



Technik, die dem Menschen dient.

TopWing - Air Heater TLHK

Heating or cooling



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Description

The air heaters of the series TLHK were particularly developed for the comfort range.

They are suitable for heating or cooling.

Each device can be used in circulating air or mixed air operation as wall device with the corresponding equipment.

Air filtering is also possible with suitable accessories.

The 4 unit sizes permit air volumes up to 7700 m³/h in heating operation and a heating power of up to 153 kW, or air volumes up to 4620 m³/h in cooling operation and a cooling capacity of up to 39.7 kW.



- Casing made of welded, galvanised and powder-coated profile frame construction
- Panelling made of steel sheet, powder-coated, colour white (RAL 9016), with increased thermal insulation with bonded PU soft-foam insulation, 25mm thick
- Back panel with deep-drawn inflow nozzle, powder-coated, colour white (RAL 9016)
- Integrated condensate basin made of aluminium with downward gradient for complete draining
- Condensate pump, float switch and controller with alarm generator integrated and pre-wired
- Condensate hose with inside diameter of 4 mm mounted on outlet chute
alternative: Device with outlet chute 1/2" for free drainage
- Induction shutter with secondary air cone and continuous servomotor 24 V, installed as standard for TLHK, pre-wired
- Supply air sensor mounted and pre-wired

Motor fan safety screen unit:

As motor/fan unit, a quiet impeller with a single phase motor 230 V or 3x400 V is used.

- Oscillation-dampened mounting of the motor-fan safety screen unit on back panel
- Fan motor unit pre-wired in control
- Degree of protection IP54, heat class CL F

Controlling DigiPro



- Bus technology control (power pack) for continuous, noiseless control of the motor-fan unit integrated in the TLHK.
- Maintenance switch and cable entries attached to power pack back panel. Degree of protection IP 54

Heat exchanger Cu/Al:



Large two-conductor heat exchangers (type 4) are used for heating or cooling. This has the advantage that in cooling operation, sufficient cooling capacity is available and, in heating operation with low-temperature heaters or condensation heating systems with supply/return spreading of 50/40 °C and a maximum volume flow in operation with circulating air of approx. 36 °C can be reached.

- Heat exchanger made of Cu/Al, collecting tank made of steel, alternatively Cu, extractable to the side, connectors with threaded end PN 16 up to 140 °C
- Connection side in air direction right/left

Colour selection:



The housing of the air heaters TLHK is standard white RAL 9016.

Other RAL colours and special colours on request.

TopWing Performance table heating or cooling TLHK 25

for warm water

Speed [min ⁻¹]		1350		1000		750	
Vol. flow. \dot{V}_O [m ³ /h]		1700		1350		1000	
	t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}
	°C	kW	°C	kW	°C	kW	°C
PWW 45/35	- 10	19.8	22	16.8	24	13.4	26
	± 0	15.3	25	13.0	27	10.4	29
	+ 10	10.9	29	9.3	30	7.5	32
	+ 20	6.6	32	5.7	33	4.6	34
PWW 50/40	- 10	22.1	25	18.6	27	14.8	30
	± 0	17.5	29	14.8	31	11.8	33
	+ 10	13.1	32	11.1	34	8.9	36
	+ 20	8.8	36	7.5	37	6.1	38
PWW 60/40	- 10	22.7	26	19.3	29	15.5	32
	± 0	18.2	30	15.5	32	12.5	35
	+ 10	13.7	33	11.7	35	9.5	38
	+ 20	9.4	37	8.1	38	6.6	40
PWW 70/50	- 10	27.2	33	23.0	36	18.4	40
	± 0	22.6	37	19.2	40	15.4	43
	+ 10	18.2	41	15.5	43	12.4	46
	+ 20	13.8	44	11.8	46	9.5	49
PWW 80/60	- 10	31.6	40	26.6	43	21.2	47
	± 0	27.0	45	22.8	47	18.2	51
	+ 10	22.5	48	19.1	51	15.2	54
	+ 20	18.1	52	15.4	54	12.4	57

for cold water

Speed [min ⁻¹]		800		550		400	
Vol. flow. \dot{V}_O [m ³ /h]		1020		710		510	
	t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}
	°C / %r.h.	kW	°C	kW	°C	kW	°C
PKW 5/10	32 / 40	7.7	15.4	5.9	13.9	4.6	12.6
	28 / 47	6.2	14.5	4.8	13.3	3.8	12.2
	26 / 49	5.4	13.7	4.2	12.6	3.3	11.6
	25 / 50	5.0	13.4	3.8	12.3	3.0	11.4
PKW 6/12	32 / 40	6.7	16.3	5.1	14.9	4.0	13.7
	28 / 47	5.3	15.4	4.1	14.3	3.2	13.3
	26 / 49	4.4	14.6	3.4	13.6	2.6	12.8
	25 / 50	4.0	14.1	3.1	13.2	2.3	12.6
PKW 7/12	32 / 40	6.7	16.2	5.2	14.9	4.0	13.7
	28 / 47	5.3	15.3	4.1	14.2	3.2	13.3
	26 / 49	4.5	14.5	3.4	13.6	2.7	12.7
	25 / 50	4.0	14.1	3.1	13.2	2.4	12.5
PKW 8/12	32 / 40	6.8	16.2	5.2	14.9	4.0	13.8
	28 / 47	5.4	15.3	4.1	14.2	3.2	13.3
	26 / 49	4.5	14.5	3.5	13.6	2.7	12.8
	25 / 50	4.1	14.0	3.1	13.2	2.4	12.5

Performance data refers to cold pump water without antifreeze.

When using antifreeze, cooling capacity is reduced and the water-side resistance is increased.

Motor output (3 x 400 V)	max. 0.18 kW
Current consumption (3 x 400 V)	max. 0.4A
Motor output (1 x 230 V)	0.20 kW
Current consumption (1 x 230 V)	0.90A
Heat exchanger water contents	1.8 litres
Heat exchanger connectors	R 1"

TopWing Performance table heating or cooling TLHK 40

for warm water

Speed [min ⁻¹]	1350		1000		750		
Vol. flow. \dot{V}_O [m ³ /h]	2800		2000		1500		
t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
°C	kW	°C	kW	°C	kW	°C	
PWW 45/35	- 10	32.6	21	25.5	24	20.5	27
	± 0	25.3	25	19.9	28	16.0	30
	+ 10	18.2	29	14.4	31	11.6	33
	+ 20	11.2	32	8.9	33	7.3	35
PWW 50/40	- 10	36.1	25	28.2	28	22.6	31
	± 0	28.8	29	22.6	32	18.1	34
	+ 10	21.7	33	17.0	35	13.7	37
	+ 20	14.7	36	11.6	38	9.5	39
PWW 60/40	- 10	37.7	26	29.7	30	24.0	33
	± 0	30.4	30	24.0	34	19.4	36
	+ 10	23.2	34	18.4	37	15.0	39
	+ 20	16.1	37	12.9	39	10.6	41
PWW 70/50	- 10	44.9	33	35.1	37	28.3	41
	± 0	37.5	38	29.4	41	23.7	44
	+ 10	30.3	41	23.9	45	19.3	47
	+ 20	23.2	45	18.4	48	14.9	50
PWW 80/60	- 10	51.8	40	40.4	45	32.4	48
	± 0	44.4	44	34.7	49	27.9	52
	+ 10	37.2	49	29.1	52	23.4	55
	+ 20	30.1	52	23.7	56	19.1	58

for cold water

Speed [min ⁻¹]	800		550		400		
Vol. flow. \dot{V}_O [m ³ /h]	1680		1180		840		
t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
°C / %r.h.	kW	°C	kW	°C	kW	°C	
PKW 5/10	32 / 40	13.0	15.4	10.0	13.9	7.7	12.5
	28 / 47	10.7	14.5	8.3	13.2	6.4	12.1
	26 / 49	9.3	13.7	7.2	12.6	5.6	11.5
	25 / 50	8.6	13.3	6.7	12.2	5.2	11.2
PKW 6/12	32 / 40	11.5	16.3	8.9	14.9	6.9	13.6
	28 / 47	9.2	15.4	7.1	14.2	5.6	13.1
	26 / 49	7.8	14.5	6.1	13.5	4.7	12.6
	25 / 50	7.1	14.1	5.5	13.2	4.3	12.3
PKW 7/12	32 / 40	11.5	16.3	8.9	14.9	6.8	13.7
	28 / 47	9.2	15.4	7.1	14.2	5.5	13.2
	26 / 49	7.8	14.5	6.0	13.5	4.7	12.6
	25 / 50	7.1	14.1	5.5	13.2	4.3	12.3
PKW 8/12	32 / 40	11.5	16.3	8.8	15.0	6.8	13.8
	28 / 47	9.2	15.4	7.1	14.3	5.5	13.3
	26 / 49	7.8	14.5	6.0	13.6	4.6	12.7
	25 / 50	7.1	14.1	5.5	13.2	4.2	12.4

Performance data refers to cold pump water without antifreeze.

When using antifreeze, cooling capacity is reduced and the water-side resistance is increased.

Motor output (3 x 400 V)	max. 0.32 kW
Current consumption (3 x 400 V)	max. 0.62A
Motor output (1 x 230 V)	0.37 kW
Current consumption (1 x 230 V)	1.60A
Heat exchanger water contents	2.5 litres
Heat exchanger connectors	R 1"

TopWing Performance table heating or cooling TLHK 63

for warm water

Speed [min ⁻¹]		900		700		500	
Vol. flow. \dot{V}_O [m ³ /h]		4400		3400		2400	
	t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}
	°C	kW	°C	kW	°C	kW	°C
PWW 45/35	- 10	55.1	24	45.4	26	34.6	29
	± 0	42.9	27	35.5	29	27.1	32
	+ 10	31.1	31	25.8	32	19.8	34
	+ 20	19.5	33	16.3	34	12.6	36
PWW 50/40	- 10	60.9	27	50.1	30	38.1	33
	± 0	48.7	31	40.1	33	30.6	36
	+ 10	36.8	34	30.5	36	23.3	38
	+ 20	25.3	37	21.0	39	16.2	40
PWW 60/40	- 10	64.2	29	53.2	32	40.8	36
	± 0	52.0	33	43.2	36	33.2	39
	+ 10	40.0	36	33.3	39	25.8	41
	+ 20	28.1	39	23.6	41	18.4	43
PWW 70/50	- 10	75.9	37	62.6	40	47.8	44
	± 0	63.6	41	52.6	43	40.3	47
	+ 10	51.7	44	42.8	47	32.9	50
	+ 20	39.9	47	33.2	49	25.7	52
PWW 80/60	- 10	87.2	44	71.7	47	54.5	51
	± 0	75.0	48	61.7	51	47.0	55
	+ 10	63.0	52	52.0	54	39.7	58
	+ 20	51.3	55	42.4	58	32.5	61

for cold water

Speed [min ⁻¹]		550		400		300	
Vol. flow. \dot{V}_O [m ³ /h]		2640		1850		1320	
	t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}
	°C / %r.h.	kW	°C	kW	°C	kW	°C
PKW 5/10	32 / 40	22.2	14.3	17.0	12.8	13.0	11.5
	28 / 47	18.4	13.5	14.1	12.2	10.9	11.1
	26 / 49	16.0	12.8	12.3	11.7	9.5	10.6
	25 / 50	14.9	12.4	11.4	11.4	8.8	10.4
PKW 6/12	32 / 40	19.8	15.2	15.2	13.8	11.7	12.6
	28 / 47	16.0	14.5	12.3	13.3	9.5	12.2
	26 / 49	13.6	13.7	10.5	12.7	8.1	11.8
	25 / 50	12.5	13.4	9.6	12.4	7.5	11.5
PKW 7/12	32 / 40	19.7	15.3	15.0	13.9	11.5	12.8
	28 / 47	15.9	14.5	12.2	13.4	9.4	12.4
	26 / 49	13.5	13.8	10.4	12.8	8.0	11.9
	25 / 50	12.4	13.4	9.5	12.5	7.3	11.6
PKW 8/12	32 / 40	19.6	15.3	14.9	14.1	11.4	13.0
	28 / 47	15.7	14.5	12.0	13.5	9.2	12.5
	26 / 49	13.4	13.8	10.2	12.9	7.8	12.1
	25 / 50	12.2	13.4	9.3	12.6	7.1	11.8

Performance data refers to cold pump water without antifreeze.

When using antifreeze, cooling capacity is reduced and the water-side resistance is increased.

Motor output (3 x 400 V)	max. 0.34 kW
Current consumption (3 x 400 V)	max. 0.85A
Motor output (1 x 230 V)	0.40 kW
Current consumption (1 x 230 V)	1.80A
Heat exchanger water contents	5.5 litres
Heat exchanger connectors	R 1¼"

TopWing Performance table heating or cooling TLHK 100

for warm water

Speed [min ⁻¹]	900		700		500		
Vol. flow. \dot{V}_O [m ³ /h]	7700		5600		4000		
t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
°C	kW	°C	kW	°C	kW	°C	
PWW 45/35	- 10	96.8	24.0	76.1	27.0	58.5	30.0
	± 0	75.7	28.0	59.7	30.0	46.0	32.0
	+ 10	55.1	31.0	43.7	33.0	33.8	35.0
	+ 20	35.0	34.0	27.9	35.0	21.8	36.0
PWW 50/40	- 10	106.7	27.0	83.8	30.0	64.3	33.0
	± 0	85.6	31.0	67.4	34.0	51.8	36.0
	+ 10	65.0	35.0	51.3	37.0	39.6	39.0
	+ 20	44.9	38.0	35.7	39.0	27.7	41.0
PWW 60/40	- 10	113.6	30.0	89.8	33.0	69.4	37.0
	± 0	92.3	34.0	73.2	37.0	56.7	40.0
	+ 10	71.5	37.0	57.0	40.0	44.4	42.0
	+ 20	50.0	40.0	40.8	42.0	32.1	44.0
PWW 70/50	- 10	133.6	37.0	105.2	41.0	80.9	45.0
	± 0	112.3	41.0	88.6	44.0	68.3	48.0
	+ 10	91.5	45.0	72.4	48.0	56.0	51.0
	+ 20	71.1	48.0	56.6	50.0	43.9	53.0
PWW 80/60	- 10	153.0	44.0	120.1	48.0	92.0	52.0
	± 0	131.7	48.0	103.5	52.0	79.4	56.0
	+ 10	110.9	52.0	87.4	55.0	67.2	59.0
	+ 20	90.6	55.0	71.6	58.0	55.2	62.0

for cold water

Speed [min ⁻¹]	550		400		300		
Vol. flow. \dot{V}_O [m ³ /h]	4620		3230		2310		
t_{LE}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
°C / %r.h.	kW	°C	kW	°C	kW	°C	
PKW 5/10	32 / 40	39.7	14.1	30.3	12.6	23.3	11.3
	28 / 47	33.1	13.4	25.3	12.1	19.5	10.9
	26 / 49	29.0	12.6	22.2	11.5	17.1	10.5
	25 / 50	27.0	12.3	20.7	11.2	16.0	10.2
PKW 6/12	32 / 40	35.8	15.1	27.4	13.7	21.1	12.4
	28 / 47	29.1	14.3	22.4	13.1	17.3	12.0
	26 / 49	25.1	13.6	19.3	12.5	14.9	11.5
	25 / 50	23.1	13.2	17.7	12.2	13.7	11.3
PKW 7/12	32 / 40	35.4	15.2	27.0	13.8	20.7	12.6
	28 / 47	28.7	14.4	22.0	13.2	16.9	12.2
	26 / 49	24.7	13.6	18.9	12.6	14.5	11.7
	25 / 50	22.6	13.3	17.3	12.3	13.4	11.5
PKW 8/12	32 / 40	35.0	15.3	26.6	14.0	20.3	12.9
	28 / 47	28.3	14.5	21.6	13.4	16.5	12.5
	26 / 49	24.2	13.7	18.4	12.8	14.1	12.0
	25 / 50	22.2	13.4	16.9	12.5	12.9	11.7

Performance data refers to cold pump water without antifreeze.

When using antifreeze, cooling capacity is reduced and the water-side resistance is increased.

Motor output (3 x 400 V)	max. 0.76 kW
Current consumption (3 x 400 V)	max. 1.70A
Motor output (1 x 230 V)	0.73 kW
Current consumption (1 x 230 V)	3.40A
Heat exchanger water contents	9.5 litres
Heat exchanger connectors	R 1½"

System extension with the DigiPro control

The DigiPro control is an installation-ready configured system for controlling and monitoring functions in ventilation systems.

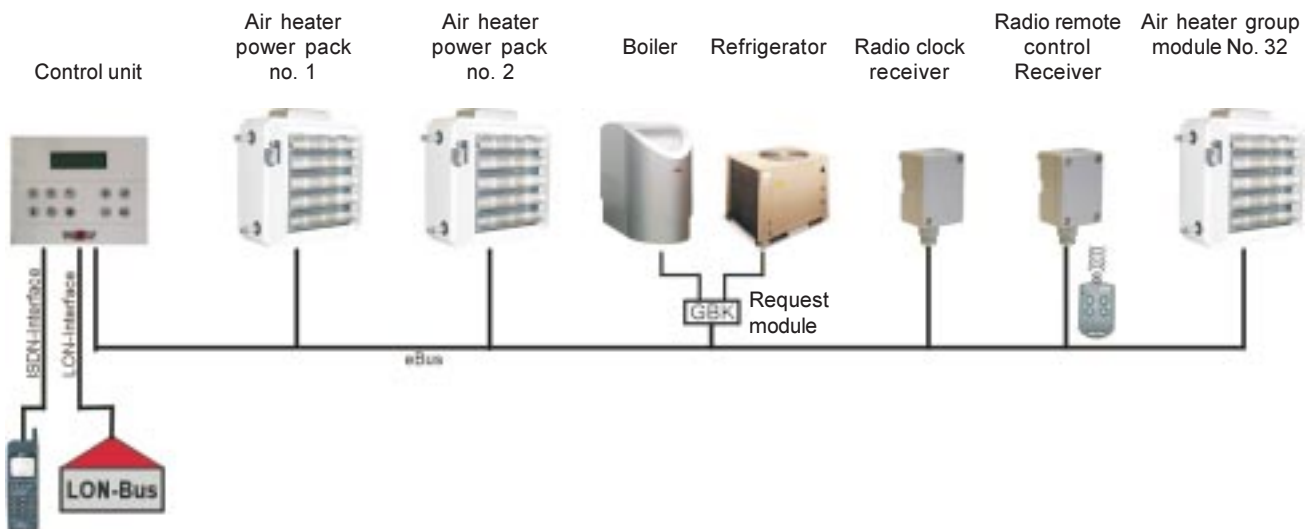
The smallest unit consists of a control unit and an air heater.

These components are interconnected with a bus in two-wire technology (eBus).

Up to 32 air heaters (with a power pack and/or group module each) can be integrated in the bus system.

Sample system structure

Single devices



The operation does not require previous knowledge or training periods; the control is ready for installation, configured in the factory, and is ready for use immediately.

No cost-intensive programming work is required.

For communication between a mobile phone network and the control unit, the control unit can be equipped with an ISDN interface. In case of system malfunctions, messages are sent as text to a cellular phone, fax or a PC, thus substantially increasing the operation reliability and availability of the devices.

Furthermore, there is a LON interface for connecting the ventilation control with the LON field bus in order to overcome the limits between the most varied works and systems in an intelligent way.

Control unit



Model

- 2-shell plastic housing in degree of protection IP30
- short-stroke keyboard with 10 convenient function keys
- illuminated 4-line LCD graphics display
- room temperature sensor integrated, in addition connector for outside temperature sensor and room temperature sensor, external device start-up and collective operating condition display possible

Standard functions

- fan motor units are continuously variable by means of power pack
- most diverse operating modes can be set:
Standby operation, preheating program, support operation heating-cooling, quick heating, night ventilation, withdrawn air management, quick ventilation, quiet operation, burner request, refrigerator request, induction shutter control, ceiling fan LD-15 activation, pumping and mixing protection function
- menu system in plain language, as well as simple menu-based user interface
- max. of 8 different temperature zones controllable independently
- for each zone, 8 switch-on and switch-off times per day can be set
- 10 periods for holidays and vacation can be set

Control unit

Standard functions

- very simple automatic start-up by reading the customised data from the power packs
- many controller presettings are already integrated in the factory

Standard control functions

- logging of the malfunction signals with date, time and number
- diagnosis and plausibility monitoring of the unit
- sensor control with automatic emergency operation of the system (selective)

Optional functions

- ISDN interface for service SMS on Cellular phone (possible to retrofit!)
- LON interface for establishing a link to the building field bus (possible to retrofit!)
- radio clock module for automatic time synchronisation (possible to retrofit!)
- radio remote control for the change of the fan speed and the execution of alternative function (possible to retrofit!)

Guide device with power pack



Temperature control via speed or mixer

- electrical connection of the air heater TLHK are wired internally
- attractive cast-die aluminium housing with integrated maintenance switch
- extremely quiet fan due to latest motor performance electronics, power pack configured for „heating or cooling“
- 2 different fan power variations selectable with power packs:
Power pack FKE 230VAC / 2.2 kW for continuous adjustment of the fan motor unit
Power pack FKD 400VAC / 2.2 kW for continuous adjustment of the fan motor unit
- Setting of the participant address via DIP switches

Standard functions

- universal regulator for heating or cooling
- pre-programmed unit, custom configured in the factory
- optimally adaptable to individual systems and possible to retrofit for enlarging systems
- control types: temperature-dependent speed or mixer control selectable
- room sensor for different temperature zones
 alternative room sensor with potentiometer
- full motor protection with thermal contact
- various monitoring functions implemented (frost protection, fire protection, overflow condensate pump, filter monitoring)
- integrated optional functions: e.g. mixed air flap control system, ceiling fan LD-15 controllable, induction shutter control, heating circuit pump controlling, mixer activation, outside air flap Open/Closed, returning valve heating medium/cooling agent
- control for condensate pump
- fan speed with heating operation 100%.
 To prevent accumulating condensate from being dragged into the supply air, the fan speed is reduced to 60% when switching from heating to cooling. If necessary, this speed can be increased at the control unit.

Parallel device with group module

Group module



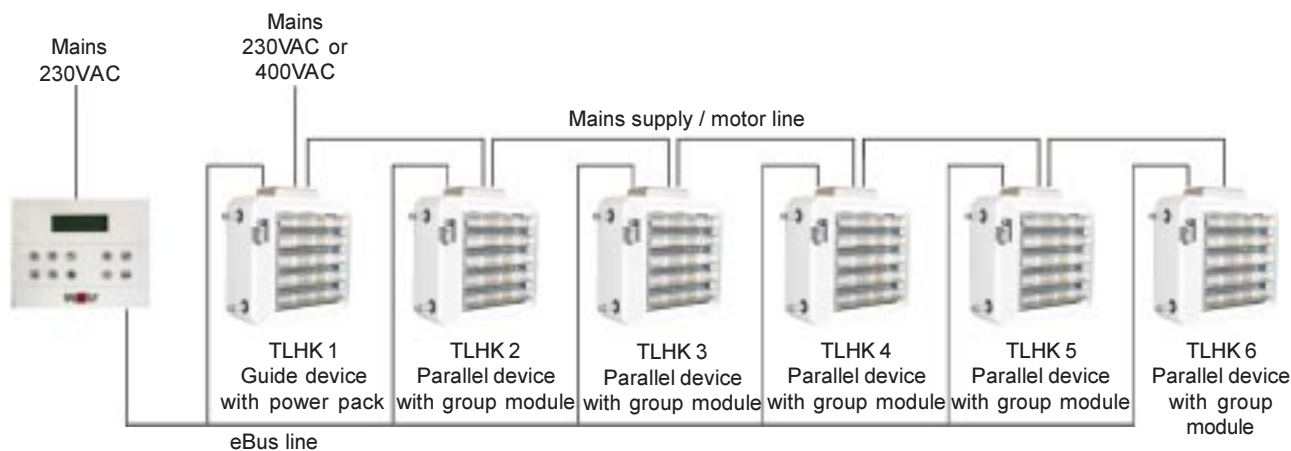
Up to 5 TLHK parallel devices with group module can be connected to a TLHK guide device with power pack and form a group of 6 TLHK elements. However, the max. nominal power of the power pack may not be exceeded. Mains supply and motor line to the individual group modules is done via the power pack.

Electrical connections of air heater TLHK are wired internally. 2 different fan power variations selectable:

- **Group module GME 230VAC**
Fan speed continuous, mixed air flap continuous, induction shutter continuous, for power pack FKE
- **Group module GMD 400VAC**
Fan speed continuous, mixed air flap continuous, induction shutter continuous, for power pack FKD

Setting of the participant address via DIP switches on the respective group module. Messages on display:
Full motor protection (thermal contact), e.g. for TLHK 5..., triggered.
Frost protection thermostat (with mixed air operation), e.g. for TLHK 2..., is triggered.

Example system structure group devices



Accessories

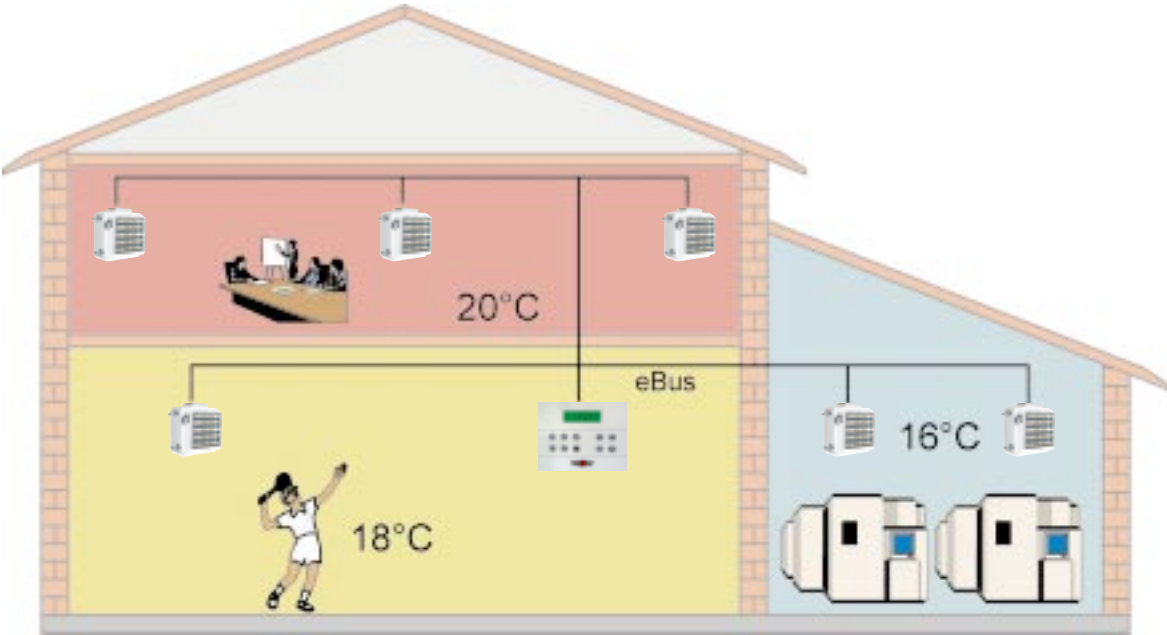
Auxiliary module GBK

required for different temperature zones (boiler request or refrigerator request with contact)

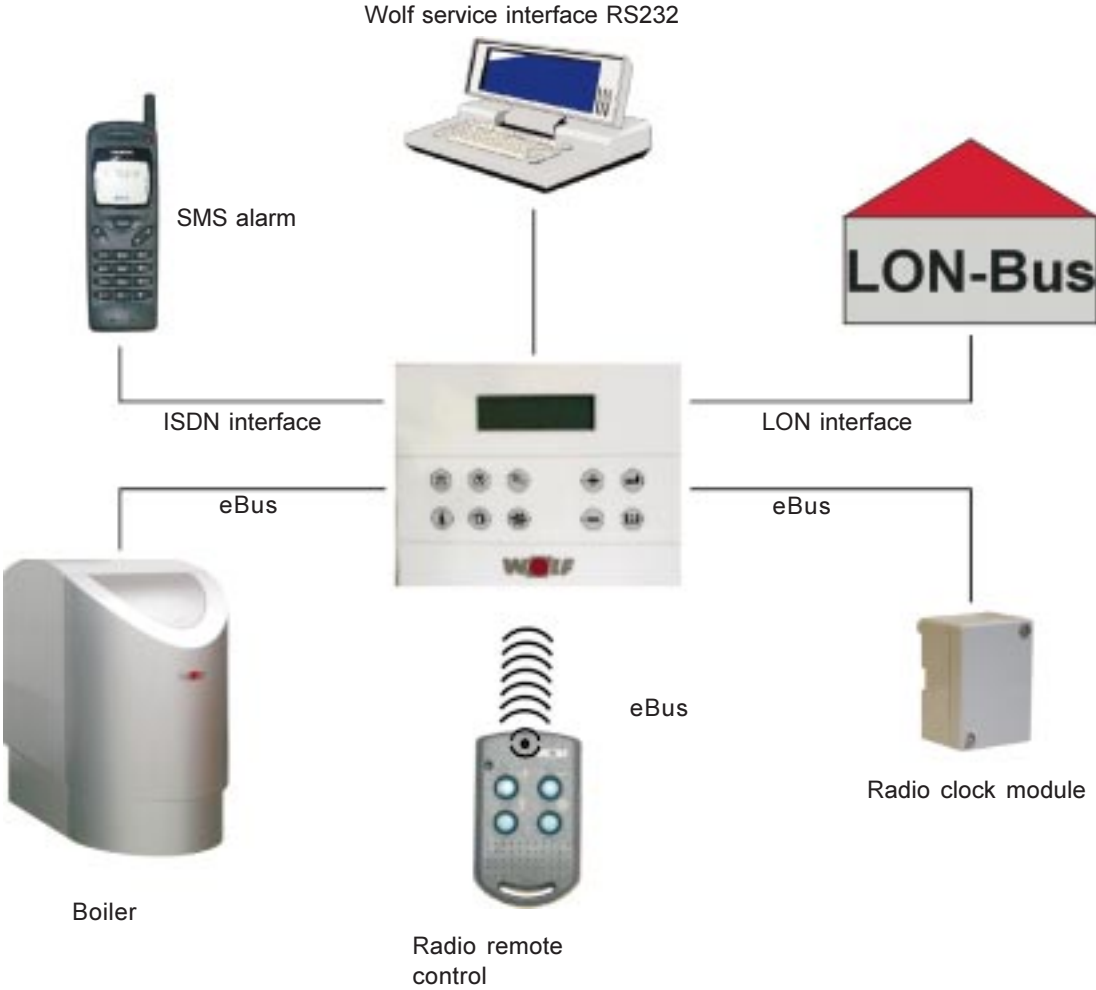
Sine filter SF1

required for a motor cable length of more than 50m between the guide device and the final parallel device in connection with a power pack FKD 400VAC/2.2kW

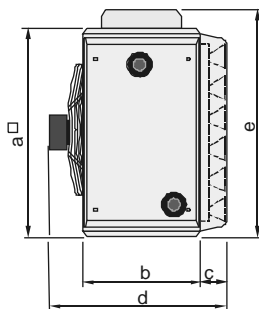
Example different temperature zones



Example possible communication interfaces



Dimensions base device



TLHK	a	b	c	max. d	e
25	540	300	120	580	600
40	670	300	120	595	730
63	840	300	120	625	900
100	1040	340	120	665	1100

Guide device with power pack	TLHK 25	TLHK 40	TLHK 63	TLHK 100
Free condensate drainage				
Single-phase motor 230V / 50Hz	65 00 811	65 00 815	65 00 819	65 00 823
Three phase motor 3 x 400V	65 00 812	65 00 816	65 00 820	65 00 824
With condensate pump				
Single-phase motor 230V / 50Hz	65 00 813	65 00 817	65 00 821	65 00 825
Three phase motor 3 x 400V	65 00 814	65 00 818	65 00 822	65 00 826
Parallel device with group module	TLHK 25	TLHK 40	TLHK 63	TLHK 100
Free condensate drainage				
Single-phase motor 230V / 50Hz	65 00 827	65 00 831	65 00 835	65 00 839
Three phase motor 3 x 400V	65 00 828	65 00 832	65 00 836	65 00 840
With condensate pump				
Single-phase motor 230V / 50Hz	65 00 829	65 00 833	65 00 837	65 00 841
Three phase motor 3 x 400V	65 00 830	65 00 834	65 00 838	65 00 842

Shut-off sets for heat exchanger

Shut-off set in passage or corner design for supply and return of the heat exchanger for TLHK 25 and TLHK 40 suitable for heating water temperatures up to 110°C and an operating pressure up to 10 bar, consisting of:



Connector 1" for connection to supply and return with EPDM gasket

automatic venting valve in supply

Fill and emptying cock in return

Ball valves with female thread 1" in supply and return

Connection type 1/2" female threads (e.g. for thermometers) in supply and return

Passage design
Art. no. 20 08 030

Corner design
Art. no. 20 08 040

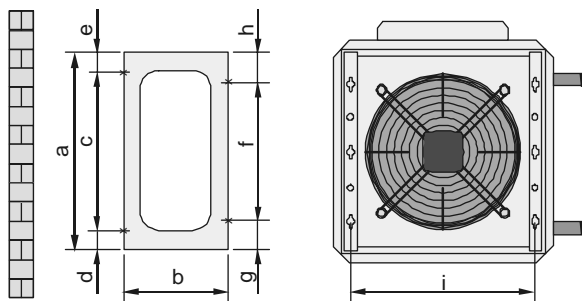
Mounting supports

For wall mounting, made of edged steel sheet 2mm, powder-coated, colour white (RAL 9016).

Mounting set complete consisting of:

2 supports

Hexagon bolts for mounting to TLHK device

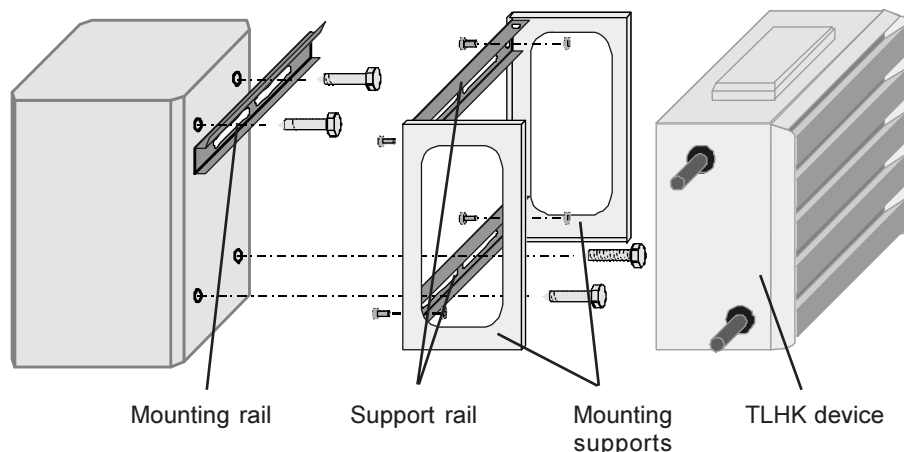


TLHK	a	b	c	d	e	f	g	h	i	Art. no.
25	480	250	380	70	30	170	155	155	434	65 00 494
40	480	250	2x170	90	50	2x170	70	70	564	65 00 494
63	784	350	170+340+170	72	32	3x170	137	137	734	65 00 497
100	784	350	170+340+170	72	32	3x170	137	137	894	65 00 497

Mounting set concrete support

For mounting to concrete support by suspending from pre-mounted mounting rails. Pegs and screws on site.

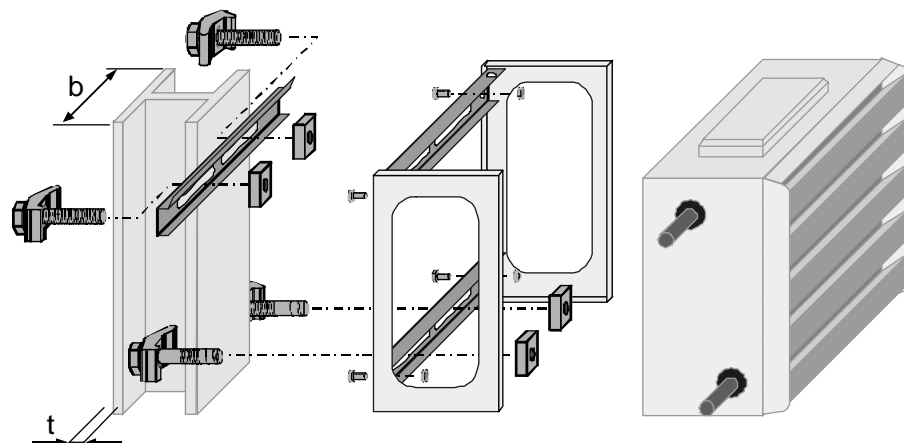
TLHK	Art. no.
25	65 00 781
40	65 00 782



Mounting set steel girder

For mounting to a steel girder by suspending from mounting rail, pre-assembled with claws. Suitable for all steel girders with flange width „b“ from 100mm to 300mm and a flange thickness „t“ from 6mm to 21mm.

TLHK	b	t	Art. no.
25	100-300	6-21	65 00 783
40	100-300	6-21	65 00 784



Note:

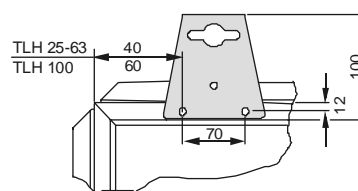
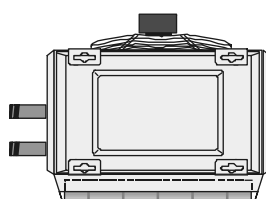
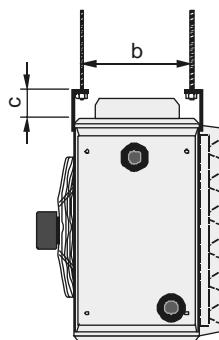
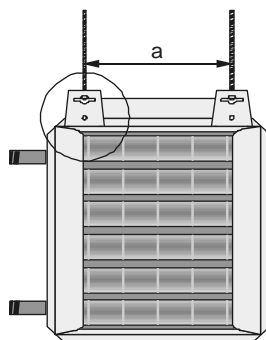
Before using the mounting sets, check and consider the static regulations of the concrete pillars and/or steel girders on site!

Hanging strap for device suspension Air circulation horizontal

For vertical ceiling mounting of the TLHK device, powder-coated, colour white (RAL 9016).

Suitable for mounting with threaded rods or perforated belt for horizontal air circulation.

TLHK	a	b	c	Art. no.
25	350	266	60	65 00 038
40	480	266	60	65 00 038
63	650	266	60	65 00 038
100	810	306	60	65 00 038

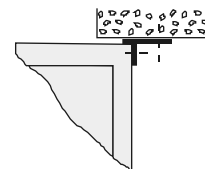
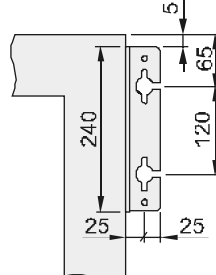
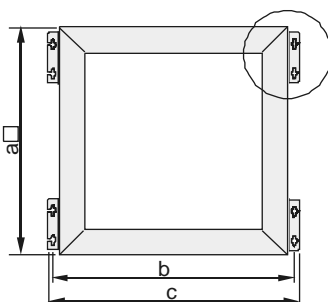


Hanging bracket for suction accessories, separately

For wall mounting of the TLHK device with mounted mixed air, circulating air or filter box, powder-coated, colour white (RAL 9016).

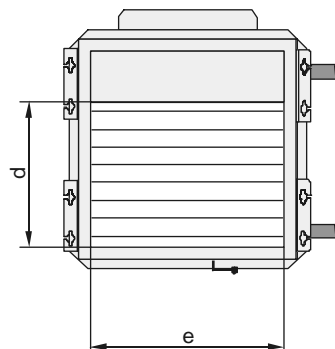
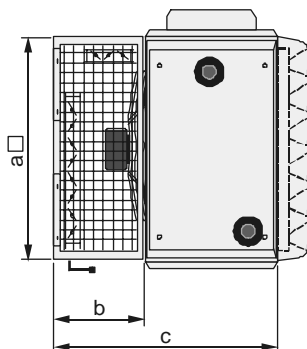
For mounting, 4 hanging brackets are necessary. They are included with the respective suction accessories. (seal between device and wall on site).

TLHK	a	b	c	Art. no.
25	500	550	600	65 00 325
40	630	680	730	65 00 325
63	800	850	900	65 00 325
100	1000	1050	1100	65 00 325



Mixed air box

Mixed air box in insulated design to avoid condensate accumulation. For individual adaptation to the outside air amount. Outside air suction on the back panel, circulating air suction on side or, when turning mixed air box around 90°, from top or bottom. Continuous adjustment between pure circulating air and mixed air operation with continuous servomotor 24V. Powder-coated, colour white (RAL 9016).

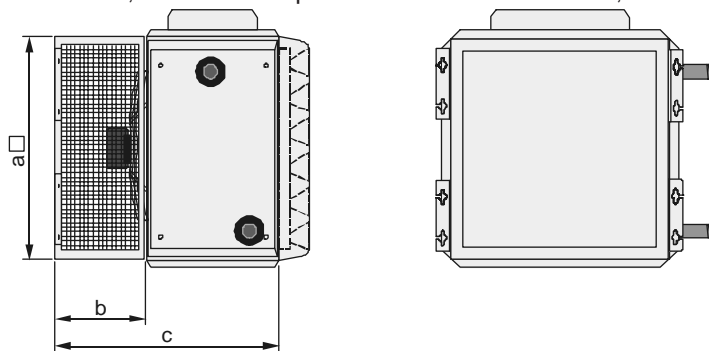


TLHK	a	b	c	d	e	Art. no.
25	500	500	800	295	400	65 00 632
40	630	500	800	360	530	65 00 633
63	800	500	800	530	700	65 00 634
100	1000	540	880	690	860	65 00 635

Circulating air box

Circulating air box for circulating air suction through two grids on side or, when turning around 90°, suction from top and bottom. Powder-coated, colour white (RAL 9016).

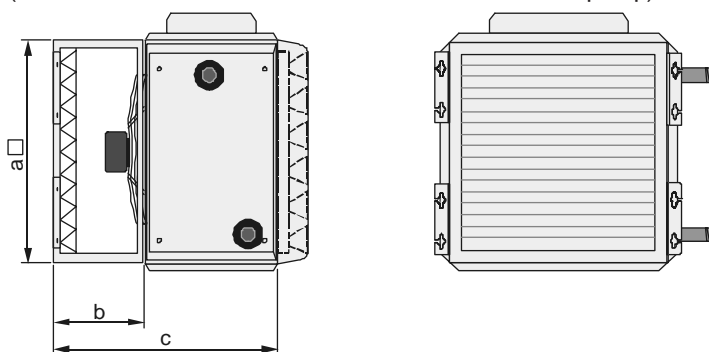
TLHK	a	b	c	Art. no.
25	500	300	600	65 00 331
40	630	300	600	65 00 389
63	800	300	600	65 00 393
100	1000	340	680	65 00 397



Filter box

With filter element for dust filtering in case of outside air or mixed air operation, filter class G4. Hanging bracket on request. Powder-coated, colour white (RAL 9016). (recommended for models with internal condensate pump)

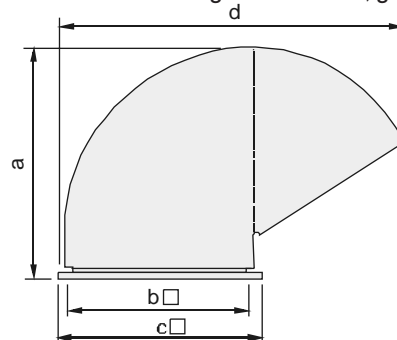
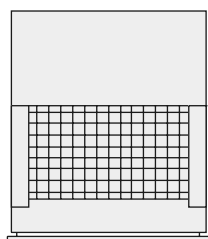
TLHK	a	b	c	Art. no.
25	500	300	600	65 00 549
40	630	300	600	65 00 554
63	800	300	600	65 00 559
100	1000	340	680	65 00 564



Rain hood with bird safety screen

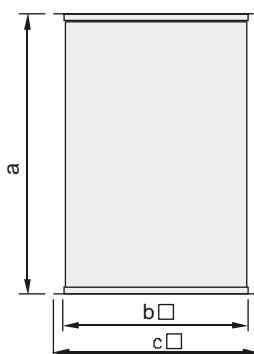
With bird safety screen (if desired, with non-return shutter) for outside air supply through top. Connection to TLHK device with roof lead-through. Steel sheet, galvanised.

TLHK	a	b	c	d	Art. no.
25	640	500	606	1011	25 51 025
40	770	630	736	1254	25 51 040
63	940	800	906	1570	25 51 063
100	1140	1000	1106	1944	25 50 100



Roof lead-through

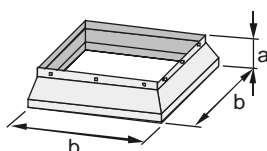
For connection of the TLHK device with the rain hood through top. Top waterproofing on site. Steel sheet, galvanised.



TLHK	a	b	c	Art. no.
25	1100	500	600	25 50 025
40	1100	630	730	25 50 040
63	1100	800	900	25 50 063
100	1100	1000	1100	25 50 100

Covering collar

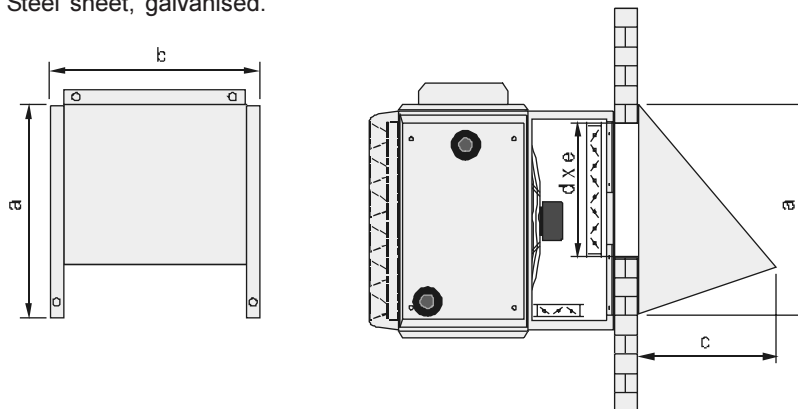
For roof lead-through. Steel sheet, galvanised.



TLHK	a	b	Art. no.
25	170	580	65 13 481
40	170	710	65 13 482
63	170	880	65 13 483
100	170	1080	65 13 484

Suction hood with bird safety screen

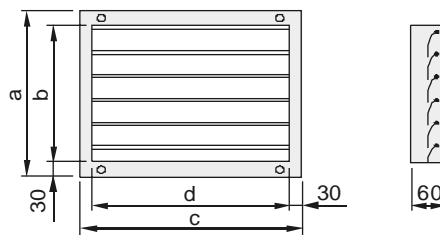
With bird safety screen for outside air suction through wall (if desired, with non-return shutter).
Steel sheet, galvanised.



TLHK	a	b	c	d	e	Art. no.
25	470	480	330	320	420	60 12 951
40	600	610	420	380	550	60 12 952
63	770	780	545	550	720	60 12 953
100	960	960	980	710	880	60 12 954

Non-return shutter for rain / suction hood

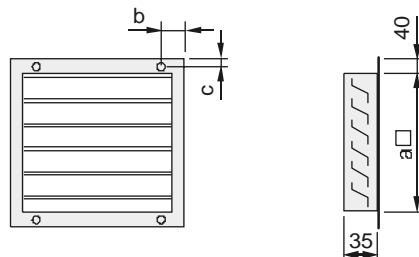
For installation in rain hood or in wall cut-out for suction hood.
Steel sheet, galvanised.



TLHK	a	b	c	d	Art. no.
25	360	300	460	400	25 32 025
40	420	360	590	530	25 32 040
63	590	530	760	700	25 32 063
100	750	690	920	860	25 32 100

Weather guard grid

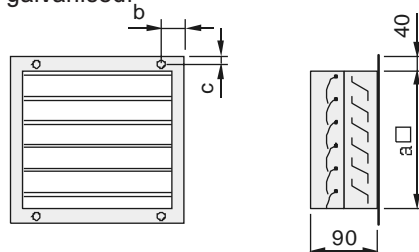
Weather guard grid with bird safety screen. Steel sheet, galvanised.



TLHK	a	b	c	Art. no.
25	410	75	20	25 65 400
40	540	55	20	25 65 401
63	710	55	20	25 65 402
100	870	50	20	25 65 403

Weather guard grid with non-return shutter

Weather guard grid with bird safety screen and non-return shutter. Steel sheet, galvanised.



TLHK	a	b	c	Art. no.
25	410	75	20	25 65 025
40	540	55	20	25 65 040
63	710	55	20	25 65 063
100	870	50	20	25 65 100

Frost protection thermostat



Frost protection thermostat mounted and wired in DigiPro control

Switching capacity 10 A at 230 V / 50 Hertz.

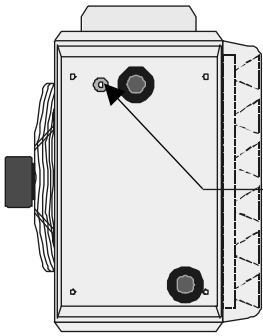
Setting range 4.5 °C to 22 °C.

Switching difference 2.5 K.

TLHK	Art. no.
25 - 63	65 00 636
100	65 00 637

TLHK with condensate pump

For direct introduction of the condensate into an open drain (siphon)



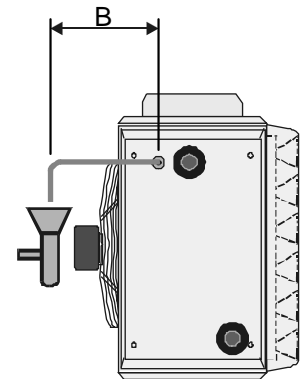
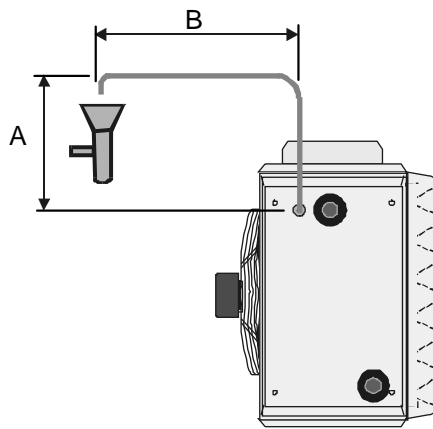
Standard equipment:

- Condensate pump
- Float switch
- Control unit with alarm generator
- Condensate hose to outlet chute
- Outlet chute for hose inside diameters of 4 - 6mm mounted
- Condensate hose, inside diameter of 4mm, mounted, length 400 mm

Technical data of the condensate pump

TLHK 25-63

TLHK 100



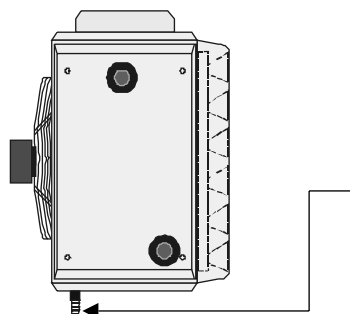
Warning: Always mount siphon higher than bottom edge of device.

		TLHK 25	TLHK 40	TLHK 63	TLHK 100
Max. elevation outlet chute - siphon	Dim. „A“ in [m]	2.0	2.0	1.0	0.0
Max. horiz. distance between outlet - siphon with elevation „A“	Dim. „B“ in [m]	5.0	4.0	2.0	0.3
Max. delivery rate of the pump at max. elevation „A“*)	l/h	7.2	7.6	10.2	12.7
Operating voltage	V/Hz	230 / 50			
Power consumption	[W]	20			

*) and max. horizontal distance „B“ for clean float filter and condensate hose inside diameter of 4mm.

TLHK with free drain

recommended under operating conditions with increased air pollution or increased air humidity

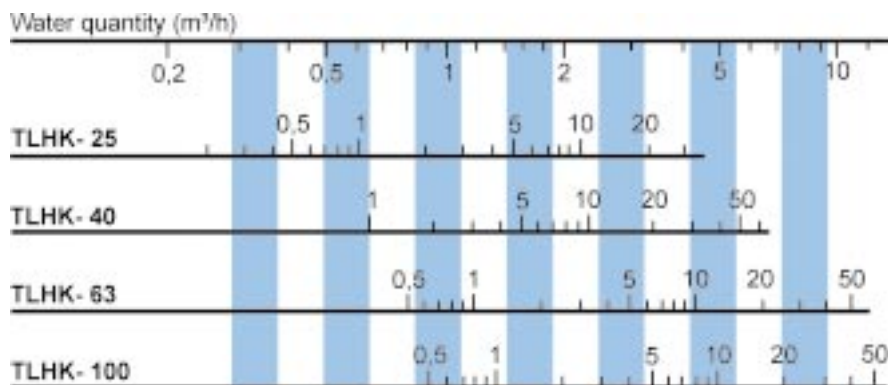


Standard equipment:

- Condensate hose to outlet chute
- Outlet chute ½“ mounted, for connection to drain hose ½“.

TopWing Water resistance / sound pressure level TLHK

Water resistance [kPa]:



Water quantity w [m³/h]:

$$w = \frac{0,86 \cdot \dot{Q}}{\Delta t_w}$$

w = Water quantity [m³/h] (without antifreeze)

\dot{Q} = heating power/cooling capacity [kW]

Δt_w = temperature difference supply / return [kW]

Frost protection through addition of antifreeze:

If low temperatures are expected (outside air operation) or the refrigeration device is installed in a cold environment, a sufficient amount of antifreeze must be added to the circulating water quantity.

By adding antifreeze, the specific heat capacity of the water is reduced (e.g. specific heat capacity of ethylene glycol (trade name Antifogen N) = 2.357 kJ/kgK). The circulating quantity of water must therefore be increased for the same power. In addition, the water resistance increases.

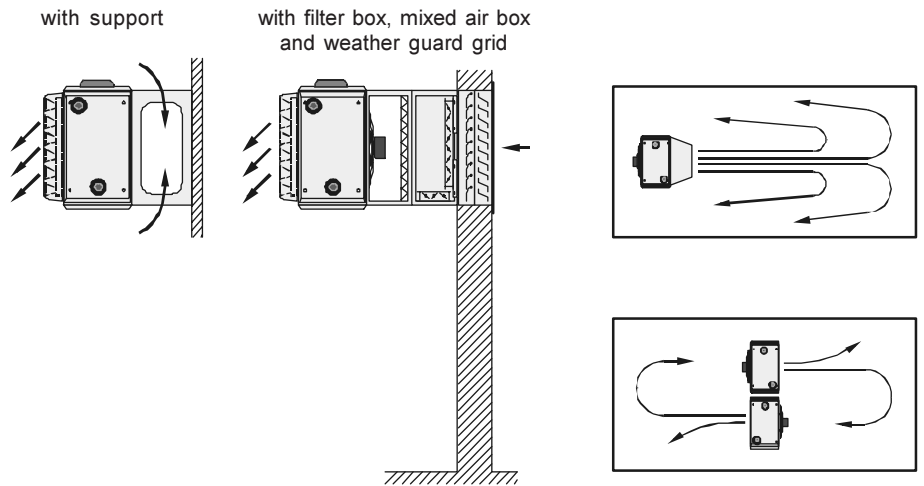
Freezing point (°C)	-40	-30	-20	-10	±0
Antifreeze (Vol%)	50	40	30	20	10 0
Water resistance increase		45%	30%	15%	0%

Sound pressure level / sound power level as a function of the speed

TLHK25			TLHK40			TLHK63			TLHK100		
Speed min ⁻¹	Sound power level dBA	Sound pressure level* dBA 2m	Speed min ⁻¹	Sound power level dBA	Sound pressure level* dBA 2m	Speed min ⁻¹	Sound power level dBA	Sound pressure level* dBA 2m	Speed min ⁻¹	Sound power level dBA	Sound pressure level* dBA 2m
3 x 400 V Heating			3 x 400 V Heating			3 x 400 V Heating			3 x 400 V Heating		
1350	70	59	1350	74	63	900	70	59	900	74	63
1000	64	53	1000	68	57	700	65	54	700	69	58
750	57	46	750	61	50	500	57	46	500	61	50
1 x 230 V Heating			1 x 230 V Heating			1 x 230 V Heating			1 x 230 V Heating		
1350	70	59	1350	72	61	900	70	59	900	76	65
1000	64	53	1000	66	55	700	65	54	700	71	60
750	57	46	750	59	48	500	57	46	500	63	52
3 x 400 V Cooling			3 x 400 V Cooling			3 x 400 V Cooling			3 x 400 V Cooling		
810	59	48	810	63	52	540	59	48	540	63	52
570	51	40	570	55	44	380	51	40	380	55	44
410	44	33	410	48	37	270	44	33	270	48	37
1 x 230 V Cooling			1 x 230 V Cooling			1 x 230 V Cooling			1 x 230 V Cooling		
810	60	49	810	61	50	540	59	48	540	65	54
570	52	41	570	53	42	380	51	40	380	57	46
410	45	34	410	46	35	270	44	33	270	50	39

* Sound pressure level calculated for a room of medium absorption, room size approx. 1500 m³.

General guidelines TLHK for wall mounting



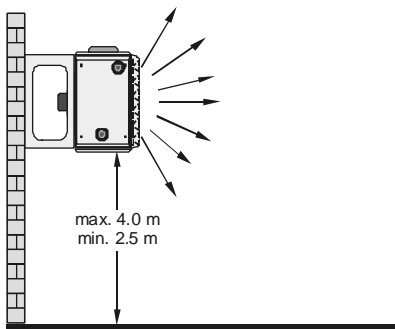
The Wolf air heaters should be arranged in such a way that air is not blown directly on people or machines.

For a uniform temperature distribution in the room, it is recommended to install several smaller devices rather than one larger device. If possible, the arrangement should be in such a way that the devices blow not against each other, but support each other in the air circulation. Freely circulating air suction must always be ensured.

The jet range of the Wolf air heaters should depend on the room dimensions. The values in the performance tables are approximate values.

When the fan stops, all control and/or shut-off valves must close automatically.

General notes on planning



Required air volume flow (m³/h) at least 2.5 times, better 3-4 times, the room volume.

Do not blow directly on people.

Distance to the floor at least 2.5m, max. 4m.

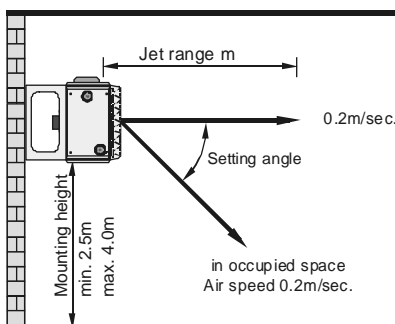
Consider jet range.

When assembling, the mounting heights should be kept in accordance with illustration shown on side.

Mounting distances

TLHK	25	40	63	100
TLHK to TLHK	7-9 m	9-11 m	11-13 m	13-15 m
TLHK to side wall	3-4 m	3-5 m	4-6 m	5-7 m

Jet range



TLHK	25	40	63	100
max. jet range [m]*	15	21	23	32

* Values are jet ranges for defined operating conditions at a mixing temperature of 10K above the room temperature.

In case of mixing temperatures with more than 10K above room temperature, the jet ranges are reduced!

Symbol

Conversion:

1 Pa = 0.1 mm WC
1 kPa = 1000 Pa

\dot{V}	= volume flow	m ³ /h
\dot{V}_B	= reference volume flow	m ³ /h
\dot{V}_O	= catalogue volume flow	m ³ /h
\dot{V}_{eff}	= effective volume flow	m ³ /h
t_{LE}	= air entry temperature	°C
t_{LA}	= air outlet temperature	°C
t_{LAeff}	= effective air outlet temperature	°C
Δt_L	= air temperature rise	K
Δt_W	= temp. spreading of the water	K
W	= water throughput	m ³ /h
\dot{Q}	= thermal output	kW
\dot{Q}_O	= catalogue thermal output	kW
\dot{Q}_{eff}	= effective thermal output	kW
Δp	= air resistance	Pa
Δp_W	= Water resistance	kPa
e	= heating factor	
q_{eff}	= heating power factor	
l_{eff}	= air volume factor	
K	= accessories index of the complete device	

Example

Given:

TLHK 40, $t_{LE} = 0^\circ\text{C}$, PWW 70/50,
speed 1100 min⁻¹
Standard equipment (induction shutter with
secondary air cone)

Accessories: Mixed air box and filter

To be calculated:

Effective air volume	\dot{V}_{eff}
Effective air temperature rise	Δt_{Leff}
Effective air outlet temp.	t_{LAeff}
Effective heating power	\dot{Q}_{eff}
Water throughput	W
Water resistance	Δp_W

Solution:

1. Read catalogue data from performance table TLHK 40 (always read for upper speed, as correction factors for the operation at lower speeds are taken into consideration in the characteristic curve)

$$\dot{V}_O = 2800 \text{ m}^3/\text{h}$$

$$\dot{Q}_O = 37.5 \text{ kW}$$

$$t_{LA} = 38^\circ\text{C}$$

$$\Delta t_{LO} = (38 + 0) \text{ K} = 38 \text{ K}$$

2. Determining accessories index

$$K = 3 \text{ (mixed air box)}$$

$$K = 5 \text{ (filter)}$$

$$K = 2 \text{ (Induct. shutter with second. air cone)}$$

$$K_{tot} = 3 + 5 + 2 = 10$$

3. Reading characteristic diagram (TLHK 40, 1100 min⁻¹, K=10)

$$\text{Air volume factor } l_{eff} = 0.62$$

$$\text{Heating factor } e = 1.18$$

$$\text{Heating power factor } q_{eff} = 0.73$$

4. Calculating effective air volume

$$\dot{V}_{eff} = \dot{V}_O \cdot l_{eff} = 2800 \text{ m}^3/\text{h} \cdot 0.62 = 1736 \text{ m}^3/\text{h}$$

5. Calculating effective air temperature rise

$$\Delta t_{Leff} = \Delta t_{LO} \cdot e = 38 \text{ K} \cdot 1.18 = 44.8 \text{ K}$$

6. Calculating effective air outlet temperature

$$t_{LAeff} = t_{LE} + \Delta t_{Leff} = 0^\circ\text{C} + 44.8 \text{ K} = 44.8^\circ\text{C}$$

7. Calculating effective heating power

$$\dot{Q}_{eff} = \dot{Q}_O \cdot q_{eff} = 37.5 \text{ kW} \cdot 0.73 = 27.38 \text{ kW}$$

8. Calculating water throughput

$$W = \frac{0.86 \cdot \dot{Q}_{eff}}{\Delta t_W} = \frac{0.86 \cdot 27.38}{20} = 1.177 \text{ m}^3/\text{h}$$

9. Determining water resistance (read water resistance from diagram, TLHK 40, 1.177 m³/h)

$$\Delta p_W = 3 \text{ kPa}$$

Accessories index K:

($K = 1 \hat{=} 10 \text{ Pa at } \dot{V}_B$)

Induction shutter with secondary air cone*	2
Mixed air box	3
Filter clean	5
Rain hood	2
Weather guard grid	7
Weather guard grid with non-return shutter	9
Non-return shutter	3
Circulating air box	0
Suction hood	1

For on-site accessories, K must be calculated:

$$K = 0,1 \cdot \Delta p \cdot \left(\frac{\dot{V}_B}{\dot{V}} \right)^2$$

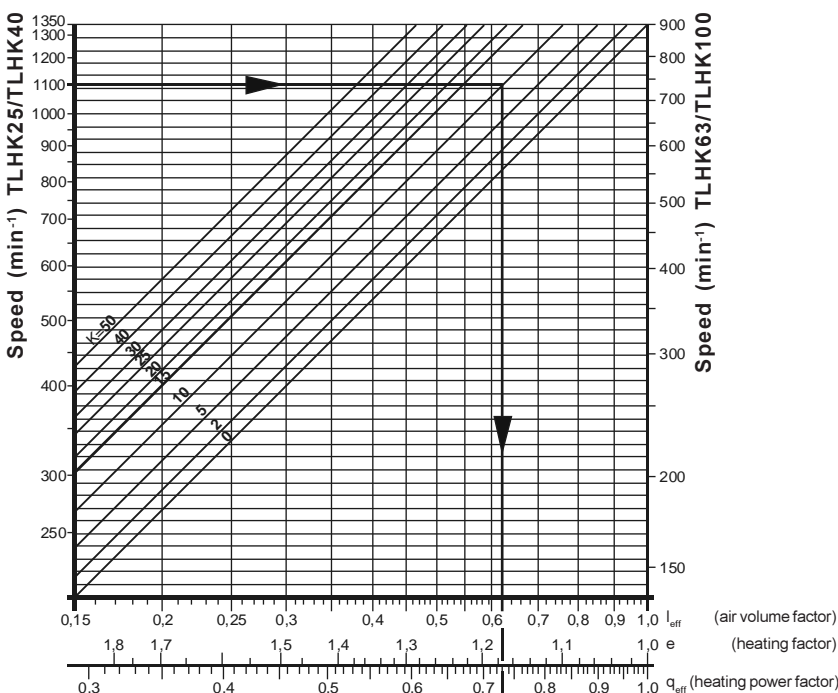
Δp = air resistance (Pa) at \dot{V} (m³/h)

\dot{V} = volume flow (m³/h) at Δp (Pa)

TLHK	\dot{V}_B
25	2000 m ³ /h
40	3000 m ³ /h
63	6000 m ³ /h
100	10000 m ³ /h

* Must always be taken into account since it is contained in the standard equipment.

Characteristic curve



Item	Quantity	Art. no.	Individual price	Total price
Suction accessories				
Mixed air box insulated; with built-in flaps for outside air on the back panel and for circulating air on the side; continuous adjustment with flap adjustment motor 24V; powder-coated, colour white RAL 9016				
Circulating air box with two grids for circulating air suction on the side; powder-coated, colour white RAL 9016				
Filter box with built-in exchangeable filter set, filter class G4; powder-coated, colour white RAL 9016				
Rain hood with bird safety screen, steel sheet galvanised.				
Roof lead-through , steel sheet galvanised.				
Covering collar for roof lead-through , steel sheet galvanised.				
Suction hood with bird safety screen, steel sheet galvanised.				
Non-return shutter for rain/suction hood, steel sheet galvanised.				
Weather guard grid with bird safety screen without non-return shutter, steel sheet galvanised.				
Weather guard grid with bird safety screen and non-return shutter, steel sheet galvanised.				
Flexible canvas connector made of 4-hole profile frame , steel sheet galvanised.				
Miscellaneous				
Shut-off set for supply and return; passage design.				
Shut-off set for supply and return; corner design.				
Mounting supports for wall mounting of the TLHK device, powder-coated, colour white RAL 9016.				
Mounting set for mounting of the TLHK device on a concrete support, steel sheet galvanised.				
Mounting set for mounting of the TLHK device on a steel girder; Steel sheet, galvanised.				
Hanging bracket for wall mounting of suction accessories, powder-coated, colour white RAL 9016.				
Hanging brackets for vertical ceiling mounting (air circulation horizontal with respect to TLHK device, powder-coated, colour white RAL 9016.				

Item	Quantity		Art. no.	Individual price	Total price
		<p>Base components:</p> <p>Control unit GC for microprocessor control of air heaters in connection with the power packs and group modules, with simple 10-keys operation; 4-line display.</p> <p>Guide device with power pack FKE 230VAC / 2.2kW for circulating air or mixed air operation, continuous induction shutter, continuous fan speed.</p> <p>Guide device with power pack FKD 400VAC / 2.2kW for circulating air or mixed air operation, continuous induction shutter, continuous fan speed.</p> <p>Parallel device with group module GME, 230VAC for circulating air or mixed air operation, continuous induction shutter, continuous fan speed.</p> <p>Parallel device with group module GMD, 400VAC for circulating air or mixed air operation, continuous induction shutter, continuous fan speed.</p> <p>Accessories</p> <p>Auxiliary module GBK 230VAC required for different temperature zones (boiler request or refrigerator request with contact).</p> <p>Sine filter SF1 required for a motor cable length of more than 50m between the guide device and the final parallel device in connection with a power pack FKD 400VAC/2.2kW.</p> <p>ISDN interface for communication between control unit and a mobile? network; sending system malfunction messages to cellular phone or fax in text form.</p> <p>LON interface for communication between the control unit via the building field bus LON; reading and writing of defined parameters to LON participants.</p> <p>Radio remote control FS (transmitter) for the simple adjustment of fan speed and alternatively the induction shutter for air heater(s); air heaters can be selected individually for this function.</p> <p>Radio remote control FE (receiver) necessary for at least one transmitter.</p> <p>Radio clock module for the synchronisation of the internal controller clock with the DC77 transmitter.</p> <p>Radio clock module for the synchronisation of the internal controller clock with the DC77 transmitter and measuring of the outside temperature.</p> <p>Outside temperature sensor QAC 22; precision Ni1000; degree of protection IP43; for wall mounting; dimensions w x h x d: 80x92x50.</p> <p>Room sensor and/or ceiling sensor QAA24; precision Ni1000; degree of protection IP30; for wall mounting; dimensions w x h x d: 90x100x32.</p> <p>Room sensor with potentiometer QAA26; precision Ni1000; degree of protection IP30; for wall mounting; dimensions w x h x d: 90x100x32.</p> <p>Frost protection thermostat TLHK 25 - 63 Frost protection thermostat pre-wired in the control (with mixed air operation). Length of the capillary sensor 1.5m.</p> <p>Frost protection thermostat TLHK 100 Frost protection thermostat pre-wired in the control (with mixed air operation). Length of the capillary sensor 3m.</p>			



Technik, die dem Menschen dient.

TopWing

Weights

TLHK

Weights in kg	TLHK 25	TLHK 40	TLHK 63	TLHK 100
Air heater base device	39	51	71	108
Mixed air box	30	37	48	75
Circulating air box	16	28	31	50
Filter box	13	16	20	37
Rain hood	13	19	30	43
Roof lead-through	22	27	37	48
Suction hood	2	5	6	20
Non-return shutter	2	2	4	5
Weather guard grid	6	9	14	20
Weather guard grid with non-return shutter	8	11	18	25