high water temperatures are used.

Fan models

Unit heater	Series	44 _ _ _ _	45 _ _ _ _	46 _ _ _ _	47 _ _ _ _
Three-phase fan motor 2-stage, whisper-quiet, sickle-blade fan 400 V/50 Hz Motor figure 36	Nominal fan speed 1/min	1350/1050	1350/1050	900/700	900/700
	Rated power consumption A	0.34/0.20	0.62/0.37	0.71/0.39	1.50/0.81
	Rated voltage consumption W	180/130	320/230	340/230	760/470
	Maximum air intake temp. °C	50	40	40	40
Three-phase fan motor 3-stage, whisper-quiet, sickle-blade fan 400 V/50 Hz Motor figure 35	Nominal fan speed 1/min	1350/1050/700	1350/1050/700	900/700/450	900/700/450
	Rated power consumption A	0.32/0.19/0.11	0.65/0.46/0.19	0.73/0.44/0.26	1.35/0.74/0.46
	Rated voltage consumption W	165/120/40	350/280/65	380/270/90	680/410/120
	Maximum air intake temp. °C	50	40	40	40
Three-phase fan motor explosion-proof 2-stage, wide-blade fan 400 V/50 Hz Motor figure 37	Nominal fan speed 1/min	1350/1050	1350/1050	900/700	900/700
	Rated power consumption A	0.28/0.19	0.61/0.41	0.87/0.46	0.89/0.55
	Rated voltage consumption W	140/110	360/250	390/200	500/340
	Maximum air intake temp. °C	40	40	40	40
Single-phase fan motor whisper-quiet, sickle-blade fan 230 V/50 Hz Motor figure 31	Nominal fan speed 1/min	1350	1350	900	900
	Rated power consumption A	0.9	1.6	1.8	3.4
	Rated voltage consumption W	200	370	400	730
	Capacitor µF	5.0	5.0	10.0	16.0
	Maximum air intake temp. °C	50	40	40	50

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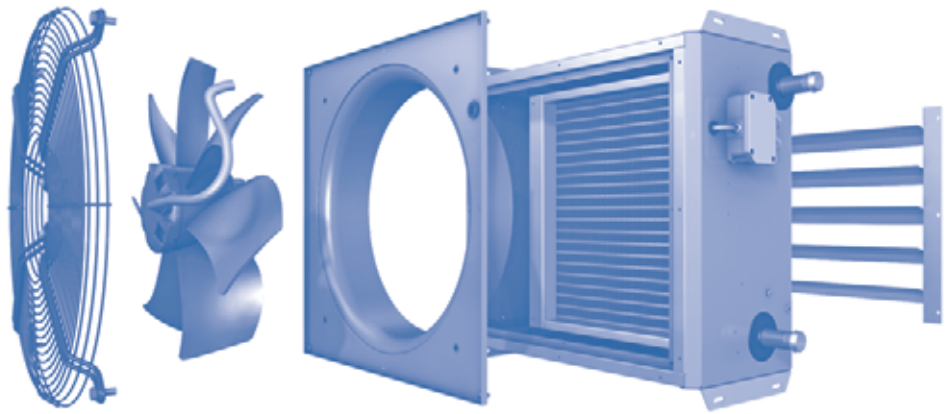
Whisper-quiet, sickle-blade fan with a full nozzle



Motor guard (standard) | Whisper-quiet, sickle-blade fan motor | Rear panel with full nozzle | Unit heater housing with heat exchanger | Single row louvre (standard)

TOP with whisper-quiet, sickle-blade fan

TOP units heaters are fitted with whisper-quiet, sickle-blade fans, which combine both the impeller and the drive in an extremely flat unit, ideal for the construction of the unit. The aerodynamic shape of the rotor housing, comprising a cast-aluminium body with aluminium fins, provides excellent fan cooling and a high level of efficiency. The fan has a characteristic curve, aligned to the construction of the unit, which at the same time provides 100 % fan speed control by voltage reduction.

- The fan is balanced on two levels; balance class G 6.3 DIN ISO 1940 Part 1
- The drive is provided by a single-phase or three-phase external rotor motor
- Electrical design conforms to DIN VDE 0530 Part 1 in heating class F
- Protection class: IP 54 according to DIN VDE 0470 Part 1 (EN 60 529)
- Contact protection conforms to DIN EN 294
- Optimum noise levels are achieved by reducing the rotational sound
- Thorough final inspection of fans and unit heaters before leaving the factory

Full nozzle

All Kampmann unit heaters with sickle-blade fans are fitted with generously-proportioned full nozzles. It is only with the low-turbulent airflow through full nozzles that sickle-blade fans work at their most efficient.

- The significant nozzle depth (up to 110 mm) and large inlet radius guarantee directional airflow and avoid cross-currents,
- Lowest possible noise levels with positive tonal behaviour
- Optimum charateristic curve with high air volume and pressure.

Drive	Single-phase or three-phase external rotor motor
Heating class	F
Balance class	G 6,3
Protection class	IP 54
Conforms to	Elec. design to DIN EN 60034-1; Balance class to DIN ISO 1940, Part 1; Protection class to DIN EN 60529; Contact protection to DIN EN 294

Explosion-proof TOP EEx model with wide-blade fan

TOP unit heaters for use in areas at risk of explosion are fitted with 2-stage, 3-phase external rotor motors which comply with "Increased safety e" protection of equipment category 2 G and can be used where hazardous, explosive, gaseous atmospheres can occur from time to time, that is in zones 1 and 2. These fan motor units meet the requirements of directive 94/9/EG (ATEX).

Explosion-proof "Ex" motors are provided with full motor protection by temperature sensors (PTC resistors, DIN 4408-M130 or M 100) in conjunction with trip devices (U-EK 230 E) categorised as Ex II (2) G, fitted in Kampmann switches used with "EEx-e" unit heaters. The trip device disconnects the motor power circuit from the mains via a separate protection switch, when the nominal activation temperature of the temperature sensor (PTC resistor) has been exceeded.

Motor type	Ex II 2 G EEx e II T1, T2, T3 or T4
Fan type	Ex II 2 G c EEx e IIB T1, T2, T3 or T4
Ambient temp.	maximum 40 °C
Insulation class	F
Protection class	IP 44
Conforms to	DIN EN 14986 : 2004 (D), DIN EN 13463-1, DIN EN 13463-5, DIN EN 600079-0, DIN EN 60079-14

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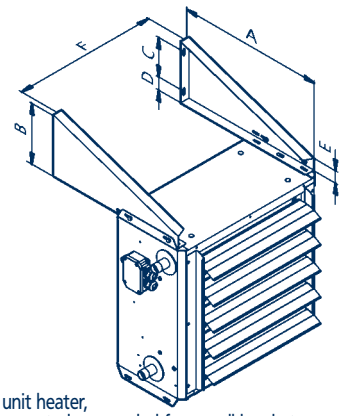
Brackets

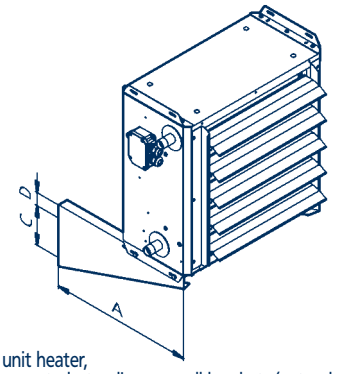


TOP unit heater,
wall-mounted, suspended from wall brackets

Wall brackets, type **3*044**

made of sendzimir galvanised sheet steel for the wall-mounting of recirculating air units; TOP unit heaters can be fixed either standing on or suspended from the brackets.

Unit heater series	Type no.	A	B	C	D	E	F
44 _ _ _ _	34044	585	251	160	40	50	350
45 _ _ _ _	35044	585	251	160	40	50	450
46 _ _ _ _	36044	635	268	187	40	50	550
47 _ _ _ _	37044	685	286	204	40	50	650

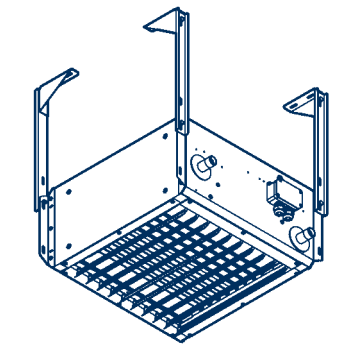


TOP unit heater,
wall-mounted, standing on wall brackets (extended)

Wall brackets, extended, type 3002_

for greater clearance from the wall, when using ductwork components, such as mixing boxes, filter boxes, louvres, sailcloth sockets etc. The length A of the bracket should be chosen as required.

Type no.	A	B	C	D	E
30022	785	321	123	40	50
30024	885	355	143	40	50
30026	1080	422	175	40	50
30020	Dimension depends on length of bracket				

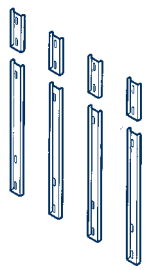


TOP unit heater, ceiling-mounted on universal 4-point brackets, shown with two-row louvre

Universal 4-point brackets, type 30042

made of sendzimir galvanised sheet steel, for use as a 4-point bracket for fixing unit heaters onto the ceiling, comprising:

- 4 no. U-profiles with longitudinal slots for length adjustment, length 500 mm
- 4 no. triangular fixings with screws and nuts



Universal bracket extension, type 30043

made of sendzimir galvanised sheet steel for extending universal brackets type 30041, 30042 and 30047, comprising:

- 4 no. U-profiles with longitudinal slots for length adjustment, length 500 mm
- 4 no. slip joints with screws and nuts

*Insert figure for unit size

**State dimensions when ordering

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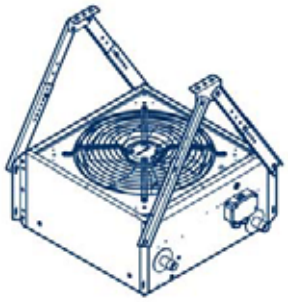
Brackets

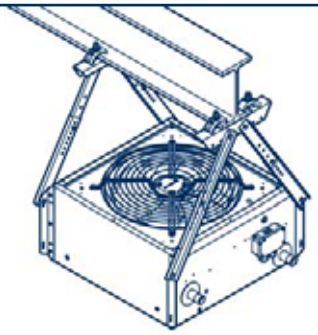


TOP unit heater fixed on a universal 2-point bracket

Universal 2-point brackets, type 30041

for use as a 2-point bracket for fixing unit heaters onto the ceiling, made of sendzimir galvanised sheet steel, comprising:

- 4 pairs of U-profiles with several slots for length adjustment, length 340 to 560 mm
- 2 no. fixing angles complete with screws and nuts

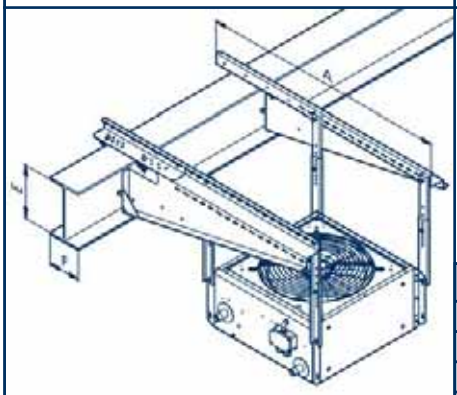


TOP unit heater on a universal 2-point T-beam bracket

Universal 2-point T-beam brackets, type 30047

for use as a 2-point suspended bracket for ceiling-mounting unit heaters onto T-beams with a flange width of between 80 and 220 mm; made of sendzimir galvanised sheet steel and comprising:

- 4 pairs of U-profiles with several slots for length adjustment, length 260 to 560 mm
- 2 no. fixing angles complete with screws and nut
- 4 no. beam clamps with screws and nuts



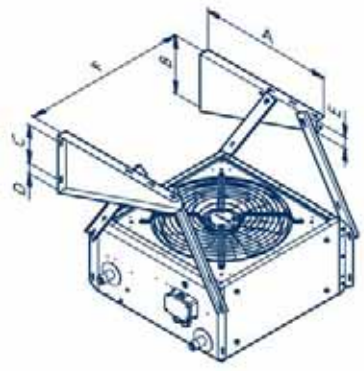
TOP unit heater on trapezium ceiling brackets

Trapezium steel ceiling brackets, type 3*046

Ceiling brackets for use with steel beams with trapezium brackets; fix to steel beams (300 mm high and above, up to a flange width of 340 mm) without welding or drilling; fix on the opposite side to the unit with two beam clamps; on the heater side, the brackets are supported by spacing bolts. The unit heater is fixed to four U-rails. The trapezium brackets have to have a free area of at least 80 x 80 mm.

Dimensions

Unit heater series	A	E minimum	F maximum
44 _ _ _ _	1300	300	340
45 _ _ _ _	1300	300	340
46 _ _ _ _	1500	300	340
47 _ _ _ _	1500	300	340



TOP unit heater on combined wall brackets

Wall-mounted truss brackets, type 3*048

for wall-mounting unit heaters with a vertical air outlet, for example as a door screening unit or to wooden trusses; the unit heater is suspended from 4 U-rails; made of sendzimir galvanised sheet steel, comprising:

- 2 no. folded brackets for fixing the unit heater onto the wall or a wooden truss
- 4 no. U-profiles with longitudinal slots and screws

Dimensions

Unit heater series	A	B	C	D	E	F
44 _ _ _ _	785	321	160	40	50	620
45 _ _ _ _	885	355	160	40	50	720
46 _ _ _ _	1080	422	187	40	50	820
47 _ _ _ _	1200	464	204	40	50	920

*Insert figure for unit size

All dimensions are in mm

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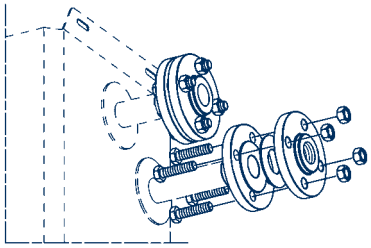
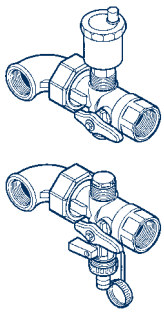
Connection accessories



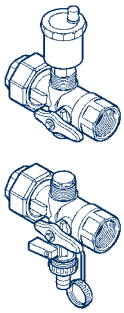
Flange connection type 3*009

PN 16 conforming to DIN EN 1092-1, comprising 2 threaded flanges conforming to DIN 2566, 2 blank flanges conforming to DIN 2633, seals and screws

Unit heater series	Nominal width		Type
44 _ _ _ _	1"	DN 25	34009
45 _ _ _ _	1"	DN 25	35009
46 _ _ _ _	1 1/4"	DN 32	36009
47 _ _ _ _	1 1/2"	DN 40	37009



Angle valve type 3*976



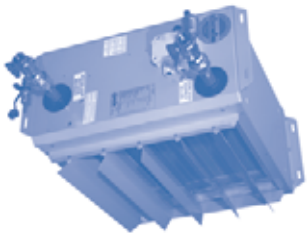
Straight valve type 3*977

Unit heater shut-off valve set

Angle valve, type 3*976,
Straight valve, type 3*977

comprising two valves, two ball valves with two side connections for thermometer and plugs, 1/2" female thread, air vent and drain cock

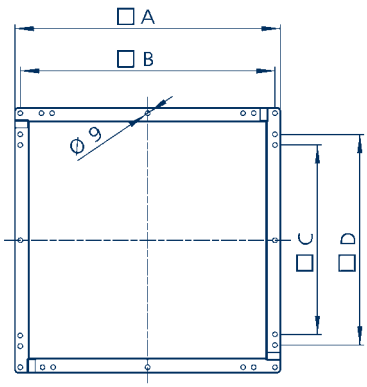
Unit heater series	Nominal width		Angle valve type	Straight valve type
44 _ _ _ _	1"	DN 25	34976	34977
45 _ _ _ _	1"	DN 25	35976	35977
46 _ _ _ _	1 1/4"	DN 32	36976	36977
47 _ _ _ _	1 1/2"	DN 40	37976	37977



Ceiling-mounted units heater with shut-off valve set (straight) type 3*977

Wall-mounted unit heater with shut-off valve set (angled) type 3*976

Inlet and outlet side connection frame dimensions



Overall frame dimensions

All inlet air and outlet air accessories are fitted with a standard connection frame. This standardised connection profile simplifies the fixing of the units.

Dimensions

Unit heater series	A	B	C	D
44 _ _ _ _	500	480	360	400
45 _ _ _ _	600	580	460	500
46 _ _ _ _	700	680	560	600
47 _ _ _ _	800	780	660	700

*Insert figure for unit size

All dimensions are in mm

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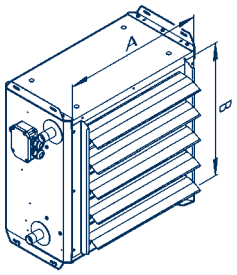
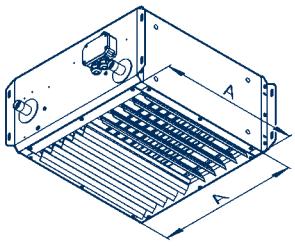
Outlet air accessories



Louvre, single row, type 3*001, fitted as standard



Louvre, two-row type 3*002

Louvre, single row type 3*001

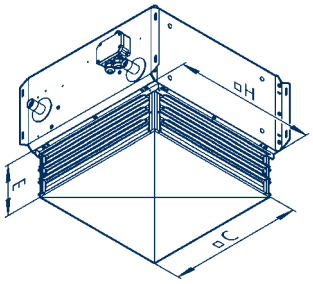
for wall- and ceiling units or for fixing to a ductwork system

- Achieves excellent throw
- Air direction can be adjusted in one or two directions
- Fitted as standard to TOP unit heaters

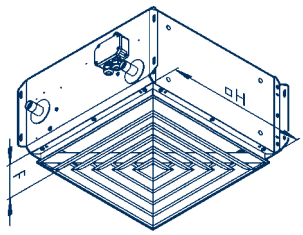
Louvre, two-row type 3*002

for use with wall and ceiling units

- Achieves excellent throw
- Air discharge in three or four directions



4-way diffuser type 3*004



Diffuser hood type 3*005

4-way air diffuser type 3*004

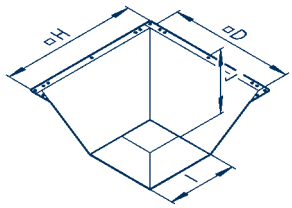
for ceiling units

- Ideal for use with ceiling heights of less than 4 m
- Exact mounting heights and performance data are shown on page 55 onwards
- Air discharge in four directions

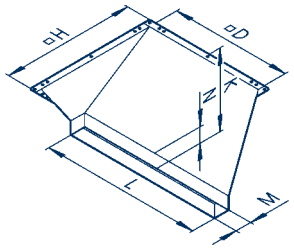
Diffuser hood type 3*005

for use with ceiling units

- Especially suitable for use with suspended ceilings owing to the shallow depth
- Only suitable with low ceiling heights of less than 3.5 m
- Four-directional air stream



Outlet nozzle type 3*006



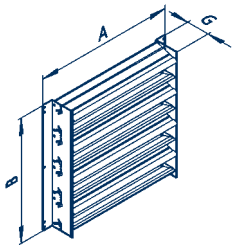
Wide nozzle type 3*007

Outlet nozzle type 3*006

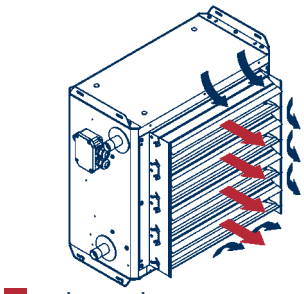
- For use with ceiling units
- Ideal for use with high ceilings
- Refer to Technical Data for exact mounting heights and performance data
- Concentrated air stream thanks to conical neck

Wide nozzle type 3*007

- Suitable for use with door air curtain units
- Concentrates the air stream into a flat air stream



Induction louvre type 3*101



Induction louvre type 3*101

Secondary air drawn in between the primary air streams . This lowers the outlet air temperature and the upcurrent of warm air is minimised. This significantly improves air mixing.

- Primarily intended for use as a wall-mounted air diffuser
- Also suitable for use with ceiling-mounted units with ceiling heights in excess of 4 m if the Kampmann KaMAX is not fitted
- The fins are arranged to work against each other and can be individually adjusted and fixed

Unit heater series	Dimensions													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
44 _ _ _ _	495	425	462	450	200	70	100	500	250	230	300	600	60	50
45 _ _ _ _	595	525	562	550	200	70	100	600	300	260	340	700	90	50
46 _ _ _ _	695	625	662	650	200	70	100	700	350	290	380	800	120	50
47 _ _ _ _	795	725	762	750	200	70	100	800	400	320	420	900	150	50

*Insert figure for unit size

All dimensions are in mm

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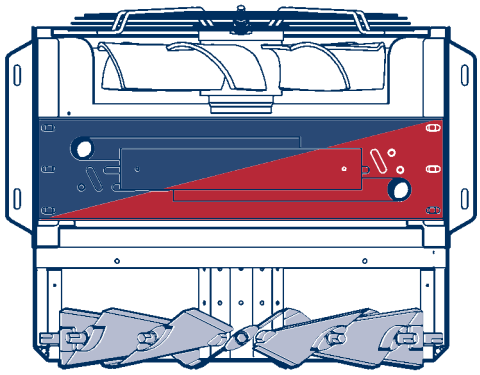
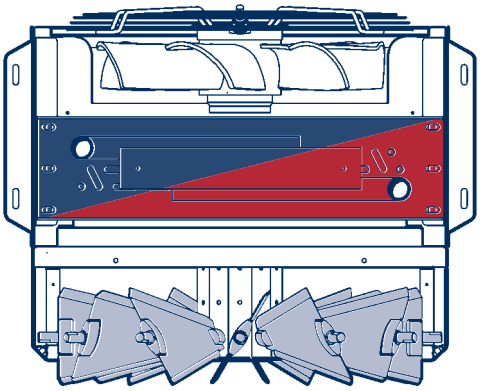
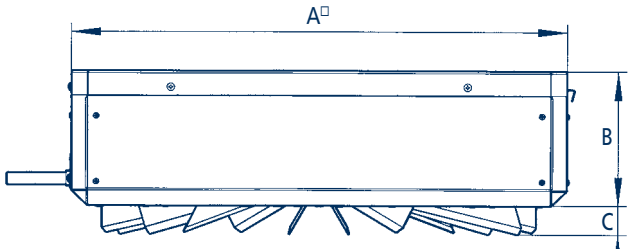


TOP unit heaters with KaMAX diffuser in a horizontal position (cross-section)



TOP unit heater with KaMAX in a vertical position (cross-section)



KaMAX dimensions

Dimensions in mm			
Typ	A□	B	C
34111	500	165	35
35111	600	165	50
36111	700	165	65
37111	800	165	80

KaMAX air outlet, type 3*111

KaMAX stands for Kampmann-Multi-Air-MiX, thus already explaining the effect of this tried-and-tested air outlet.

A number of factors can impair the distribution of temperature and circulation of air in a high-ceilinged area:

– Improved heat insulation,
– Minimum permissible outlet air temperatures in conjunction with ceiling mounted units, which are now increasingly used.

KaMAX ensures that the air in a hall is systematically mixed, bridges over thermal upcurrents and so prevents the formation of an accumulation of air directly under the ceiling of the hall:

- Transmission heat losses are thus minimised,
- Energy costs are reduced,
- Enhanced comfort at ground level.

Design and mode of operation

Circular fins have internal and external bearings. The fins can be adjusted from outside by adjusting levers fixed on a crown. The fins are alternately fitted with a short and a long adjusting lever.

- In a horizontal position, the fins are almost perpendicular to the air stream. The slim air outlet between the fins forms the same-sized opening between the fins and the discharged air is distributed in an extremely flat manner with an extremely twisting effect.
- The further the fins are moved into a vertical position, the wider are the air outlet openings. The penetration depth of the air stream increases and at the same time secondary air is increasingly drawn in.
- In the maximum vertical position, two fins are inclined towards each other to form a nozzle. A diffuser-like space is formed between the two fins. The negative pressure formed at this point causes secondary air to be drawn in, which is pulled down by the exiting air stream. The primary air stream that is discharged, is intensively mixed with the surrounding air, thereby reducing the outlet air temperature and minimising the thermal up-current of the entire air stream.

Benefits

- KaMAX does not permit differences in temperature to form between the floor and ceiling.
- Warm air concentrated directly under the ceiling is drawn in and incorporated in the overall air circulation.
- A significantly larger volume of air, at a comfortable temperature and a minimum velocity, reaches ground level.
- Draughts are avoided.
- The twisting effect of the outlet air, its rotation, can be adjusted so that both horizontal and vertical streams of air, with different degrees of induction and penetration depth, can be created.

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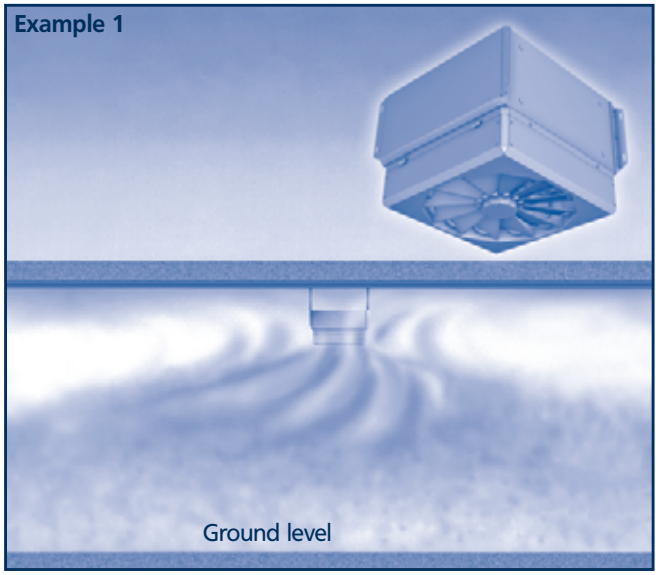

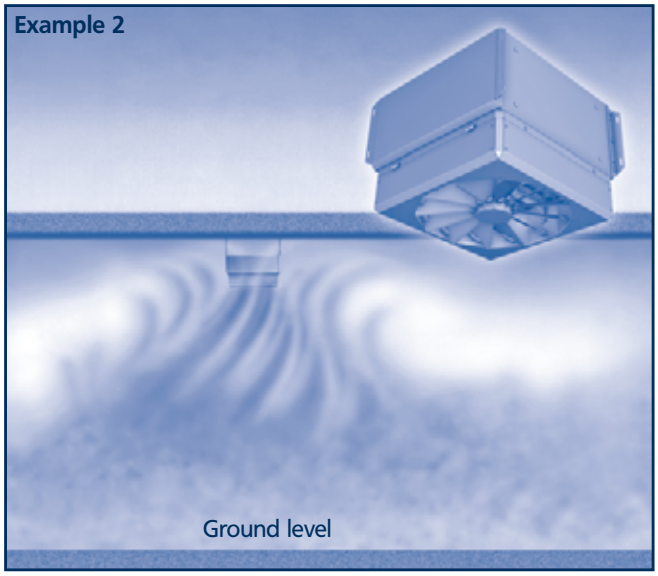

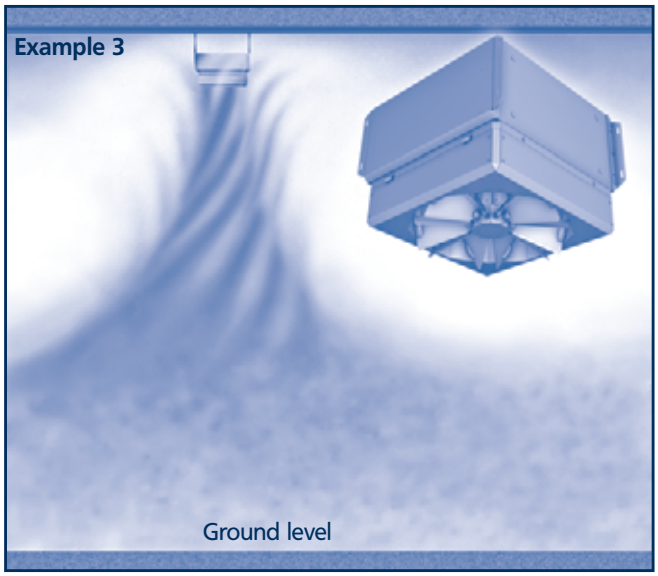

Function and applications

Example 1: Ceiling height 3–5 m

- The fins are almost horizontal.
- Air is distributed under the ceiling and flows in a circular pattern around the KaMAX.
- Floor and ceiling air is drawn in.
- The air movements are even.
- Low air velocity at ground level, no draughts and thus enhanced comfort.

Example 2: Ceiling height 5–10 m

- The air can be discharged at any angle into the space.
- The slightly vertical fins increase the proportion of induction air directly at the outlet of the KaMAX.
- The entire air in the space is pulled into the air exchange due to a significant twisting effect.
- At ground level, the primary air stream cannot be felt.
- As the surrounding air is drawn in, the outlet air temperature falls.
- There is intensive mixing of the surrounding air at low air velocity and minimal temperature stratification.
- Comfort and energy-savings result.

Example 3: Ceiling height up to 17 m

- The air is predominantly discharged vertically.
- In their maximum vertical position, the fins act as nozzles.
- Surrounding air is induced from all sides, the outlet temperature is this significantly reduced.
- Twice the air volume is moved 2 metres below the KaMAX.
- High volumes of air are moved at low temperature and velocity and the penetration depth is increased by up to 30 %.
- Comfort and energy-savings result.
- This discharge position is ideal for the cost-effective heating of even very high-ceilinged spaces.

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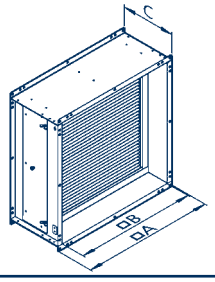
Mixed air accessories

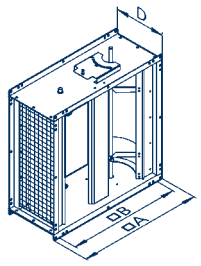


Filter box, type 3*010

- Made of sendzimir galvanised sheet steel
- Removable filter insert within a fiberplast frame
- Filter cell with pleated filter medium, quality class G4 according to DIN EN 779
- Designs with other filter media (e.g. filter classes F5 or F7) are available on request

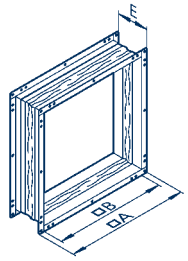
Replacement filter cassette G4, type 3*611

to fit filter box 3*010



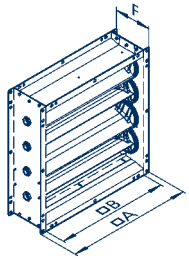
Mixing box, type 3*012

- Recirculating air induction openings on 2 sides, fitted with a grille
- Volume regulation thanks to semi-circular elements, connected by rods to ball joints.
- Servomotors to fit type 30262 Open/Closed) or type 30264 (continuous) can be supplied



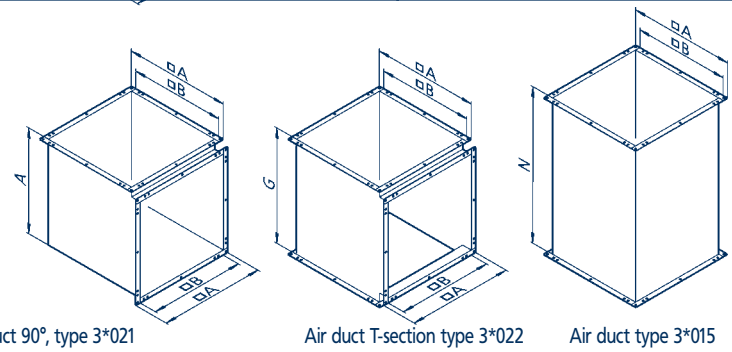
Sail cloth socket, type 3*013

for use as a flexible connection with a frame on both sides;
length 120–160 mm



Louvre, type 3*023

- With plastic-mounted fins driven in contra-rotation by toothed wheels made of fibreglass-reinforced polyamide
- Servomotors to fit types 30262 (Open/Closed) or 30264 (continuous) can be supplied



Air duct 90°, type 3*021 | Air duct T-section type 3*022 | Air duct type 3*015

Air ducts

Air duct 90°, type 3*021

with ductwork connection profile at each side

Air duct T-section, type 3*022

with ductwork connection profile on three sides

Air duct, type 3*015 with ductwork connection profile at both ends; please state length when ordering!

Unit heaters series	Dimensions									
	A	B	C	D	E	F	G	H	I	N
44 _ _ _ _	500	450	250	200		150	550	60	160	Please state
45 _ _ _ _	600	550	250	250	120-160	150	650	60	160	dimensions
46 _ _ _ _	700	650	250	300	mm	150	750	60	160	when
47 _ _ _ _	800	750	250	350		150	850	60	160	ordering

*Insert figure for unit size

All dimensions in mm

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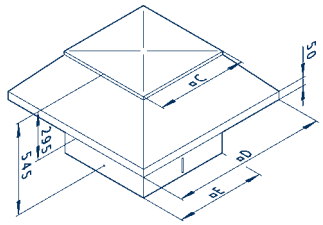
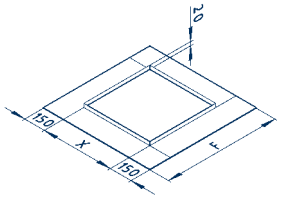
Mixed air accessories



Rain hood type 3*114

Square hood, removable top cover, protection from birds thanks to perforated inlet openings on all sides

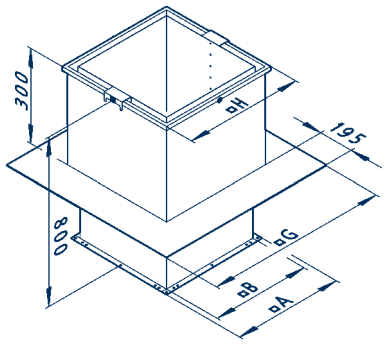


X: Dimensions dependent on roof angle

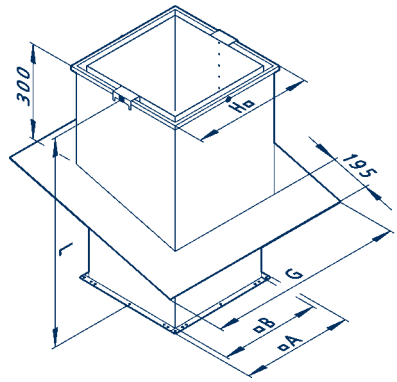
Cover panel type 3*118**

Suitable for covering the underside of a roof opening visible from the room

Roof angle	Type
0–4°	3*11800
5–14°	3*11810
15–24°	3*11820
25–32°	3*11830
33–40°	3*11837
41–48°	3*11845
greater than 48° ***	3*11899



Roof socket for flat roof type 3*119**



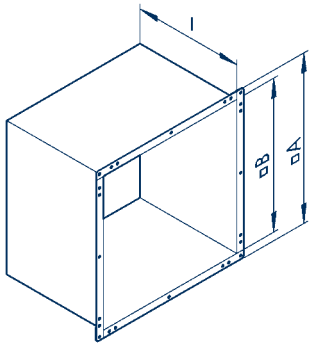
Roof socket for angled roof type 3*120**

Roof socket for flat roof with roof duct, type 3*119

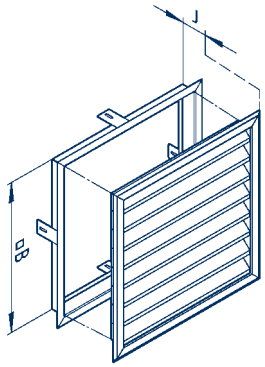
suitable for roofs with an angle of up to 4°

Roof socket for angled roof with roof duct, type 3*120**

Roof angle	Type
5–14°	3*12010
15–24°	3*12020
25–32°	3*12030
33–40°	3*12037
41–48°	3*12045
greater than 48° ***	3*12099



Wall duct
type 3*026



Weather grate frame, type 3*017,
Weather grate, type 3*016

Wall duct, type 3*026

ideal for connection to a wall with a ductwork connection profile on one side

Weather grate frame type 3*017

sendzimir galvanised with anchoring lugs for brickwork; to fit weather grate type 3*016

Weather grate, type 3*016

sendzimir galvanised with frame; to fit weather grate frame type 3*017

Unit heater series	Dimensions											L with angled roof				
	A	B	C	D	E	F	G	H	I	J	K	0-14°	15-24°	25-32°	33-40°	41-48°
44 _ _ _ _	500	450	557	950	550	750	900	540	400	58	522	800	1000	1000	1200	1500
45 _ _ _ _	600	550	657	1050	650	850	1000	640	400	58	622	800	1000	1000	1200	1500
46 _ _ _ _	700	650	757	1150	750	950	1100	740	400	58	722	800	1000	1200	1500	1500
47 _ _ _ _	800	750	857	1250	850	1050	1200	840	400	58	822	800	1000	1200	1500	1500

* Insert figure for unit size
** Insert figure for roof angle see page 81
***Please state roof angle when ordering

All dimensions in mm

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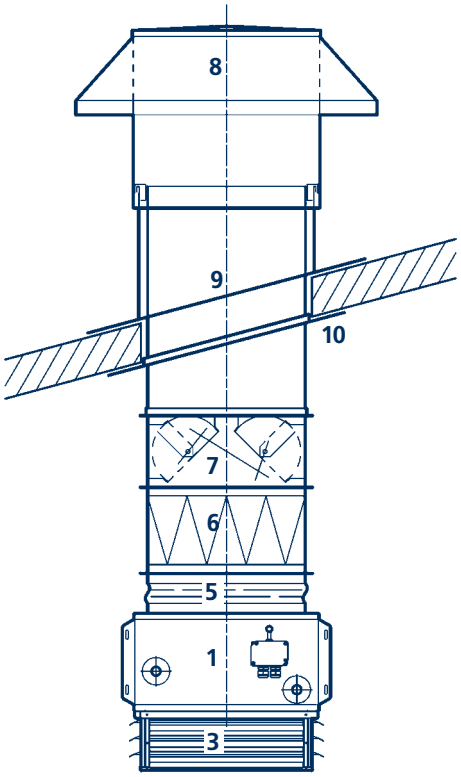
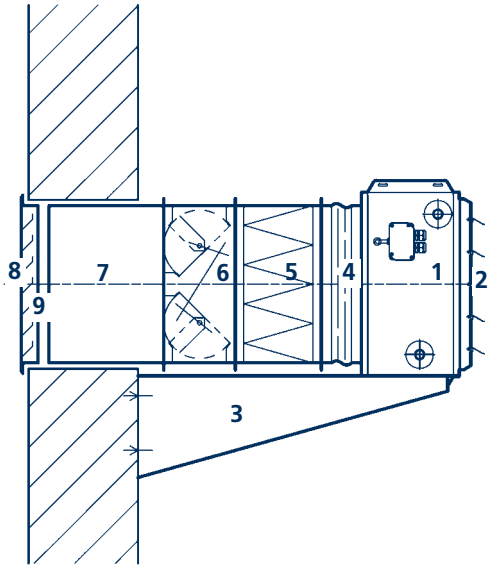
Ceiling-mounted, mixed air, air entry through rain hood, angled roof



1 TOP unit heater
3 Air diffuser, type 3*004
5 Sail cloth socket, type 3*013
6 Filter box, type 3*010
7 Mixing box, type 3*012
8 Rain hood, type 3*114
9 Roof socket for angled roof with roof duct, type 3*120**
10 Cover panel, type 3*118**

Wall-mounted, mixed air



1 TOP unit heater
2 Louvre, single row, standard
3 Wall brackets, extended, type 3002*
4 Sail cloth socket, type 3*013
5 Filter box, type 3*010
6 Mixing box, type 3*012
7 Wall duct, type 3*026
8 Weather grate, type 3*016
9 Weather grate frame, type 3*017

* Insert figure for unit size
**Insert figure for roof angle, see page 19

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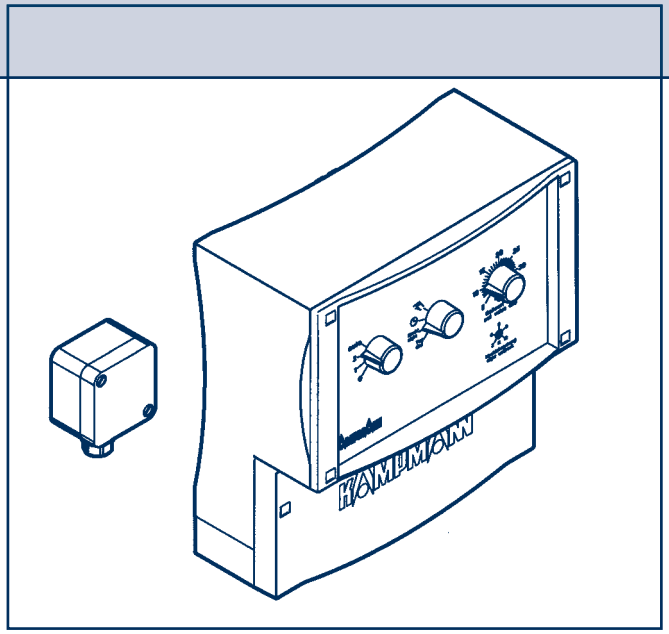
SYSTEMS FOR HEATING · COOLING · VENTILATING

Controls



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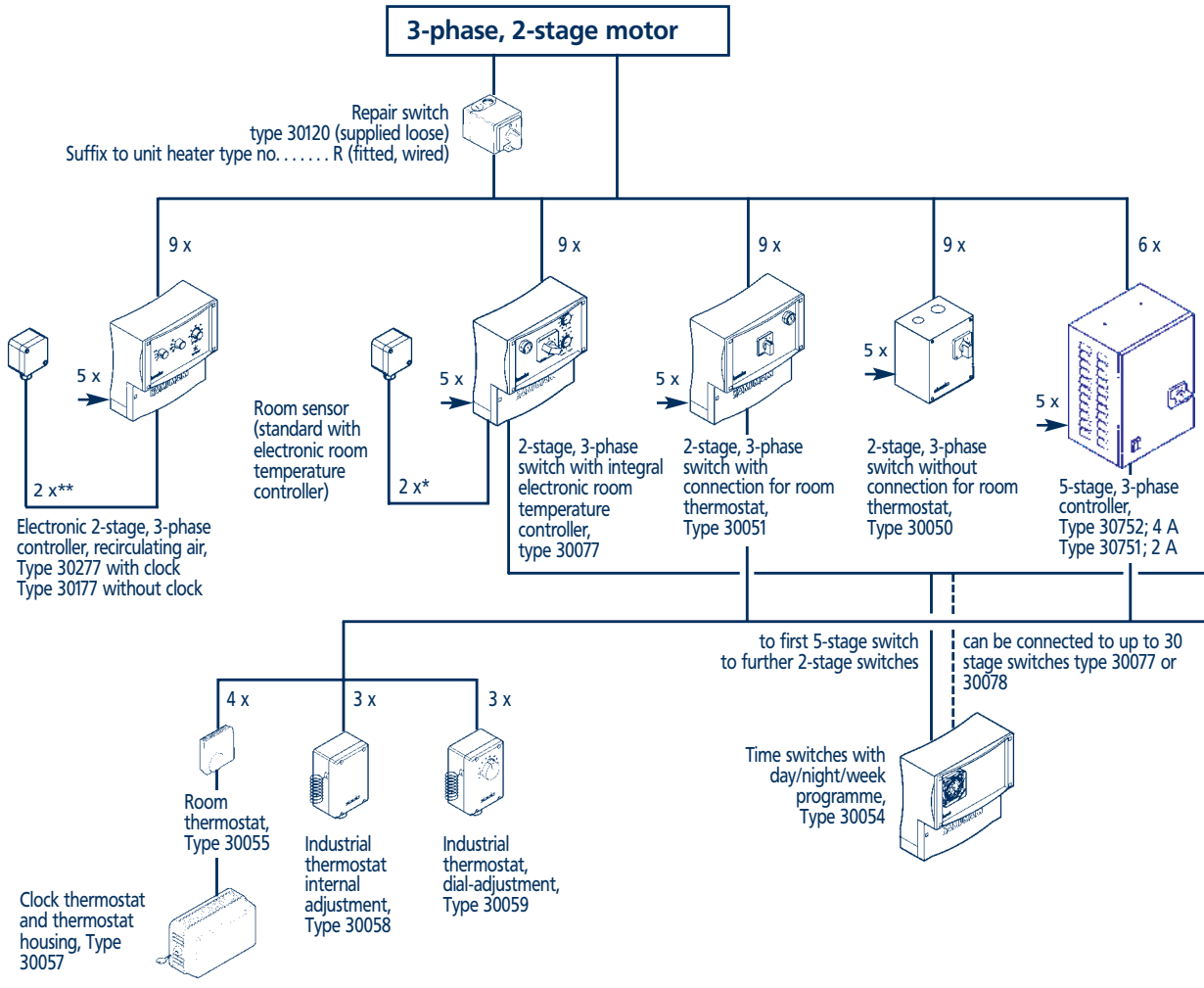
Maximum number of unit heaters per switch

Motor model	3-phase, 2-stage, motor number 36						
Switch	Electronic 2-stage, 3-phase controller		2-stage, 3-phase switch with integral electronic room temperature controller	2-stage, 3-phase switch with possible connection to a room thermostat	2-stage, 3-phase switch without possible connection to a room thermostat	5-stage, 3-phase controller	
	with clock	without clock					
Unit heater type	Type 30277	Type 30177	Type 30077	Type 30051	Type 30050	Type 30751 max. rated current 2 A	Type 30752 max. rated current 4 A
44 _ _ 36	22	22	22	22	20	5	11
45 _ _ 36	12	12	12	12	12	3	6
46 _ _ 36	11	11	11	11	11	2	5
47 _ _ 36	5	5	5	5	5	1	2

Stage switches

Thermostats – Time switches



* Sensor cable 1.5 mm², e.g. J-Y (St) Y 4 x 2 x 0.8 mm, max. 100 m, laid separately from high-voltage cables!
** Shielded cable (e.g. J-Y(St)Y, 0.8 mm) max. 100 m, laid separately from high-voltage cables!

The number of connecting wires is given for each switch/controller.

5 x → Mains supply: three-phase 3 x 400 V/50 Hz
3 x → Mains supply: single-phase 230 V/50 Hz

Mains connection: Please observe the technical conditions specified by the energy-providing companies!

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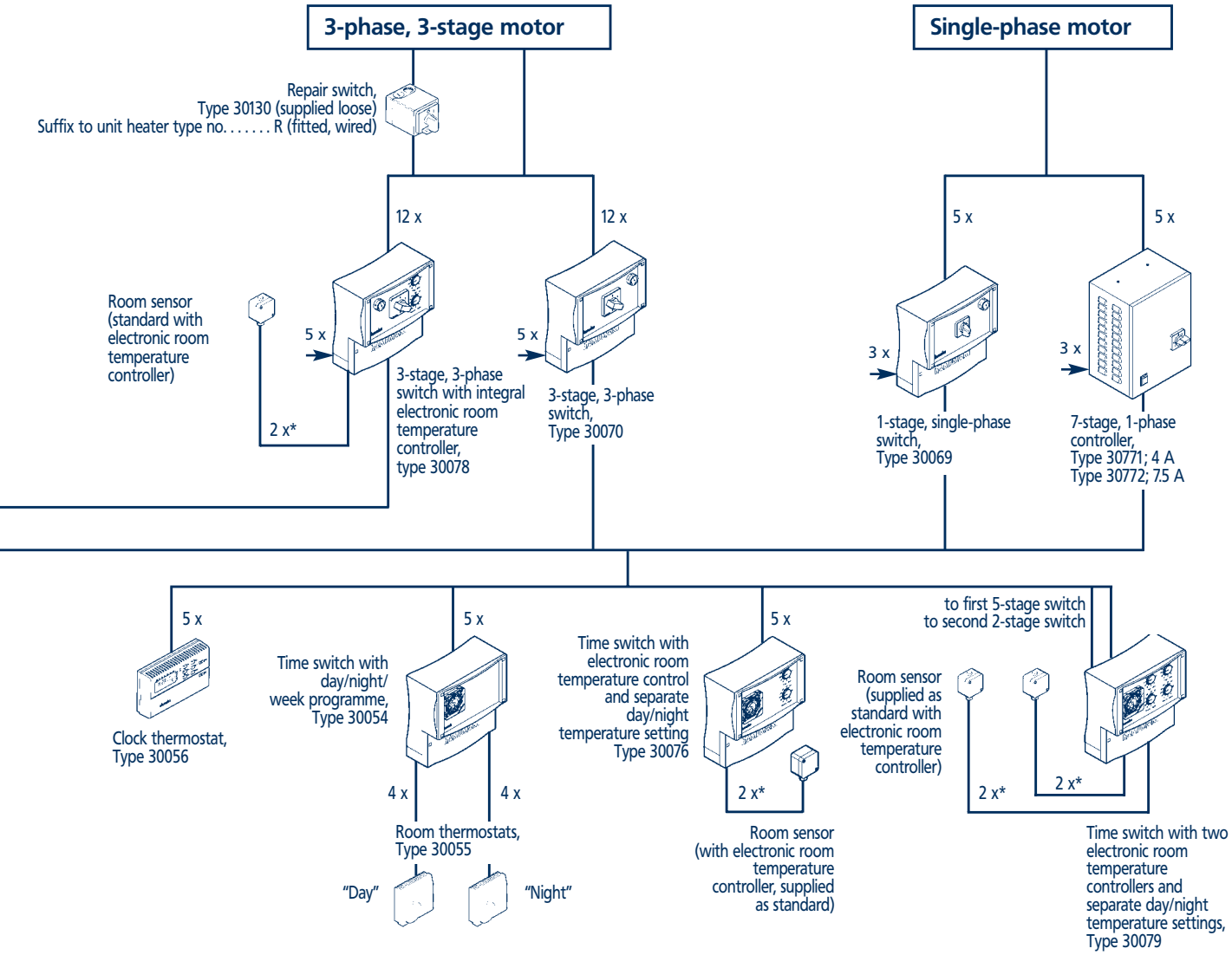
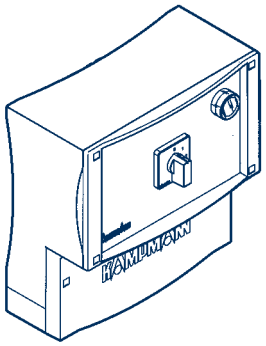
Overview of switches and controllers

3-phase, 3-stage, motor number 35			1-phase, motor number 31			
Switch	3-stage, 3-phase switch with integral electronic room temperature controller	3-stage, 3-phase switch	Switch	1-stage, 1-phase switch	7-stage, 1-phase switch	
Unit heater Type	Type 30078	Type 30070	Unit heater Type	Type 30069	Type 30771 max. rated current 4 A	Type 30772 max. rated current 7.5 A
44 _ _ 35	21	24	44 _ _ 31	10	4	7
45 _ _ 35	11	11	45 _ _ 31	5	2	3
46 _ _ 35	10	10	46 _ _ 31	4	2	3
47 _ _ 35	5	5	47 _ _ 31	2	1	2



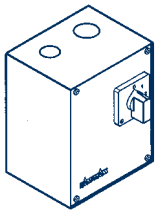
2-stage switches



2-stage, 3-phase switch with possible connection to a room thermostat, type 30051

For use with 2-stage, 3-phase motors with thermal contacts:
- Cable entry from below, in a separate terminal box that can be opened
- Provided with all requisite input terminals and several neutral and earthed terminals
- Terminals for room thermostats, frost protection thermostas, thermal contacts and motor output terminals
- Terminals for time switch and servomotor for louvres
- Externally-accessible control fuse
- Automatic reset following power failure

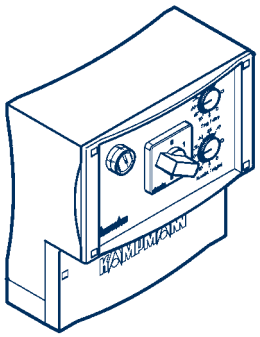
Housing	polystyrene, wall-mounted
Protection class	IP 54
Dimensions W x H x D	262 x 277 x 153 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 22	



2-stage, 3-phase switch without connection to room thermostat, type 30050

This alternative to the 2-stage, 3-phase switch type 30051 allows the manual switching of recirculating air units. It is not possible to connect it to room thermostats, frost protection thermostats or frost protection switches. It cannot control the flap of the unit heaters. When controlling more than one unit heater, the thermal contacts have to be switched in series. Fitted with all requisite input, neutral and earthed terminals and terminals for the connection of thermal contacts and motor output terminals.

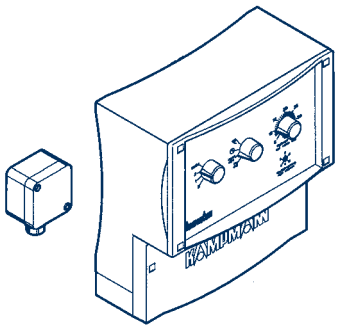
Housing	polystyrene, wall-mounted
Protection class	IP 43
Dimensions W x H x D	127 x 160 x 100 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 22	



2-stage, 3-phase switch with electronic room tempterature controller and room temperature sensor, type 30077

This electronic room temperature controller is combined with two separately settable setpoint potentiometers accommodated within a 2-stage, 3-phase switch (type 30051). The day and night temperature can be set using the setpoint potentiometers on the front panel. The changeover is triggered by an external time switch, such as type 30054. The switch comes with a room temperature sensor, which is housed within a separate unit approx. 50 x 50 x 30 mm. The connecting cable (1.5 mm^2) for the room temperature sensor should have a maximum length of 100 m and should not be laid together with high-voltage cables.

Setting range	0–40 °C
Protection class	IP 20
Dimensions W x H x D	262 x 277 x 153 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see page 22	



Electronic 2-stage, 3-phase controller, recirculating air type 30177

- Stage switch 0-1-2-Auto with automatic room temperature-dependant speed control
- Integral room temperature control with day/night setpoint adjustment and room sensor in a separate housing
- Day/Night/Time/Manual switch

Housing	polystyrene
Dimensions W x H x D:	262 x 277 x 153 mm
Protection class	IP 40 (room sensor IP 54)
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 22	

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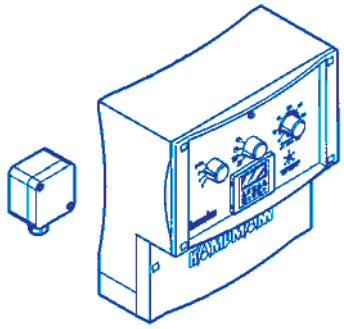
Switching accessories: 1-, 2- and 3-stage switches

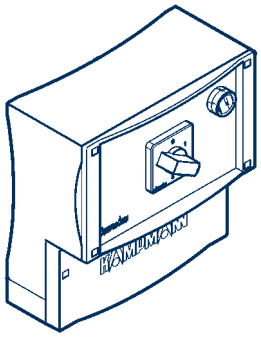
1-, 2- and 3-stage switches



Electronic 2-stage, 3-phase controller, recirculating air, with digital time switch, type 30277

- Stage switch 0-1-2-Auto with automatic room temperature-dependent speed control
- Integral room temperature control with day/night setpoint adjustment and room sensor in a separate housing
- Day/Night/Time/Manual switch
- With integral digital time switch with day/night/week programme

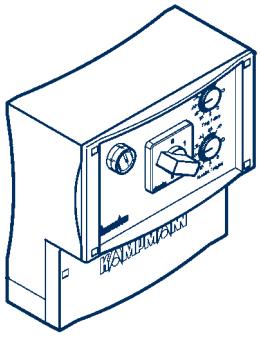
Housing	polystyrene
Dimensions W x H x D:	262 x 277 x 153 mm
Protection class	IP 40 (room sensor IP 54)
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 22	



3-stage, 3-phase switch, type 30070

- Cable entry from below, in a separate terminal box that can be opened
- Provided with all requisite input terminals and several neutral and earthed terminals
- Terminals for room thermostats, frost protection thermostats, thermal contacts and motor output terminals
- Terminals for time switch and servomotor for louvres
- Externally-accessible control fuse
- Automatic reset following power failure
- Switch thermal contacts in series when multiple unit heaters are connected.

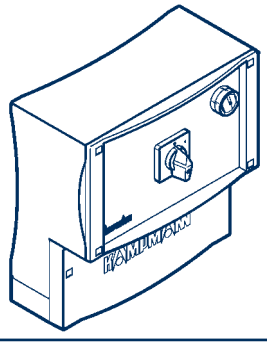
Housing	polystyrene
Protection class	IP 54
Dimensions W x H x D	262 x 277 x 153 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 23	



3-stage, 3-phase switch with electronic room temperature controller and room temperature sensor, type 30078

This electronic room temperature controller is combined with two separately settable setpoint potentiometers accommodated within a 3-stage, 3-phase switch (type 30070). The day and night temperature can be set using the setpoint potentiometers on the front panel. The changeover is triggered by an external time switch, such as type 30054. The switch comes with a room temperature sensor, which is housed within a separate unit approx. 50 x 50 x 30 mm. The connecting cable (1.5 mm^2) for the room temperature sensor should have a maximum length of 100 m and should not be laid together with high-voltage cables

Setting range	0–40 °C
Protection class	IP 20
Dimensions W x H x D	262 x 277 x 153 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 23	



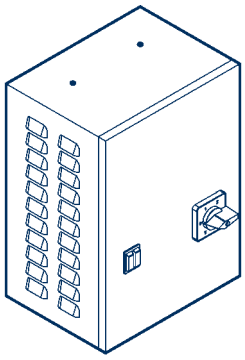
1-stage, single-phase switch, type 30069

with On/Off switch for use with single-phase motors (motor number 31)

Housing	polystyrene
Protection class	IP 54
Dimensions W x H x D	262 x 277 x 153 mm
Max. switching capacity	4 kW/10 A
Max. no. of connectable unit heaters see P 23	

Switching accessories: 5-stage and 7-stage controllers, repair switches

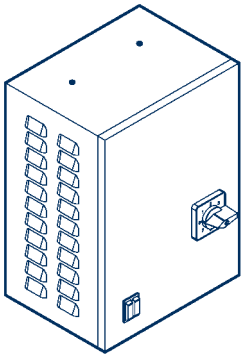
5-stage and 7-stage controllers, repair switches



5-stage, 3-phase controller, 4 A, type 30752; 2 A, type 30751

- Voltage control via 5-stage transformer
- With all requisite input terminals and multiple neutral and earthed terminals
- Terminals for room thermostats, frost protection thermostats, frost protection controllers, time switches and servomotors for louvre
- Automatic reset following power failure

Housing	painted steel, wall-mounted
Protection class	IP 20
Dimensions W x H x D	220 x 300 x 165 mm
Max. switching capacity	Type 30751: 2 A; 30752: 4 A
Max. no. of connectable unit heaters	see P 22

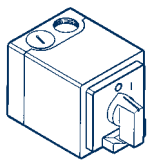


7-stage, single phase controller 4 A, type 30771;
7.5 A, type 30772

For use with single-phase motors (motor number 31), this switch provides the option of switching unit heaters between 7 fan speeds.

- Voltage control via 7-stage transformer
- With all requisite input terminals and multiple neutral and earthed terminals
- Terminals for room thermostats, frost protection thermostats, frost protection controllers, time switches and servomotors for louvre
- Automatic reset following power failure

Housing	steel
Protection class	IP 20
Dimensions W x H x D	220 x 300 x 165 mm
Max. switching capacity	Type 30771: 4 A; Type 30772: 7.5 A
Max. no. of connectable unit heaters	see P 23

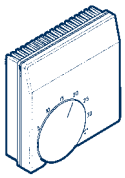


Repair switch

Type 30120 for 2-stage motors, motor number 36, supplied loose;
Type _ _*_ _ 36 R for 2-stage motors, motor number 36, fitted to the unit heater
Type 30130 for 3-stage motors, motor number 35, supplied loose
Type _ _*_ _ 35 R for 3-stage motors, motor number 35, fitted to the unit heater and wired;
Permits the shut-down of individual unit heaters in a switching group by disabling the voltage; the thermal contacts are temporarily bridged and lagged open on the motor side, so that the other unit heaters in the group can continue to work without interruption. No repair switch is required when using KaBUS control electronic unit; protection class: IP 55; max. switching current 25 A (30120; _ _*_ _ 36R), max. switching current 20 A (30130; _ _*_ _ 35R)

*Insert unit heater type

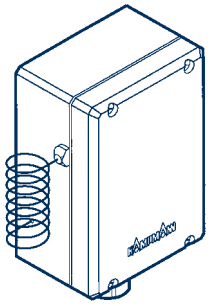
Thermostats



Room thermostat, type 30055

with thermal feedback and adjustable setting

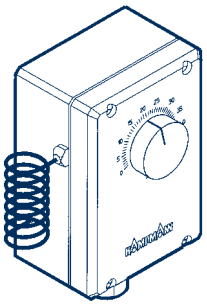
Housing	white plastic, surface-mounted
Temperature setting range	5–30 °C
Switching difference	approx. 0.6 K
Switching capacity	250 V~ 50/60 Hz; 10 (4) A
Protection class	IP 30



Industrial thermostat, type 30058

To prevent unauthorised adjustment, the setpoint can only be adjusted with a screwdriver once the cover has been removed; for use in areas where there is a high level of air humidity and a high concentration of dust in the air

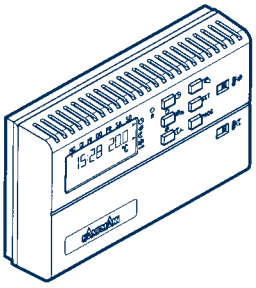
Housing	impact-resistant plastic
Temperature setting range	0–40 °C
Switching difference	approx. 0.75 K
Switching capacity	250 V~; heating 16 (4) A, cooling 8 (4) A
Protection class	IP 54
Dimensions W x H x D	85 x 145 x 57,5 mm



Industrial thermostat, type 30059

Room temperature setpoint is adjusted externally using a dial

Housing	impact-resistant plastic
Temperature setting range	0–40 °C
Switching difference	approx. 0.75 K
Switcing capacity	250 V~; heating 16 (4) A, cooling 8 (4) A
Protection class	IP 54
Dimensions W x H x D	85 x 145 x 68 mm

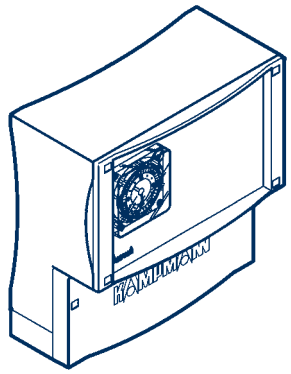


Clock thermostat, type 30056

Attractive combination of clock/room thermostat with electronic 2-point control and digital clock, 15 min power reserve, party switch, switch mode indicator and operating mode indicator (Automatic/Day/Night/Off)

Housing	white plastic, surface-mounted
Temperature setting range	5–40 °C
Night setback	2–10 K, settable
Switching difference	0,1–3 K
Protection class	IP 20
Switching capacity	250 V~; 10 (4) A
Dimensions W x H x D	132 x 82 x 32 mm

Time switches

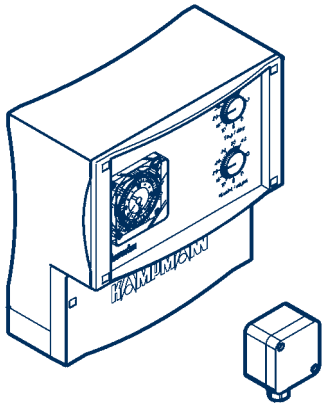


Time switch, type 30054

It is possible to switch between the day and night setpoints using this time switch in conjunction with a 2- or 3-stage, 3-phase switch with integral electronic room temperature controller types 30077/30078; it can also be used in conjunction with two room thermostats type 30055 or industrial thermostats.

- Time switch with day/night/week programme c/w setting pins
- Programmable every 5 minutes/30 minutes - minimum switching interval 20 min/2 h
- Driven by quartz-controlled step motor
- Cable entry via separate terminal box, which can be opened
- Above-average service life due to gold-plated silver contacts

Housing	polystyrene
Protection class	IP 20
Power reserve	100 h
Dimensions W x H x D	262 x 277 x 153 mm

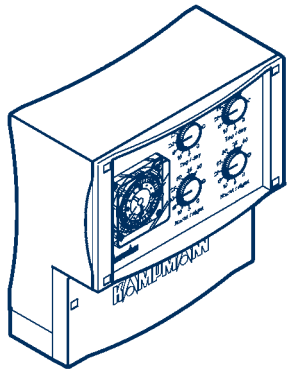


Time switch with electronic room temperature controller and room temperature sensor, type 30076

Electronic 2-point controller for remote control of room temperature from a central point

- With two separately adjustable setpoint potentiometers for day and night room temperature
- Time switch with 100 hour power reserve, day, night and week programme with adjustment pins
- With room temperature sensors in a separate housing

Housing	polystyrene, wall-mounted
Temperature setting range	0–40 °C
Switching capacity	230 V~; 8 (3) A
Protection class	time switch: IP 20, sensor: IP 54
Dimensions of time switch W x H x D:	262 x 277 x 153 mm
Dimensions of sensor W x H x D:	50 x 50 x 30 mm



Time switch with electronic room temperature controller and room temperature sensor, type 30079

As time switch 30076, except that there is an additional room temperature controller with relay

- Required temperature can be set on the four potentiometers for each of two groups
- Two control groups (switches) can be connected
- Two room temperature sensors included with the unit

Housing	polystyrene, wall-mounted
Temperature setting range	0–40 °C
Switching capacity	230 V~; 8 (3) A
Protection class	time switch: IP 20, sensor: IP 54
Dimensions of time switch W x H x D:	262 x 277 x 153 mm
Dimensions of sensor W x H x D:	50 x 50 x 30 mm

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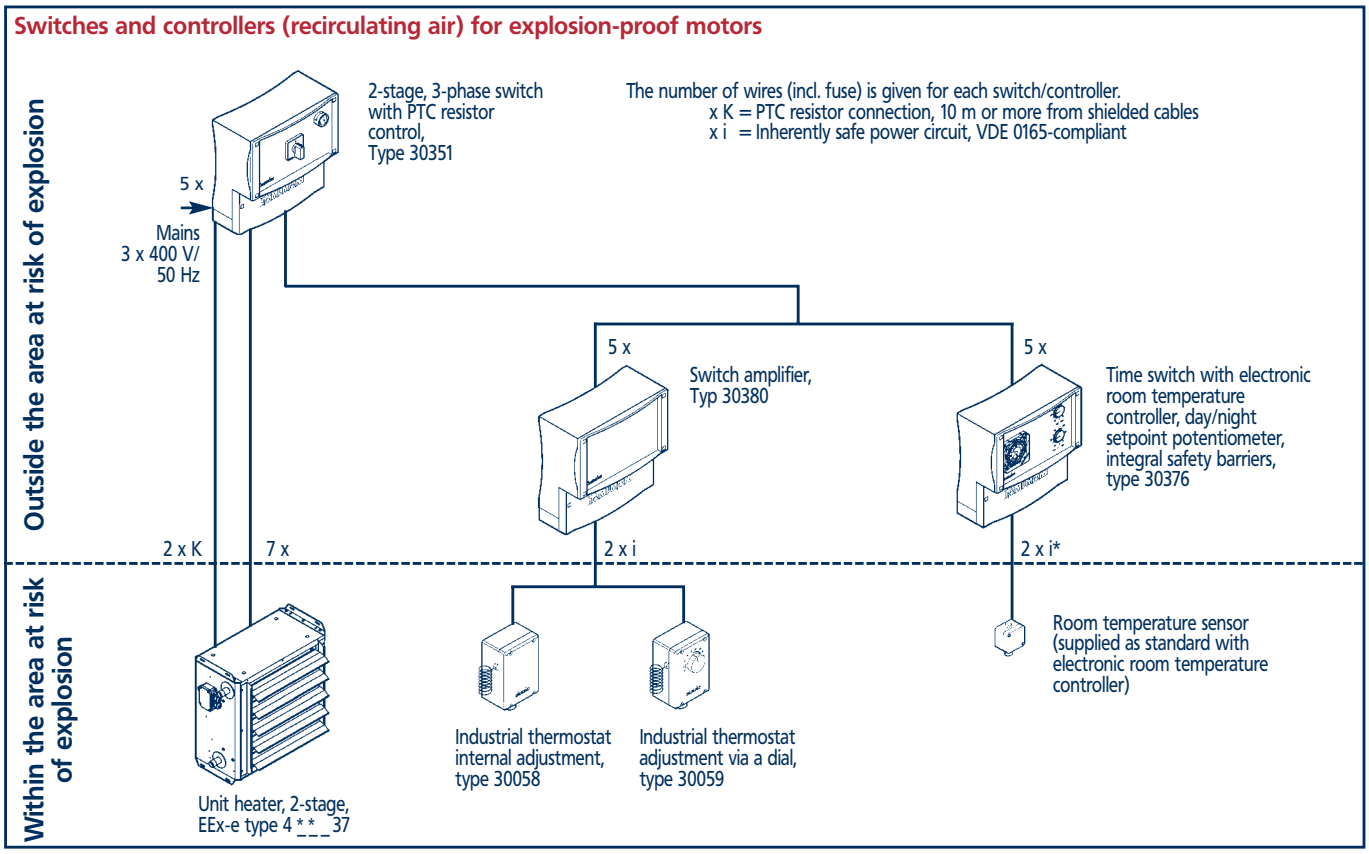
Accessories: Switches for explosion-proof motors

Switches and controllers (recirculating air) for explosion-proof motors



*The sensor cable (1.5 mm²) should be at most 100 m in length and should not be laid near high-voltage cables.
**Insert unit heater type no.

Accessories: Switches for explosion-proof motors

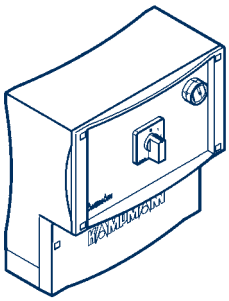
Important information

The provisions of VDE 0165 should be adhered to when installing electrical equipment in explosion-proof areas!

All switches and controllers, with the exception of the sensors in inherently safe power circuits, should not be installed in areas at risk of explosion.

Switch cabinets and bespoke controllers for unit heaters installed in areas at risk of explosion may include multiple stage switches, time switches, electronic room temperature controllers and flap controllers. These units should be designed and calculated specifically to meet the customer's requirements. Please provide us with detailed information.

Switches for explosion-proof motors

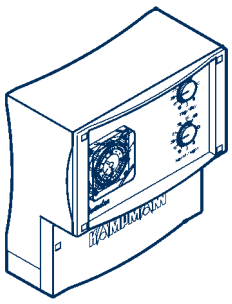


2-stage, 3-phase switch with PTC resistor control, type 30351

With integral PTC resistor unit conforming to PTB 3.53 PTC/A for full motor protection and temperature control. The integral PTC resistors detect all unauthorised motor activity. The motor will be shut-down and there is no automatic reset following power failure.

- Up to two unit heaters can be connected
- Cable entry from below into separate terminal box, which can be opened
- Includes input terminals and several neutral and earthed terminals, as well as terminals for the connection of time switches type 30376 or switch amplifiers type 30380
- Tailor-made model for the connection of more than two unit heaters on request
- Fix outside of area at risk of explosion

Housing	polystyrene
Protection class	IP 54
Max. switching capacity	4 kW/10 A
Dimensions W x H x D	262 x 277 x 153 mm

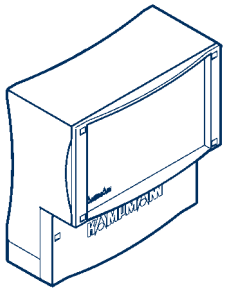


Time switch with electronic room temperature controller and room temperature sensor type 30376

Electronic 2-point controller for remote control of room temperature from a central point; integral safety barrier; allows the room temperature sensor to be connected in areas at risk of explosion; sensor power circuit inherently safe and VDE 0615-compliant

- With two separately adjustable setpoint potentiometers for day and night temp.
- Time switch with 100 hour power reserve, day, night and week programme with adjustment pins; install outside of area at risk of explosion
- With room temperature sensor in a separate housing. Conforms to VDE 0165

Housing	polystyrene
Temperature setting range	0–40 °C
Protection class	IP 20, sensor: IP 54
Dimensions of time switch W x H x D:	262 x 277 x 153 mm
Dimensions of sensor W x H x D:	50 x 50 x 30 mm



Switch amplifier with inherently safe sensor output, type 30380

A switch amplifier is required if an industrial thermostat type 30058 or 30059, a rocker switch or similar is to be connected to the stage switch type 30351. It enables the galvanic separation of the sensor power circuit from the switching power circuit and a strengthening of the signal. The sensor power circuit is inherently safe and VDE 0165-compliant; two-channel switch amplifier for connecting two switches on request; install outside of the area at risk of explosion.

Housing	polytyrene
Protection class	IP 54
Dimensions W x H x D:	262 x 277 x 153 mm

Industrial thermostats, type 30058 and 30059 see P 27

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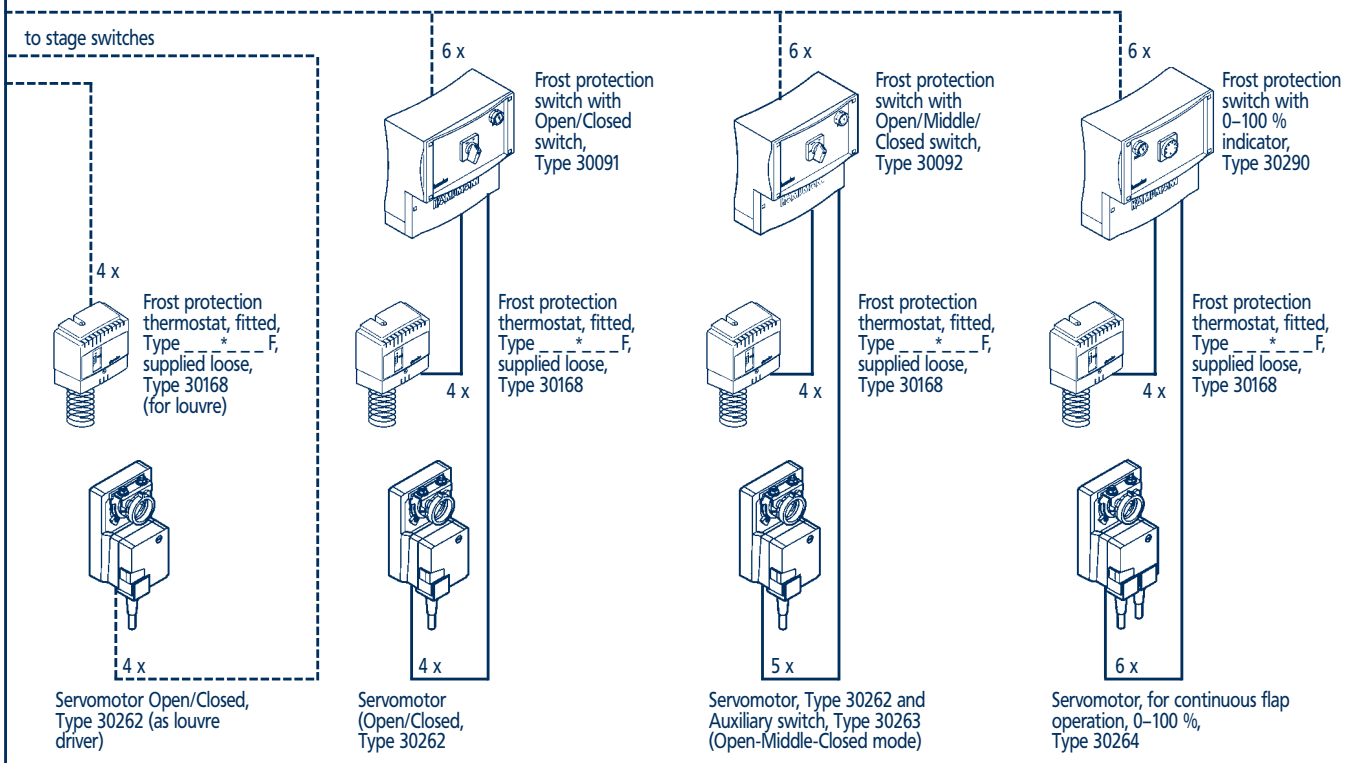
Accessories for mixed air operation: Flap operation

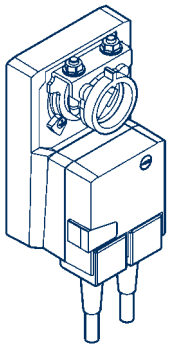


Overview of flap servomotors

The number of wires required is shown for each controller/switch.

Controls

Flap servomotors

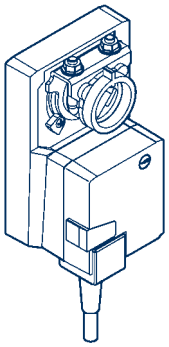


Servomotor for continuous flap operation, Type 30264

Activated by a potentiometer in the frost protection switch type 30290 or supply air temperature controller type 30294;

- For continuous operation
- Protected against overloading, requires no end position switch
- Stops automatically at the end position of the flap or at the motor stop position
- Gear wheel can be moved manually by a push button

Supply voltage	230 V/50 Hz
Control voltage	0–10 V
Running time	150 sec
Protection class	IP 54



Servomotor for flap adjustment "Open/Closed", Type 30262

Activated by frost protecion switch type 30091, type 30092 or supply air controller type 30095;

- For Open/Closed operation
- Protected against overloading, requires no end position switch
- Stops automatically at the end position of the flap or at the motor stop position
- Gear wheel can be moved manually by a push button

Control voltage	230 V/50 Hz
Running time	150 sec
Protection class	IP 54

*Insert unit heater type

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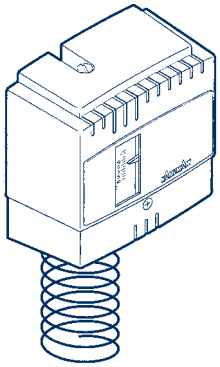
Accessories for mixed air operation: Frost protection

Frost protection



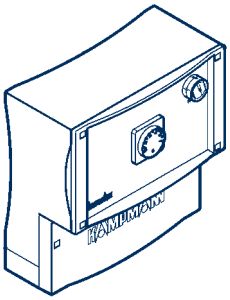
Frost protection thermostat

supplied loose, Type _ _ _*_ _ _ F

All fresh air systems require every unit heater to be fitted with a frost protection thermostat. This is fitted to the outlet air side of the unit heater and is set to approx. +7 °C (minimum 5 °C). Once the temperature falls below this level, in conjunction with a frost protection switch (type 30290, type 30091 or type 30092) or the supply air temperature controller (type 30294 or type 30095), the flap of the mixing box closes and the fan is switched to "fault" mode. Once the fan has been switched off due to this fault, it has to be restarted manually.

- With a self-monitoring sensor
- Type _ _ _*_ _ _ F frost protection thermostat is factory-fitted to the unit heater

Setting range	–10 to +12 °C
Protection class	IP 40
Length of capillary tube	3 m

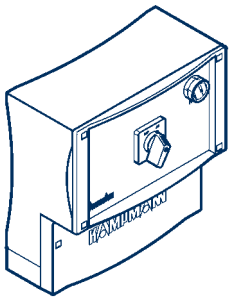


Frost protection switch with 0–100 % position indicator, Type 30290

If the supply of external air is closed off when there is a risk of frost and when the unit heater fan is shut down by the room temperature controller or by manual operation; when there is risk of frost, the system is switched to "fault" mode. When it restarts, the servomotor moves to the position set on the frost protection switch.

- For continuous control (0–100 %) in conjunction with servomotor type 30264 and frost protection thermostat type 30168 or type _ _ _*_ _ _ F
- Control indicator to display risk of frost
- Max. 10 servomotors can be run
- A frost protection thermostat and servomotor are required for each unit heater.

Housing	polystyrene, wall-mounted
Protection class	IP 40
Dimensions W x H x D:	262 x 277 x 153 mm

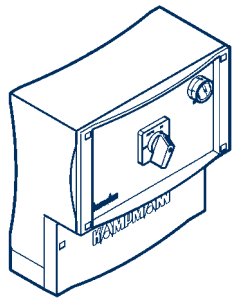


Frost protection switch with "Open/Closed" switch, type 30091

The operation of this unit is identical to that of type 30290.

When the unit restarts, the servomotor moves to the "Open" or "Closed" position set on the frost protection switch; for "Open/Closed" operation in conjunction with servomotor type 30262 and frost protection thermostat type 30168 or type _ _ _*_ _ _ F

Housing	polystyrene, wall-mounted
Protection class	IP 54
Dimensions W x H x D:	262 x 277 x 153 mm



Frost protection switch with "Open/Middle/Closed" switch, type 30092

The operation of this unit is identical to that of type 30290 and 30091.

When the unit restarts, the servomotor moves to the "Open", "Middle" or "Closed" position set on the frost protection switch; for "Open/Middle/Closed" operation in conjunction with servomotor type 30262, auxiliary switch type 30263 and frost protection thermostat type 30168 or type _ _ _*_ _ _ F

Housing	polystyrene, wall-mounted
Protection class	IP 54
Dimensions W x H x D:	262 x 277 x 153 mm

*Insert unit heater type

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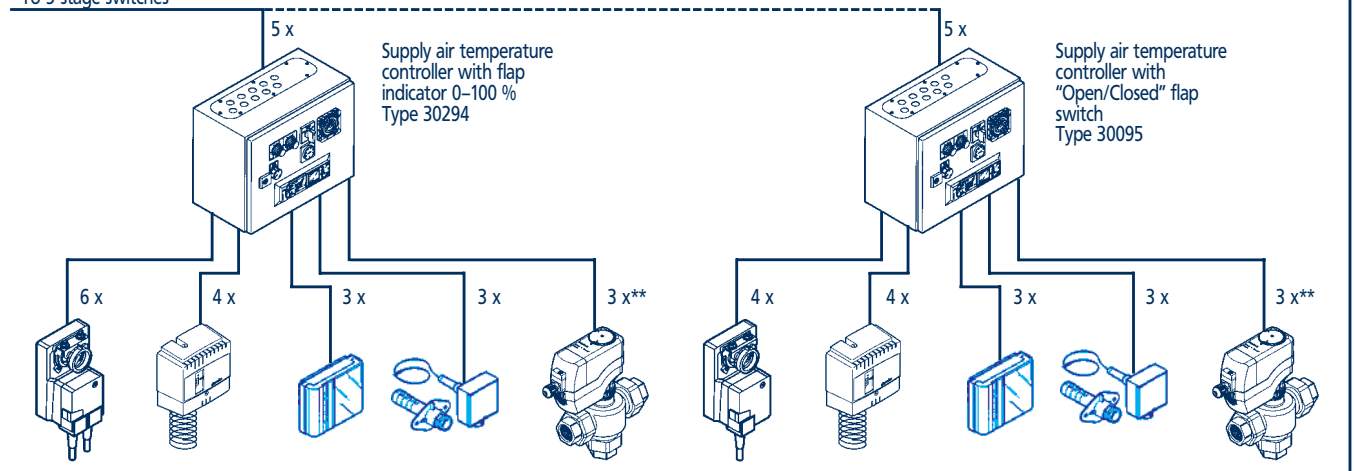
Accessories for mixed air operation: Supply air temperature control · 3-way valves



Servomotor for continuous flap operation 0–100 %, Type 30264 | Frost protection thermostat fitted Type _ _ _*_ _ _F, supplied loose, Type 30168 | Room temp. sensor (supplied as standard with supply air temperature controller) | Supply air sensor (supplied as standard with supply air temperature controller) | 3-way valve with actuator, Type 30197, 1" Type 30198, 1 1/4" Type 30199, 1 1/2"

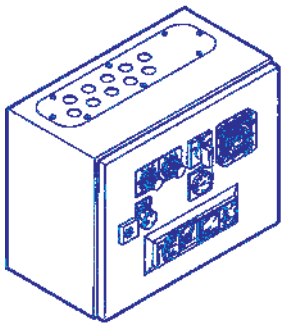
Servomotor "Open/Closed", Type 30262 | Frost protection thermostat fitted Type _ _ _*_ _ _F, supplied loose, Type 30168 | Room temp. sensor (supplied as standard with supply air temperature controller) | Supply air sensor (supplied as standard with supply air temperature controller) | 3-way valve with actuator, Type 30197, 1" Type 30198, 1 1/4" Type 30199, 1 1/2"

The number of wires required is given for each control unit, e.g. 4 x = 4 connecting wires inclusive of fuse.

Overview of supply temperature controllers

*Insert unit heater type **Shielded cables, such as J-Y (St) Y, 0.8 mm, should be laid separately from high-voltage cables!

Supply temperature control · 3-way valve



Supply temperature controller

Type 30294 with 0–100 % position indicator, for use with continuous flap servomotors, type 30264

Type 30095 with "Open/Closed" flap switch, for use with Open/Closed flap servomotors type 30262

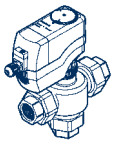
With the following equipment and functions:

- Constant temperature controller, compares the temperature detected by the room temperature sensor with the setpoint value set on the day or night potentiometer and regulates the movement of the 3-way valve accordingly
- Integral supply air controller, used in conjunction with a supply duct sensor, prevents the supply air temperature falling below the pre-set value.
- Frost protection contoller to close the mixing box when there is a risk of frost and when the fan is switched off and to open the 3-way valve when there is a risk of frost
- Optional connection of stage switches for supply and extract air (time-controlled air extraction), 3-phase and 1-phase models, frost protection thermostat, flap servo-motor, room temperature sensor and actuator for 3-way valve

Robust controls cabinet: painted RAL 7035, VDE-compliant, terminal strips wired on a back panel, including:

- Time switch with day/night/week programme and power reserve
- Day/night/time switch (in "Night" position, the flap is in the "Recirc. air" position),
- Frost indictor, reset button and night temperature indicator

Separate controls accessories: 1 no. room temperature sensor, 1 no. air duct sensor to limit the minimum supply air temperature

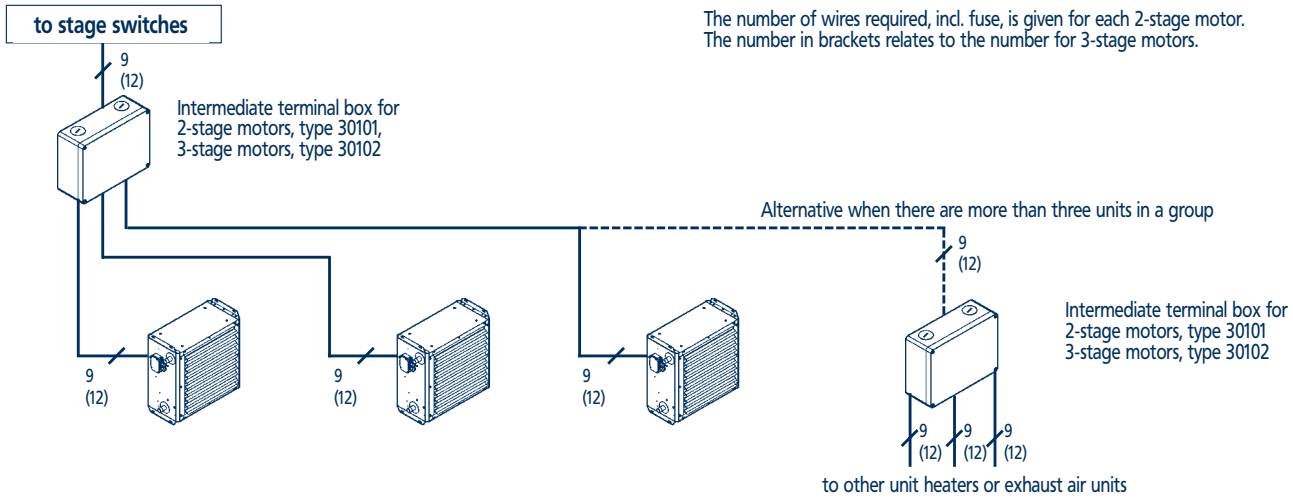


3-way valve with actuator type 30197 1", type 30198 1 1/4", type 30199 1 1/2"

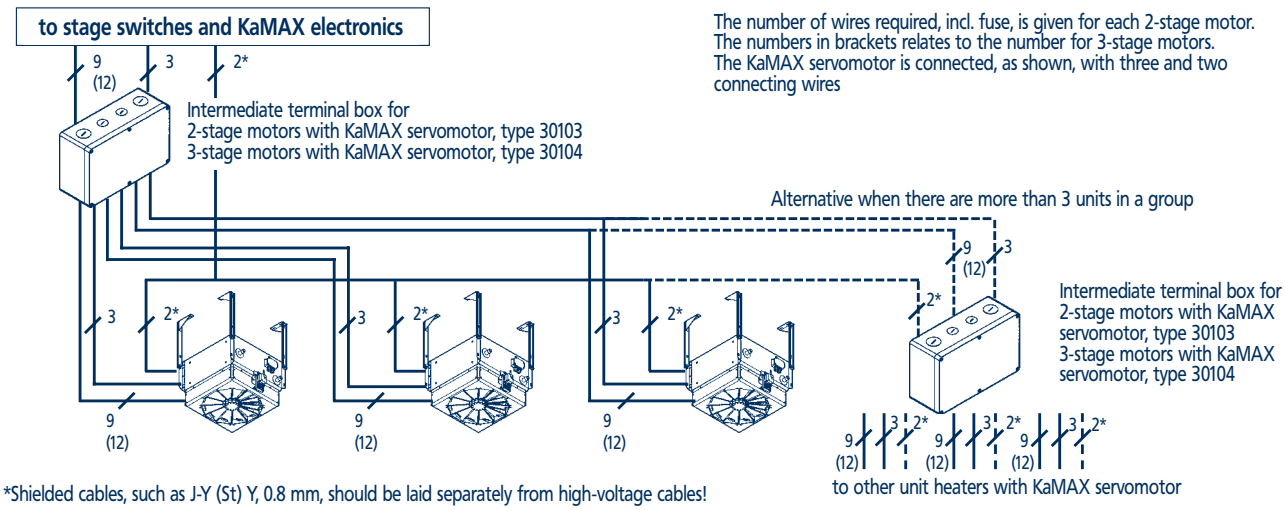
For use in conjunction with the supply air temperature controller; with 24 V actuator with automatic zero control

Accessories: Intermediate terminal boxes

Intermediate terminal boxes for unit heaters and extract air units

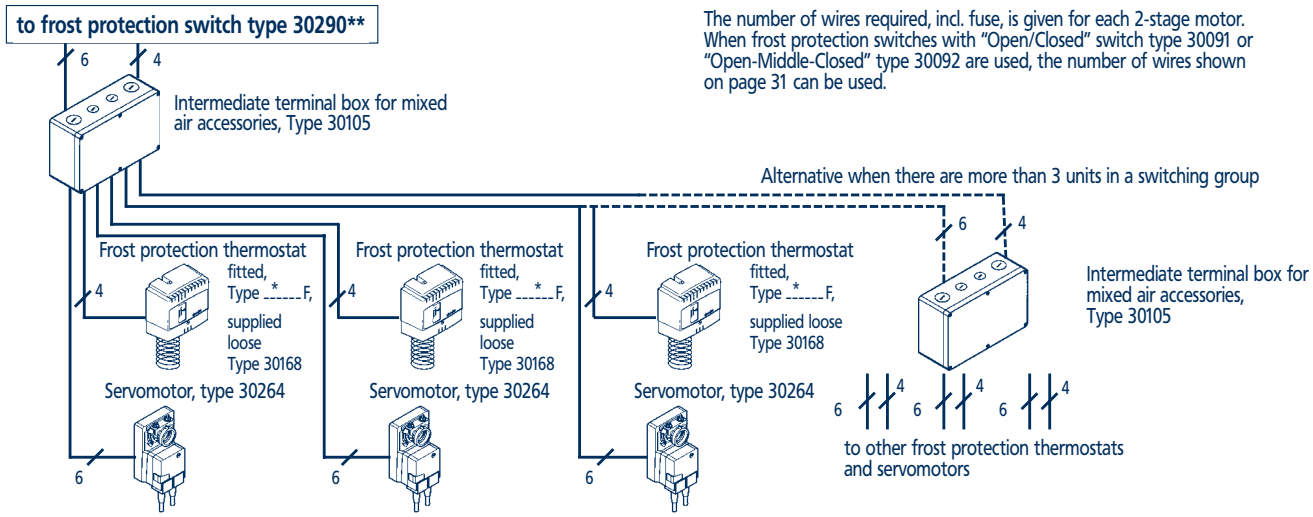


Intermediate terminal boxes for unit heaters and supply air units with KaMAX servomotors



*Shielded cables, such as J-Y (St) Y, 0.8 mm, should be laid separately from high-voltage cables!

Intermediate terminal boxes for mixed air accessories



* Insert unit heaters type
**See also page 33 with supply air temperature controller type 30294

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Accessories: Intermediate terminal boxes · Customised designs

Operational readiness indicator

All switches, with the exception of type 30050, are fitted with an operational readiness indicator, which goes out when there is a fault or malfunction, such as when the thermal contact has been activated owing to overheating of the windings. Switching functions, triggered by room thermostats or other controllers, are not shown by the operational readiness indicator. Should there be a fault or malfunction, the motor is shut down to prevent the motor continually switching on and off.

The motor can be switched on again by switching the stage switch to zero. Switches connected to a room thermostat, automatically restart following power failure.

Intermediate terminal boxes

Intermediate terminal boxes are required if one or more unit heaters or extract air units is connected as a group to a stage switch or switching cabinet. With unit heaters which have mixed air accessories and where a frost protection switch is used, intermediate terminal boxes are used to connect additional frost protection thermostats and flap actuators.

The intermediate terminal boxes allow users to distribute the incoming cable, such as from the stage switch, to three connections. Three unit heaters or two unit heaters and an additional intermediate terminal box can thus be connected up.

Construction:

- Wall-mounted housing with quick-release opening made of impact-resistant ABS, grey
- Fitted with WAGO spring caged terminals for wires up to 4 mm², with sufficient room for looping cables and openings for other cables
- Protection class IP 54

Overview of intermediate terminal boxes

Type	Intermediate terminal box for	Dimensions H x W x D mm
30101	2-stage motors	200 x 150 x 75
30102	3-stage motors	200 x 150 x 75
30103	2-stage motors with KaMAX servomotor	200 x 160 x 90
30104	3-stage motors with KaMAX servomotor	200 x 160 x 90
30105	Mixed air accessories when using a frost protection switch	200 x 150 x 75

Customised designs

Stage switches

available on request

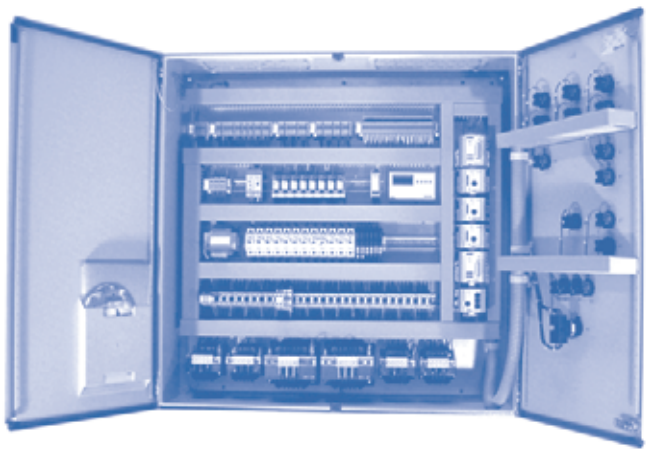
- for **installation within a switching cabinet,** fixed to a back panel, cam switch supplied loose, fault indicators by others
- with **additional relay** for diverse applications
- to connect to **DDC system** provided by others

Customised switching cabinets

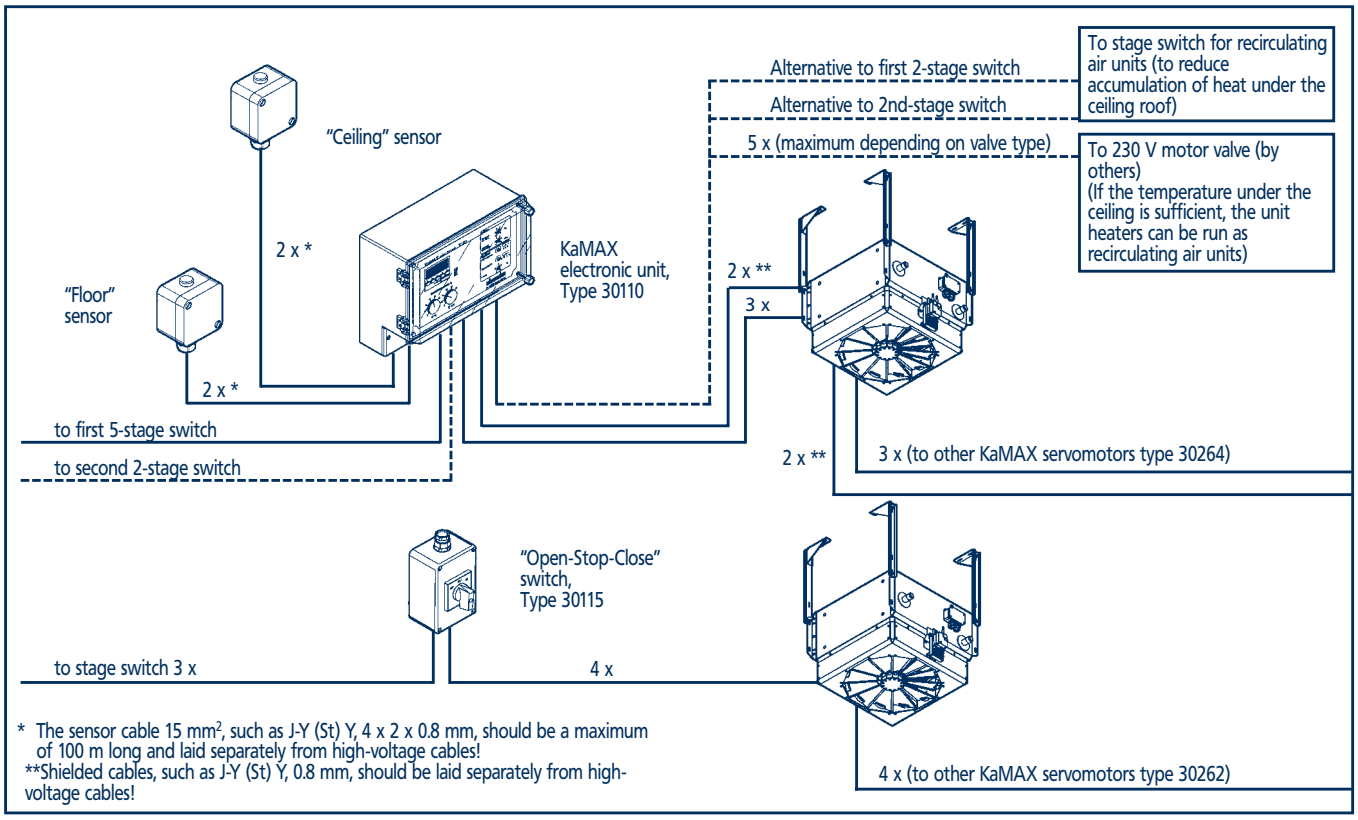
Individual switching cabinets for various systems are available on request.

Kampmann switching cabinets are designed and manufactured in cooperation with the client. There is a very wide choice of controllers and control technology to choose from. All the switches and control units described on the previous pages can be combined in the switching cabinet.

- Stage switches are either 2-stage, 3-stage or 5-stage
- Analogue controller for simple control tasks
- Digital databus-supported controller for use with the KaBUS system for more complex tasks
- Combinations of recirculating air, mixed air and extract air controllers
- The type and number of switching groups can be selected at will
- Training can be provided on request



Switching cabinet for the combined operation of recirculating air, mixed air and exhaust air groups



* The sensor cable 15 mm², such as J-Y (St) Y, 4 x 2 x 0.8 mm, should be a maximum of 100 m long and laid separately from high-voltage cables!
**Shielded cables, such as J-Y (St) Y, 0.8 mm, should be laid separately from high-voltage cables!

Control using the KaMAX electronic unit, type 30110

The KaMAX electronic unit controls the room temperature electronically and improves the function of the KaMAX. The KaMAX electronic unit can be connected to 2 stage switches and up to 10 servomotors. One servomotor (continuous), type 30264, is required per KaMAX. The operating elements are protected by a perspex front panel.

Electronic temperature control

When the temperature falls below the pre-set setpoint, the electronic room temperature controller starts the unit heater up via the electronic room temperature controller. The set point can be set on two separate day-night setpoint potentiometers on the KaMAX electronic unit within a range of 5-40 °C.

Enhanced KaMAX operation

The temperature difference (temperature stratification) between the "ceiling" sensor and the "floor" sensor determines the fin positions of the KaMAX by means of a characteristic curve. The steepness of the characteristic curve can be set within a temperature difference range of 1–10 K. Fin adjustment is continuous. As an alternative, a sensor can also be fitted in the air outlet of the unit heaters rather than the "ceiling" sensor. In this case, the steepness of the characteristic curve can be set to a range of 10–40 K.

Min-Max position limitation

The minimum and maximum fin position can be limited to up to 50 %. This prevents the air being discharged horizontally in high-ceilinged buildings where there is minimal temperature stratification. The maximum vertical position of the fins can also be restricted to 50 % in low-ceilinged spaces.

Variable switching point

An additional switching point 0–10 K above the pre-set setpoint permits the use of a motorised valve in the pipework. In this case, the unit heater can be operated as a recircuating air unit when a pre-set minimum temperature difference is exceeded and heat underneath the ceiling can be used to heat ground level. Should the temperature at ground level fall below the preset temperature, the motorised valve is opened and warm air is blown into the area. Two recirculating air switching groups can also be connected instead of the motorised valve.

Digital time switch

The integral digital time switch has six switching cycles, which can be selected at random, switching status indicator, party switch, 1-month power reserve and Automatic/Day/Night/Off operating mode switch, enabling the system to be individually programmed. Two temperature sensors (ceiling and floor) are included with the unit.

Protection class	IP 54
Dimensions W x H x D	257 x 214 x 128 mm

Open-Stop-Closed switch, type 30115

For the electrical operation of the KaMAX with continuous fin adjustment. One Open/Closed servomotor type 30262, is required per KaMAX.

Protection class	IP 54
Dimensions W x H x D	80 x 120 x 60 mm

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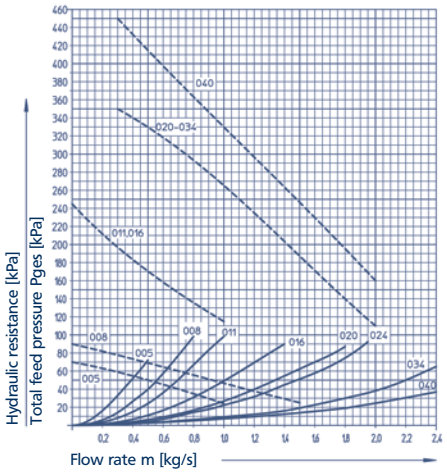

Design information

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Heat load calculation

The heat load is calculated on the basis of the current version of DIN EN 12831.

Transmission heat losses

On the basis of DIN, transmission heat losses can be simply and easily calculated. Standard cases are calculated on the basis of the following assumptions:

- Heated room with a height of greater than 5 m or less
- Even temperature stratification

In rooms with a height in excess of 5 m, the increase in heat loss due to the vertical temperature stratification has to be taken into consideration. In buildings, in which the standard heat losses are below 60 w/m² of heated useable area, the entire standard heat loss must therefore be corrected using a supplementary value, as per the following table, if these buildings have a high ceiling.

Room height correction factor for predominantly convective heating process — **Table 1**

Forced convection of warm air	Height of space to be heated	
	5-10 m	10-15
Cross-flow from a low height	1,30	1,60
Downward-pointing from a high height	1,21	1,45
Cross-flow of medium and high temperature from a medium height	1,15	1,30

Ventilation heat losses

According to DIN EN 12831, both free ventilation as well as mechanical ventilation has to be taken into account.

Free ventilation

In every building, air exchange with outside air takes place, depending on the construction and position of the building. This free natural exchange of air has to be taken into account when calculating the heat load. Contrary to transmission heat losses, the ventilation heat loss by free ventilation cannot be calculated exactly using DIN.

In practice, it is hard to avoid doors being opened. In order to allow for the effect of doors being opened from time to time, air exchanges, as shown in Table 2, have proved to be realistic.

Do not confuse air exchange and air circulation!

Air exchange is understood as meaning the replacement of inside air by outside air. Air circulation is the circulation per hour of air caused by the unit heater and thus is a measure of the quality of air distribution in the area to be heated.

Air exchange (LW) — **Table 2**

Ceiling height [m]	Air exchange (normal position)	Air exchange (exposed position)
3	1.0	1.7–2.0
4	0.9	1.5–1.8
5	0.85	1.4–1.7
7	0.7	1.0–1.4
> 10	0.5	0.8–1.0

Mechanical ventilation

Mechanical ventilation is always necessary, according to work-place regulations, when

- The size of the space conflicts with free ventilation (this is always the case if there are no adequate ventilation shafts in the building for free ventilation).
- The position of the space requires it, such as in a basement, whether the floor is 2 m lower than ground level, or where there are surrounding buildings.
- There is a particular type of use of the building, such as work space without windows or rooflight, high internal heat load, danger of exceeding MAK values.

We would recommend that you check the planning requirements prior to commencement of the design. Should the circumstances be unclear, then we would recommend contacting the responsible building authorities. Building approvals also often make reference to other standards and guidelines, such as VDI 2082. The ventilation heat loss has to be added to the transmission heat loss and the heat loss due to free ventilation, accoding to DIN EN 12831.

Standard inside temperature (room temperature)

The minimum room temperature is generally stipulated by workplace guidelines.

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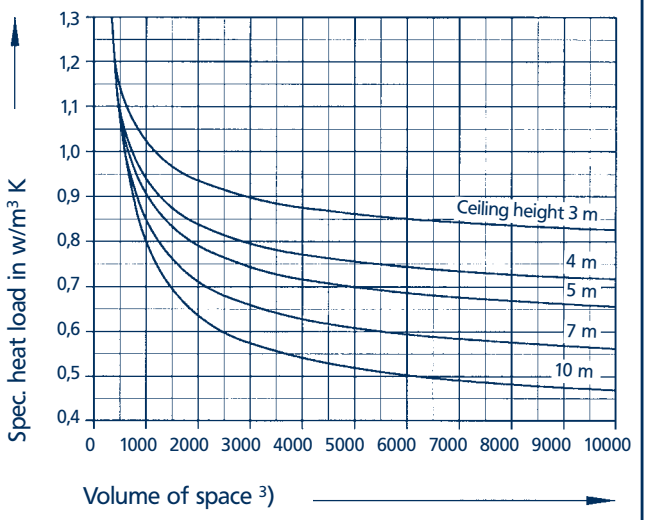
Approximate calculation of the heat load of buildings with natural ventilation

A precise calculation can be made of the heat load for buildings with natural ventilation simply and easily using the form on page 40 and using the specific heat load diagram (Diag. 1).

An exact calculation must be done according to DIN EN 2831 and DIN 4108 for unusual halls or for submission to the building authorities. This also applies to systems that operate with mechanical ventilation.

Specific heat load — **Diag. 1**

Basis	Natural air exchange taken into consideration	
	Ceiling height	Air exchange [1/h]
Detached building, side ratio 1:4 to 2:3 mean U-figure 0.7 w/mK Percentage of windows and doors up to 20 %	3 m 4 m 5 m 7 m 10 m	1,0 0,9 0,85 0,7 0,5



Number and size of unit heaters

The calculation of the number and size of unit heaters to be used is based on the heat load calculated. Structural issues, such as fixings and mounting points, as well as the permissible noise level, also have to be taken into consideration.

It is more beneficial to have several smaller units as

- the distribution of temperature is better,
- air velocity is lower,
- this produces lower noise levels.

If only very low air velocity is desired, then we would recommend designing the unit heater system in such a way that the required heat output can be achieved at low speed.

In practise, it has proved effective to run 2-stage unit heaters at stage 1 and 3-stage unit heaters at stage 2. This then leaves something in reserve for heating the space after the heaters have been switched off for some time , such as at the weekend.

Air circulation

It has alo shown itself to be effective to design the unit heater system on the basis of air circulation, in order to achieve a reliable choice of unit and even air distribution.

$$LU\ [1/h] = \frac{V_{Leff} \cdot n}{V}$$

LU	[1/h]	=	Air circulation at design fan stage
V_{Leff}	[m³/h]	=	Effective air volume from unit heater at design fan stage
V	[m³]	=	Volume of the space to be heated
n	[-]	=	Number of unit heaters

Designing the system on the basis of air circulation makes the choice of unit heater much easier. By taking into account the maximum mounting height of the different air outlets, the correct spacing between unit heaters can be achieved without further calculations.

Air circulation LU — **Table 3**

LU [1/h]	Standard louvres	KaMAX
at least	2.0	1.5
better	2.5	1.8
good	3 – 3.5	2.5
very good	4 – 5	3.0

Form for the heating of high-ceilinged buildings

Approximate calculation of the heat load of buildings with natural ventilation (no mechanical ventilation)

Order: _____

Location: _____

Project:

Calculation of correction factors

V	[m³]	=	Volume of the space = L _____ x W _____ x H _____	→ _____ m³ **V**
q	[w/m³ K]	=	Specific heat load from Diagram 1 (page 39)	→ _____ w/m³K **x q**
△t	[K]	=	Temperature difference between inside temperature and outside temperature _____ °C = t_i (inside temperature) - _____ °C = t_a (outside temperature) For outside temperature, see DIN EN 12831 Appendix 1 (-10 °C to -20 °C) = _____ °C	→ _____ K **x △t**
	f_1	=	**Correction factor for U-value**	
	1.0	–	Standard insulation, according to Heat Insulation Ordinance, mean U-value 0.7 w/m² K Percentage of windows and doors on walls 20 %	
	0.6 – 0.7	–	Very well insulation, mean U-value 0.4 w/m² K Low percentage of windows and doors on walls 10 %	
	0.8 – 0.9	–	Well-insulated, mean U-value 0.5 w/m² K Low percentage of windows and doors on walls 15 %	→ _____ **x f_1**
	1.5 – 2.0	–	Poorly insulated High percentage of windows and doors on walls 20 - 40%	
	2.0 – 3.0	–	No insulation, old buildings Very high percentage of windows and doors on walls over 40 %	

	f_2	=	**Correction factor for frequency of use/position**
normal positon	Unprotected position exposed to wind (coastal, exposed hill)		Frequency of door opening
0.8	1.0 – 1.2		seldom (up to 1 min/h) or doorway with door curtain
1.0	1.3 – 1.4		average (up to 5 min/h)
1.3 – 1.5	2.0 – 2.5		frequent (no door curtain system)
2.0 – 2.5	3.0 – 4.0 preferably install door air curtain		doors opposite each other, frequent use, often both at the same time

→ _____ **x f_2**

	f_3	=	**Correction factor for adjacent heated rooms**	
1.0		=	no adjacent heated rooms	
up to 2000 m³	above 2000 m³	Height		
0.90 0.94	0.88 0.92	up to 5 m over 5 m	upper floor with heated lower floor (no heat losses through floor)	
0.80 0.88	0.76 0.84	up to 5 m over 5 m	lower floor, heated upper floor (no heat losses through ceiling)	→ _____ **x f_3**
0.97 0.95	1.00 0.97	up to 5 m over 5 m	short external wall, adjacent heating (no heat losses through short external wall)	
0.90 0.85	0.95 0.90	up to 5 m over 5 m	long external wall, adjacent heating (no heat losses through long external wall)	

	f_4	=	**Correction factor for floor area**	
1.0		=	normal halls, wall ratio 1 : 4 to 2 : 3	
up to 2000 m³	above 2000 m³	Height		
0.96 0.94	1.00 0.97	up to 5 m over 5 m	square floor area	→ _____ **x f_4**
1.06 1.10	1.04 1.08	up to 5 m over 5 m	long narrow space wall ratio approx. 1 : 5	
Q [watt]		=	Approximate heat load of building with natural ventilation (without forced ventilation)	← _____ W **= Q**

The above calculation is an approximate calculation. Unusual halls or submissions to building authorities will require an exact calculation in line with DIN EN 12831 and DIN 4108. This also applies to systems with mechanical ventilation.

Administrator: _____ Date: _____

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Form for the heating of high-ceilinged buildings

Hall heating

In order to be able to provide a solution and quotation, we require the following technical data.

Project information

Quotation for:

Contact: Tel.:

Building project:

Details of the hall to be heated

Floor area: L = x W = m

Height: H = m

Type of use: (warehouse)

Required inside temp.: °C

External temp. (EN 12831 Bb: °C

Position: normal detached exposed

Transmiss. heat losses: kW

Ventilation heat losses: kW

not yet calculated

Heat insulation (should heat load not yet be known)

good normal poor none
(attach drawing)

Doors: No. x m

insulated uninsulated

Are the doors used frequently? yes no

Door air curtains to be fitted? yes no

Windows: No. x m

No. x m

single glazing double glazing

Equipment in the hall

Crane runway Large machinery Shelving

Plan of equipment (enclosed) yes no

Statutory requirements

Building authority requirements? yes no
(Please check and attach copy of building authority document)

Layout and design of units

Unit heater layout: Wall Ceiling

Unit heater design: Recirc. air Mixed air

With mixed air units:

Required air exchange: 1/h

Extracted air: Roof Wall

Heat exchanger: Copper/alu. Steel

Steam Cross-flow

Fan: 2-stage 5-stage 3-stage

1-phase Expl.-proof

Temperature control: Simple KaBUS system

Centralised control
(caretaker's office) by time switch

Switching cabinet for multiple switching groups

Boiler

existent, LPHW / °C

new:

Please sketch hall or attach drawings; please draw in layout of unit heaters, if known.

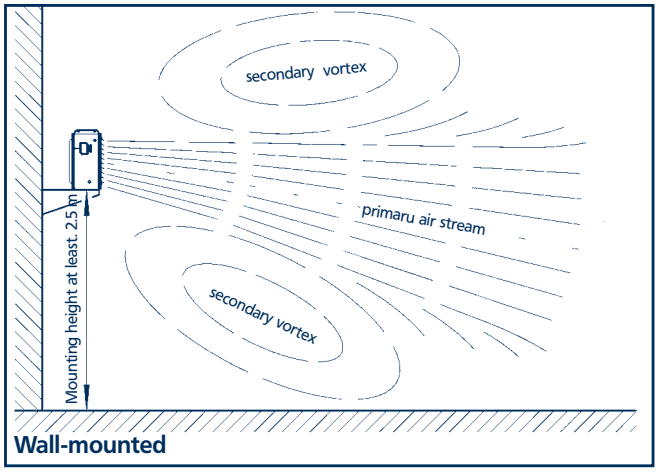
Sketch

Drawings attached: yes no

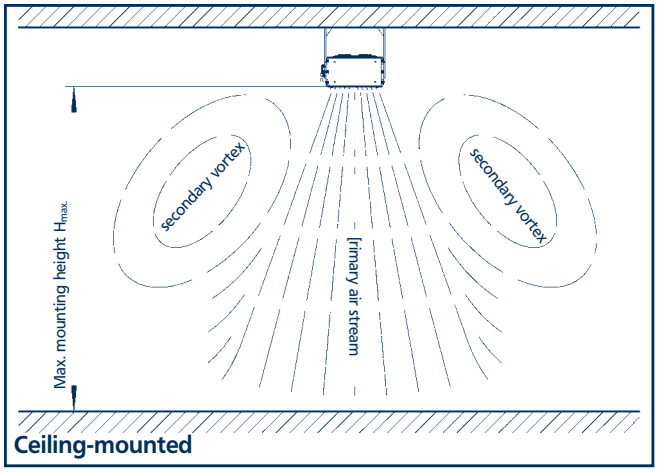
Data taken by: Date:

1 kPa = 1

Design information



Wall-mounted



Ceiling-mounted

Layout of unit heaters

When positioning unit heaters within a space, existing fixtures and fittings, such as shelving, large production plants, machinery, crane runways etc. have to be taken into consideration. Workplaces and recreational areas should not be located directly in the primary air stream of a unit heater, but rather in the secondary air vortices.

Wall-mounting

If unit heaters are to be fixed to the wall, the distance from the lower edge of the unit heater to the floor should be at least 2.5 m and at most 4 m. Where they are fitted at a height of greater than > 4 m, it is not possible to guarantee that the area will be heated evenly, without the use of further accessories, such as air ducts etc.

The lateral distance of the unit heaters from each other is determined first and foremost by the air circulation; a spacing of more than 15 m should be avoided at all costs.

Off-set arrangement of the unit heaters opposite each other provides better air distribution.

Ceiling-mounting

Fixing the unit heaters to the ceiling has significant advantages over wall-mounting:

- Energy-savings, thanks to the lower temperatures under the ceiling. The accumulation of heat under the ceiling is dispersed and heat losses are reduced.
- The arrangement of the unit heaters is not dependent on the position of the fixtures and fittings and to a large extent free from restrictions due to structural conditions.
- A number of special air outlets, such as KaMAX, makes a tailor-made system possible.
- The distance to ground level means that the air outlets can be adjusted to ensure that there are no draughts at floor level.

The units are arranged symmetrically in the space on the basis of the air circulation.

Throw

The throw (see pages 60 to 75) is directly related to the

- geometry of the space, primarily the ceiling height,
- excess temperature of the air volume,
- fixtures and fittings in the space,
- air volume
- unit heater air outlet.

The throw is defined as the maximum penetration of the primary air stream under ideal conditions.

The isothermal throw, given in the performance tables for wall-mounted units, only applies to the use of louvre type 3*001. Owing to the huge significance of the room geometry, fixtures and fittings, upcurrents and higher outlet temperatures, these figures are only guideline figures. A maximum penetration depth of the primary air stream of 3 to 4.5 x ceiling height should be assumed. Greater penetration depths are only indirectly involved in the air exchange owing to secondary vortices.

Maximum mounting height

The maximum mounting height H_{max} is calculated from the maximum penetration depth of the air stream with ceiling-mounted units. Like the throw with wall-mounted units, the maximum mounting height is also dependent on the

- geometry of the space and the fixtures and fittings in it,
- air volume and air outlet of the unit heaters but also the excess temperature of the discharged air stream.

The maximum mounting heights given in Table 4 on page 43 and in the Technical Data on pages 60–75 apply to free-blowing operation at each fan stage.

Diagrams 3 to 6 on page 44 show the maximum mounting heights in line with the effective air volume, when using ductwork components.

All given maximum mounting heights only apply to a leaving air temperature of up to 15 K above room temperature. A correction factor is needed for higher outlet air temperatures, see page 43, Diagram 2.

Maximum mounting height (ceiling-mounted units) (approx. figures, free-blowing)* Table 4

TOP unit heater			44 _ _ _ _			45 _ _ _ _			46 _ _ _ _			47 _ _ _ _		
Switching stage			2(3)	1(2)	(1)	2(3)	1(2)	(1)	2(3)	1(2)	(1)	2(3)	1(2)	(1)
Fan speed 1/min			1350	1050	900	1350	1050	900	900	700	450	900	700	450
Max. mounting height H_{max} in m	Diffuser hood	3*005	3.3	2.9	2.2	3.9	3.4	2.6	3.9	3.4	2.6	4.2	3.8	2.9
	4-way air diffuser	3*004	3.3	2.9	2.2	3.9	3.4	2.6	3.9	3.4	2.6	4.2	3.8	2.9
	Louvre 1-row	3*001	5.2	4.5	3.3	6.2	5.4	4.0	6.8	5.9	4.4	7.9	6.9	5.1
	Louvre 2-row	3*002												
	Induction louvre	3*101	7.1	6.0	4.4	8.7	7.5	5.5	9.3	8.0	5.9	11.4	9.9	7.4
	Outlet nozzle	3*006	7.1	6.0	4.4	8.7	7.5	5.5	9.3	8.0	5.9	11.4	9.9	7.4
	KaMAX, positioned vertically	3*111	8.2	7.0	5.0	10.7	9.2	6.5	11.8	10.2	7.3	17.2	14.8	10.7
Throw[2] wall-mounted	Louvre 1-row	3*001	17.0	13.0	8.0	21.0	16.0	10.0	25.0	19.0	12.0	36.0	26.0	17.0
	Louvre 2-row	3*002	17.0	13.0	8.0	21.0	16.0	10.0	25.0	19.0	12.0	36.0	26.0	17.0
	Induction louvre	3*101	17.0	13.0	8.0	21.0	16.0	10.0	25.0	19.0	12.0	36.0	26.0	17.0

Correction factor for mounting height

The given maximum mounting height relates solely to a leaving air temperature of up to 15 K above room temperature. The penetration depth of the primary air stream is reduced by the thermal upcurrent, the maximum mounting height $H_{max.}$ has to be corrected as follows, where there is an excess temperature of discharged air of more than 15 K:

$$H = H_{max} \cdot f_H$$

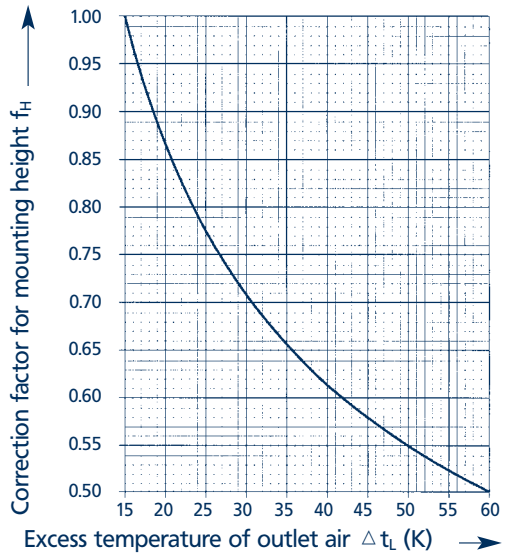
H [m] = Permitted mounting height
H_{max} [m] = Max. mounting height
f_H [/] = Correction factor for mounting height (see Diag. 2)

Calculating the excess temperature of the discharged air:

$$\triangle t_L = t_{L2} - t_i$$

$\triangle t_L$ [°C] = Excess temperature of outlet air
t_{L2} [°C] = Leaving air temperature
t_i [°C] = Inside temperature of the space

Correction factor for mounting height Diagram 2



Leaving air temperatures

The leaving air temperatures of the different unit heaters are given in the performance tables (pages 60 to 75). Should there be a reduced air volume and thus also a reduced heat output, due to the fitting of additional ductwork components, or should there be a temperature difference $\triangle t$ between the mean water temperature and the entering air temperature not shown in the tables, then the leaving air temperature can be calculated as follows:

$$t_{L2} = t_{L1} + \frac{Q_{eff} \cdot 1000}{V_{L\,eff} \cdot C}$$

t_{L1} [°C] = Entering air temperature
t_{L2} [°C] = Leaving air temperature
Q_{eff} [KW] = Eff. heat output of unit heater
$V_{L\,eff}$ [m³/h] = Effective air volume of unit heater (taking into consideration ductwork components fitted)
C [wh/m³ K] = Multiplier for calculating leaving air temperature

t_{L1}	C	t_{L1}	C
+ 20 °C	0.34 wh/m³ K	± 0 °C	0.36 wh/m³ K
+ 10 °C	0.35 wh/m³ K	– 10 °C	0.37 wh/m³ K

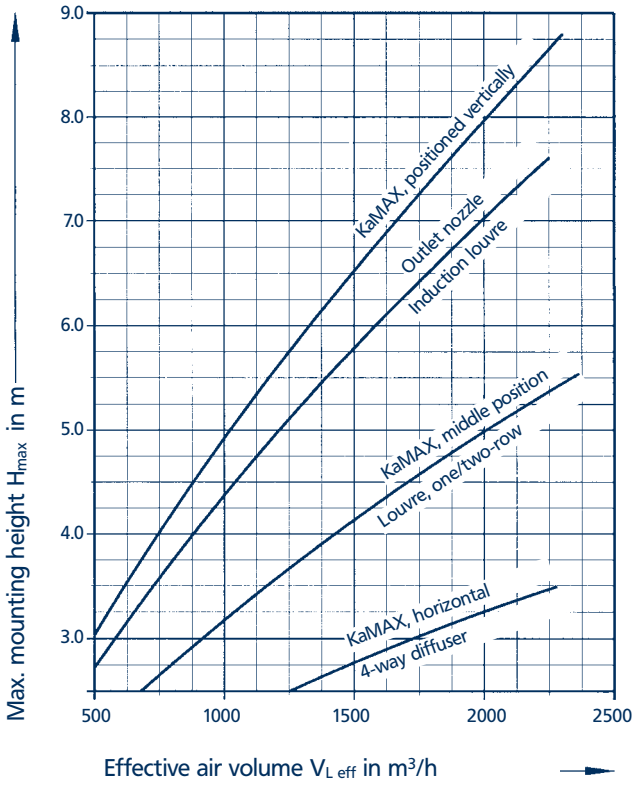
Guidelines for leaving air temperature:

- min. 35 – 40 °C (only consider a lower temperature at high fan speed or when ceiling-mounted in high spaces),
- max. 50 – 55 °C (max. 45 °C in very high-ceilinged buildings).

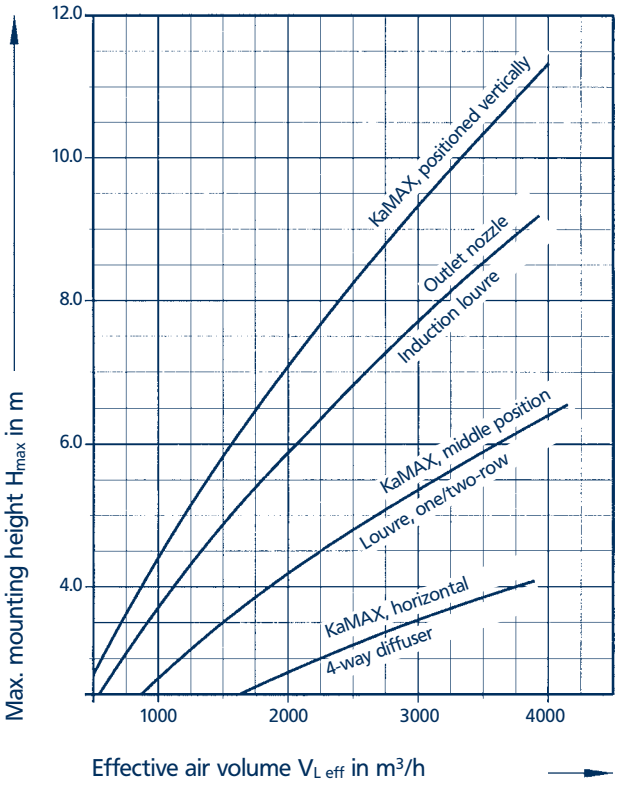
Primary air currents below 40 °C cause an uncomfortable feeling if they are directed toward people. If it is impossible to avoid a leaving air temperature of approx. 40 °C, due to lower entering air temperatures, then the discharge-side accessories should be selected in such a way that people only spend time in the secondary air stream zones. Where the unit heaters are ceiling-mounted on ceilings of higher than 4.5 m, the leaving air temperature should not be too high, as the thermal upcurrents will mean that there is not an even distribution of heat at floor level.

[1] Max. mounting height based on air volume, see page 44; all the max. mounting height figures given in the tables only apply to a leaving air temperature of up to 15 K above room temperature. For higher outlet air temperatures, see "Correction factor for mounting height" above.
[2] The throw is significantly dependent on the ceiling height. A maximum penetration depth of the primary air stream of 3–4.5 x ceiling height should be assumed.

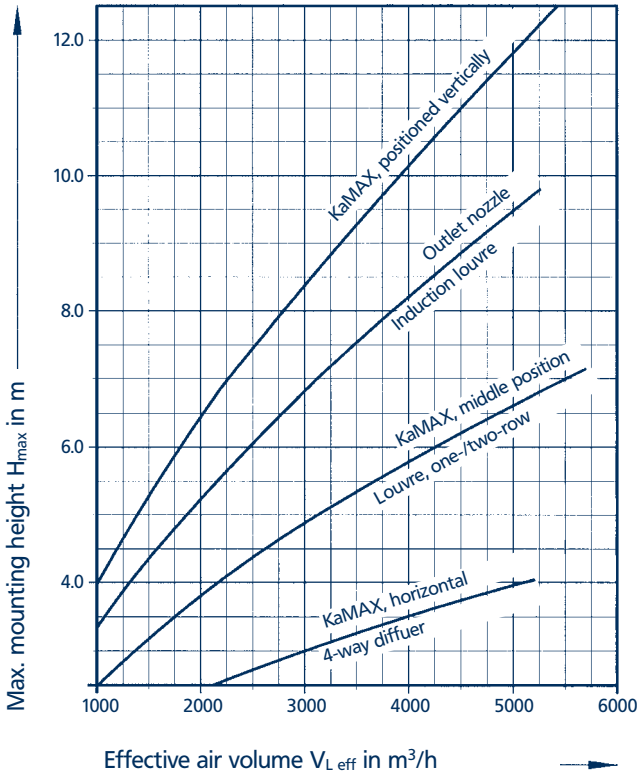
Max. mounting height* Series 44 — Diagram 3



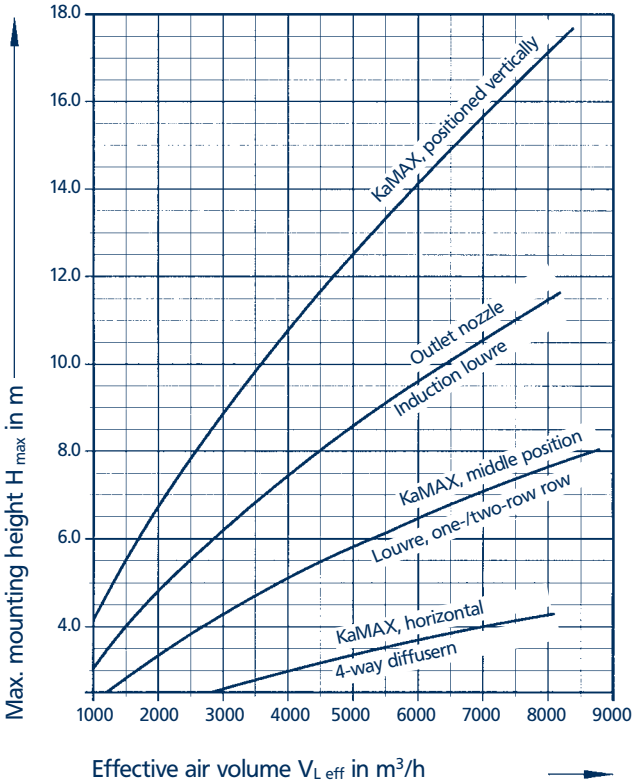
Max. mounting height* Series 45 — Diagram 4



Max. mounting height* Series 46 — Diagram 5



Max. mounting height* Series 47 — Diagram 6



*All max. mounting heights apply only to a leaving air temperature of up to 15 K above room temperature;
see correction factor on page 43 for higher leaving air temperatures

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Noise levels

The aerodynamic design of the fan sickle-blades combined with a full nozzle, achieves a relatively low noise level. Nevertheless when designing the unit heater system, the permissible sound pressure level must be taken into account.

We would recommend checking the building authority's requirements in terms of sound levels prior to embarking on the design. These often make reference to other standards and guidelines, such as DIN EN 13779, Workplace ordinance, VDI 2082.

Sound pressure level

The sound pressure levels given in the performance tables have been measured in an open room at a distance of 5 m from the unit heater. The actual sound pressure level is significantly influenced by the geometry of the room, the absorption capacity of the room and the fixtures and fittings.

To determine the permissible sound pressure level of unit heaters, we would recommend initially calculating the basic sound level of the space. If the sound pressure level of the unit heater is below the sound level of the room, the overall sound level will only change imperceptibly.

If only very low noise levels are permitted, we would recommend designing the unit heater system to operate at low to medium fan speed. Very low fan speeds can also be obtained by using the 5-stage controllers type 30751 and type 30752 (see page 26).

Sound power level

To determine the air noise that will be transferred through a ductwork system, the sound power level, which is dependent on the room and distance from the unit, is used in acoustic calculations (e.g. according to VDI 2081 "Noise generation and reduction in building services systems").

The sound pressure levels, which are required to determine the differential pressure levels, are calculated on the basis of the enveloping surface method according to DIN 45635 using comparative methods.

The sound power levels for the different fan stages are given in the performance tables of technical data on pages 60 to 75.

Examples of A-rated design sound pressure levels of building services systems according to DIN EN 13779

Building/Type of space	Recommended sound pressure dB(A)
Individual office	30 - 40
Open plan office	35 - 45*
Conference room	30 - 40
Auditorium	20 - 35
Cafeteria/Restaurant	35 - 50
Classroom/Kindergarten	35 - 45
Department store	40 - 50

*To provide privacy, it is recommended not to aim for lower noise levels in open plan offices.

Door screening systems

There is often an unpleasant exchange of air when doors are frequently opened, especially in exposed locations, which can extend right throughout the whole space. At the bottom of the door, cold air streams in and at the top of the door warm ambient air flows out. Workplaces close to the doors are significantly affected by this. Unpleasant draughts can, however, be reduced by door screening systems.

Possible control options:

- Via door contacts at pre-set fan speed.
- Constant operation when doors are continually open.
- Door contact switch with external thermostat switched in series, in order to avoid unnecessary operation when the outside temperature is acceptable.

Unit heaters are ideal for fitting above doorways. The construction of the doorway and the fixing options have to be taken into consideration. Unit heaters with the following air outlets have proved very successful in screening doorways:

Louvre type 3*002 for a 4-sided air stream above doorways up to a maximum height of 3.5 m, depending on the output of the unit heater.

Wide stream nozzles type 3*007 for use with door screening systems fitted at a height of greater than 3.0 m. Non-standard designs are available on request.

Should a supply air system be planned, the effectiveness of the door air screening system can be significantly improved by lower excess pressure. The outlet air temperatures should be approximately 30 °C. Leaving air temperatures which are too high reduce the penetration depth of the air stream. Thus, depending on the heating medium, unit heaters with a low heat exchanger performance figure and a high air volume should be used.

Design

There are no scientific studies about the effectiveness and layout of door air screening systems. In practice, the following selection of unit heaters has proved effective.

Unit selection for door screening systems — **Table 6**

Doorway size Width [m]	Doorway size Height [m]	Non-exposed doorways, normal requirements	Exposed doorways, increased requirements	Non-exposed doorways, reduced req.
2.0	2.0	2 x 4420 (4421)	2 x 4520 (4521)	1 x 4520 (4521)
2.0	3.0	2 x 4620 (4621) or 1 x 4720 (4721)	2 x 4620 (4621) od. 2 x 4720 (4721)	2 x 4520 (4521)
3.0	3.0	3 x 4620 (4621) or 2 x 4720 (4721)	5 x 4620 (4621) od. 3 x 4720 (4721)	2 x 4620 (4621)
3.0	4.0	4 x 4620 (4621) or 3 x 4720 (4721)	6 x 4620 (4621) od. 4 x 4720 (4721)	3 x 4620 (4621) or 2 x 4720 (4721)
4.0	4.0	5 x 4620 (4621) or 4 x 4720 (4721)	8 x 4620 (4621) od. 5 x 4720 (4721)	4 x 4620 (4621) or 3 x 4720 (4721)
5.0	4.0	7 x 4620 (4621) or 4 x 4720 (4721)	6 x 4720 (4721)	5 x 4620 (4621) or 3 x 4720 (4721)
4.0	5.0	7 x 4620 (4621) or 4 x 4720 (4721)	7 x 4720 (4721)	5 x 4620 (4621) orr 3 x 4720 (4721)
5.0	5.0	5 x 4720 (4721)	8 x 4720 (4721)	6 x 4620 (4621) or 4 x 4720 (4721)

Figures in brackets apply to unit heaters with galvanised steel heat exchangers

Conversion to other water temperatures

Calculating the water temperatures should these not be listed in the performance tables:

Formulae

$$Q_{eff} = Q_B \bullet f_{Q1} \quad (1)$$

$$t_{wm} = \frac{t_{w1} + t_{w2}}{2} \quad (2)$$

$$\triangle t_w = t_{w1} - t_{w2} \quad (3)$$

$$\triangle t = t_{wm} - t_{L1} \quad (4) \quad \text{for steam: } \triangle t = t_D - t_{L1} \quad (5)$$

$$t_{L2} = t_{L1} + \frac{Q_{eff} \bullet 1000}{V_{Leff} \bullet C} \quad (6)$$

$$m = \frac{Q_{eff}}{\triangle t_w} \bullet 0{,}86 \quad (7)$$

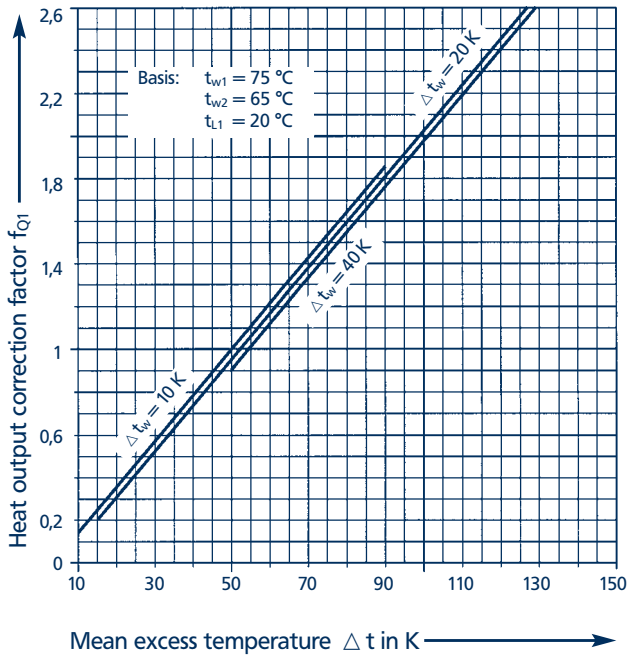
Formulae

Q_{eff} [kW] = Effective heat output from the unit heater
Q_B [kW] = Basic heat output from the unit heater (Technical data)
LPHW : t_{w1} 75 °C, t_{w2} = 65 °C, t_{L1} = 20 °C
Steam: saturated steam 0.1 bar, t_{L1} = 20 °C
Cross-flow: t_{w1} = 80 °C, t_{w2} = 40 °C, t_{L1} = 20 °C
f_{Q1} [/] = Heat output correction factor for water
t_{wm} [°C] = Mean water temperature
t_{w1} [°C] = Flow temperature
t_{w2} [°C] = Return temperature
$\triangle t_w$ [K] = Water temperature difference
$\triangle t$ [K] = Mean excess temperature
t_D [°C] = Saturated steam temperature
t_{L1} [°C] = Entering air temperature
t_{L2} [°C] = Leaving air temperature
V_{Leff} [m³/h] = Effective air volume from the unit heater (taking into account ductwork see pages 51–53)
V_L [m³/h] = Nominal air volume from unit heater (Technical data, see pages 60-75)
C [wh/m³K] = Multipler for leaving air temperature

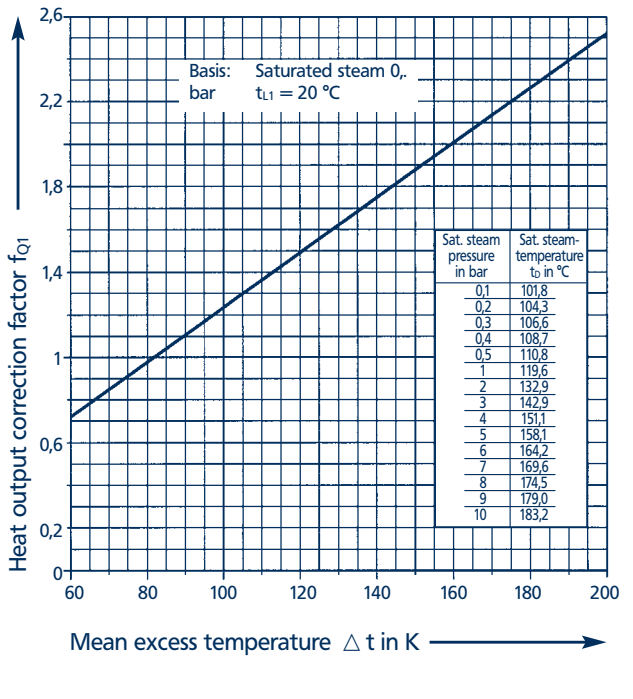
t_{L1}	C
+ 20 °C	0.34 wh/m³K
+ 10 °C	0.35 wh/m³K
± 0 °C	0.36 wh/m³K
– 10 °C	0.37 wh/m³K

m [m³/h] = Flow rate
$\triangle P_w$ [kPa] = Water pressure drop

Heat output correction factors for copper/aluminium and galvanised steel heat exchangers **Diagram 7**



Heat output correction factor for galvanised steel heat exchanger for use with steam **Diagram 8**



Sat. steam pressure in bar	Sat. steam-temperature t_D in °C
0,1	101,8
0,2	104,3
0,3	106,6
0,4	108,7
0,5	110,8
1	119,6
2	132,9
3	142,9
4	151,1
5	158,1
6	164,2
7	169,6
8	174,5
9	179,0
10	183,2

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Conversion to other water temperatures

Calculation

given:

Unit heater type 463035
Flow temperature 65 °C
Return temperature 55 °C
Entering air temperature +18 °C

required:

Heat output Q_{eff} at
Fan stage 2
Leaving air temperature t_{L2}
Water pressure drop $\triangle P_w$

Calculation

(2) $t_{wm} = \frac{t_{w1} + t_{w2}}{2} = \frac{65\,°C + 55\,°C}{2} = 60\,°C$

(3) $\triangle t_w = t_{w1} - t_{w2} = 65 - 55 = 10\,K$

(4) $\triangle t = t_{wm} - t_{L1} = 60 - 18 = 42\,K$

From Diagram 7: $f_{Q1} = 0.82$; from Technical Data page 62, Type 463035, 2nd fan stage: QB (LPWW 75/65 °C $t_{L1} = 20$ °C) = 36,2 kW
$V_L = V_{Leff} = 4120\ m^3/h$

(1) $Q_{eff} = Q_B \cdot f_{Q1} = 36{,}2 \cdot 0.82 = 29{,}7\,kW$

(6) $t_{L2} = t_{L1} + \frac{Q_{eff} \cdot 1000}{V_{Leff} \cdot C} = 18 + \frac{29.7 \cdot 1000}{4120 \cdot 0.34} = 39.2\,°C$

(7) $m = \frac{Q_{eff}}{\triangle t_w} \cdot 0.86 = \frac{29{,}7}{10} \cdot 0.86 = 2.6\ m^3/h$

From water pressure drop diagram 15 on page 54: $\triangle P_w = 10$ kPa

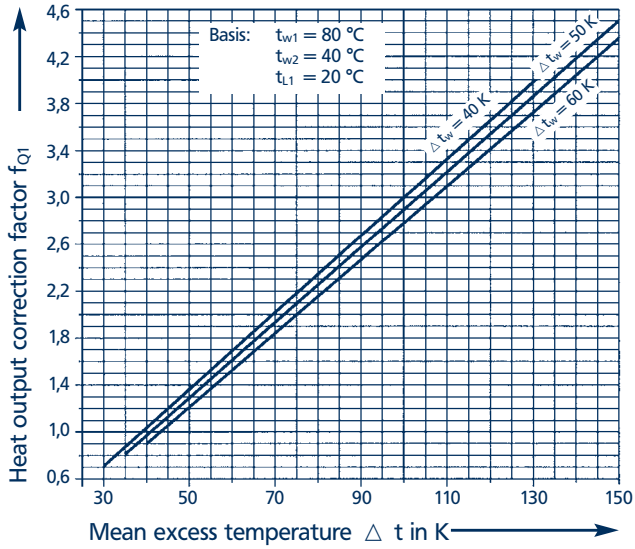
Conversion to other fan speeds

The speed of the unit heater fan can be significantly lowered by using a 5-stage switch with 3-phase motor or a 7-stage switch with 1-phase motor. The unit heater is then fixed at stage 1 or stage 2 and the fan speed is reduced by the output voltage. Unit heaters supplied with KaBUS control are factory-wired to stage 2. It is possible to re-wire them on site to stage 1.

Formulae:

$V_{eff} = V_L \cdot f_{L2}$ $\quad Q_{eff} = Q \cdot f_{Q2}$

Heat output correction factors for galvaised steel heat exchange, cross-flow Diagram 9



Result

Heat output Q_{eff} = 29. kW
Leaving air temperature t_{L2} = 39.2 °C
Water pressure drop $\triangle P_w$ = 10 kPa

Abbreviations

V_{Leff} [m³/h] = Effective unit heater air volume
V_L [m³/h] = Nominal air volume of unit heater (Technical data)
f_{L2} [/] = Air volume correction factor (fan speed) Table 7
Q_{eff} [kW] = Effective unit heater heat output
Q [kW] = Nominal heat output from unit heater (Technical data)
f_{Q2} [/] = Heat output correction factor (fan speed) Table 7

Correction factors for heat output and air volume at other fan speeds Table 7

		5-stage switch type 30752, type 30751 or KaBUS system										7-stage switch type 30772							
		2 (delta connection)					1 (star connection)					Operation with a 7-stage 1-phase controller							
	TOP Series	Switching stage 5	4	3	2	1	Switching stage 5	4	3	2	1	TOP Series	Switching stage 7	6	5	4	3	2	1
Fan speed [1/min]	44_ _36/45_ _36	1350	1280	1200	1000	770	1050	900	700	530	380	44_ _31	1350	1300	1260	1190	890	600	390
f_{L2}	44_ _36/45_ _36	1.0	0.95	0.88	0.74	0.57	1.0	0.86	0.67	0.50	0.36	45_ _31	1.0	0.96	0.93	0.88	0.66	0.44	0.29
f_{Q2}	44_ _36/45_ _36	1.0	0.96	0.92	0.82	0.68	1.0	0.9	0.76	0.62	0.50		1.0	0.97	0.95	0.92	0.75	0.57	0.42
Sound pressure level [dB(A)]	44_ _36	55	54	52	48	42	49	45	39	34	30	44_ _31	55	54	53	52	46	37	28
Sound power level [dB(A)]		71	70	68	64	58	65	61	55	50	46		71	70	69	68	62	53	44
Sound pressure level [dB(A)]	45_ _36	59	57	55	51	45	51	47	42	37	32	45_ _31	59	58	57	56	50	41	32
Sound power level [dB(A)]		75	73	71	67	61	67	63	58	53	48		75	74	73	72	66	57	48
Fan speed [1/min]	46_ _36/47_ _36	900	800	730	600	490	700	550	460	360	280	46_ _31	900	770	640	500	370	290	220
f_{L2}	46_ _36/47_ _36	1.0	0.89	0.81	0.67	0.54	1.0	0.79	0.66	0.51	0.40	47_ _31	1.0	0.86	0.71	0.56	0.41	0.32	0.24
f_{Q2}	46_ _36/47_ _36	1.0	0.93	0.87	0.76	0.65	1.0	0.85	0.75	0.63	0.54		1.0	0.9	0.79	0.67	0.54	0.46	0.38
Sound pressure level [dB(A)]	46_ _36	58	56	53	49	45	51	46	42	37	32	46_ _31	58	55	51	45	39	33	27
Sound power level [dB(A)]		74	72	69	65	61	67	62	58	53	48		74	71	67	61	55	49	43
Sound pressure level [dB(A)]	47_ _36	61	58	56	52	48	57	52	48	43	37	47_ _31	61	58	54	48	42	36	30
Sound power level [dB(A)]		77	74	72	68	64	73	68	64	59	53		77	74	70	64	58	52	46

Fresh air and mixed air operation

Unit heaters are ideal for the decentralised supply of fresh air (see also pages 38 and 39).

A wide range of standard accessories enables the individualised arrangement and design of wall-mounted or ceiling-mounted units. Suggested installation arrangements are given on page 20.

Fitting ductwork components to the system reduces the air volume and thus also the heat output of the unit heater. This should be borne in mind when designing the system; refer also to the Technical data and calculation formulae on pages 50 to 53.

Mixing box • Louvre

Mixing boxes and louvres can prevent fresh external air from entering the room when the fan is switched off. The flaps are shut by frost protection switches when the fan is not operational. If it is planned to fit a mixing box then it is not necessary to fit an additional louvre.

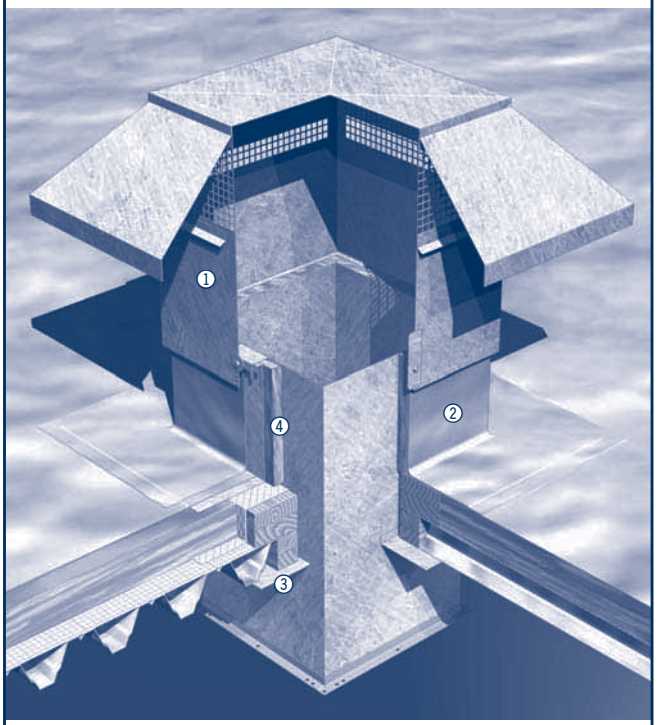
Mixing boxes and louvres are fitted with an adjustable lever if no servomotor is ordered.

The following flap servomotors are available as accessories:

- Type 30262: Open/Closed
- Type 30262 with 30263: Open/Middle/Closed
- Type 30264: Continuous, 0–100 %

For controls options for mixed air operation see pages 31 to 33.

Fresh air entry through the roof



1 Rain hood type 3*114
2 Roof socket for flat roof with roof duct type 3*119
3 Cover panel type 3*11800
4 Insulate with insulation material

Frost protection

Fresh air systems have to be fitted with some sort of frost protection equipment. Frost protection thermostats monitor the leaving air temperature in conjunction with the frost protection switch and this protects the heat exchanger from freezing. A frost protection thermostat thus has to be provided for every system that has a fresh air connection. The frost protection thermostat should be set to a minimum of +5 °C.

The following frost protection thermostats are available:

- Unit heater type no. suffix . . . . . F, will be factory-fitted to the unit heater when a unit heater is ordered at the same time (please state relevant unit heater type no.).
- Type 30168 is supplied loose and can be fitted subsequently to the unit heater.

The frost protection switch ensures, in the event of frost, that the flap is closed and the fan is switched to "fault" mode. Automatic re-set is not possible.

The following frost protection switches are available:

- Type 30290 with continuous (0–100 %) position indicator
- Type 30091 with Open/Closed switch
- Type 30092 with Open/Middle/Closed switch

See page 32 for frost protection controls.

Supply air temperature control

To control the supply air temperature if fresh air is still required once the required room temperature has been reached. Supply air temperature controllers with minimum temperature limitation, 3-way valves and accessories are described in more detail on page 33.

Extract air

If unit heaters have an extract air connection, appropriate extract air units have to be provided. The design of the extract fans is based on the desired excess or negative pressure in the space to be heated. The following can be used, for example:

- Roof extract fans with diagonal impeller (Catalogue group 1.60)
- Extract air units with axial fans (see page 76)

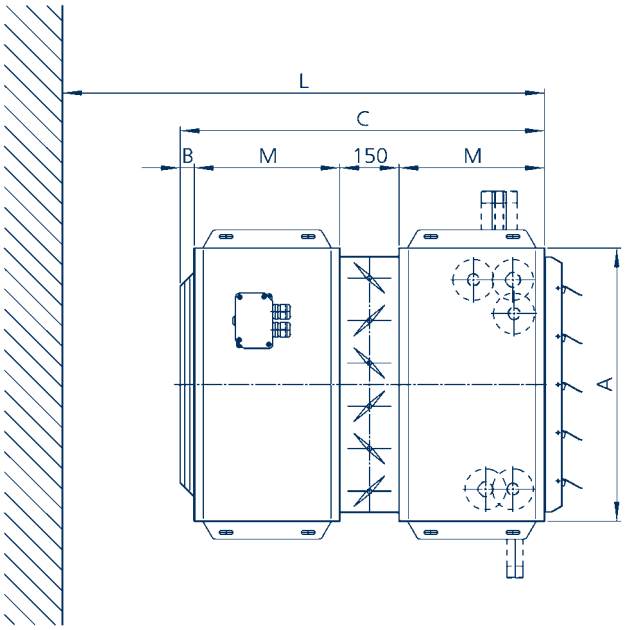
It is more efficient, in terms of energy-savings, to extract air from lower level because then cooler air will be drawn in.

Use of ductwork components

The extensive range of accessories enables a wide range of different layout combinations to be designed using the ductwork components listed on pages 18 to 19. These can be used on either the inlet air or outlet air side. The following should be borne in mind:

- There will be a reduction in air volume and heat output when ductwork components are used which have substantial air-side resistance. Refer to pages 50 to 53 for information on this.
- The maximum permissible flow temperature may not be exceeded as it may lead to unacceptable overheating of the motor windings and bearings if the fan does not operate for a period of time (see Table 9).
- Overheating of the fan can also be prevented by using a slow-closing solenoid or motorised valve. This means that the water flow is interrupted before the fan is switched off and the heat exchanger cools down. Stage switches with fan run-on relay (3 minutes) and terminals for a motorised valve are available on request.
- If ductwork components are to be fitted, it must still be possible to remove and replace the fan if necessary.
- If a filter box is to be fitted, room must be left to replace the filter if necessary.
- In order to prevent vibration transfer to the ductwork components, the use of a sail cloth socket is recommended in the wall or ceiling opening.

Unit heater combination with supply air unit, loackable louvre and heat exchanger with housing



Dimensions of supply air units • Louvre • Heat exchanger with housing — Table 8

Supply air units	Louvre	Heat exchanger with fan*	A	B	C	L min.	M
4400**	34023	44200-44400/44210-44410/44220-44320/44330-44430	500	30	820	950	320
4500**	35023	45200-45400/45210-45410/45220-45320/45330-45430	600	30	830	970	320
4600**	36023	46200-46400/46210-46410/46220-46320/46330-46430	700	40	830	1020	320
4700**	37023	47200-47400/47210-47410/47220-47320/47330-47430	800	40	910	1130	360
Diameter of connection and arrangement as per the heat exchanger selected, as shown on the following pages; dimensions in mm							

*Housings with heat exchangers can also be supplied on their own without fan unit and louvre, with heat exchangers of your choice for use in ductwork systems for heating and cooling. The housing can also be fitted to heat exchangers, for low temperature heat recovery.

Maximum permissible flow temperatures — Table 9

	Arrangement	Unit heater type nos.**			
		4420 – 4440 4421 – 4441 4422 – 4432 4432 – 4443	4520 – 4540 4521 – 4541 4522 – 4532 4532 – 4543	4620 – 4640 4621 – 4641 4622 – 4632 4632 – 4643	4720 – 4740 4721 – 4741 4722 – 4732 4732 – 4743
without louvre	Ceiling-mounted with louvre or diffuser without any other ductwork. With wall-mounted units, the given temperatures can be exceeded by approx. 20 °C.	180 °C	165 °C	150 °C	140 °C
	Wall-/ceiling-mounted with ductwork or components up to a resistance factor of 4***	150 °C	145 °C	138 °C	133 °C
	Wall-/ceiling-mounted with ductwork or components above a total resistance factor of 4***	130 °C	128 °C	125 °C	120 °C
with louvre	Ceiling-mounted with louvre or diffuser without any other ductwork. With wall-mounted units, the given temperatures can be exceeded by approx. 20 °C.	215 °C	210 °C	190 °C	175 °C
	Wall-/ceiling-mounted with ductwork or components up to a resistance factor of 4***	200 °C	195 °C	185 °C	165 °C
	Wall-/ceiling-mounted with ductwork or components above a total resistance factor of 4***	155 °C	152 °C	135 °C	130 °C

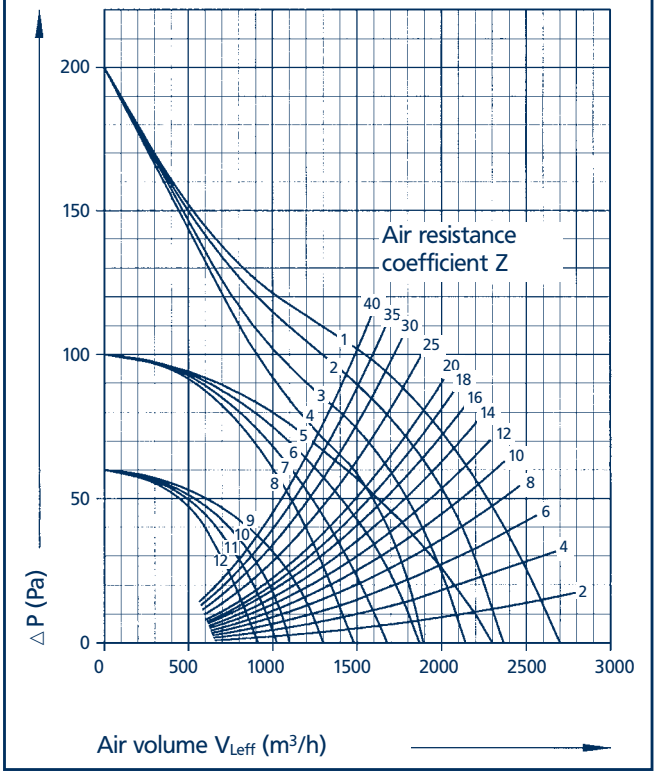
** Insert motor figure
*** Refer to pages 52–53

Type number-specific diagrammatic curves for heat outputs on page 51 — Table 10

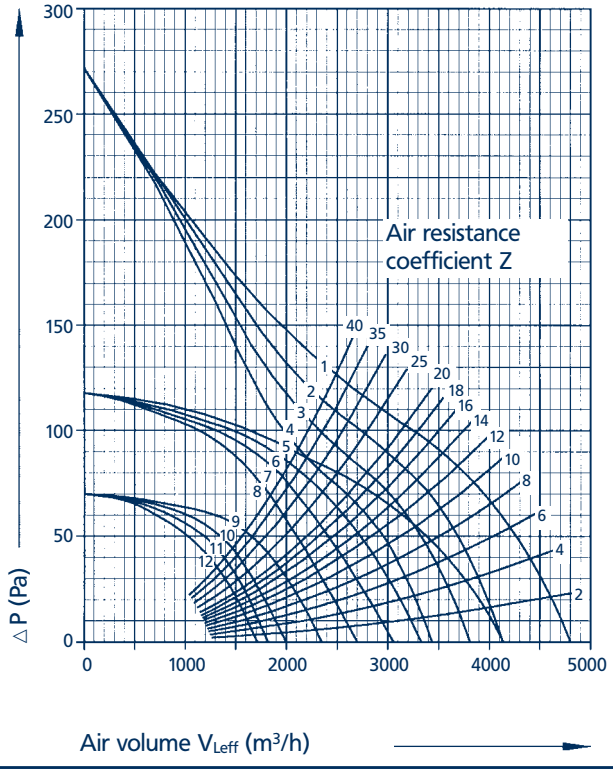
Unit heater	Heat exchanger	2-stage, 3-phase motor figure 36			3-stage, 3-phase motor figure 35				3-phase, explosion-proof motor figure 37			1-phase motor figure 31	
Series	Diagrammatic curve	Type	Stage 2	Stage 1	Type	Stage 3	Stage 2	Stage 1	Type	Stage 2	Stage 1	Type	
44 _ _ _ _ Diagram 10	Copper/ aluminium	442036 443036 444036	2 3 4	6 7 8	442035 443035 444035	2 3 4	6 7 8	10 11 12	442037 443037 444037	2 3 4	6 7 8	442031 443031 444031	2 3 4
	Steel	442136 443136 444136	2 2 4	6 6 8	442135 443135 444135	2 2 4	6 6 8	10 10 12	442137 443137 444137	2 2 4	6 6 8	442131 443131 444131	2 2 4
	Steam	442236 443236	2 2	6 6	442235 443235	2 2	6 6	10 10	442237 443237	2 2	6 6	442231 443231	2 2
	Cross-flow	443336 444336	2 4	6 8	443335 444335	2 4	6 8	10 12	443337 444337	2 4	6 8	443331 444331	2 4
	Ventilation unit (no heat exchanger)	440036	1	5	440035	1	5	9	440037	1	5	440031	1
45 _ _ _ _ Diagram 11	Copper/ aluminium	452036 453036 454036	2 3 4	6 7 8	452035 453035 454035	2 3 4	6 7 8	10 11 12	452037 453037 454037	2 3 4	6 7 8	452031 453031 454031	2 3 4
	Steel	452136 453136 454136	2 2 4	6 6 8	452135 453135 454135	2 2 4	6 6 8	10 10 12	452137 453137 454137	2 2 4	6 6 8	452131 453131 454131	2 2 4
	Steam	452236 453236	2 2	6 6	452235 453235	2 2	6 6	10 10	452237 453237	2 2	6 6	452231 453231	2 2
	Cross-flow	453336 454336	2 4	6 8	453335 454335	2 4	6 8	10 12	453337 454337	2 4	6 8	453331 454331	2 4
	Ventilation unit (no heat exchanger)	450036	1	5	450035	1	5	9	450037	1	5	450031	1
46 _ _ _ _ Diagram 12	Copper/ aluminium	462036 463036 464036	2 3 4	6 7 8	462035 463035 464035	2 3 4	6 7 8	10 11 12	462037 463037 464037	2 3 4	6 7 8	462031 463031 464031	2 3 4
	Steel	462136 463136 464136	2 2 4	6 6 8	462135 463135 464135	2 2 4	6 6 8	10 10 12	462137 463137 464137	2 2 4	6 6 8	462131 463131 464131	2 2 4
	Steam	462236 463236	2 2	6 6	462235 463235	2 2	6 6	10 10	462237 463237	2 2	6 6	462231 463231	2 2
	Cross-flow	463336 464336	2 4	6 8	463335 464335	2 4	6 8	10 12	463337 464337	2 4	6 8	463331 464331	2 4
	Ventilation unit (no heat exchanger)	460036	1	5	460035	1	5	9	460037	1	5	460031	1
47 _ _ _ _ Diagram 13	Copper/ aluminium	472036 473036 474036	2 3 4	6 7 8	472035 473035 474035	2 3 4	6 7 8	10 11 12	472037 473037 474037	2 3 4	6 7 8	472031 473031 474031	2 3 4
	Steel	472136 473136 474136	2 2 4	6 6 8	472135 473135 474135	2 2 4	6 6 8	10 10 12	472137 473137 474137	2 2 4	6 6 8	472131 473131 474131	2 2 4
	Steam	472236 473236	2 2	6 6	472235 473235	2 2	6 6	10 10	472237 473237	2 2	6 6	472231 473231	2 2
	Cross-flow	473336 474336	2 4	6 8	473335 474335	2 4	6 8	10 12	473337 474337	2 4	6 8	473331 474331	2 4
	Ventilation unit (no heat exchanger)	470036	1	5	470035	1	5	9	470037	1	5	470031	1

Fresh air and mixed air operation: Air volume

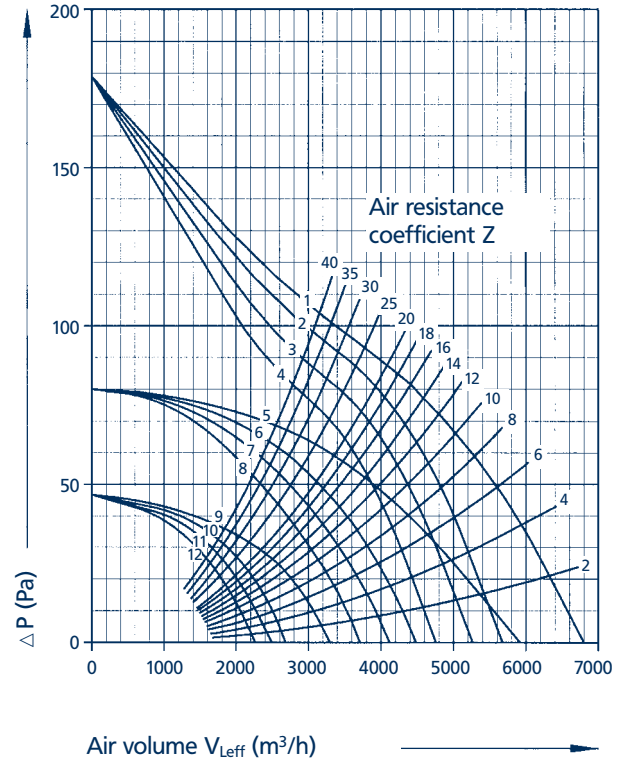
Air volume Series 44 — Diagram 10



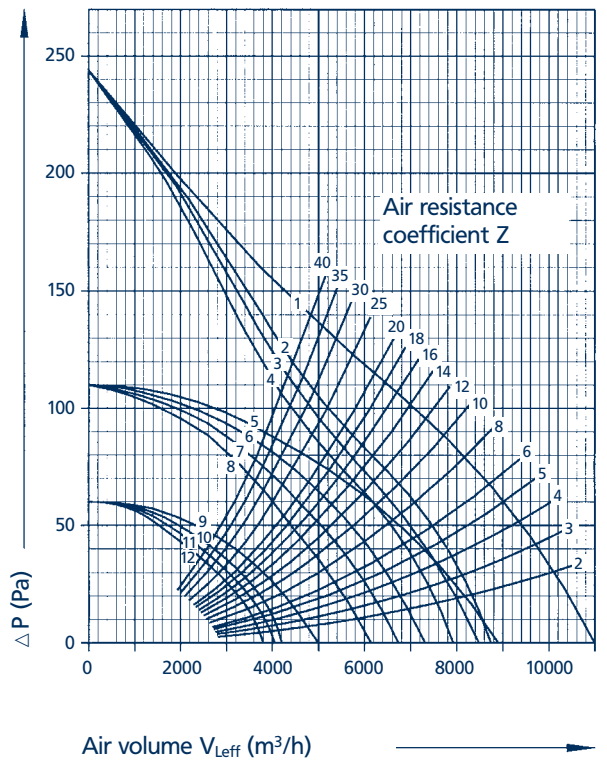
Air volume Series 45 — Diagram 11



Air volume Series 46 — Diagram 12



Air volume Series 47 — Diagram 13



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Fresh air and mixed air operation: Air volume

Air volume diagrams

The effective air volume can be calculated using diagrams 10-13 on page 51 in systems where there are components with high air-side resistance. The resistance coefficients required can be found in Table 11.

Correction factors for usual configurations can be found in Table 12.

If ductwork components provided by others are to be used, then the actual air volume can be calculated using the airside pressure loss from the ductwok calculation.

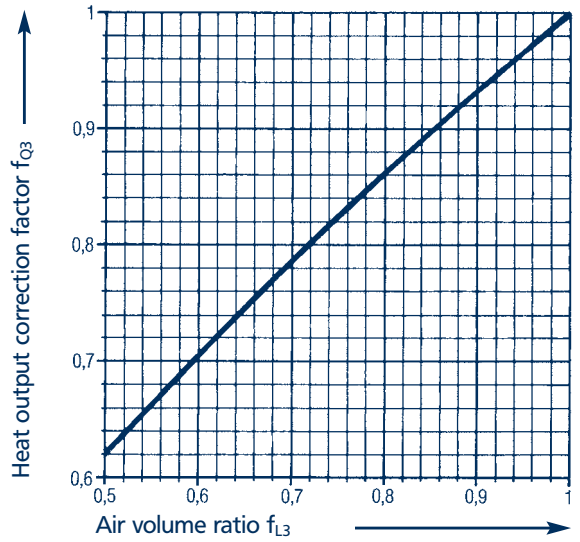
Non-listed standard components should be ignored or taken into account in the standard design.

Resistance coefficients — **Table 11**

Component	Type	Resistance coefficient Z
KaMAX (pos. horizontally)	3*111	4.0
KaMAX (middle position)	3*111	0
KaMAX (pos. vertically)	3*111	2.0
Outlet nozzle	3*006	3.5
Wide stream nozzle	3*007	4.5
Filter box	3*010	12.0
Mixing box	3*012	3.0
Rain hood	3*114	1.2
Roof socket for flat roof	3*119	0.1
Roof socket for angled roof	3*120_ _	0.1
Air duct (per m of duct)	3*015	0.1
Weather grate	3*016	5.0
90° air duct	3*021	1.0
Louvre	3*023	3.0
Wall duct	3*026	0.1

* Insert figure for unit size
**Based on respective diameter ratio

Heat output correction factor — **Diagram 14**



Air volume calculation

Given: Unit heater, Type 473135, design fan stage 3
Flow temperature t_{w1} = 75 °C
Return temperature t_{w2} = 65 °C
Entering air temperature = –10 °C

Air inlet side accessories:
Rain hood, Type 37114
Sail cloth socket, Type 37013
Mixing box, Type 37012
Filter box, Type 37010
KaMAX (vertically positioned), Type 37111

Required: Air volume V_{Leff} and heat output Q_{eff}

Formulae

$V_{Leff} = V_L \cdot f_{L3}$ (1) or $f_{L3} = \frac{V_{Leff}}{V_L}$

$Q_{eff} = Q_N \cdot f_{Q3}$ (2)

Abbreviations

V_{Leff}	[m³/h]	=	Effective air volume of unit heater
V_L	[m³/h]	=	Nominal air volume of unit heater (Technical data)
f_{L3}	[/]	=	Air volume correction factor or air volume ratio (air resistance)
Q_{eff}	[kW]	=	Effective heat output from unit heater
Q_N	[kW]	=	Nominal heat output of unit heater (Technical data)
f_{Q3}	[/]	=	Heat output correction factor (Air resistance)

Calculation

Resistance coefficient see Table 11		Z
Rain hood	Type 3*114	1.3
Sail cloth socket	Type 37013	0
Mixing box	Type 37012	3.0
Filter box	Type 37010	12.0
KaMAX (positioned vertically)	Type 37111	2.0
	Sum Z	18.3

From Table 12: Unit heater 473135. design fan stage 3
air volume diagram 13. page 51. curve 2

From Diagram 13: Air resistance coefficient 18.3 (~18)
cuts air volume curve 2
at $V_{L\,eff}$ = 5700 m³/h

From Technical data on page 67 at LPWW 75/65 °C t_{L1} = –10 °C
Q_N = 107.3 kW and V_L = 8770 m³/h

(1) $f_{L3} = \frac{V_{Leff}}{V_L} = \frac{5700}{8770} = 0.65$

From Diagram 14 at f_{L3} = 0.65 is f_{Q3} = 0.75

(2) $Q_{eff} = Q_N \cdot f_{Q3}$ = 107.3 • 0.75 = 80.5 kW

Result

Air volume $V_{L\,eff}$ = 5700 m³/h
Heat output Q_{eff} = 80.5 kW
All other data can be calculated as shown.

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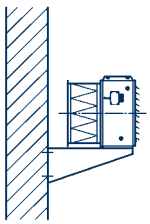
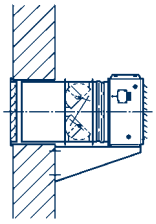
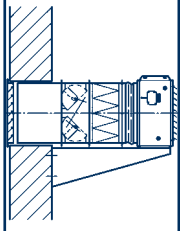
Correction factors for heat output and air volume for usual configurations — Table 12



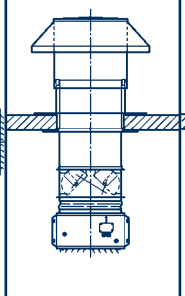
Unit heater with filter box



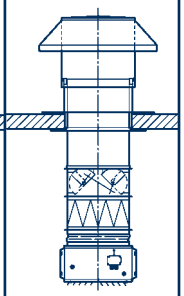
Unit heater with mixing box or louvre, sailcloth socket, wall duct and weather grate



Unit heater with filter box, mixing box or louvre, sailcloth socket, wall duct and weather grate



Unit heater with mixing box or louvre, sailcloth socket and rain hood



Unit heater with filter box, mixing box or louvre, sailcloth socket and rain hood

Unit heater type no (without motor figure)					Z = 12		Z = 8,1		Z = 20,1		Z = 4,3		Z = 16,3	
Heat exchanger														
Copper/ aluminium	**Steel**	**Steam**	**Cross-flow**	Stage	f_{L3}	f_{Q3}	f_{L3}	f_{Q3}	f_{L3}	f_{Q3}	f_{L3}	f_{Q3}	f_{L3}	f_{Q3}
4420	4421 4431	4422 4432	4433	2 (3) 1 (2) (1)	0.85 0.86 0.94	0,89 0,90 0,96	0,90 0,90 0,95	0,93 0,93 0,97	0,75 0,77 0,88	0,82 0,83 0,92	0,94 0,95 0,98	0,96 0,97 0,99	0,80 0,81 0,91	0,86 0,86 0,94
4430				2 (3) 1 (2) (1)	0,87 0,87 0,93	0,91 0,91 0,95	0,90 0,90 0,95	0,93 0,93 0,97	0,78 0,80 0,88	0,84 0,86 0,92	0,95 0,95 0,98	0,97 0,97 0,99	0,81 0,83 0,90	0,86 0,88 0,93
4440	4441		4443	2 (3) 1 (2) (1)	0,89 0,89 0,93	0,92 0,92 0,95	0,93 0,93 0,96	0,95 0,95 0,97	0,82 0,83 0,88	0,87 0,88 0,92	0,97 0,97 0,98	0,98 0,98 0,99	0,85 0,86 0,90	0,89 0,90 0,93
4520	4521 4531	4522 4532	4533	2 (3) 1 (2) (1)	0.82 0.83 0.90	0,87 0,88 0,93	0,88 0,88 0,93	0,92 0,92 0,95	0,72 0,75 0,85	0,80 0,82 0,89	0,94 0,94 0,96	0,96 0,96 0,97	0,77 0,79 0,86	0,83 0,85 0,90
4530				2 (3) 1 (2) (1)	0,83 0,83 0,91	0,88 0,88 0,94	0,89 0,88 0,93	0,92 0,92 0,95	0,73 0,76 0,87	0,80 0,83 0,91	0,94 0,93 0,97	0,96 0,95 0,98	0,78 0,79 0,88	0,84 0,85 0,92
4540	4541		4543	2 (3) 1 (2) (1)	0,85 0,85 0,92	0,89 0,89 0,94	0,90 0,89 0,94	0,93 0,92 0,96	0,76 0,79 0,87	0,83 0,85 0,91	0,95 0,94 0,96	0,97 0,96 0,97	0,80 0,82 0,88	0,86 0,87 0,92
4620	4621 4631	4622 4632	4633	2 (3) 1 (2) (1)	0,79 0,79 0,87	0,85 0,85 0,91	0,85 0,85 0,90	0,89 0,89 0,93	0,69 0,69 0,79	0,77 0,77 0,85	0,92 0,92 0,96	0,94 0,94 0,97	0,74 0,74 0,82	0,81 0,81 0,87
4630				2 (3) 1 (2) (1)	0,80 0,80 0,87	0,86 0,86 0,91	0,86 0,86 0,90	0,90 0,90 0,93	0,71 0,71 0,80	0,79 0,79 0,86	0,92 0,92 0,96	0,94 0,94 0,97	0,75 0,75 0,83	0,82 0,82 0,88
4640	4641		4643	2 (3) 1 (2) (1)	0,83 0,82 0,88	0,88 0,87 0,92	0,87 0,87 0,92	0,91 0,91 0,94	0,74 0,74 0,81	0,81 0,81 0,86	0,93 0,93 0,96	0,95 0,95 0,97	0,78 0,77 0,85	0,84 0,83 0,89
4720	4721 4731	4722 4732	4733	2 (3) 1 (2) (1)	0,73 0,75 0,85	0,80 0,82 0,89	0,81 0,82 0,90	0,86 0,87 0,93	0,64 0,66 0,76	0,73 0,75 0,83	0,90 0,90 0,95	0,93 0,93 0,97	0,68 0,70 0,80	0,77 0,78 0,86
4730				2 (3) 1 (2) (1)	0,73 0,77 0,84	0,80 0,83 0,89	0,80 0,83 0,89	0,86 0,88 0,92	0,64 0,67 0,76	0,73 0,76 0,83	0,89 0,91 0,95	0,92 0,94 0,97	0,68 0,71 0,80	0,77 0,79 0,86
4740	4741		4743	2 (3) 1 (2) (1)	0,75 0,78 0,85	0,82 0,84 0,89	0,82 0,84 0,90	0,87 0,89 0,93	0,65 0,69 0,77	0,74 0,77 0,83	0,90 0,91 0,95	0,93 0,94 0,97	0,70 0,73 0,81	0,78 0,80 0,86

( ) Figures in brackets relate to 3-stage fans

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Calculating the water pressure drop

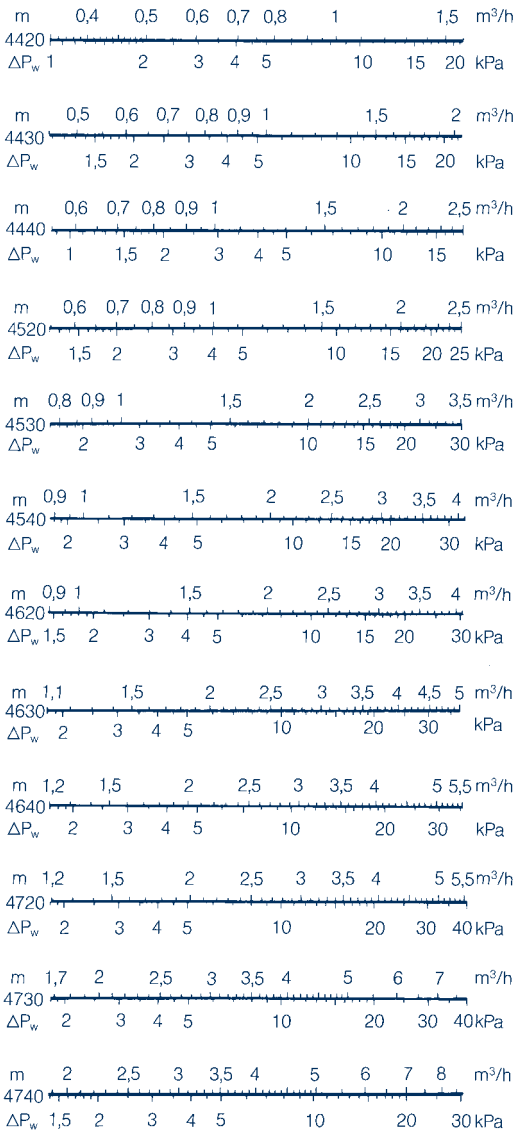
The water pressure drop can be calculated using the following diagrams. It can be calculated from the heat output Q_{eff}, of the water temperature difference.

$\Delta t_w = t_{w1} - t_{w2}$, and the water flow rate

$$m = \frac{Q_{eff}}{\Delta t_w} \cdot 0.86.$$

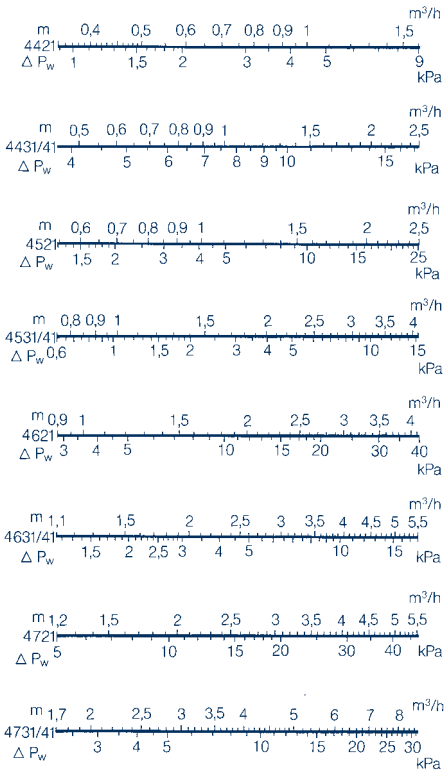
These figures apply to a mean water temperature of 70 °C, but owing to the minimal dependency on the water temperature, they can also be used for other water temperatures.

Water pressure drop for copper/aluminium heat exchangers — Diagram 15

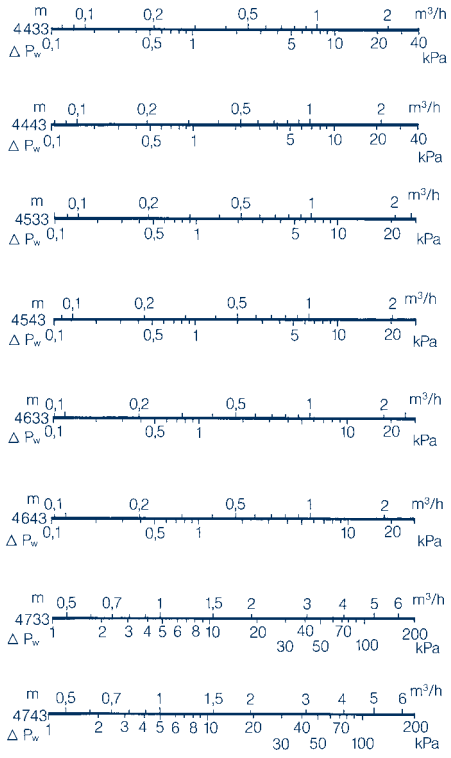


1 kPa = 10 mbar

Water pressure drop for galvanised steel heat exchangers — Diagram 16



Water pressure drop for galvanised steel heat exchangers, cross-flow — Diagram 17



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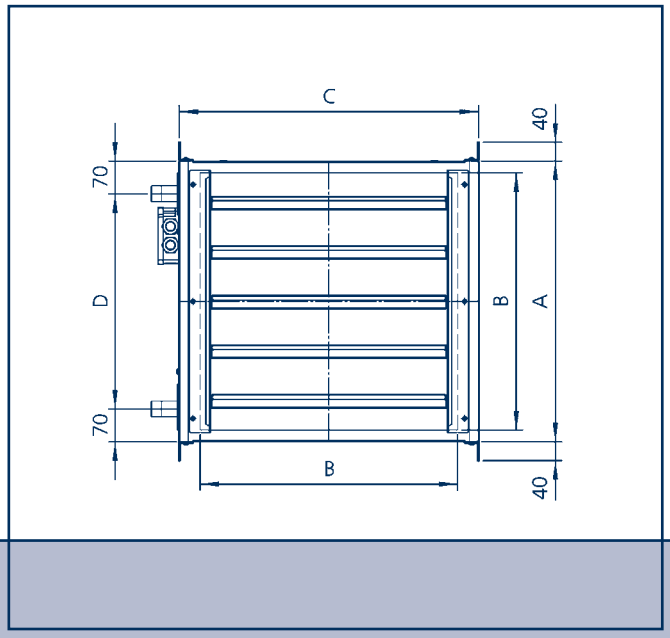

Technical data

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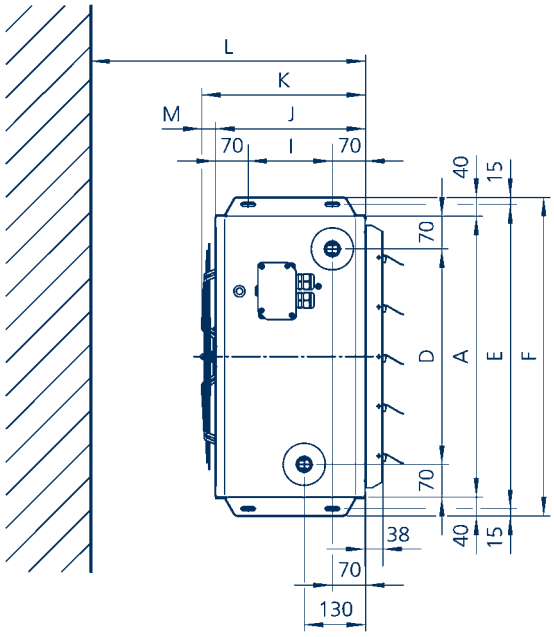
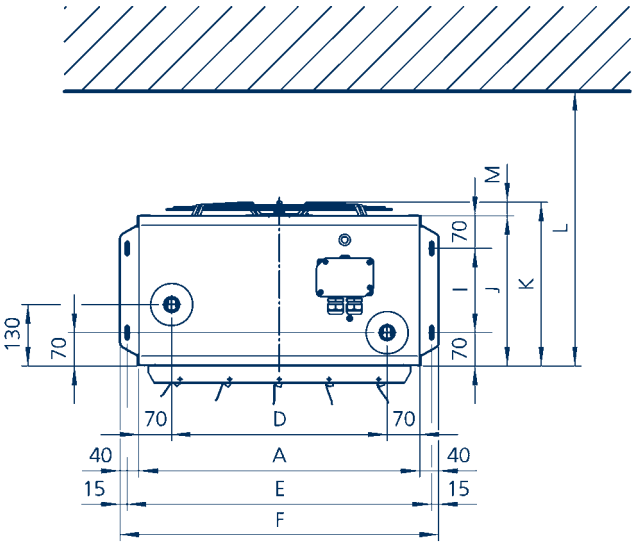
Dimensions of TOP unit heaters with copper/aluminium heat exchanger

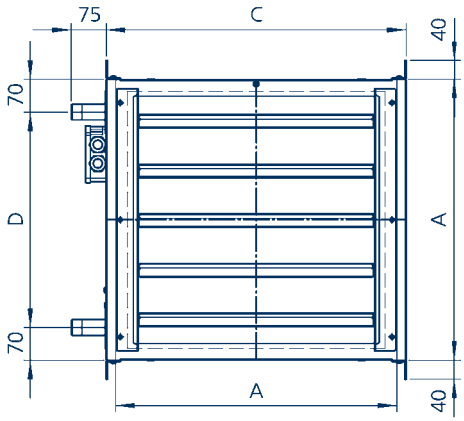
TOP with copper/aluminium heat exchanger



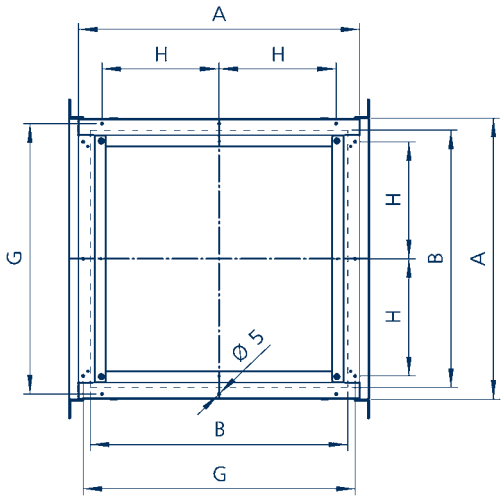
Wall-mounted



Ceiling-mounted



Front view



View of connections

Technical data

Dimensions [mm] of TOP unit heaters with copper/aluminium heat exchanger														
Type nos.	A	B	C	D	E	F	G	H	I	J	K	L_{min}	M	Conn. thread
4420**, 4430**, 4440**	500	450	540	360	550	580	480	200	180	320	350	480	30	1"
4520**, 4530**, 4540**	600	550	640	460	650	680	580	250	180	320	350	500	30	1"
4620**, 4630**, 4640**	700	650	740	560	750	780	680	300	180	320	360	550	40	1 1/4"
4720**, 4730**, 4740**	800	750	840	660	850	880	780	350	220	360	400	660	40	1 1/2"

**Insert motor figure

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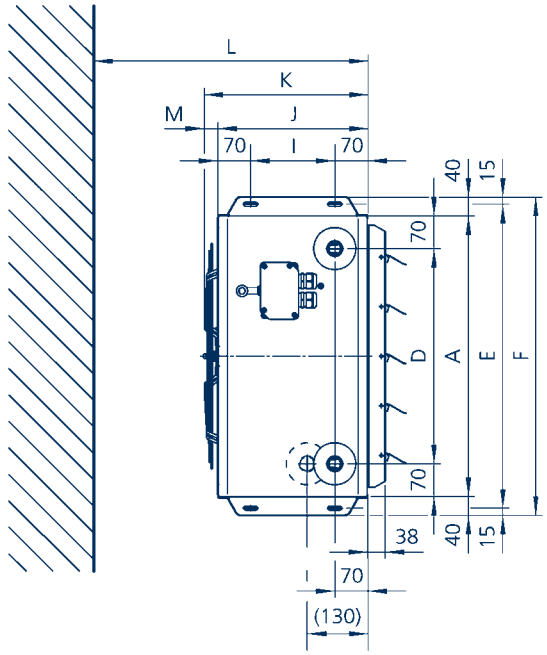
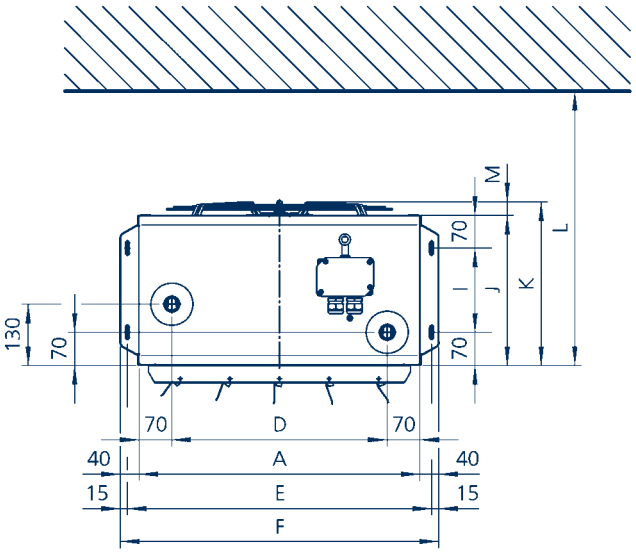
SYSTEMS FOR HEATING · COOLING · VENTILATING

Dimensions of TOP unit heaters with galvanised steel heat exchanger

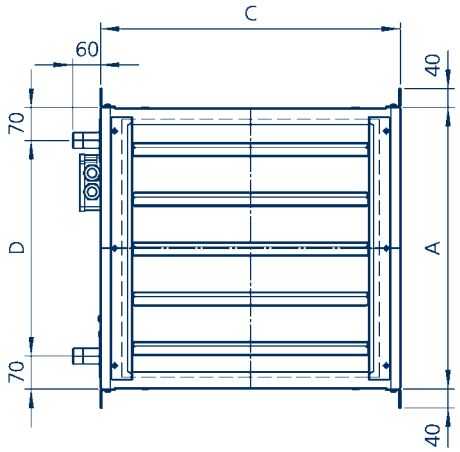
TOP with galvanised steel heat exchanger



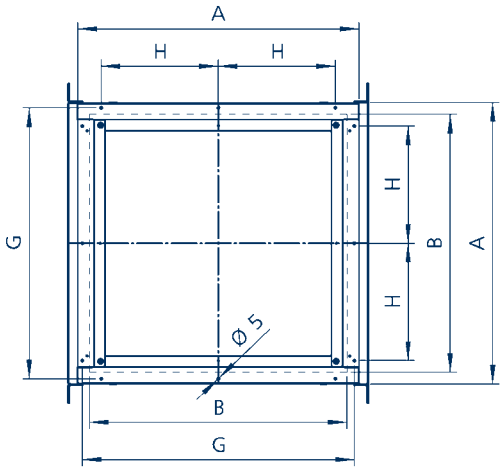
Wall-mounted
1-row heat exchanger; (2-row)



Ceiling-mounted,
2-row heat exchanger



Front view



View of connections

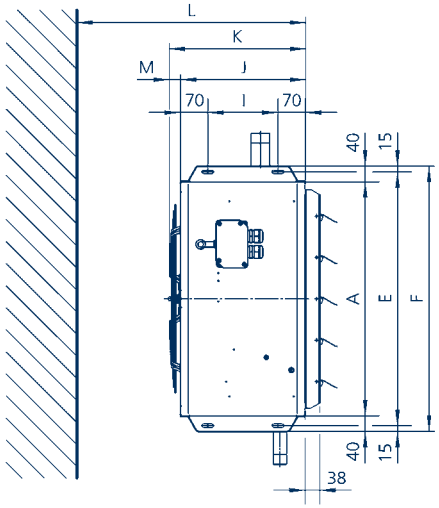
Dimensions [mm] of TOP unit heaters with galvanised steel heat exchanger

Type nos.	A	B	C	D	E	F	G	H	I	J	K	L_{min}	M	Conn. thread
4421**, 4431**, 4441**	500	450	540	360	550	580	480	200	180	320	350	480	30	1″
4521**, 4531**, 4541**	600	550	640	460	650	680	580	250	180	320	350	500	30	1″
4621**, 4631**, 4641**	700	650	740	560	750	780	680	300	180	320	360	550	40	1 1/4″
4721**, 4731**, 4741**	800	750	840	660	850	880	780	350	220	360	400	660	40	1 1/2″

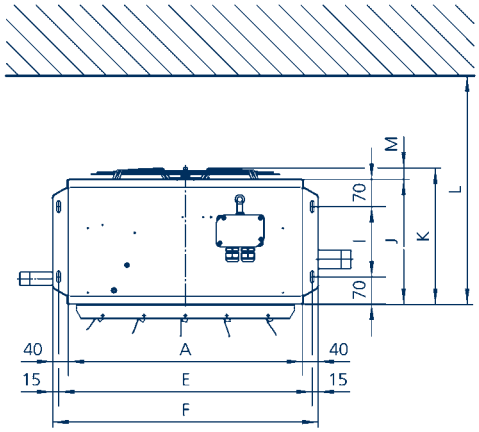
**Insert motor figure

Dimensions of TOP unit heater with galvanised steel heat exchanger for use with steam

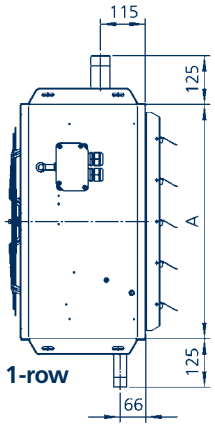
TOP with galvanised steel heat exchanger for use with steam



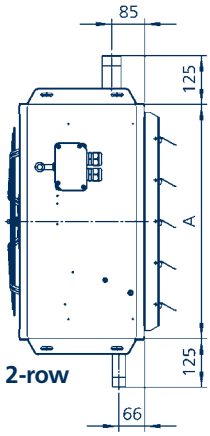
Wall-mounted



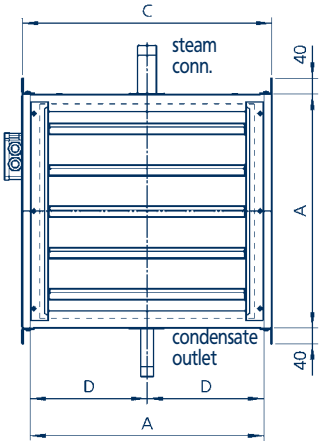
Ceiling-mounted



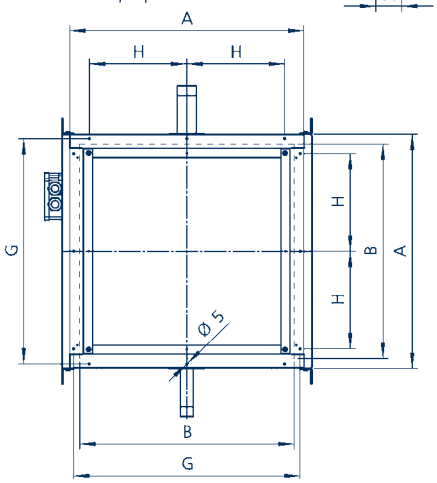
1-row



2-row



Front view



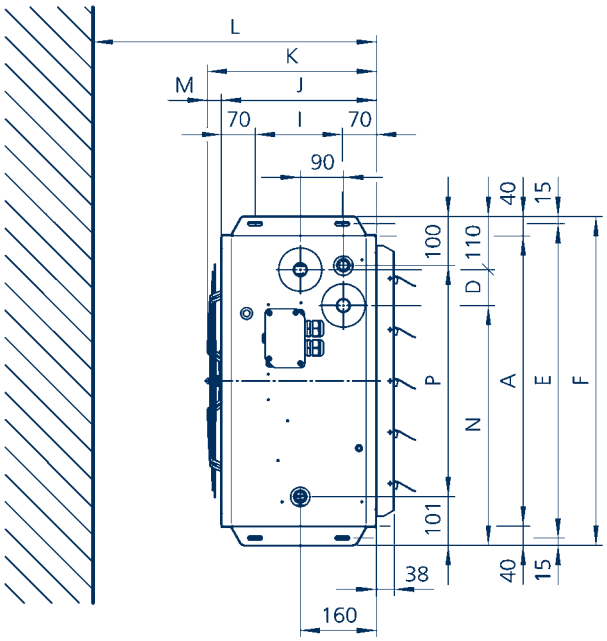
View of connections

Dimensions [mm] of TOP unit heaters with galvanised steel heat exchanger for use with steam															
Type nos.	A	B	C	D	E	F	G	H	I	J	K	L	M	Connections steam	Connections condensate
4422**, 4432**	500	450	540	200	550	580	480	200	180	320	350	480	30	1 1/2"	1"
4522**, 4532**	600	550	640	300	650	680	580	250	180	320	350	500	30	1 1/2"	1"
4622**, 4632**	700	650	740	400	750	780	680	300	180	320	360	550	40	1 1/2"	1"
4722**, 4732**	800	750	840	500	850	880	780	350	220	360	400	660	40	1 1/2"	1"

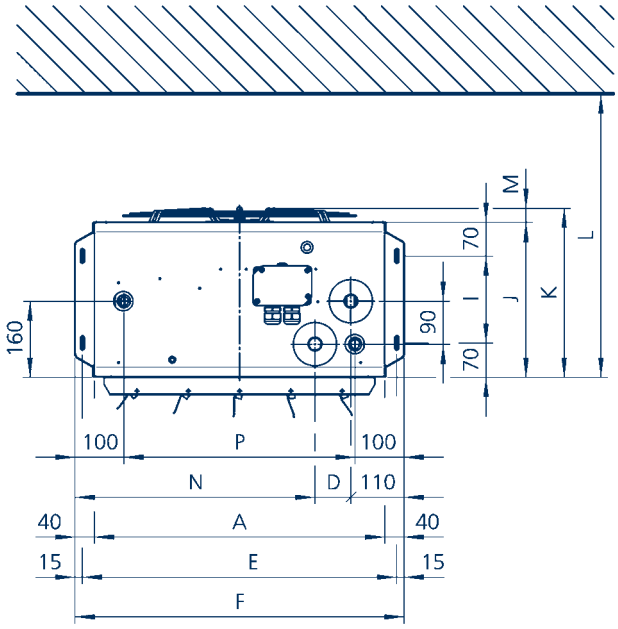
**Insert motor figure

Dimensions of TOP unit heater with galvanised steel heat exchanger, cross-flow

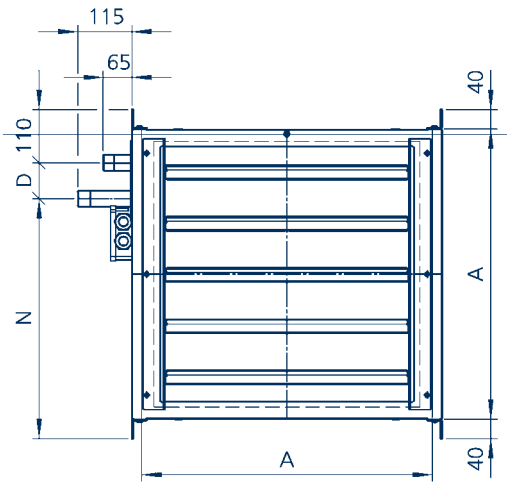
TOP with galvanised steel heat exchanger, cross-flow



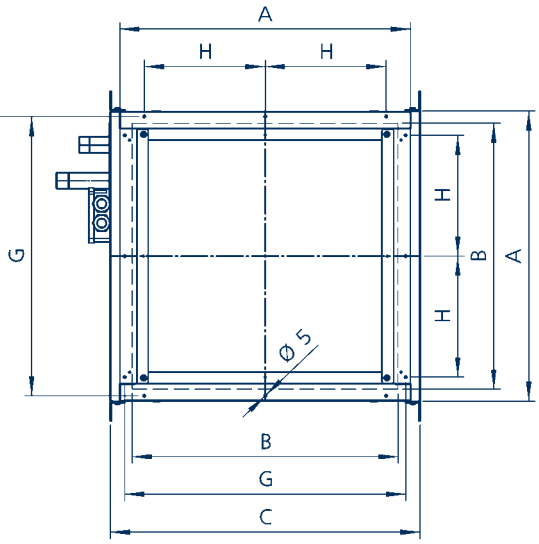
Wall-mounted



Ceiling-mounted



Front view



View of connections

Dimensions [mm] of TOP unit heaters with galvanised steel heat exchanger, cross-flow																
Type nos.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Conn. thread
4433**, 4443**	500	450	540	49	550	580	480	200	180	320	350	480	30	395	380	1"
4533**, 4543**	600	550	640	74	650	680	580	250	180	320	350	500	30	495	480	1"
4633**, 4643**	700	650	740	99	750	780	680	300	180	320	360	550	40	595	580	1 1/4"
4733**, 4743**	800	750	840	124	850	880	780	350	220	360	400	660	40	695	680	1 1/2"

**Insert motor figure

Copper/aluminium heat exchangers

Type nos.		4420_ _			4430_ _			4440_ _		
2-stage 400 V 3-phase	Type	442036 180 W/0,34 A	130 W/0,20 A		443036 180 W/0,34 A	130 W/0,20 A		444036 180 W/0,34 A	130 W/0,20 A	
3-stage 400 V 3-phase	Type	442035 165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	443035 165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	444035 165 W/0,32 A	120 W/0,19 A	40 W/0,11 A
Expl.-proof 400 V 3-phase	Type	442037 140 W/0,28 A	110 W/0,19 A		443037 140 W/0,28 A	110 W/0,19 A		444037 140 W/0,28 A	110 W/0,19 A	
1-phase 230 V	Type	442031 200 W/0,9 A			443031 200 W/0,9 A			444031 200 W/0,9 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**2360**	**1870**	**1100**	**2140**	**1670**	**1020**	**1890**	**1480**	**910**
Wall-mounted Throw	m	18	13	8	17	13	8	16	12	7
Max. height* when ceilling-mounted with										
Louvre	m	5,5	4,7	3,4	5,2	4,5	3,3	4,8	4,1	3,0
Diffuser	m	3,5	3,0	2,3	3,3	2,9	2,2	3,1	2,7	2,1
Outlet nozzle	m	7,6	6,5	4,6	7,1	6,0	4,4	6,7	5,6	4,1
Induction louvre	m	7,6	6,5	4,6	7,1	6,0	4,4	6,7	5,6	4,1
KaMAX (vertical)	m	8,8	7,4	5,2	8,2	7,0	5,0	7,6	6,5	4,6
Weight	kg	27	27	27	28	28	28	29	29	29
Water content	l	1,6	1,6	1,6	2,1	2,1	2,1	2,6	2,6	2,6
Connection	inch	1"	1"	1"	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	55	49	39	55	49	39	55	49	39
Sound power level	dB(A)	71	65	55	71	65	55	71	65	55

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	19,4	6,9	17,2	9,6	12,7	15,9	24,7	15,8	21,4	19,2	15,7	26,0	28,0	24,5	23,9	28,1	17,1	35,1
	-10	18,1	10,7	16,1	13,2	11,9	19,1	23,0	19,0	20,0	22,3	14,6	28,7	26,0	27,2	22,3	30,7	15,9	37,3
	-5	16,7	14,4	14,9	16,8	11,0	22,4	21,3	22,3	18,5	25,3	13,5	31,3	24,1	29,9	20,6	33,2	14,7	39,4
	0	15,4	18,1	13,7	20,3	10,1	25,5	19,6	25,4	17,0	28,3	12,4	33,9	22,2	32,6	19,0	35,6	13,6	41,4
	5	14,1	21,8	12,5	23,8	9,2	28,6	17,9	28,5	15,5	31,2	11,4	36,4	20,2	35,2	17,3	38,0	12,4	43,3
	10	12,7	25,4	11,3	27,3	8,3	31,7	16,2	31,6	14,0	34,0	10,3	38,8	18,3	37,7	15,7	40,3	11,2	45,2
	15	11,4	29,0	10,1	30,7	7,5	34,7	14,5	34,6	12,6	36,8	9,2	41,1	16,4	40,1	14,0	42,5	10,0	46,9
	18	10,6	31,1	9,4	32,7	6,9	36,4	13,5	36,4	11,7	38,5	8,5	42,5	15,2	41,6	13,0	43,8	9,3	47,9
	20	10,0	32,5	8,9	34,0	6,6	37,6	12,8	37,6	11,1	39,5	8,1	43,4	14,5	42,5	12,4	44,6	8,8	48,6
LPHW 70/60 °C	-15	20,5	8,2	18,2	11,0	13,5	17,7	26,1	17,6	22,7	21,2	16,6	28,4	29,6	26,7	25,3	30,6	18,1	38,0
	-10	19,2	12,0	17,0	14,6	12,6	20,9	24,4	20,8	21,2	24,3	15,5	31,1	27,6	29,5	23,7	33,2	16,9	40,2
	-5	17,9	15,7	15,9	18,2	11,7	24,2	22,7	24,1	19,7	27,3	14,4	33,8	25,7	32,3	22,0	35,7	15,7	42,3
	0	16,5	19,4	14,7	21,8	10,8	27,4	21,0	27,3	18,2	30,3	13,3	36,3	23,8	35,0	20,4	38,2	14,5	44,4
	5	15,2	23,1	13,5	25,3	10,0	30,5	19,3	30,4	16,8	33,3	12,3	38,9	21,9	37,6	18,7	40,6	13,4	46,3
	10	13,8	26,8	12,3	28,8	9,1	33,6	17,6	33,5	15,3	36,1	11,2	41,3	19,9	40,1	17,1	42,9	12,2	48,2
	15	12,5	30,4	11,1	32,2	8,2	36,6	15,9	36,5	13,8	39,0	10,1	43,7	18,0	42,6	15,4	45,2	11,0	50,0
	18	11,7	32,5	10,4	34,2	7,7	38,4	14,9	38,3	12,9	40,6	9,5	45,1	16,8	44,1	14,4	46,5	10,3	51,1
	20	11,2	33,9	9,9	35,6	7,3	39,6	14,2	39,5	12,3	41,7	9,0	46,0	16,1	45,0	13,7	47,3	9,8	51,7
LPHW 75/65 °C	-15	21,9	9,7	19,4	12,7	14,4	19,8	27,8	19,7	24,2	23,6	17,7	31,2	31,5	29,4	27,0	33,6	19,3	41,4
	-10	20,5	13,5	18,2	16,4	13,5	23,1	26,1	23,0	22,7	26,7	16,6	34,0	29,6	32,3	25,3	36,2	18,1	43,7
	-5	19,2	17,3	17,0	20,0	12,6	26,4	24,4	26,3	21,2	29,8	15,5	36,7	27,6	35,1	23,7	38,8	16,9	45,9
	0	17,9	21,0	15,9	23,6	11,7	29,6	22,7	29,5	19,7	32,8	14,4	39,3	25,7	37,8	22,0	41,3	15,7	48,0
	5	16,5	24,7	14,7	27,1	10,8	32,7	21,0	32,7	18,2	35,8	13,3	41,9	23,8	40,5	20,4	43,7	14,5	50,0
	10	15,2	28,4	13,5	30,6	10,0	35,9	19,3	35,8	16,8	38,7	12,3	44,4	21,9	43,0	18,7	46,1	13,4	51,9
	15	13,8	32,0	12,3	34,0	9,1	38,9	17,6	38,8	15,3	41,5	11,2	46,8	19,9	45,6	17,1	48,4	12,2	53,8
	18	13,0	34,2	11,6	36,1	8,6	40,7	16,6	40,7	14,4	43,2	10,5	48,2	18,8	47,0	16,1	49,7	11,5	54,9
	20	12,5	35,6	11,1	37,5	8,2	41,9	15,9	41,9	13,8	44,3	10,1	49,1	18,0	48,0	15,4	50,6	11,0	55,6
LPHW 82/71 °C	-15	23,6	11,7	21,0	14,9	15,5	22,6	30,0	22,4	26,1	26,6	19,1	34,9	34,0	33,0	29,1	37,4	20,8	45,9
	-10	22,3	15,5	19,8	18,6	14,6	25,9	28,3	25,8	24,6	29,8	18,0	37,7	32,1	35,9	27,4	40,1	19,6	48,2
	-5	20,9	19,3	18,6	22,2	13,7	29,2	26,6	29,1	23,1	32,9	16,9	40,4	30,2	38,7	25,8	42,8	18,4	50,5
	0	19,6	23,1	17,4	25,9	12,9	32,5	24,9	32,4	21,6	36,0	15,8	43,1	28,2	41,5	24,1	45,3	17,2	52,6
	5	18,3	26,8	16,2	29,4	12,0	35,7	32,2	35,6	20,2	39,0	14,8	45,7	26,3	44,2	22,5	47,8	16,1	54,7
	10	16,9	30,5	15,0	33,0	11,1	38,8	21,5	38,7	18,7	42,0	13,7	48,3	24,4	46,8	20,8	50,2	14,9	56,7
	15	15,6	34,1	13,8	36,4	10,2	41,9	19,8	41,8	17,2	44,9	12,6	50,8	22,4	49,4	19,2	52,6	13,7	58,7
	18	14,8	36,3	13,1	38,5	9,7	43,8	18,8	43,7	16,3	46,6	11,9	52,2	21,3	50,9	18,2	54,0	13,0	59,8
	20	14,2	37,7	12,6	39,9	9,3	45,0	18,1	44,9	15,7	47,7	11,5	53,2	20,5	51,9	17,5	54,9	12,5	60,5
LPHW 90/70 °C	20	14,6	38,2	13,0	40,4	9,6	45,6	18,6	45,5	16,1	48,4	11,8	54,0	21,0	52,7	18,0	55,7	12,8	61,5

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Copper/aluminium heat exchangers

Type nos.		4520_ _			4530_ _			4540_ _		
2-stage 400 V 3-phase	Type	452036 320 W/0,62 A	230 W/0,37 A		453036 320 W/0,62 A	230 W/0,37 A		454036 320 W/0,62 A	230 W/0,37 A	
3-stage 400 V 3-phase	Type	452035 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	453035 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	454035 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A
Expl.-proof 400 V 3-phase	Type	452037 360 W/0,61 A	250 W/0,41 A		453037 360 W/0,61 A	250 W/0,41 A		454037 360 W/0,61 A	250 W/0,41 A	
1-phase 230 V	Type	452031 370 W/1,6 A			453031 370 W/1,6 A			454031 370 W/1,6 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**4140**	**3330**	**2000**	**3810**	**3060**	**1820**	**3430**	**2700**	**1710**
Wall-mounted Throw	m	23	17	11	21	16	10	19	13	9
Max. height* when ceilling-mounted with										
Louvre	m	6,5	5,7	4,2	6,2	5,4	4,0	5,8	5,0	3,8
Diffuser	m	4,1	3,6	2,8	3,9	3,4	2,6	3,7	3,2	2,5
Outlet nozzle	m	9,2	8,0	5,8	8,7	7,5	5,5	8,2	7,0	5,3
Induction louvre	m	9,2	8,0	5,8	8,7	7,5	5,5	8,2	7,0	5,3
KaMAX (vertical)	m	11,4	9,8	7,0	10,7	9,2	6,5	10,1	8,5	6,3
Weight	kg	36	26	36	37	37	37	38	38	38
Water content	l	2,2	2,2	2,2	2,97	2,97	2,97	3,75	3,75	3,75
Connection	inch	1"	1"	1"	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	59	51	42	59	51	42	59	51	42
Sound power level	dB(A)	75	67	58	75	67	58	75	67	58

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	30,8	4,8	27,5	7,0	20,8	12,8	42,6	14,8	37,6	17,8	27,2	24,8	48,0	22,3	41,3	25,8	30,5	32,5
	-10	28,6	8,7	25,6	10,8	19,4	16,2	39,6	18,1	35,0	20,9	25,3	27,6	44,7	25,2	38,5	28,5	28,3	34,8
	-5	26,5	12,5	23,7	14,5	17,9	19,6	36,7	21,4	32,4	24,0	23,4	30,3	41,4	28,1	35,6	31,1	26,2	37,1
	0	24,4	16,4	21,8	18,2	16,5	22,9	33,8	24,6	29,8	27,1	21,6	32,9	38,1	30,8	32,8	33,7	24,1	39,2
	5	22,3	20,2	19,9	21,8	15,1	26,2	30,8	27,8	27,2	30,1	19,7	35,5	34,8	33,5	29,9	36,2	22,0	41,3
	10	20,2	23,9	18,0	25,5	13,6	29,5	27,9	30,9	24,6	33,0	17,8	38,0	31,5	36,2	27,1	38,6	19,9	43,3
	15	18,0	27,6	16,1	29,0	12,2	32,7	25,0	34,0	22,0	35,9	15,9	40,4	28,1	38,8	24,2	41,0	17,8	45,3
	18	16,8	29,8	15,0	31,2	11,3	34,6	23,2	35,8	20,5	37,6	14,8	41,8	26,2	40,3	22,5	42,4	16,6	46,4
	20	15,9	31,3	14,2	32,6	10,8	35,8	22,0	37,0	19,4	38,7	14,1	42,7	24,8	41,3	21,4	43,3	15,7	47,1
LPHW 70/60 °C	-15	32,5	6,0	29,1	8,3	22,0	14,4	45,0	16,5	39,8	19,6	28,8	27,1	50,8	24,5	43,7	28,2	32,2	35,2
	-10	30,4	9,9	27,2	12,1	20,6	17,8	42,1	19,9	37,2	22,8	26,9	29,9	47,5	27,4	40,9	30,9	30,1	37,6
	-5	28,3	13,7	25,3	15,8	19,1	21,2	39,1	23,1	34,6	26,0	25,0	32,6	44,1	30,3	38,0	33,6	28,0	39,9
	0	26,2	17,6	23,4	19,5	17,7	24,6	36,2	26,4	32,0	29,0	23,1	35,3	40,8	33,1	35,2	36,2	25,9	42,1
	5	24,0	21,4	21,5	23,2	16,3	27,9	33,3	29,6	29,4	32,1	21,3	37,9	37,5	35,8	32,3	38,7	23,8	44,2
	10	21,9	25,1	19,6	26,8	14,8	31,2	30,3	32,7	26,8	35,0	19,4	40,4	34,2	38,5	29,5	41,2	21,7	46,3
	15	19,8	28,9	17,7	30,4	13,4	34,4	27,4	35,8	24,2	37,9	17,5	42,9	30,9	41,1	26,6	43,6	19,6	48,2
	18	18,5	31,1	16,6	32,5	12,5	36,3	25,6	37,7	22,6	39,6	16,4	44,3	28,9	42,6	24,9	45,0	18,3	49,4
	20	17,7	32,6	15,8	34,0	12,0	37,6	24,5	38,9	21,6	40,8	15,6	45,3	27,6	43,7	23,9	45,9	17,5	50,1
LPHW 75/65 °C	-15	34,7	7,3	31,0	9,8	23,5	16,3	48,0	18,6	42,4	21,9	30,6	29,9	54,1	27,0	46,6	31,0	34,3	38,5
	-10	32,5	11,2	29,1	13,6	22,0	19,7	45,0	21,9	39,8	25,1	28,8	32,7	50,8	30,0	43,7	33,7	32,2	40,9
	-5	30,4	15,1	27,2	17,4	20,6	23,2	42,1	25,3	37,2	28,3	26,9	35,5	47,5	32,9	40,9	36,5	30,1	43,2
	0	28,3	19,0	25,3	21,1	19,1	26,6	39,1	28,5	34,6	31,4	25,0	38,2	44,1	35,7	38,0	39,1	28,0	45,5
	5	26,2	22,8	23,4	24,8	17,7	29,9	36,2	31,8	32,0	34,4	23,1	40,8	40,8	38,5	35,2	41,7	25,9	47,7
	10	24,0	26,6	21,5	28,4	16,3	33,2	33,3	35,0	29,4	37,4	21,3	43,4	37,5	41,3	32,3	44,2	23,8	49,8
	15	21,9	30,3	19,6	32,1	14,8	36,5	30,3	38,1	26,8	40,4	19,4	45,9	34,2	43,9	29,5	46,6	21,7	51,8
	18	20,6	32,6	18,5	34,2	14,0	38,4	28,6	39,9	25,2	42,1	18,3	47,3	32,2	45,5	27,7	48,0	20,4	53,0
	20	19,8	34,1	17,7	35,6	13,4	39,7	27,4	41,2	24,2	43,3	17,5	48,3	30,9	46,5	26,6	49,0	19,6	53,7
LPHW 82/71 °C	-15	37,4	9,1	33,4	11,8	25,3	18,8	51,8	21,2	45,7	24,8	33,1	33,4	58,4	30,4	50,3	34,6	37,0	42,7
	-10	35,3	13,0	31,5	15,6	23,9	22,3	48,8	24,6	43,1	28,1	31,2	36,3	55,1	33,4	47,4	37,5	34,9	45,2
	-5	33,2	16,9	29,6	19,4	22,4	25,7	45,9	28,0	40,5	31,3	29,3	39,1	51,8	36,3	44,6	40,2	32,8	47,6
	0	31,0	20,8	27,8	23,1	21,0	29,2	43,0	31,3	37,9	34,4	27,4	41,9	48,4	39,2	41,7	42,9	30,7	49,9
	5	28,9	24,7	25,9	26,9	19,6	32,6	40,0	34,6	35,4	37,5	25,6	44,6	45,1	42,1	38,9	45,5	28,6	52,2
	10	26,8	28,5	24,0	30,6	18,1	35,9	37,1	37,8	32,8	40,6	23,7	47,2	41,8	44,8	36,0	48,1	26,5	54,3
	15	24,7	32,3	22,1	34,2	16,7	39,2	34,2	41,0	30,2	43,6	21,8	49,7	38,5	47,5	33,2	50,6	24,4	56,4
	18	23,4	34,5	20,9	36,4	15,8	41,2	32,4	42,9	28,6	45,3	20,7	51,2	36,5	49,1	31,4	52,1	23,2	57,6
	20	22,6	36,0	20,2	37,8	15,3	42,5	31,2	44,1	27,6	46,5	19,9	52,2	35,2	50,2	30,3	53,0	22,3	58,4
LPHW 90/70 °C	20	23,1	36,4	20,7	38,2	15,6	43,0	32,0	44,7	28,2	47,1	20,4	53,0	36,1	50,9	31,0	53,8	22,9	59,3

Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Type nos.		4620_ _			4630_ _			4640_ _		
2-stage 400 V 3-phase	Type	462036 340 W/0,71 A	230 W/0,39 A		463036 340 W/0,71 A	230 W/0,39 A		464036 340 W/0,71 A	230 W/0,39 A	
3-stage 400 V 3-phase	Type	462035 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	463035 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	464035 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A
Expl.-proof 400 V 3-phase	Type	462037 390 W/0,87 A	200 W/0,46 A		463037 390 W/0,87 A	200 W/0,46 A		464037 390 W/0,87 A	200 W/0,46 A	
1-phase 230 V	Type	462031 400 W/1,8 A			463031 400 W/1,8 A			464031 400 W/1,8 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450	900	700	450
Air volume	**m³/h**	**5680**	**4490**	**2690**	**5260**	**4120**	**2490**	**4750**	**3720**	**2270**
Wall-mounted Throw	m	27	20	12	25	19	12	21	16	10
Max. height* when ceilling-mounted with										
Louvre	m	7,2	6,2	4,6	6,8	5,9	4,4	6,4	5,1	4,1
Diffuser	m	4,1	3,6	2,8	3,9	3,4	2,6	3,7	3,0	2,5
Outlet nozzle	m	9,8	8,4	6,2	9,3	8,0	5,9	8,8	7,0	5,6
Induction louvre	m	9,8	8,4	6,2	9,3	8,0	5,9	8,8	7,0	5,6
KaMAX (vertical)	m	12,5	10,7	7,7	11,8	10,2	7,3	11,1	8,7	6,8
Weight	kg	47	47	47	49	49	49	51	51	51
Water content	l	3,4	3,4	3,4	4,5	4,5	4,5	5,6	5,6	5,6
Connection	inch	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Sound pressure level	dB(A)	58	51	40	58	51	40	58	51	40
Sound power level	dB(A)	74	67	56	74	67	56	74	67	56

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	48,0	7,5	42,4	10,2	31,5	16,3	65,1	18,0	56,2	21,4	40,7	28,6	74,4	26,8	63,4	30,4	44,9	37,7
	-10	44,7	11,3	39,5	13,8	29,4	19,5	60,6	21,1	52,4	24,3	37,9	31,1	69,3	29,4	59,0	32,9	41,8	39,8
	-5	41,4	15,0	36,6	17,3	27,2	22,7	56,1	24,2	48,5	27,2	35,1	33,6	64,2	32,0	54,6	35,2	38,7	41,7
	0	38,1	18,6	33,6	20,8	25,0	25,8	51,6	27,3	44,6	30,1	32,3	36,0	59,0	34,5	50,3	37,5	35,6	43,6
	5	34,8	22,2	30,7	24,3	22,8	28,9	47,1	30,2	40,7	32,8	29,5	38,3	53,9	37,0	45,9	39,8	32,5	45,3
	10	31,5	25,8	27,8	27,7	20,7	31,9	42,6	33,2	36,8	35,6	26,7	40,6	48,8	39,3	41,5	41,9	29,4	47,0
	15	28,1	29,4	24,9	31,0	18,5	34,9	38,2	36,0	33,0	38,2	23,9	42,8	43,6	41,6	37,2	44,0	26,3	48,6
	18	26,2	31,5	23,1	33,0	17,2	36,7	35,5	37,7	30,6	39,7	22,2	44,0	40,5	43,0	34,5	45,1	24,5	49,5
	20	24,8	32,9	21,9	34,4	16,3	37,8	33,7	38,8	29,1	40,8	21,1	44,9	38,5	43,8	32,8	45,9	23,2	50,1
LPHW 70/60 °C	-15	50,8	8,8	44,9	11,6	33,4	18,1	68,8	19,9	59,5	23,5	43,0	31,1	78,7	29,2	67,0	33,1	47,5	40,8
	-10	47,5	12,6	41,9	15,2	31,2	21,3	64,3	23,1	55,6	26,5	40,2	33,7	73,6	31,9	62,7	35,5	44,4	42,8
	-5	44,1	16,3	39,0	18,8	29,0	24,5	59,9	26,2	51,7	29,4	37,4	36,2	68,4	34,5	58,3	37,9	41,3	44,8
	0	40,8	20,0	36,1	22,3	26,8	27,7	55,4	29,2	47,8	32,3	34,6	38,6	63,3	37,0	53,9	40,3	38,2	46,7
	5	37,5	23,6	33,2	25,8	24,7	30,8	50,9	32,2	44,0	35,1	31,8	41,0	58,2	39,5	49,5	42,5	35,1	48,5
	10	34,2	27,2	30,2	29,2	22,5	33,9	46,4	35,2	40,1	37,8	29,0	43,3	53,0	41,9	45,2	44,7	32,0	50,3
	15	30,9	30,8	27,3	32,6	20,3	36,9	41,9	38,1	36,2	40,5	26,2	45,5	47,9	44,2	40,8	46,8	28,9	51,9
	18	28,9	32,9	25,5	34,6	19,0	38,6	39,2	39,8	33,9	42,0	24,5	46,8	44,8	45,6	38,2	48,0	27,0	52,8
	20	27,6	34,3	24,4	36,0	18,1	39,8	37,4	40,9	32,3	43,1	23,4	47,6	42,8	46,5	36,4	48,8	25,8	53,4
LPHW 75/65 °C	-15	54,1	10,4	47,8	13,4	35,5	20,2	73,3	22,2	63,4	26,0	45,9	34,1	83,8	32,1	71,4	36,2	50,6	44,4
	-10	50,8	14,2	44,9	17,0	33,4	23,5	68,8	25,4	59,5	29,0	43,0	36,7	78,7	34,8	67,0	38,7	47,5	46,5
	-5	47,5	17,9	41,9	20,6	31,2	26,8	64,3	28,5	55,6	32,0	40,2	39,3	73,6	37,4	62,7	41,1	44,4	48,6
	0	44,1	21,6	39,0	24,1	29,0	29,9	59,9	31,6	51,7	34,9	37,4	41,8	68,4	40,0	58,3	43,5	41,3	50,5
	5	40,8	25,3	36,1	27,6	26,8	33,1	55,4	34,7	47,8	37,7	34,6	44,2	63,3	42,5	53,9	45,8	38,2	52,4
	10	37,5	28,9	33,2	31,1	24,7	36,2	50,9	37,6	44,0	40,5	31,8	46,5	58,2	45,0	49,5	48,1	35,1	54,2
	15	34,2	32,5	30,2	34,5	22,5	39,2	46,4	40,6	40,1	43,2	29,0	48,8	53,0	47,4	45,2	50,2	32,0	55,9
	18	32,2	34,6	28,5	36,5	21,2	41,0	43,7	42,3	37,8	44,8	27,3	50,1	50,0	48,7	42,5	51,4	30,1	56,8
	20	30,9	36,0	27,3	37,9	20,3	42,2	41,9	43,4	36,2	45,8	26,2	50,9	47,9	49,7	40,8	52,3	28,9	57,4
LPHW 82/71 °C	-15	58,4	12,4	51,6	15,6	38,4	23,0	79,2	25,1	68,4	29,3	49,5	38,0	90,5	35,8	77,1	40,3	54,6	49,1
	-10	55,1	16,2	48,7	19,3	36,2	26,3	74,7	28,4	64,5	32,3	46,7	40,7	85,4	38,6	72,7	42,8	51,5	51,3
	-5	51,8	20,0	45,7	22,9	34,0	29,6	70,2	31,6	60,6	35,3	43,9	43,3	80,2	41,3	68,3	45,3	48,4	53,4
	0	48,4	23,7	42,8	26,5	31,8	32,9	65,7	34,7	56,8	38,3	41,1	45,8	75,1	43,9	64,0	47,8	45,3	55,4
	5	45,1	27,4	39,9	30,0	29,7	36,1	61,2	37,8	52,9	41,2	38,3	48,3	70,0	46,5	59,6	50,1	42,2	57,4
	10	41,8	31,0	37,0	33,5	27,5	39,2	56,7	40,8	49,0	44,0	35,5	50,7	64,8	49,0	55,2	52,4	39,1	59,2
	15	38,5	34,7	34,0	37,0	25,3	42,3	52,2	43,8	45,1	46,7	32,7	53,0	59,7	51,4	50,9	54,6	36,0	61,0
	18	36,5	36,8	32,3	39,0	24,0	44,1	49,5	45,5	42,8	48,4	31,0	54,4	56,6	52,9	48,2	55,9	34,2	62,0
	20	35,2	38,2	31,1	40,4	23,1	45,3	47,7	46,7	41,2	49,4	29,8	55,3	54,6	53,8	46,5	56,8	32,9	62,7
LPHW 90/70 °C	20	36,1	38,7	31,9	40,9	23,7	45,9	48,9	47,3	42,2	50,1	30,6	56,1	55,9	54,6	47,6	57,6	33,7	63,7

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Copper/aluminium heat exchangers

Type nos.		4720_ _			4730_ _			4740_ _		
2-stage 400 V 3-phase	Type	472036 760 W/1,50 A	470 W/0,81 A		473036 760 W/1,50 A	470 W/0,81 A		474036 760 W/1,50 A	470 W/0,81 A	
3-stage 400 V 3-phase	Type	472035 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	473035 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	474035 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A
Expl.-proof 400 V 3-phase	Type	472037 500 W/0,89 A	340 W/0,55 A		473037 500 W/0,89 A	340 W/0,55 A		454037 500 W/0,89 A	340 W/0,55 A	
1-phase 230 V	Type	472031 730 W/3,4 A			473031 730 W/3,4 A			474031 730 W/3,4 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450	900	700	450
Air volume	**m³/h**	**8770**	**7320**	**4240**	**8500**	**6730**	**4080**	**7960**	**6150**	**3840**
Wall-mounted Throw	m	38	28	18	36	26	17	32	22	14
Max. height* when ceilling-mounted with										
Louvre	m	8,0	7,2	5,3	7,9	6,9	5,1	7,6	6,5	5,0
Diffuser	m	4,3	3,9	3,0	4,2	3,8	2,9	4,1	3,6	2,8
Outlet nozzle	m	11,7	10,4	7,6	11,4	9,9	7,4	11,0	9,4	7,1
Induction louvre	m	11,7	10,4	7,6	11,4	9,9	7,4	11,0	9,4	7,1
KaMAX (vertical)	m	17,7	15,6	11,0	17,2	14,8	10,7	16,5	13,9	10,3
Weight	kg	64	64	64	66	66	66	68	68	68
Water content	l	4,8	4,8	4,8	6,2	6,2	6,2	7,6	7,6	7,6
Connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Sound pressure level	dB(A)	61	57	48	61	57	48	61	57	48
Sound power level	dB(A)	77	73	64	77	73	64	77	73	64

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	74,1	7,5	67,4	9,6	49,6	16,2	100,2	16,4	87,6	19,7	64,0	26,8	119,9	25,2	101,8	29,1	73,6	36,1
	-10	69,0	11,3	62,8	13,2	46,1	19,4	93,3	19,7	81,6	22,8	59,6	29,5	111,7	27,9	94,7	31,6	68,6	38,3
	-5	63,9	15,0	58,1	16,8	42,7	22,6	86,4	22,8	75,5	25,7	55,2	32,1	103,4	30,6	87,7	34,1	63,5	40,3
	0	58,8	18,6	53,5	20,3	39,3	25,7	79,5	26,0	69,5	28,7	50,8	34,6	95,1	33,2	80,7	36,5	58,4	42,2
	5	53,7	22,2	48,8	23,8	35,9	28,8	72,6	29,0	63,4	31,6	46,3	37,0	86,8	35,7	73,7	38,8	53,3	44,1
	10	48,6	25,8	44,2	27,2	32,5	31,9	65,6	32,1	57,4	34,4	41,9	39,4	78,6	38,2	66,7	41,0	48,2	45,9
	15	43,4	29,4	39,5	30,7	29,1	34,9	58,7	35,0	51,4	37,1	37,5	41,7	70,3	40,6	59,6	43,1	43,2	47,6
	18	40,4	31,5	36,7	32,7	27,0	36,6	54,6	36,8	47,7	38,7	34,9	43,0	65,3	42,0	55,4	44,4	40,1	48,5
	20	38,3	32,9	34,9	34,0	25,6	37,8	51,8	37,9	45,3	39,8	33,1	43,9	62,0	42,9	52,6	45,2	38,1	49,2
LPHW 70/60 °C	-15	78,4	8,8	71,3	11,0	52,4	18,0	106,0	18,2	92,7	21,7	67,7	29,2	126,8	27,5	107,6	31,7	77,9	39,1
	-10	73,3	12,6	66,7	14,6	49,0	21,2	99,1	21,5	86,6	24,8	63,3	31,9	118,6	30,3	100,6	34,2	72,8	41,2
	-5	68,1	16,3	62,0	18,2	45,6	24,4	92,1	24,7	80,6	27,8	58,9	34,5	110,3	33,0	93,6	36,7	67,7	43,3
	0	63,0	20,0	57,4	21,8	42,2	27,6	85,2	27,9	74,5	30,8	54,4	37,1	102,0	35,6	86,6	39,1	62,6	45,3
	5	57,9	23,6	52,7	25,3	38,7	30,7	78,3	31,0	68,5	33,7	50,0	39,5	93,7	38,2	79,5	41,4	57,6	47,2
	10	52,8	27,2	48,1	28,8	35,3	33,8	71,4	34,0	62,4	36,5	45,6	41,9	85,5	40,7	72,5	43,7	52,5	49,0
	15	47,7	30,8	43,4	32,2	31,9	36,8	64,5	37,0	56,4	39,3	41,2	44,3	77,2	43,1	65,5	45,9	47,4	50,8
	18	44,6	32,9	40,6	34,2	29,8	38,6	60,4	38,8	52,8	40,9	38,6	45,6	72,2	44,5	61,3	47,1	44,4	51,8
	20	42,6	34,3	38,7	35,6	28,5	39,8	57,6	39,9	50,4	42,0	36,8	46,5	68,9	45,5	58,5	48,0	42,3	52,4
LPHW 75/65 °C	-15	83,5	10,4	76,0	12,7	55,8	20,1	112,9	20,4	98,7	24,1	72,1	32,1	135,1	30,3	114,6	34,7	83,0	42,6
	-10	78,4	14,2	71,3	16,3	52,4	23,4	106,0	23,7	92,7	27,2	67,7	34,8	126,8	33,1	107,6	37,3	77,9	44,8
	-5	73,3	17,9	66,7	19,9	49,0	26,7	99,1	26,9	86,6	30,3	63,3	37,5	118,6	35,8	100,6	39,8	72,8	46,9
	0	68,1	21,6	62,0	23,5	45,6	29,9	92,1	30,1	80,6	33,3	58,9	40,1	110,3	38,5	93,6	42,3	67,7	49,0
	5	63,0	25,2	57,4	27,1	42,2	33,0	85,2	33,2	74,5	36,2	54,4	42,6	102,0	41,1	86,6	44,6	62,6	50,9
	10	57,9	28,9	52,7	30,6	38,7	36,1	78,3	36,3	68,5	39,1	50,0	45,0	93,7	43,6	79,5	47,0	57,6	52,8
	15	52,8	32,5	48,1	34,0	35,3	39,1	71,4	39,4	62,4	41,9	45,6	47,4	85,5	46,1	72,5	49,2	52,5	54,6
	18	49,7	34,6	45,3	36,1	33,3	40,9	67,3	41,1	58,8	43,6	43,0	48,8	80,5	47,6	68,3	50,5	49,4	55,6
	20	47,7	36,0	43,4	37,4	31,9	42,1	64,5	42,3	56,4	44,6	41,2	49,7	77,2	48,5	65,5	51,3	47,4	56,3
LPHW 82/71 °C	-15	90,1	12,4	82,0	14,9	60,3	22,9	121,9	23,2	106,6	27,2	77,8	35,9	145,9	33,9	123,8	38,7	89,6	47,2
	-10	85,0	16,2	77,3	18,6	56,9	26,2	115,0	26,6	100,5	30,4	73,4	38,6	137,6	36,7	116,7	41,3	84,5	49,5
	-5	79,9	20,0	72,7	22,2	53,4	29,5	108,0	29,8	94,5	33,5	69,0	41,3	129,3	39,5	109,7	43,9	79,4	51,6
	0	74,8	23,7	68,0	25,8	50,0	32,8	101,1	33,0	88,4	36,5	64,6	44,0	121,0	42,2	102,7	46,4	74,3	43,8
	5	69,7	27,4	63,4	29,4	46,6	36,0	94,2	36,2	82,4	39,5	60,2	46,6	112,8	44,9	95,7	48,8	69,2	55,8
	10	64,6	31,0	58,7	32,9	43,2	39,1	87,3	39,3	76,3	42,4	55,8	49,1	104,5	47,5	88,7	51,2	64,2	57,7
	15	59,5	34,7	54,1	36,4	39,8	42,2	80,4	42,4	70,3	45,3	51,4	51,5	96,2	50,0	81,6	53,5	59,1	59,6
	18	56,4	36,8	51,3	38,5	37,7	44,0	76,2	44,2	66,7	47,0	48,7	52,9	91,3	51,5	77,4	54,8	56,0	60,7
	20	54,3	38,2	49,4	39,9	36,3	45,2	73,5	45,4	64,3	48,1	46,9	53,8	88,0	52,5	74,6	55,7	54,0	61,4
LPHW 90/70 °C	20	55,7	38,7	50,6	40,3	37,2	45,8	75,3	46,0	65,8	48,8	48,1	54,7	90,1	53,3	76,4	56,5	55,3	62,4

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Type nos.		4421_ _			4431_ _			4441_ _		
2-stage 400 V 3-phase	Typ	442136			443136			444136		
		180 W/0,34 A	130 W/0,20 A		180 W/0,34 A	130 W/0,20 A		180 W/0,34 A	130 W/0,20 A	
3-stage 400 V 3-phase	Typ	442135			443135			444135		
		165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	165 W/0,32 A	120 W/0,19 A	40 W/0,11 A
Expl.-proof 400 V 3-phase	Typ	442137			443137			444137		
		140 W/0,28 A	110 W/0,19 A		140 W/0,28 A	110 W/0,19 A		140 W/0,28 A	110 W/0,19 A	
1-phase 230 V	Typ	442131			443131			444131		
		200 W/0,9 A			200 W/0,9 A			200 W/0,9 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**2360**	**1870**	**1100**	**2360**	**1870**	**1100**	**1890**	**1480**	**910**
Wall-mounted Throw	m	18	13	8	18	13	8	16	12	7
Max. height* when ceilling-mounted with										
Louvre	m	5,5	4,7	3,4	5,5	4,7	3,4	4,8	4,1	3,0
Diffuser	m	3,5	3,0	2,3	3,5	3,0	2,3	3,1	2,7	2,1
Outlet nozzle	m	7,6	6,5	4,6	7,6	6,5	4,6	6,7	5,6	4,1
Induction louvre	m	7,6	6,5	4,6	7,6	6,5	4,6	6,7	5,6	4,1
KaMAX (vertical)	m	8,8	7,4	5,2	8,8	7,4	5,2	7,6	6,5	4,6
Weight	kg	45	45	45	58	58	58	69	69	69
Water content	l	3,1	3,1	3,1	6,1	6,1	6,1	6,1	6,1	6,1
Connection	inchl	1"	1"	1"	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	55	49	39	55	49	39	55	49	39
Sound power level	dB(A)	71	65	55	71	65	55	71	65	55

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	18,2	5,5	15,5	7,1	10,7	11,0	24,2	12,4	20,6	14,4	14,3	19,7	26,1	21,8	22,0	24,7	15,8	31,2
	-10	16,9	9,4	14,4	10,8	10,0	14,6	22,6	15,8	19,2	17,8	13,3	22,7	24,3	24,7	20,5	27,5	14,7	33,6
	-5	15,7	13,2	13,3	14,6	9,3	18,0	20,9	19,3	17,8	21,1	12,3	25,7	22,5	27,6	19,0	30,2	13,6	35,9
	0	14,4	17,0	12,3	18,2	8,5	21,5	19,2	22,6	16,4	24,3	11,4	28,7	20,7	30,4	17,5	32,8	12,5	38,2
	5	13,2	20,7	11,2	21,9	7,8	24,9	17,5	25,9	14,9	27,5	10,4	31,5	18,9	33,2	16,0	35,4	11,4	40,3
	10	11,9	24,4	10,1	25,5	7,0	28,3	15,9	29,2	13,5	30,7	9,4	34,4	17,1	35,8	14,4	37,9	10,3	42,4
	15	10,7	28,1	9,1	29,1	6,3	31,6	14,2	32,4	12,1	33,8	8,4	37,1	15,3	38,5	12,9	40,3	9,2	44,4
	18	9,9	30,3	8,4	31,2	5,8	33,5	13,2	34,4	11,2	35,6	7,8	38,7	14,2	40,0	12,0	41,7	8,6	45,6
	20	9,4	31,7	8,0	32,6	5,6	34,8	12,5	35,6	10,7	36,8	7,4	39,8	13,5	41,0	11,4	42,7	8,2	46,3
LPHW 70/60 °C	-15	19,2	6,7	16,4	8,3	11,4	12,5	25,6	14,0	21,8	16,1	15,1	21,7	27,6	23,9	23,3	27,0	16,7	33,8
	-10	18,0	10,6	15,3	12,1	10,6	16,1	24,0	17,4	20,4	19,5	14,1	24,8	25,8	26,9	21,8	29,8	15,6	36,3
	-5	16,7	14,4	14,2	15,9	9,9	19,6	22,3	20,9	19,0	22,8	13,2	27,8	24,0	29,8	20,3	32,5	14,5	38,6
	0	15,5	18,2	13,2	19,6	9,1	23,1	20,6	24,3	17,6	26,1	12,2	30,7	22,2	32,6	18,8	35,2	13,4	40,9
	5	14,2	22,0	12,1	23,2	8,4	26,5	18,9	27,6	16,1	29,3	11,2	33,6	20,4	35,4	17,2	37,8	12,3	43,1
	10	13,0	25,7	11,0	26,9	7,6	29,9	17,3	30,9	14,7	32,5	10,2	36,5	18,6	38,1	15,7	40,3	11,2	45,3
	15	11,7	29,4	10,0	30,4	6,9	33,2	15,6	34,2	13,3	35,6	9,2	39,3	16,8	40,8	14,2	42,8	10,1	47,3
	18	10,9	31,6	9,3	32,6	6,5	35,2	14,6	36,1	12,4	37,4	8,6	40,9	15,7	42,3	13,3	44,2	9,5	48,5
	20	10,4	33,0	8,9	34,0	6,2	36,5	13,9	37,4	11,9	38,7	8,2	42,0	15,0	43,3	12,7	45,2	9,1	49,3
LPHW 75/65 °C	-15	20,5	8,1	17,4	9,9	12,1	14,3	27,3	15,8	23,3	18,2	16,1	24,1	29,4	26,5	24,8	29,7	17,8	37,0
	-10	19,2	12,0	16,4	13,7	11,4	17,9	25,6	19,4	21,8	21,5	15,1	27,2	27,6	29,5	23,3	32,6	16,7	39,5
	-5	18,0	15,9	15,3	17,4	10,6	21,4	24,0	22,8	20,4	24,9	14,1	30,2	25,8	32,4	21,8	35,3	15,6	41,9
	0	16,7	19,7	14,2	21,1	9,9	24,9	22,3	26,2	19,0	28,2	13,2	33,2	24,0	35,3	20,3	38,1	14,5	44,2
	5	15,5	23,5	13,2	24,8	9,1	28,4	20,6	29,6	17,6	31,4	12,2	36,2	22,2	38,1	18,8	40,7	13,4	46,5
	10	14,2	27,2	12,1	28,5	8,4	31,8	18,9	32,9	16,1	34,6	11,2	39,1	20,4	40,8	17,2	43,3	12,3	48,7
	15	13,0	30,9	11,0	32,1	7,6	35,2	17,3	36,2	14,7	37,8	10,2	41,9	18,6	43,5	15,7	45,8	11,2	50,8
	18	12,2	33,1	10,4	34,2	7,2	37,2	16,3	38,2	13,9	39,7	9,6	43,5	17,5	45,1	14,8	47,2	10,6	52,0
	20	11,7	34,6	10,0	35,7	6,9	38,5	15,6	39,4	13,3	40,9	9,2	44,6	16,8	46,1	14,2	48,2	10,1	52,8
LPHW 82/71 °C	-15	22,1	10,0	18,8	11,8	13,1	16,6	29,5	18,3	25,1	20,8	17,4	27,2	31,7	29,8	26,8	33,3	19,2	41,2
	-10	20,9	13,9	17,8	15,7	12,3	20,3	27,8	21,8	23,7	24,2	16,4	30,3	29,9	32,8	25,3	36,2	18,1	43,7
	-5	19,6	17,8	16,7	19,5	11,6	23,8	26,1	25,3	22,3	27,6	15,4	33,4	28,1	35,8	23,8	39,0	17,0	46,2
	0	18,3	21,6	15,6	23,2	10,8	27,4	24,5	28,8	20,8	30,9	14,4	36,5	26,3	38,7	22,3	41,8	15,9	48,6
	5	17,1	25,4	14,6	26,9	10,1	30,8	22,8	32,2	19,4	34,2	13,5	39,5	24,5	41,6	20,7	44,5	14,8	50,9
	10	15,8	29,2	13,5	30,6	9,4	34,3	21,1	35,6	18,0	37,5	12,5	42,4	22,7	44,4	19,2	47,1	13,7	53,1
	15	14,6	32,9	12,4	34,3	8,6	37,7	19,4	38,9	16,6	40,7	11,5	45,3	20,9	47,1	17,7	49,6	12,6	55,3
	18	13,8	35,1	11,8	36,4	8,2	39,7	18,4	40,8	15,7	42,6	10,9	46,9	19,9	48,7	16,8	51,1	12,0	56,5
	20	13,3	36,6	11,4	37,9	7,9	41,0	17,8	42,1	15,1	43,8	10,5	48,1	19,1	49,8	16,2	52,1	11,6	57,4
LPHW 90/70 °C	20	13,7	37,0	11,6	38,3	8,1	41,6	18,2	42,7	15,5	44,4	10,7	48,7	19,6	50,5	16,6	52,9	11,8	58,3

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Galvanised steel heat exchangers

Type nos.		4521_ _			4531_ _			4541_ _		
2-stage 400 V 3-phase	Type	452136 320 W/0,62 A	230 W/0,37 A		453136 320 W/0,62 A	230 W/0,37 A		454136 320 W/0,62 A	230 W/0,37 A	
3-stage 400 V 3-phase	Type	452135 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	453135 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	454135 350 W/0,65 A	280 W/0,46 A	65 W/0,19 A
Expl.-proof 400 V 3-phase	Type	452137 360 W/0,61 A	250 W/0,41 A		453137 360 W/0,61 A	250 W/0,41 A		454137 360 W/0,61 A	250 W/0,41 A	
1-phase 230 V	Type	452131 370 W/1,6 A			453131 370 W/1,6 A			454131 370 W/1,6 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**4140**	**3330**	**2000**	**4140**	**3330**	**2000**	**3430**	**2700**	**1710**
Wall-mounted Throw	m	23	17	11	23	17	11	19	13	9
Max. height* when ceilling-mounted with										
Louvre	m	6,5	5,7	4,2	6,5	5,7	4,2	5,8	5,0	3,8
Diffuser	m	4,1	3,6	2,8	4,1	3,6	2,8	3,7	3,2	2,5
Outlet nozzle	m	9,2	8,0	5,8	9,2	8,0	5,8	8,2	7,0	5,3
Induction louvre	m	9,2	8,0	5,8	9,2	8,0	5,8	8,2	7,0	5,3
KaMAX (vertical)	m	11,4	9,8	7,0	11,4	9,8	7,0	10,1	8,5	6,3
Weight	kg	71	71	71	87	87	87	102	102	102
Water content	l	5,1	5,1	5,1	8,2	8,2	8,2	8,2	8,2	8,2
Connection	inch	1"	1"	1"	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	59	51	42	59	51	42	59	51	42
Sound power level	dB(A)	75	67	58	75	67	58	75	67	58

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	30,5	4,6	26,2	6,0	18,4	9,6	38,8	10,0	33,4	11,8	23,5	16,3	46,3	21,0	39,2	23,8	28,6	29,7
	-10	28,3	8,5	24,4	9,8	17,2	13,2	36,2	13,6	31,1	15,3	21,9	19,6	43,1	24,0	36,5	26,6	26,7	32,1
	-5	26,2	12,4	22,6	13,6	15,9	16,8	33,5	17,2	28,8	18,7	20,3	22,8	39,9	26,9	33,8	29,3	24,7	34,6
	0	24,1	16,2	20,8	17,3	14,6	20,3	30,8	20,7	26,5	22,1	18,6	25,9	36,7	29,7	31,1	32,0	22,7	36,9
	5	22,0	20,0	19,0	21,1	13,3	23,8	28,1	24,1	24,2	25,5	17,0	29,0	33,5	32,5	28,4	34,7	20,7	39,2
	10	19,9	23,8	17,2	24,7	12,1	27,3	25,4	27,6	21,9	28,8	15,4	32,0	30,3	35,3	25,7	37,2	18,8	41,4
	15	17,8	27,5	15,4	28,4	10,8	30,7	22,8	30,9	19,6	32,1	13,8	35,0	27,1	37,9	23,0	39,7	16,8	43,5
	18	16,6	29,7	14,3	30,5	10,0	32,7	21,2	32,9	18,2	34,0	12,8	36,7	25,2	39,5	21,4	41,2	15,6	44,7
	20	15,7	31,2	13,6	32,0	9,5	34,0	20,1	34,3	17,3	35,3	12,2	37,9	23,9	40,5	20,3	42,1	14,8	45,5
LPHW 70/60 °C	-15	32,2	5,7	27,7	7,2	19,5	11,0	41,1	11,5	35,3	13,3	24,9	18,1	49,0	23,1	41,5	26,0	30,3	32,2
	-10	30,1	9,7	25,9	11,0	18,2	14,6	38,4	15,1	33,0	16,8	23,2	21,4	45,8	26,1	38,8	28,8	28,3	34,7
	-5	28,0	13,5	24,1	14,8	16,9	18,2	35,7	18,6	30,7	20,3	21,6	24,6	42,6	29,0	36,1	31,6	26,3	37,2
	0	25,9	17,4	22,3	18,6	15,7	21,8	33,0	22,2	28,4	23,7	20,0	27,8	39,4	31,9	33,4	34,3	24,4	39,6
	5	23,8	21,2	20,5	22,3	14,4	25,3	30,4	25,7	26,1	27,1	18,4	30,9	36,2	34,7	30,7	37,0	22,4	41,9
	10	21,7	25,0	18,7	26,0	13,1	28,8	27,7	29,1	23,8	30,4	16,8	33,9	33,0	37,5	28,0	39,6	20,4	44,1
	15	19,6	28,7	16,9	29,7	11,9	32,2	25,0	32,5	21,5	33,7	15,1	36,9	29,8	40,2	25,3	42,1	18,4	46,2
	18	18,3	31,0	15,8	31,9	11,1	34,2	23,4	34,5	20,1	35,7	14,2	38,7	27,9	41,8	23,6	43,6	17,2	47,5
	20	17,5	32,4	15,1	33,3	10,6	35,6	22,3	35,9	19,2	37,0	13,5	39,9	26,6	42,8	22,6	44,6	16,5	48,3
LPHW 75/65 °C	-15	34,3	7,1	29,5	8,6	20,8	12,7	43,8	13,2	37,6	15,1	26,5	20,3	52,2	25,5	44,2	28,7	32,3	35,3
	-10	32,2	11,0	27,7	12,5	19,5	16,3	41,1	16,8	35,3	18,7	24,9	23,6	49,0	28,6	41,5	31,5	30,3	37,9
	-5	30,1	14,9	25,9	16,3	18,2	20,0	38,4	20,4	33,0	22,2	23,2	26,8	45,8	31,6	38,8	34,4	28,3	40,4
	0	28,0	18,8	24,1	20,1	16,9	23,5	35,7	24,0	30,7	25,6	21,6	30,0	42,6	34,5	36,1	37,1	26,3	42,8
	5	25,9	22,6	22,3	23,9	15,7	27,1	33,0	27,5	28,4	29,0	20,0	33,2	39,4	37,3	33,4	39,8	24,4	45,1
	10	23,8	26,4	20,5	27,6	14,4	30,6	30,4	31,0	26,1	32,4	18,4	36,3	36,2	40,1	30,7	42,5	22,4	47,4
	15	21,7	30,2	18,7	31,3	13,1	34,0	27,7	34,4	23,8	35,7	16,8	39,3	33,0	42,9	28,0	45,0	20,4	49,6
	18	20,4	32,4	17,6	33,4	12,4	36,1	26,1	36,4	22,4	37,7	15,8	41,1	31,1	44,5	26,3	46,5	19,2	50,9
	20	19,6	33,9	16,9	34,9	11,9	37,4	25,0	37,8	21,5	39,0	15,1	42,3	29,8	45,6	25,3	47,5	18,4	51,7
LPHW 82/71 °C	-15	37,0	8,9	31,9	10,5	22,4	14,9	47,2	15,4	40,6	17,5	28,6	23,1	56,3	28,8	47,7	32,1	34,8	39,3
	-10	34,9	12,8	30,1	14,4	21,1	18,6	44,6	19,1	38,3	21,1	27,0	26,4	53,1	31,8	45,0	35,1	32,9	41,9
	-5	32,8	16,7	28,3	18,2	19,9	22,2	41,9	22,7	36,0	24,6	25,3	29,7	49,9	34,9	42,3	37,9	30,9	44,5
	0	30,7	20,6	26,4	22,1	18,6	25,8	39,2	26,3	33,7	28,1	23,7	33,0	46,7	37,8	39,6	40,8	28,9	47,0
	5	28,6	24,5	24,6	25,8	17,3	29,4	36,5	29,8	31,4	31,6	22,1	36,1	43,5	40,7	36,9	43,5	26,9	49,4
	10	26,5	28,3	22,8	29,6	16,1	32,9	33,8	33,4	29,1	35,0	20,5	39,3	40,3	43,6	34,2	46,2	25,0	51,7
	15	24,4	32,1	21,0	33,3	14,8	36,4	31,2	36,8	26,8	38,3	18,9	42,3	37,1	46,4	31,5	48,8	23,0	53,9
	18	23,2	34,4	19,9	35,5	14,0	38,5	29,6	38,9	25,4	40,3	17,9	44,2	35,2	48,0	29,9	50,3	21,8	55,3
	20	22,3	35,9	19,2	37,0	13,5	39,9	28,5	40,2	24,5	41,6	17,2	45,4	34,0	49,1	28,8	51,4	21,0	56,1
LPHW 90/70 °C	20	22,9	36,2	19,7	37,4	13,8	40,4	29,2	40,7	25,1	42,2	17,7	46,0	34,8	49,8	29,5	52,1	21,5	57,0

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Type nos.		4621_ _			4631_ _			4641_ _		
2-stage 400 V 3-phase	Type	462136 340 W/0,71 A	230 W/0,39 A		463136 340 W/0,71 A	230 W/0,39 A		464136 340 W/0,71 A	230 W/0,39 A	
3-stage 400 V 3-phase	Type	462135 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	463135 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	464135 380 W/0,73 A	270 W/0,44 A	90 W/0,26 A
Expl.-proof 400 V 3-phase	Type	462137 390 W/0,87 A	200 W/0,46 A		463137 390 W/0,87 A	200 W/0,46 A		464137 390 W/0,87 A	200 W/0,46 A	
1-phase 230 V	Type	462131 400 W/1,8 A			463131 400 W/1,8 A			464131 400 W/1,8 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450	900	700	450
Air volume	**m³/h**	**5680**	**4490**	**2690**	**5680**	**4490**	**2690**	**4750**	**3720**	**2270**
Wall-mounted Throw	m	27	20	12	27	20	12	21	16	10
Max. height* when ceilling-mounted with										
Louvre	m	7,2	6,2	4,6	7,2	6,2	4,6	6,4	5,1	4,1
Diffuser	m	4,1	3,6	2,8	4,1	3,6	2,8	3,7	3,0	2,5
Outlet nozzle	m	9,8	8,4	6,2	9,8	8,4	6,2	8,8	7,0	5,6
Induction louvre	m	9,8	8,4	6,2	9,8	8,4	6,2	8,8	7,0	5,6
KaMAX (vertical)	m	12,5	10,7	7,7	12,5	10,7	7,7	11,1	8,7	6,8
Weight	kg	101	101	101	117	117	117	138	138	138
Water content	l	5,7	5,7	5,7	11,5	11,5	11,5	11,5	11,5	11,5
Connection	inch	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Sound pressure level	dB(A)	58	51	40	58	51	40	58	51	40
Sound power level	dB(A)	74	67	56	74	67	56	74	67	56

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	46,6	6,9	39,6	8,5	27,8	12,6	59,8	13,1	50,9	15,2	35,7	20,4	67,0	22,6	56,6	25,6	40,2	32,3
	-10	43,4	10,6	36,9	12,2	25,9	16,0	55,7	16,5	47,3	18,5	33,2	23,4	62,3	25,5	52,7	28,3	37,5	34,6
	-5	40,2	14,4	34,2	15,8	24,0	19,4	51,6	19,9	43,8	21,8	30,8	26,4	57,7	28,3	48,8	30,9	34,7	36,9
	0	37,0	18,1	31,4	19,4	22,1	22,8	47,4	23,2	40,3	25,0	28,3	29,2	53,1	31,1	44,9	33,5	31,9	39,0
	5	33,7	21,7	28,7	23,0	20,2	26,1	43,3	26,5	36,8	28,1	25,9	32,1	48,5	33,8	41,0	36,0	29,1	41,1
	10	30,5	25,4	26,0	26,5	18,2	29,4	39,2	29,7	33,3	31,2	23,4	34,9	43,9	36,4	37,1	38,5	26,4	43,2
	15	27,3	28,9	23,2	30,0	16,3	32,6	35,1	32,9	29,8	34,2	20,9	37,6	39,3	39,0	33,2	40,8	23,6	45,1
	18	25,4	31,1	21,6	32,1	15,2	34,5	32,6	34,8	27,7	36,0	19,5	39,1	36,5	40,5	30,8	42,2	21,9	46,2
	20	24,1	32,5	20,5	33,4	14,4	35,7	30,9	36,0	26,3	37,2	18,5	40,2	34,6	41,4	29,3	43,1	20,8	47,0
LPHW 70/60 °C	-15	49,3	8,1	41,9	9,9	29,4	14,2	63,3	14,7	53,8	16,9	37,8	22,4	70,8	24,8	59,8	27,9	42,5	35,0
	-10	46,1	11,9	39,2	13,6	27,5	17,6	59,1	18,1	50,3	20,3	35,3	25,5	66,2	27,7	55,9	30,6	39,8	37,3
	-5	42,9	15,7	36,4	17,2	25,6	21,1	55,0	21,5	46,8	23,5	32,8	28,4	61,6	30,5	52,0	33,3	37,0	39,6
	0	39,6	19,4	33,7	20,9	23,7	24,4	50,9	24,9	43,3	26,8	30,4	31,4	57,0	33,3	48,1	35,9	34,2	41,9
	5	36,4	23,1	31,0	24,4	21,8	27,8	46,8	28,2	39,7	29,9	27,9	34,2	52,3	36,0	44,2	38,5	31,4	44,0
	10	33,2	26,7	28,2	28,0	19,8	31,1	42,6	31,4	36,2	33,1	25,5	37,0	47,7	38,7	40,3	41,0	28,7	46,1
	15	30,0	30,3	25,5	31,5	17,9	34,3	38,5	34,6	32,7	36,1	23,0	39,8	43,1	41,3	36,4	43,4	25,9	48,1
	18	28,1	32,5	23,9	33,5	16,8	36,2	36,0	36,5	30,6	37,9	21,5	41,4	40,3	42,8	34,1	44,8	24,2	49,2
	20	26,8	33,9	22,8	34,9	16,0	37,5	34,4	37,8	29,2	39,1	20,5	42,4	38,5	43,8	32,5	45,7	23,1	50,0
LPHW 75/65 °C	-15	52,5	9,6	44,6	11,5	31,3	16,1	67,4	16,6	57,3	19,0	40,2	24,9	75,4	27,3	63,7	30,7	45,3	38,2
	-10	49,3	13,5	41,9	15,2	29,4	19,6	63,3	20,1	53,8	22,4	37,8	27,9	70,8	30,3	59,8	33,5	42,5	40,7
	-5	46,1	17,2	39,2	18,9	27,5	23,0	59,1	23,5	50,3	25,7	35,3	31,0	66,2	33,2	55,9	36,2	39,8	43,0
	0	42,9	21,0	36,4	22,5	25,6	26,4	55,0	26,9	46,8	28,9	32,8	33,9	61,6	36,0	52,0	38,8	37,0	45,3
	5	39,6	24,7	33,7	26,1	23,7	29,8	50,9	30,2	43,3	32,1	30,4	36,8	57,0	38,8	48,1	41,4	34,2	47,5
	10	36,4	28,3	31,0	29,7	21,8	33,1	46,8	33,5	39,7	35,3	27,9	39,6	52,3	41,5	44,2	44,0	31,4	49,6
	15	33,2	31,9	28,2	33,2	19,8	36,4	42,6	36,8	36,2	38,4	25,5	42,4	47,7	44,1	40,3	46,4	28,7	51,6
	18	31,3	34,1	26,6	35,3	18,7	38,3	40,2	38,7	34,1	40,2	24,0	44,1	44,9	45,7	38,0	47,8	27,0	52,8
	20	30,0	35,5	25,5	36,7	17,9	39,6	38,5	39,9	32,7	41,4	23,0	45,1	43,1	46,7	36,4	48,8	25,9	53,6
LPHW 82/71 °C	-15	56,7	11,6	48,2	13,6	33,8	18,5	72,7	19,2	61,8	21,7	43,4	28,1	81,4	30,7	68,8	34,3	48,9	42,5
	-10	53,5	15,4	45,5	17,4	31,9	22,1	68,6	22,6	58,3	25,1	41,0	31,2	76,8	33,7	64,9	37,1	46,2	44,9
	-5	50,3	19,2	42,7	21,1	30,0	25,6	64,5	26,1	54,8	28,5	38,5	34,2	72,2	36,6	61,0	39,9	43,4	47,4
	0	47,0	23,0	40,0	24,7	28,1	29,0	60,4	29,5	51,3	31,8	36,0	37,2	67,6	39,5	57,1	42,6	40,6	49,7
	5	43,8	26,7	37,3	28,4	26,2	32,4	56,2	32,9	47,8	35,0	33,6	40,2	63,0	42,3	53,2	45,3	37,8	51,9
	10	40,6	30,4	34,5	32,0	24,2	35,8	52,1	36,2	44,3	38,2	31,1	43,0	58,3	45,1	49,3	47,9	35,1	54,1
	15	37,4	34,1	31,8	35,5	22,3	39,1	48,0	39,5	40,8	41,3	28,7	45,9	53,7	47,8	45,4	50,4	32,3	56,2
	18	35,5	36,3	30,2	37,6	21,2	41,0	45,5	41,4	38,7	43,2	27,2	47,5	51,0	49,4	43,0	51,8	30,6	57,4
	20	34,2	37,7	29,1	39,0	20,4	42,3	43,9	42,7	37,3	44,4	26,2	48,6	49,1	50,4	41,5	52,8	29,5	58,2
LPHW 90/70 °C	20	35,0	38,1	29,8	39,5	20,9	42,8	44,9	43,3	38,2	45,0	26,8	49,3	50,3	51,1	42,5	53,6	30,2	59,1

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Type nos.		4721_ _			4731_ _			4741_ _		
2-stage 400 V 3-phase	Type	472136 760 W/1,50 A	470 W/0,81 A		473136 760 W/1,50 A	470 W/0,81 A		474136 760 W/1,50 A	470 W/0,81 A	
3-stage 400 V 3-phase	Type	472135 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	473135 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	474135 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A
Expl.-proof 400 V 3-phase	Type	472137 500 W/0,89 A	340 W/0,55 A		473137 500 W/0,89 A	340 W/0,55 A		474137 500 W/0,89 A	340 W/0,55 A	
1-phase 230 V	Type	472131 730 W/3,4 A			473131 730 W/3,4 A			474131 730 W/3,4 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450	900	700	450
Air volume	**m³/h**	**8770**	**7320**	**4240**	**8770**	**7320**	**4240**	**7960**	**6150**	**3840**
Wall-mounted Throw	m	38	28	18	38	28	18	32	22	14
Max. height* when ceilling-mounted with										
Louvre	m	8,0	7,2	5,3	8,0	7,2	5,3	7,6	6,5	5,0
Diffuser	m	4,3	3,9	3,0	4,3	3,9	3,0	4,1	3,6	2,8
Outlet nozzle	m	11,7	10,4	7,6	11,7	10,4	7,6	11,0	9,4	7,1
Induction louvre	m	11,7	10,4	7,6	11,7	10,4	7,6	11,0	9,4	7,1
KaMAX (vertical)	m	17,7	15,6	11,0	17,7	15,6	11,0	16,5	13,9	10,3
Weight	kg	136	136	136	152	152	152	178	178	178
Water content	l	8,7	8,7	8,7	16,8	16,8	16,8	16,8	16,8	16,8
Connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Sound pressure level	dB(A)	61	57	48	61	57	48	61	57	48
Sound power level	dB(A)	77	73	64	77	73	64	77	73	64

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPWW 70/55 °C	-15	78,3	8,8	69,1	10,2	47,4	14,8	101,4	15,8	89,6	17,6	61,4	23,6	118,5	24,7	99,2	28,0	71,7	34,8
	-10	72,9	12,5	64,4	13,8	44,2	18,1	94,5	19,1	83,4	20,8	57,2	26,5	110,4	27,5	92,4	30,6	66,7	37,0
	-5	67,5	16,1	59,6	17,3	40,9	21,4	87,5	22,3	77,2	23,9	53,0	29,2	102,2	30,2	85,5	33,1	61,8	39,1
	0	62,1	19,7	54,8	20,8	37,6	24,6	80,5	25,5	71,0	27,0	48,7	31,9	94,0	32,8	78,7	35,5	56,9	41,1
	5	56,7	23,2	50,1	24,3	34,3	27,8	73,5	28,6	64,8	30,0	44,5	34,6	85,8	35,4	71,8	37,9	51,9	43,1
	10	51,3	26,7	45,3	27,7	31,1	30,9	66,5	31,7	58,7	32,9	40,3	37,1	77,7	37,9	65,0	40,2	47,0	44,9
	15	45,9	30,2	40,5	31,0	27,8	34,0	59,5	34,7	52,5	35,8	36,0	39,6	69,5	40,3	58,2	42,4	42,0	46,7
	18	42,7	32,2	37,7	33,0	25,8	35,8	55,3	36,4	48,8	37,5	33,5	41,1	64,6	41,7	54,0	43,7	39,1	47,7
	20	40,5	33,6	35,7	34,4	24,5	37,0	52,5	37,6	46,3	38,6	31,8	42,0	61,3	42,7	51,3	44,5	37,1	48,4
LPHW 70/60 °C	-15	82,8	10,2	73,1	11,6	50,1	16,5	107,3	17,6	94,7	19,5	65,0	25,9	125,4	27,0	104,9	30,5	75,8	37,6
	-10	77,4	13,9	68,3	15,2	46,9	19,9	100,3	20,9	88,5	22,7	60,7	28,7	117,2	29,8	98,1	33,1	70,9	39,9
	-5	72,0	17,5	63,6	18,8	43,6	23,2	93,3	24,1	82,4	25,8	56,5	31,5	109,0	32,5	91,2	35,6	65,9	42,0
	0	66,6	21,1	58,8	22,3	40,3	26,4	86,3	27,3	76,2	28,9	52,3	34,2	100,8	35,2	84,4	38,1	61,0	44,1
	5	61,2	24,7	54,0	25,8	37,1	29,6	79,3	30,5	70,0	31,9	48,0	36,9	92,7	37,8	77,5	40,5	56,0	46,1
	10	55,8	28,2	49,3	29,2	33,8	32,8	72,3	33,6	63,8	34,9	43,8	39,5	84,5	40,3	70,7	42,8	51,1	48,0
	15	50,4	31,7	44,5	32,6	30,5	35,9	65,3	36,6	57,6	37,8	39,5	42,0	76,3	42,8	63,9	45,1	46,1	49,8
	18	47,2	33,7	41,6	34,6	28,6	37,7	61,1	38,4	53,9	39,5	37,0	43,5	71,4	44,2	59,8	46,4	43,2	50,9
	20	45,0	35,1	39,7	36,0	27,3	38,9	58,3	39,6	51,5	40,7	35,3	44,5	68,1	45,2	57,0	47,3	41,2	51,6
LPHW 75/65 °C	-15	88,2	11,8	77,9	13,4	53,4	18,6	114,3	19,7	100,9	21,8	69,2	28,5	133,5	29,7	111,8	33,5	80,7	41,1
	-10	82,8	15,5	73,1	17,0	50,1	22,0	107,3	23,1	94,7	25,0	65,0	31,4	125,4	32,6	104,9	36,1	75,8	43,4
	-5	77,4	19,2	68,3	20,6	46,9	25,3	100,3	26,3	88,5	28,1	60,7	34,2	117,2	35,3	98,1	38,7	70,9	45,6
	0	72,0	22,8	63,6	24,1	43,6	28,6	93,3	29,5	82,4	31,3	56,5	37,0	109,0	38,0	91,2	41,2	65,9	47,7
	5	66,6	26,4	58,8	27,6	40,3	31,8	86,3	32,7	76,2	34,3	52,3	39,7	100,8	40,7	84,4	43,7	61,0	49,7
	10	61,2	29,9	54,0	31,1	37,1	35,0	79,3	35,8	70,0	37,3	48,0	42,4	92,7	43,3	77,5	46,0	56,0	51,7
	15	55,8	33,4	49,3	34,5	33,8	38,1	72,3	38,9	63,8	40,3	43,8	44,9	84,5	45,8	70,7	48,3	51,1	53,6
	18	52,6	35,5	46,4	36,5	31,8	40,0	68,1	40,7	60,1	42,0	41,2	46,4	79,6	47,2	66,6	49,7	48,1	54,6
	20	50,4	36,9	44,5	37,9	30,5	41,2	65,3	41,9	57,6	43,2	39,5	47,4	76,3	48,2	63,9	50,5	46,1	55,3
LPHW 82/71 °C	-15	95,2	14,0	84,1	15,6	57,7	21,3	123,4	22,5	108,9	24,7	74,7	32,0	144,2	33,3	120,7	37,3	87,2	45,5
	-10	89,8	17,7	79,3	19,3	54,4	24,7	116,4	25,9	102,7	27,9	70,5	34,9	136,0	36,2	113,8	40,0	82,2	47,9
	-5	84,4	21,4	74,5	22,9	51,1	28,0	109,4	29,2	96,6	31,1	66,2	37,8	127,8	39,0	107,0	42,7	77,3	50,1
	0	79,0	25,0	69,8	26,5	47,9	31,4	102,4	32,4	90,4	34,3	62,0	40,6	119,6	41,7	100,1	45,2	72,3	52,3
	5	73,6	28,6	65,0	30,0	44,6	34,6	95,4	35,6	84,2	37,4	57,8	43,4	111,5	44,4	93,3	47,7	67,4	54,4
	10	68,2	32,2	60,2	33,5	41,3	37,8	88,4	38,8	78,0	40,5	53,5	46,1	103,3	47,1	86,4	50,2	62,5	56,5
	15	62,8	35,8	55,5	37,0	38,0	41,0	81,4	41,9	71,9	43,5	49,3	48,7	95,1	49,6	79,6	52,5	57,5	58,4
	18	59,6	37,9	52,6	39,0	36,1	42,9	77,2	43,7	68,1	45,2	46,8	50,2	90,2	51,1	75,5	53,9	54,5	59,5
	20	57,4	39,3	50,7	40,4	34,8	44,1	74,4	45,0	65,7	46,4	45,1	51,3	86,9	52,1	72,8	45,8	52,6	60,3
LPHW 90/70 °C	20	58,8	39,7	51,9	40,9	35,6	44,7	76,2	45,5	67,3	47,0	46,1	52,0	89,0	52,9	74,5	55,6	53,8	61,2

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Galvanised steel heat exchangers for use with steam

Type nos.		4422_ _			4432_ _		
2-stage 400 V 3-phase	Type	442236			443236		
		180 W/0,34 A	130 W/0,20 A		180 W/0,34 A	130 W/0,20 A	
3-stage 400 V 3-phase	Type	442235			443235		
		165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	165 W/0,32 A	120 W/0,19 A	40 W/0,11 A
Expl.-proof 400 V 3-phase	Type	442237			443237		
		140 W/0,28 A	110 W/0,19 A		140 W/0,28 A	110 W/0,19 A	
1-phase 230 V	Type	442231			443231		
		200 W/0,9 A			200 W/0,9 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**2360**	**1870**	**1100**	**2360**	**1870**	**1100**
Wall-mounted Throw	m	18	13	8	18	13	8
Max. height* when ceilling-mounted with							
Louvre	m	5,5	4,7	3,4	5,5	4,7	3,4
Diffuser	m	3,5	3,0	2,3	3,5	3,0	2,3
Outlet nozzle	m	7,6	6,5	4,6	7,6	6,5	4,6
Induction louvre	m	7,6	6,5	4,6	7,6	6,5	4,6
KaMAX (vertical)	m	8,8	7,4	5,2	8,8	7,4	5,2
Weight	kg	45	45	45	58	58	58
Steam connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Condensate connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	55	49	39	55	49	39
Sound power level	dB(A)	71	65	55	71	65	55

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
0.1 bar saturated steam	-15	29,3	18,1	25,9	22,0	19,2	31,6	39,6	29,7	34,6	34,4	25,0	45,6
	-10	28,0	22,0	25,9	27,5	19,0	36,8	37,8	33,3	33,1	37,8	23,9	48,7
	-5	26,7	26,0	24,8	31,3	18,2	40,3	36,1	36,9	31,6	41,3	22,8	51,8
	0	25,4	29,9	23,6	35,1	17,3	43,8	34,3	40,4	30,0	44,6	21,7	54,7
	5	24,1	33,7	22,5	38,9	16,5	47,2	32,6	43,9	28,5	47,9	20,6	57,7
	10	22,8	37,6	21,3	42,6	15,6	50,6	30,8	47,3	27,0	51,2	19,5	60,5
	15	21,5	41,4	20,2	46,3	14,8	53,9	29,0	50,7	25,4	54,4	18,4	63,4
	20	20,2	45,2	17,9	48,2	13,3	55,4	27,3	54,0	23,9	57,6	17,3	66,1
0.5 bar saturated steam	-15	31,6	20,7	28,0	24,9	20,7	35,3	42,7	33,3	37,4	38,3	27,0	50,4
	-10	30,3	24,7	26,9	28,8	19,9	38,9	41,0	36,9	35,9	41,8	25,9	53,6
	-5	29,0	28,7	25,7	32,7	19,0	42,4	39,2	40,5	34,3	45,3	24,8	56,7
	0	27,7	32,6	24,6	36,5	18,2	45,9	37,5	44,1	32,8	48,7	23,7	59,8
	5	26,4	36,5	23,4	40,3	17,3	49,4	35,7	47,6	31,3	52,1	22,6	62,8
	10	25,1	40,4	22,3	44,0	16,5	52,8	34,0	51,1	29,7	55,4	21,5	65,7
	15	23,8	44,3	21,1	47,7	15,6	56,2	32,2	54,5	28,2	58,7	20,3	68,6
	20	22,5	48,1	20,0	51,4	14,8	59,5	30,4	57,9	26,7	61,9	19,2	71,4
1.0 bar saturated steam	-15	33,9	23,3	30,0	27,8	22,2	38,9	45,8	36,8	40,1	42,2	28,9	55,2
	-10	32,6	27,3	28,9	31,8	21,4	42,5	44,1	40,5	38,6	45,7	27,8	58,4
	-5	31,3	31,3	27,7	35,6	20,5	46,1	42,3	44,1	37,0	49,3	26,7	61,6
	0	30,0	35,3	26,6	39,5	19,7	49,7	40,6	47,7	35,5	52,7	25,6	64,7
	5	28,7	39,3	25,4	43,3	18,8	53,2	38,8	51,3	34,0	56,2	24,5	67,8
	10	27,4	43,2	24,3	47,1	18,0	56,7	37,0	54,8	32,4	59,5	23,4	70,8
	15	26,1	47,1	23,1	50,9	17,1	60,1	35,3	58,3	30,9	62,9	22,3	73,8
	20	24,8	50,9	22,0	54,6	16,3	63,5	33,5	61,8	29,4	66,2	21,2	76,7
3.0 bar saturated steam	-15	39,9	30,1	35,4	35,5	26,2	48,5	54,0	46,0	47,3	52,4	34,1	67,7
	-10	38,6	34,3	34,2	39,5	25,4	52,3	52,2	49,8	45,7	56,1	33,0	71,1
	-5	37,4	38,4	33,1	43,5	24,5	56,0	50,5	53,6	44,2	59,7	31,9	74,4
	0	36,1	42,4	31,9	47,5	23,6	59,7	48,7	57,3	42,7	63,4	30,8	77,7
	5	34,8	46,5	30,8	51,4	22,8	63,4	47,0	61,1	41,1	66,9	29,7	81,0
	10	33,5	50,5	29,6	55,3	21,9	67,0	45,2	64,7	39,6	70,5	28,6	84,2
	15	32,2	54,5	28,5	59,2	21,1	70,6	43,5	68,4	38,0	74,0	27,5	87,4
	20	30,9	58,5	27,3	63,0	20,2	74,1	41,7	72,0	36,5	77,4	26,4	90,5
5.0 bar saturated steam	-15	43,9	34,6	38,9	40,5	28,8	54,8	59,3	52,0	51,9	59,1	37,5	75,9
	-10	42,6	38,8	37,7	44,6	27,9	58,6	57,6	55,9	50,4	62,8	36,4	79,4
	-5	41,3	42,9	36,6	48,6	27,1	62,5	55,8	59,8	48,9	66,6	35,3	82,8
	0	40,0	47,1	35,4	52,6	26,2	66,3	54,1	63,6	47,3	70,3	34,2	86,3
	5	38,7	51,2	34,3	56,7	25,4	70,0	52,3	67,4	45,8	74,0	33,0	89,6
	10	37,4	55,3	33,1	60,6	24,5	73,7	50,5	71,2	44,3	77,6	31,9	93,0
	15	36,1	59,3	32,0	64,6	23,7	77,4	48,8	74,9	42,7	81,2	30,8	96,2
	20	34,8	63,4	30,8	68,5	22,8	81,0	47,0	78,6	41,2	84,8	29,7	99,5

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Galvanised steel heat exchangers, for use with steam

Type nos.		4522_ _			4532_ _		
2-stage 400 V 3-phase	Type	452236			453236		
		320 W/0,50 A	230 W/0,30 A		320 W/0,50 A	230 W/0,30 A	
3-stage 400 V 3-phase	Type	452235			453235		
		350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	350 W/0,65 A	280 W/0,46 A	65 W/0,19 A
Expl.-proof 400 V 3-phase	Type	452237			453237		
		360 W/0,61 A	250 W/0,41 A		360 W/0,61 A	250 W/0,41 A	
1-phase 230 V	Type	452231			453231		
		370 W/1,60 A			370 W/1,60 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**4140**	**3330**	**2000**	**4140**	**3330**	**2000**
Wall-mounted Throw	m	23	17	11	23	17	11
Max. height* when ceilling-mounted with							
Louvre	m	6,5	5,7	4,2	6,5	5,7	4,2
Diffuser	m	4,1	3,6	2,8	4,1	3,6	2,8
Outlet nozzle	m	9,2	8,0	5,8	9,2	8,0	5,8
Induction louvre	m	9,2	8,0	5,8	9,2	8,0	5,8
KaMAX (vertical)	m	11,4	9,8	7,0	11,4	9,8	7,0
Weight	kg	71	71	71	87	87	87
Steam connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Condensate connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	59	51	42	59	51	42
Sound power level	dB(A)	75	67	58	75	67	58

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
0.1 bar saturated steam	-15	46,5	15,0	41,7	18,4	31,5	26,9	67,5	28,5	59,7	32,8	43,9	43,6
	-10	44,5	19,0	41,7	23,9	31,2	32,1	64,5	32,1	57,1	36,3	42,0	46,7
	-5	42,4	23,1	39,9	27,8	29,8	35,8	61,6	35,7	54,4	39,8	40,0	49,8
	0	40,3	27,1	38,0	31,7	28,4	39,4	58,6	39,3	51,8	43,2	38,1	52,9
	5	38,3	31,0	36,2	35,6	27,0	43,0	55,6	42,8	49,1	46,6	36,1	55,9
	10	36,2	35,0	34,3	39,5	25,6	46,6	52,6	46,3	46,5	49,9	34,2	58,8
	15	34,2	38,9	32,5	43,3	24,2	50,1	49,6	49,7	43,8	53,2	32,2	61,7
	20	32,1	42,8	28,8	45,4	21,7	51,9	46,6	53,1	41,2	56,4	30,3	64,6
0.5 bar saturated steam	-15	50,2	17,4	45,1	21,1	34,0	30,3	72,9	32,0	64,5	36,6	47,4	48,2
	-10	48,2	21,4	43,2	25,1	32,6	34,0	69,9	35,7	61,8	40,2	45,5	51,5
	-5	46,1	25,5	41,4	29,0	31,2	37,7	66,9	39,3	59,2	43,7	43,5	54,6
	0	44,1	29,6	39,5	33,0	29,8	41,4	63,9	42,9	56,5	47,2	41,6	57,8
	5	42,0	33,6	37,7	36,9	28,4	45,0	61,0	46,5	53,9	50,6	39,6	60,8
	10	39,9	37,6	35,8	40,7	27,0	48,6	58,0	50,0	51,2	54,0	37,7	63,8
	15	37,9	41,5	34,0	44,6	25,6	52,1	55,0	53,5	48,6	57,3	35,7	66,8
	20	35,8	45,4	32,1	48,4	24,2	55,6	52,0	56,9	45,9	60,6	33,8	69,7
1.0 bar saturated steam	-15	53,9	19,7	48,3	23,7	36,4	33,6	78,2	35,4	69,1	40,4	50,8	52,8
	-10	51,8	23,8	46,5	27,7	35,0	37,3	75,2	39,1	66,5	44,0	48,9	56,1
	-5	49,7	27,9	44,6	31,7	33,6	41,1	72,2	42,8	63,8	47,5	47,0	59,3
	0	47,7	32,0	42,8	35,7	32,2	44,8	69,2	46,4	61,2	51,0	45,0	62,5
	5	45,6	36,0	40,9	39,6	30,8	48,4	66,2	50,1	58,5	54,5	43,1	65,6
	10	43,6	40,1	39,1	43,5	29,4	52,1	63,2	53,6	55,9	58,0	41,1	68,7
	15	41,5	44,1	37,2	47,4	28,0	55,7	60,2	57,2	53,3	61,4	39,2	71,8
	20	39,4	48,0	35,4	51,2	26,7	59,2	57,2	60,7	50,6	64,7	37,2	74,7
3.0 bar saturated steam	-15	63,5	25,9	57,0	30,6	42,9	42,2	92,2	44,4	81,5	50,2	59,9	64,9
	-10	61,4	30,1	55,1	34,7	41,5	46,1	89,2	48,2	78,8	54,0	58,0	68,3
	-5	59,4	34,3	53,3	38,8	40,1	50,0	86,2	52,0	76,2	57,7	56,0	71,7
	0	57,3	38,4	51,4	42,9	38,7	53,8	83,2	55,8	73,5	61,3	54,1	75,1
	5	55,2	42,6	49,6	46,9	37,3	57,6	80,2	59,6	70,9	65,0	52,1	78,4
	10	53,2	46,7	47,7	50,9	35,9	61,3	77,2	63,3	68,2	68,5	50,2	81,7
	15	51,1	50,8	45,9	54,9	34,5	65,1	74,2	66,9	65,6	72,1	48,2	84,9
	20	49,0	54,8	44,0	58,9	33,2	68,8	71,2	70,6	62,9	75,6	46,3	88,1
5.0 bar saturated steam	-15	69,7	29,9	62,6	35,1	47,2	47,9	101,3	50,2	89,5	56,7	65,8	72,8
	-10	67,7	34,2	60,7	39,3	45,8	51,8	98,3	54,1	86,9	60,5	63,9	76,3
	-5	65,6	38,4	58,9	43,4	44,4	55,8	95,3	58,0	84,2	64,3	61,9	79,9
	0	63,6	42,6	57,0	47,6	43,0	59,7	92,3	61,9	81,6	68,1	60,0	83,3
	5	61,5	46,8	55,2	51,7	41,6	63,6	89,3	65,7	78,9	71,8	58,0	86,8
	10	59,4	51,0	53,3	55,8	40,2	67,4	86,3	69,5	76,3	75,5	56,1	90,1
	15	57,4	55,2	51,5	59,8	38,8	71,2	83,3	73,3	73,6	79,1	54,2	93,5
	20	55,3	59,3	49,6	63,8	37,4	75,0	80,3	77,0	71,0	82,7	52,2	96,8

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Galvanised steel heat exchangers for use with steam

Type nos.		4622_ _			4632_ _		
2-stage 400 V 3-phase	Type	462236			463236		
		340 W/0,71 A	230 W/0,39 A		340 W/0,71 A	230 W/0,39 A	
3-stage 400 V 3-phase	Type	462235			463235		
		380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	380 W/0,73 A	270 W/0,44 A	90 W/0,26 A
Expl.-proof 400 V 3-phase	Type	462237			463237		
		390 W/0,87 A	200 W/0,46 A		390 W/0,87 A	200 W/0,46 A	
1-phase 230 V	Type	462231 400 W/1,80 A			463231 400 W/1,80 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450
Air volume	**m³/h**	**5680**	**4490**	**2690**	**5680**	**4490**	**2690**
Wall-mounted Throw	m	27	20	12	27	20	12
Max. height* when ceilling-mounted with							
Louvre	m	7,2	6,2	4,6	7,2	6,2	4,6
Diffuser	m	4,1	3,6	2,8	4,1	3,6	2,8
Outlet nozzle	m	9,8	8,4	6,2	9,8	8,4	6,2
Induction louvre	m	9,8	8,4	6,2	9,8	8,4	6,2
KaMAX (vertical)	m	12,5	10,7	7,7	12,5	10,7	7,7
Weight	kg	101	101	101	117	117	117
Steam connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Condensate connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	58	51	40	58	51	40
Sound power level	dB(A)	74	67	56	74	67	56

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
0.1 bar saturated steam	-15	72,8	19,2	64,1	23,0	48,0	32,6	92,2	28,3	80,3	32,7	58,3	42,8
	-10	69,5	23,1	64,1	28,6	47,6	37,8	88,1	31,9	76,7	36,2	55,7	45,9
	-5	66,3	27,0	61,2	32,4	45,4	41,3	84,0	35,5	73,2	39,7	53,1	49,1
	0	63,1	30,9	58,4	36,1	43,3	44,7	79,9	39,1	69,6	43,1	50,5	52,2
	5	59,9	34,7	55,5	39,8	41,2	48,1	75,8	42,6	66,1	46,4	47,9	55,2
	10	56,6	38,5	52,7	43,5	39,0	51,5	71,7	46,1	62,5	49,8	45,4	58,2
	15	53,4	42,3	49,9	47,2	36,9	54,8	67,7	49,5	58,9	53,0	42,8	61,1
	20	50,2	46,0	44,2	49,0	33,1	56,2	63,6	52,9	55,4	56,3	40,2	64,0
0.5 bar saturated steam	-15	78,6	21,9	69,2	26,1	51,8	36,4	99,5	31,7	86,7	36,5	62,9	47,4
	-10	75,3	25,8	66,3	29,9	49,7	39,9	95,4	35,4	83,1	40,0	60,3	50,6
	-5	72,1	29,8	63,5	33,7	47,5	43,4	91,4	39,1	79,6	43,6	57,7	53,8
	0	68,9	33,7	60,7	37,5	45,4	46,9	87,3	42,7	76,0	47,0	55,2	57,0
	5	65,7	37,6	57,8	41,3	43,3	50,3	83,2	46,3	72,5	50,5	52,6	60,1
	10	62,4	41,4	55,0	45,0	41,2	53,7	79,1	49,8	68,9	53,8	50,0	63,1
	15	59,2	45,2	52,1	48,7	39,0	57,1	75,0	53,3	65,3	57,2	47,4	66,1
	20	56,0	49,0	49,3	52,3	36,9	60,4	70,9	56,7	61,8	60,5	44,8	69,0
1.0 bar saturated steam	-15	84,2	24,5	74,2	29,1	55,5	40,1	106,7	35,1	93,0	40,2	67,5	51,9
	-10	81,0	28,5	71,3	32,9	53,4	43,7	102,6	38,8	89,4	43,8	64,9	55,2
	-5	77,8	32,5	68,5	36,8	51,3	47,2	98,6	42,5	85,8	47,4	62,3	58,4
	0	74,6	36,5	65,7	40,6	49,2	50,8	94,5	46,2	82,3	50,9	59,7	61,7
	5	71,3	40,4	62,8	44,4	47,0	54,3	90,4	49,8	78,7	54,4	57,1	64,8
	10	68,1	44,3	60,0	48,2	44,9	57,7	86,3	53,4	75,2	57,8	54,5	67,9
	15	64,9	48,1	57,1	51,9	42,8	61,1	82,2	57,0	71,6	61,2	52,0	71,0
	20	61,7	51,9	54,3	55,6	40,7	64,5	78,1	60,5	68,1	64,6	49,4	74,0
3.0 bar saturated steam	-15	99,3	31,6	87,4	36,9	65,5	49,9	125,8	44,0	109,6	50,1	79,5	63,8
	-10	96,0	35,7	84,6	40,9	63,3	53,6	121,7	47,9	106,0	53,8	76,9	67,3
	-5	92,8	39,8	81,7	44,9	61,2	57,3	117,6	51,7	102,4	57,5	74,3	70,7
	0	89,6	43,8	78,9	48,8	59,1	61,0	113,5	55,5	98,9	61,2	71,7	74,1
	5	86,4	47,8	76,0	52,7	56,9	64,6	109,4	59,3	95,3	64,8	69,2	77,4
	10	83,1	51,8	73,2	56,6	54,8	68,2	105,3	63,0	91,8	68,4	66,6	80,7
	15	79,9	55,8	70,4	60,4	52,7	71,8	101,3	66,7	88,2	71,9	64,0	84,0
	20	76,7	59,7	67,5	64,2	50,6	75,3	97,2	70,3	84,6	75,4	61,4	87,2
5.0 bar saturated steam	-15	109,1	36,2	96,0	42,0	71,9	56,3	138,2	49,9	120,4	56,5	87,3	71,6
	-10	105,9	40,4	93,2	46,1	69,8	60,1	134,1	53,8	116,8	60,3	84,8	75,2
	-5	102,6	44,5	90,4	50,1	67,7	63,9	130,0	57,7	113,3	64,1	82,2	78,7
	0	99,4	48,6	87,5	54,1	65,5	67,7	125,9	61,6	109,7	67,9	79,6	82,2
	5	96,2	52,7	84,7	58,1	63,4	71,4	121,8	65,4	106,1	71,6	77,0	85,6
	10	92,9	56,8	81,8	62,1	61,3	75,1	117,8	69,2	102,6	75,3	74,4	89,1
	15	89,7	60,8	79,0	66,0	59,2	78,7	113,7	73,0	99,0	78,9	71,9	92,4
	20	86,5	64,8	76,2	69,9	57,0	82,4	109,6	76,7	95,5	82,5	69,3	95,7

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Galvanised steel heat exchanger for use with steam

Type nos.		4722_ _			4732_ _		
2-stage 400 V 3-phase	Type	472236 760 W/1,50 A	470 W/0,81 A		473236 760 W/1,50 A	470 W/0,81 A	
3-stage 400 V 3-phase	Type	472235 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	473235 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A
Expl.-proof 400 V 3-phase	Type	472237 500 W/0,89 A	340 W/0,55 A		473237 500 W/0,89 A	340 W/0,55 A	
1-phase 230 V	Type	472231 730 W/3,40 A			473231 730 W/3,40 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450
Air volume	**m³/h**	**8770**	**7320**	**4240**	**8770**	**7320**	**4240**
Wall-mounted Throw	m	38	28	18	38	28	18
Max. height* when ceilling-mounted with							
Louvre	m	8,0	7,2	5,3	8,0	7,2	5,3
Diffuser	m	4,3	3,9	3,0	4,3	3,9	3,0
Outlet nozzle	m	11,7	10,4	7,6	11,7	10,4	7,6
Induction louvre	m	11,7	10,4	7,6	11,7	10,4	7,6
KaMAX (vertical)	m	17,7	15,6	11,0	17,7	15,6	11,0
Weight	kg	136	136	136	152	152	152
Steam connection	inch	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Condensate connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	61	57	48	61	57	48
Sound power level	dB(A)	77	73	64	77	73	64

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
0.1 bar saturated steam	-15	116,5	20,4	106,2	23,7	78,1	34,1	154,5	32,0	139,4	35,8	99,9	47,8
	-10	111,4	24,3	106,2	29,2	77,4	39,4	147,7	35,5	133,2	39,2	95,4	50,8
	-5	106,2	28,2	101,5	33,0	74,0	42,8	140,8	39,0	127,1	42,6	91,0	53,8
	0	101,0	32,0	96,8	36,7	70,5	46,2	134,0	42,4	120,9	45,9	86,6	56,7
	5	95,9	35,8	92,1	40,4	67,0	49,5	127,1	45,8	114,7	49,1	82,2	59,6
	10	90,7	39,5	87,4	44,1	63,6	52,8	120,3	49,2	108,5	52,4	77,7	62,4
	15	85,5	43,3	82,7	47,7	60,1	56,1	113,4	52,5	102,3	55,5	73,3	65,1
	20	80,4	47,0	73,3	49,5	53,9	57,4	106,6	55,8	96,2	58,7	68,9	67,8
0.5 bar saturated steam	-15	125,8	23,3	114,7	26,8	84,4	38,1	166,8	35,7	150,6	39,8	107,8	52,8
	-10	120,7	27,2	110,0	30,6	80,9	41,6	160,0	39,3	144,4	43,3	103,4	55,9
	-5	115,5	31,1	105,3	34,4	77,4	45,0	153,1	42,8	138,2	46,7	99,0	59,0
	0	110,3	34,9	100,6	38,2	74,0	48,5	146,3	46,3	132,0	50,1	94,6	61,9
	5	105,2	38,8	95,9	41,9	70,5	51,8	139,4	49,8	125,8	53,4	90,1	64,9
	10	100,0	42,6	91,2	45,6	67,0	55,2	132,6	53,2	119,7	56,7	85,7	67,7
	15	94,8	46,3	86,5	49,2	63,6	58,5	125,7	56,6	113,5	59,9	81,3	70,6
	20	89,7	50,1	81,8	52,8	60,1	61,7	118,9	59,9	107,3	63,1	76,8	73,3
1.0 bar saturated steam	-15	134,9	26,0	123,0	29,8	90,5	41,9	178,9	39,4	161,4	43,8	115,6	57,7
	-10	129,8	30,0	118,3	33,7	87,0	45,4	172,0	43,0	155,3	47,3	111,2	60,9
	-5	124,6	33,9	113,6	37,5	83,5	49,0	165,2	46,6	149,1	50,8	106,8	64,0
	0	119,4	37,8	108,9	41,3	80,1	52,5	158,3	50,2	142,9	54,2	102,3	67,0
	5	114,3	41,7	104,2	45,1	76,6	55,9	151,5	53,7	136,7	57,6	97,9	70,1
	10	109,1	45,5	99,5	48,8	73,1	59,3	144,6	57,1	130,5	60,9	93,5	73,0
	15	103,9	49,3	94,7	52,5	69,7	62,6	137,8	60,5	124,3	64,2	89,1	75,9
	20	98,8	53,1	90,0	56,2	66,2	65,9	130,9	63,9	118,2	67,5	84,6	78,7
3.0 bar saturated steam	-15	159,0	33,3	145,0	37,8	106,6	52,0	210,8	49,1	190,2	54,3	136,3	70,7
	-10	153,8	37,4	140,2	41,8	103,1	55,7	204,0	52,9	184,1	58,0	131,8	74,0
	-5	148,7	41,4	135,5	45,7	99,7	59,4	197,1	56,6	177,9	61,6	127,4	77,3
	0	143,5	45,5	130,8	49,6	96,2	63,0	190,3	60,3	171,7	65,2	123,0	80,6
	5	138,3	49,4	126,1	53,5	92,7	66,6	183,4	63,9	165,5	68,7	118,5	83,8
	10	133,2	53,4	121,4	57,4	89,3	70,2	176,6	67,5	159,3	72,2	114,1	86,9
	15	128,0	57,3	116,7	61,2	85,8	73,7	169,7	71,1	153,2	75,6	109,7	90,0
	20	122,8	61,2	112,0	65,0	82,3	77,1	162,9	74,6	147,0	79,1	105,3	93,0
5.0 bar saturated steam	-15	174,7	38,1	159,3	43,0	117,1	58,7	231,6	55,4	209,0	61,1	149,7	79,2
	-10	169,5	42,2	154,6	47,1	113,7	62,4	224,8	59,3	202,8	64,9	145,3	82,6
	-5	164,4	46,3	149,8	51,1	110,2	66,2	217,9	63,1	196,7	68,6	140,9	86,0
	0	159,2	50,4	145,1	55,1	106,7	69,9	211,1	66,9	190,5	72,3	136,4	89,4
	5	154,0	54,5	140,4	59,0	103,3	73,6	204,2	70,6	184,3	75,9	132,0	92,7
	10	148,9	58,5	135,7	63,0	99,8	77,3	197,4	74,3	178,1	79,5	127,6	96,0
	15	143,7	62,5	131,0	66,9	96,3	80,9	190,5	78,0	171,9	83,1	123,1	99,2
	20	138,5	66,5	126,3	70,7	92,9	84,4	183,7	81,6	165,8	86,6	118,7	102,4

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Galvanised steel heat exchangers, cross-flow

Type nos.		4433_ _			4443_ _		
2-stage 400 V 3-phase	Type	443336			444336		
		180 W/0,34 A	130 W/0,20 A		180 W/0,34 A	130 W/0,20 A	
3-stage 400 V 3-phase	Type	443335			444335		
		165 W/0,32 A	120 W/0,19 A	40 W/0,11 A	165 W/0,32 A	120 W/0,19 A	40 W/0,11 A
Expl.-proof 400 V 3-phase	Type	443337			444337		
		140 W/0,28 A	110 W/0,19 A		140 W/0,28 A	110 W/0,19 A	
1-phase 230 V	Type	443331 200 W/0,9 A			444331 200 W/0,9 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**2360**	**1870**	**1100**	**1890**	**1480**	**910**
Wall-mounted Throw	m	18	13	8	16	12	7
Max. height* when ceilling-mounted with							
Louvre	m	5,5	4,7	3,4	4,8	4,1	3,0
Diffuser	m	3,5	3,0	2,3	3,1	2,7	2,1
Outlet nozzle	m	7,6	6,5	4,6	6,7	5,6	4,1
Induction louvre	m	7,6	6,5	4,6	6,7	5,6	4,1
KaMAX (vertical)	m	8,8	7,4	5,2	7,6	6,5	4,6
Weight	kg	60	60	60	71	71	71
Water content	l	6,1	6,1	6,1	6,1	6,1	6,1
Connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	55	49	39	55	49	39
Sound power level	dB(A)	71	65	55	71	65	55

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPHW 80/40 °C	-15	23,4	11,4	20,9	14,8	15,8	23,2	25,9	21,6	22,7	25,8	17,1	35,1
	-10	21,6	14,8	19,3	18,0	14,6	25,9	24,0	24,3	21,0	28,3	15,8	37,0
	-5	19,9	18,1	17,8	21,0	13,4	28,4	22,0	26,9	19,3	30,7	14,5	38,8
	0	18,1	21,3	16,2	24,1	12,2	30,9	20,1	29,5	17,6	33,0	13,3	40,5
	5	16,4	24,5	14,6	27,1	11,0	33,3	18,1	32,0	15,9	35,2	12,0	42,1
	10	14,6	27,7	13,1	30,0	9,9	35,6	16,2	34,5	14,2	37,3	10,7	43,6
	15	12,9	30,8	11,5	32,8	8,7	37,9	14,3	36,9	12,5	39,4	9,4	45,0
	20	10,7	33,4	9,6	35,1	7,2	39,4	11,9	38,5	10,4	40,7	7,9	45,4
LPHW 110/50 °C	-15	28,2	16,9	25,2	20,9	19,0	31,1	31,2	29,1	27,3	34,2	20,6	45,4
	-10	26,5	20,4	23,7	24,3	17,9	33,9	29,4	32,0	25,7	36,9	19,4	47,6
	-5	24,8	23,8	22,2	27,5	16,7	36,7	27,5	34,9	24,0	39,5	18,1	49,6
	0	23,1	27,2	20,7	30,7	15,6	39,4	25,6	37,7	22,4	42,1	16,9	51,6
	5	21,5	30,6	19,2	33,9	14,5	42,0	23,8	40,4	20,8	44,5	15,7	53,6
	10	19,8	33,9	17,7	37,0	13,3	44,6	21,9	43,1	19,1	47,0	14,5	55,4
	15	18,1	37,2	16,2	40,1	12,2	47,1	20,0	45,7	17,5	49,3	13,2	57,1
	20	16,4	40,4	14,7	43,1	11,1	49,6	18,2	48,3	15,9	51,6	12,0	58,7
LPHW 110/60 °C	-15	31,1	20,1	27,8	24,6	21,0	35,8	34,4	33,6	30,1	39,2	22,7	51,6
	-10	29,4	23,6	26,2	27,9	19,8	38,6	32,5	36,5	28,4	41,9	21,5	53,7
	-5	27,6	27,1	24,7	31,2	18,6	41,4	30,6	39,4	26,8	44,5	20,2	55,8
	0	25,9	30,5	23,2	34,4	17,5	44,1	28,7	42,2	25,1	47,1	18,9	57,8
	5	24,2	33,9	21,6	37,6	16,3	46,8	26,8	45,0	23,4	49,6	17,7	59,7
	10	22,5	37,2	20,1	40,7	15,1	49,3	24,9	47,6	21,8	52,0	16,4	61,6
	15	20,7	40,5	18,5	43,7	14,0	51,9	23,0	50,3	20,1	54,3	15,2	63,3
	20	19,0	43,7	17,0	46,7	12,8	54,3	21,1	52,8	18,4	56,6	13,9	64,9
LPHW 130/70 °C	-15	34,9	24,5	31,2	29,5	23,6	42,1	38,7	39,6	33,8	46,0	25,5	59,9
	-10	33,3	28,1	29,7	33,0	22,4	45,1	36,9	42,7	32,2	48,8	24,3	62,2
	-5	31,6	31,7	28,2	36,4	21,3	48,0	35,0	45,7	30,6	51,6	23,1	64,5
	0	29,9	35,2	26,7	39,7	20,1	50,9	33,1	48,7	28,9	54,3	21,8	66,7
	5	28,2	38,7	25,2	43,0	19,0	53,7	31,2	51,6	27,3	57,0	20,6	68,8
	10	26,5	42,1	23,7	46,2	17,9	56,4	29,4	54,4	25,7	59,6	19,4	70,9
	15	24,8	45,5	22,2	49,4	16,7	59,1	27,5	57,2	24,0	62,1	18,1	72,8
	20	23,1	48,8	20,7	52,5	15,6	61,7	25,6	59,9	22,4	64,5	16,9	74,7
LPHW 130/80 °C	-15	38,0	27,9	34,0	33,4	25,6	47,1	42,1	44,4	36,8	51,3	27,8	66,4
	-10	36,3	31,5	32,4	36,8	24,4	50,1	40,2	47,5	35,1	54,1	26,5	68,7
	-5	34,5	35,1	30,9	40,2	23,3	53,0	38,3	50,5	33,4	56,9	25,2	71,0
	0	32,8	38,6	29,3	43,6	22,1	55,9	36,4	53,4	31,8	59,6	24,0	73,2
	5	31,1	42,1	27,8	46,9	21,0	58,7	34,4	56,3	30,1	62,3	22,7	75,3
	10	29,4	45,6	26,2	50,1	19,8	61,4	32,5	59,2	28,4	64,9	21,5	77,4
	15	27,6	48,9	24,7	53,3	18,6	64,1	30,6	62,0	26,8	67,4	20,2	79,4
	20	25,9	52,3	23,2	56,4	17,5	66,7	28,7	64,7	25,1	69,9	18,9	81,2

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Galvanised steel heat exchangers, cross-flow

Type nos.		4533_ _			4543_ _		
2-stage 400 V 3-phase	Type	453336			454336		
		320 W/0,50 A	230 W/0,30 A		320 W/0,50 A	230 W/0,30 A	
3-stage 400 V 3-phase	Type	453335			454335		
		350 W/0,65 A	280 W/0,46 A	65 W/0,19 A	350 W/0,65 A	280 W/0,46 A	65 W/0,19 A
Expl.-proof 400 V 3-phase	Type	453337			454337		
		360 W/0,61 A	250 W/0,41 A		360 W/0,61 A	250 W/0,41 A	
1-phase 230 V	Type	453331			454331		
		370 W/1,60 A			370 W/1,60 A		
Fan speed		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	1350	1050	700	1350	1050	700
Air volume	**m³/h**	**4140**	**3330**	**2000**	**3430**	**2700**	**1710**
Wall-mounted Throw	m	23	17	11	19	13	9
Max. height* when ceilling-mounted with							
Louvre	m	6,5	5,7	4,2	5,8	5,0	3,8
Diffuser	m	4,1	3,6	2,8	3,7	3,2	2,5
Outlet nozzle	m	9,2	8,0	5,8	8,2	7,0	5,3
Induction louvre	m	9,2	8,0	5,8	8,2	7,0	5,3
KaMAX (vertical)	m	11,4	9,8	7,0	10,1	8,5	6,3
Weight	kg	89	89	89	105	105	105
Water content	l	8,2	8,2	8,2	8,2	8,2	8,2
Connection	inch	1"	1"	1"	1"	1"	1"
Sound pressure level	dB(A)	59	51	42	59	51	42
Sound power level	dB(A)	75	67	58	75	67	58

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPHW 80/40 °C	-15	41,4	11,7	37,3	14,8	28,3	22,8	44,2	19,4	39,0	23,5	30,4	32,4
	-10	38,3	15,0	34,5	18,0	26,2	25,4	40,9	22,2	36,1	26,1	28,1	34,4
	-5	35,2	18,3	31,7	21,1	24,1	28,0	37,6	25,0	33,1	28,6	25,8	36,4
	0	32,1	21,5	28,9	24,1	21,9	30,5	34,3	27,8	30,2	31,1	23,6	38,3
	5	29,0	24,7	26,1	27,1	19,8	32,9	31,0	30,4	27,3	33,5	21,3	40,0
	10	25,9	27,9	23,3	30,0	17,7	35,3	27,6	33,0	24,4	35,8	19,0	41,7
	15	22,8	30,9	20,5	32,8	15,6	37,6	24,3	35,5	21,4	38,0	16,7	43,3
	20	19,0	33,5	17,1	35,1	13,0	39,1	20,3	37,4	17,9	39,5	14,0	44,0
LPHW 110/50 °C	-15	49,9	17,1	44,9	21,0	34,1	30,5	53,3	26,4	47,0	31,4	36,6	42,1
	-10	46,9	20,6	42,2	24,3	32,1	33,4	50,1	29,5	44,2	34,2	34,4	44,4
	-5	43,9	24,1	39,5	27,5	30,1	36,2	46,9	32,5	41,4	37,0	32,3	46,7
	0	40,9	27,5	36,9	30,7	28,0	38,9	43,7	35,4	38,6	39,7	30,1	48,8
	5	38,0	30,8	34,2	33,9	26,0	41,6	40,6	38,3	35,8	42,3	27,9	50,9
	10	35,0	34,1	31,5	37,0	23,9	44,2	37,4	41,1	33,0	44,9	25,7	52,9
	15	32,0	37,4	28,8	40,1	21,9	46,7	34,2	43,9	30,1	47,4	23,5	54,8
	20	29,0	40,6	26,1	43,1	19,9	49,2	31,0	46,6	27,3	49,8	21,3	56,6
LPHW 110/60 °C	-15	55,0	20,4	49,5	24,6	37,6	35,2	58,8	30,7	51,8	36,2	40,4	48,0
	-10	51,9	23,9	46,8	27,9	35,5	38,0	55,5	33,7	48,9	39,0	38,1	50,3
	-5	48,9	27,4	44,0	31,2	33,5	40,8	52,2	36,7	46,1	41,7	35,9	52,5
	0	45,9	30,8	41,3	34,4	31,4	43,6	49,0	39,7	43,2	44,4	33,7	54,7
	5	42,8	34,1	38,5	37,6	29,3	46,2	45,7	42,6	40,3	47,1	31,4	56,8
	10	39,8	37,4	35,8	40,7	27,2	48,9	42,5	45,4	37,5	49,6	29,2	58,8
	15	36,7	40,7	33,0	43,8	25,1	51,4	39,2	48,1	34,6	52,1	26,9	60,7
	20	33,7	43,9	30,3	46,8	23,0	53,9	36,0	50,8	31,7	54,5	24,7	62,5
LPHW 130/70 °C	-15	61,8	24,8	55,6	29,6	42,3	41,4	66,1	36,4	58,2	42,5	45,4	55,8
	-10	58,8	28,4	53,0	33,0	40,3	44,4	62,9	39,5	55,4	45,5	43,2	58,3
	-5	55,9	32,0	50,3	36,4	38,2	47,4	59,7	42,7	52,6	48,4	41,0	60,7
	0	52,9	35,5	47,6	39,7	36,2	50,2	56,5	45,8	49,8	51,3	38,8	63,1
	5	49,9	38,9	44,9	43,0	34,1	53,1	53,3	48,8	47,0	54,0	36,6	65,3
	10	46,9	42,4	42,2	46,2	32,1	55,9	50,1	51,7	44,2	56,8	34,4	67,5
	15	43,9	45,8	39,5	49,4	30,1	58,6	46,9	54,7	41,4	59,4	32,3	69,7
	20	40,9	49,1	36,9	52,5	28,0	61,2	43,7	57,5	38,6	62,0	30,1	71,7
LPHW 130/80 °C	-15	67,2	28,3	60,5	33,4	46,0	46,3	71,8	40,8	63,3	47,5	49,3	61,9
	-10	64,1	31,9	57,7	36,9	43,9	49,3	68,5	44,0	60,4	50,5	47,1	64,4
	-5	61,1	35,4	55,0	40,2	41,8	52,3	65,3	47,1	57,6	53,4	44,9	66,9
	0	58,0	38,9	52,2	43,6	39,7	55,2	62,0	50,2	54,7	56,3	42,6	69,2
	5	55,0	42,4	49,5	46,9	37,6	58,0	58,8	53,3	51,8	59,1	40,4	71,5
	10	51,9	45,9	46,8	50,1	35,5	60,8	55,5	56,2	48,9	61,8	38,1	73,7
	15	48,9	49,2	44,0	53,3	33,5	63,5	52,2	59,2	46,1	64,5	35,9	75,9
	20	45,9	52,6	41,3	56,4	31,4	66,1	49,0	62,0	43,2	67,1	33,7	77,9

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Galvanised steel heat exchangers, cross-flow

Type nos.		4633_ _			4643_ _		
2-stage 400 V 3-phase	Type	463336			464336		
		340 W/0,71 A	230 W/0,39 A		340 W/0,71 A	230 W/0,39 A	
3-stage 400 V 3-phase	Type	463335			464335		
		380 W/0,73 A	270 W/0,44 A	90 W/0,26 A	380 W/0,73 A	270 W/0,44 A	90 W/0,26 A
Expl.-proof 400 V 3-phase	Type	463337			464337		
		390 W/0,87 A	200 W/0,46 A		390 W/0,87 A	200 W/0,46 A	
1-phase 230 V	Type	463331			464331		
		400 W/1,80 A			400 W/1,80 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450
Air volume	**m³/h**	**5680**	**4490**	**2690**	**4750**	**3720**	**2270**
Wall-mounted Throw	m	27	20	12	21	16	10
Max. height* when ceilling-mounted with							
Louvre	m	7,2	6,2	4,6	6,4	5,1	4,1
Diffuser	m	4,1	3,6	2,8	3,7	3,0	2,5
Outlet nozzle	m	9,8	8,4	6,2	8,8	7,0	5,6
Induction louvre	m	9,8	8,4	6,2	8,8	7,0	5,6
KaMAX (vertical)	m	12,5	10,7	7,7	11,1	8,7	6,8
Weight	kg	120	120	120	141	141	141
Water content	l	11,5	11,5	11,5	11,5	11,5	11,5
Connection	inch	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Sound pressure level	dB(A)	58	51	40	58	51	40
Sound power level	dB(A)	74	67	56	74	67	56

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPHW 80/40 °C	-15	58,4	12,4	51,9	15,8	39,0	23,7	66,9	22,6	58,2	26,7	43,0	35,5
	-10	54,0	15,7	48,0	18,9	36,1	26,2	61,9	25,2	53,8	29,1	39,8	37,4
	-5	49,6	18,9	44,1	21,9	33,1	28,8	56,9	27,8	49,4	31,4	36,6	39,1
	0	45,2	22,1	40,2	24,9	30,2	31,2	51,8	30,3	45,1	33,7	33,3	40,8
	5	40,9	25,3	36,3	27,8	27,3	33,6	46,8	32,8	40,7	35,8	30,1	42,4
	10	36,5	28,4	32,4	30,6	24,4	35,9	41,8	35,1	36,3	37,9	26,9	43,8
	15	32,1	31,4	28,5	33,4	21,4	38,1	36,8	37,4	32,0	39,9	23,6	45,2
	20	26,8	33,9	23,8	35,6	17,9	39,6	30,7	39,0	26,7	41,1	19,7	45,6
LPHW 110/50 °C	-15	70,4	18,0	62,5	22,1	47,0	31,6	80,6	30,3	70,1	35,3	51,8	45,9
	-10	66,2	21,5	58,8	25,4	44,2	34,4	75,8	33,1	65,9	37,9	48,7	48,0
	-5	62,0	24,9	55,0	28,6	41,4	37,1	71,0	35,9	61,7	40,5	45,6	50,1
	0	57,8	28,2	51,3	31,7	38,6	39,8	66,2	38,7	57,5	43,0	42,5	52,1
	5	53,5	31,6	47,6	34,8	35,8	42,5	61,3	41,4	53,3	45,4	39,4	53,9
	10	49,3	34,8	43,8	37,9	33,0	45,0	56,5	44,0	49,2	47,8	36,3	55,7
	15	45,1	38,0	40,1	40,9	30,1	47,5	51,7	46,5	45,0	50,0	33,2	57,4
	20	40,9	41,2	36,3	43,8	27,3	49,9	46,9	49,0	40,8	52,2	30,1	59,1
LPHW 110/60 °C	-15	77,6	21,4	68,9	25,9	51,8	36,4	88,9	34,9	77,3	40,4	57,1	52,1
	-10	73,3	24,9	65,1	29,2	48,9	39,2	83,9	37,8	73,0	43,0	54,0	54,3
	-5	69,0	28,3	61,3	32,4	46,1	41,9	79,0	40,6	68,7	45,6	50,8	56,3
	0	64,7	31,6	57,4	35,5	43,2	44,6	74,1	43,3	64,4	48,1	47,6	58,3
	5	60,4	34,9	53,6	38,6	40,3	47,2	69,2	46,0	60,1	50,5	44,5	60,2
	10	56,1	38,2	49,8	41,7	37,5	49,8	64,2	48,6	55,9	52,9	41,3	62,0
	15	51,8	41,4	46,0	44,7	34,6	52,3	59,3	51,2	51,6	55,2	38,1	63,7
	20	47,5	44,6	42,2	47,6	31,7	54,7	54,4	53,7	47,3	57,4	35,0	65,3
LPHW 130/70 °C	-15	87,2	25,9	77,4	31,0	58,2	42,7	99,9	41,1	86,9	47,3	64,2	60,5
	-10	83,0	29,5	73,7	34,4	55,4	45,7	95,1	44,1	82,7	50,1	61,1	62,8
	-5	78,8	33,0	70,0	37,7	52,6	48,6	90,3	47,1	78,5	52,8	58,0	65,0
	0	74,6	36,5	66,2	41,0	49,8	51,4	85,4	50,0	74,3	55,5	54,9	67,2
	5	70,4	39,9	62,5	44,2	47,0	54,2	80,6	52,8	70,1	58,1	51,8	69,3
	10	66,2	43,3	58,8	47,4	44,2	56,9	75,8	55,6	65,9	60,6	48,7	71,3
	15	62,0	46,6	55,0	50,5	41,4	59,6	71,0	58,3	61,7	63,1	45,6	73,3
	20	57,8	49,9	51,3	53,6	38,6	62,2	66,2	61,0	57,5	65,5	42,5	75,1
LPHW 130/80 °C	-15	94,8	29,5	84,2	35,0	63,3	47,8	108,6	46,0	94,4	52,7	69,8	67,0
	-10	90,5	33,1	80,4	38,4	60,4	50,7	103,6	49,0	90,1	55,5	66,6	69,4
	-5	86,2	36,6	76,5	41,7	57,6	53,6	98,7	51,9	85,9	58,2	63,5	71,6
	0	81,9	40,0	72,7	45,0	54,7	56,5	93,8	54,9	81,6	60,9	60,3	73,8
	5	77,6	43,5	68,9	48,2	51,8	59,3	88,9	57,7	77,3	63,5	57,1	75,9
	10	73,3	46,9	65,1	51,4	48,9	62,0	83,9	60,5	73,0	66,1	54,0	77,9
	15	69,0	50,2	61,3	54,5	46,1	64,6	79,0	63,2	68,7	68,5	50,8	79,9
	20	64,7	53,5	57,4	57,6	43,2	67,2	74,1	65,9	64,4	70,9	47,6	81,7

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

Galvanised steel heat exchangers, cross-flow

Type nos.		4733_ _			4743_ _		
2-stage 400 V 3-phase	Type	473336 760 W/1,50 A	470 W/0,81 A		474336 760 W/1,50 A	470 W/0,81 A	
3-stage 400 V 3-phase	Type	473335 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A	474335 680 W/1,35 A	410 W/0,74 A	120 W/0,46 A
Expl.-proof 400 V 3-phase	Type	473337 500 W/0,89 A	340 W/0,55 A		474337 500 W/0,89 A	340 W/0,55 A	
1-phase 230 V	Type	473331 730 W/3,40 A			474331 730 W/3,40 A		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Nominal fan speed	1/min	900	700	450	900	700	450
Air volume	**m³/h**	**8770**	**7320**	**4240**	**7960**	**6150**	**3840**
Wall-mounted Throw	m	38	28	18	32	22	14
Max. height* when ceilling-mounted with							
Louvre	m	8,0	7,2	5,3	7,6	6,5	5,0
Diffuser	m	4,3	3,9	3,0	4,1	3,6	2,8
Outlet nozzle	m	11,7	10,4	7,6	11,0	9,4	7,1
Induction louvre	m	11,7	10,4	7,6	11,0	9,4	7,1
KaMAX (vertical)	m	17,7	15,6	11,0	16,5	13,9	10,3
Weight	kg	155	155	155	181	181	181
Water content	l	16,8	16,8	16,8	16,8	16,8	16,8
Connection	inch	1 "	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"
Sound pressure level	dB(A)	61	57	48	61	57	48
Sound power level	dB(A)	77	73	64	77	73	64

Heat output

Water temp.	t_{L1}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}	Q	t_{L2}
	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
LPHW 80/40 °C	-15	102,4	16,1	93,0	18,9	69,7	28,9	119,0	24,9	103,7	30,0	78,4	39,5
	-10	94,7	19,2	86,1	21,8	64,5	31,1	110,0	27,4	95,9	32,2	72,6	41,1
	-5	87,0	22,2	79,1	24,6	59,3	33,3	101,1	29,8	88,2	34,3	66,7	42,6
	0	79,4	25,1	72,1	27,4	54,0	35,4	92,2	32,2	80,4	36,3	60,8	44,0
	5	71,7	28,0	65,1	30,1	48,8	37,4	83,3	34,5	72,6	38,2	54,9	45,3
	10	64,0	30,8	58,1	32,7	43,6	39,4	74,3	36,7	64,8	40,1	49,0	46,5
	15	56,3	33,6	51,2	35,3	38,3	41,2	65,4	38,8	57,0	41,9	43,1	47,6
	20	47,0	35,8	42,7	37,2	32,0	42,2	54,6	40,2	47,6	42,8	36,0	47,6
LPHW 110/50 °C	-15	123,4	22,5	112,1	25,8	84,0	37,9	143,4	33,0	125,0	39,2	94,5	50,7
	-10	116,0	25,8	105,4	28,9	79,0	40,4	134,8	35,8	117,5	41,6	88,9	52,6
	-5	108,7	28,9	98,7	31,9	74,0	42,8	126,2	38,4	110,1	44,0	83,2	54,4
	0	101,3	32,1	92,0	34,9	69,0	45,2	117,7	41,1	102,6	46,3	77,6	56,1
	5	93,9	35,2	85,3	37,8	63,9	47,5	109,1	43,6	95,1	48,6	71,9	57,8
	10	86,5	38,2	78,6	40,7	58,9	49,7	100,5	46,1	87,6	50,7	66,3	59,3
	15	79,1	41,2	71,9	43,5	53,9	51,8	91,9	48,5	80,2	52,8	60,6	60,8
	20	71,8	44,1	65,2	46,2	48,9	53,9	83,4	50,8	72,7	54,8	55,0	62,1
LPHW 110/60 °C	-15	136,1	26,4	123,6	30,0	92,6	43,3	158,1	37,9	137,8	44,7	104,2	57,4
	-10	128,5	29,6	116,8	33,1	87,5	45,8	149,3	40,7	130,1	47,2	98,4	59,3
	-5	121,0	32,8	109,9	36,1	82,4	48,2	140,5	43,4	122,5	49,6	92,7	61,1
	0	113,4	35,9	103,0	39,1	77,2	50,6	131,8	46,0	114,9	51,9	86,9	62,8
	5	105,9	39,0	96,2	42,0	72,1	52,9	123,0	48,5	107,2	54,1	81,1	64,5
	10	98,3	42,0	89,3	44,9	67,0	55,1	114,2	51,0	99,6	56,3	75,3	66,0
	15	90,8	45,0	82,5	47,7	61,8	57,3	105,5	53,4	91,9	58,3	69,5	67,5
	20	83,2	47,9	75,6	50,4	56,7	59,3	96,7	55,7	84,3	60,3	63,8	68,8
LPHW 130/70 °C	-15	152,9	31,5	138,9	35,6	104,1	50,5	177,7	44,5	154,9	52,2	117,1	66,4
	-10	145,6	34,9	132,2	38,8	99,1	53,2	169,1	47,4	147,4	54,8	111,5	68,5
	-5	138,2	38,2	125,5	42,0	94,1	55,8	160,5	50,3	139,9	57,3	105,8	70,5
	0	130,8	41,4	118,8	45,1	89,1	58,3	152,0	53,0	132,5	59,8	100,2	72,5
	5	123,4	44,6	112,1	48,2	84,0	60,8	143,4	55,7	125,0	62,3	94,5	74,3
	10	116,0	47,8	105,4	51,2	79,0	63,2	134,8	58,4	117,5	64,6	88,9	76,1
	15	108,7	50,9	98,7	54,1	74,0	65,6	126,2	61,0	110,1	66,9	83,2	77,8
	20	101,3	54,0	92,0	57,0	69,0	67,8	117,7	63,5	102,6	69,1	77,6	79,4
LPHW 130/80 °C	-15	166,2	35,5	151,0	40,0	113,2	56,2	193,1	49,7	168,3	58,0	127,3	73,4
	-10	158,7	38,9	144,2	43,2	108,0	58,9	184,3	52,6	160,7	60,6	121,5	75,5
	-5	151,1	42,2	137,3	46,4	102,9	61,5	175,6	55,4	153,1	63,2	115,8	77,6
	0	143,6	45,5	130,5	49,5	97,8	64,1	166,8	58,2	145,4	65,7	110,0	79,6
	5	136,1	48,7	123,6	52,6	92,6	66,5	158,1	60,9	137,8	68,1	104,2	81,4
	10	128,5	51,9	116,8	55,6	87,5	69,0	149,3	63,6	130,1	70,5	98,4	83,2
	15	121,0	55,0	109,9	58,5	82,4	71,3	140,5	66,2	122,5	72,7	92,7	84,9
	20	113,4	58,0	103,0	61,4	77,2	73,6	131,8	68,7	114,9	74,9	86,9	86,5

* Maximum mounting heights apply only to a leaving air temperature of up to 15 K above room temperature, see information on pages 42 to 44

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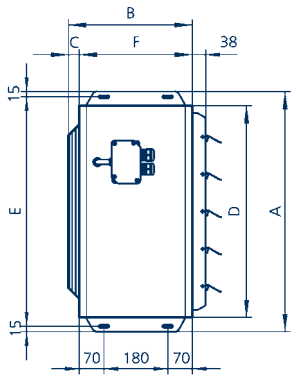


TOP supply or extract air units

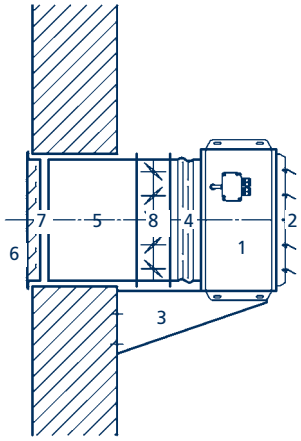
Fan motors	Series	4400			4500			4600			4700		
2-stage 400 V 3-phase	Type	440036			450036			460036			470036		
	W/A	180/0,34	130/0,20		320/0,62	230/0,37		340/0,71	230/0,39		760/1,50	470/0,81	
3-stage 400 V 3-phase	Type	440035			450035			460035			470035		
	W/A	165/0,32	120/0,19	40/0,11	350/0,65	280/0,46	65/0,19	380/0,73	270/0,44	90/0,26	680/1,35	410/0,74	120/0,46
Expl.-proof 400 V 3-phase	Type	440037			450037			460037			470037		
	W/A	140/0,28	110/0,19		360/0,61	250/0,41		390/0,87	200/0,46		500/0,89	340/0,55	
1-phase 230 V	Type	440031			450031			460031			470031		
	W/A	200/0,90			370/1,60			400/1,80			730/3,40		
Fan stage		**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**	**2 (3)**	**1 (2)**	**(1)**
Fan speed	1/min	1350	1050	700	1350	1050	700	900	700	450	900	700	450
Air volume	**m³/h**	**2700**	**2300**	**1300**	**4800**	**4140**	**2340**	**6800**	**5900**	**3300**	**11000**	**8900**	**5000**
Weight	kg	19	19	19	26	26	26	36	36	36	51	51	51
Sound press. level	dB (A)	55	49	39	59	51	42	58	51	40	61	57	48
Sound power level	dB (A)	71	65	55	75	67	58	74	67	56	77	73	64

Dimensions of supply air and extract air units

Type nos.	A	B	C	D	E	F
4400**	580	350	30	500	550	320
4500**	680	350	30	600	650	320
4600**	780	360	40	700	750	320
4700**	880	400	40	800	850	360

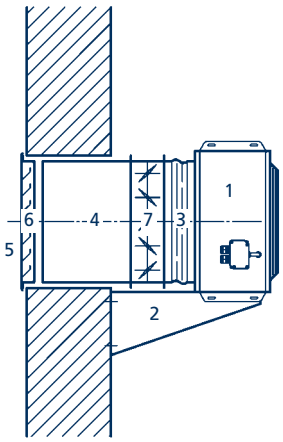
**Insert motor figure
All TOP unit heater inlet air or outlet air accessories can be used for all supply air and extract air units.

Wall-mounted supply air unit



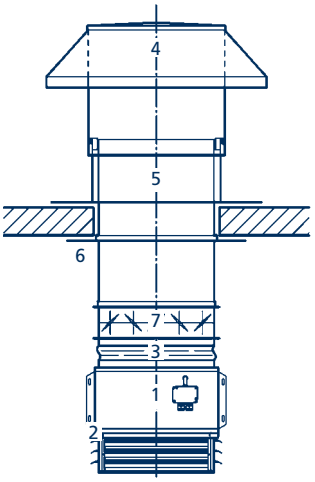
1 TOP supply air unit
2 Single row louvre
3 Wall bracket, type 3*044
4 Sailcloth socket, type 3*013
5 Wall duct, type 3*026
6 Weather grate, type 3*016
7 Weather grate frame, type 3*017
8 Louvre, type 3*023

Wall-mounted extract air unit



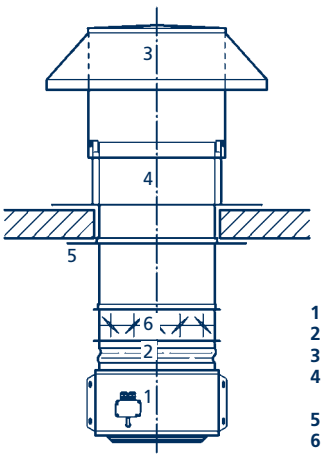
1 TOP extract air unit
2 Single row louvre
3 Wall bracket, type 3*044
4 Sailcloth socket, type 3*013
5 Wall duct, type 3*026
6 Weather grate, type 3*016
7 Weather grate frame, type 3*017
8 Louvre, type 3*023

Ceiling-mounted supply air unit



1 TOP supply air unit
2 Air diffuser, type 3*004
3 Sailcloth socket, type 3*013
4 Rain hood, type 3*114
5 Roof socket for use with flat roofs with roof duct, type 3*119
6 Cover panel, 0-4°, type 3*11800
7 Louvre, type 3*023

Ceiling-mounted extract air unit



1 TOP extract air unit
2 Sailcloth socket, type 3*013
3 Rain hood, type 3*114
4 Roof socket for use with flat roofs with roof duct, type 3*119
5 Cover panel, 0-4°, type 3*11800
6 Louvre, type 3*023

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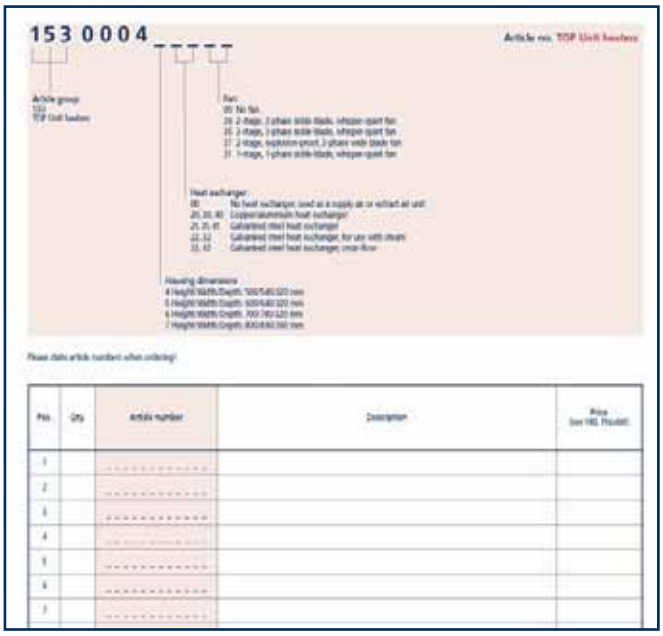

Specifications

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Design-orientated wall- and ceiling-mounted units

Qty.	Article no.	Description	Price / each	Total price
pc.	153 0 0 0 **4** **4** **20** **36** **R**			
	R	Suffix for unit heater type no. for factory-fitted accessories, see also page 87		
	4	**TOP Unit heater** wall- or ceiling-mounted with standard suspension brackets, sendzimir galvanised housing complete with motor guard (DIN EN 294-compliant) and fitted louvre (single row); inlet and outlet air accessories can be screwed onto the unit heater		
	00	**Excluding fan,** for use as an additional heat exchanger		
	36	**Two-stage** 3-phase **sickle-blade, whisper-quiet fan,** made of cast aluminium with an optimised nozzle and maintenance-free external rotor motor, 400 V, 50 Hz, Protection class IP 54. Electrical design conforms to VDE, heat class F; motor protection is provided by integral thermal contacts, with external junction box		
	35	**Three-stage** three-phase **sickle-blade, whisper-quiet fan,** made of cast aluminium with optimised nozzle and low-maintenance external rotor motor, 400 V, 50 Hz, Protection class IP 54. Electrical design conforms to VDE, heat class F; motor protection by integral thermal contacts, with external junction box		
	37	**Two-stage explosion-proof** three-phase wide-blade fan, maintenance-free external rotor motor, with integral PTC resistor; motor protection in conjunction with a trigger unit, increased safety protection class "e" in compliance with EN 50019, 400 V, 50 Hz, class Ex II 2 G EEx e II T1, T2, T3 or T4	For use with motor number 37: only type 30351 can be used as a switch; steel accessories on request	
	31	**Single-stage** single-phase **sickle-blade, whisper-quiet fan** with maintenance-free external rotor motor, 230 V, 50 Hz, protection class IP 54, with operating capacitor; electrical design conforms to VDE, heat class F; motor protection by integral thermal contacts, with external junction box		
	00	**No heat exchanger** for use as a supply air or extract air unit		
	20 **30** **40**	**Heat exchanger made of copper pipes** with expansion-joined aluminium fins. Corrosion-proof steel manifold and distributor, suitable for use with LPHW/LPWW up to 120 °C and 16 bar continuous operating pressure		
	21 **31** **41**	**Steel heat exchanger** **with ellipse-shaped pipe with steel fins** galvanised, suitable for LPHW/LPWW and thermal oil, maximum continuous operating pressure 16 bar at 120 °C		
	22 **32**	**Steel heat exchanger** **with ellipse-shaped pipe with steel fins** galvanised, suitable for LPHW/LPWW and thermal oil, maximum continuous operating pressure 12 bar at 200 °C		
	33 **43**	**Cross-flow heat exchanger made of steel** **with ellipse-shaped pipe with steel fins** for use with large water temperature spreads (e.g. district heating), galvanised, water passes through the heat exchanger on a cross-flow principle, suitable for use with LPHW/LPWW, maximum continuous operating pressure 16 bar at 120 °C		
		Housing dimensions		
	4	Height/Width/Depth: 500/540/320 mm		
	5	Height/Width/Depth: 600/640/320 mm		
	6	Height/Width/Depth: 700/740/320 mm		
	7	Height/Width/Depth: 800/840/360 mm		
	required to complete article no. for DataNorm/EDV	Continuation of TOP unit heater on page 79		

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Qty.	Article no.	Description	Price / each	Total price
		Technical data: Fan stage _____ _____ _____ Fan speed _____ _____ _____ 1/min Air volume _____ _____ _____ m^3/h Heat output _____ _____ _____ kW Leaving air temp. _____ _____ _____ °C Power consumption _____ _____ _____ W Sound press. level _____ _____ _____ dB(A) Sound power level _____ _____ _____ dB(A) Water temperatures _____ / _____ °C Entering air temp. _____ °C Weight _____ kg Connections _____ " Type no. _____ Article group 1.53, Manuf. Kampmann, Article no. 1530004_ _ _ _ _, Type 4_ _ _ _ _		
pc.	198 0 0 0 0 3 * 0 0 1	**Louvre** single-row with louvre for vertical air guidance. Article group 1.98, Manufacturer Kampmann, Article no. 1980003_ 001, Type 3_ 001	fitted as standard to TOP unit heaters	
pc.	198 0 0 0 0 3 * 1 0 1	**Induction louvre** single-row with fins arranged opposite each other, all of which can be set and locked separately. Article group 1.98, Manufacturer Kampmann, Article no. 19800003_101, Type 3_ 101		
pc.	198 0 0 0 0 3 * 0 0 2	**Louvre** two-row with louvre for vertical and horizontal air guidance in three or four directions Article group 1.98, Manufacturer Kampmann, Article no. 19800003_ 002, Type 3_ 002		
pc.	198 0 0 0 0 3 * 0 0 4	**Diffuser** for ceiling-mounted units with self-locking fins for air guidance in three or four directions Article group 1.98, Manufacturer Kampmann, Article no. 19800003_ 004, Type 3_ 004		
pc.	198 0 0 0 0 3 * 0 0 5	**Diffuser hood** for ceiling units, 70 mm height, fixed slats for guiding the air in four directions Article group 1.98, Manufacturer Kampmann, Article no. 19800003_ 005, Type 3_ 005		
pc.	198 0 0 0 0 3 * 0 0 6	**Outlet nozzle** for ceiling-mounted units Article group 1.98, Manufacturer Kampmann, Article no. 19800003_ 006, Type 3_ 006		
pc.	198 0 0 0 0 3 * 0 0 7	**Wide stream nozzle** for door screening systems Article group 1.98, Manufacturer Kampmann, Article no. 19800003_ 007, Type 3_ 007		
pc.	198 0 0 0 0 3 * 1 1 1	**KaMAX (Kampmann MultiAirMiX)** Air diffuser with trapezium-shaped slats, arranged in a circle, with bearings on the inside and outside, centrally adjustable with a manual lever or servomotor; slats are parallel in a horizontal position and begin to face each other as the position becomes more vertical. Room air is drawn into the unit and temperature stratification is thereby reduced. Article group 1.98, Manufacturer Kampmann, Article no. 19800003_111, Type 3_111	Can be supplied with: – manual lever – servomotor type 30262 for Open/Stop/Closed switch – servomotor type 30264 for KaMAX electronic unit 30110	
	4 5 6 7	*Please insert unit size, depending on housing dimensions Height/Width/Depth: 500/540/320 mm Height/Width/Depth: 600/640/320 mm Height/Width/Depth: 700/740/320 mm Height/Width/Depth: 800/840/360 mm		
	required to complete article no. for DataNorm/EDV			

Qty.	Article no.	Description	Price / each	Total price
pc.	198 0000 **30041**	**Universal 2-point brackets** for ceiling-mounting unit heaters on 2-point brackets, comprising 4 pairs of U-profiles with several openings for length adjustment, length 260–560 mm, 2 ceiling fixing angles and screws Article group 1.98 Manufacturer Kampmann, Article no. 198000030041, Type 30041		
pc.	198 0000 **30042**	**Universal 4-point brackets** for ceiling-mounting unit heaters for vertical or horizontal air outlet on 4-point brackets, completely comprising 4 no. U-profiles with longitudinal slots, 4 triangular brackets and screws Article group 1.98 Manufacturer Kampmann, Article no. 198000030042, Type 30042		
pc.	198 0000 **30043**	**Universal bracket extension** consisting of 4 no. U-profiles, with longitudinal slots and screws Article group 1.98 Manufacturer Kampmann, Article no. 198000030043, Type 30043		
pc.	198 0000 **30047**	**Universal 2-point T-beam brackets** for the ceiling-mounting of unit heaters on T-beams with a flange width of 80–230 mm on 2-point brackets, consisting of 4 pairs of U-profiles with several openings for length adjustment, length 260–560 mm, 2 fixing angles with screws Article group 1.98 Manufacturer Kampmann, Article no. 198000030047, Type 30047		
pc.	198 0000 **3*046**	**Trapezium steel ceiling brackets** for use as ceiling brackets for steel beams with trapezium brackets, fixing to steel beams without welding or drilling, consisting of 2 folded brackets, with spacing bolts and 2 beam clamps, 4 no. U-rails for fixing the unit heater Article group 1.98 Manufacturer Kampmann, Article no. 19800003_046, Type 3_046	Minimum opening of trapezium bracket 80 x 80 mm	
pc.	198 0000 **3*048**	**Wall-mounted truss brackets** for fixing unit heaters with a vertical air outlet to the wall or a truss, consisting of 2 folded brackets for screw-fixing to the wall or a truss, 4 U-profiles with longitudinal slots and screws Article group 1.98 Manufacturer Kampmann, Article no. 19800003_048, Type 3_048		
pc.	198 0000 **3*044**	**Wall brackets** for wall-mounting, suspended or standing, made of sendzimir galvanised sheet steel, complete brackets, consisting of 2 folded brackets with screws Article group 1.98 Manufacturer Kampmann, Article no. 19800003_044, Type 3_044		
pc.	198 0000 **3002**2	**Wall brackets, extended** for wall-mounting, suspended or standing, made of sendzimir galvanised sheet steel, complete brackets, consisting of 2 folded brackets with screws **2** Length A = 785 mm, Type 30022 **4** Length A = 885 mm, Type 30024 **6** Length A = 1080 mm, Type 30026 **0** Length A = ___ mm, Type 30020 Article group 1.98 Manufacturer Kampmann, Article no. 19800003002_, Type 3002_	The length of the bracket should be specified as required or stated for type 30020	

required to complete article no. for DataNorm/EDV

*Insert unit size, according to unit dimensions:
4 Height/Width/Depth: 500/540/320 mm
5 Height/Width/Depth: 600/640/320 mm
6 Height/Width/Depth: 700/740/320 mm
7 Height/Width/Depth: 800/840/360 mm

Qty.	Article no.	Description	Price / each	Total price
pc.	198 0000 3*010	**Filter box** made of sendzimir galvanised sheet steel, filter insert with easily removable fiberplast frame, filter class G 4 Article group 1.98, Manufacturer Kampmann, Article no. 19800003_010, Type 3_010		
pc.	198 0000 3*611	**Replacement filter cassette** for filter box, filter class G 4 Article group 1.98, Manufacturer Kampmann, Article no. 19800003_611, Type 3_611		
pc.	198 0000 3*012	**Mixing box** Recirculating air openings at the side, complete with grille, volume regulation by semi-circular segments, which rotate towards each other on a bearing Article group 1.98, Manufacturer Kampmann, Article no. 19800003_012, Type 3_012		
pc.	198 0000 3*013	**Sailcloth socket** for use as a flexible connection, length 120–160 mm Article group 1.98, Manufacturer Kampmann, Article no. 1980000 3_013, Type 3_013		
pc.	198 0000 3*114	**Rain hood** square, removable top cover, bird protection by means of perforated inlets on all sides Article group 1.98, Manufacturer Kampmann, Article no. 19800003_114, Type 3_114		
pc.	198 0000 3*015	**Air duct** with a frame at both ends Article group 1.98, Manufacturer Kampmann, Article no. 19800003_015, Type 3_015		
pc.	198 0000 3*016	**Weather grate** sendzimir galvanised with frame Article group 1.98, Manufacturer Kampmann, Article no. 19800003_016, Type 3_016		
pc.	198 0000 3*017	**Weather grate frame** sendzimir galvanised with anchorings lugs for brickwork Article group 1.98, Manufacturer Kampmann, Article no. 19800003_017, Type 3_017		
pc.	198 0000 3*118 00	**Cover panel** sendzimir galvanised, to cover the opening through the roof visible from below; for use with 00 0– 4° Roof angle, Type 3*11800 10 5–14° Roof angle, Type 3*11810 20 15–24° Roof angle, Type 3*11820 30 25–32° Roof angle, Type 3*11830 37 33–40° Roof angle, Type 3*11837 45 41–48° Roof angle, Type 3*11845 99 ____° Roof angle, Type 3*11899 Article group 1.98, Manufacturer Kampmann, Article no. 198003_118_ _, Type 3_118_	Please state angle for angled roofs with an angle of inclincation of more than 48°	
pc.	198 0000 3*119	**Roof socket for flat roof with roof duct** with connection flange, for use with roofs up to a roof angle of 4°. Article group 1.98, Manufacturer Kampmann, Article no. 19800003_119, Type 3_119		
pc.	198 0000 3*120 10	**Roof socket for angled roofs with roof duct** with connection flange for use with angled roofs with: 10 5–14° Roof angle, Type 3*12010 20 15–24° Roof angle, Type 3*12020 30 25–32° Roof angle, Type 3*12030 37 33–40° Roof angle, Type 3*12037 45 41–48° Roof angle, Type 3*12045 99 ____° Roof angle, Type 3*12099 Article group 1.98, Manufacturer Kampmann, Article no. 19800003_120_ _, Type 3_120_ _	Please state angle for angled roofs with an angle of inclincation of more than 48°	

required to complete article no. for DataNorm/EDV

*Insert unit size, according to unit dimensions:
4 Height/Width/Depth: 500/540/320 mm
5 Height/Width/Depth: 600/640/320 mm
6 Height/Width/Depth: 700/740/320 mm
7 Height/Width/Depth: 800/840/360 mm

Qty.	Article no.	Description	Price / each	Total price
pc.	198 0000 3*023	**Louvre** with profile fins on plastic bearings on fibreglass-reinforced polyamide gears Article group 1.98 Manufacturer Kampmann, Article no. 19800003_023, Type 3_023		
pc.	198 0000 3*026	**Wall duct** with connecting flange for ductwork on one side, for encasing within the brickwork Length 400 mm Article group 1.98 Manufacturer Kampmann, Article no. 19800003_026, Type 3_026		
pc.	198 0000 3*039	**Powdercoating** of steel accessories in white RAL 9016 or RAL 7035 Article group 1.98 Manufacturer Kampmann, Article no. 19800003_039, Type 3_039		
pc.	198 0000 3*040	**Powdercoating** of unit heater housing in white RAL 9016 or RAL 7035 Article group 1.98 Manufacturer Kampmann, Article no. 19800003_040, Type 3_040		
pc.	198 0000 3*021	**Air duct 90°** Article group 1.98 Manufacturer Kampmann, Article no. 19800003_021, Type 3_021		
pc.	198 0000 3*022	**Air duct (T-shaped)** Article group 1.98 Manufacturer Kampmann, Article no. 19800003_022, Type 3_022		
pc.	153 0000 3*976	**Unit heater shut-off valve set** comprising 2 valves, 2 ball valves with two side connections 1/2"(fem.), for thermometers and automatic air vent and drain cock plugs Article group 1.53, 6 Manufacturer Kampmann, Article no. 15300003_976 , Type 3_976, angled Article group 1.53, 7 Manufacturer Kampmann, Article no. 15300003_977 , Type 3_977, straight		
pc.	153 0000 3*009	**Flange connection** PN 16, conforms to DIN 2633, consisting ot 2 threaded flanges, counter-flange, seals and screws, DN _____ Article group 1.53, Manufacturer Kampmann, Article no. 15300003_009, Type 3_009		

required to complete article no. for DataNorm/EDV

Specifications/ Ordering

*Insert unit size, according to unit dimensions:
4 Height/Width/Depth: 500/540/320 mm
5 Height/Width/Depth: 600/640/320 mm
6 Height/Width/Depth: 700/740/320 mm
7 Height/Width/Depth: 800/840/360 mm

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Controls accessories: Stage switches

Qty.	Article no.	Description	Price / each	Total price
pc.	196 0000 30050	**2-stage 3-phase switch** with a stage switch 0-1-2, **without connection for a room thermostat,** for the manual control of recirculating air units. With motor protection relay for monitoring the thermal contacts in the motor, reset lock. Polystyrene housing, protection class IP 43, switching capacity max. 4 KW/ 10 A, dimensions W x H x D: 127 x 160 x 100 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030050, Type 30050	only for motor number 36	
pc.	196 0000 30051	**2-stage 3-phase switch** with a stage switch 0-1-2, possible connection to room thermostats, frost protection switches, time switches and flap motors. With motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and operating readiness indicator. Automatic reset following voltage failure. Polystyrene housing, protection class IP 54. Switching capacity max. 4 KW/ 10 A. Dimensions W x H x D: 262 x 277 x 153 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030051, Type 30051	only for motor number 36	
pc.	196 0000 30752 752 751	**5-stage 3-phase controller** with stage switch 0-1-2-3-4-5 via transformer. Possible connection to room thermostats, frost protection switches, time switches and flap motors. With motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and fault indicator, automatic reset following voltage failure. Steel housing, painted. Protection class IP 20. Dimensions W x H x D: 220 x 300 x 165 mm Switching current max. 4.0 A, Type 30752 Switching current max. 2.0 A, Type 30751 Article group 1.96, Manufacturer Kampmann, Article no. 19600003075_, Type 3075_	only for motor number 36	
pc.	196 0000 30070	**3-stage 3-phase switch** with stage switch 0-1-2-3. Possible connection to room thermostats, frost protection switches, time switches and flap motors. With motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and operating readiness indicator, automatic reset following voltage failure. Polystyrene housing, protection class IP 54. Switching capacity max. 4 KW/ 10 A. Dimensions W x H x D: 262 x 277 x 153 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030070, Type 30070	only for motor number 35	
pc.	196 0000 30069	**1-stage, 1-phase switch** with On/Off switch, possible connection to room thermostats, frost protection switches and flap motors. With motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and operating readiness indicator, automatic reset following voltage failure. Polystyrene housing, protection class IP 54. Switching capacity max. 4 KW/ 10 A. Dimensions W x H x D: 262 x 277 x 153 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030069, Type 30069	only for motor number 31	
pc.	196 0000 30771 1 2	**7-Stage, 1-phase-switch** with stage switch 0-1-2-3-4-5-6-7 via transformer. Possible connection to room thermostats, frost protection switches, time switches and flap motors. With motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, operating readiness and fault indicator, control relay, automatic reset following voltage failure. Steel housing, painted. Protection class IP 20. Dimensions W x H x D: 220 x 300 x 165 mm Switching current max. 4.0 A, Type 30771 Switching current max. 7.5 A, Type 30772 Article group 1.96, Manufacturer Kampmann, Article no. 19600003077_, Type 3077_	only for motor number 31	
pc.	196 0000 30120 2 3 required to complete article no. for DataNorm/EDV	**Repair switch, supplied loose** for the shut-down of motors with thermal contacts; possible connection to parallel units, thermal contacts will be temporarily bridged, lagged open; protection class IP 55 Type 30120 for 2-stage motors, supplied loose Type 30130 für 3-stage motors, supplied loose Article group 1.96, Manufacturer Kampmann, Article no. 1960000301_0, Type 301_0	Repair switch fitted to unit, see page 88	

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SYSTEMS FOR HEATING · COOLING · VENTILATING

Controls accessories: Stage switches

Qty.	Article no.	Description	Price / each	Total price
pc.	196 0000 **3077**	**2-stage, 3-phase switch** with stage switch 0-1-2 and electronic room temperature control, with two separately settable setpoint potentiometers for day and night temperature and room sensor for changeover via external time switch. Possible connection to frost protection switches and flap motors; with motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and operating readiness indicator, automatic reset following voltage failure; polystyrene housing, protection class IP 54. Switching capacity max. 4 KW/10 A. Dimensions W x H x D: 262 x 277 x 153 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030077, Typ 30077	only for motor figure 36	
pc.	196 0000 **3078**	**3-stage, 3-phase switch** with stage switch 0-1-2-3 and electronic room temperature control, with two separately settable setpoint potentiometers for day and night temperature and room sensor for changeover via external time switch. Possible connection to frost protection switches and flap motors; with motor protection relay for monitoring the thermal contacts in the motor, reset lock following a fault, control relay and operating readiness indicator, automatic reset following voltage failure; polystyrene housing, protection class IP 54. Switching capacity max. 4 KW/10 A. Dimensions W x H x D: 262 x 277 x 153 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030078, Typ 30078	only for motor figure 35	
pc.	196 0000 **3177** **1** = without clock **2** = with integral digital time switch with day/night/week programme required to complete article no. for DataNorm/EDV	**Electronic 2-stage controller, 3-phase, recirculating air** Mircroprocessor-controlled controller with 0-1-2-Auto stage switch, automatic room temperature-dependent fan speed control, integral room temperature controller with day setpoint adjustment 5 to 35 °C and night setback of 1 to 10 K. Hysteresis and switching intervals of automatic fan operation can be set, motor protection to monitor the thermal contacts in the motor, reset lock following a fault, automatic reset after power failure, operating mode selector switch day/night/time/manual, LED for displaying operating readiness, operation and fault, digitial inputs for external day/night and heating/cooling changeover, potential-free NO contact for fan mode and fault, control output 230 V for activating a thermoelectric shut-off valve or heat/cooling requirement. Polystyrene switch housing, protection class IP 40, room temperature sensor in a separate housing, protection class IP 54, switching capacity max. 4 KW/ 10 A, Dimensions W x H x D: 262 x 277 x 153 mm; Article group 1.96, Manufacturer Kampmann, Article no. 196000030_77, Typ 30_77	only for motor figure 36	

Controls accessories: Thermostats · Time switches

Qty.	Article no.	Description	Price / each	Total price
pc.	196 0000 30055	**Room thermostat** in a slimline housing, white, with thermal feedback, temperature setting range 5–30 °C, range limitation is possible; protection class IP 30 Article group 1.96, Manufacturer Kampmann, Article no. 196000030055, Type 30055		
pc.	196 0000 30056	**Clock thermostat** in an attractive white housing, with electronic 2-point room temperature control and digital weekly time clock, power reserve approx. 15 min; party switch; switching mode indicator, with operating mode switch Automatic/Day/Night/Off; switching difference can be set; temperature range 5–40 °C, night setback 2–10 K; dimensions W x H x D: 132 x 82 x 32 mm; protection class IP 20 Article group 1.96, Manufacturer Kampmann, Article no. 196000030056, Type 30056		
pc.	196 0000 30057	**Clock and thermostat cover** with 2 keys, perspex cover Article group 1.96, Manufacturer Kampmann, Article no. 196000030057, Type 30057	to prevent clock thermostats or room thermostats from being tampered with	
pc.	196 0000 30058	**Industrial thermostat** Housing made of impact-resistant plastic, setpoint adjustment only after removing front cover of housing with a screwdriver; protection class IP 54, temperature setting range 0–40 °C Article group 1.96, Manufacturer Kampmann, Article no. 196000030058, Type 30058		
pc.	196 0000 30059	**Industrial thermostat** Housing made of impact-resistant plastic, setpoint adjustment via a dial; protection class IP 54, temperature setting range 0–40 °C Article group 1.96, Manufacturer Kampmann, Article no. 196000030059, Type 30059		
pc.	196 0000 30076	**Time switch with electronic room temperature controlller and room temperature sensor** Time switch with day/night/week programme, clearly laid-out programme display. Programmable every 5 mins/30 mins, shortest switching interval 20 min/2 hr, 100 hours of power reserve, room temperature controller with day and night setpoint potentiometer, changeover by means of time switch, with room temperature sensor in a separate housing (max. distance 100 m). Temperature setting range 0-40 degrees C. Time switch: protection class IP 20. Sensor: protection class IP 54. Switching capacity 230 V AC, 50 Hz, 8 (3) A, Dimensions of time switch W x H x D: 262 x 277 x 153 mm, Dimensions of sensor W x H x D: 50 x 50 x 30 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030076, Type 30076		
pc.	196 0000 30079	**Time switch with two electronic room temperature controllers and two room temperature sensors** Time switch with day/night/week programme, clearly laid-out programme display. Programmable every 5 mins/30 mins, shortest switching interval 20 min/2 hr, 100 hours of power reserve, room temperature controller with day and night setpoint potentiometer, changeover by means of time switch, with room temperature sensor in a separate housing (max. distance 100 m). To switch a maximum of 2 switching groups. Temperature setting range 0-40 degrees C. Time switch: protection class IP 20. Sensor: protection class IP 54. Switching capacity 230 V AC, 50 Hz, 8 (3) A, Dimensions of time switch W x H x D: 262 x 277 x 153 mm, Dimensions of sensor W x H x D: 50 x 50 x 30 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030079, Type 30079		
pc.	196 0000 30054	**Time switch** with day/night/week programme, clearly laid-out programme display. Programmable every 5 mins/30 mins, shortest switching interval 20 min/2 hr, 100 hours of power reserve. Polystyrene housing, protection class IP 20. Dimensions W x H x D: 262 x 277 x 153 mm Article group 1.96, Manufacturer Kampmann, Article no. 196000030054, Type 30054		

required to complete article no. for DataNorm/EDV

KAMPMANN
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Controls accessories: KaMAX electronic units · Supply temperature controllers

Qty.	Article no.	Description	Price / each	Total price
pc.	196 0000 **30110**	**KaMAX Electronic unit** in a polystyrene housing with a perspex front cover, comprising: – KaMAX optimisation - KaMAX units are continuously adjusted in line with temperature stratification, – Characteristic curve setting with minimum and maximum position limitation, – Additional variable switching point to switch a motorised valve, circulation pump or a ventilator at ceiling height, – Digital time switch with day/night/week programme, power reserve, switch mode indicator, operating mode switch Automatic/Day/Night/Off/Frost protection, – Electronic temperature controller with day and night potentiometer 5–40 °C to set the temperature at ground level, – With two room temperature sensors (ceiling and ground level) in a separate housing Dimensions W x H x D: 257 x 214 x 128 mm, protection class IP 54 Article group 1.96, Manufacturer Kampmann, Article no. 196000030110, Type 30110	use type no. 30264 as a servomotor (see page 87)	
pc.	196 0000 **30115**	**Open/Stop/Close switch** for manual adjustment of the KaMAX Article group 1.96, Manufacturer Kampmann, Article no. 196000030115, Type 30115	use type no. 30262 as a servomotor (see page 87)	
pc.	196 0000 **30294** **294** **095**	**Supply air temperature controller** Robust housing. Snap-in closure, painted RAL 7035, VDE-compliant, terminal strips wired to a base plate with connection options for: - Stage switches for supply air and extract air (time-controlled), either 3-phase or 1-phase - Frost protection thermostat, flap adjustment motor - Room temperature sensor, supply air duct sensor - Actuator for 3-way valve With the following fittings and functions: - Continuous temperature controller, compares the temperature detected by the room sensor with the setpoint set on the day / night potentiometer and regulates the 3-way valve accordingly - Integral supply air limiter, used in conjunction with the supply air duct sensor, prevents the supply air temperature from falling below the preset value - Frost protection switch to close the mixing box when there is a risk of frost and when the fan is switched off and to open the 3-way valve when there is a risk of frost; The following are incorporated in the front door: - Time switch with day/night/week programme and power reserve - Day/night/time switch. In the "Night" position, the mixed air flap is moved to "Recirculating air" position. - Frost indicator, reset button - Day and night temperature setpoint indicator and the following controlllers (supplied loose): 1 no. Room temperature sensor 1 no. Supply air duct sensor for minimum supply air temperature limitation. - with 0-100 % indicator for flap servomotors (continuous), Type 30264 - with Open/Closed switch for Open/Closed flap servomotors, Type 30262 Article group 1.96, Manufacturer Kampmann, Article no. 196000030_9_, Type 30_9_	Non-standard units, such as constant leaving temperature controllers and switching cabinets for multiple switching groups are available on request.	
pc.	196 0000 **3097** **97** **98** **99**	**3-way valve** with 24 V actuator, with automatic return to zero position Nominal width 1", Type 30197 Nominal width 1 1/4", Type 30198 Nominal width 1 1/2", Type 30199 Article group 1.96, Manufacturer Kampmann, Article no. 1960000301_ _, Type 301_ _	only for use in conjunction with supply air temperature controller Type 30294 or Type 30095	
	required to complete article no. for DataNorm/EDV			

Specifications/ Ordering

KAMPMANN
SYSTEMS FOR HEATING · COOLING · VENTILATING

Controls accessories: Servomotors · Frost protection · Intermediate terminal boxes

Qty.	Article no.	Description	Price each	Total price
pc.	196 0000 30262	**Open/Closed flap servomotor** two-way; motor protected against overload, for Open/Closed operation; operating voltage 230 V, 50 Hz, power consumption 6 VA, travels across 95 degrees, 150 sec.; protection class IP 54 Article group 1.96, Manufacturer Kampmann, Article no. 196000030262, type 30262		
pc.	196 0000 30263	**Auxiliary switch** for indicating position or executing switching functions; can be set across the entire angle of rotation; protection class IP 54, switching current max. 3 (0.5) A Article group 1.96, Manufacturer Kampmann, Article no. 196000030263, type 30263	only for use in conjunction with flap servomotor type 30262 or type 30264	
pc.	196 0000 30264	**Flap servomotor, continuous** for continuous 0–100 % flap adjustment , motor protected against overload, operating voltage 230 V, 50 Hz; control voltage 0–10 V, power consumption 6.5 VA, travels across 95 degrees, 150 sec.; protection class IP 54 Article group 1.96, Manufacturer Kampmann, Article no. 196000030264, type 30264		
pc.	196 0000 30168	**Frost protection thermostat, supplied loose** temperature range –10/+12 °C, 3 m capillary tube with sensor monitoring, protection class IP 40 Article group 1.96, Manufacturer Kampmann, Article no. 196000030168, type 30168		
pc.	196 0000 30290	**Frost protection switch with 0–100 % position indicator** to close the mixing box when there is a risk of frost and when the fan is switched off; with frost alert indicator, protection class IP 40 Article group 1.96, Manufacturer Kampmann, Article no. 196000030290, type 30290	only for use with flap servomotor type 30264	
pc.	196 0000 30091	**Frost protection switch with "Open/Close" switch** to close the mixing box when there is a risk of frost and when the fan is switched off; with frost alert indicator, protection class IP 54 Article group 1.96, Manufacturer Kampmann, Article no. 196000030091, type 30091	only for use with flap servomotor type 30262	
pc.	196 0000 30092	**Frost protection switch with "Open/Middle/Closed" switch** to close the mixing box when there is a risk of frost and when the fan is switched off; with frost alert indicator, protection class IP 54 Article group 1.96, Manufacturer Kampmann, Article no. 196000030092, type 30092	only for use with flap servomotor type 30262 and auxiliary switch 30263	
pc.	196 0000 30101	**Intermediate terminal box** for the connection of up to three unit heaters, extract air units or mixed air accessories, accommodated in a wall-mounted housing with a snap closure made of impact-resistant ABS, light-grey, fitted with WAGO spring caged terminals for cables up to 4 mm², protection class IP 54; with adequate room to loop cables, openings for on-site PG-entry		
	1	Type 30101 for 2-stage motors, dimensions W x H x D: 200 x 150 x 75 mm		
	2	Type 30102 for 3-stage motors, dimensions W x H x D: 200 x 150 x 75 mm		
	3	Type 30103 for 2-stage motors with KaMAX servomotor dimensions W x H x D: 200 x 160 x 90 mm		
	4	Type 30104 for 3-stage motors with KaMAX servomotor dimensions W x H x D: 200 x 160 x 90 mm		
	5	Type 30105 for mixed air accessories, when using an "Open/Closed", "Open/Middle/Closed" or continuous 0–100 % frost protection switch dimensions W x H x D: 200 x 150 x 75 mm Article group 1.96, Manufacturer Kampmann, Article no. 19600003010_, type 3010_		
	Required to complete DataNorm/EDV article no.			

Controls accessories: Switches and controllers · Factory-fitted switches

Qty.	Article no.	Description	Price / each	Total price
pc.	196 0000 30351	**2-stage, 3-phase switch with PTC resistor control** with 0-1-2 stage switch, with motor protection and temperature control by PTC resistor with PCB, with operating standby indicator, control relay, restart block. Terminal for connection of time switch type 30376 or switch amplifier type 30380. Polystyrene housing. Protection class IP 54. Dimensions W x H x D: 262 x 277 x 153 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030351, type 30351	A maximum of two explosion-proof unit heaters, motor size 37 can be connected. Fit the switch outside of the area at risk of explosion	
pc.	196 0000 30376	**Time switch with electronic room temperature control, room sensor and safety barrier** Time switch with day/night/week programme, clearly laid-out programming display. Programmable every 5 minutes/30 minutes, shortest switching interval 20 min/2 hrs, 100 hours power reserve, room temperature control with day and night setpoint potentiometer, changeover via time switch, room temperature sensor in separate housing (max. distance 100 m). Complete with integral safety barrier in compliance with the certificate of conformity for installing the room sensor in an area at risk of explosion. Sensor power circuit is inherently safe according to VDE 0165. Temperature setting range 0-40 degrees C. Time switch: protection class IP 20, Sensor: protection class IP 54. Switching capacity 230V AC, 50 Hz, 8 (3) A, Dimensions of time switch W x H x D: 262 x 277 x 153 mm Dimensions of sensor W x H x D: 50 x 50 x 30 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030376, type 30376	Fit the controller outside of the area at risk of explosion	
pc.	196 0000 30380	**Switch amplifier with inherently safe sensor output** suitable for galvanically separating the sensor power circuit from the switching power circuit. Sensor power circuit is inherently safe according to VDE 0165. Protection class IP 54. Dimensions W x H x D: 262 x 277 x 153 mm. Article group 1.96, Manufacturer Kampmann, Article no. 196000030380, type 30380	Industrial thermostats types 30058 and 30059 can be connected. Fix the switch outside of the area at risk of explosion	
pc.	196 000 44 20 36 F	**Frost protection thermostat, fitted** Temperature setting range –10/12 °C, 3 m capillary tube with inherent sensor control, fitted to the unit heater, protection class IP 40 Article group 1.96, Manufacturer Kampmann, Article no. 196000_____F, type _____F	Suffix to unit heater type no.	
	196 000 44 20 36 R	**Repair switch, fitted** for shutting down motors with thermal contacts, with the option of connecting parallel units, thermal contacts are temporarily and lagged open; protection class IP 55; 2-stage type _____R; 3-stage type _____R Article group 1.96, Manufacturer Kampmann, Article no. 196000_____R, type _____R	Suffix to unit heater type no.	
	196 000 44 20 36 FR	**Frost protection thermostat and repair switch, fitted** Article group 1.96, Manufacturer Kampmann, Article no. 196000_____FR, type _____FR	Suffix to unit heater type	
	required to complete DataNorm/EDV article nos.			

Specifications/ Ordering

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Order form

153 0004 _ _ _ _ _

Article no. TOP Unit heaters

Article group
1.53
TOP Unit heaters

Fan:
00 No fan
36 2-stage, 3-phase sickle-blade, whisper-quiet fan
35 3-stage, 3-phase sickle-blade, whisper-quiet fan
37 2-stage, explosion-proof, 3-phase wide blade fan
31 1-stage, 1-phase sickle-blade, whisper-quiet fan

Heat exchanger:
00 No heat exchanger, used as a supply air or extract air unit
20, 30, 40 Copper/aluminium heat exchanger
21, 31, 41 Galvanised steel heat exchanger
22, 32 Galvanised steel heat exchanger, for use with steam
33, 43 Galvanised steel heat exchanger, cross-flow

Housing dimensions
4 Height/Width/Depth: 500/540/320 mm
5 Height/Width/Depth: 600/640/320 mm
6 Height/Width/Depth: 700/740/320 mm
7 Height/Width/Depth: 800/840/360 mm

Please state article numbers when ordering!

Pos.	Qty.	Article number	Description	Price (see HKL Pricelist)
1		_ _ _ _ _ _ _ _ _ _ _		
2		_ _ _ _ _ _ _ _ _ _ _		
3		_ _ _ _ _ _ _ _ _ _ _		
4		_ _ _ _ _ _ _ _ _ _ _		
5		_ _ _ _ _ _ _ _ _ _ _		
6		_ _ _ _ _ _ _ _ _ _ _		
7		_ _ _ _ _ _ _ _ _ _ _		
8		_ _ _ _ _ _ _ _ _ _ _		
9		_ _ _ _ _ _ _ _ _ _ _		
10		_ _ _ _ _ _ _ _ _ _ _		
11		_ _ _ _ _ _ _ _ _ _ _		
12		_ _ _ _ _ _ _ _ _ _ _		
13		_ _ _ _ _ _ _ _ _ _ _		
14		_ _ _ _ _ _ _ _ _ _ _		

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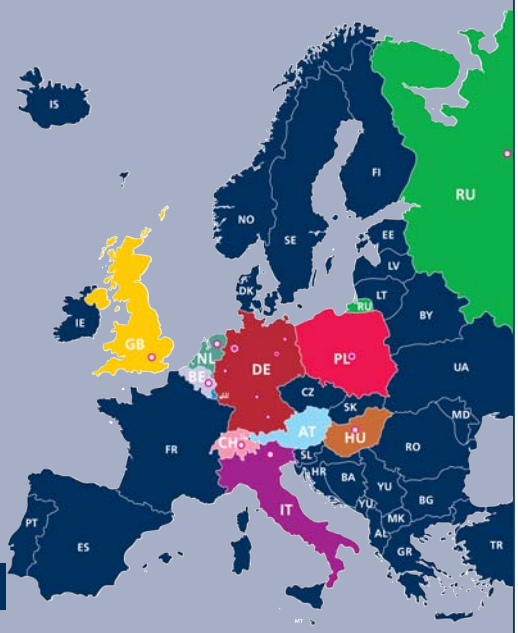

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Askari Angelsport, Lüdinghausen

Product information

- Noise level and output-enhanced cast aluminium sickle-blade, whisper-quiet fan with a full nozzle for a steep and constant characteristic line
- Over 150 types and models
- Supplied as standard with single-row louvre
- Extensive range of accessories

Product-specific information on the above project

- Exceptionally low noise levels due to quiet working environment
- Units used in a wide range of areas from low-ceilinged production areas to extremely high shelved warehouses
- Units fitted with KaMAX air outlet

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