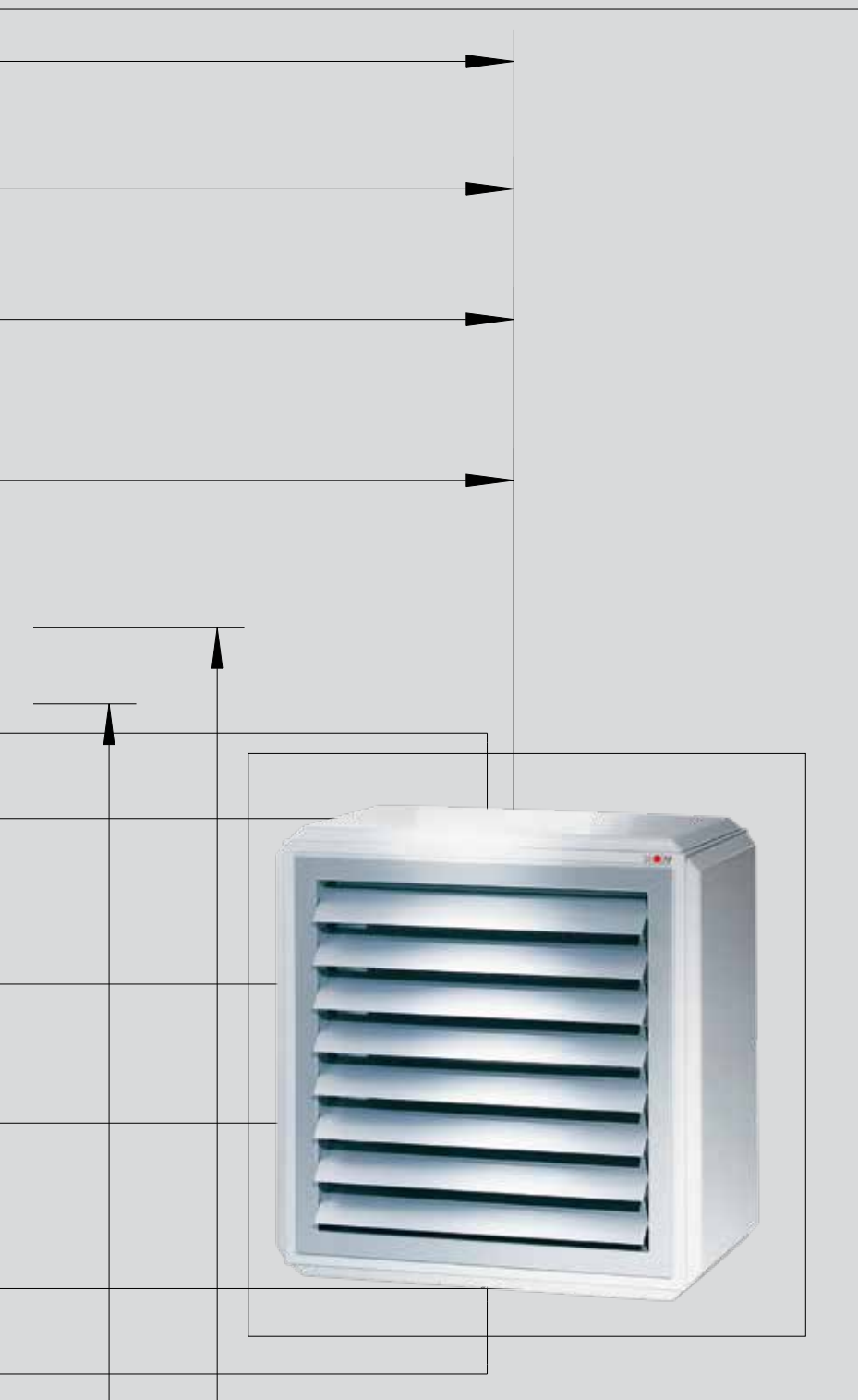
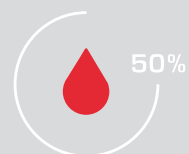
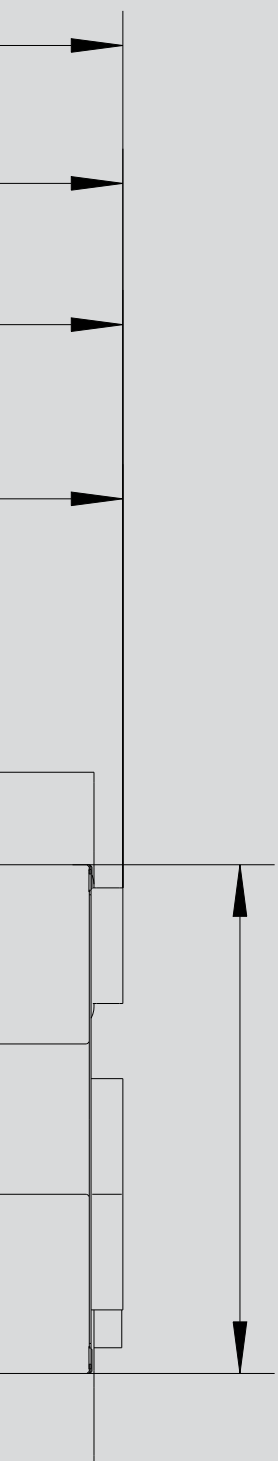


# WOLF TOPWING AIR HEATER

TLH-EC / TLHK-EC / TLH / TLHK



**WOLF**



## THE EXTENSIVE EQUIPMENT RANGE

from system supplier WOLF offers the ideal solution for commercial and industrial buildings, new build and modernisation projects alike. The range of WOLF control units can meet any requirement for heating convenience. All equipment is easy to operate, highly energy efficient and reliable. Solar thermal systems can be swiftly integrated into existing systems.

WOLF equipment is easy and quick to install and maintain.

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# TOPWING AIR HEATER TLH / TLH-EC / TLHK / TLHK-EC

As standard, the air heater casing is supplied in traffic white, RAL 9016. The discharge louvre (for TLH-EC / TLH) is finished in "Wolf silver", similar to RAL 9006. Further **RAL and special colours on request**

The **variable speed control** for the TLH-EC / TLHK-EC is achieved by means of a 0-10 V [DC] signal

Large selection of accessories

**TLH / TLH-EC**



**4 unit sizes** for the TLH / TLH-EC with air flow rates up to 9400 m<sup>3</sup>/h, heating output up to 164 kW

TLH / TLH-EC as a particularly energy saving version with exceptionally quiet external rotor motor/fan units.

**TLHK / TLHK-EC**



**BENEFITS OF WOLF AIR HEATERS**  
TLH / TLH-EC  
TLHK / TLHK-EC

**4 unit sizes** for the TLHK / TLHK-EC with air flow rates of up to 8200 m<sup>3</sup>/h in heating mode and a heating output up to 164 kW, or air flow rates up to 4300 m<sup>3</sup>/h in cooling mode and a cooling capacity up to 37.5 kW

Casing made from sheet steel, powder-coated, traffic white RAL 9016, with improved thermal insulation through bonded, flexible PUR foam, 25 mm thick

Large copper/aluminium heat exchanger for **heating and cooling**

### Motor/fan unit:



An extremely quiet impeller with a single phase motor 230 V or 3 x 400 V is used as a motor/fan unit for the TLH / TLHK.

- Anti-vibration mount for the motor/fan/grille unit at the rear
- Three-phase motor: 3 x 400 V, 50 Hz
  - Star configuration: lower speed
  - Delta configuration: higher speed
- Single phase AC motor 230 V, 50 Hz only higher speed; lower speeds with step switch
- Protection rating IP 54; thermal category CLF
- Grooved ball bearing with special greasing down to -40 °C
- Winding protection through integral thermistors; only effective in conjunction with a step switch and control module.

## TOPWING AIR HEATER TLH-EC / TLHK-EC

### Variable speed EC fan unit (1 x 230 V, 50 Hz)

The fan units with EC motors used in the TLH-EC / TLHK-EC are particularly energy efficient and quiet at higher air flow rates compared with the standard version. Variable speed control occurs via a 0-10 V (DC) signal and is perfectly straightforward with the LM2 ventilation module or alternatively a variable speed controller. This means the speed can always be matched precisely to requirements, with high motor efficiency right across the control range thanks to EC technology.

Protection rating IP 54, insulation class B, winding protection through integral temperature monitoring. Performance table, page 09 -13.

## TOPWING AIR HEATER TLH-EC / TLH



The air heaters in the TLH-EC / TLH series were developed specifically for comfort. Subject to the version, the air heaters are suitable for: heating, ventilating or filtering. With the appropriate equipment, each unit can be used in recirculating air, mixed air or outdoor air mode and can be wall or ceiling mounted. 4 unit sizes for air flow rates up to 9400 m<sup>3</sup>/h, heating output up to 164 kW.

### CASING:

- Made from welded, zinc-plated and powder-coated angle section frames
- Casing panels made from sheet steel, powder-coated, traffic white RAL 9016, with improved thermal insulation through bonded, flexible PUR foam, 25 mm thick
- Rear panel with deep-drawn inlet nozzle, powder-coated, traffic white RAL 9016
- Discharge louvre with individually adjustable air guide fins, powder-coated, "Wolf silver", similar to RAL 9006

### HEAT EXCHANGER - CU/AL:



Large coils are used as heating elements. This has the benefit that discharge temperatures of approx. 36 °C can still be reached even with low temperature heating systems or condensing systems with flow/return spreads of 50/40 °C and a maximum flow rate in recirculating air mode.

- 4 types of heat exchanger for each air heater model for pumped warm water (PWW)
- Heat exchanger made from copper/aluminium, header made from steel (alternatively copper), can be extracted from the side
- Connections with imperial thread for PWW
- Threaded connector for PN 16 to 140 °C
- Water flow on air discharge side top/bottom
- Water return on air intake side top/bottom
- Connection side in direction of airflow right/left
- For dimensions, see performance tables

### COLOUR CHOICE:



As standard, the TLH-EC / TLH air heater casing is supplied in traffic white, RAL 9016. The discharge louvre is finished in "Wolf silver", similar to RAL 9006. Further RAL and special colours on request.



The air heaters in the TLHK-EC / TLHK series were developed specifically for comfort. They are suitable for heating or cooling.

With the appropriate equipment, each unit can be used in recirculating or mixed air mode and can be wall mounted.

Air filtration is also possible with the appropriate accessories.

4 unit sizes enable air flow rates up to 8200 m<sup>3</sup>/h in heating mode and a heating output up to 164 kW, or air flow rates up to 4300 m<sup>3</sup>/h in cooling mode and a cooling capacity up to 37.5 kW.

### CASING:

- Made from welded, zinc-plated and powder-coated angle section frames
- Casing panels made from sheet steel, powder-coated, traffic white RAL 9016, with improved thermal insulation through bonded, flexible PUR foam, 25 mm thick
- Rear panel with deep-drawn inlet nozzle, powder-coated, traffic white RAL 9016
- Integral aluminium condensate pan with a fall for complete draining
- Unit with ½" drain connector for free draining
- Induction louvre with secondary air cone
- Supply air sensor fitted and wired

### HEAT EXCHANGER - CU/AL:



Large two-line heat exchangers (type 4) are used for heating or cooling. This has the benefit that in cooling mode, sufficient cooling capacity is available, and in heating mode with low temperature heating systems or condensing systems with flow/return spreads of 50/40 °C and a maximum flow rate in recirculating air mode, discharge temperatures of approx. 36 °C are reached.

- Heat exchanger made from copper/aluminium, header made from steel (alternatively copper), can be extracted from the side, male threaded connectors PN 16 up to 140 °C
- Connection side in direction of airflow right/left

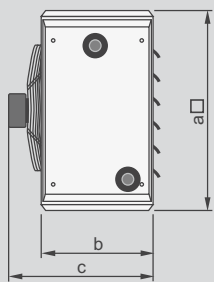
### COLOUR CHOICE:

As standard, the TLHK-EC / TLHK air heater casing is supplied in traffic white, RAL 9016. Further RAL and special colours on request.



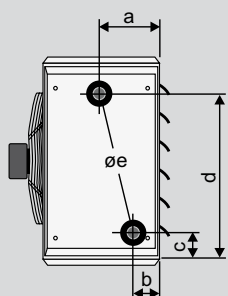
# TOPWING TLH-EC / TLH / TLHK-EC / TLHK

## DIMENSIONS



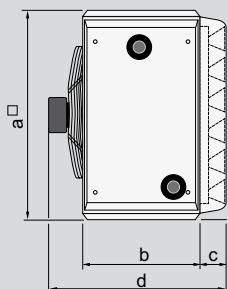
### DIMENSIONS TLH-EC / TLH STANDARD UNIT

Size		25	40	63	100
<b>a</b>	mm	540	670	840	1040
<b>b</b>	mm	300	300	300	340
<b>c</b>	mm	410	415	420	485



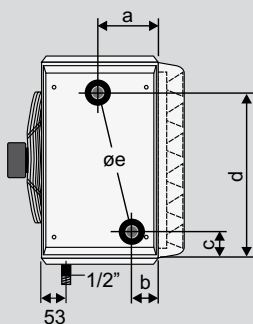
### CONNECTIONS TLH-EC / TLH

Size		25	25	40	40	63	63	100	100
		-1	-2/-3/-4	-1	-2/-3/-4	-1	-2/-3/-4	-1	-2/-3/-4
<b>a</b>	mm	98	158	98	143	103	143	124	179
<b>b</b>	mm	68	68	68	83	63	83	84	89
<b>c</b>	mm	92	95	96	100	95	98	115	109
<b>d</b>	mm	445	445	574	570	746	742	926	932
<b>Øe</b>	mm	¾"	1"	¾"	1"	1"	1¼"	1"	1½"



### STANDARD UNIT DIMENSIONS TLHK-EC / TLHK

Size		25	40	63	100
<b>a</b>	mm	540	670	840	1040
<b>b</b>	mm	300	300	300	340
<b>c</b>	mm	120	120	120	120
<b>d</b>	mm	530	535	540	605



### CONNECTIONS TLHK-EC / TLHK

Size		25	40	63	100
<b>a</b>	mm	158	143	143	179
<b>b</b>	mm	68	83	83	89
<b>c</b>	mm	94	99	99	109
<b>d</b>	mm	445	570	743	932
<b>Øe</b>	mm	1"	1"	1¼"	1½"

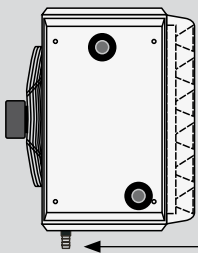


**TOPWING TLHK-EC / TLHK**  
PERFORMANCE TABLE, COOLING  
CONDENSATE DRAIN

For cold water

Type	25						40						63						100					
	TLHK-EC		TLHK		TLHK		TLHK-EC		TLHK		TLHK		TLHK-EC		TLHK		TLHK-EC		TLHK-EC		TLHK			
Motor rating	1 x 230 V EC		3 x 400 V		1 x 230 V		1 x 230 V EC		3 x 400 V		1 x 230 V		1 x 230 V EC		3 x 400 V		1 x 230 V		1 x 230 V EC		3 x 400 V			
Speed [rpm]	800		800		750		800		800		650		530		550		500		500		500			
Flow rate $\dot{V}_0$ [m³/h]	940		940		940		1660		1660		1240		2700		2700		2440		4300		4300			
°C %r.h.	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$	$\dot{Q}_0$	$t_{LA}$		
	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C		
<b>PCW 5/10</b>	32 40	7.2	15	7.2	15	7.2	15	12.9	15	12.9	15	10.4	14	22.5	14	22.5	14	20.9	14	37.5	14	37.5	14	
	28 47	5.9	14	5.9	14	5.9	14	10.6	15	10.6	15	8.6	13	18.6	14	18.6	14	17.3	13	31.2	13	31.2	13	
	26 49	5.1	14	5.1	14	5.1	14	9.2	14	9.2	14	7.5	13	16.3	13	16.3	13	15.1	13	27.4	12	27.4	12	
	25 50	4.7	13	4.7	13	4.7	13	11.4	16	11.4	16	9.2	15	20.1	15	20.1	15	18.7	15	33.9	15	33.9	15	
<b>PCW 6/12</b>	32 40	6.3	16	6.3	16	6.3	16	11.4	16	11.4	16	9.2	15	20.1	15	20.1	15	18.7	15	33.9	15	33.9	15	
	28 47	5.0	15	5.0	15	5.0	15	9.1	15	9.1	15	7.4	14	16.2	15	16.2	15	15.1	14	27.6	14	27.6	14	
	26 49	4.2	14	4.2	14	4.2	14	7.7	15	7.7	15	6.3	14	13.8	14	13.8	14	12.9	14	23.7	13	23.7	13	
	25 50	3.8	14	3.8	14	3.8	14	7.0	14	7.0	14	5.7	13	12.7	13	12.7	13	11.8	13	21.8	13	21.8	13	
<b>PCW 8/14</b>	32 40	5.4	17	5.4	17	5.4	17	9.8	17	9.8	17	8.0	16	17.4	16	17.4	16	16.2	16	29.6	16	29.6	16	
	28 47	4.1	16	4.1	16	4.1	16	7.6	16	7.6	16	6.2	15	13.6	15	13.6	15	12.6	12	23.3	15	23.3	15	
	26 49	3.4	15	3.4	15	3.4	15	6.2	12	6.2	12	5.0	14	11.2	15	11.2	15	10.4	14	19.4	14	19.4	14	
	25 50	3.1	15	3.1	15	3.1	15	5.6	15	5.6	15	4.5	14	10.0	14	10.0	14	9.3	14	17.5	14	17.5	14	
Power input [kW] (3 x 400 V)	max. 0.17						max. 0.28						max. 0.34						max. 0.75					
Power cons. [A] (3 x 400 V)	max. 0.32						max. 0.60						max. 0.79						max. 1.60					
Power input [kW] (1 x 230 V)	max. 0.17						max. 0.28						max. 0.39						-					
Power cons. [A] (1 x 230 V)	max. 0.73						max. 1.25						max. 1.78						-					
Power input [kW] (1 x 230 V EC)	max. 0.165						max. 0.31						max. 0.40						max. 0.58					
Power cons. [A] (1 x 230 V EC)	max. 1.35						max. 1.40						max. 1.80						max. 2.70					
Heat exchanger water content [l]	1.8						2.5						5.5						9.5					
Heat exchanger connections	R 1"						R 1"						R 1¼"						R 1½"					

**TLHK-EC / TLHK WITH FREE DRAINAGE**



**Standard equipment:**

- Condensate hose to the drain connector
- Fitted ½" drain connector for connection to a ½" drain hose

**TOPWING TLH-EC 25 / TLHK-EC 25, TYPE 4**  
**PERFORMANCE TABLE, HEATING**

For pumped warm water

Type	1		2		3		4		
	1500 2400		1500 2300		1500 2050		1500 1950		
Speed [rpm]									
Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]									
$t_{LE}$ [°C]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	
<b>PWW 45/35</b>	- 15	11.5	-2	16.4	4	19.4	10	24.4	18
	- 10	10.2	2	14.7	7	17.4	13	21.9	20
	- 5	9.0	5	12.9	11	15.4	16	19.3	22
	± 0	7.8	9	11.9	14	13.4	18	16.9	24
	+ 5	6.6	13	9.6	17	11.4	21	14.4	26
	+ 10	5.4	17	7.9	20	9.5	24	12.0	28
	+ 15	4.3	20	6.3	23	7.6	26	9.6	30
	+ 20	3.1	24	4.7	26	5.7	28	7.2	31
<b>PWW 50/40</b>	- 15	12.8	-1	18.2	6	21.4	13	26.9	22
	- 10	11.5	3	16.4	9	19.4	16	24.3	24
	- 5	10.3	7	14.7	13	17.4	18	21.8	26
	± 0	9.0	11	13.0	16	15.4	21	19.3	28
	+ 5	7.8	14	11.3	19	13.4	24	16.8	30
	+ 10	6.6	18	9.6	22	11.4	26	14.4	32
	+ 15	5.5	22	8.0	25	9.5	29	12.0	33
	+ 20	4.3	25	6.3	28	7.6	31	9.7	35
<b>PWW 60/40</b>	- 15	12.6	-1	18.3	6	21.8	13	27.5	22
	- 10	11.4	3	16.5	9	19.8	16	25.0	25
	- 5	10.1	7	14.8	13	17.7	19	22.4	27
	± 0	8.9	10	13.1	16	15.8	22	19.9	29
	+ 5	7.7	14	11.4	19	13.8	24	17.5	31
	+ 10	6.6	18	9.7	22	11.8	27	15.0	32
	+ 15	5.4	22	8.1	25	9.9	29	12.6	34
	+ 20	4.3	25	6.5	29	8.0	32	10.2	36
<b>PWW 70/50</b>	- 15	15.2	2	21.9	10	25.9	19	32.6	29
	- 10	14.0	6	20.1	14	23.8	21	30.0	32
	- 5	12.7	10	18.3	17	21.8	24	27.4	34
	± 0	11.5	13	16.6	20	19.8	27	24.9	36
	+ 5	10.3	17	14.9	24	17.8	30	22.4	38
	+ 10	9.1	21	13.2	27	15.8	33	20.0	40
	+ 15	7.9	25	11.5	30	13.9	35	17.6	42
	+ 20	6.7	28	9.9	33	12.0	38	15.2	43
<b>PWW 80/60</b>	- 15	17.8	5	25.4	14	29.9	24	37.4	36
	- 10	16.5	9	23.6	18	27.8	27	34.8	38
	- 5	15.3	13	21.8	21	25.8	30	32.3	41
	± 0	14.0	16	20.1	25	23.7	33	29.8	43
	+ 5	12.8	20	18.3	28	21.7	35	27.3	45
	+ 10	11.6	24	16.6	31	19.7	38	24.8	47
	+ 15	10.4	28	15.0	34	17.8	41	22.4	49
	+ 20	9.2	32	13.3	37	15.9	43	20.0	51
<b>PWW 90/70</b>	- 15	20.4	8	28.9	18	33.9	29	42.2	42
	- 10	19.1	12	27.1	22	31.7	32	39.6	45
	- 5	17.0	15	25.3	25	29.7	35	37.0	47
	± 0	16.5	19	23.5	29	27.6	38	34.4	50
	+ 5	15.3	23	21.7	32	25.6	41	31.9	52
	+ 10	14.0	27	20.0	35	23.6	44	29.5	54
	+ 15	12.8	31	18.3	39	21.6	46	27.0	56
	+ 20	11.6	35	16.6	42	19.7	49	24.6	58
Power input [kW] (1 x 230 V)	max. 0.165		max. 0.165		max. 0.165		max. 0.165		
Power cons. [A] (1 x 230 V)	max. 1.35		max. 1.35		max. 1.35		max. 1.35		
Air throw wall mounted unit [m]*	17.5		16.5		15.5		14.5		
Air throw of ceiling unit [m]*	6.2		6.0		5.6		5.4		
Sound press. level dB [A]**	52		52		52		52		
Heat exchanger water content [l]	0.7		1.0		1.1		1.8		
Heat exchanger connections	R ¾"		R 1"		R 1"		R 1"		

\* At  $t_{LA} - t_{Room} = 10$  K

\*\* Sound pressure level at 5 m distance, tested in a room with medium absorption properties; room volume approx. 1500 m<sup>3</sup>

**TOPWING TLH-EC 40 / TLHK-EC 40, TYPE 4**  
PERFORMANCE TABLE, HEATING

For pumped warm water

Type	1		2		3		4		
	Speed [rpm]	1350	1350	1350	1350	1350	1350	1350	
Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]	3800		3700		3400		3050		
$t_{LE}$ [°C]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	
<b>PWW 45/35</b>	- 15	21.0	0	25.2	3	33.8	11	38.6	19
	- 10	18.8	3	22.5	6	30.3	14	34.7	21
	- 5	16.6	7	19.9	10	26.9	17	30.7	23
	± 0	14.4	11	17.3	13	23.5	19	26.9	25
	+ 5	12.2	14	14.7	16	18.3	20	23.1	27
	+ 10	10.1	18	12.2	20	15.0	23	19.3	28
	+ 15	8.0	21	9.7	23	11.7	25	15.6	30
	+ 20	5.9	25	7.2	26	8.4	27	11.9	32
<b>PWW 50/40</b>	- 15	23.3	1	27.9	5	37.3	14	42.4	22
	- 10	21.0	5	25.2	8	33.7	17	38.4	24
	- 5	18.8	9	22.5	12	30.2	20	34.5	26
	± 0	16.6	12	19.9	15	26.8	22	30.6	28
	+ 5	14.4	16	17.3	18	23.4	25	26.8	30
	+ 10	12.3	19	14.7	22	20.1	27	23.0	32
	+ 15	10.2	23	12.2	25	16.8	30	19.3	34
	+ 20	8.1	26	9.7	28	13.5	32	15.6	35
<b>PWW 60/40</b>	- 15	23.3	1	28.1	5	38.3	15	44.0	23
	- 10	21.1	5	25.4	9	34.8	18	40.0	25
	- 5	18.9	9	22.7	12	31.3	20	36.1	28
	± 0	16.7	12	20.1	15	27.9	23	32.2	30
	+ 5	14.5	16	17.5	19	24.5	26	28.3	32
	+ 10	12.4	19	15.0	22	21.1	28	24.5	33
	+ 15	10.3	23	12.5	25	17.8	30	20.7	35
	+ 20	8.2	27	10.0	28	14.5	33	17.0	37
<b>PWW 70/50</b>	- 15	28.0	5	33.6	9	45.3	20	51.7	30
	- 10	25.7	8	20.8	13	41.7	23	47.7	32
	- 5	23.4	12	28.2	16	38.2	26	43.7	34
	± 0	21.2	16	25.5	19	34.7	29	39.8	37
	+ 5	19.0	19	23.9	23	31.3	31	35.9	39
	+ 10	16.9	23	20.3	26	27.9	34	32.1	41
	+ 15	14.7	26	17.8	29	24.6	36	28.4	42
	+ 20	12.6	30	15.2	32	21.3	39	24.6	44
<b>PWW 80/60</b>	- 15	32.5	8	39.0	13	52.1	26	59.1	36
	- 10	30.2	12	36.2	16	48.5	29	55.1	39
	- 5	28.0	15	33.5	20	44.9	31	51.1	41
	± 0	25.7	19	30.8	23	41.4	34	47.2	43
	+ 5	23.5	23	28.2	27	38.0	37	43.3	46
	+ 10	21.3	26	25.6	30	34.6	40	39.5	48
	+ 15	19.1	30	23.0	33	31.2	42	35.7	50
	+ 20	17.0	33	20.4	37	27.9	45	32.0	52
<b>PWW 90/70</b>	- 15	37.1	11	44.3	17	58.7	31	66.4	43
	- 10	34.7	15	41.6	20	55.1	34	62.3	45
	- 5	32.4	18	38.8	24	51.5	37	58.3	48
	± 0	30.1	22	36.1	27	48.0	40	54.4	50
	+ 5	27.9	26	33.4	31	44.5	42	50.5	52
	+ 10	25.7	30	30.7	34	41.1	45	46.7	54
	+ 15	23.5	33	28.1	37	37.7	48	42.9	57
	+ 20	21.3	37	25.5	41	34.4	50	39.1	59
Power input [kW] (1 x 230 V)	max. 0.31		max. 0.31		max. 0.31		max. 0.31		
Power cons. [A] (1 x 230 V)	max. 1.4		max. 1.4		max. 1.4		max. 1.4		
Air throw of wall mounted unit [m]*	26		25		22.5		19.5		
Air throw of ceiling unit [m]*	6.1		5.9		5.5		5.0		
Sound press. level dB [A]**	55		55		55		55		
Heat exchanger water content [l]	1.0		1.5		2.0		2.5		
Heat exchanger connections	R 3/4"		R 1"		R 1"		R 1"		

\* At  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, tested in a room with medium absorption properties; room volume approx. 1500 m<sup>3</sup>

**TOPWING TLH-EC 63 / TLHK-EC 63, TYPE 4**  
**PERFORMANCE TABLE, HEATING**

For pumped warm water

Type	1		2		3		4		
Speed [rpm]	1000		1000		1000		1000		
Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]	5500		5400		5000		4800		
$t_{LE}$ [°C]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	
<b>PWW 45/35</b>	- 15	34.4	2	44.7	7	53.6	13	65.3	21
	- 10	30.8	5	40.0	10	48.1	16	58.7	23
	- 5	27.3	9	35.4	13	42.6	18	52.2	25
	± 0	23.8	12	30.9	16	37.3	21	45.7	27
	+ 5	20.4	16	26.4	19	32.0	23	39.4	28
	+ 10	17.0	19	22.0	22	26.8	26	33.1	30
	+ 15	13.7	22	17.7	25	21.6	28	26.9	32
	+ 20	10.4	26	13.4	27	16.5	30	28.7	33
<b>PWW 50/40</b>	- 15	37.9	3	49.2	9	58.9	16	71.6	25
	- 10	34.3	7	44.5	12	53.3	19	64.9	27
	- 5	30.8	10	39.9	15	47.9	21	58.4	28
	± 0	27.3	14	35.4	18	42.5	24	51.9	30
	+ 5	23.8	17	30.9	21	37.2	26	45.5	32
	+ 10	20.4	21	26.5	24	32.0	29	39.2	34
	+ 15	17.1	24	22.1	27	26.8	31	33.0	35
	+ 20	13.8	28	17.8	30	21.7	33	26.9	37
<b>PWW 60/40</b>	- 15	38.9	4	50.4	10	61.0	17	75.0	26
	- 10	35.3	7	45.7	13	55.5	20	68.4	28
	- 5	31.8	11	41.1	16	50.0	23	61.8	30
	± 0	28.3	14	36.6	19	44.6	25	55.3	32
	+ 5	24.9	18	32.1	22	39.3	27	48.8	34
	+ 10	21.4	21	27.7	25	34.0	30	42.5	36
	+ 15	18.1	25	23.3	28	28.8	32	36.1	37
	+ 20	14.7	28	18.9	31	23.6	34	29.8	39
<b>PWW 70/50</b>	- 15	46.0	7	59.7	14	71.8	23	87.6	33
	- 10	42.4	11	55.0	18	69.2	26	80.9	36
	- 5	38.8	14	50.3	21	60.7	28	74.3	38
	± 0	35.3	18	45.7	24	55.3	31	67.8	40
	+ 5	31.8	22	41.2	27	49.9	34	61.3	42
	+ 10	28.4	25	36.7	30	44.6	36	55.0	43
	+ 15	25.0	28	32.3	33	39.4	38	48.7	45
	+ 20	21.6	32	27.9	36	34.2	41	42.4	47
<b>PWW 80/60</b>	- 15	53.1	11	68.8	19	82.3	29	99.8	40
	- 10	49.4	14	64.1	21	76.7	31	93.1	42
	- 5	45.8	18	59.4	25	71.1	34	86.4	44.5
	± 0	42.3	22	54.7	28	65.7	37	79.9	47
	+ 5	38.7	25	50.2	32	60.3	39	73.5	49
	+ 10	35.3	29	45.6	35	54.9	42	67.1	51
	+ 15	31.8	32	41.2	38	49.7	44	60.8	52
	+ 20	28.4	36	36.8	40	44.5	47	54.6	54
<b>PWW 90/70</b>	- 15	60.0	14	77.8	23	92.6	34	111.6	47
	- 10	55.4	20	73.0	27	86.9	37	104.9	49
	- 5	52.1	23	68.3	30	81.3	40	98.2	51
	± 0	49.1	25	63.6	33	75.8	43	91.7	54
	+ 5	45.6	29	59.0	36	70.4	45	85.2	56
	+ 10	42.0	32	54.4	39	65.0	48	78.8	58
	+ 15	38.6	36	49.9	42	59.7	50	72.5	60
	+ 20	35.1	39	45.5	45	54.5	53	66.3	62
Power input [kW] (1 x 230 V)	max. 0.40		max. 0.40		max. 0.40		max. 0.40		
Power cons. [A] (1 x 230 V)	max. 1.8		max. 1.8		max. 1.8		max. 1.8		
Air throw of wall mounted unit [m]*	27		26		23		22		
Air throw of ceiling unit [m]*	7.3		7.1		6.3		6.0		
Sound press. level dB [A]**	56		56		56		56		
Heat exchanger water content [l]	2.5		3.5		3.5		5.5		
Heat exchanger connections	R 1"		R 1¼"		R 1¼"		R 1¼"		

\* When  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

**TOPWING TLH-EC 100 / TLHK-EC 100, TYPE 4**  
PERFORMANCE TABLE, HEATING

For pumped warm water

Type	1			2		3		4	
	900			900		900		900	
	9400			9300		8700		8200	
Speed [rpm]									
Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]									
$t_{LE}$ [°C]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	
<b>PWW 45/35</b>	- 15	58.6	2	75.3	7	96.9	15	112.6	21
	- 10	52.5	5	67.4	10	87.0	17	101.3	23
	- 5	46.5	9	59.6	13	77.2	19	90.2	25
	± 0	40.6	12	52.0	16	67.6	22	79.2	27
	+ 5	34.8	16	44.4	19	58.1	24	68.4	29
	+ 10	29.9	19	36.9	22	48.7	26	57.7	31
	+ 15	23.3	22	29.6	24	39.4	28	47.1	32
	+ 20	17.7	26	22.3	27	30.2	30	36.5	33
<b>PWW 50/40</b>	- 15	64.6	3	83.1	9	106.4	17	123.1	25
	- 10	58.4	7	75.2	12	96.5	20	111.8	27
	- 5	52.4	10	67.4	15	86.6	22	100.6	29
	± 0	46.5	14	59.6	18	77.0	25	89.6	31
	+ 5	40.6	17	52.0	21	67.4	27	78.8	32
	+ 10	34.8	21	44.5	24	58.0	29	68.1	34
	+ 15	29.1	24	37.1	27	48.6	32	57.5	36
	+ 20	23.4	27	29.7	30	39.4	34	47.0	37
<b>PWW 60/40</b>	- 15	66.2	4	84.7	9	110.7	19	130.2	27
	- 10	60.1	7	76.8	12	100.7	21	118.8	29
	- 5	54.1	11	69.0	15	90.9	24	107.6	31
	± 0	48.2	14	61.3	19	81.2	26	96.5	33
	+ 5	42.3	18	53.7	22	71.6	29	85.6	35
	+ 10	36.5	21	46.2	24	62.0	31	74.7	37
	+ 15	30.8	25	38.8	27	52.6	33	63.9	38
	+ 20	25.1	28	31.4	30	43.2	35	53.1	40
<b>PWW 70/50</b>	- 15	78.4	7	100.6	14	129.9	25	151.3	34
	- 10	72.2	11	92.6	17	119.9	27	139.9	36
	- 5	66.2	14	84.7	20	110.0	30	128.7	38
	± 0	60.2	18	76.9	23	100.2	32	117.6	40
	+ 5	54.2	21	69.2	26	90.5	35	106.6	42
	+ 10	48.4	25	61.6	29	81.0	37	95.8	44
	+ 15	42.6	28	54.1	32	71.5	39	85.0	46
	+ 20	36.8	32	46.7	35	62.2	42	74.4	47
<b>PWW 80/60</b>	- 15	90.4	11	116.2	18	148.7	30	171.8	41
	- 10	84.2	14	108.1	21	138.6	33	160.4	43
	- 5	78.1	18	100.2	25	128.6	36	149.1	45
	± 0	72.0	21	92.3	28	118.8	38	138.0	47
	+ 5	66.0	25	84.5	31	109.1	41	127.0	49
	+ 10	60.1	29	76.8	34	99.5	43	116.1	51
	+ 15	54.2	32	69.2	37	90.0	46	105.4	53
	+ 20	48.4	35	61.7	40	80.6	48	94.8	55
<b>PWW 90/70</b>	- 15	102.3	14	131.6	23	167.1	36	191.8	47
	- 10	96.0	18	123.4	26	156.9	39	180.3	49
	- 5	89.8	21	115.3	29	146.9	42	169.0	52
	± 0	83.7	25	107.4	32	137.0	44	157.8	54
	+ 5	77.6	29	99.5	36	127.2	47	146.8	56
	+ 10	71.6	32	91.8	39	117.6	49	136.0	58
	+ 15	65.7	36	84.1	42	108.0	52	125.2	60
	+ 20	59.9	39	76.6	45	96.6	54	114.6	62
Power input [kW] [1 x 230 V]	max. 0.58			max. 0.58		max. 0.58		max. 0.58	
Power cons. [A] [1 x 230 V]	max. 2.7			max. 2.7		max. 2.7		max. 2.7	
Air throw of wall mounted unit [m]*	32			31		29		27	
Air throw of ceiling unit [m]*	7.9			7.8		7.6		7.2	
Sound press. level dB [A]**	56			56		56		56	
Heat exchanger water content [l]	3.5			5.5		7.5		9.5	
Heat exchanger connections	R 1"			R 1½"		R 1½"		R 1½"	

\* When  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

**TOPWING TLH 25 / TLHK 25, TYPE 4**  
**PERFORMANCE TABLE, HEATING**

For pumped warm water

Type	1				2				3				4				
	1350		1000		1350		1000		1350		1000		1350		1000		
	Speed [rpm]	Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	
<b>PWW 45/35</b>	- 15	10.7	-2	9.5	0	15.1	5	13.2	7	17.9	11	15.5	13	22.1	20	18.7	22
	- 10	9.5	2	8.5	3	13.5	8	11.8	10	16.0	14	13.9	16	19.8	22	16.8	24
	- 5	8.4	6	7.4	7	11.9	11	10.4	13	14.1	17	12.3	18	17.6	23	14.9	25
	± 0	7.2	10	6.4	11	10.3	15	9.1	16	12.3	19	10.7	21	15.3	25	13.0	27
	+ 5	6.1	13	5.5	14	8.8	18	7.7	19	10.5	22	9.2	23	13.1	27	11.1	29
	+ 10	5.0	17	4.5	18	7.3	21	6.4	22	8.8	24	7.6	25	10.9	29	9.3	30
	+ 15	4.0	21	3.5	21	5.8	24	5.1	24	7.0	27	6.1	28	8.8	30	7.5	31
	+ 20	2.9	24	2.6	25	4.3	27	3.8	27	5.3	29	4.6	30	6.6	32	5.7	33
<b>PWW 50/40</b>	- 15	11.9	0	10.5	1	16.7	7	14.6	9	19.7	14	17.1	16	24.4	23	20.5	25
	- 10	10.7	4	9.5	5	15.1	10	13.2	12	17.8	17	15.5	19	22.1	25	18.6	27
	- 5	9.5	8	8.5	9	13.5	14	11.8	15	16.0	19	13.9	21	19.8	27	16.7	29
	± 0	8.4	11	7.5	12	11.9	17	10.4	18	14.1	22	12.3	24	17.5	29	14.8	31
	+ 5	7.3	15	6.5	16	10.4	20	9.1	21	12.3	25	10.7	26	15.3	31	12.9	32
	+ 10	6.2	19	5.5	19	8.8	23	7.7	24	10.5	27	9.2	28	13.1	32	11.1	34
	+ 15	5.1	22	4.5	23	7.3	26	6.4	27	8.8	29	7.7	31	10.9	34	9.3	35
	+ 20	4.0	26	3.6	26	5.8	29	5.1	30	7.0	32	6.2	33	8.8	36	7.5	37
<b>PWW 60/40</b>	- 15	11.7	0	10.4	1	16.8	7	14.7	9	20.1	15	17.5	17	25.0	24	21.2	27
	- 10	10.6	4	9.4	5	15.2	11	13.3	13	18.2	17	15.9	20	22.7	26	19.3	29
	- 5	9.4	7	8.4	9	13.6	14	12.0	16	16.4	20	14.3	22	20.4	28	17.4	30
	± 0	8.3	11	7.4	12	12.1	17	10.6	19	14.5	23	12.7	25	18.2	30	15.5	32
	+ 5	7.2	15	6.4	16	10.5	20	9.3	22	12.7	25	11.1	27	15.9	32	13.6	34
	+ 10	6.1	18	5.5	19	9.0	23	7.9	24	10.9	28	9.6	29	13.7	33	11.7	35
	+ 15	5.0	22	4.5	23	7.5	26	6.6	27	9.2	30	8.1	31	11.5	35	9.9	37
	+ 20	4.0	26	3.6	26	6.0	29	5.3	30	7.4	32	6.5	34	9.4	37	8.1	38
<b>PWW 70/50</b>	- 15	14.1	3	12.6	5	20.1	12	17.6	14	23.8	20	20.7	23	29.5	31	25.0	34
	- 10	13.0	7	11.5	8	18.5	15	16.2	17	21.9	23	19.1	26	27.2	33	23.0	36
	- 5	11.8	10	10.5	12	16.9	18	14.8	20	20.1	26	17.5	28	24.9	35	21.1	38
	± 0	10.7	14	9.5	16	15.3	21	13.4	23	18.2	28	15.9	31	22.6	37	19.2	40
	+ 5	9.5	18	8.5	19	13.7	25	12.0	26	16.4	31	14.3	33	20.4	39	17.3	42
	+ 10	8.4	22	7.5	23	12.2	28	10.7	29	14.6	34	12.7	36	18.2	41	15.5	43
	+ 15	7.3	25	6.6	26	10.7	31	9.4	32	12.8	36	11.2	38	16.0	43	13.6	45
	+ 20	6.3	29	5.6	30	9.1	34	8.0	35	11.1	38	9.7	40	13.8	44	11.8	46
<b>PWW 80/60</b>	- 15	16.6	6	14.7	8	23.3	16	20.4	19	27.5	26	23.8	29	33.9	38	28.6	41
	- 10	15.4	10	13.6	12	21.7	19	18.9	22	25.6	28	22.2	31	31.6	40	26.6	43
	- 5	14.2	14	12.6	15	20.1	23	17.5	25	23.7	31	20.6	34	29.3	42	24.7	45
	± 0	13.0	17	11.6	19	18.5	26	16.1	28	21.8	34	19.0	37	27.0	45	22.8	47
	+ 5	11.9	21	10.6	23	16.9	29	14.8	31	20.0	37	17.4	39	24.7	47	20.9	49
	+ 10	10.7	25	9.6	26	15.3	32	13.4	34	18.2	39	15.8	42	22.5	48	19.1	51
	+ 15	9.6	29	8.6	30	13.8	35	12.1	37	16.4	42	14.3	44	20.3	50	17.2	53
	+ 20	8.5	32	7.6	33	12.2	38	10.7	40	14.6	44	12.7	46	18.1	52	15.4	54
<b>PWW 90/70</b>	- 15	18.9	9	16.8	11	26.5	20	23.1	23	31.1	31	26.9	34	38.1	44	32.1	48
	- 10	17.7	13	15.7	15	24.9	24	21.8	27	29.2	34	25.2	37	35.9	47	30.1	50
	- 5	16.5	17	14.7	19	23.2	27	20.2	30	27.2	37	23.6	40	33.5	49	28.2	53
	± 0	15.3	20	13.6	22	21.6	30	18.8	33	25.4	40	22.0	43	31.2	51	26.3	55
	+ 5	14.2	24	12.6	26	20.0	34	17.4	36	23.5	42	20.4	45	28.9	54	24.4	57
	+ 10	13.0	28	11.6	30	18.4	37	16.1	39	21.7	45	18.8	48	26.7	56	22.5	59
	+ 15	11.9	32	10.6	33	16.8	40	14.7	42	19.9	48	17.3	50	24.5	58	20.7	60
	+ 20	10.8	35	9.6	37	15.3	43	13.4	45	18.1	50	15.7	53	22.3	60	18.9	63
Power input [kW] (3 x 400 V)	max. 0.17		max. 0.10		max. 0.17		max. 0.10		max. 0.17		max. 0.10		max. 0.17		max. 0.10		
Power cons. [A] (3 x 400 V)	max. 0.32		max. 0.16		max. 0.32		max. 0.16		max. 0.32		max. 0.16		max. 0.32		max. 0.16		
Air throw of wall mounted unit [m]*	15.5		12.5		14.5		12		13		10.5		12.5		10		
Air throw of ceiling unit [m]*	5.7		4.7		5.4		4.5		5.0		4.2		4.8		4.0		
Sound press. level dB [A]**	56		50		56		50		56		50		56		50		
Heat exchanger water content [l]	0.7				1.0				1.1				1.8				
Heat exchanger connections	R 3/4"				R 1"				R 1"				R 1"				

\* When  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

**TOPWING TLH 40 / TLHK 40, TYPE 4**  
PERFORMANCE TABLE, HEATING

For pumped warm water

Type	1				2				3				4												
	1350		1000		1350		1000		1350		1000		1350		1000										
	Speed [rpm]	Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C									
<b>PWW 45/35</b>	- 15	3500	20.1	0	2500	16.5	3	3400	24.0	4	2400	19.5	7	3100	31.9	12	2200	25.3	16	2800	36.3	19	2000	28.4	23
	- 10		17.9	4		14.8	6		21.4	7		17.4	10		28.6	15		22.7	18		32.6	21		25.5	24
	- 5		15.8	7		13.1	9		18.9	10		15.4	13		25.3	17		20.2	20		28.9	23		22.7	26
	± 0		13.7	11		11.3	13		16.4	14		13.4	16		22.1	20		17.6	22		25.3	25		19.9	28
	+ 5		11.7	15		9.7	16		14.0	17		11.4	19		18.9	22		15.1	25		21.7	27		17.1	29
	+ 10		9.6	18		8.0	19		11.6	20		9.5	21		15.8	25		12.7	27		18.2	29		14.4	31.2
	+ 15		7.7	21		6.4	23		9.2	23		7.5	24		12.7	27		10.2	29		14.7	31		11.6	32
	+ 20		5.7	25		4.8	26		6.9	26		5.7	27		9.7	29		7.8	31		11.2	32		8.9	33
<b>PWW 50/40</b>	- 15		22.2	2		18.3	4		26.6	6		21.5	9		35.1	15		27.9	19		39.9	23		31.1	26
	- 10		20.1	5		16.5	8		24.0	9		19.4	12		31.7	18		25.2	21		36.1	25		28.2	28
	- 5		17.9	9		14.8	11		21.4	12		17.4	15		28.5	20		22.7	23		32.5	27		25.4	30
	± 0		15.8	13		13.1	15		18.9	16		15.4	18		25.2	23		20.1	26		28.8	29		22.6	32
	+ 5		13.8	16		11.4	18		16.5	19		13.4	21		22.1	25		17.6	28		25.2	31		19.8	33
	+ 10		11.7	20		9.7	21		14.0	22		11.4	24		18.9	28		15.1	30		21.7	33		17.0	35
	+ 15		9.7	23		8.0	25		11.6	25		9.5	27		15.8	30		12.7	32		18.2	34		14.3	36
	+ 20		7.7	27		6.4	28		9.3	28		7.6	30		12.8	32		10.2	34		14.7	36		11.6	38
<b>PWW 60/40</b>	- 15		22.3	2		18.4	5		26.7	6		21.8	9		36.1	16		28.9	20		41.5	24		32.6	28
	- 10		20.1	6		16.7	8		24.2	9		19.7	12		32.8	19		26.2	22		37.7	26		29.7	30
	- 5		18.0	9		14.9	11		21.6	13		17.7	15		29.5	21		23.7	25		34.0	28		26.8	32
	± 0		15.9	13		13.2	15		19.2	16		15.7	18		26.3	24		21.1	27		30.4	30		24.0	34
	+ 5		13.9	16		11.6	18		16.7	19		13.7	21		23.1	26		18.6	29		26.7	32		21.2	35
	+ 10		11.9	20		9.9	22		14.3	22		11.8	24		20.0	29		16.1	31		23.2	34		18.4	37
	+ 15		9.9	23		8.3	25		11.9	25		9.8	27		16.8	31		13.6	33		19.6	36		15.6	38
	+ 20		7.9	27		6.6	28		9.6	28		7.9	30		13.7	33		11.1	35		16.1	37		12.9	39
<b>PWW 70/50</b>	- 15		26.7	5		22.0	8		31.9	10		25.9	14		42.6	21		33.9	26		48.6	31		38.0	35
	- 10		24.5	9		20.3	12		29.4	13		23.9	17		39.3	24		31.3	28		44.9	33		35.1	37
	- 5		22.4	13		18.5	15		26.8	17		21.8	20		36.0	27		28.7	31		41.2	35		32.3	39
	± 0		20.3	16		16.8	19		24.3	20		19.8	23		32.7	30		26.1	33		37.5	38		29.4	41
	+ 5		18.2	20		15.1	22		21.8	23		17.8	26		29.5	32		23.6	36		33.9	40		26.6	43
	+ 10		16.1	23		13.4	26		19.3	27		15.8	29		26.3	35		21.1	38		30.3	41		23.9	45
	+ 15		14.1	27		11.7	29		16.9	30		13.8	32		23.2	37		18.6	40		26.7	43		21.1	46
	+ 20		12.1	30		10.1	32		14.5	33		11.9	35		20.1	39		16.2	42		23.2	45		18.4	48
<b>PWW 80/60</b>	- 15		31.1	9		25.6	12		37.1	14		30.1	18		49.0	27		38.9	32		55.6	38		43.3	42
	- 10		28.9	12		23.8	16		34.5	17		27.9	21		45.6	30		36.2	35		51.8	40		40.4	45
	- 5		26.7	16		22.0	19		31.9	21		25.9	25		42.3	33		33.6	37		48.1	42		37.5	47
	± 0		24.5	20		20.2	23		29.3	24		23.8	28		39.0	35		31.0	40		44.4	44		34.7	49
	+ 5		22.4	23		18.5	26		26.8	28		21.8	31		35.8	38		28.5	42		40.8	47		31.9	51
	+ 10		20.3	27		16.8	30		24.3	31		19.8	34		32.6	41		26.0	44		37.2	49		29.1	52
	+ 15		18.3	30		15.1	33		21.9	34		17.8	37		29.4	43		23.5	47		33.6	51		26.4	54
	+ 20		16.2	34		13.4	36		19.4	37		15.9	40		26.3	46		21.0	49		30.1	52		23.7	56
<b>PWW 90/70</b>	- 15		35.4	12		29.1	16		42.1	18		34.1	23		55.2	32		43.7	38		62.4	44		48.5	49
	- 10		33.1	16		27.3	19		39.5	21		32.0	26		51.8	35		41.1	40		58.6	47		45.5	52
	- 5		30.9	19		25.5	23		36.9	25		29.9	29		48.5	38		38.4	43		54.8	49		42.7	54
	± 0		28.8	23		23.7	27		34.3	28		27.8	32		45.2	41		35.8	46		51.1	51		39.8	56
	+ 5		26.6	27		21.9	30		31.8	32		25.7	36		41.9	44		33.3	48		47.5	53		37.0	58
	+ 10		24.5	30		20.2	33		29.2	35		23.7	39		38.7	46		30.7	51		43.9	56		34.2	60
	+ 15		22.4	34		18.5	37		26.8	38		21.7	42		35.5	49		28.2	53		40.3	58		31.5	62
	+ 20		20.3	37		16.8	40		24.3	42		19.7	45		32.4	51		25.8	55		36.8	60		28.8	63
Power input [kW] (3 x 400 V)	max. 0.28		max. 0.22		max. 0.28		max. 0.22		max. 0.28		max. 0.22		max. 0.28		max. 0.22		max. 0.28		max. 0.22						
Power cons. [A] (3 x 400 V)	max. 0.6		max. 0.3		max. 0.6		max. 0.3		max. 0.6		max. 0.3		max. 0.6		max. 0.3		max. 0.6		max. 0.3						
Air throw of wall mounted unit [m]*	23		16		22.5		15		20		13.5		18		12										
Air throw of ceiling unit [m]*	5.6		4.1		5.5		3.9		5.0		3.6		4.5		3.3										
Sound press. level dB [A]**	60		54		60		54		60		54		60		54										
Heat exchanger water content [l]	1.0				1.5				2.0				2.5												
Heat exchanger connections	R 3/4"				R 1"				R 1"				R 1"												

\* When  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

**TOPWING TLH 63 / TLHK 63, TYPE 4**  
**PERFORMANCE TABLE, HEATING**

For pumped warm water

Type	1				2				3				4				
	900		700		900		700		900		700		900		700		
	Speed [rpm]	Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	$\dot{Q}_0$ [kW]	$t_{LA}$ [°C]	
PWW 45/35	- 15	33.6	2	28.6	4	43.6	7	36.5	10	50.7	14	42.1	17	61.3	22	50.5	24
	- 10	30.2	5	25.6	7	39.1	10	32.7	13	45.5	17	37.8	19	55.1	24	45.4	26
	- 5	26.7	9	22.7	11	34.6	13	29.0	15	40.4	19	33.6	21	49.0	26	40.4	28
	± 0	23.3	12	19.8	14	30.2	16	25.3	18	35.3	22	29.4	24	42.9	27	35.5	29
	+ 5	20.0	16	17.0	17	25.8	19	21.7	21	30.3	24	25.3	26	37.0	29	30.6	31
	+ 10	16.7	19	14.2	20	21.5	22	18.1	23	25.4	26	21.2	28	31.1	31	25.8	32
	+ 15	13.4	22	11.5	23	17.3	25	14.6	26	20.5	28	17.2	30	25.3	32	21.0	33
	+ 20	10.2	26	8.7	27	13.1	28	11.1	29	15.7	30	13.2	31	19.5	33	16.3	34
PWW 50/40	- 15	37.1	4	31.5	6	48.1	10	40.2	12	55.7	17	46.2	20	67.1	25	55.2	28
	- 10	33.6	7	28.5	9	43.5	13	36.4	15	50.5	20	41.9	22	60.9	27	50.1	30
	- 5	30.1	11	25.6	13	39.0	16	32.6	18	45.3	22	37.6	25	54.8	29	45.1	32
	± 0	26.7	14	22.7	16	34.6	19	28.9	21	40.2	25	33.5	27	48.7	31	40.1	33
	+ 5	23.3	18	19.8	19	30.2	22	25.3	24	35.2	27	29.3	29	42.8	33	35.3	35
	+ 10	20.0	21	17.0	22	25.9	24	21.7	26	30.3	29	25.2	31	36.9	34	30.5	36
	+ 15	16.7	24	14.2	26	21.6	27	18.1	29	25.4	31	21.2	33	31.0	36	25.7	37
	+ 20	13.5	28	11.5	29	17.4	30	14.6	31	20.6	33	17.2	35	25.3	37	21.0	39
PWW 60/40	- 15	38.0	4	32.4	6	49.3	10	41.3	13	57.8	18	48.2	22	70.5	27	58.3	30
	- 10	34.6	8	29.4	10	44.7	13	37.5	16	52.6	21	43.9	24	64.2	29	53.2	32
	- 5	31.1	11	26.5	13	40.2	16	33.8	19	47.4	23	39.6	26	58.1	31	48.1	34
	± 0	27.7	15	23.6	17	35.8	19	30.1	22	42.3	26	35.4	28	52.0	33	43.2	36
	+ 5	24.3	18	20.8	20	31.4	22	26.5	24	37.3	28	31.2	31	46.0	35	38.2	37
	+ 10	21.0	22	18.0	23	27.1	25	22.8	27	32.3	30	27.1	33	40.0	36	33.3	39
	+ 15	17.7	25	15.2	26	22.8	28	19.3	30	27.4	33	23.0	34	34.1	38	28.5	40
	+ 20	14.4	28	12.4	29	18.5	31	15.7	32	22.5	35	19.0	36	28.1	39	23.6	41
PWW 70/50	- 15	45.0	8	38.3	10	58.3	15	48.8	18	67.9	24	56.5	28	82.2	35	67.7	38
	- 10	41.5	11	35.3	14	53.7	18	45.0	21	62.6	27	52.1	30	75.9	37	62.6	40
	- 5	38.0	15	32.3	17	49.2	21	41.2	24	57.5	29	47.8	33	69.7	39	57.6	42
	± 0	34.6	18	29.4	21	44.7	24	37.5	27	52.3	32	43.6	35	63.7	41	52.6	43
	+ 5	31.2	22	26.5	24	40.3	27	33.8	30	47.3	34	39.4	37	57.6	42	47.7	45
	+ 10	27.8	25	23.7	27	35.9	30	30.2	32	42.3	37	35.3	39	51.7	44	42.8	47
	+ 15	24.5	29	20.9	30	31.6	33	26.6	35	37.3	39	31.2	41	45.8	46	38.0	48
	+ 20	21.2	32	18.1	34	27.3	36	23.0	38	32.4	41	27.2	43	39.9	47	33.2	49
PWW 80/60	- 15	51.9	11	44.1	14	67.3	19	56.2	23	77.8	30	64.5	34	93.5	41	76.9	45
	- 10	48.4	15	41.0	18	62.6	23	52.3	26	72.5	33	60.2	36	87.2	44	71.7	47
	- 5	44.8	18	38.1	21	58.0	26	48.5	29	67.3	35	55.9	39	81.1	46	66.7	49
	± 0	41.4	22	35.1	25	53.5	29	44.7	32	62.1	38	51.6	41	74.9	48	61.7	51
	+ 5	37.9	25	32.2	28	49.0	32	41.0	35	57.0	40	47.4	44	68.9	50	56.8	53
	+ 10	34.5	29	29.3	31	44.6	35	37.4	38	52.0	43	43.3	46	63.0	52	52.0	54
	+ 15	31.2	32	26.5	35	40.2	38	33.7	41	47.0	45	39.2	48	57.1	53	47.1	56
	+ 20	27.8	36	23.7	38	35.9	41	30.1	43	42.1	48	35.1	50	51.3	55	42.4	58
PWW 90/70	- 15	58.8	14	49.8	18	76.0	24	63.4	28	87.5	35	72.4	40	104.5	48	85.7	52
	- 10	55.1	18	46.7	22	71.3	27	59.5	31	82.2	38	68.0	43	98.2	50	80.6	54
	- 5	51.6	22	43.7	25	66.7	30	55.6	34	76.9	41	63.7	45	92.0	53	75.5	56
	± 0	48.1	25	40.8	29	62.1	34	51.9	37	71.7	44	59.4	48	86.1	55	70.6	58
	+ 5	44.6	29	37.8	32	57.6	37	48.1	40	66.6	46	55.2	50	79.9	57	65.6	60
	+ 10	41.2	33	34.9	35	53.2	40	44.4	43	61.5	49	51.0	52	73.9	59	60.8	62
	+ 15	37.8	36	32.1	39	48.8	43	40.8	46	56.5	51	46.9	55	68.0	61	56.0	64
	+ 20	34.4	40	29.2	42	44.4	46	37.2	49	51.6	54	42.9	57	62.2	63	51.2	65
Power input [kW] (3 x 400 V)	max. 0.34		max. 0.25		max. 0.34		max. 0.25		max. 0.34		max. 0.25		max. 0.34		max. 0.25		
Power cons. [A] (3 x 400 V)	max. 0.79		max. 0.35		max. 0.79		max. 0.35		max. 0.79		max. 0.35		max. 0.79		max. 0.35		
Air throw of wall mounted unit [m]*	26		18		24		17		21		15		20		14		
Air throw of ceiling unit [m]*	7.1		5.3		6.9		5.1		6.1		4.5		5.8		4.4		
Sound press. level dB [A]**	59		53		59		53		59		53		59		53		
Heat exchanger water content [l]	2.5				3.5				3.5				5.5				
Heat exchanger connections	R 1"				R 1¼"				R 1¼"				R 1¼"				

\* When  $t_{LA} - t_{room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>



**TOPWING TLH 100 / TLHK 100, TYPE 4**  
**PERFORMANCE TABLE, HEATING**

For pumped warm water

Type	1				2				3				4				
	900		700		900		700		900		700		900		700		
	9000		6700		8800		6500		8300		6000		7700		5600		
Speed [rpm]																	
Flow rate $\dot{V}_0$ [m <sup>3</sup> /h]																	
$t_{LE}$ [°C]	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	$\dot{Q}_0$ kW	$t_{LA}$ °C	
<b>PWW 45/35</b>	- 15	57.1	2	48.1	4	72.8	7	60.4	10	93.9	15	75.1	18	107.5	22	84.5	25
	- 10	51.2	5	43.1	7	65.2	10	54.1	12	84.3	17	67.5	20	96.8	24	76.1	27
	- 5	45.3	9	38.2	11	57.7	13	47.9	15	74.8	20	60.0	23	86.1	26	67.9	28
	± 0	39.6	12	33.4	14	50.3	16	41.8	18	65.5	22	52.5	25	75.7	28	59.7	30
	+ 5	33.9	16	28.6	17	43.0	19	35.7	21	56.3	24	45.2	27	65.4	29	51.7	31
	+ 10	28.3	19	23.9	20	35.7	22	29.8	23	47.2	27	38.0	28	55.1	31	43.7	33
	+ 15	22.8	22	19.3	24	28.6	25	23.9	26	38.2	29	30.9	30	45.0	32	35.8	34
	+ 20	17.3	26	14.7	27	21.6	27	18.1	28	29.3	31	23.8	32	35.0	34	27.9	35
<b>PWW 50/40</b>	- 15	62.9	4	53.0	6	80.4	9	66.5	12	103.1	18	82.3	21	117.5	25	92.2	29
	- 10	57.0	7	48.0	9	72.7	12	60.2	15	93.4	20	74.7	24	106.7	27	83.8	30
	- 5	51.1	11	43.0	13	65.1	15	54.0	18	83.9	23	67.1	26	96.1	29	75.5	32
	± 0	45.3	14	38.2	16	57.7	18	47.8	21	74.6	25	59.7	28	85.6	31	67.4	34
	+ 5	39.6	18	33.4	19	50.3	21	41.8	23	65.3	27	52.3	30	75.2	33	59.3	35
	+ 10	33.9	21	28.7	22	43.0	24	35.8	26	56.2	30	45.1	32	65.0	35	51.3	37
	+ 15	28.4	24	24.0	26	35.9	27	29.9	29	47.2	32	37.9	34	54.9	36	43.5	38
	+ 20	22.9	28	19.4	29	28.8	30	24.0	31	38.2	34	30.9	35	44.9	38	35.7	39
<b>PWW 60/40</b>	- 15	64.6	4	54.5	7	81.9	10	68.2	13	107.3	19	86.2	23	124.4	28	98.3	32
	- 10	58.6	8	49.5	10	74.3	13	61.9	16	97.6	22	78.5	25	113.6	30	89.8	33
	- 5	52.8	11	44.6	13	66.8	16	55.7	19	88.1	24	70.9	28	102.9	32	81.5	35
	± 0	47.0	15	39.8	17	59.3	19	49.5	21	78.7	27	63.5	30	92.3	34	73.2	37
	+ 5	41.3	18	35.0	20	52.0	22	43.5	24	69.4	29	56.1	32	81.9	35	65.1	38
	+ 10	35.6	22	30.2	23	44.7	25	37.5	27	60.2	31	48.7	34	71.5	37	57.0	40
	+ 15	30.1	25	25.5	26	37.5	28	31.5	29	51.1	33	41.5	35	61.2	39	48.9	41
	+ 20	24.5	28	20.9	29	30.4	30	25.6	32	42.0	35	34.2	37	50.9	40	40.8	42
<b>PWW 70/50</b>	- 15	76.5	8	64.4	10	97.3	14	80.7	18	125.9	25	100.8	30	144.5	35	113.7	39
	- 10	70.5	11	59.4	14	89.5	18	74.3	21	116.2	28	93.0	32	133.6	37	105.2	41
	- 5	64.5	15	54.4	17	81.9	21	68.1	24	106.6	30	85.4	34	122.9	39	96.9	43
	± 0	58.7	18	49.5	21	74.4	24	61.9	27	97.1	33	77.9	36	112.3	41	88.6	44
	+ 5	52.9	22	44.7	24	67.0	27	55.7	30	87.8	35	70.5	39	101.9	43	80.5	46
	+ 10	47.2	25	39.9	27	59.6	30	49.7	32	78.5	38	63.2	41	91.5	45	72.4	48
	+ 15	41.5	29	35.2	31	52.4	33	43.7	35	69.4	40	55.9	43	81.3	46	64.5	49
	+ 20	35.9	32	30.5	34	45.2	35	37.8	37	60.3	42	48.7	44	71.1	48	56.6	50
<b>PWW 80/60</b>	- 15	88.2	11	74.2	14	112.3	19	93.0	23	144.0	31	114.9	36	164.0	41	128.6	46
	- 10	82.1	15	69.1	18	104.5	22	86.6	26	134.3	34	107.2	38	153.0	44	120.1	48
	- 5	76.1	18	64.1	21	96.8	25	80.2	29	124.6	36	99.6	41	142.3	46	111.8	50
	± 0	70.2	22	59.1	25	89.2	28	74.0	32	115.1	39	92.0	43	131.7	48	103.5	52
	+ 5	64.4	25	54.2	28	81.7	32	67.8	35	105.7	41	84.6	45	121.3	50	95.4	54
	+ 10	58.6	29	49.4	31	74.3	35	61.7	38	96.4	44	77.2	47	110.9	52	87.4	55
	+ 15	52.9	32	44.6	35	67.0	38	55.7	40	87.2	46	70.0	49	100.7	54	79.4	57
	+ 20	47.2	36	39.9	38	59.7	40	49.7	43	78.2	48	62.8	51	90.6	55	71.6	58
<b>PWW 90/70</b>	- 15	99.7	14	83.8	18	127.1	23	105.0	28	161.8	37	128.8	42	182.9	48	143.0	53
	- 10	93.6	18	78.7	22	119.3	27	98.6	31	152.0	39	121.0	45	172.0	50	134.5	55
	- 5	87.6	22	73.6	25	111.5	30	92.2	34	142.2	42	113.3	47	161.2	53	126.2	57
	± 0	81.6	25	68.6	29	103.8	33	85.8	37	132.7	45	105.8	49	150.6	55	118.0	59
	+ 5	75.7	29	63.7	32	96.2	36	79.6	40	123.2	47	98.3	52	140.1	57	109.8	61
	+ 10	69.8	33	58.3	36	88.7	39	73.5	43	113.9	50	90.9	54	129.7	59	101.8	63
	+ 15	64.1	36	54.0	39	81.3	42	67.4	46	104.7	52	83.6	56	119.5	61	93.9	65
	+ 20	58.4	40	49.2	42	74.0	45	61.4	48	95.6	55	76.4	58	109.4	63	86.0	66
Power input [kW] (3 x 400 V)	max. 0.75		max. 0.50		max. 0.75		max. 0.50		max. 0.75		max. 0.50		max. 0.75		max. 0.50		
Power cons. [A] (3 x 400 V)	max. 1.6		max. 0.85		max. 1.6		max. 0.85		max. 1.6		max. 0.85		max. 1.6		max. 0.85		
Air throw of wall mounted unit [m]*	30		23		30		22		28		20		26		20		
Air throw of ceiling unit [m]*	7.7		5.6		7.6		5.5		7.1		5.0		6.6		4.6		
Sound press. level dB [A]**	64		58		64		58		64		58		64		58		
Heat exchanger water content [l]	3.5				5.5				7.5				9.5				
Heat exchanger connections	R 1"				R 1½"				R 1½"				R 1½"				

\* When  $t_{LA} - t_{Room} = 10$  K

\*\* Sound pressure level at 5 m distance, measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

## TOPWING TLH-EC / TLH / TLHK-EC / TLHK SHUT-OFF SETS / FIXING ACCESSORIES



### SHUT-OFF SETS FOR HEAT EXCHANGER

Shut-off set in straight-through or right angle version for heat exchanger flow and return for TLH-EC / TLH 25: type 2/3/4, TLH-EC / TLH 40: type 2/3/4, TLH-EC / TLH 63: type 1, TLH-EC / TLH 100: type 1, TLHK-EC / TLHK 25 and TLHK-EC / TLHK 40 units suitable for heating water temperatures up to 110 °C and operating pressure up to 10 bar, consisting of the following:

1" fitting for flow and return connection with flat gasket

Automatic air vent valve (quick-action) with automatic shut-off valve

Drain & fill valve with cap and hose connection

Ball valves with 1" female thread in the flow and return

Optional connection, 3/4" male thread (e.g. for thermometer) in flow and return



### HYDRONIC BALANCING VALVE

DN 20	4 - 15 l/min
DN 20	8 - 30 l/min
DN 25	6 - 20 l/min
DN 25	10 - 40 l/min
DN 32	20 - 70 l/min
DN 40	30 - 120 l/min

### FLANGE SET

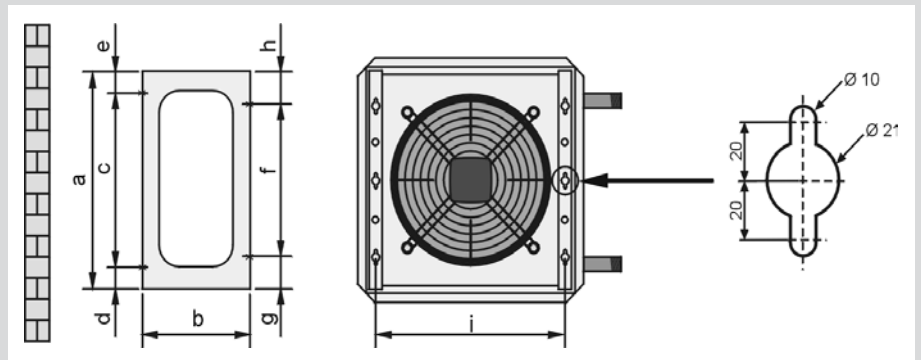
Consisting of 2 threaded flanges,  
2 welded flanges, 2 flat gaskets,  
plus hexagon bolts and nuts



DN 20	R 3/4"	LH-EC/LH 25, 40	Type 1
DN 25	R 1"	TLH-EC/TLH 25, 40	Type 2/3/4
		TLHK-EC/TLHK 25, 40	
		TLH-EC/TLH 63, 100	Type 1
DN 32	R 1 1/4"	TLH-EC/TLH 63	Type 2/3/4
		TLHK-EC/TLHK 63	
DN 40	R 1 1/2"	TLH-EC/TLH 100	Type 2/3/4
		TLHK-EC/TLHK 100	

**FIXING BRACKETS**

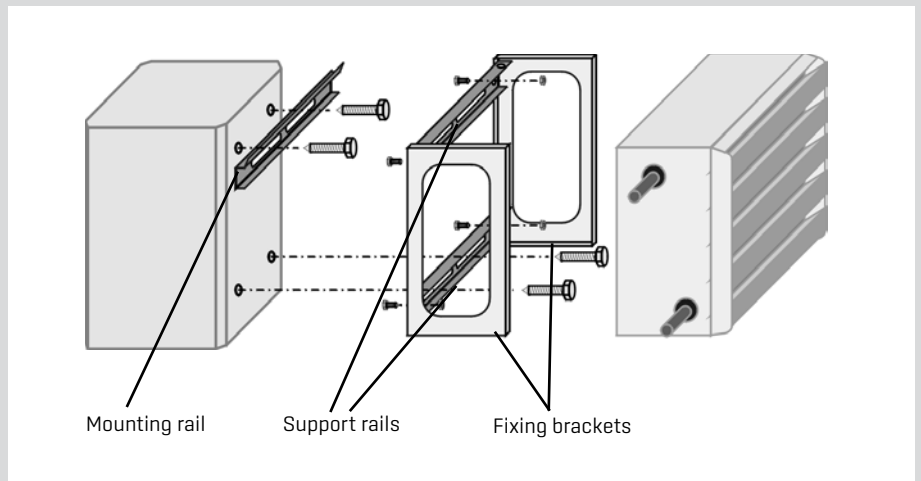
For wall or ceiling mounting; made from 2 mm sheet steel, powder-coated, traffic white RAL 9016. **Complete installation set**, consisting of: 2 brackets and hexagon bolts for mounting on the unit



Sizes	a	b	c	d	e	f	g	h	i
25	480	250	380	70	30	170	155	155	434
40	480	250	2x170	90	50	2x170	70	70	564
63	784	350	170+340+170	72	32	3x170	137	137	734
100	784	350	170+340+170	72	32	3x170	137	137	894

**FIXING SET FOR CONCRETE BEAM, VERTICAL**

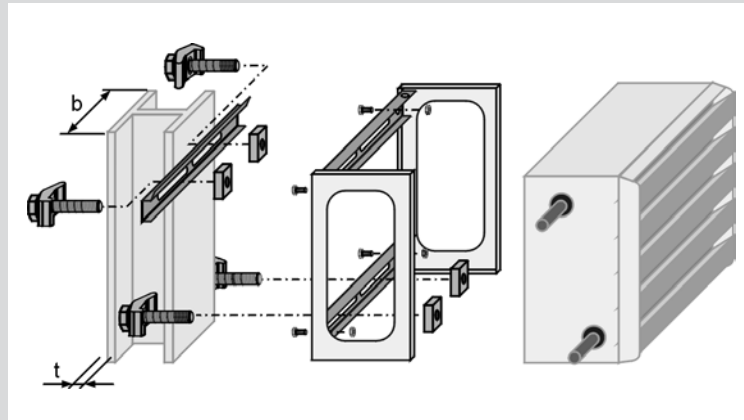
For fixing the air heater to a concrete beam by hooking it into a pre-assembled mounting rail. Provide rawl plugs and screws on site. Consisting of: mounting rail, 2 support rails [zinc-plated sheet steel], screws and nuts.



**TOPWING TLH-EC / TLH / TLHK-EC / TLHK**  
**FIXING ACCESSORIES**

**FIXING SET FOR STEEL BEAM,  
 VERTICAL**

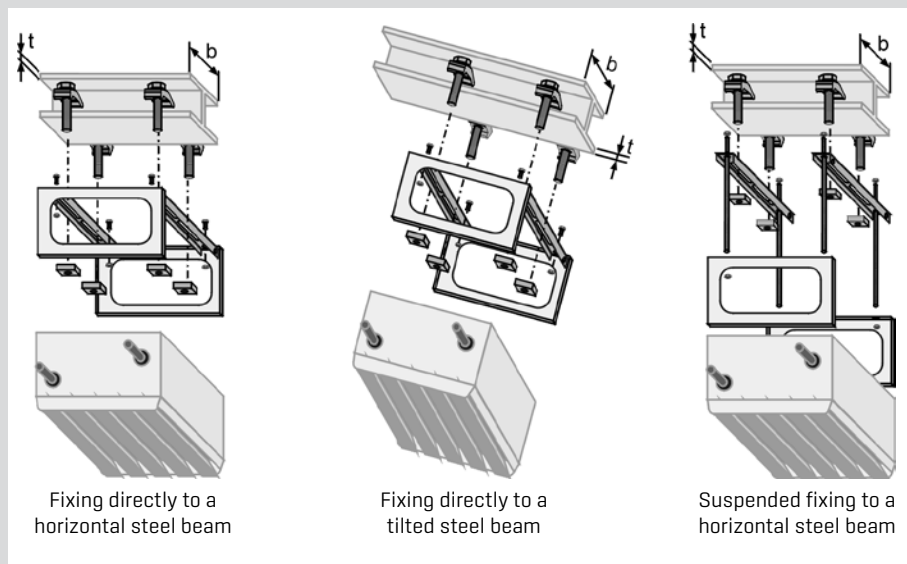
For fixing to a steel beam by hooking it into a pre-assembled installation rail using clamping claws. Suitable for all steel beams with a flange width "b" of 100 mm to 300 mm, and a flange thickness "t" of 6 mm to 21 mm. Consisting of: mounting rail, 2 support rails (zinc-plated sheet steel), 4 clamping claws, screws and nuts.



Sizes	b	t
25	100-300	6-21
40	100-300	6-21

**FIXING SET FOR HORIZONTAL AND  
 SLOPING STEEL BEAMS, WITH NO  
 SELF-ALIGNING BRACKETS**

For fixing to a horizontal or tilted steel beam with a flange width "b" of 100 mm to 300 mm, and a flange thickness "t" of 6 mm to 21 mm. Consisting of: 2 support rails (zinc-plated sheet steel), 4 clamping claws, screws and nuts. \* Provide M8 threaded rods on site. Installation examples:



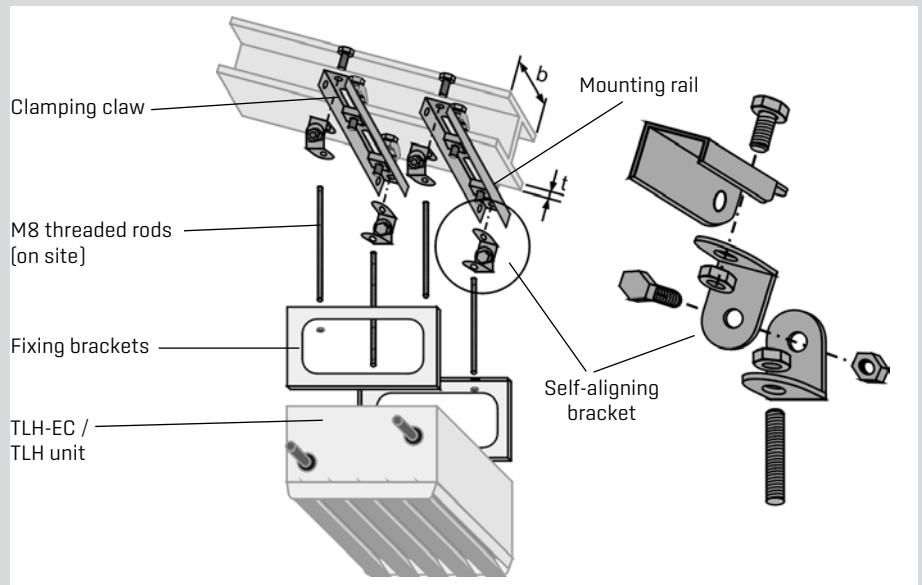
Sizes	b	t
25	100-300	6-21
40	100-300	6-21

**PLEASE NOTE**

Before using the fixing sets, check and factor in the static regulations of the on-site concrete pillars or steel beams. Installation only in standard units with a total depth of 300 mm.

**FIXING SET FOR  
SLOPING STEEL BEAM  
WITH SELF-ALIGNING BRACKETS**

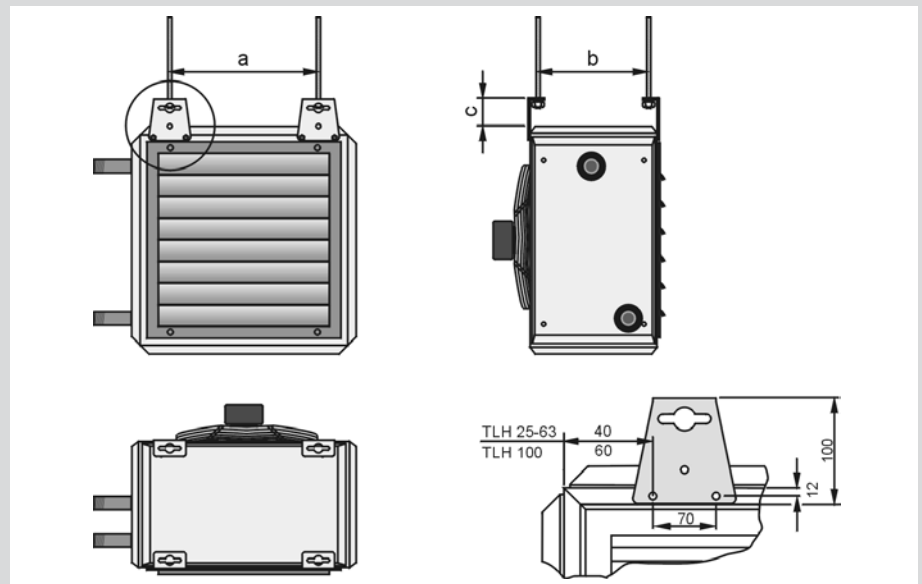
For fixing to a steel beam with a flange width "b" of 100 mm to 300 mm, and a flange thickness "t" of 6 mm to 21 mm.  
Consisting of: 2 support rails (zinc-plated sheet steel), 4 clamping claws, 4 self-aligning brackets, screws and nuts.



Sizes	b	t
25	100-300	6-21
40	100-300	6-21

**SUSPENSION TAB FOR  
SUSPENDING THE UNIT,  
HORIZONTAL AIR DUCT ROUTING**

For vertical mounting on a ceiling; powder-coated, traffic white RAL 9016.  
Suitable for mounting with threaded rods or perforated straps with horizontal air duct routing. [Set = 4 pce]

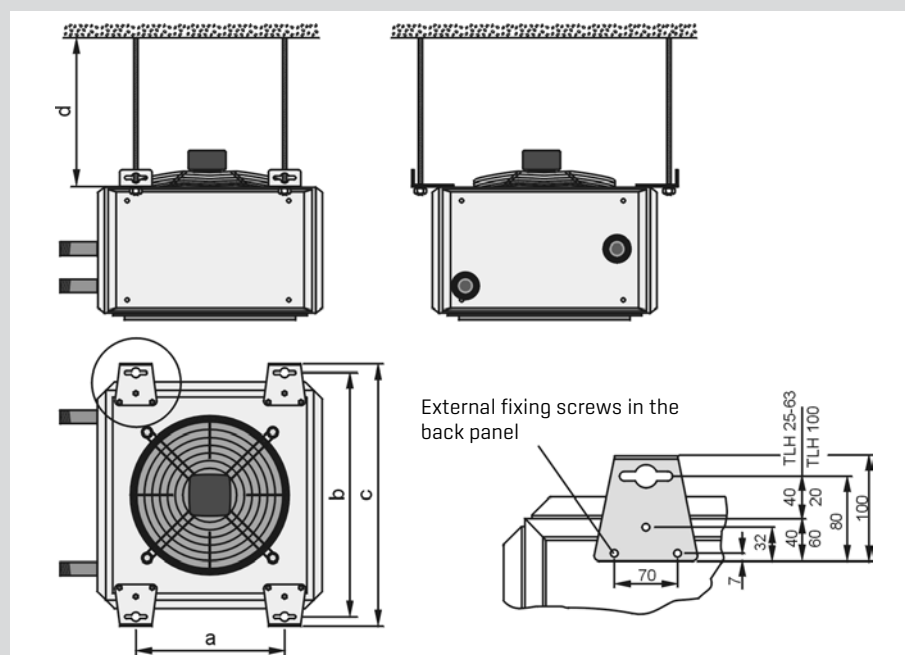


Sizes	a	b	c
25	350	266	60
40	480	266	60
63	650	266	60
100	810	306	60

## TOPWING TLH-EC / TLH FIXING ACCESSORIES

### SUSPENSION TAB FOR SUSPENDING THE UNIT, VERTICAL AIR DUCT ROUTING

For horizontal mounting on a ceiling; powder-coated, traffic white RAL 9016. Suitable for mounting with threaded rods or perforated straps with vertical air duct routing. [Set = 4 pce]

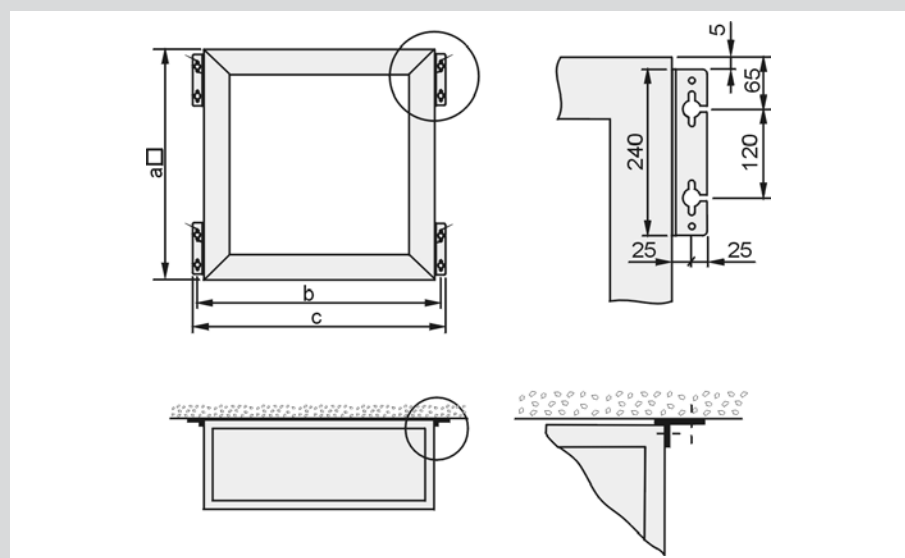


Sizes	a	b	c	d <sub>min</sub>
25	270	580	620	250
40	440	710	750	250
63	610	880	920	350
100	780	1040	1080	350

### MOUNTING BRACKET FOR INTAKE ACCESSORIES, LOOSE

For wall or ceiling mounting of the TLH-EC / TLH unit and wall mounting of the TLHK-EC / TLHK unit with fitted mixed air, recirculation air, outdoor air or filter box; powder-coated, traffic white RAL 9016.

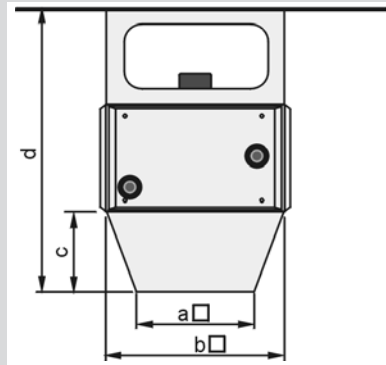
4 mounting brackets are required for fixing. These are provided with the relevant intake accessories. [Sealing against wall/ceiling on site.]



Sizes	a	b	c
25	500	550	600
40	630	680	730
63	800	850	900
100	1000	1050	1100

**DISCHARGE CONE**

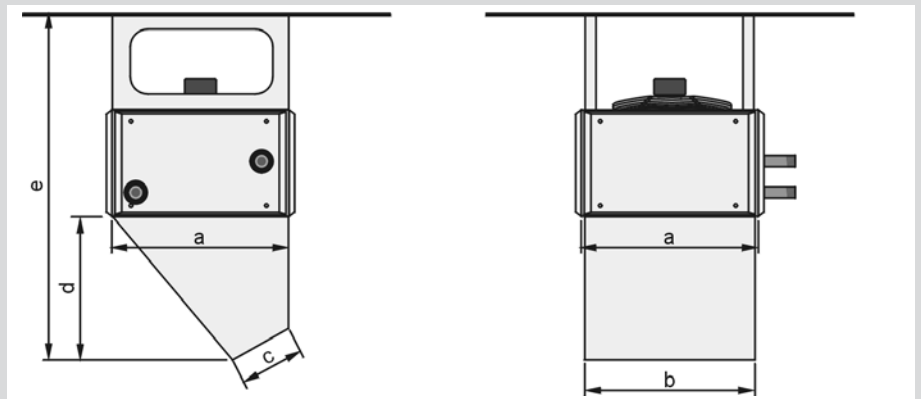
For increasing the air throw when the unit is installed at height.  
Powder-coated, traffic white RAL 9016.  
[For air throw values, see page 52 - 53.]



Sizes	a	b	c	d
25	280	460	200	750
40	370	590	240	790
63	430	760	270	920
100	530	920	320	1010

**DISCHARGE NOZZLE**

For a wider air throw; suitable as air curtain at doors.  
Discharge temperature for air curtain approx. 10-15 °C above room temperature.  
Powder-coated, traffic white RAL 9016.  
[For air throw values, see page 52 - 53.]



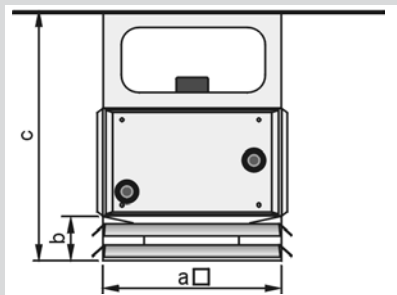
Sizes	a	b	c	d	e
25	460	420	190	390	940
40	590	550	250	480	1030
63	760	720	260	585	1235
100	920	880	320	685	1375

# TOPWING TLH-EC / TLH DISCHARGE ACCESSORIES

## FOUR-WAY DISCHARGE

With adjustable air guide fins, suitable for heating low rooms with even air distribution to all four sides.

Powder-coated, traffic white RAL 9016. Fins in "Wolf silver", similar to RAL 9006.



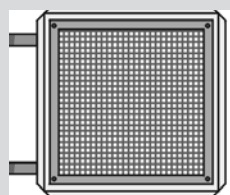
Sizes	a	b	c
25	500	155	705
40	630	155	705
63	800	155	805
100	1000	155	845

## WIDE SPREAD DISCHARGE

For greater lateral spread of the warm air stream.

Air jet cone up to approx. 120°; horizontal and vertical fins individually adjustable.

Powder-coated, "Wolf silver", similar to RAL 9006.



Wide spread discharge (for air throw values, see page 52 - 53)

## INDUCTION LOUVRE WITH SECONDARY AIR CONE



Wall mounted unit



Ceiling unit

To optimise the air throw and temperature distribution

### FUNCTION DESCRIPTION

The induction louvre with secondary air cone divides the warm air stream from the air heater into partial streams and draws secondary air (indoor air) from behind the fins directly into the core of the warm air stream.

The secondary air drawn in causes intensive mixing of the warm air with the indoor air over a very short distance, thus reducing the temperature of the discharge air.

This temperature reduction decreases the thermal lift of the warm air stream and as a result increases the air throw and consequently the depth of reach into the room, particularly at higher air discharge temperatures.

The induction louvre with secondary air cone (and therefore also the direction of the warm air stream) is infinitely adjustable manually or by motorised actuator, and can therefore be set to suit any operating or local conditions.

### ENERGY SAVINGS

Avoids high temperatures close to the ceiling and the associated ventilation and transmission heat losses. Energy savings of up to 15 % are achievable.

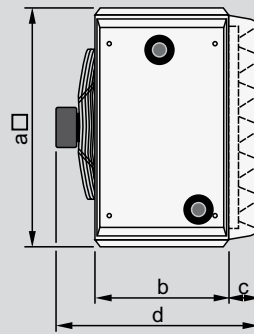
### STANDARD DELIVERY

Induction louvre with secondary air cone fitted to the unit, with 230 V/50 Hz servomotor, controlled by pushbuttons; alternatively 24 V servomotor, switched by the LM2 ventilation module.

Alternative: induction louvre with secondary air cone, manually adjustable



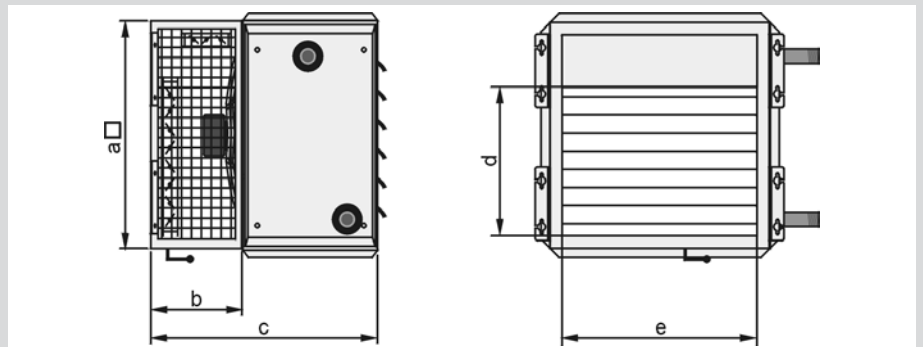
**DIMENSIONS OF STANDARD  
UNIT AND INDUCTION LOUVRE  
WITH SECONDARY AIR CONE**



TLH-EC / TLH	a	b	c	d
25	540	300	120	530
40	670	300	120	535
63	840	300	120	540
100	1040	340	120	605

**MIXING BOX**

For individual adjustment of the outdoor air flow rate. Outdoor air intake at the back, recirculation air intake at the side or, when the mixed air box is rotated by 90°, from above/below. Powder-coated, traffic white RAL 9016. Variable adjustment between pure recirculating air mode via mixed air to pure outdoor air mode by hand or using a 230 V servomotor. Infinitely variable in conjunction with the LM2 ventilation module [24 V].

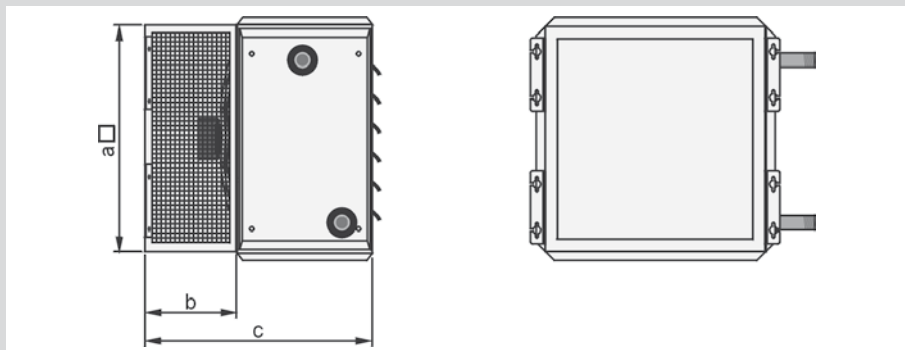


TLH-EC / TLH TLHK-EC/TLHK	a	b	c	d	e
25	500	500	800	245	400
40	630	500	800	360	530
63	800	500	800	530	700
100	1000	540	880	690	860

# TOPWING TLH-EC / TLH INTAKE ACCESSORIES

## RECIRCULATION AIR BOX

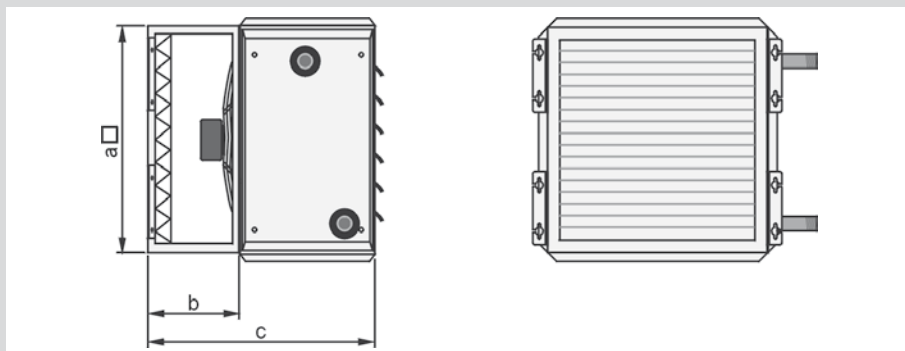
Recirculation air box for recirculation air intake through two grilles at the side or, when rotated by 90°, from above/below. Powder-coated, traffic white RAL 9016.



Sizes	a	b	c
25	500	300	600
40	630	500	600
63	800	500	600
100	1000	540	680

## FILTER BOX

With filter element as dust trap in outdoor air and mixed air modes; filter category ISO Coarse 45% [G4]. Mounting bracket on request. Powder-coated, traffic white RAL 9016.



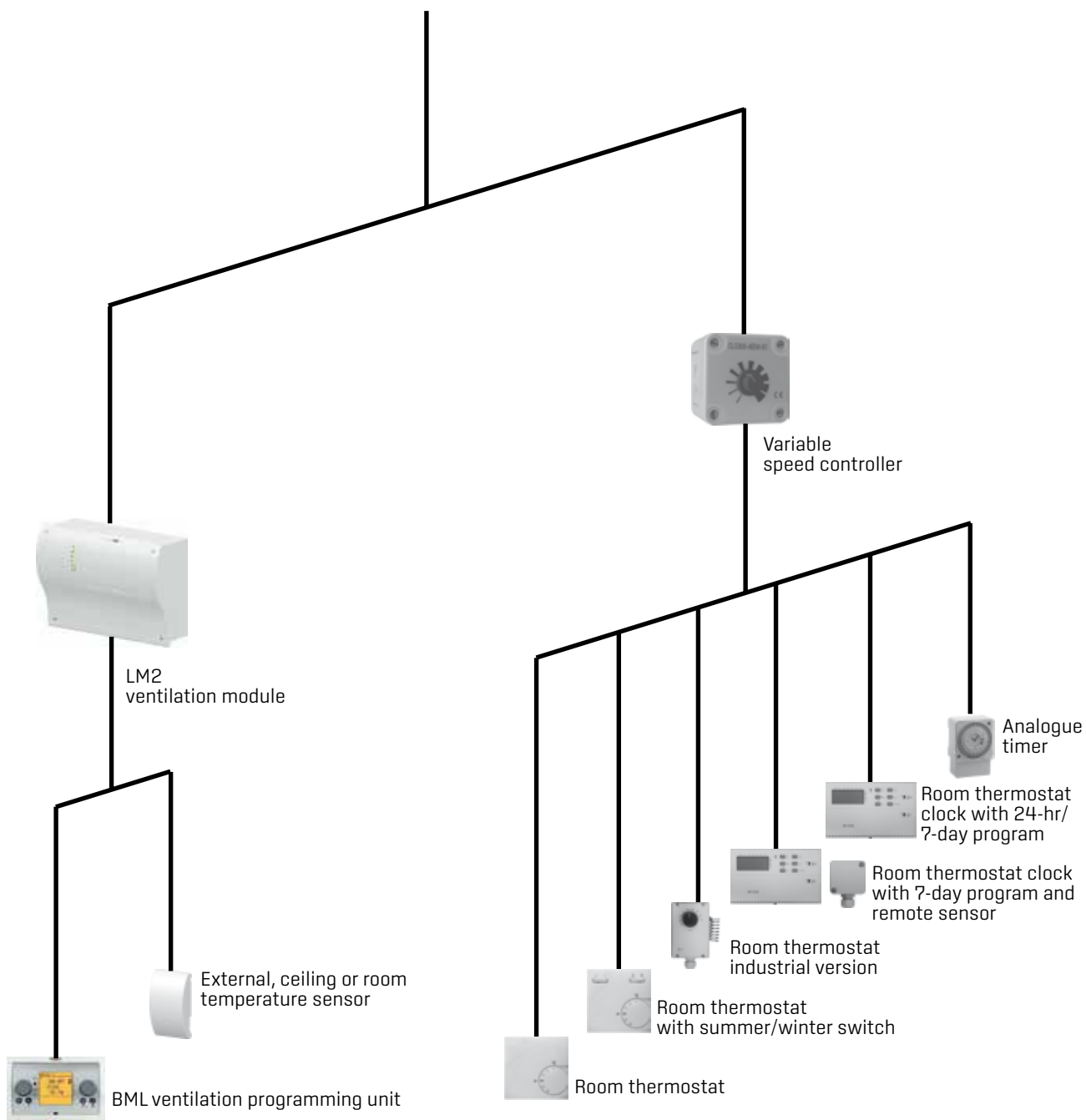
Sizes	a	b	c
25	500	300	600
40	630	300	600
63	800	300	600
100	1000	340	680

<b>TOPWING TLH / TLHK CONTROL UNIT / ELECTRICAL CONNECTION</b>	<b>27-51</b>
Switching devices and control modules TLH-EC	28
Switching devices and control modules TLH	29
Switching devices TLH	30-33
Actuators for outdoor or mixed air TLH-EC / TLH	34
Switching devices for damper actuators TLH-EC / TLH	35
Room thermostats TLH-EC / TLH	36
Thermostats, terminal box TLH-EC / TLH	37
WRS control unit for TLH-EC / TLH	38-39
WRS control unit - examples	40-43
5-stage electrical step switch for 0 - 10 V TLH / TLHK	44
Room thermostats TLHK-EC / TLHK	45
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Electrical connection / special drive units TLH / TLHK	49
Electrical connection TLH-EC / TLHK-EC	50

# TOPWING TLH-EC / TLHK-EC SWITCHING DEVICES AND CONTROL MODULES



Variable speed control  
EC fan, 230 V



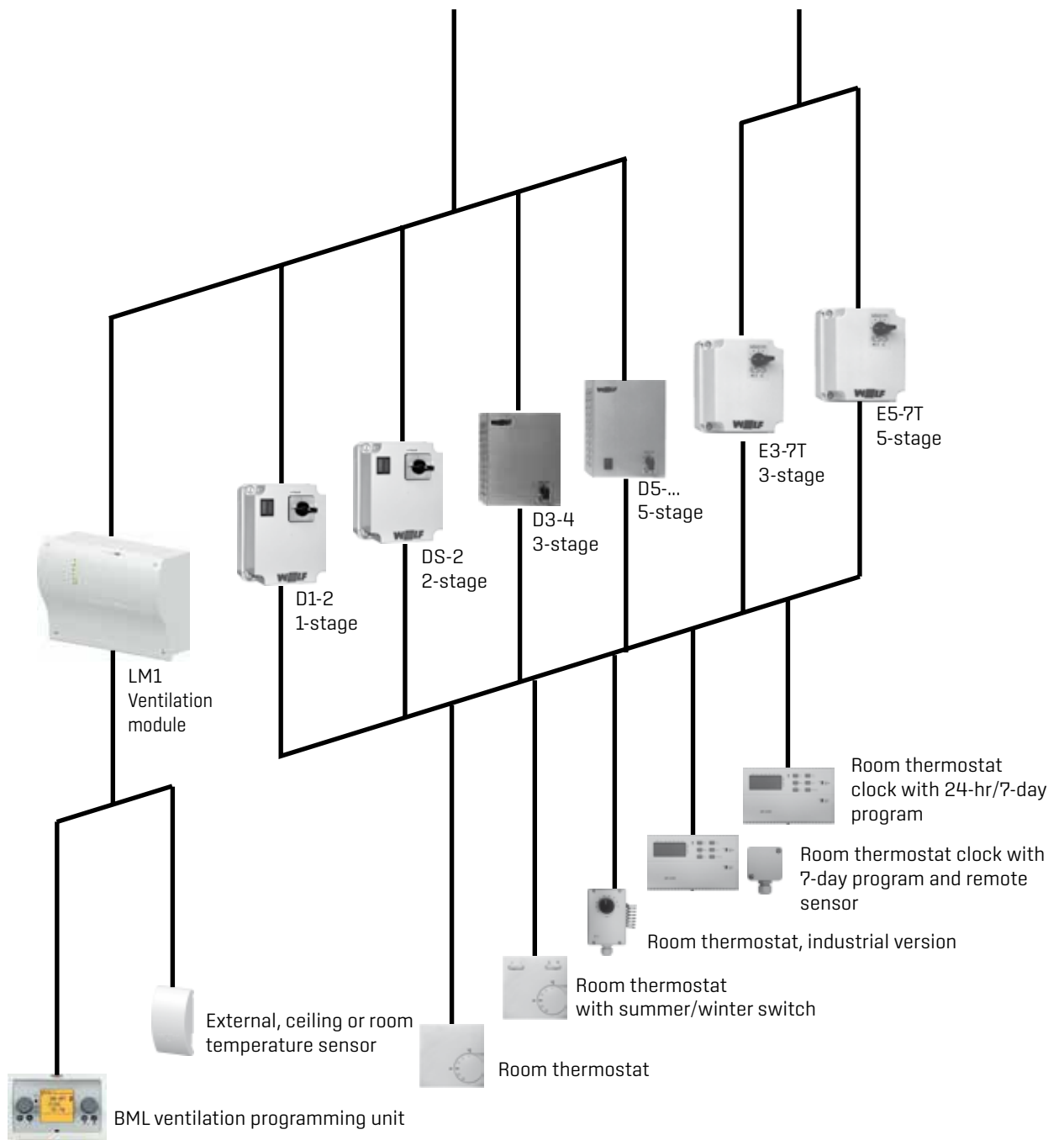
**TOPWING TLH**  
SWITCHING DEVICES AND CONTROL MODULES



Three-phase motor  
3 x 400 V



Single phase AC motor  
1 x 230 V



# TOPWING TLH SWITCHING DEVICES

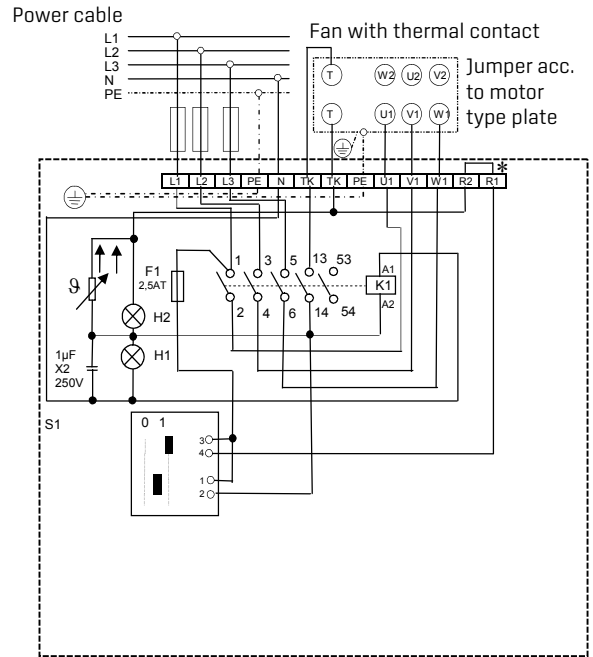
## 1-STAGE STEP SWITCH D1-2

For single speed operation of one or more air heaters with full motor protection and interlock preventing unintentional restart.



Operating voltage	400 V
Control voltage	230 V
Max. current	8 A
Weight	0.9 kg
IP rating	IP 54

Interlocked shutdown when winding temperature exceeds limit [motor].  
Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact K1 53-54 - heating demand

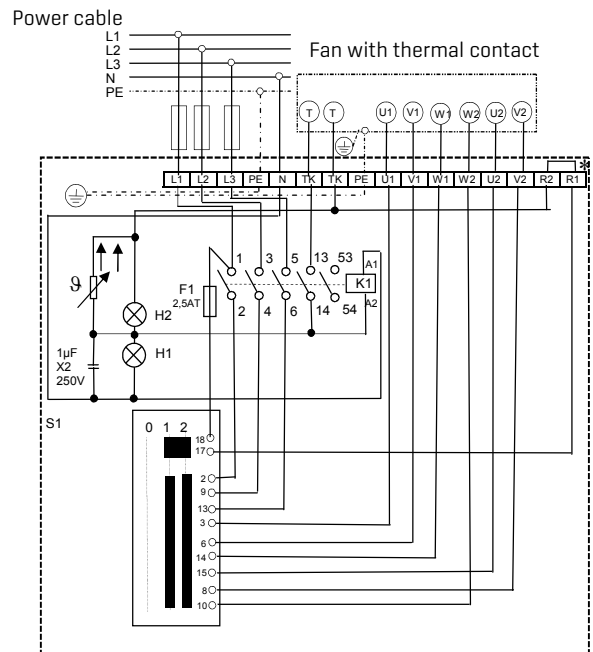
## 2-STAGE STEP SWITCH DS-2

For 2-speed operation of one or more air heaters with full motor protection and interlock preventing unintentional restart.



Operating voltage	400 V
Control voltage	230 V
Max. current	8 A
Weight	0.9 kg
IP rating	IP 54

Interlocked shutdown when winding temperature exceeds limit [motor].  
Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact K1 53-54 - heating demand

F2-4 5.0 AT

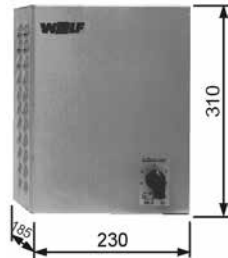
### NOTE:

No motor guarantee without switching devices for full motor protection.  
If the permissible winding temperature is exceeded, without a switching device for full motor protection, the motor may be irreparably damaged.

**Full motor protection switch for 3 x 230 V on request.**

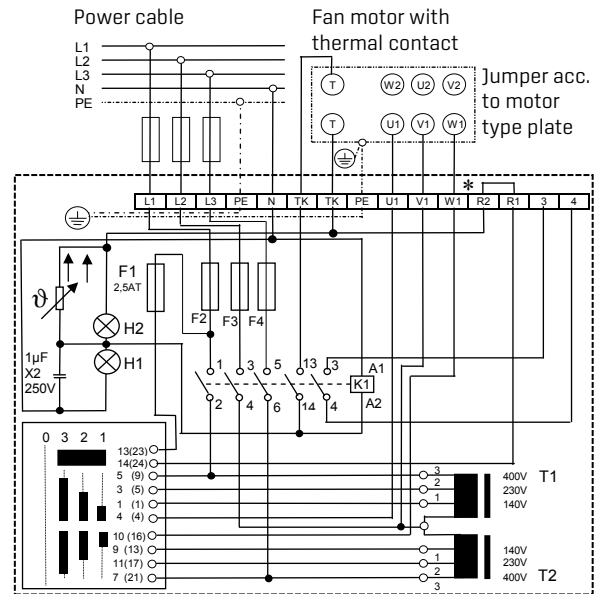
**3-STAGE STEP SWITCH D 3-4  
WITH INTERLOCK PREVENTING UNINTENTIONAL  
RESTART**

For 3-speed operation of one or more air heaters with full motor protection.



Operating voltage	400 V
Control voltage	230 V
Max. current	4 A
Weight	8.0 kg
IP rating	IP 20

Interlocked shutdown when winding temperature exceeds limit [motor] Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact 3/4 - heating demand  
F2-4 = D5-1 - 1.25 AT [6.3x32 mm]

**5-STAGE STEP SWITCH D 5...**

For 5-speed operation of one or more air heaters with full motor protection and interlock preventing unintentional restart.



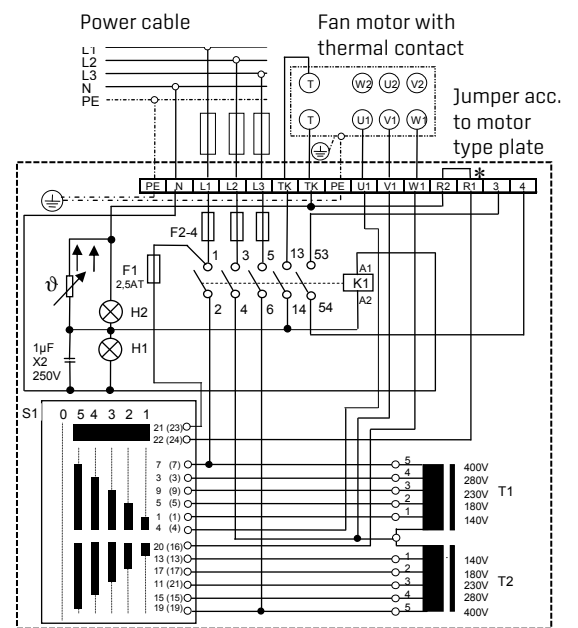
Dimensions

TYPE		D5-1	D5-3	D5-7	D5-12	D5-19
Width	A	150	230	230	230	310
Height	B	200	310	310	310	385
Depth	C	175	185	185	185	225

Dimensions

TYPE		D5-1	D5-3	D5-7	D5-12	D5-19
Operating voltage	V	400	400	400	400	400
Control voltage	V	230	230	230	230	230
Max. current	A	1	2	4	7	12
Weight	kg	4.5	7	9	19	27
IP rating	IP	40	20	20	20	20

Interlocked shutdown when winding temperature exceeds limit [motor]. Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact 3/4 - heating demand  
F2-4 = D5-1 - 1.25 AT [6.3x32 mm]

**NOTE:**

No motor guarantee without switching devices for full motor protection. If the permissible winding temperature is exceeded, without a switching device for full motor protection, the motor may be irreparably damaged.

**Full motor protection switch for 3 x 230 V on request.**

# TOPWING TLH SWITCHING DEVICES

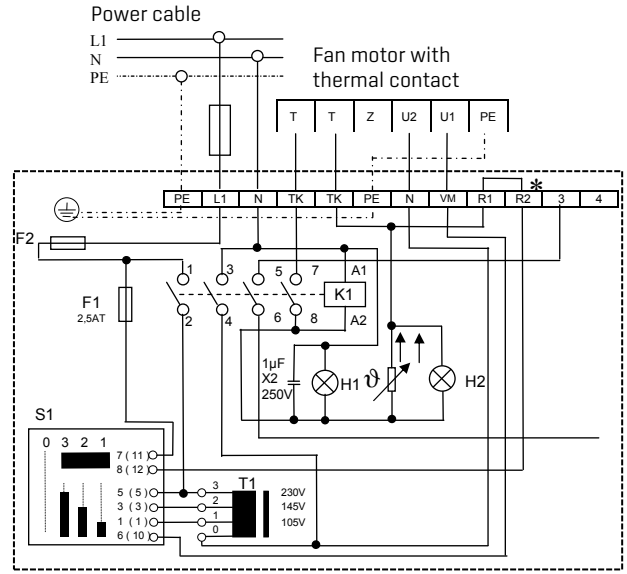
## 3-STAGE STEP SWITCH E 3-7T WITH INTERLOCK PREVENTING UNINTENTIONAL RESTART

For 3-speed operation of one or more air heaters with single phase AC motor with full motor protection.



Operating voltage	230 V
Max. current	7 A
Weight	4.5 kg
IP rating	IP 40

Interlocked shutdown when winding temperature exceeds limit (motor). Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact 3/4 - heating demand

F2 - 8.0 AT [ 6.3x32 mm ]

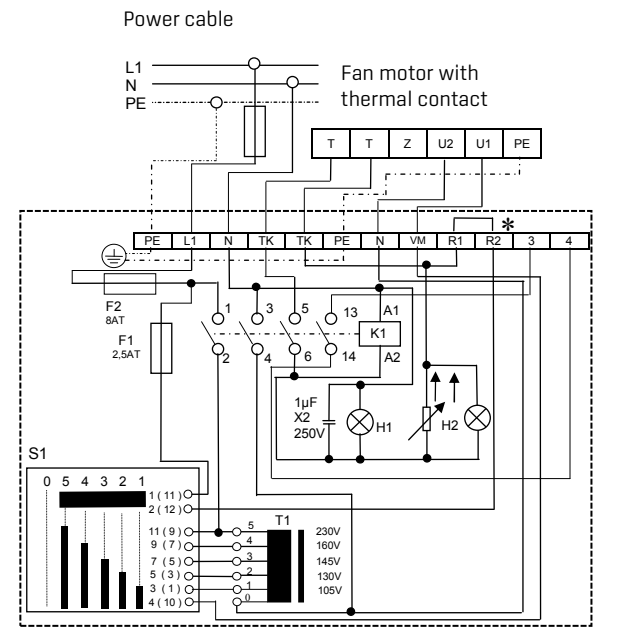
## 5-STAGE STEP SWITCH E 5-7T WITH INTERLOCK PREVENTING UNINTENTIONAL RESTART

For 5-speed operation of one or more air heaters with single phase AC motors with full motor protection.



Operating voltage	230 V
Max. current	7 A
Weight	4.5 kg
IP rating	IP 40

Interlocked shutdown when winding temperature exceeds limit (motor). Restart: set the step switch to 0, then set the required speed stage.



\* Remove jumper if connecting a room thermostat  
H1 - Operation (green), H2 - Fault (red)  
S1/K1 - Contact assignment depending on make  
T - TB/TW thermal contact  
Contact 3/4 - heating demand

**NOTE:** No motor guarantee without switching devices for full motor protection. If the permissible winding temperature is exceeded, without a switching device for full motor protection, the motor may be irreparably damaged.

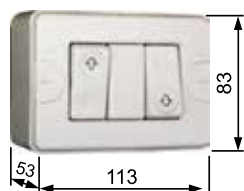
**Full motor protection switch for 3 x 230 V on request.**



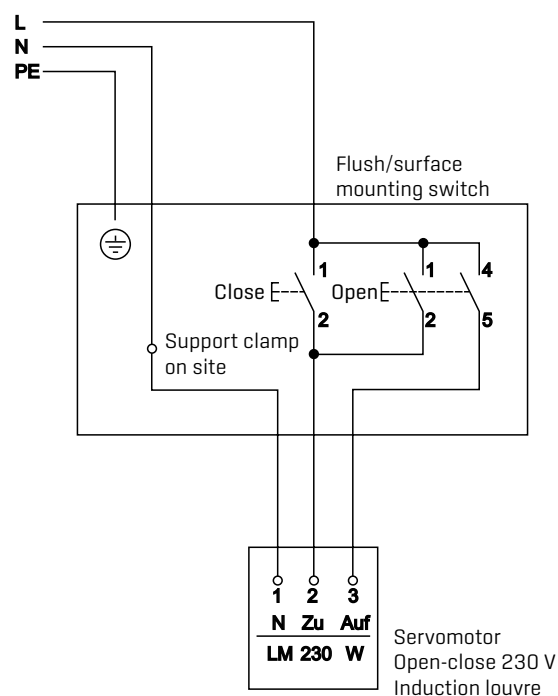
**PUSHBUTTONS FOR 230 V / 50 HZ ACTUATOR  
INDUCTION LOUVRE WITH SECONDARY AIR CONE**

For surface/flush mounting;

for variable adjustment of the induction louver to optimise the air throw.



Operating voltage	230 V
Max. current	10 A
IP rating	IP 20



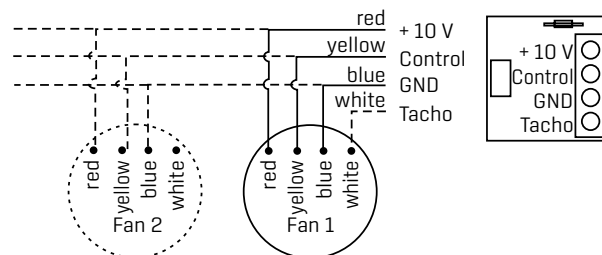
**VARIABLE SPEED CONTROLLER 0-10 V**

For variable operation of one or more air heaters with EC motor

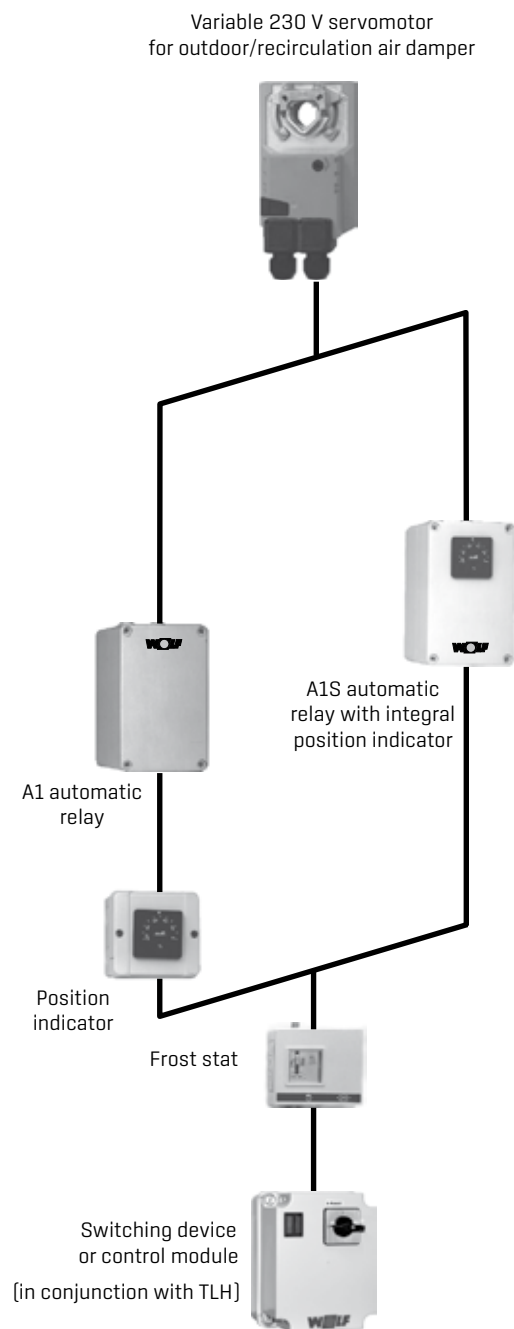
Up to 10 TLH-EC / TLHK-EC units can be operated at variable speed with one speed controller.



Operating voltage	10 V [DC]
Control voltage	0-10 V [DC]
Max. current	1.1 mA
Pressure drop	0-10 kOhm [Lin]
Weight	0.1 kg
IP rating	IP 54



## TOPWING TLH-EC / TLH ACTUATORS FOR MIXED AIR



### Servomotor OPEN - CLOSE 230 V

For motorised actuation of an outdoor air damper in conjunction with the A1 automatic relay.

Starting up the TLH-EC / TLH; → outdoor air damper opens

Shutting down the TLH-EC / TLH or frost protection cuts in; → outdoor air damper closes

### Variable servomotor 230 V or 24 V

For variable motorised actuation of outdoor/recirculation air dampers in conjunction with the A1 automatic relay and a position indicator in the control panel or on finished walls or with the A1S automatic relay with integral position indicator.

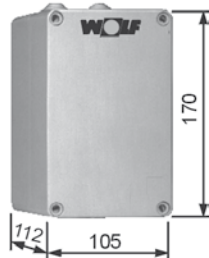
Starting up the TLH/EC / TLH → outdoor air damper opens up to the selected setting; the recirculation air damper closes accordingly.

Shutting down the TLH-EC / TLH or frost protection cuts in; → outdoor air damper closes the recirculation air damper opens 100 %.

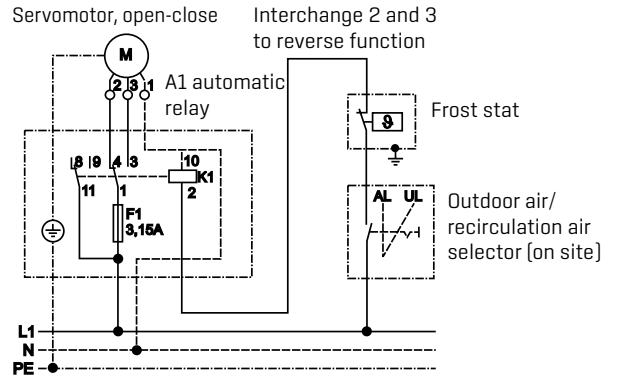
**A1 AUTOMATIC RELAY**

Auxiliary relay for automatic actuation of the outdoor air damper with 230 V "open-close" servomotor.

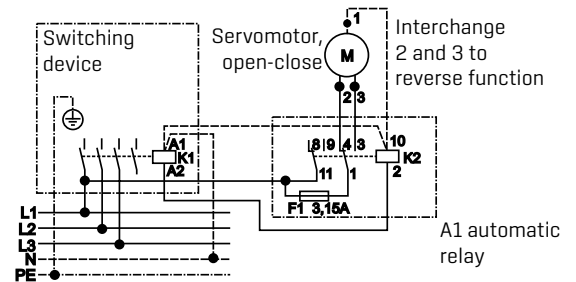
When the TLH-EC / TLH unit is switched off or the frost stat cuts in, the A1 automatic relay moves the servomotor to the "close" position. When the unit is switched on, the servomotor is moved to the "open" position.



Operating voltage	230 V
Max. output	1.5 kW
Weight	0.5 kg
IP rating	IP 54



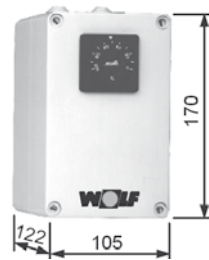
Circuit diagram in conjunction with TLH



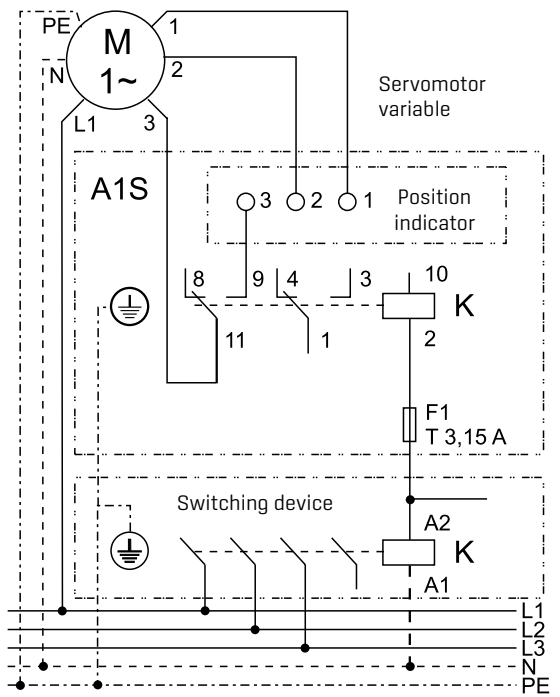
**A1S AUTOMATIC RELAY**

Auxiliary relay with integral position indicator for automatic actuation of the mixed air damper with 230 V variable servomotor.

When the TLH-EC / TLH unit is switched off or the frost stat cuts in, the A1S automatic relay moves the servomotor to the "close" position.

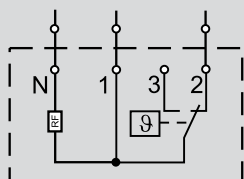
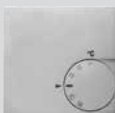


Control voltage	230 V
Max. output	1.5 kW
Weight	0.5 kg
IP rating	IP 54



Circuit diagram in conjunction with TLH

## TOPWING TLH-EC / TLH ROOM THERMOSTATS



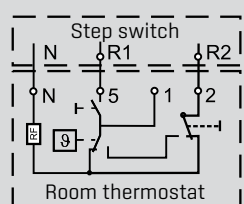
### ROOM THERMOSTAT

In plastic casing 75 x 75 x 25 mm for surface mounting. Breaking capacity for heating 10(4)A, cooling 5(2)A at 230 V / 50 Hz, thermal feedback.

Temperature range 5-30 °C

Switching differential 0.5 K

Protection rating IP 30



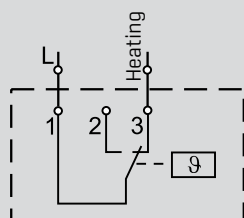
### ROOM THERMOSTAT WITH SUMMER/WINTER SWITCH

In plastic casing 75 x 75 x 25 mm for surface mounting. Breaking capacity for heating 10(4)A, cooling 5(2)A at 230 V / 50 Hz, thermal feedback.

Temperature range 5-30 °C

Switching differential 0.5 K

Protection rating IP 30



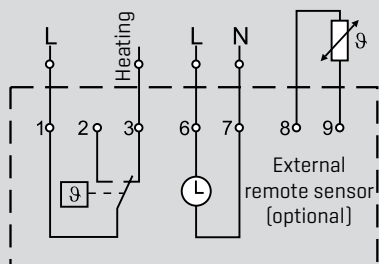
### ROOM THERMOSTAT IN INDUSTRIAL VERSION

In plastic casing 145 x 112 x 68 mm for surface mounting. Breaking capacity 16(4) A at 230 V / 50 Hz

Temperature range 0-40 °C

Switching differential  $\pm 0.75$  K

Protection rating IP 54



### ROOM THERMOSTAT CLOCK WITH 7-DAY PROGRAM

In plastic casing 132 x 82 x 32 mm for installation in plug-in base; day and night temperatures can be adjusted separately.

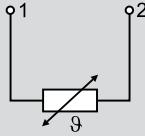
Temperature setback can be adjusted by 2-10 K

Breaking capacity 10(4)A at 230 V / 50 Hz

Temperature range 5-40 °C

Switching differential adjustable  $\pm 0.1$  to 3 K

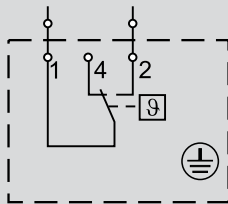
Protection rating IP 20



**REMOTE SENSOR FOR ROOM THERMOSTAT CLOCK**

In plastic casing 52 x 50 x 35 mm for installation in plug-in base.

Protection rating IP 54



**FROST STAT**

When the air discharge temperature falls below the adjustable value, the frost stat switches the LH-EC / LH unit off to prevent frost damage to the heat exchanger. When the air discharge temperature rises, the TLH-EC / TLH unit starts again automatically.

The frost stat must be wired in series to the thermistors.

Breaking capacity 10 A at 230 V / 50 Hz

Setting range 2 °C to 20 °C

Switching differential 2.5 K

Protection rating IP 43

Dimensions W x H x D 85 x 75 x 40 mm



**INTERMEDIATE TERMINAL BOX**

Intermediate terminal box for parallel wiring of up to 3 TLH units with 3 x 400 V, 50 Hz motors.

Protection rating IP 54

Dimensions W x H x D 105 x 170 x 112 mm



**Omnipolar ISOLATOR AR8**

Fitted and wired.

## TOPWING TLH-EC / TLH CONTROL UNIT (WRS)



### BML VENTILATION PROGRAMMING UNIT

- Room temperature-dependent control
- Graphic display with backlighting
- Easy user prompts via plain text display
- Control by rotary selector with pushbutton function
- 4 function keys for frequently used functions [info, temperature settings, speed settings, fresh air proportion]
- Installation either in the ventilation module or in the wall mounting base as a remote control
- Only one BML ventilation programming unit required to control up to 7 zones
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface



### WALL MOUNTING BASE

Wall mounting base for using the BML ventilation programming unit as a remote control.



### LM1 VENTILATION MODULE (INCL. ROOM TEMPERATURE SENSOR)

- Ventilation module for controlling air heaters with a two-stage motor
- Easy controller configuration by selecting one of the pre-defined system schemes
- Demand-optimised room temperature control via air heater speed
- Switching of the heating circuit pump
- Switching of one heat generator
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface with automatic energy management
- BML ventilation programming unit can be clipped into place



### LM2 VENTILATION MODULE

- LM2 ventilation module to control the room temperature via speed or mixer
- 2-stage motor control in conjunction with LM1 ventilation module or variable motor control via 0-10 V signal in conjunction with EC fan
- Easy controller configuration by selecting one of the pre-defined system schemes
- Switching of one heat generator
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface with automatic energy management
- BML ventilation programming unit can be clipped into place
- Mixed air damper control [in conjunction with 24 V servomotor]
- Induction louvre control



### EXTERNAL, CEILING OR ROOM TEMPERATURE SENSOR



**DIFFERENTIAL PRESSURE SWITCH**

Differential pressure switch, loose, for on-site control.



**5-STAGE STEP SWITCH**

Electronic 5-stage speed controller, input 0-10 V.



**SUPPLY AIR SENSOR AND SENSOR RETAINER**

For measuring the supply air temperature.



**ISM 5 LON INTERFACE MODULE**

For connecting LM1 and LM2 ventilation modules to a building management system using LON standard network variables.

# TOPWING TLH-EC CONTROL UNIT (WRS)

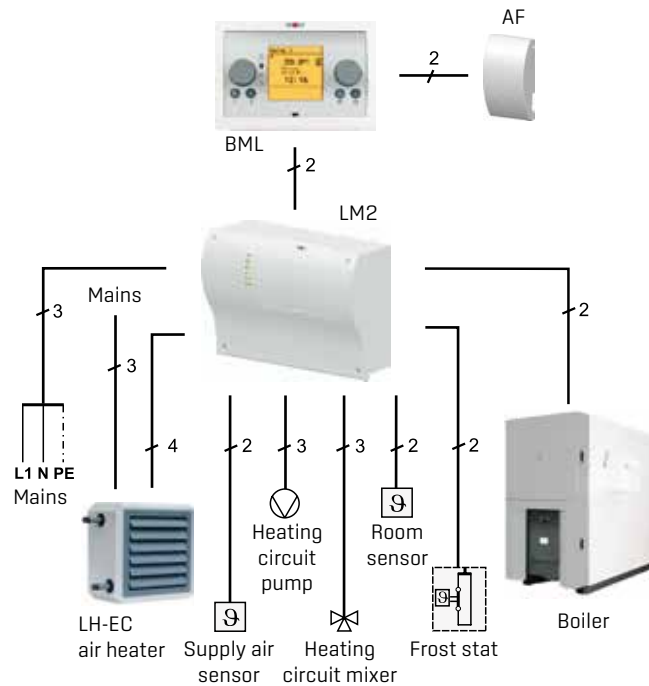
## LM2 VENTILATION MODULE WITH BML IN CONJUNCTION WITH TLH-EC

### DESCRIPTION

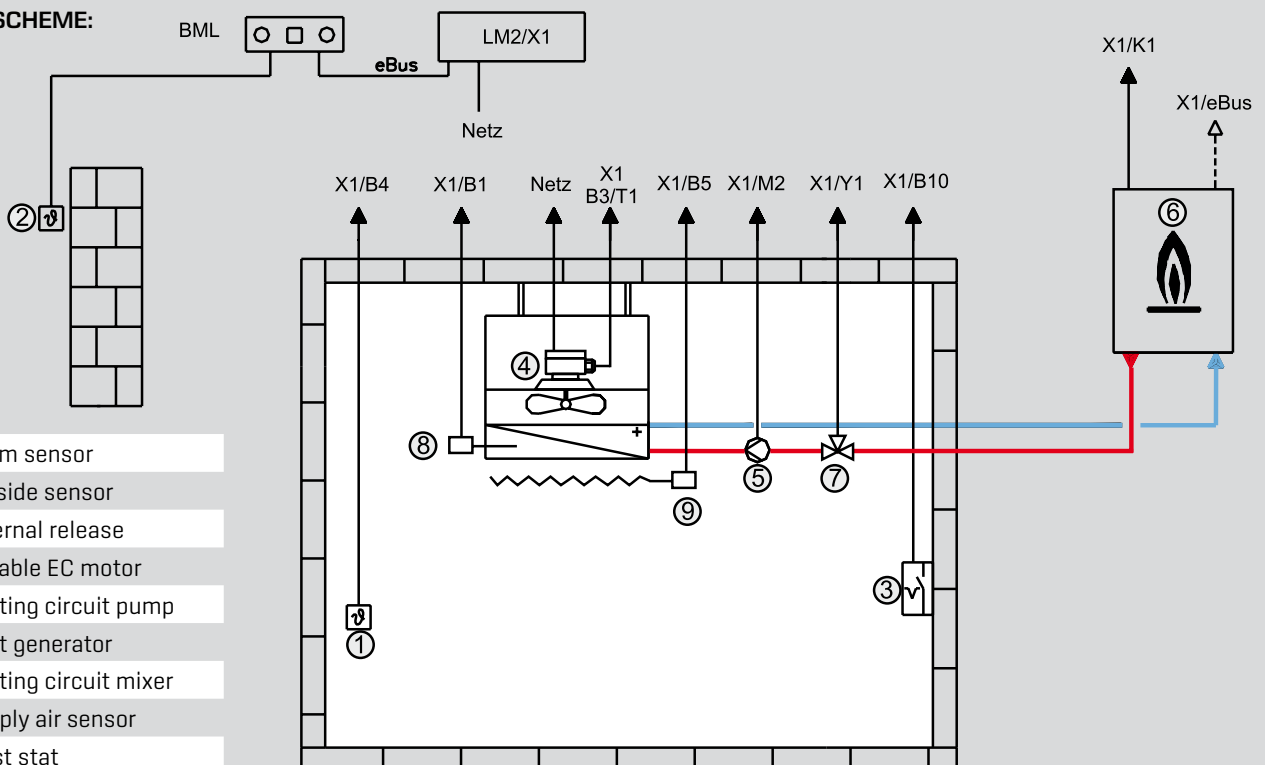
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fan, heating circuit pump, heat generator and heating circuit mixer are switched on or off subject to demand.

There is the possibility of preselecting mixer or variable speed control.

Example:  
Ventilation unit, heating with room control



### SYSTEM SCHEME:



- 1 Room sensor
- 2 Outside sensor
- 3 External release
- 4 Variable EC motor
- 5 Heating circuit pump
- 6 Heat generator
- 7 Heating circuit mixer
- 8 Supply air sensor
- 9 Frost stat

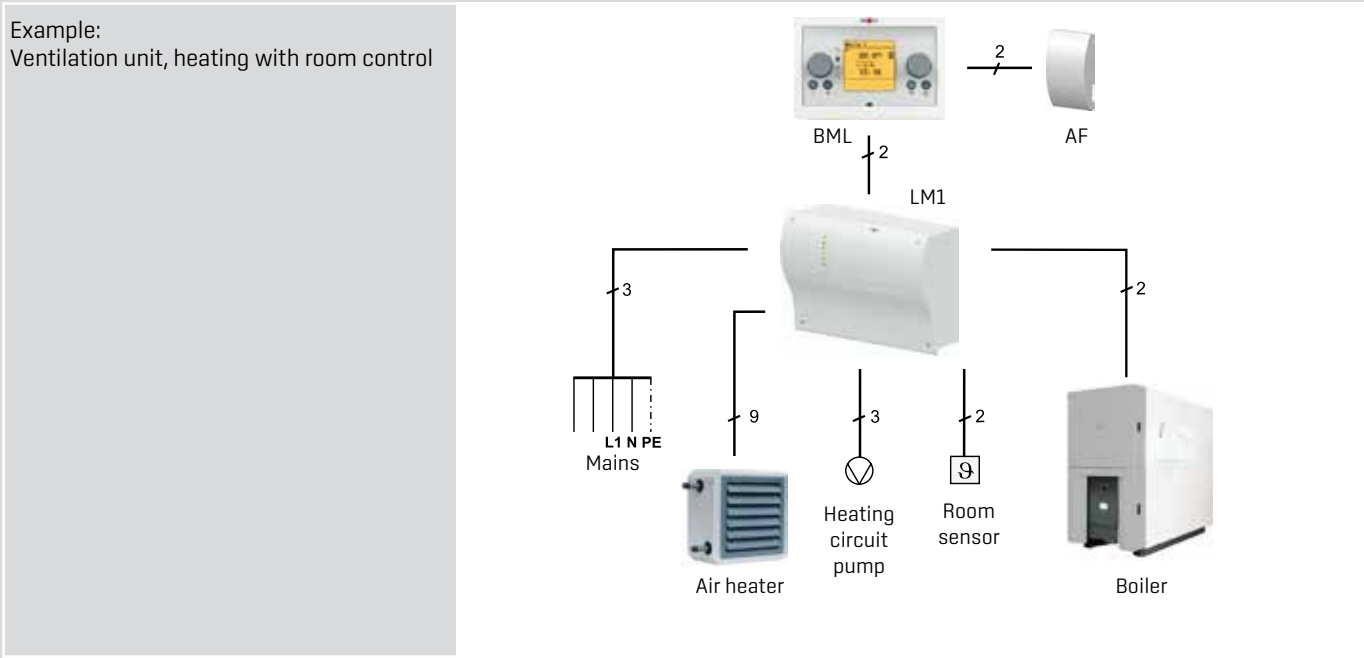


**LM1 VENTILATION MODULE WITH BML**

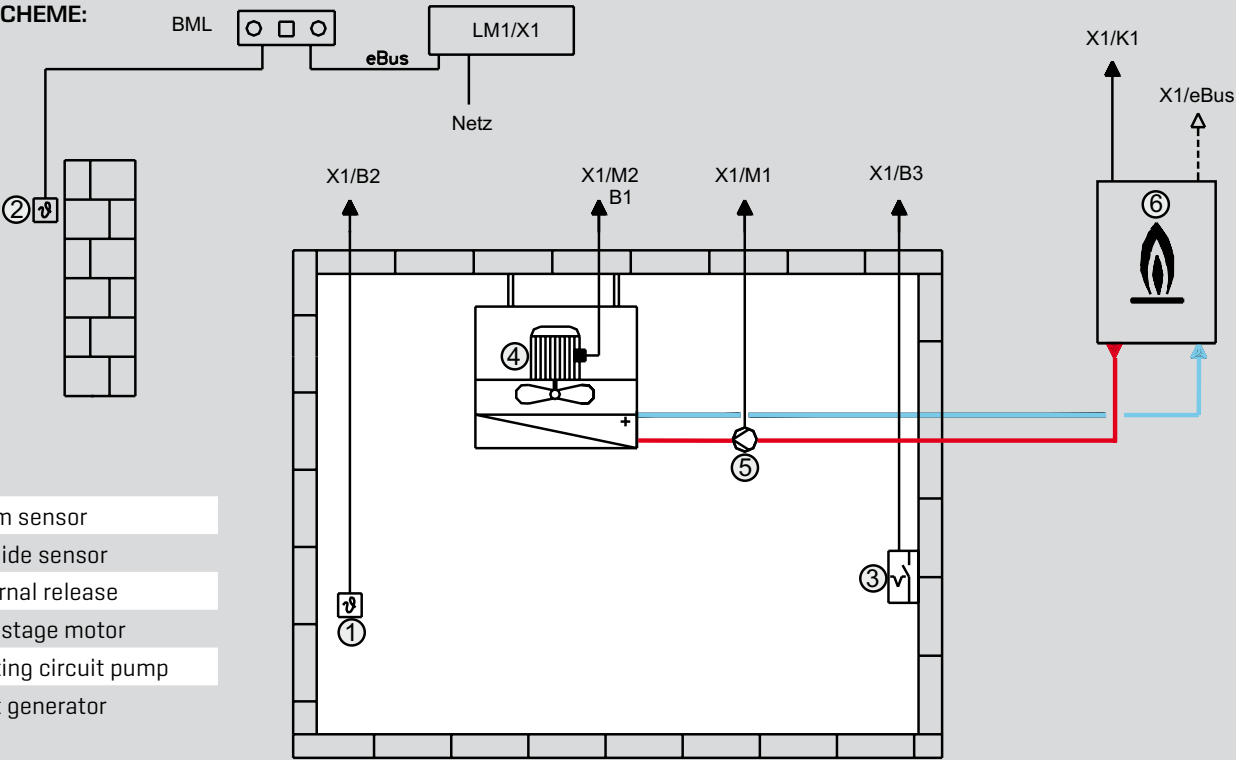
**DESCRIPTION**

This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor and the fan, heating circuit pump and heat generator are switched on or off subject to demand.

If the temperature deviation [set room temperature to actual room temperature] is low, the fan is operated in stage 1. If the temperature deviation is greater, it is switched to stage 2.



**SYSTEM SCHEME:**



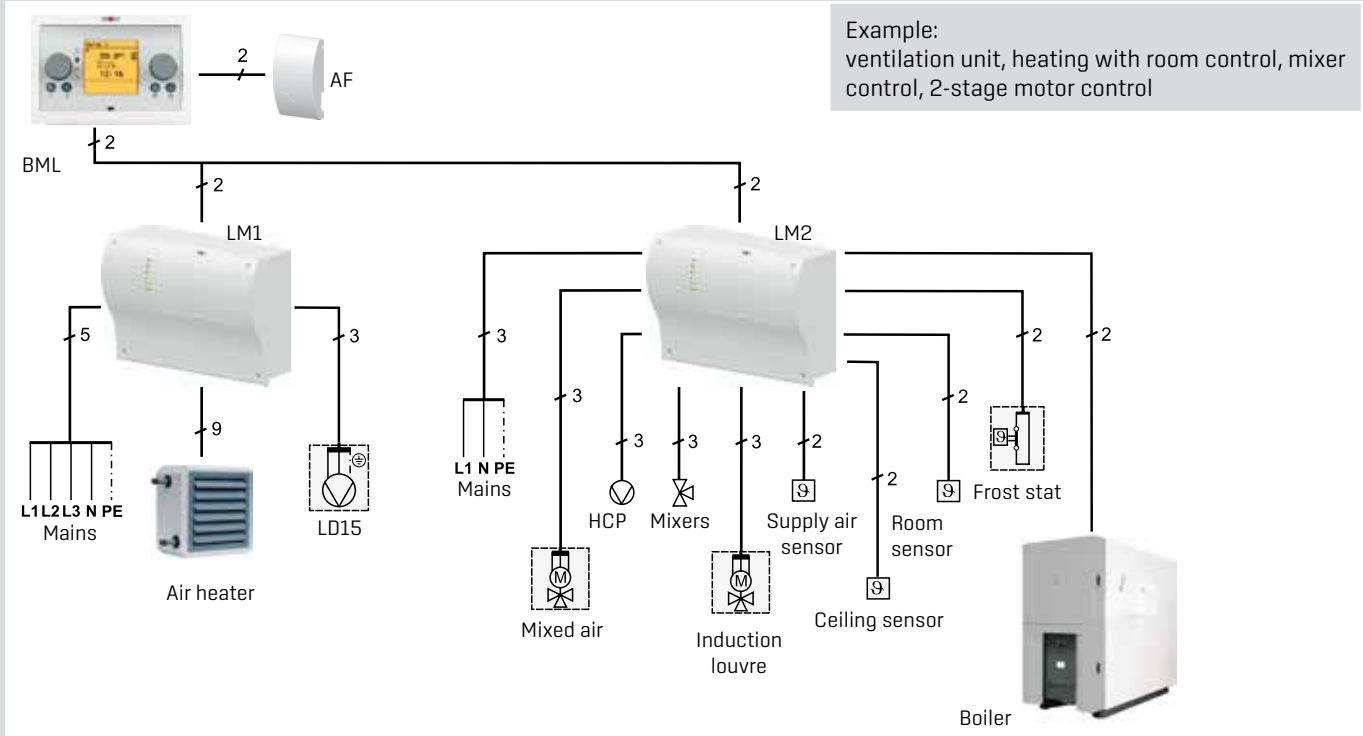
- 1 Room sensor
- 2 Outside sensor
- 3 External release
- 4 Two-stage motor
- 5 Heating circuit pump
- 6 Heat generator

# TOPWING TLH CONTROL UNIT (WRS)

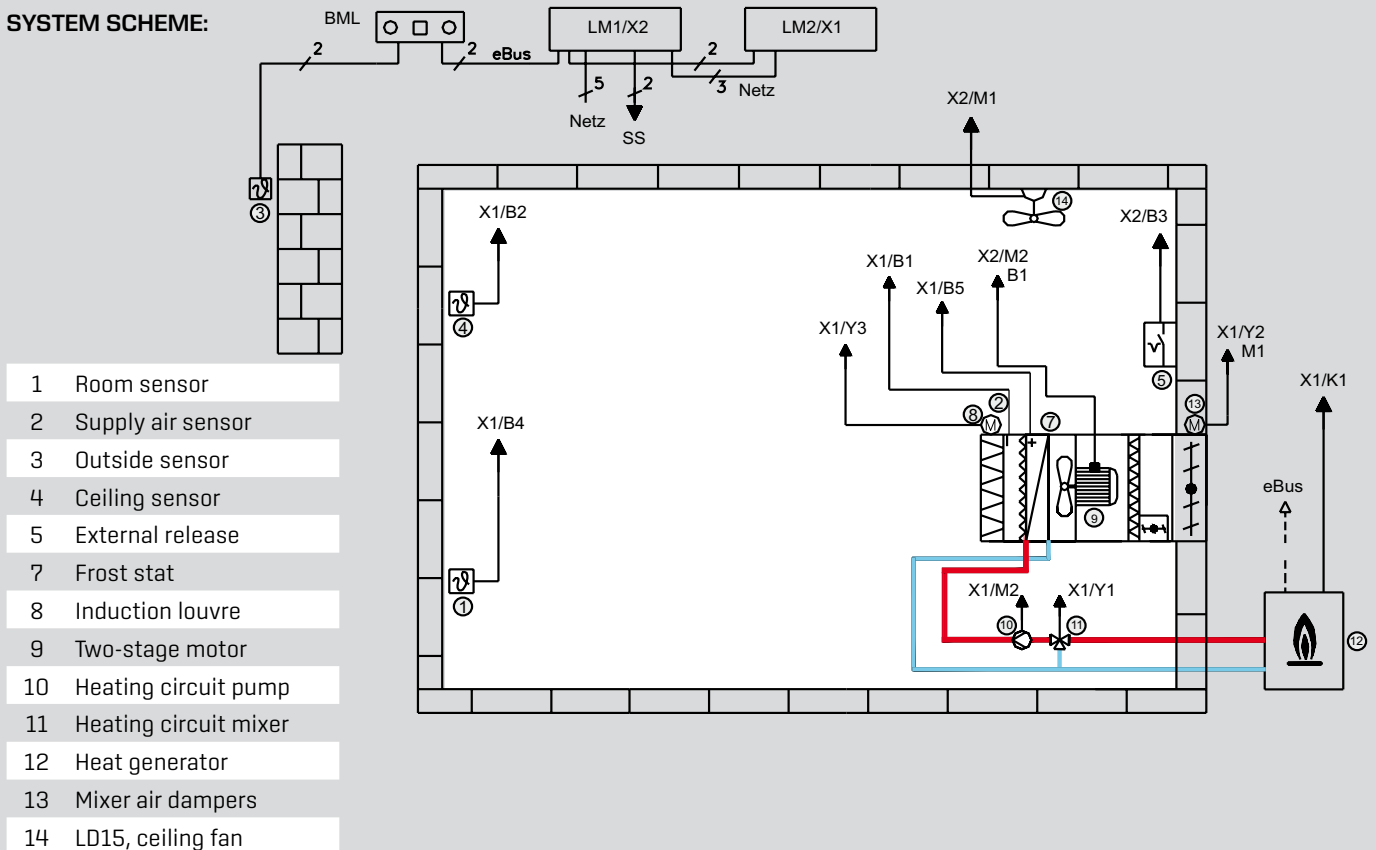
## LM1 AND LM2 VENTILATION MODULE WITH BML

### DESCRIPTION:

This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat generator are switched on or off subject to demand.



### SYSTEM SCHEME:

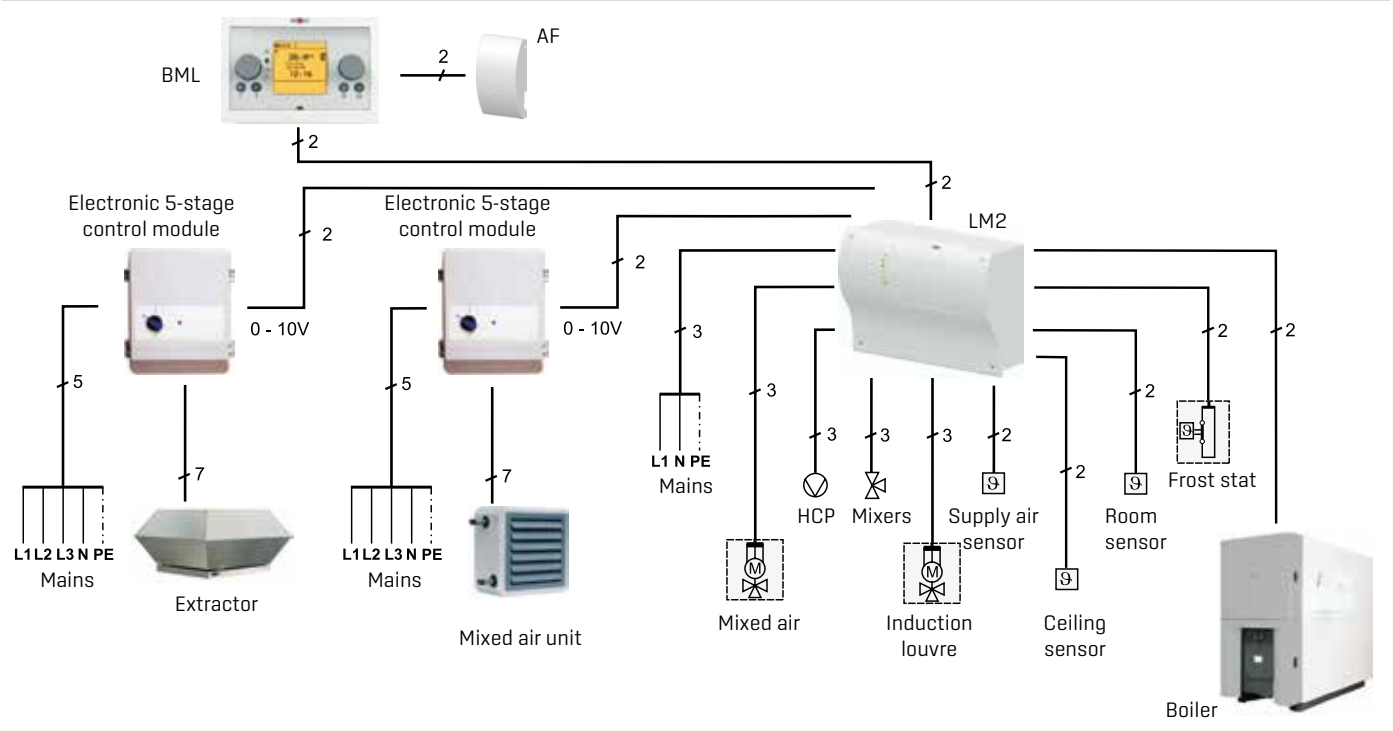


**LM2 VENTILATION MODULE WITH BML**

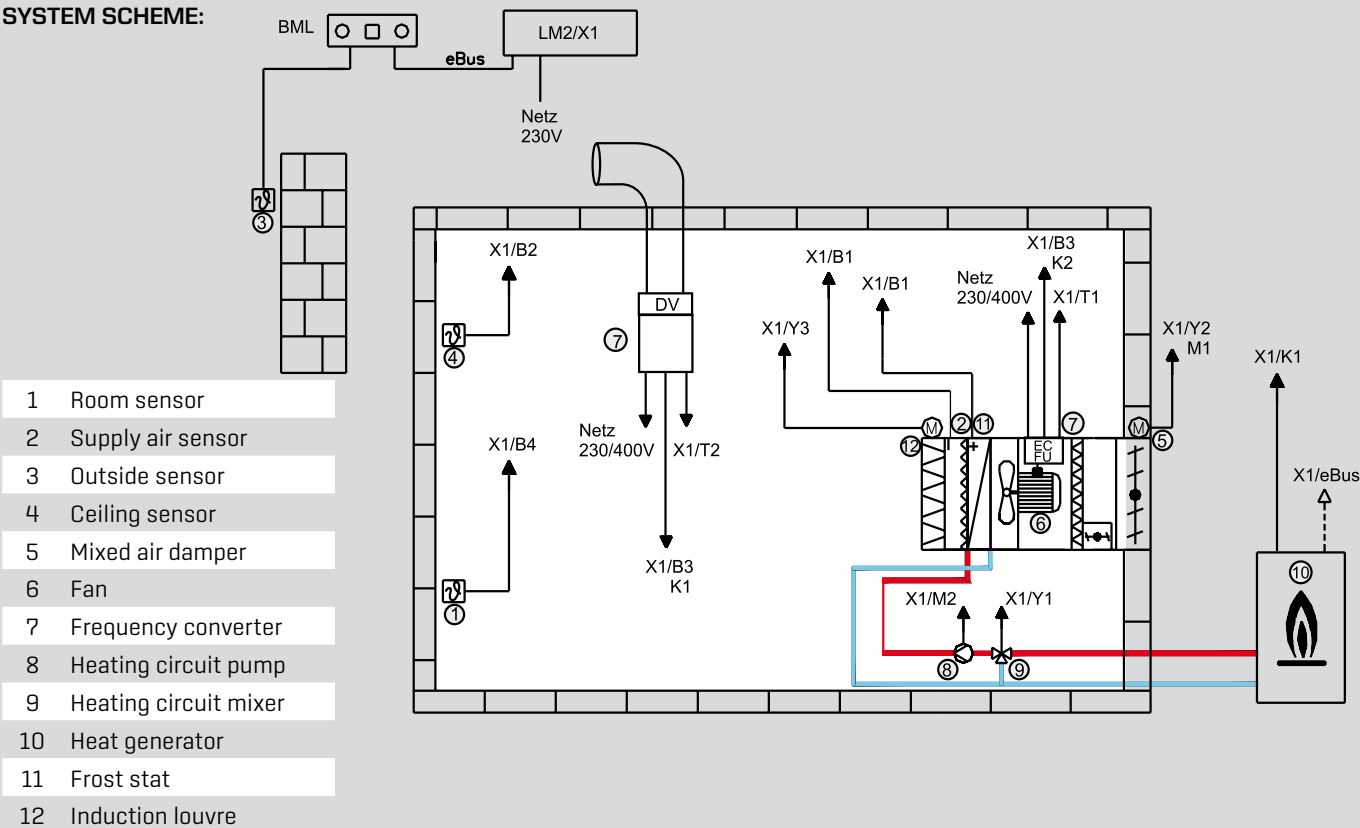
**DESCRIPTION:**

This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat generator are switched on or off subject to demand. The extract air fan is enabled subject to the fresh air proportion.

Example:  
ventilation unit, heating with room control, mixer control, motor control with 5-stage electronic speed controller



**SYSTEM SCHEME:**



**TOPWING TLH / TLHK**  
**5-STAGE ELECTRICAL STEP SWITCH FOR 0-10 V**

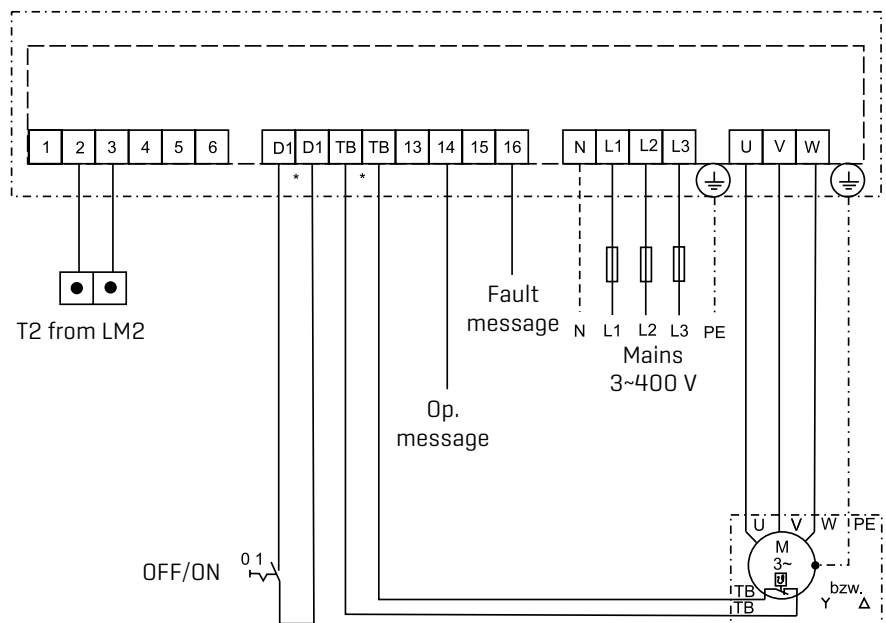


L=170 W=220 H=315

**5-STAGE STEP SWITCH 0-10 V:**

SWITCH TYPE	D5-2F	D5-4F	E5-6F
Voltage	400 V	400 V	230 V
Max. current	2 A	4 A	6 A
Weight	7.4 kg	11.0 kg	5.2 kg
IP rating	IP 21	IP 21	IP 20

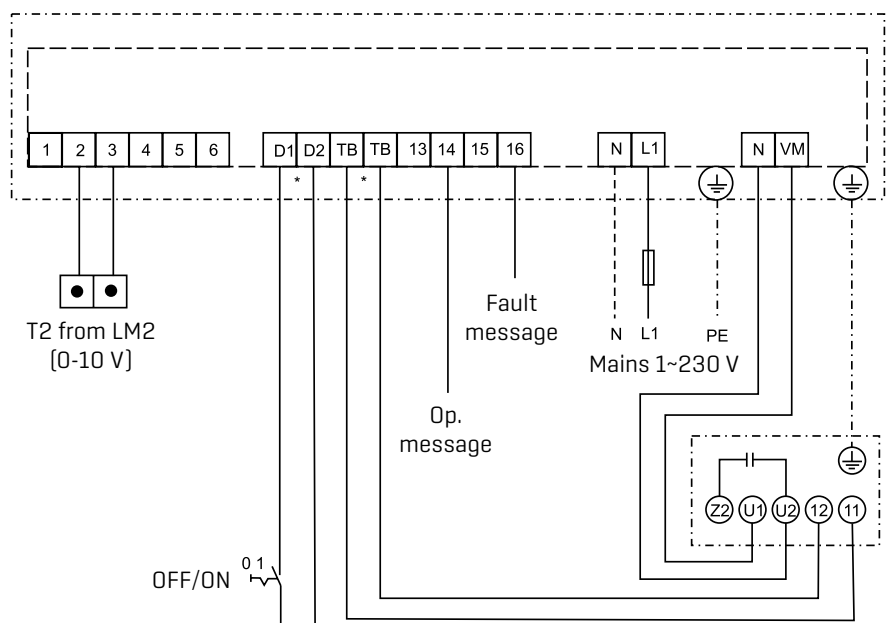
**CONNECTION DIAGRAM D5-.....**



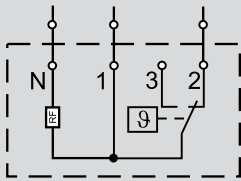
\* If the function is not required, bridge the terminals

3~motor with integral thermostat switches

**CONNECTION DIAGRAM E5-6F**



\* If the function is not required, bridge the terminals



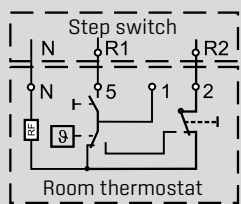
**ROOM THERMOSTAT**

In plastic casing 75 x 75 x 25 mm for surface mounting. Breaking capacity for heating 10(4)A, cooling 5(2)A at 230 V / 50 Hz, thermal feedback.

Temperature range 5-30 °C

Switching differential 0.5 K

Protection rating IP 30



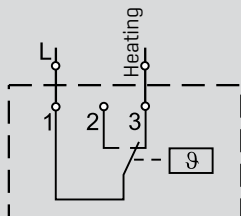
**ROOM THERMOSTAT WITH SUMMER/WINTER SWITCH**

In plastic casing 75 x 75 x 25 mm for surface mounting. Breaking capacity for heating 10(4)A, cooling 5(2)A at 230 V / 50 Hz, thermal feedback.

Temperature range 5-30 °C

Switching differential 0.5 K

Protection rating IP 30



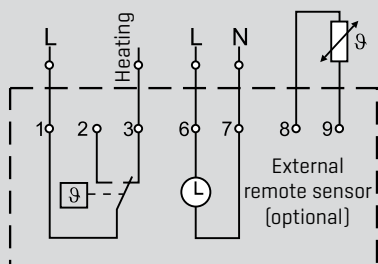
**ROOM THERMOSTAT IN INDUSTRIAL VERSION**

In plastic casing 145 x 112 x 68 mm for surface mounting. Breaking capacity 16(4) A at 230 V / 50 Hz.

Temperature range 0-40 °C

Switching differential ±0.75 K

Protection rating IP 54



**ROOM THERMOSTAT CLOCK WITH 7-DAY PROGRAM**

In plastic casing 132 x 82 x 32 mm for installation in plug-in base; day and night temperatures can be adjusted separately.

Temperature setback can be adjusted by 2-10 K

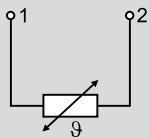
Breaking capacity 10(4)A at 230 V / 50 Hz

Temperature range 5-40 °C

Switching differential adjustable ±0.1 to 3 K

Protection rating IP 20

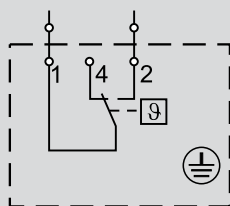
## TOPWING TLHK-EC / TLHK THERMOSTATS, TERMINAL BOX



### REMOTE SENSOR FOR ROOM THERMOSTAT CLOCK

In plastic casing 52 x 50 x 35 mm for installation in plug-in base.

Protection rating IP 54



### FROST STAT

When the air discharge temperature falls below the adjustable value, the frost stat switches the TLH-EC / TLH unit off to prevent frost damage to the heat exchanger. When the air discharge temperature rises, the TLH-EC / TLH unit starts again automatically.

The frost stat must be wired in series to the thermistors.

Breaking capacity 10 A at 230 V / 50 Hz

Setting range 2 °C to 20 °C

Switching differential 2.5 K

Protection rating IP 43

Dimensions W x H x D 85 x 75 x 40 mm



### INTERMEDIATE TERMINAL BOX

Intermediate terminal box for parallel wiring of up to 3 TLH units with 3 x 400 V, 50 Hz motors.

Protection rating IP 54

Dimensions W x H x D 105 x 170 x 112 mm



### OMNIPOLAR REPAIR SWITCH AR8

Fitted and wired.



#### **BML VENTILATION PROGRAMMING UNIT**

- Room temperature-dependent control
- Graphic display with backlighting
- Easy user prompts via plain text display
- Control by rotary selector with pushbutton function
- 4 function keys for frequently used functions [info, temperature settings, speed settings, fresh air proportion]
- Installation either in the ventilation module or in the wall mounting base as a remote control
- Only one BML ventilation programming unit required to control up to 7 zones
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface



#### **WALL MOUNTING BASE**

Wall mounting base for using the BML ventilation programming unit as a remote control.



#### **LM1 VENTILATION MODULE (INCL. ROOM TEMPERATURE SENSOR)**

- Ventilation module for controlling air heaters with a two-stage motor
- Easy controller configuration by selecting one of the pre-defined system schemes
- Demand-optimised room temperature control via air heater speed
- Switching of the heating circuit pump
- Switching of one heat generator
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface with automatic energy management
- BML ventilation programming unit can be clipped into place



#### **LM2 VENTILATION MODULE**

- LM2 ventilation module to control the room temperature via speed or mixer
- 2-stage motor control in conjunction with LM1 ventilation module or variable motor control via 0-10 V signal in conjunction with EC fan
- Easy controller configuration by selecting one of the pre-defined system schemes
- Switching of one heat generator
- Demand-optimised boiler water temperature request via eBUS
- eBUS interface with automatic energy management
- BML ventilation programming unit can be clipped into place
- Mixed air damper control [in conjunction with 24 V servomotor]
- Induction louvre control



#### **EXTERNAL, CEILING OR ROOM TEMPERATURE SENSOR**

## TOPWING TLHK-EC / TLHK CONTROL UNIT (WRS)



### DIFFERENTIAL PRESSURE SWITCH

Differential pressure switch, loose, for on-site control.



### 5-STAGE STEP SWITCH

Electronic 5-stage speed controller, input 0-10 V.



### SUPPLY AIR SENSOR AND SENSOR RETAINER

For measuring the supply air temperature.



### ISM 5 LON INTERFACE MODULE

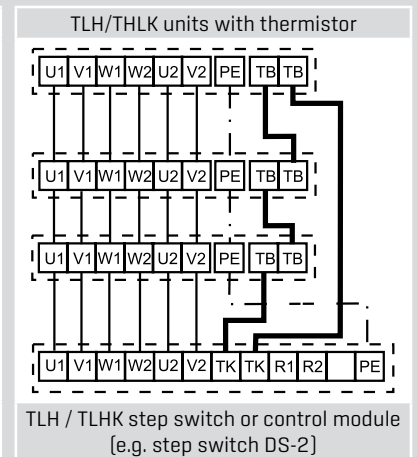
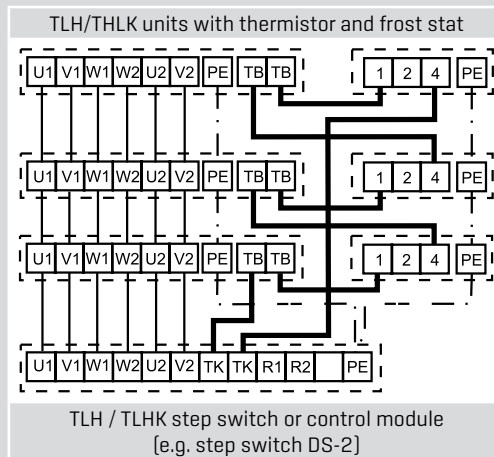
For connecting LM1 and LM2 ventilation modules to a building management system using LON standard network variables.



**NOTE:**

TLH / TLHK units of various sizes and ratings up to the maximum permissible output or current rating can be connected in parallel to a full motor protection device.

When connecting multiple air heaters, the motor terminals must be connected in parallel and the thermistors and frost stats must be connected in series.



**NUMBER OF CORES  
FOR CONNECTING CABLES**

CONNECTION FROM TO	SWITCHING DEVICE									
	D1-2	DS-2	D3-4	D5-...	E3-7T	E5-7T	A1Ü	A1	A1S	
Mains	5	5	5	5	3	3	5	-	-	
TLH/TLHK motor 3x400V	6	9	6	6	-	-	4	-	-	
TLH/TLHK motor 3x230V	-	-	-	-	5	5	-	-	-	
Room thermostat	3/4 <sup>1)</sup>	3/4 <sup>1)</sup>	3/4 <sup>1)</sup>	3/4 <sup>1)</sup>	3/4 <sup>1)</sup>	3/4 <sup>1)</sup>	-	-	-	
Room thermostat clock	5	5	5	5	5	-	-	6 <sup>2)</sup>	-	
A1 auto. relay	4	4	4	4	4	4	-	-	-	
A1S control module	4	4	-	4	-	4	-	-	-	
Servomotor	-	-	-	-	-	-	-	4	6	
Explosion-proof switch	-	-	-	-	-	-	3	-	-	

<sup>1)</sup> If using a room thermostat with thermal feedback.

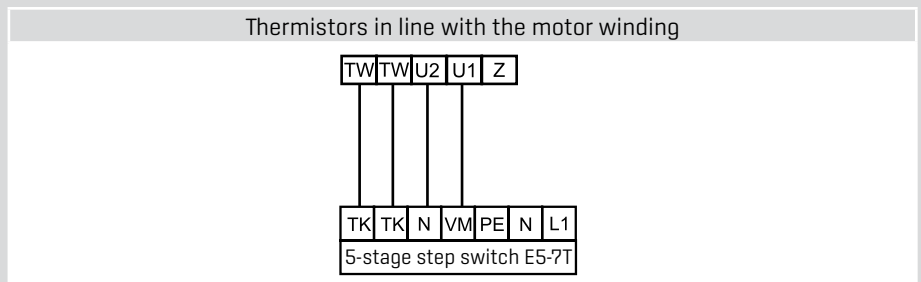
<sup>2)</sup> 2-stage.

Make the connection to the frost stat using 3 cores.

**SINGLE PHASE AC MOTORS  
230 V / 50 HZ**

Single phase AC motors are supplied up to TLH / TLHK 63 with the higher speed.

Thermistors in line with the motor winding.

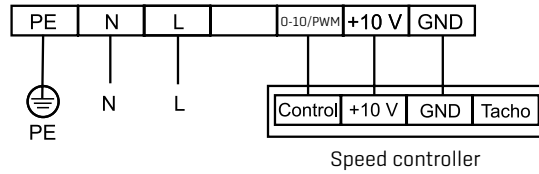


# TOPWING TLH-EC / TLHK-EC ELECTRICAL CONNECTION

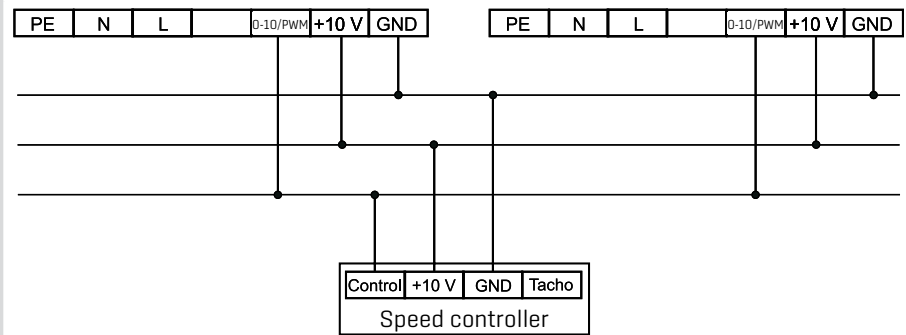
## ELECTRICAL CONNECTION TLH-EC / TLHK-EC

### CONTROL VIA VARIABLE 0-10 V SPEED CONTROLLER

Parallel connection of multiple TLH-EC/ TLHK-EC units via variable speed controller

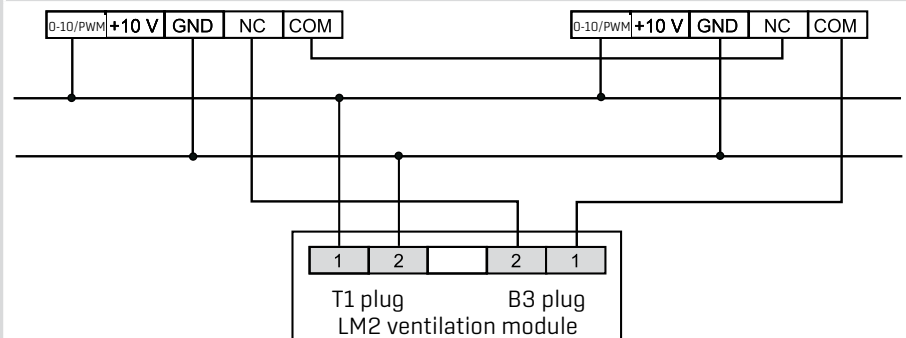


Up to ten TLH-EC / TLHK-EC units can be operated at variable speed with one speed controller.



### CONTROL OF TLH-EC 40 - 100 VIA LM2 VENTILATION MODULE

Parallel connection of multiple TLH-EC / TLHK-EC 40 - 100 units via LM2 ventilation module



Up to five TLH-EC / TLHK-EC 40 - 100 units can be operated at variable speed with one LM2 ventilation module.

**Control of TLH-EC 25 via LM2 ventilation module on request.**

TLH-EC / TLH wall mounting

TLH-EC / TLH ceiling mounting

TLHK-EC / TLHK wall mounting

**GENERAL GUIDELINES**

Always position WOLF air heaters so they do not discharge air directly towards people or machinery.

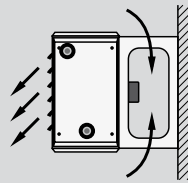
It is advisable to use a number of small heaters instead of one large unit in order to achieve even temperature distribution in the room. Where possible, arrange the units so that they increase air circulation rather than blowing against each other. Free intake of recirculation air must be ensured at all times.

The air throw of WOLF air heaters should be set to suit the dimensions of the room. The figures in the performance tables are standard values that can be adjusted to the room dimensions by means of accessories such as a discharge cone, wide spread discharge and four-way discharge [accessories only for TLH-EC / TLH].

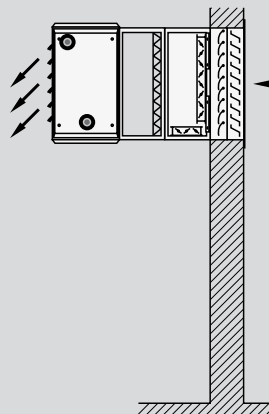
WOLF air heaters emit very low levels of sound. The dB[A] values in the performance tables are average values.

All control and shut-off valves must close automatically when the fan stops.

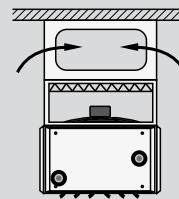
With bracket



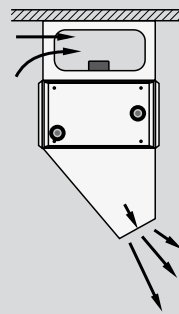
With filter box, mixed air box and intake louvre



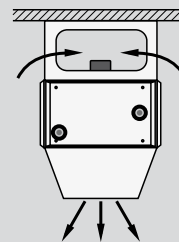
With bracket



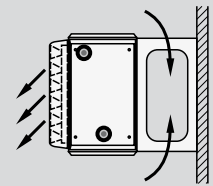
With discharge nozzle and mounting bracket



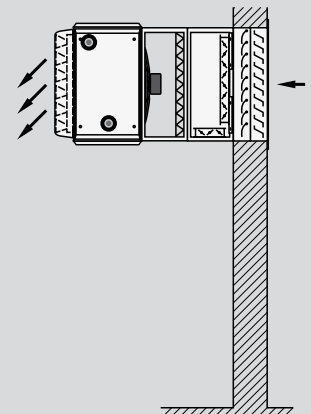
With discharge cone and bracket



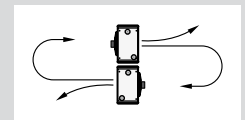
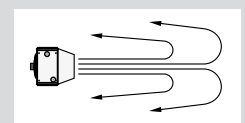
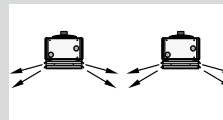
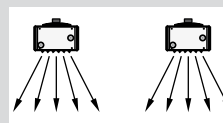
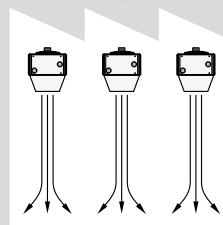
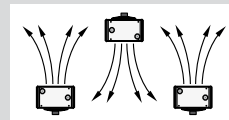
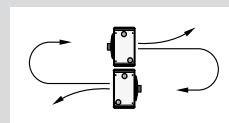
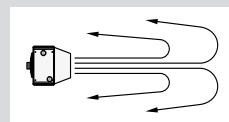
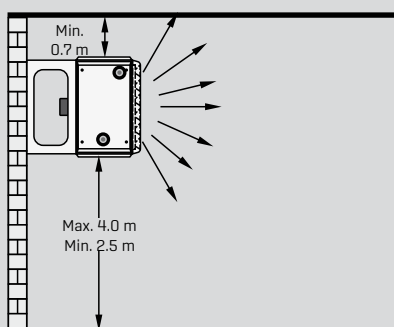
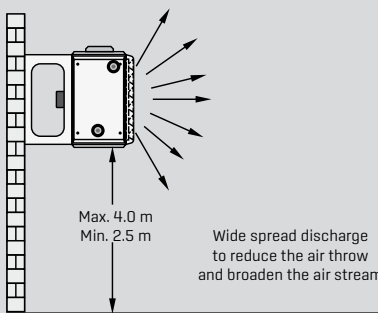
With bracket



With filter box, mixed air box and intake louvre



**GENERAL INFORMATION ON DESIGN**



**TLH-EC / TLH / TLHK-EC / TLHK:**

- Required air flow rate [m<sup>3</sup>/h] at least 2.5 times, preferably 3-4 times, the room volume.
- Never direct immediately towards occupants.
- Distance between units 10-15 m.
- Distance from floor for wall mounted units at least 2.5 m and max. 4 m.
- Take the air throw into account.
- When installing wall mounted units, maintain the installation height in accordance with the adjacent diagram.

**TLH-EC / TLH:**

- Use wide spread or twisted discharges if the unit is not far from the opposite wall.
- Where the air throw of ceiling units with discharge louvre is insufficient, use a discharge cone or an induction louvre with secondary air cone.
- Use four-way discharge in low-ceilinged rooms if the distance from bottom edge of the discharge louvres to floor is less than approx. 2.5 m.

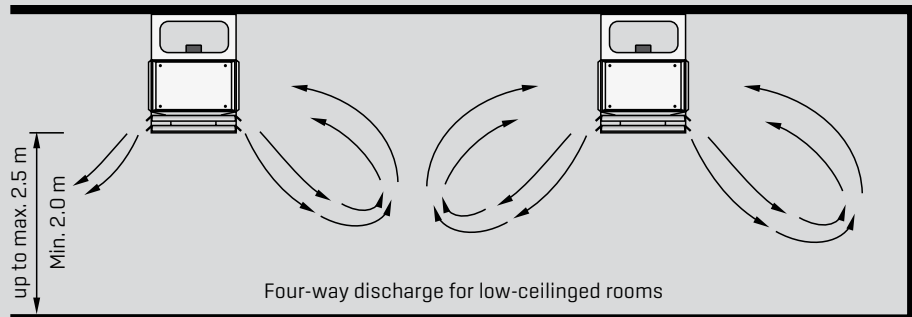
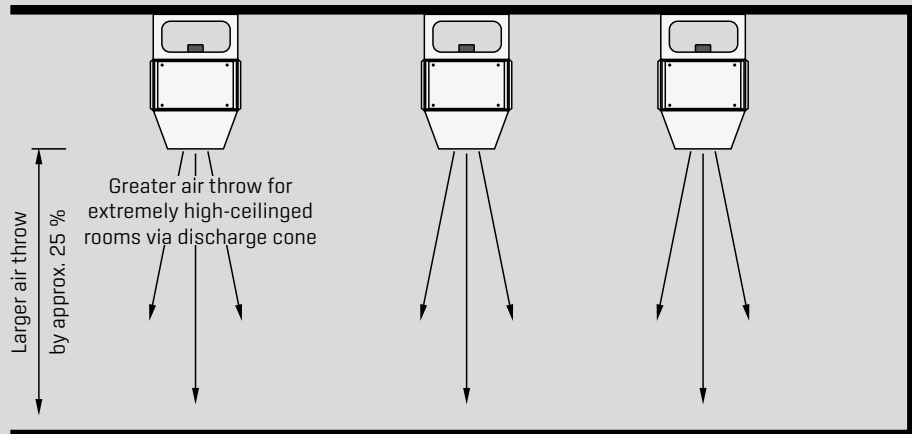
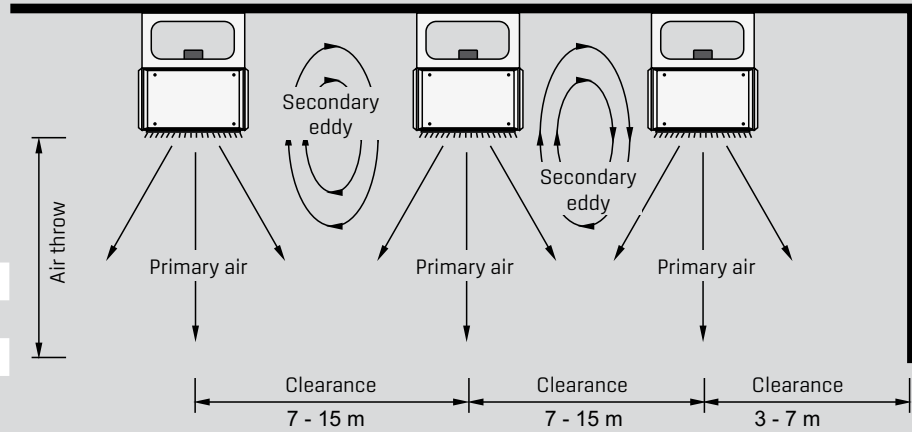
# TOPWING TLH-EC / TLH

## TECHNICAL INFORMATION

### CLEARANCES

Installation clearances for TLH-EC / TLH  
Ceiling unit or wall mounted unit in m

TLH-EC / TLH	TLH-EC / TLH	TLH-EC / TLH to wall
25	7 - 9	3 - 4
40	9 - 11	3 - 5
63	11 - 13	4 - 6
100	13 - 15	5 - 7



### Discharge accessories for optimum air distribution

Given the distances specified above, air heat increase  $\Delta t_L [= t_{\text{Discharge}} - t_{\text{Room}}]$  of approx. 25 K and high speed.

TLH-EC / TLH	25	40	63	100
Clearance: discharge/floor				
Up to 2.5 m	4-way discharge	4-way discharge	4-way discharge	4-way discharge
3-4 m	Wide spread discharge louvre	Wide spread discharge louvre	Wide spread discharge	Wide spread discharge
4-5 m	Cone	Cone	Louvre	Wide spread discharge
5-6 m	Cone	Cone	Cone	Louvre
From 6 m	Cone	Cone	Cone	Cone

This accessory selection table is no longer valid at a temperature differential  $\Delta t_L$  greater than 30 K, because of the reduced depth of reach.

**TLH-EC / TLH air heater**  
**Induction louvre with secondary air cone**

**CLEARANCES**

Clearances for wall mounted  
and ceiling units  
Fins vertical

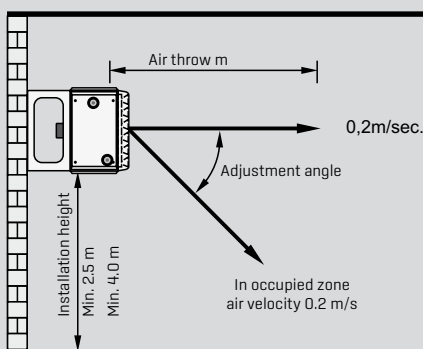
Ceiling unit  
Fins deflected

TLH-EC / TLH	25	40	63	100
Wall mounted unit: TLH-EC / TLH to TLH-EC / TLH	7-9 m	9-11 m	11-13 m	13-15 m
TLH-EC / TLH to side wall	3-4 m	3-5 m	4-6 m	5-7 m
Ceiling unit: TLH-EC / TLH to TLH-EC / TLH	-12 m	-14 m	-16 m	-18 m
TLH-EC / TLH to side wall	4-6 m	5-7 m	6-8 m	7-9 m

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

**AIR THROW OF WALL MOUNTED UNIT**



TLH-EC / TLH	25				40				63				100			
Type	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Air throw [m]*																
Upper speed	19	18	16	15	27	26	23	21	29	27	25	23	36	35	34	32
Lower speed	16	15	13	12	20	19	16	14	22	20	18	17	30	28	26	25

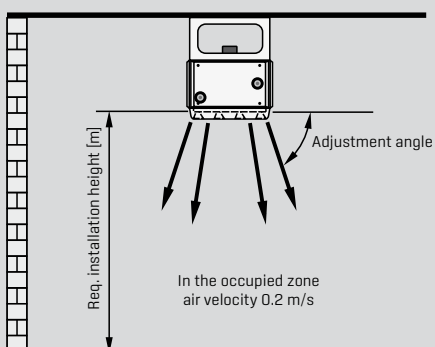
  

TLHK-EC / TLHK	25	40	63	100
Air throw [m]*				
Heating*	15	21	23	32
Cooling**	10	14	15	21

\* Values relate to air throw at specific operating conditions at a mixed air temperature of 10 K above room temperature. At mixed air temperatures of in excess of 10 K above room temperature, reduced air throw will result.

\*\* Values relate to air throw at specific operating conditions at a mixed air temperature of 10 K below room temperature. At mixed air temperatures of in excess of 10 K below room temperature, reduced air throw will result.

**INSTALLATION HEIGHT OF CEILING UNIT**



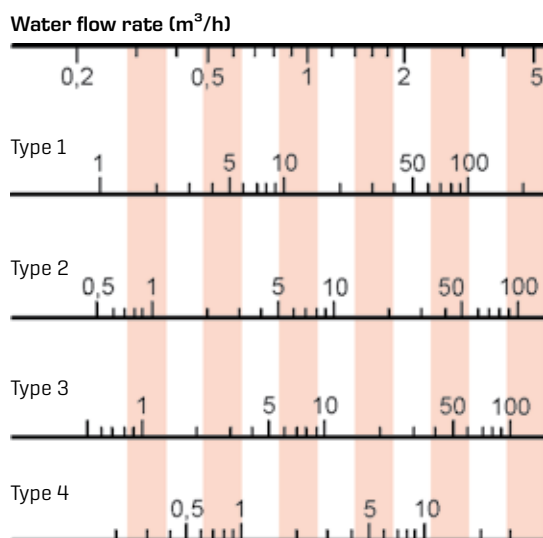
TLH-EC / TLH	25				40				63				100			
Type	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Required installation height [m]*	5	4.5	4	3.5	6	5.5	5	4.5	7	6.5	6	5.5	8	7.5	7	6.5

\* The optimum angle of the fins depends on local conditions. Greater installation heights on request.

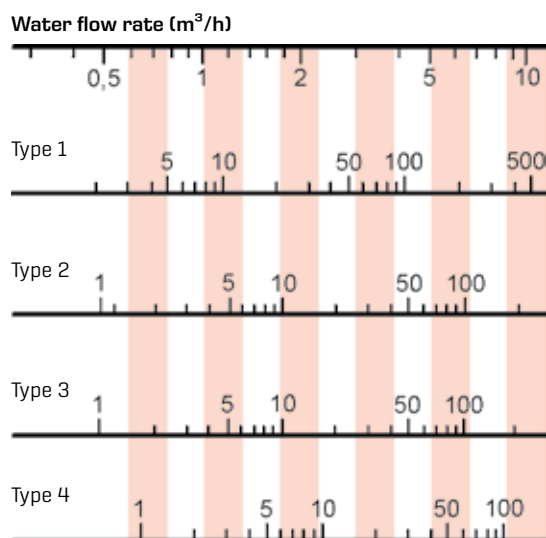
# TOPWING TLH-EC / TLH / TLHK-EC / TLHK, TYPE 4

## TECHNICAL INFORMATION

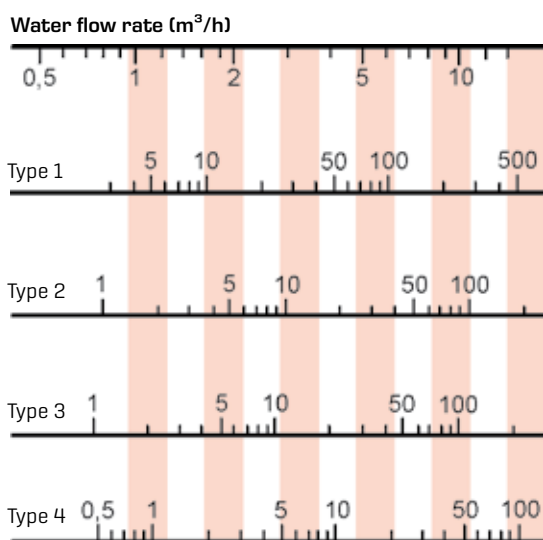
### WATER PRESSURE DROP [kPa] TLH-EC / TLH 25



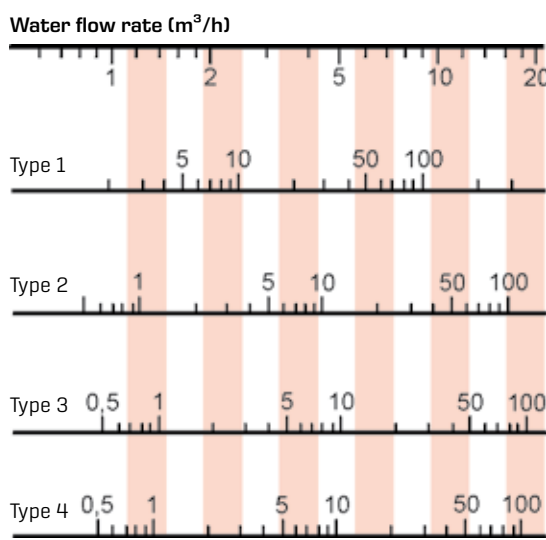
### WATER PRESSURE DROP [kPa] TLH-EC / TLH 40



### WATER PRESSURE DROP [kPa] TLH-EC / TLH 63



### WATER PRESSURE DROP [kPa] TLH-EC / TLH 100



Water flow rate  $w$  [m<sup>3</sup>/h]

$$w = \frac{0.86 \cdot \dot{Q}}{\Delta t_w}$$

$\dot{Q}$  = heating output  
 $\Delta t_w$  = temperature differential flow / return

Pages 55 - 56:

#### Air throw

[subject to air heating and discharge accessories]

Pages 57 - 58:

#### Speed

[in conjunction with step switch]

#### Sound pressure level

[subject to speed]

Page 59:

#### Heating output

#### Air flow rate and air discharge temperature

[subject to accessories and speed]

#### Frost protection by mixing in antifreeze:

If low temperatures are to be expected (outdoor air mode) or if the cooling system is installed in a cold environment, an adequate amount of antifreeze should be mixed into the circulating water.

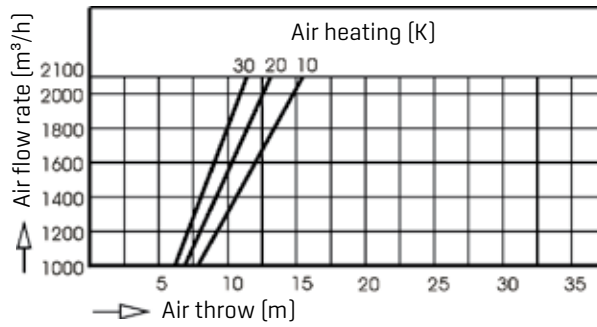
The addition of antifreeze reduces the specific thermal capacity of the water. For example, the specific thermal capacity of ethylene glycol [trade name Antifogen N] is 2.357 kJ/kgK, so at the same output, the volume of circulating water must be increased. The water pressure drop also increases.

Freezing point [°C]	-40	-30	-20	-10	±0
Antifreeze [vol%]	50	40	30	20	10 0
Increase in water pressure drop		45%	30%	15%	0%

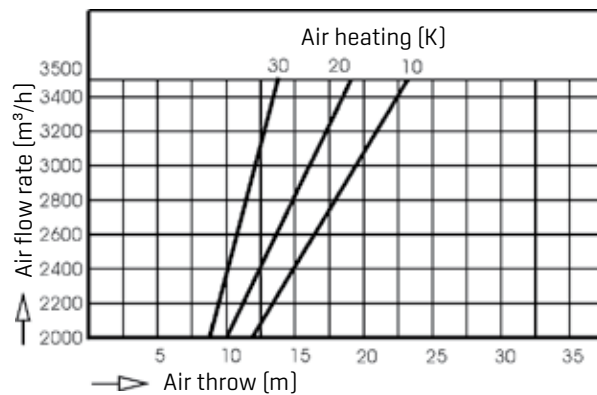
THE HORIZONTAL AIR THROW IS THE DEPTH OF REACH OF THE WARM AIR DISCHARGED BY A WALL MOUNTED TLH-EC / TLH UNIT

With discharge louvre or wide spread discharge

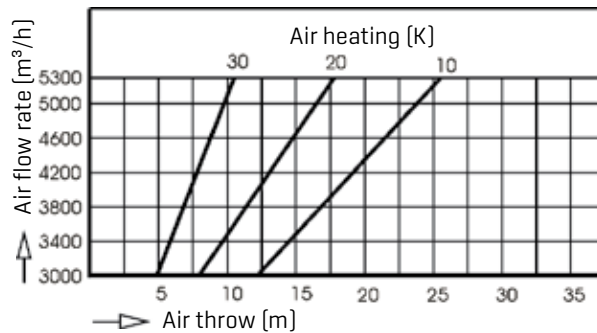
TLH-EC / TLH 25



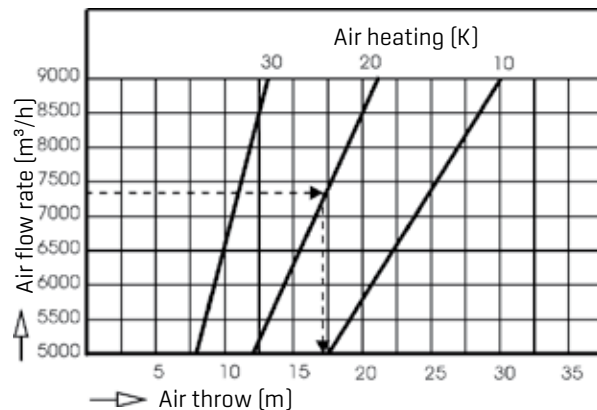
TLH-EC / TLH 40



TLH-EC / TLH 63



TLH-EC / TLH 100



Example: TLH 100 with discharge louvre;  $\Delta t_L = t_{L,eff} - t_{Room} = 20$  K; air flow rate = 7300 m³/h  
Result: horizontal air throw = 17 m

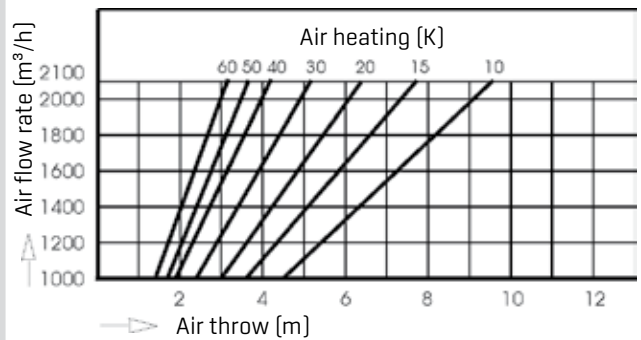
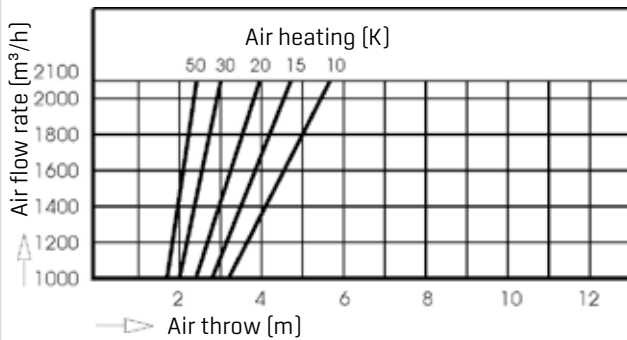
**TOPWING TLH-EC / TLH**  
**TECHNICAL INFORMATION**

THE VERTICAL AIR THROW IS THE DEPTH OF REACH OF THE WARM AIR DISCHARGED BY A TLH-EC / TLH CEILING UNIT

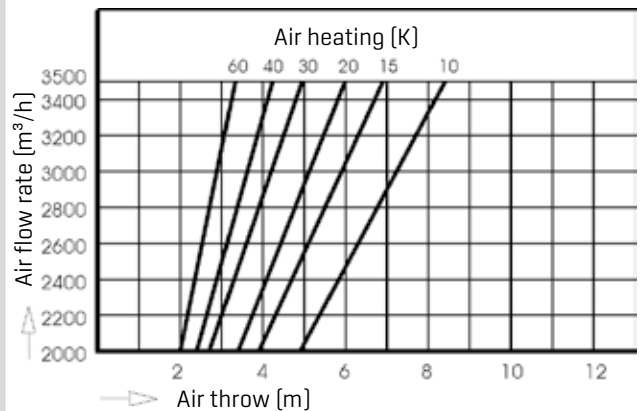
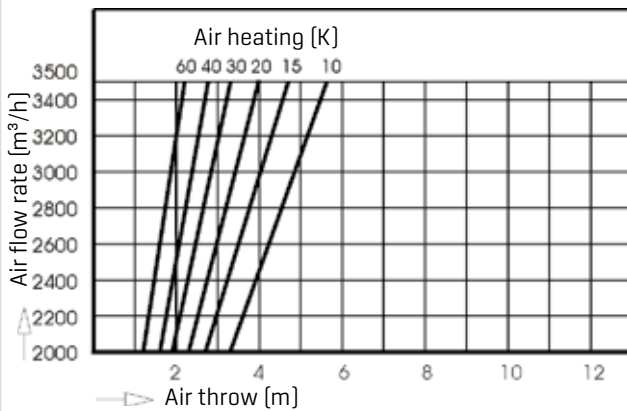
With discharge louvre or wide spread discharge

With discharge louvre or discharge cross

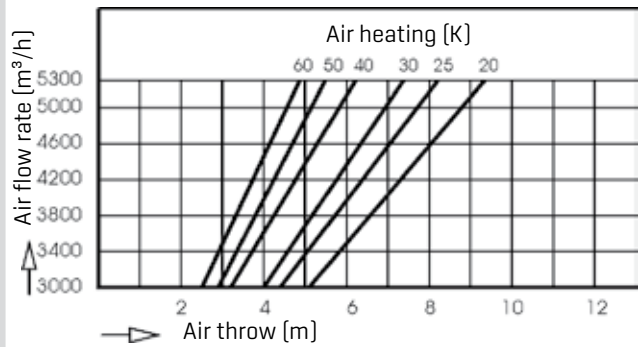
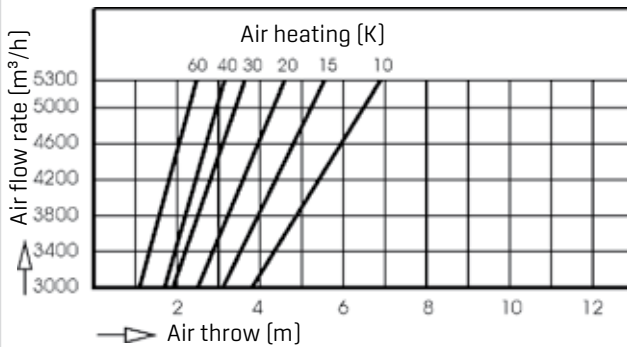
TLH-EC / TLH 25



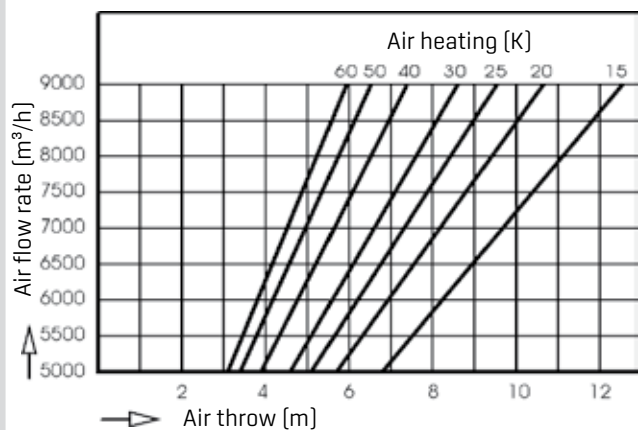
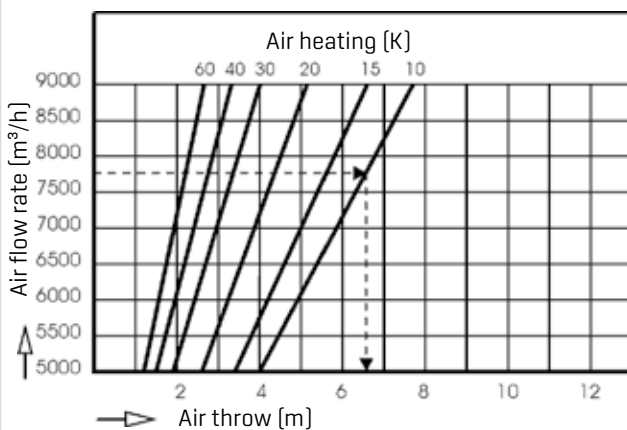
TLH-EC / TLH 40



TLH-EC / TLH 63



TLH-EC / TLH 100



Example: TLH 100 with discharge louvre;  $\Delta t_L = t_{L,eff} - t_{Room} = 10$  K; air flow rate = 7750 m<sup>3</sup>/h  
 Result: vertical air throw = 6.6 m



**TOPWING TLH-EC / TLHK-EC**  
SPEED TABLE / SOUND PRESSURE LEVEL

**SOUND PRESSURE LEVEL / SOUND POWER LEVEL SUBJECT TO SPEED**

Control voltage	TLH-EC 25			TLH-EC 40			TLH-EC 63			TLH-EC 100		
	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*
V	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m
10	1500	72	59	1350	74	62	1000	74	63	900	72	63
9	1450	70	58	1330	74	62	950	73	62	860	71	62
8	1320	67	55	1300	73	61	850	69	59	810	70	60
7	1170	64	52	1170	70	58	750	66	55	720	66	57
6	1020	61	49	1010	66	54	640	62	51	610	63	53
5	860	56	44	850	61	50	530	58	47	510	58	48
4	700	50	39	670	55	43	430	52	41	410	54	45
3	540	43	32	490	49	37	320	44	34	305	47	40
2	370	34	26	330	41	28	210	34	27	205	39	32
1	220	25	22	160	39	25	105	33	26	100	38	32

Control voltage	TLH-EC 25			TLH-EC 40			TLH-EC 63			TLH-EC 100		
	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*
V	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m
	<b>Heating</b>			<b>Heating</b>			<b>Heating</b>			<b>Heating</b>		
10	1500	72	59	1350	74	62	1000	74	63	900	72	63
7	1170	64	52	1170	70	58	750	66	55	720	66	57
4	700	50	39	670	55	43	430	52	41	410	54	45
	<b>Cooling</b>			<b>Cooling</b>			<b>Cooling</b>			<b>Cooling</b>		
5	-	-	-	-	-	-	530	58	47	500	58	48
4.5	800	53	42	800	59	48	-	-	-	-	-	-
4	-	-	-	-	-	-	430	52	41	410	54	45
3	540	43	32	490	49	37	320	44	34	305	47	40
2	370	34	26	330	41	28	-	-	-	-	-	-

\* Sound pressure level measured in a room of average absorption, room size approx. 1500 m<sup>3</sup>

# TOPWING TLH / TLHK SPEED TABLE

## SPEED TABLE FOR TLH FAN MOTORS

SUPPLY VOLTAGE	STAGE	TLH 25 Speed rpm	TLH 40 Speed rpm	TLH 63 Speed rpm	TLH 100 Speed rpm
<b>Single stage step switch</b>					
3 x 400 V $\Delta$	-	1350	1350	900	900
3 x 400 V Y	-	1000	1000	700	700
3 x 230 V $\Delta$	-	1000	1000	700	700
<b>Two-stage step switch</b>					
3 x 400 V $\Delta$	II	1350	1350	900	900
3 x 400 V Y	I	1000	1000	700	700
3 x 230 V $\Delta$	II	1350	1350	900	900
<b>Three-stage step switch</b>					
3 x 400 V $\Delta$	III	1350	1350	900	900
230 V $\Delta$	II	1150	1150	800	750
140 V $\Delta$	I	750	800	550	500
3 x 400 V Y	III	1000	1000	700	700
230 V Y	II	700	800	500	500
140 V Y	I	400	450	300	300
1 x 230 V	III	1350	1350	900	
145 V	II	1250	900	750	
105 V	I	750	600	500	
<b>Five-stage step switch</b>					
3 x 400 V $\Delta$	V	1350	1350	900	900
280 V $\Delta$	IV	1280	1300	850	840
230 V $\Delta$	III	1210	1200	800	750
180 V $\Delta$	II	1050	1090	710	620
140 V	I	800	800	550	500
3 x 400 V Y	V	1000	1000	700	700
3 x 230 V $\Delta$	IV	800	840	590	540
	III	660	700	500	440
	II	490	550	400	350
	I	360	400	300	270
1 x 230 V	V	1350	1350	900	
160 V	IV	1290	1140	750	
145 V	III	1230	960	640	
130 V	II	1160	780	540	
105 V	I	750	650	500	

**TOPWING TLH / TLHK**  
**SOUND PRESSURE LEVEL**

**Sound pressure level / sound power level subject to speed**

TLH 25			TLH 40			TLH 63			TLH 100		
Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*
rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m
<b>3 x 400 V</b>			<b>3 x 400 V</b>			<b>3 x 400 V</b>			<b>3 x 400 V</b>		
1350	74	63	1350	78	67	900	77	66	900	82	71
1290	73	62	1300	77	66	850	76	65	840	80	69
1280	73	62	1200	75	64	800	74	63	750	78	67
1230	72	61	1140	74	63	750	73	62	700	76	65
1210	72	61	1090	73	62	710	71	60	620	74	63
1160	71	60	1000	72	61	700	71	60	540	71	60
1050	68	57	960	71	60	640	70	59	440	66	55
1000	68	57	840	68	57	590	68	57	350	61	50
860	64	53	780	66	55	560	67	56	270	56	45
800	63	52	700	64	53	540	66	55	220	51	40
660	58	47	580	60	49	500	64	53	160	44	33
530	53	42	550	58	47	400	59	48			
490	52	41	530	58	47	360	57	46			
430	49	38	490	56	45	300	53	42			
360	45	34	400	51	40	280	52	41			
320	43	32	380	50	39	210	45	34			
240	36	25	280	44	33						
<b>1 x 230 V</b>			<b>1 x 230 V</b>			<b>1 x 230 V</b>			<b>1 x 230 V</b>		
1350	74	63	1350	78	67	900	77	66	-	-	-
1290	73	62	1300	77	66	850	76	65	-	-	-
1280	73	62	1200	75	64	800	74	63	-	-	-
1230	72	61	1140	74	63	750	73	62	-	-	-
1210	72	61	1090	73	62	710	71	60	-	-	-
1160	71	60	1000	72	61	700	71	60	-	-	-
1050	68	57	960	71	60	640	70	59	-	-	-
1000	68	57	840	68	57	590	68	57	-	-	-
860	64	53	780	66	55	560	67	56	-	-	-
800	63	52	700	64	53	540	66	55	-	-	-
660	58	47	580	60	49	500	64	53	-	-	-
530	53	42	550	58	47	400	59	48	-	-	-
490	52	41	530	58	47	360	57	46	-	-	-
430	49	38	490	56	45	300	53	42	-	-	-
360	45	34	400	51	40	280	52	41	-	-	-
320	43	32	380	50	39	210	45	34	-	-	-
240	36	25	280	44	33						
TLHK 25			TLHK 40			TLHK 63			TLHK 100		
Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*	Speed	Sound power level	Sound pressure level*
rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m	rpm	dBA	dBA 2 m
<b>3 x 400 V heating</b>			<b>3 x 400 V heating</b>			<b>3 x 400 V heating</b>			<b>3 x 400 V heating</b>		
1350	74	63	1350	78	67	900	77	66	900	82	71
1000	68	57	1000	72	61	700	71	60	700	76	65
800	63	52	780	66	55	500	64	53	540	71	60
<b>1 x 400 V cooling</b>			<b>1 x 400 V cooling</b>			<b>1 x 400 V cooling</b>			<b>1 x 400 V cooling</b>		
800	63	52	800	67	56	550	66	55	500	69	58
530	53	42	580	60	49	400	59	48	440	66	55
430	49	38	400	51	40	300	53	42	350	61	50
<b>1 x 230 V heating</b>			<b>1 x 230 V heating</b>			<b>1 x 230 V heating</b>			<b>1 x 230 V heating</b>		
1350	74	63	1350	78	67	900	77	66	-	-	-
1000	68	57	1000	72	61	700	71	60	-	-	-
800	63	52	780	66	55	500	64	53	-	-	-
<b>1 x 230 V cooling</b>			<b>1 x 230 V cooling</b>			<b>1 x 230 V cooling</b>			<b>1 x 230 V cooling</b>		
750	61	50	650	62	51	500	64	53	-	-	-
530	53	42	490	56	45	400	59	48	-	-	-
430	49	38	380	50	39	300	53	42	-	-	-

\* Sound pressure level determined for a room of average absorption, room size approx. 1500 m<sup>3</sup>

# TOPWING TLH-EC / TLH

## PERFORMANCE AND INFLUENCE OF ACCESSORIES

### SYMBOLS

$\dot{V}$	= flow rate	m <sup>3</sup> /h
$\dot{V}_B$	= reference flow rate	m <sup>3</sup> /h
$\dot{V}_0$	= catalogue flow rate	m <sup>3</sup> /h
$\dot{V}_{eff}$	= effective flow rate	m <sup>3</sup> /h
$t_{LE}$	= air intake temperature	°C
$t_{LA}$	= air discharge temperature	°C
$t_{LAeff}$	= effective air discharge temperature	°C
$\Delta t_L$	= air heating	K
$\Delta t_w$	= temp. spread of water	K
$W$	= water flow rate	m <sup>3</sup> /h
$\dot{Q}$	= thermal output	kW
$\dot{Q}_0$	= catalogue thermal output	kW
$\dot{Q}_{eff}$	= effective thermal output	kW
$\Delta p$	= air pressure drop	Pa
$\Delta p_w$	= water pressure drop	kPa
$e$	= heating factor	
$q_{eff}$	= heating output factor	
$l_{eff}$	= air flow rate factor	
$K$	= accessory index for entire unit	

### Conversion:

1 Pa = 0.1 mm WS  
1 kPa = 1000 Pa

### Accessory index K:

Mixed air box	3
Four-way discharge	2
Discharge nozzle	2
Discharge cone	2
Wide spread discharge	0
Twisted wide spread discharge	1
Filter, clean	5
Rain cowl	2
Intake louver	7
Intake louver with	
Non-return flap	9
Non-return flap	3
Outdoor air box	0
Recirculation air box	0
Intake hood	1
Induction louver with	
secondary air cone	2

### Calculate k for on-site accessories:

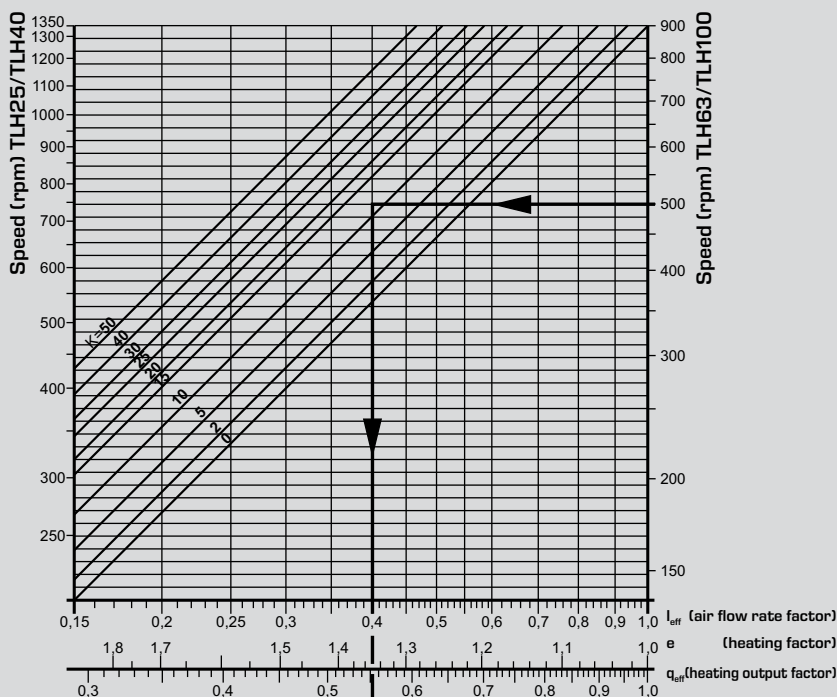
$$k = 0.1 \cdot \Delta p \cdot \left[ \frac{\dot{V}_B}{\dot{V}} \right]^2$$

$\Delta p$  = air pressure drop (Pa) at  $\dot{V}$  (m<sup>3</sup>/h)

$\dot{V}$  = flow rate (m<sup>3</sup>/h) at  $\Delta p$  (Pa)

LH	$\dot{V}_B$
25	2000 m <sup>3</sup> /h
40	3000 m <sup>3</sup> /h
63	6000 m <sup>3</sup> /h
100	10000 m <sup>3</sup> /h

### Performance diagram



### EXAMPLE

#### Assuming:

TLH 100 type 4,  $t_{LE} = -5$  °C, PWW 50/40

From "Performance table, heating" on page 13:  
[Always take figures for high speed, because correction factors for operation at lower speeds are taken into account in the performance diagram.]

$$\begin{aligned} \dot{V}_0 &= 7700 \text{ m}^3/\text{h} \\ \dot{Q}_0 &= 96.1 \text{ kW} \\ t_{LA} &= 29 \text{ °C} \\ \Delta t_{LO} &= (29+5) \text{ K} = 34 \text{ K} \end{aligned}$$

Supply voltage 3 x 400 V  $\Delta$  with  
5-stage step switch, set to stage 1  
From "Speed table" on page 58: 500 rpm

Accessories: mixed air box and filter  
On-site accessories: fresh air duct

$$\begin{aligned} \Delta p &= 10 \text{ Pa at } 5000 \text{ m}^3/\text{h} \\ k &= 0.1 \cdot 10 \cdot \left[ \frac{10000}{5000} \right]^2 \\ k &= 4 \text{ (duct)} \\ k &= 3 \text{ (mixed air box)} \\ k &= 5 \text{ (filter)} \\ k_{ges} &= 4 + 3 + 5 = 12 \end{aligned}$$

TLH 100, 500 rpm,  $k = 12$

From performance diagram:

$$\begin{aligned} l_{eff} &= 0.4 \\ e &= 1.35 \\ q_{eff} &= 0.55 \end{aligned}$$

#### Find:

Effective air flow rate	$\dot{V}_{eff}$
Effective air heating	$\dot{\Delta t}_{L,eff}$
Effective air discharge temp.	$t_{LA,eff}$
Effective heating output	$\dot{Q}_{eff}$
Water flow rate	$W$
Water pressure drop	$\Delta p_w$

#### Solution:

$$\dot{V}_{eff} = \dot{V}_0 \cdot l_{eff} = 7700 \text{ m}^3/\text{h} \cdot 0.4 = 3080 \text{ m}^3/\text{h}$$

$$\Delta t_{L,eff} = \Delta t_{LO} \cdot e = 34 \text{ K} \cdot 1.35 = 45.9 \text{ K}$$

$$t_{LA,eff} = t_{LE} + \Delta t_{L,eff} = -5 + 45.9 \text{ °C} = 40.9 \text{ °C}$$

$$\dot{Q}_{eff} = \dot{Q}_0 \cdot q_{eff} = 96.1 \text{ kW} \cdot 0.55 = 52.9 \text{ kW}$$

$$W = \frac{0.86 \cdot \dot{Q}_{eff}}{\Delta t_w} = \frac{0.86 \cdot 52.9}{10} = 4.5 \text{ m}^3/\text{h}$$

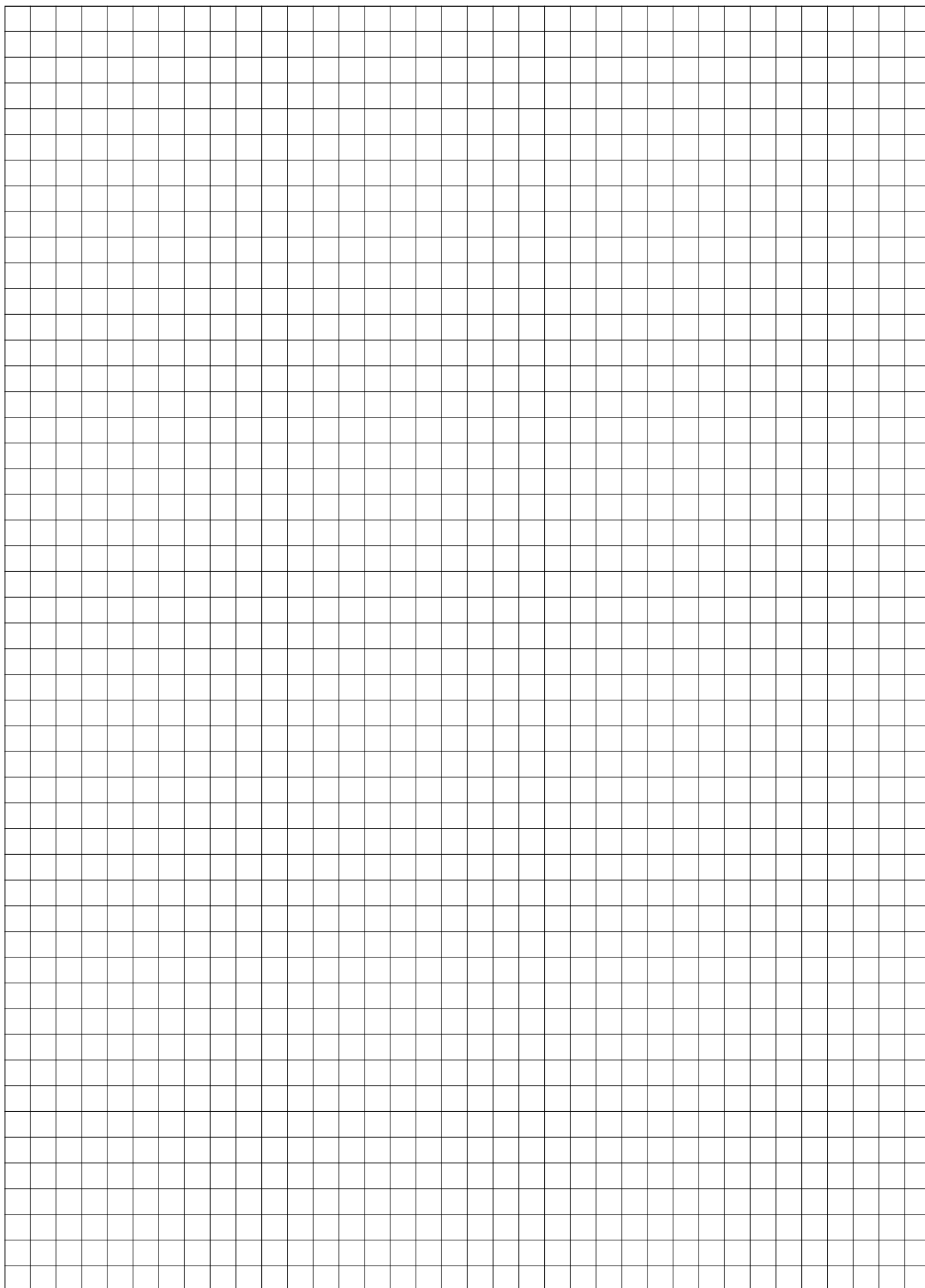
$\Delta p_w$  [see diagram on page "Water pressure drop TLH-EC / TLH 100" on page "Water pressure drop [kPa] TLH-EC / TLH 100" on page 54] = 8.5 kPa

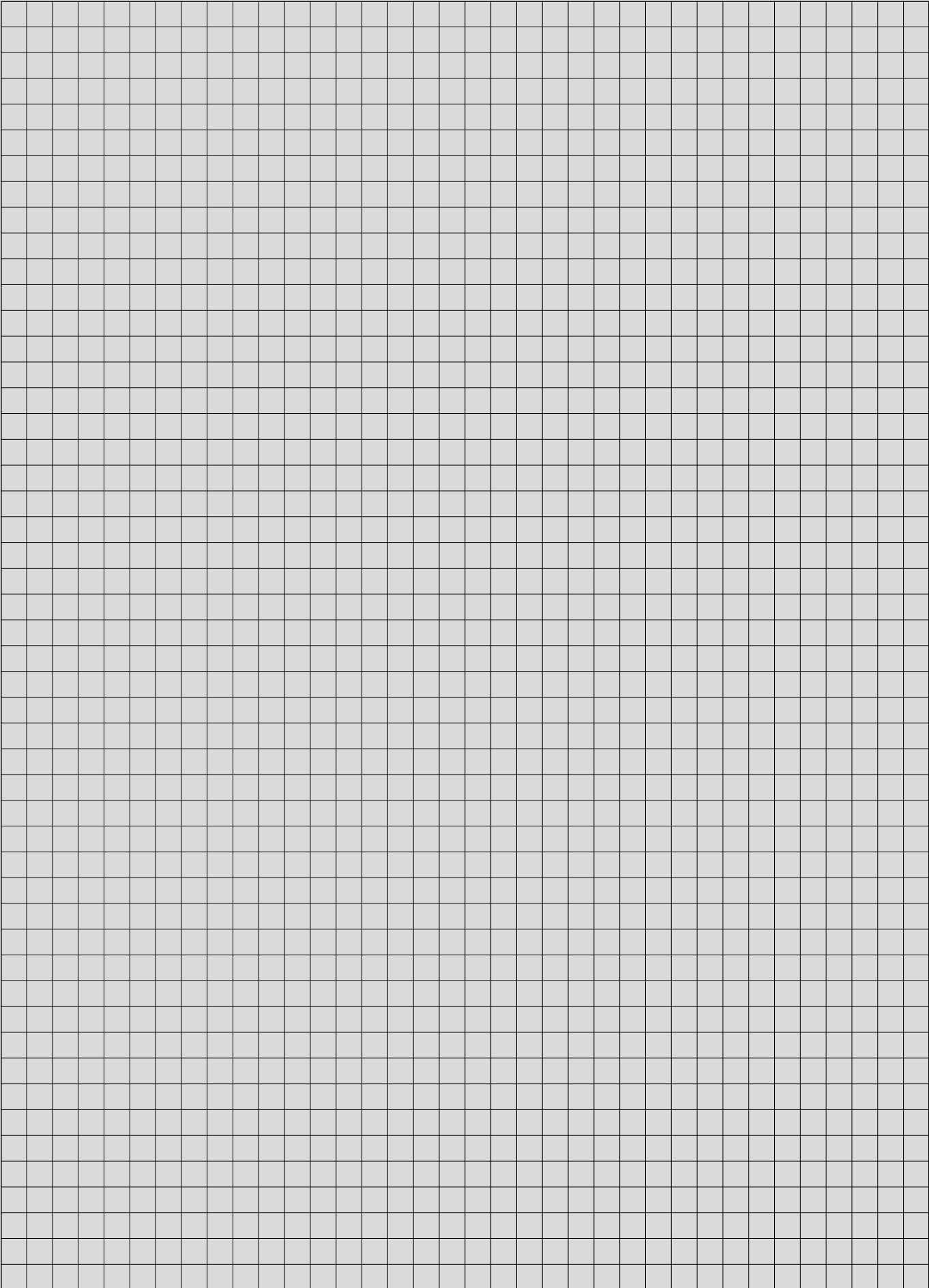
**TOPWING TLH-EC / TLH / TLHK-EC / TLHK**  
WEIGHT

**WEIGHT IN KG**

<b>Standard unit</b>	<b>25</b>	<b>40</b>	<b>63</b>	<b>100</b>
TLH-EC / TLH air heater type 1	26	35	51	80
TLH-EC / TLH air heater type 2	28	38	54	86
TLH-EC / TLH air heater type 3	29	39	55	88
TLH-EC / TLH air heater type 4	30	41	57	92
TLHK-EC / TLHK air heater	32	44	64	101
<b>Intake accessories</b>				
Mixing box	26	32	42	68
Recirculation air box	16	28	31	50
Filter box	13	16	20	37
<b>Accessory, discharge (only for TLH-EC / TLH)</b>				
Discharge nozzle	5	7	10	14
Discharge cone	4	12	19	27
Wide spread discharge	4	7	11	16
Four-way discharge	4	5	8	10
Induction louvre with secondary air cone	4	5	8	10
Miscellaneous fixing brackets [1 set]	3	3	9	9

# NOTES





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