



Technology that serves mankind.

TopWing TLH Unit Heater 25-100



Best aspect, best technology -
The premium-class for heating and ventilation

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TopWing Unit Heaters

TLH

The TLH-series unit heaters were developed specifically for convenient heating. Various models are available, catering to the following applications:

heating, ventilation or filtration. Each device can be used in conjunction with suitable accessories for recirculated-air, mixed-air or outdoor-air operation and mounted on the wall or ceiling. There are four different sizes for air flow rates up to 9000 m³/h and heating-power ratings up to 164 kW.



Housing:

- Welded, galvanized and powder-coated sectional frame
- Skin panels made of sheet steel, powder-coated, color standard white RAL 9016, with bonded PU soft-foam insulation, 24mm thick
- Rear panel with deep-drawn intake nozzle, powder-coated, color standard white RAL 9016
- Discharge louver with individually adjustable vanes, powder-coated, color Wolf silver, similar to RAL 9006

Motor- fan guard unit:



The motor/fan unit has a super-quiet crescent-wing rotor with a single-phase 230 V AC or 3x400 V motor.

- The motor-fan guard unit is carried by a vibration damper mounted on the rear panel
- Fan-motor unit is plastic-coated, color black, RAL 9005
- Three-phase motor 3 x 400V, 50Hz
 - Star wiring: low speed
 - Delta wiring: high speed
- Single-phase alternating-current motor 230V, 50Hz high speed only; lower speeds selectable by means of multi-stage switch.
- Degree of protection IP54, heat class CLF
- Grooved ball bearing with special grease lubrication for temperatures down to -40°C

Terminal box:

- Integral thermal contacts for winding protection, effective only in conjunction with a multistage switch or control unit.

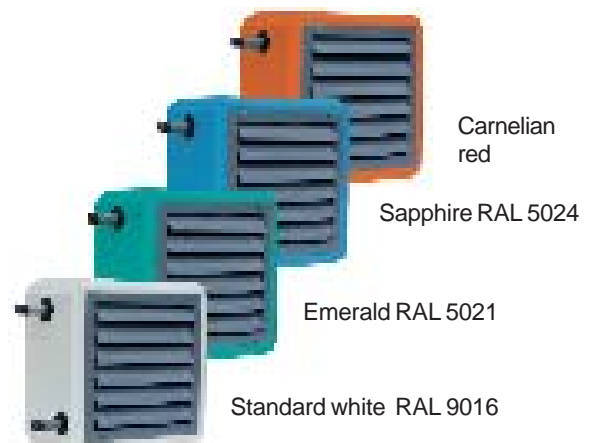
Cu/Al heat exchanger:



The heating elements are large-size registers. The advantage of this arrangement is that discharge temperatures of approximately 36°C can be achieved even with low-temperature heating systems or high-efficiency boiler systems with flow/return spreads of 50/40°C and maximum volume flow in recirculation mode.

- 4 heat-exchanger types per unit-heater size for pressurized warm water (PWW)
- Heat exchangers made of Cu/Al, manifolds steel or copper, pull out to the side for removal
- Ports with inch-system threads for PWW
- Threaded adapters for PN 16 up to 140°C
- Water flow on air discharge side, top/bottom
- Water return on air intake side, top/bottom
- Connection side right/left in direction of air flow
- Connection sizes: see performance tables.

Range of colors:



The housing of the TLH unit heater is normally finished in standard white (RAL 9016) and the discharge louver in Wolf silver (similar to RAL 9006). The unit heaters including intake accessories can also be ordered in carnelian red, sapphire, or emerald finishes. Other RAL colors are available on request.

TopWing Performance Table, Heating Power TLH 25

For warm water

Type	1				2				3				4				
Speed [rpm]	1350		1000		1350		1000		1350		1000		1350		1000		
Vol. flow \dot{V}_O [m³/h]	2100		1700		2000		1600		1800		1450		1700		1350		
	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
t_{LE} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	
PWW 45/35	- 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
PWW 50/40	- 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
PWW 60/40	- 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
PWW 70/50	- 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
PWW 80/60	- 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
Motor power [kW] (3 x 400 V)	0.18		0.13		0.18		0.13		0.18		0.13		0.18		0.13		
Consumption [A] (3 x 400 V)	0.35		0.20		0.35		0.20		0.35		0.20		0.35		0.20		
Motor power [kW] (1 x 230 V)	0.2		-		0.2		-		0.2		-		0.2		-		
Consumption [A] (1 x 230 V)	0.9		-		0.9		-		0.9		-		0.9		-		
Throw, wall-mounted [m]*	15.5		12.5		14.5		12		13		10.5		12.5		10		
Throw, ceiling-mounted [m]*	5.7		4.7		5.4		4.5		5.0		4.2		4.8		4.0		
Water capacity [L]	0.7				1.0				1.1				1.8				
Connections	R ¾"				R 1"				R 1"				R 1"				

* At $t_{La} - t_{room} = 10$ K

TopWing Performance Table, Heating Power TLH 40

For warm water

Type	1				2				3				4				
Speed [rpm]	1350		1000		1350		1000		1350		1000		1350		1000		
Vol. flow \dot{V}_O [m³/h]	3500		2500		3400		2400		3100		2200		2800		2000		
	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
t_{LE} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	
PWW 45/35	- 15	20.1	0	16.5	3	24.0	4	19.5	7	31.9	12	25.3	16	36.3	19	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
	+ 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
PWW 50/40	- 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
PWW 60/40	- 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
PWW 70/50	- 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
PWW 80/60	- 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
Motor power [kW] (3 x 400 V)	0.32		0.23		0.32		0.23		0.32		0.23		0.32		0.23		
Consumption [A] (3 x 400 V)	0.62		0.37		0.62		0.37		0.62		0.37		0.62		0.37		
Motor power [kW] (1 x 230 V)	0.37		-		0.37		-		0.37		-		0.37		-		
Consumption [A] (1 x 230 V)	1.6		-		1.6		-		1.6		-		1.6		-		
Throw, wall-mounted [m]*	23		16		22.5		15		20		13.5		18		12		
Throw, ceiling-mounted [m]*	5.6		4.1		5.5		3.9		5.0		3.6		4.5		3.3		
Water capacity [L]	1.0				1.5				2.0				2.5				
Connections	R 3/4"				R 1"				R 1"				R 1"				

* At $t_{La} - t_{room} = 10$ K

TopWing Performance Table, Heating Power TLH 63

For warm water

Type	1				2				3				4				
Speed [rpm]	900		700		900		700		900		700		900		700		
Vol. flow \dot{V}_0 [m³/h]	5300		4000		5200		3900		4600		3500		4400		3400		
	\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}	
t_{LE} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°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
Motor power [kW] (3 x 400 V)	0.34		0.23		0.34		0.23		0.34		0.23		0.34		0.23		
Consumption [A] (3 x 400 V)	0.71		0.39		0.71		0.39		0.71		0.39		0.71		0.39		
Motor power [kW] (1 x 230 V)	0.40		-		0.40		-		0.40		-		0.40		-		
Consumption [A] (1 x 230 V)	1.8		-		1.8		-		1.8		-		1.8		-		
Throw, wall-mounted [m]*	26		18		24		17		21		15		20		14		
Throw, ceiling-mounted [m]*	7.1		5.3		6.9		5.1		6.1		4.5		5.8		4.4		
Water capacity [L]	2.5				3.5				3.5				5.5				
Connections	R 1"				R 1¼"				R 1¼"				R 1¼"				

* At $t_{La} - t_{room} = 10$ K

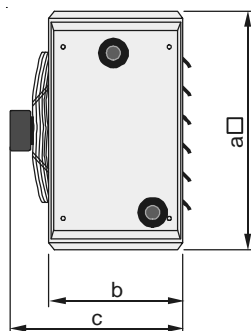
TopWing Performance Table, Heating Power TLH 100

For warm water

Type	1				2				3				4				
Speed [rpm]	900		700		900		700		900		700		900		700		
Vol. flow \dot{V}_O [m³/h]	9000		6700		8800		6500		8300		6000		7700		5600		
	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	\dot{Q}_O	t_{LA}	
t_{LE} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	
PWW 45/35	- 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
PWW 50/40	- 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
PWW 60/40	- 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
PWW 70/50	- 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
PWW 80/60	- 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
Motor power [kW] (3 x 400 V)	0.76		0.47		0.76		0.47		0.76		0.47		0.76		0.47		
Consumption [A] (3 x 400 V)	1.5		0.81		1.5		0.81		1.5		0.81		1.5		0.81		
Motor power [kW] (1 x 230 V)	0.73		-		0.73		-		0.73		-		0.73		-		
Consumption [A] (1 x 230 V)	3.4		-		3.4		-		3.4		-		3.4		-		
Throw, wall-mounted [m]*	26		18		24		17		21		15		20		14		
Throw, ceiling-mounted [m]*	7.1		5.3		6.9		5.1		6.1		4.5		5.8		4.4		
Water capacity [L]	3.5				5.5				7.5				9.5				
Connections	R 1"				R 1½"				R 1½"				R 1½"				

* At $t_{La} - t_{room} = 10$ K

Dimensions, basic unit



TLH	a	b	c
25	540	300	410
40	670	300	415
63	840	300	420
100	1040	340	490

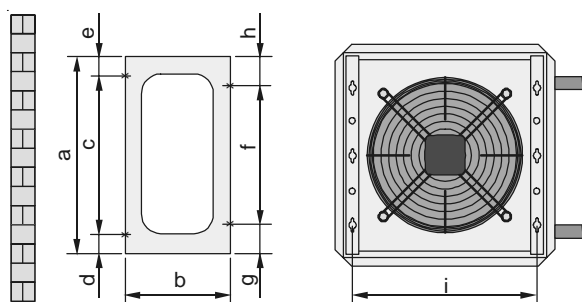
Brackets

For wall- and ceiling-mounting, made of folded sheet steel, 2 mm thick, powder-coated, colour standard white RAL 9016.

Complete installation kit, consisting of:

2 brackets

Hex-head screws for installation in the TLH heater



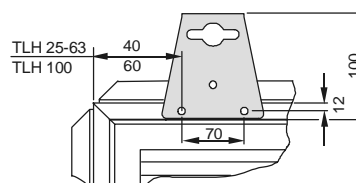
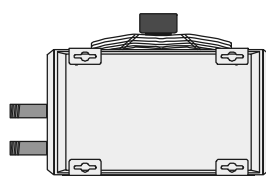
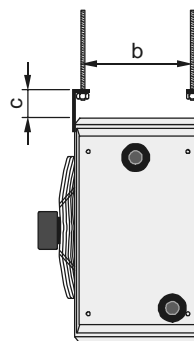
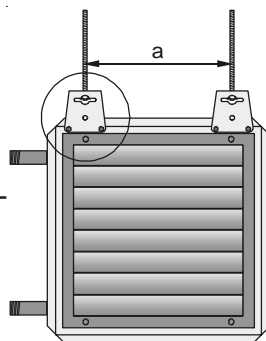
TLH	a	b	c	d	e	f	g	h	i	Part No.
25	480	250	380	70	30	170	155	155	434	65 00 494
40	480	250	2x170	90	50	2x170	70	70	564	65 00 494
63	784	350	170+340+170	72	32	3x170	137	137	734	65 00 497
100	784	350	170+340+170	72	32	3x170	137	137	894	65 00 497

Hangers for configurations with horizontal air flow

For suspending the TLH heater vertically from the ceiling, powder-coated, color standard white RAL 9016.

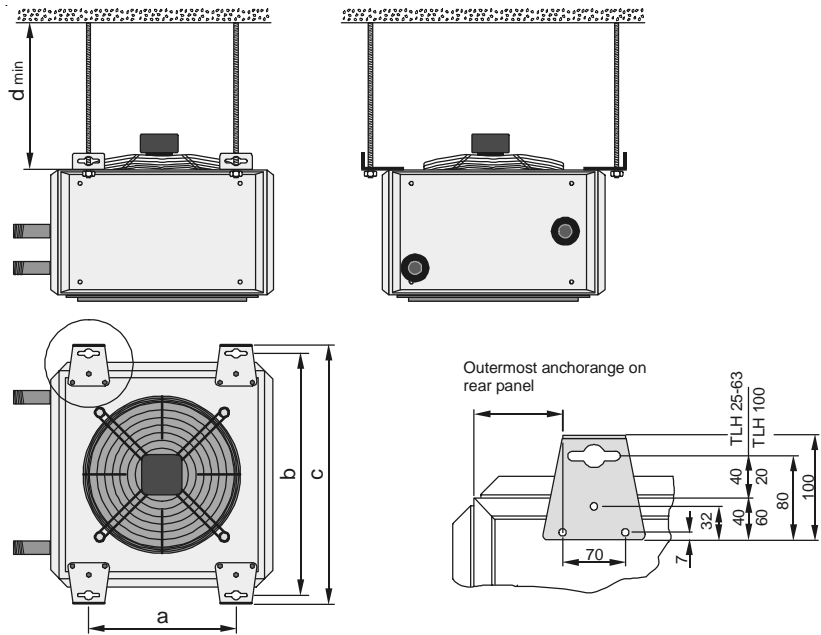
Suitable for use in conjunction with threaded rods or perforated strip for configurations with horizontal air flow.

TLH	a	b	c	Part No.
25	350	266	60	65 00 038
40	480	266	60	65 00 038
63	650	266	60	65 00 038
100	810	306	60	65 00 038



Hangers for configurations with vertical air flow

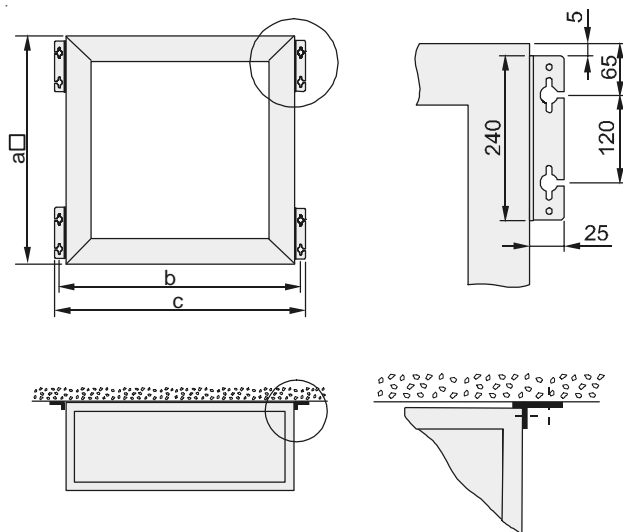
For suspending the TLH heater horizontally from the ceiling, powder-coated, color standard white RAL 9016. Suitable for use in conjunction with threaded rods or perforated strip for configurations with vertical air flow.



TLH	a	b	c	d _{min}	Part No.
25	270	580	620	250	65 00 038
40	440	710	750	250	65 00 038
63	610	880	920	350	65 00 038
100	780	1040	1080	350	65 00 038

Bracket for intake accessory, loose

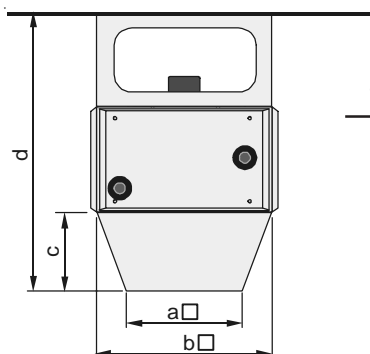
For wall-mount or ceiling-mount installation of the TLH heater with mixed-air box, recirculated-air box, outdoor-air box or filter box, powder-coated, color standard white RAL 9016. Four brackets are required for installation and are enclosed with the intake accessory (seal against wall/ceiling to be provided by others).



TLH	a	b	c	Part No.
25	500	550	600	65 00 325
40	630	680	730	65 00 325
63	800	850	900	65 00 325
100	1000	1050	1100	65 00 325

Discharge cone

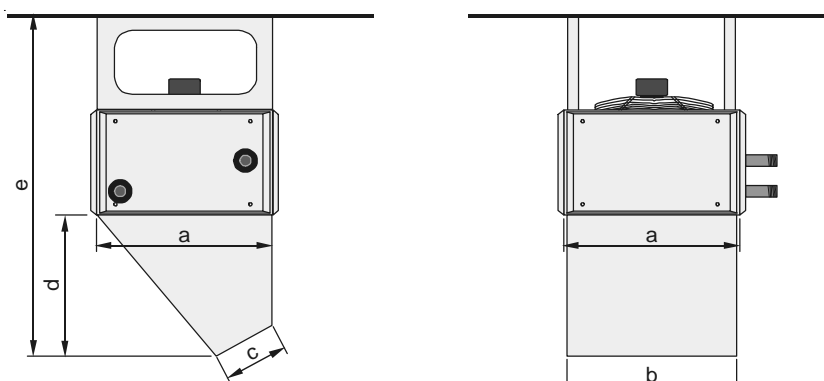
To increase throw if the unit is high above the floor.
Powder-coated, color standard white RAL 9016.
(See pages 29/30 for throw)



TLH	a	b	c	d	Part No.
25	280	460	200	750	65 00 333
40	370	590	240	790	65 00 403
63	430	760	270	920	65 00 406
100	530	920	320	1010	65 00 409

Discharge nozzle

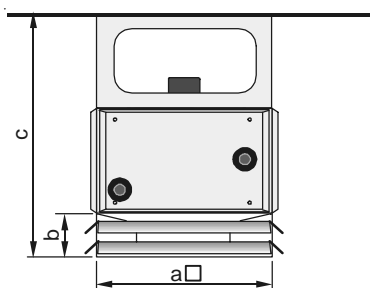
For extended throw, suitable as an air curtain at doors.
Discharge temperature for air-curtain operation approx. 10-15°C above room temperature.
Powder-coated, color standard white RAL 9016.
(See pages 29/30 for throw)



TLH	a	b	c	d	e	Part No.
25	460	420	190	390	940	65 00 412
40	590	550	250	480	1030	65 00 424
63	760	720	260	585	1235	65 00 436
100	920	880	320	685	1375	65 00 448

Four-way discharge

With adjustable deflector vanes, suitable for heating low-ceilinged rooms, uniform air discharge to all four sides.
Powder-coated, color standard white RAL 9016. Vanes Wolf silver, similar to RAL 9006.

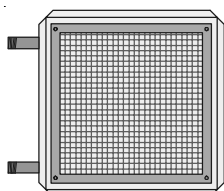


TLH	a	b	c	Part No.
25	500	155	705	65 00 460
40	630	155	705	65 00 465
63	800	155	805	65 00 467
100	1000	155	845	65 00 469

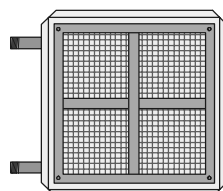
Wide discharge / swirl wide discharge

Spread the stream of warm air to each side.
Air cone spread up to approx. 120°; vanes individually adjustable horizontally and vertically.
Powder-coated, color Wolf silver, similar to RAL 9006.

Wide dis.	Part No.
25	25 65 020
40	25 65 120
63	25 65 220



Wide discharge
(See pages 29/30 for throw)



Swirl wide discharge

Swirl wide dis.	Part No.
25	25 65 410
40	25 65 411
63	25 65 412
100	25 65 413

Induction louver with secondary-air cone



Wall-mounted



Ceiling-mounted

For optimizing throw and temperature distribution

Description of function

The induction louver with secondary-air cone divides the warm air into separate flows and inducts secondary air (room air) directly into the current of warm air downstream from the deflector vanes.

The induction of secondary air ensures that the warm air is thoroughly mixed with the room air within a very short distance, and this reduces the discharge temperature of the air.

This reduction in temperature prevents the warm air from rising, thus extending throw and depth of penetration into the room, especially in systems with high air-discharge temperatures.

The induction louver with secondary-air cone is adjustable (which means that the direction of the current of warm air is also variable) and can be moved either manually or by means of an electric motor to suit all operating conditions and on-site situations.

Energy savings

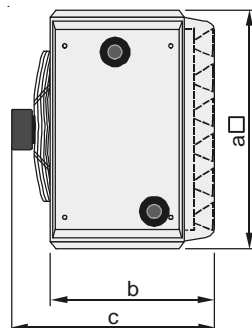
High temperatures close to the ceiling are avoided, and this reduces ventilation-related and transmission-related heat losses. Energy savings up to 15% can be achieved.

Scope of supply

Induction louver with secondary-air cone mounted on the heater, with 230V / 50Hz servomotor for positioning.

Alternatively: Induction louver with secondary-air cone, manually adjustable.

Dimensions of basic unit and induction louver with secondary-air cone



TLH	a	b	c
25	540	420	530
40	670	420	535
63	840	420	560
100	1040	460	610

Induction louver with secondary-air cone for wall-mounted heater

Manual adjustment

TLH	Part No.
25	65 00 477
40	65 00 489
63	65 00 506
100	65 00 517

With electric servomotor

TLH	Part No.
25	65 00 479
40	65 00 491
63	65 00 508
100	65 00 519

Induction louver with secondary-air cone for ceiling-mounted heater

Manual adjustment

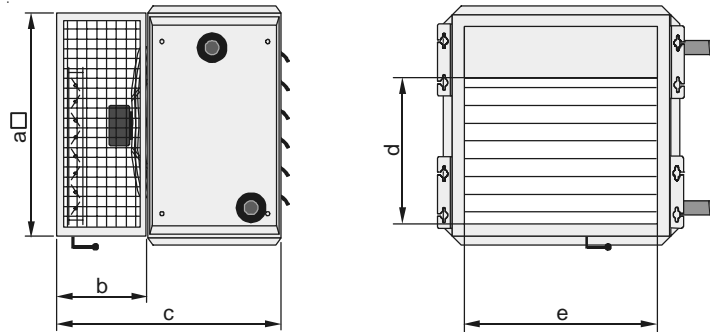
TLH	Part No.
25	65 00 478
40	65 00 490
63	65 00 507
100	65 00 518

With electric servomotor

TLH	Part No.
25	65 00 480
40	65 00 492
63	65 00 509
100	65 00 520

Mixed-air box

For custom air-flow settings. Outdoor-air intake at the rear, recirculated-air intake at the side or from above or below with the mixed-air box turned through 90°. Stepless adjustment between recirculated-air only through mixed air to outdoor-air only, adjustment manual or by means of 230V servomotor. Powder-coated, color standard white RAL 9016.

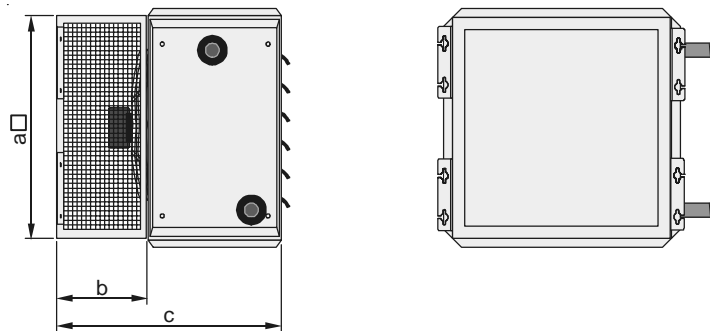


TLH	a	b	c	d	e	Part No.
25	500	500	800	400	400	65 00 335
40	630	500	800	360	530	65 00 531
63	800	500	800	530	700	65 00 535
100	1000	540	880	690	860	65 00 542

Recirculated-air box

Recirculated-air box for recirculated-air intake through two side screens or, when rotated through 90°, intake from above and below. Powder-coated, color standard white RAL 9016.

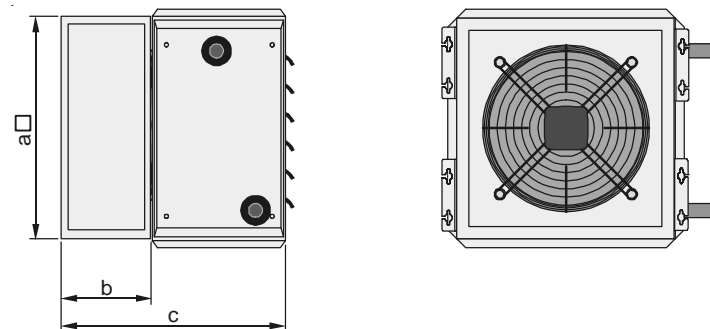
TLH	a	b	c	Part No.
25	500	300	600	65 00 331
40	630	300	600	65 00 389
63	800	300	600	65 00 393
100	1000	340	680	65 00 397



Outdoor-air box

Outdoor-air box with air intake at rear, for connection to a wall penetration or outdoor-air duct. Powder-coated, color standard white RAL 9016.

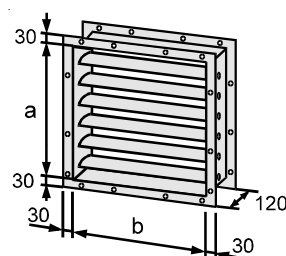
TLH	a	b	c	Part No.
25	500	300	600	65 00 326
40	630	500	600	65 00 365
63	800	500	600	65 00 369
100	1000	540	680	65 00 373



Louver flap for outdoor-air box

Louver flap for installation in outdoor-air box, sheet steel, galvanized.

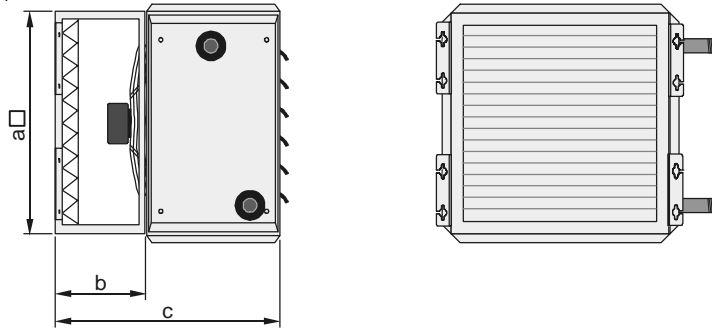
TLH	a	b	Part No.
25	400	400	60 22 302
40	530	530	60 22 702
63	700	700	60 32 703
100	860	860	60 42 704



Filter box

With filter element as dust trap in outdoor-air and mixed-air modes, filter category G4. Bracket on request. Powder-coated, color standard white RAL 9016.

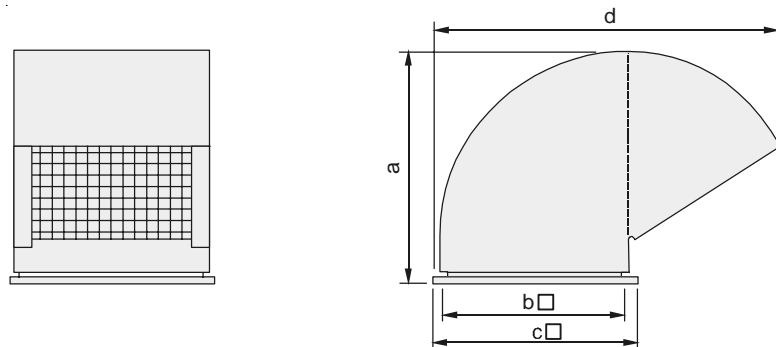
TLH	a	b	c	Part No.
25	500	300	600	65 00 549
40	630	300	600	65 00 554
63	800	300	600	65 00 559
100	1000	340	680	65 00 564



Rain cowl with birdproof screen

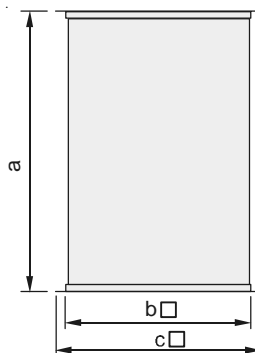
With birdproof screen (flow-stop louver available on request), for inducing outdoor air through the roof. Connects to TLH heater with roof penetration. Sheet steel, galvanized.

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



Roof penetration

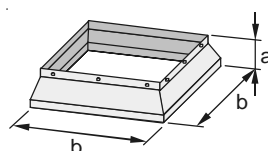
For connecting the TLH heater to the rain cowl through the roof. Roof must be sealed on site. Sheet steel, galvanized.



TLH	a	b	c	Part No.
25	1100	500	600	25 50 025
40	1100	630	730	25 50 040
63	1100	800	900	25 50 063
100	1100	1000	1100	25 50 100

Flashing

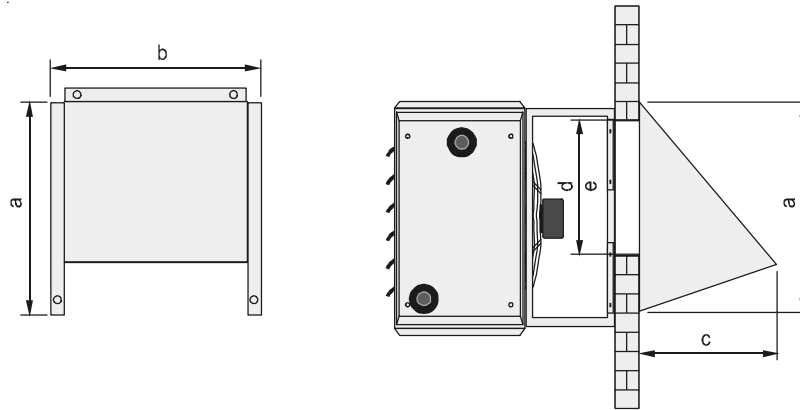
As weathering collar for roof penetration, sheet steel, galvanized



TLH	a	b	Part No.
25	170	580	65 13 481
40	170	710	65 13 482
63	170	880	65 13 483
100	170	1080	65 13 484

Intake cowl with weatherproof screen

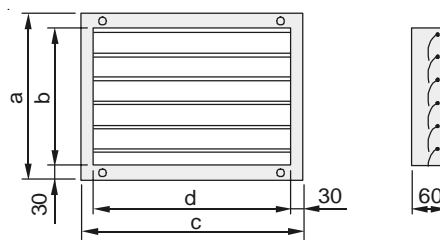
With birdproof screen for outdoor-air intake through the wall (available with flow-stop louver on request). Sheet steel, galvanized.



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

Flow-stop louver for rain cowl/intake cowl

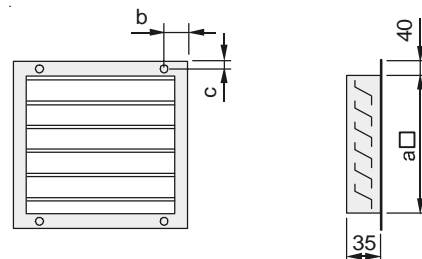
For installation in the rain cowl or in the wall penetration for the intake cowl. Sheet steel, galvanized.



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

Weatherproof screen

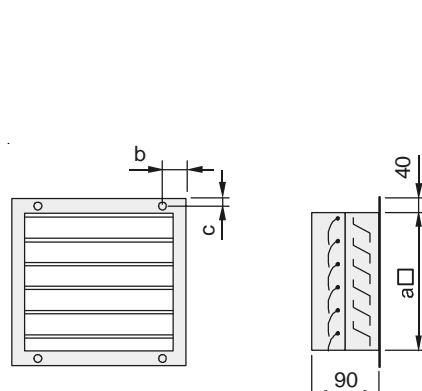
Weatherproof screen with birdproof screen. Sheet steel, galvanized.



TLH	a	b	c	Part No.
25	410	75	20	25 65 400
40	540	55	20	25 65 401
63	710	55	20	25 65 402
100	870	50	20	25 65 403

Weatherproof screen with flow-stop louver

Weatherproof screen with birdproof screen and flow-stop louver. Sheet steel, galvanized.

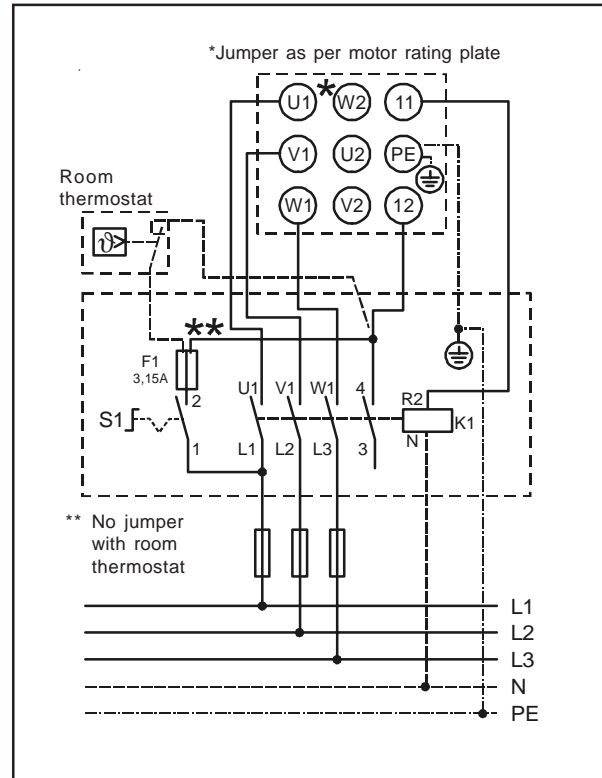


TLH	a	b	c	Part No.
25	410	75	20	25 65 025
40	540	55	20	25 65 040
63	710	55	20	25 65 063
100	870	50	20	25 65 100

1-stage switch, D1

For single-speed operation of one or more unit heaters with thermistor-type motor protection.

Operating voltage	400 V
Control voltage	230 V
Capacity, max.	3 kW
Weight	0.9 kg
Degree of protection	IP 54
Part No.	79 40 001

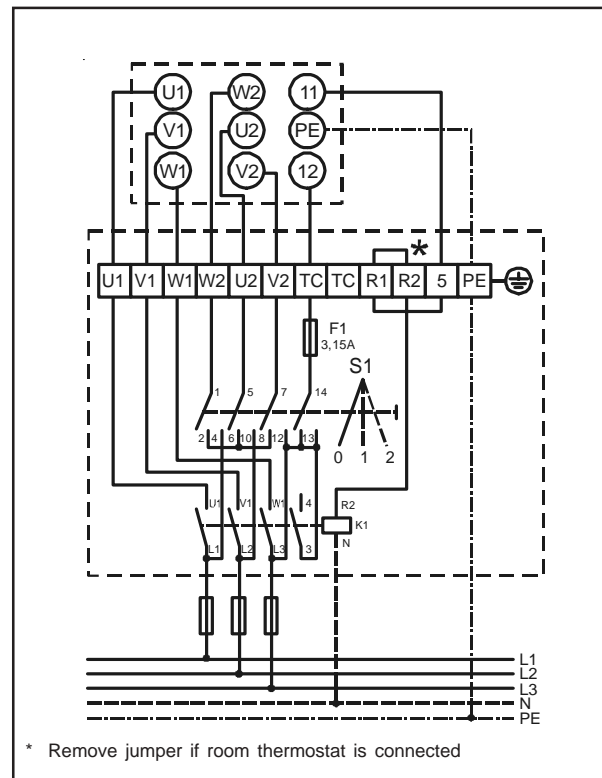
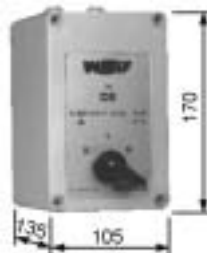


Automatic restart when winding temperature drops (motor).

2-stage switch, DS

For two-speed operation of one or more unit heaters with thermistor-type motor protection.

Operating voltage	400 V
Control voltage	230 V
Capacity, max.	4 kW
Weight	0.9 kg
Degree of protection	IP 54
Part No.	79 25 110



Automatic restart when winding temperature drops (motor).

Note:

Operation without switchgear for thermistor-type protection voids the guarantee on the motor.
Installation must be in compliance with local utility regulations.

Thermistor-type motor protection switches for 3 x 230 V available on request.

Control unit, A2

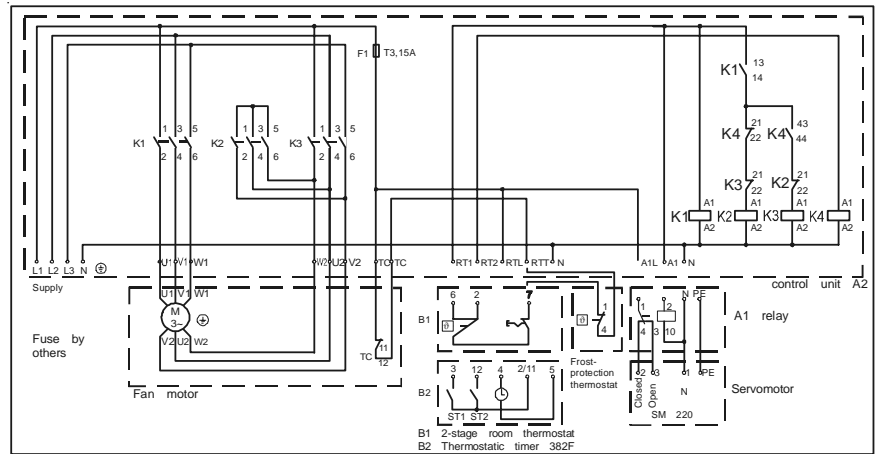
For automatic 2-speed operation of one or more unit heaters in conjunction with a 2-stage room thermostat or a 2-stage thermostatic timer.

With the assistance of the A2 control unit, the 2-stage room thermostat or thermostatic timer selects the speed stage (0, 1 or 2) best suited to the required heating output.



Operating voltage	3 x 400 V
Control voltage	230 V
Capacity, max.	4 kW
Weight	2.0 kg
Degree of protection	IP 55
Part No.	79 25 130

Automatic restart when the winding temperature drops (motor).



Note:

Operation without switchgear for thermistor-type protection voids the guarantee on the motor.
Installation must be in compliance with local utility regulations.

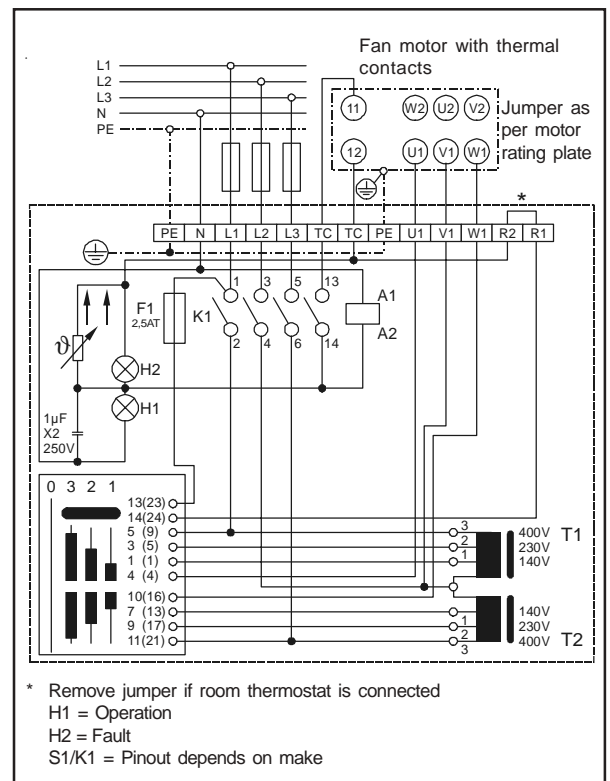
3-stage switch D 3- 4 with restart disablement

For 3-speed operation of one or more unit heaters with thermistor-type motor protection.



Operating voltage	400 V
Control voltage	230 V
Capacity, max.	4 kW
Weight	8 kg
Degree of protection	IP 20
Part No.	27 01 065

Latched shutdown if winding overheats (motor). Restart by setting multistage switch to 0 position and then select desired speed.



5-stage switch, D 5-...

For 5-speed operation of one or more unit heaters with thermistor-type motor protection.

Type		D5-1	D5-3	D5-7	D5-12
Operating voltage	V	400	400	400	400
Control voltage	kW	230	230	230	230
Current, max.	A	1	2	4	7
Weight	kg	4.5	7.0	9.0	19.0
Protection	IP	40	20	20	20

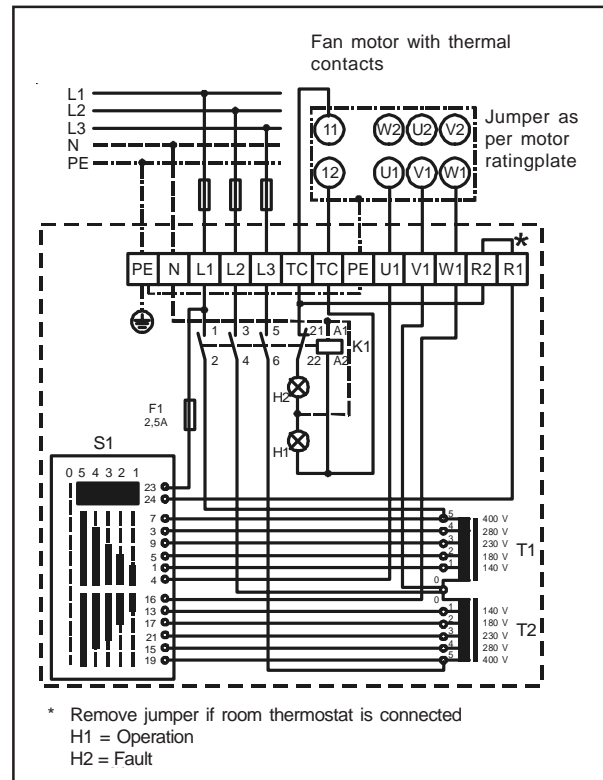
Dimensions

Type		D5-1	D5-3	D5-7	D5-12
Width	A	150	230	230	230
Height	B	200	310	310	310
Depth	C	175	185	185	181

Part numbers

Type	Part No.
D5-1	27 40 015
D5-3	27 40 010
D5-7	27 40 013
D5-12	27 40 014

Automatic restart when winding temperature drops (motor).

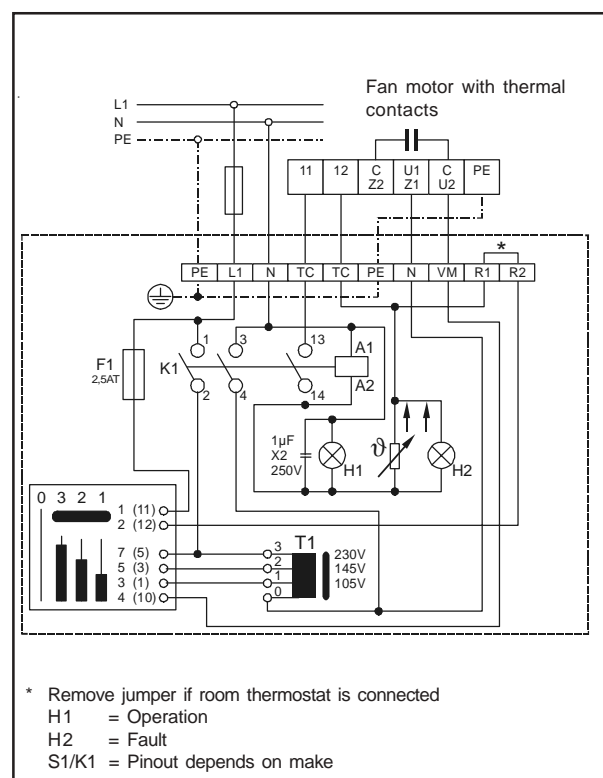


3-stage switch, E 3-7T with restart disablement

For 3-speed operation of one or more unit heaters with single-phase AC motors with thermistor-type motor protection.

Operating voltage	230 V
Current, max.	7 A
Weight	4.5 kg
Degree of protection	IP 40
Part No.	27 01 064

Latched shutdown if winding overheats (motor). Restart by setting multistage switch to 0 position and then select desired speed.

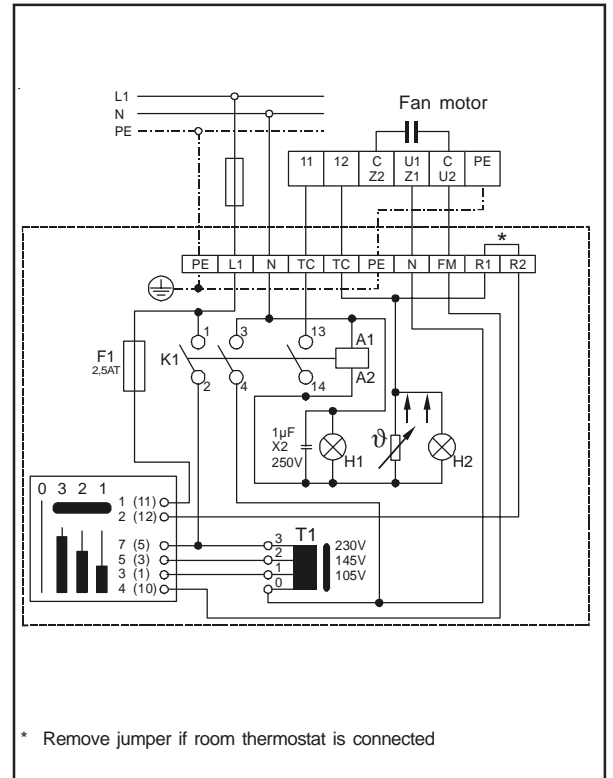


5-stage switch, E 5-3

For 5-speed operation of one or more unit heaters with single-phase AC motors with thermistor-type motor protection.

Operating voltage	230 V
Current, max.	3 A
Weight	4.0 kg
Degree of protection	IP 40
Part No.	27 40 006

Automatic restart when winding temperature drops (motor).



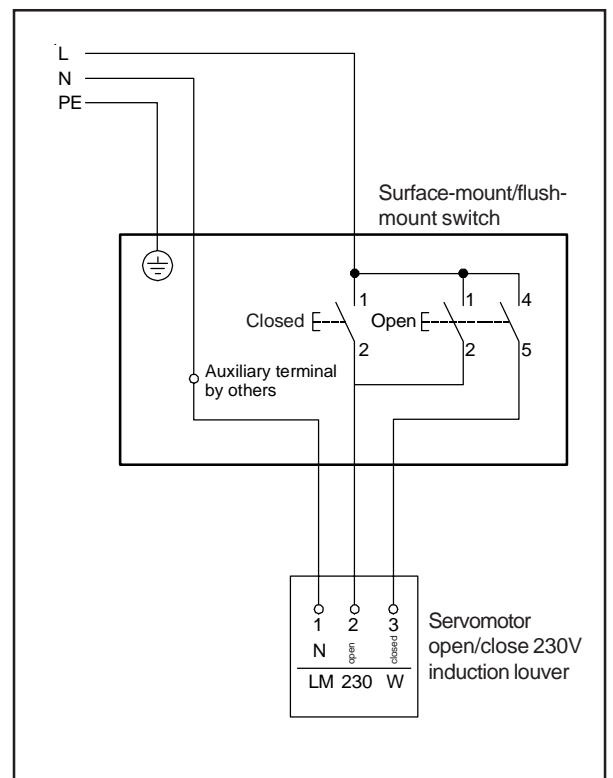
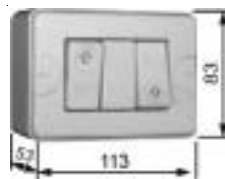
Note:

Operation without switchgear for thermistor-type protection voids the guarantee on the motor.
Installation must be in compliance with local utility regulations.

Switch for servomotor, induction louver with secondary-air cone

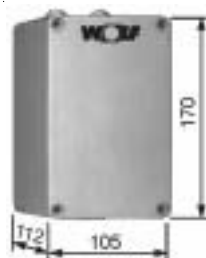
For surface mounting or flush mounting; for stepless adjustment of the induction louver for optimized throw.

Operating voltage	230 V
Current, max.	10 A
Degree of protection	IP 20
Part No.	27 01 063

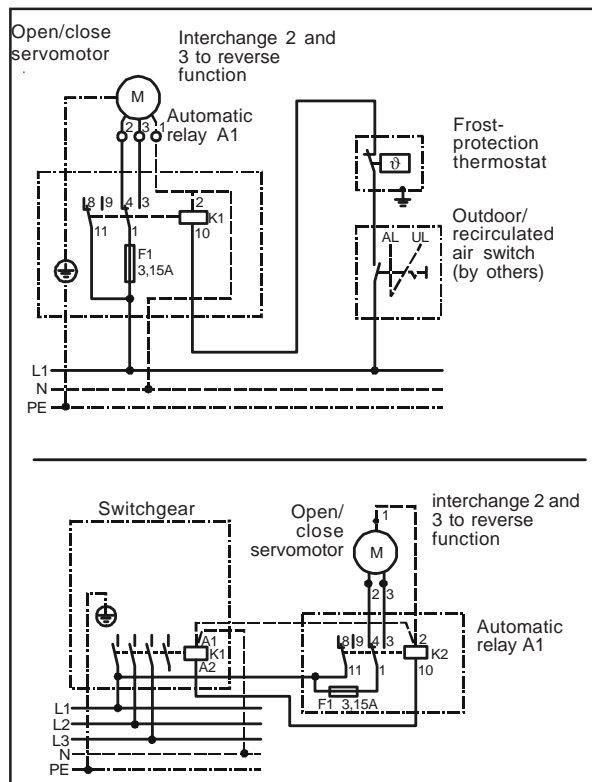


Automatic relay, A1

Auxiliary relay for automatic actuation of the outdoor-airflap with 230 V servomotor for "open/close". When the TLH switches off or the frost-protection thermostat trips, the A1 automatic relay moves the servomotor to the "closed" position. When the TLH switches on the A1 moves the servomotor to the "open" position.



Control voltage	230 V
Capacity, max.	3 kW
Weight	0.5 kg
Degree of protection	IP 54
Part No.	79 65 020



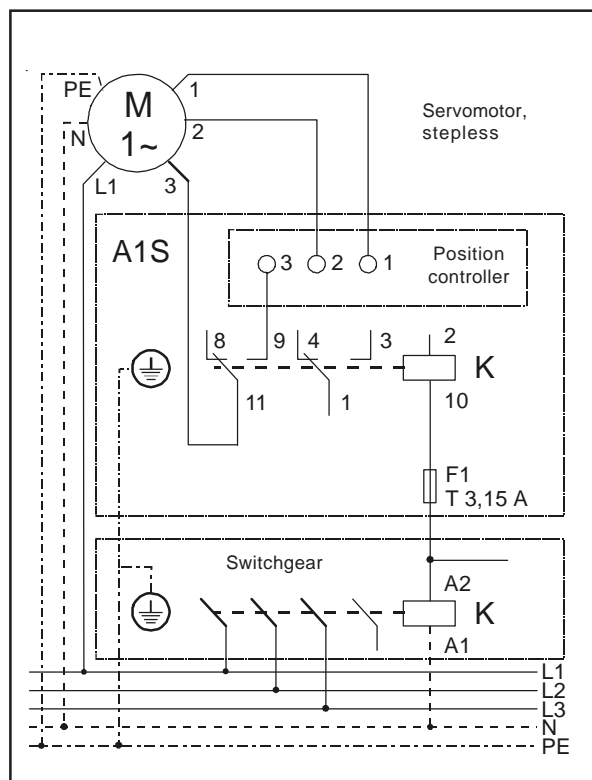
Automatic relay, A1S

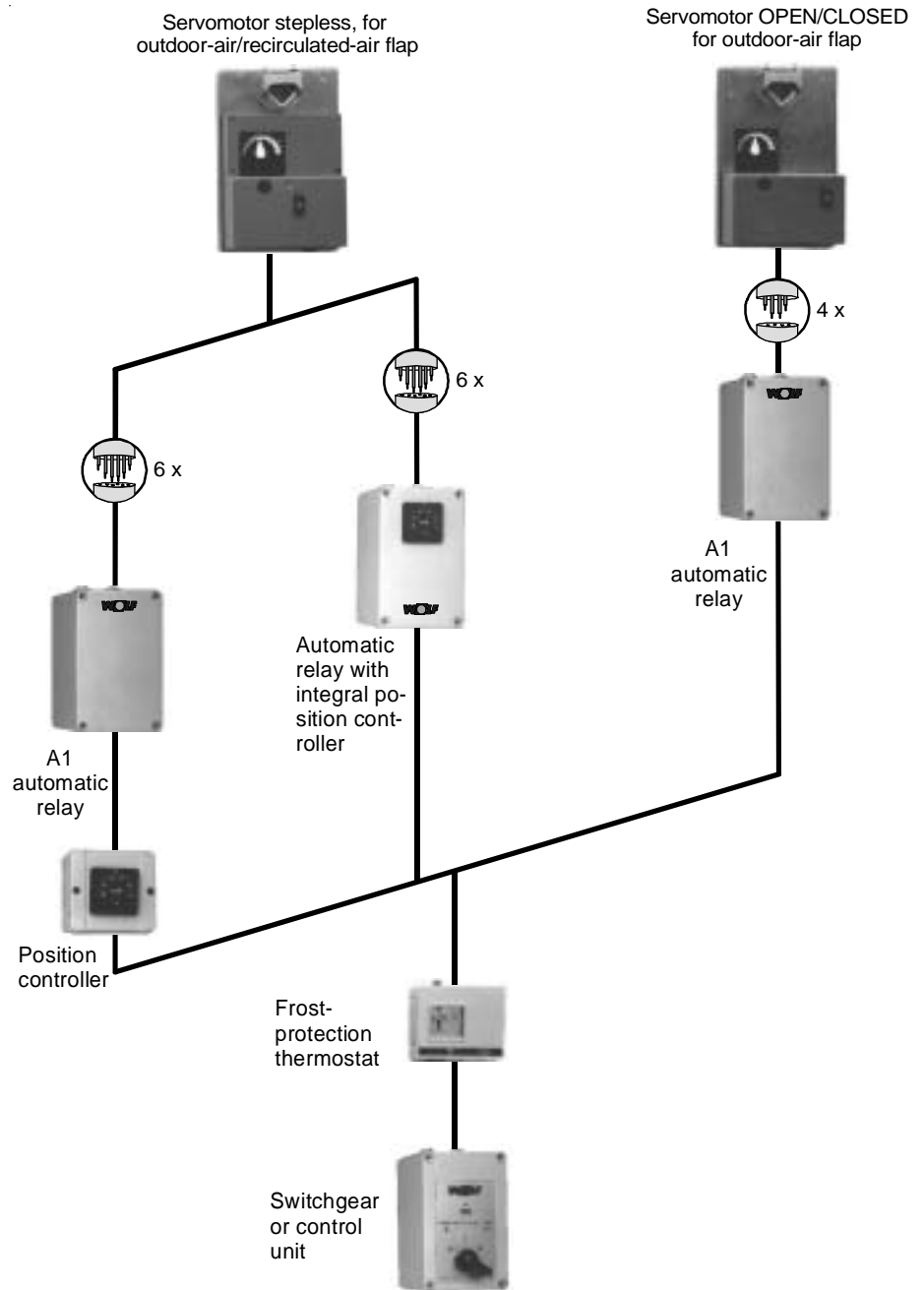
Auxiliary relay with integral position controller for automatic actuation of the mixed-air flap with 230 V servomotor for stepless positioning.

When the TLH switches off or the frost-protection thermostat trips, the A1S automatic relay moves the servomotor to the position corresponding to the position controller signal.



Control voltage	230 V
Capacity, max.	3 kW
Weight	0.5 kg
Degree of protection	IP 54
Part No.	79 65 012





Servomotor, OPEN/CLOSE 230V

Motor drive for an outdoor-air flap in conjunction with an A1 automatic relay.

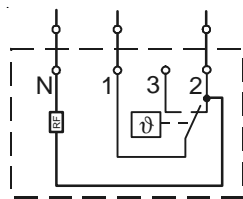
- TLH starts up → Outdoor-air flap opens
- TLH shuts down or frost-protection device trips → Outdoor-air flap closes

Servomotor, stepless 230V

Stepless, motor-driven actuation of outdoor-air and recirculated-air flaps in conjunction with an A1 automatic relay and a position controller, either in the switchgear cabinet or surface-mounted, or with an A1S automatic relay with integral position controller

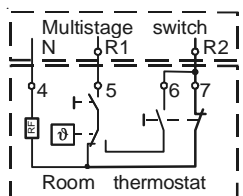
- TLH starts up → Outdoor-air flap opens to preset distance, recirculated-air flap closes accordingly.
- TLH shuts down or frost-protection device trips → Outdoor-air flap closes fully recirculating-air flap opens 100%.

Room thermostat



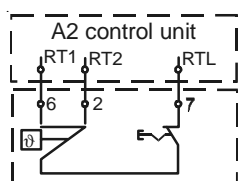
Plastic housing 71 x 71 x 30 mm for surface mounting.
 Switching capacity: heating 10(4) A, cooling 5(2) A at 230 V / 50 Hz, thermal feedback
 Temperature range 5 - 30 °C.
 Switching differential 0.5 K.
 Degree of protection IP 30.
 Part No. 27 34 000.

Room thermostat with summer/winter switch



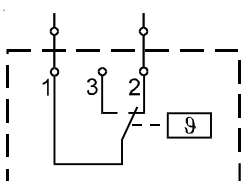
Plastic housing 117 x 71 x 30 mm for surface mounting.
 Switching capacity 6(3) A at 230 V / 50 Hz, thermal feedback.
 Temperature range 5 - 30 °C.
 Switching differential 0.5 K.
 Degree of protection IP 30.
 Part No. 27 34 700.

Room thermostat with 2-stage control



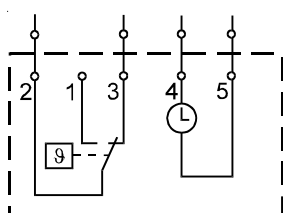
Plastic housing 117 x 71 x 30 mm for surface mounting. In conjunction with A2 control unit, suitable for automatic 2-speed operation of the TLH fan.
 Switching capacity 10(4) A at 230 V.
 Temperature range 5 - 30 °C.
 Switching differential, speed I 1.0 K
 speed II 1.5 K
 Degree of protection IP 30.
 Electrical connection: see A2 control unit.
 Part No. 27 34 600.

Room thermostat, industrial grade



Metal housing with plastic cover, 117 x 71 x 30 mm for surface mounting.
 Switching capacity 10(3) A at 230 V / 50 Hz.
 Temperature range 0 - 35 °C
 Switching differential 1 K.
 Degree of protection IP 54.
 Part No. 27 35 300.

Thermostatic timer with day or week program



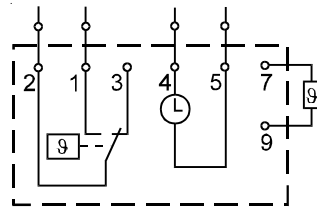
Plastic housing 162 x 80 x 44 mm for back mount, nighttime temperature reduction with day or week program (selectable), daytime and nighttime temperatures can be set separately.
 24 hr. program: programmable every 5 min.
 shortest switching period 15 min.
 7 day program: programmable every 30 min.
 shortest switching period 2 hours
 Switching capacity 5 A at 230 V / 50 Hz.
 Temperature range 6 - 26 °C.
 Switching differential 0.2 K.
 Degree of protection IP 30.
 Part No. 27 35 500.

Thermostatic timer with day or week program and 2-stage control



Plastic housing 162 x 80 x 44 mm for back mount, nighttime temperature reduction with day or week program (selectable), daytime and nighttime temperatures can be set separately.
 24 hr. program: programmable every 5 min.
 shortest switching period 15 min.
 7 day program: programmable every 30 min.
 shortest switching period 2 hours
 Switching capacity 6 A at 230 V / 50 Hz.
 Temperature range 6 - 26 °C.
 Switching differential adjustable 0.5 - 2.5 K.
 Degree of protection IP 30. Part No. 27 35 400.
 In conjunction with A2 control unit, suitable for automatic 2-speed operation of the TLH fan.

Thermostatic timer with day or week program and complete with remote sensor



Plastic housing 162 x 80 x 44 mm for back mount, nighttime temperature reduction with day or week program (selectable), daytime and nighttime temperatures can be set separately.

24 hr. program: programmable every 5 min.
shortest switching period 15 min.

7 day program: programmable every 30 min.
shortest switching period 2 hours

Switching capacity 10 A at 230 V / 50 Hz.

Temperature range 6 - 34 °C.

Switching differential adjustable 0.2 K.

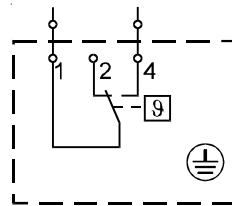
Degree of protection IP 30.

Length of cable to remote temperature sensor max. 50 m.

Degree of protection, remote temperature sensor IP 64.

Part No. 27 35 410.

Frost-protection thermostat



If the air discharge temperature drops below a preset value the frost-protection thermostat switches off the TLH to prevent frost damage to the heat exchanger. The TLH restarts automatically when the air discharge temperature increases.

The frost-protection thermostat must be wired in series with the thermal contacts.

Switching capacity 10 A at 230 V / 50 Hz.

Range of adjustment 4.5 °C to 22 °C.

Switching differential 2.5 K.

Degree of protection IP 30.

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

Part No. 27 30 050

Intermediate terminal box



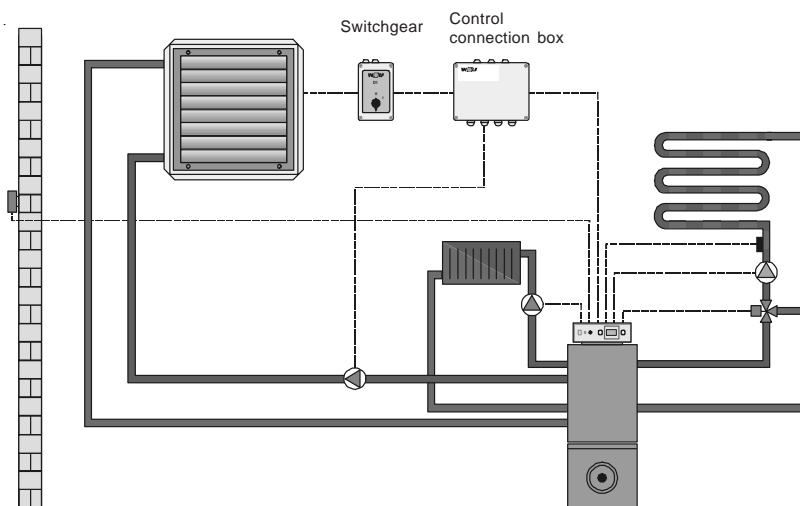
Intermediate terminal box for parallel wiring of up to three TLH heaters with 3 x 400V, 50Hz motors.

Degree of protection IP 54.

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

Part No. 79 65 043

Control connection box



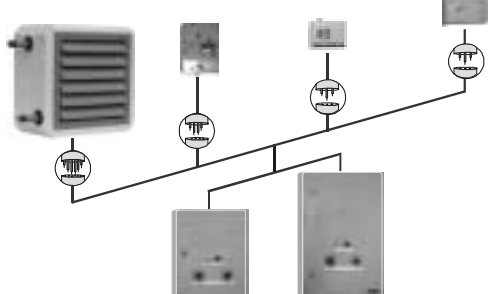
For operation of a TLH heater in conjunction with a Wolf boiler

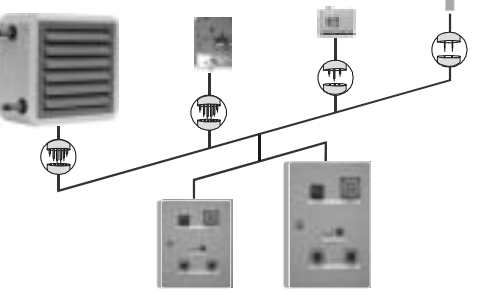
- Constant, elevated heating-water temperature for the TLH heater.

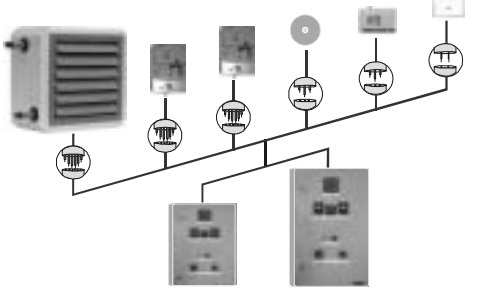
Degree of protection IP 54

Dimensions W x H x D 220 x 170 x 110mm

Part No. 88 52 933

Temperature control by room thermostat or thermostatic timer (A)	Switchgear cabinet fully wired
<p>Installation example:</p>  <ul style="list-style-type: none"> - Heating/ventilationselector switch - Speed selector switch - Control of flap servomotor, OPEN/CLOSE - Frost-protection thermostat connection - Connection for room thermostat or thermostatic timer 	<p>2-stage (max. 13A)</p> <p>5-stage (max. 4A)</p>

Temperature control electronic with room-temperature sensor (B)	Switchgear cabinet fully wired
<p>Installation example:</p>  <ul style="list-style-type: none"> - Heating/ventilationselector switch - Speed selector switch - Control of flap servomotor, stepless - Temperature reduction by timer - Frost-protection thermostat connection 	<p>2-stage (max. 13A)</p> <p>5-stage (max. 4A)</p>

Temperature control by mixer and room thermostat (C)	Switchgear cabinet fully wired
<p>Installation example:</p>  <ul style="list-style-type: none"> - Heating/ventilationselector switch - Speed selector switch - Control of flap servomotor, OPEN/CLOSE - Frost-protection thermostat connection - Connection of room thermostat or thermostatic timer 	<p>2-stage (max. 13A)</p> <p>5-stage (max. 4A)</p>

Number of cores for connecting cables

Connection from to	Switchgear device								
	D1	DS	A2	D3-4	D5..	E3-7T	E5-3	A1	A1S
Electricity supply	5	5	5	5	5	3	3	-	-
TLH motor, 3x400V	6	9	9	6	6	5	3	-	-
TLH motor, 1x230V	-	-	-	-	-	5	3	-	-
Room thermostat	3/4 ¹⁾	3/4 ¹⁾	5 ²⁾	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	-	-
Thermostatic timer	5	5	6 ²⁾	5	5	5	5	-	-
Autom. relay A1	4	4	4	4	4	4	4	-	-
Servomotor	-	-	-	-	-	-	-	4	6

¹⁾ Room thermostat with thermal feedback.

²⁾ 2-stage.

Use a 3-core cable for connection to the frost-protection thermostat.

General guidelines

Position Wolf unit heaters in such a way that the discharged air does not blow directly on to people or machines.

Temperature distribution in a room is more uniform if a number of small units are installed instead of one large unit. Whenever possible the heaters should be arranged in such a way that their discharge currents support the circulation of the air in the room, rather than blowing in opposed directions. An unobstructed intake of air must be ensured at all times.

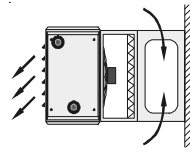
Select the throw of your Wolf heaters to suit the dimensions of the room. The figures in the performance tables are guideline values that can be varied by installing accessories such as discharge cones, wide discharges and four-way discharges to suit the dimensions of individual rooms.

The sound levels of Wolf unit heaters are very low. The dB(A) values quoted in the performance tables are averages.

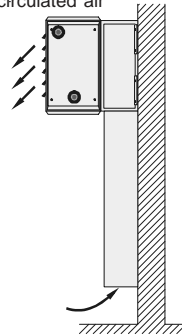
All control and shutoff valves must close automatically when the fan shuts down.

TLH, wall-mounted

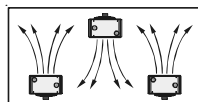
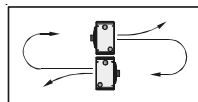
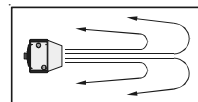
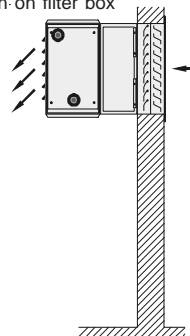
With filter box and bracket



With intake duct for recirculated air

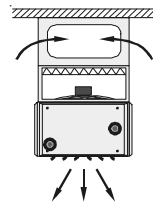


With weatherproof screen-on filter box

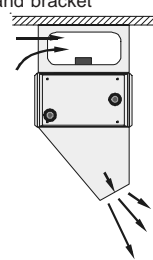


TLH, ceiling-mounted

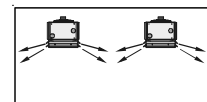
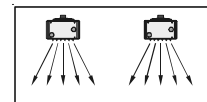
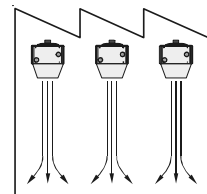
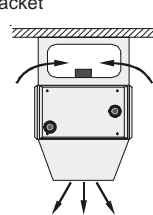
With filter box and bracket



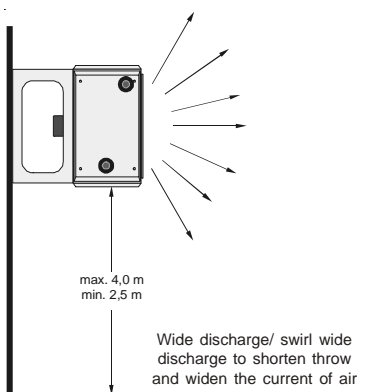
With discharge nozzle and bracket



With discharge cone bracket



General notes on planning



The requisite air volume flow rate (m^3/h) is at least 2.5 or better 3-4 times the enclosed space.

Make sure the current of air does not blow directly on to persons in the room.

Spacing between heaters 10-15m.

Wall-mounted heaters: distance above floor min 2.5m, max. 4m.

Take the throw into account.

If distance between heater and opposite wall is short, install a wide discharge or a swirl-wide discharge.

If the throw of a ceiling-mounted heater with discharge louver is insufficient, install a discharge cone or an induction louver with secondary-air cone.

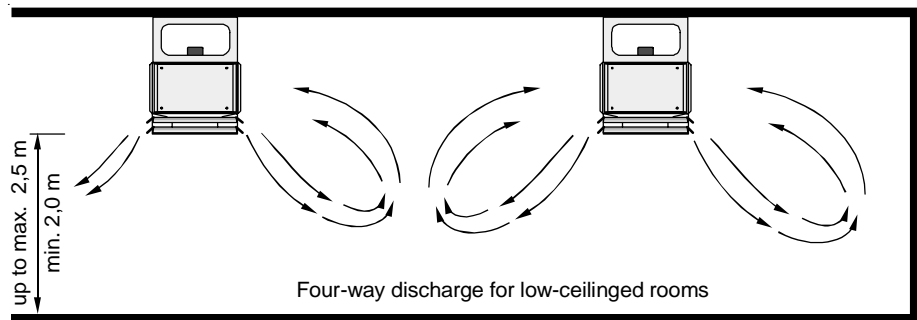
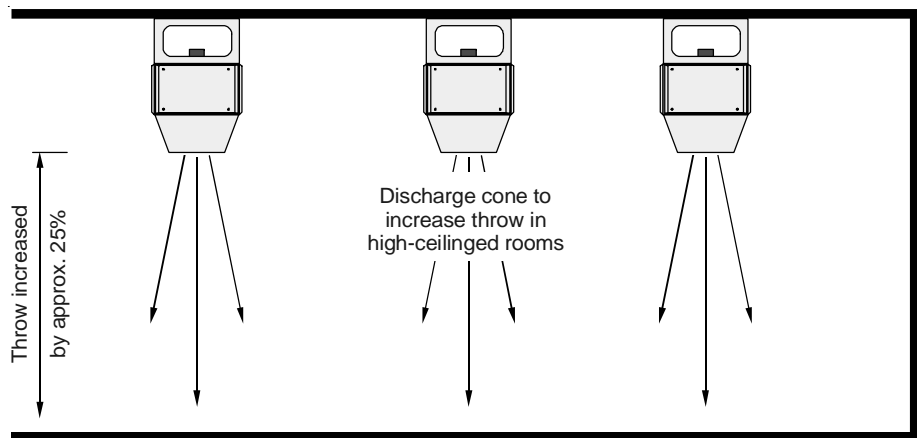
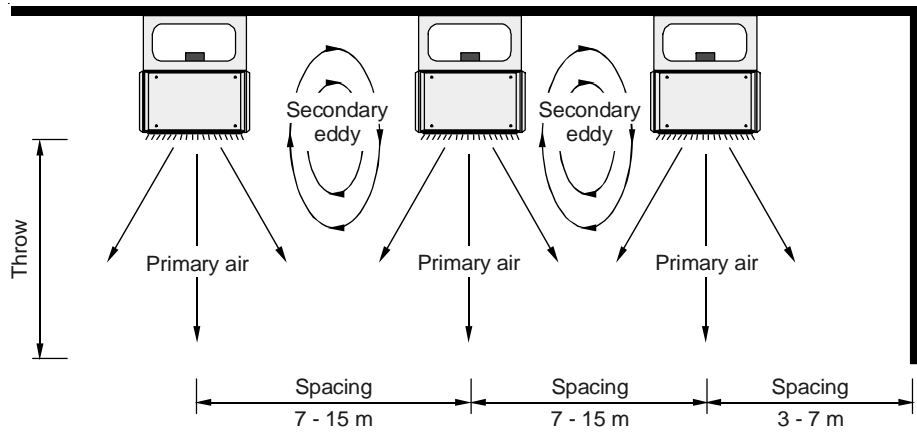
In low-ceilinged rooms where the distance from the bottom of the discharge screen to the floor is less than 2.5m, use a four-way discharge.

Install wall-mounted heaters at the heights indicated in the sketch on the left.

Clearances

Clearances for ceiling-mounted or wall-mounted TLH heaters in m

TLH	TLH to TLH	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 optimized air distribution

For clearances as specified above, air-temperature increase $\Delta t_L (= t_{\text{discharge}} - t_{\text{room}})$ of approx. 25K and high speed

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 discharge Louver	Wide discharge Louver	Wide discharge Louver	Wide discharge Louver
4-5 m	Cone	Cone	Cone	Cone
5-6 m	Cone	Cone	Cone	Cone
more than 6 m	Cone	Cone	Cone	Cone

TLH unit heaters: Induction louver with secondary-air cone

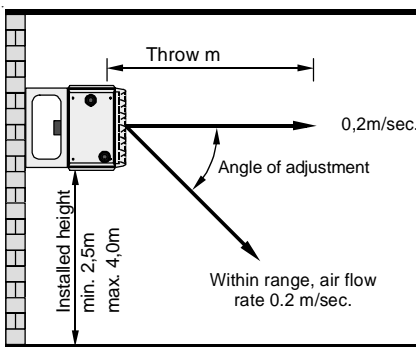
Clearances

Clearances, wall-mounted units and clearances, ceiling-mounted units, louvers vertical

Ceiling-mounted units, louvers angled toward side

TLH	25	40	63	100
TLH to TLH	7-9 m	9-11 m	11-13 m	13-15 m
TLH to side wall	3-4 m	3-5 m	4-6 m	5-7 m
TLH to TLH	-12 m	-14 m	-16 m	-18 m
TLH to side wall	4-6 m	5-7 m	6-8 m	7-9 m

Throw, wall-mounted units

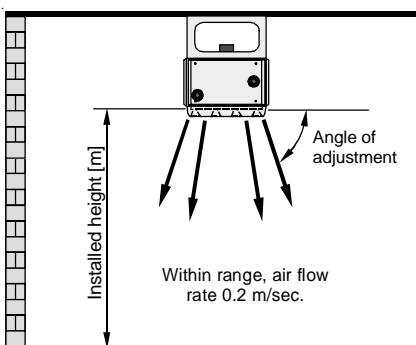


TLH Type	25				40				63				100			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Throw [m]*																
at high speed	19	18	16	15	27	26	23	21	29	27	25	23	36	35	34	32
at low speed	16	15	13	12	20	19	16	14	22	20	18	17	30	28	26	25

* Figures as stated in the table represent throw under defined operating conditions with a mixed-air temperature 10 K above room temperature.

Throw is shorter when the mixed-air temperature is more than 10 K above room temperature.

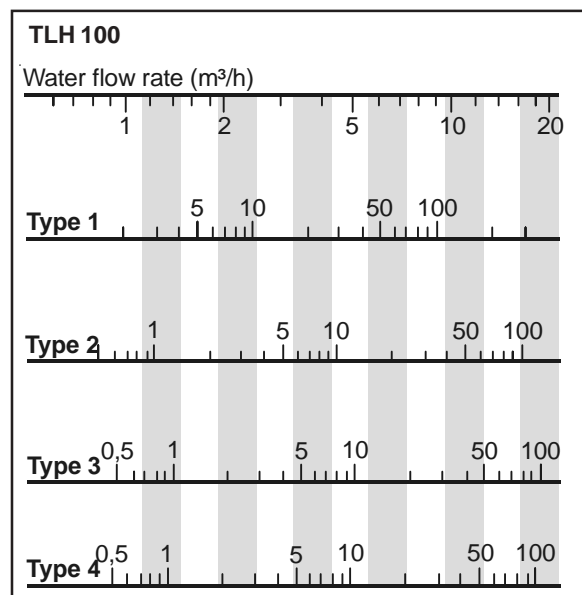
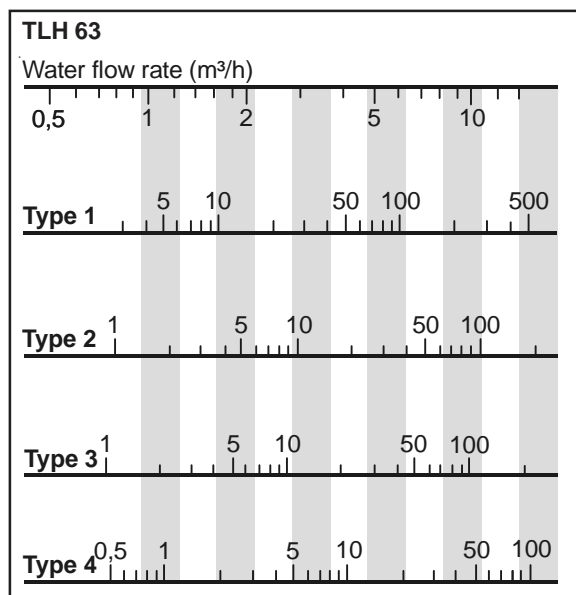
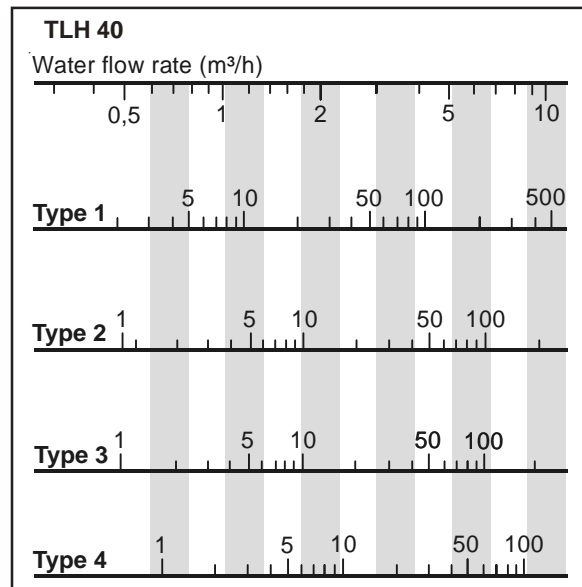
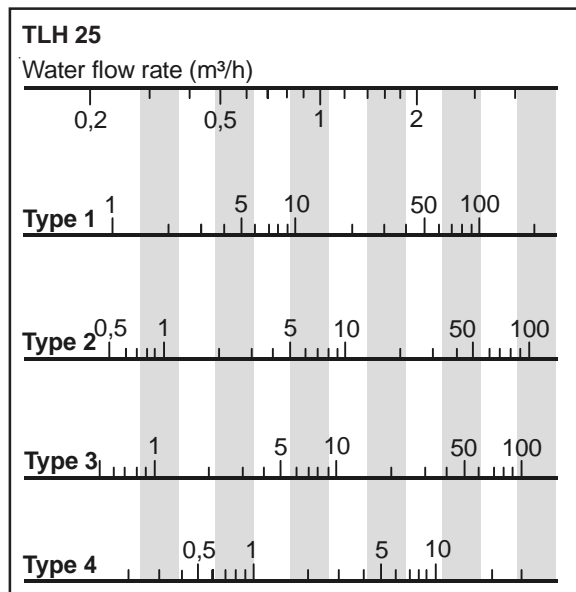
Height, ceiling-mounted units



TLH Type	25				40				63				100			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Installed 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 louver angle depends on conditions on site.

Water resistance [kPa]



Pages 29 - 30:

Throw

(depending on air temperature increase and discharge accessories)

Page 31:

Speed

(in conjunction with multi-stage switch)

Sound pressure level

(depending on speed)

Page 32:

Heating power

Air flow rate and air discharge temperature

(depending on accessories and speed)

Water flow rate w (m³/h)

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

\dot{Q} = Heating power

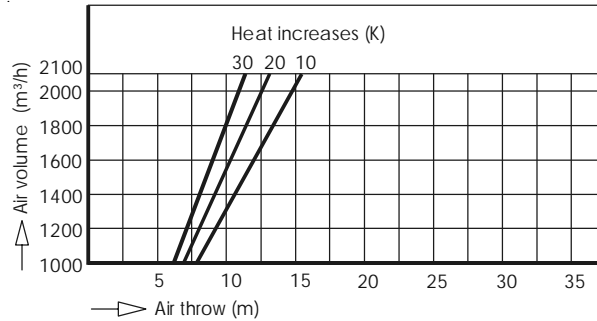
Δt_w = Flow/return temperature differential

Horizontal throw

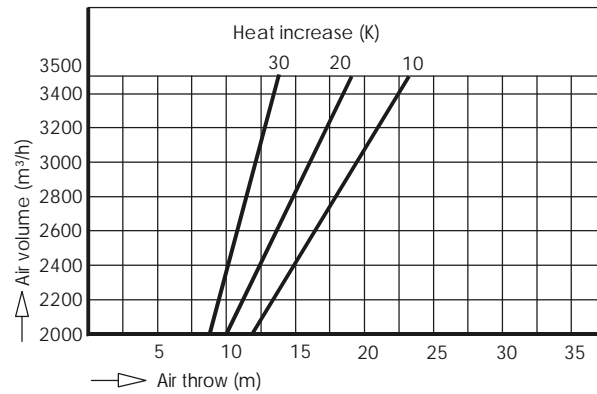
Horizontal throw is the distance travelled by the air discharged by the TLH wall-mounted heater

with discharge louver

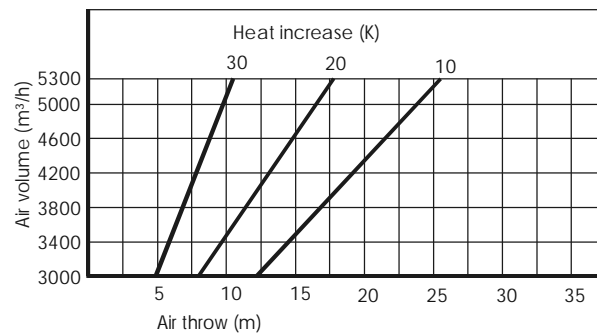
TLH 25



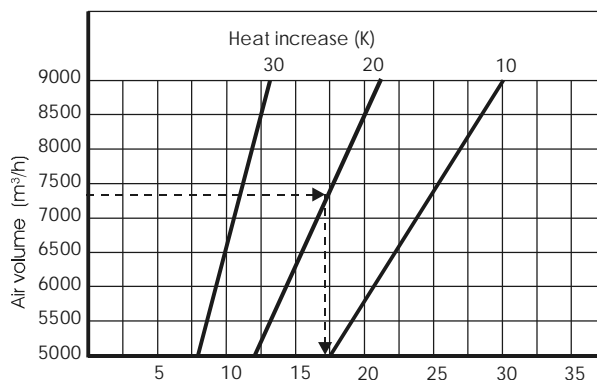
TLH 40



TLH 63



TLH 100



Example: TLH 100 with discharge louver $\Delta t_L = t_{Laeff} - t_{room} = 20$ K; air flow rate = 7300 m³/h
Result: horizontal throw = 17m

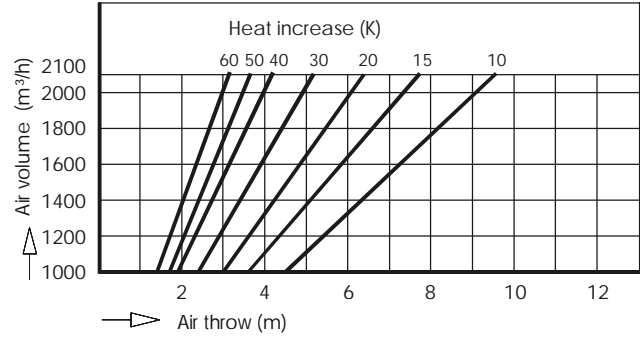
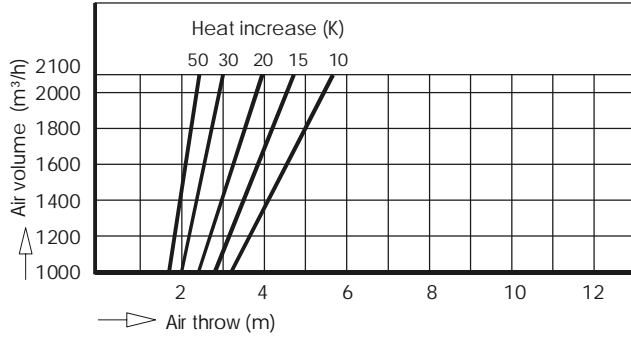
Vertical throw

Vertical throw is the distance travelled by the hot air discharged by the TLH wall-mounted heater

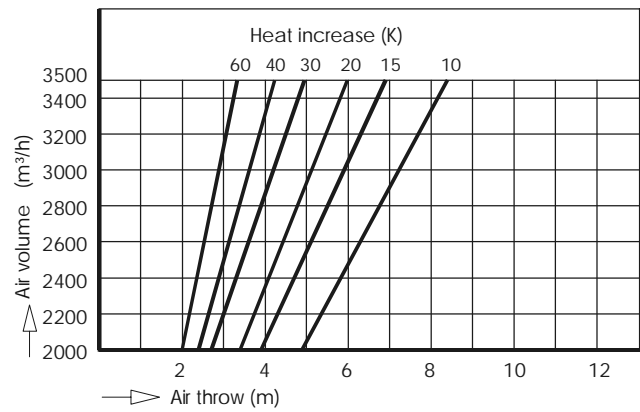
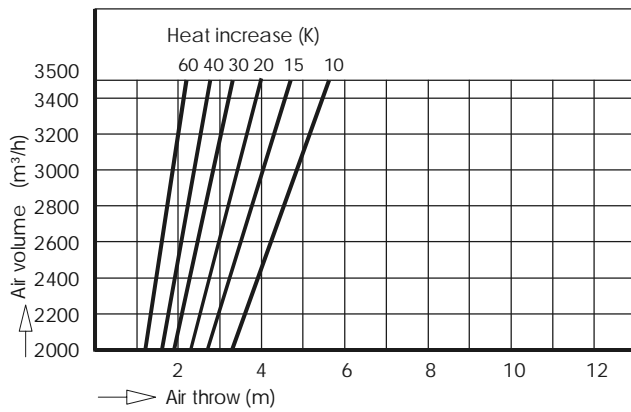
with discharge louver / swirl- wide discharge/ wide discharge

with discharge cone / discharge nozzle

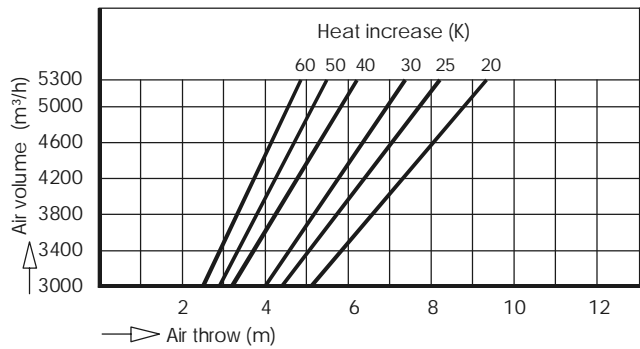
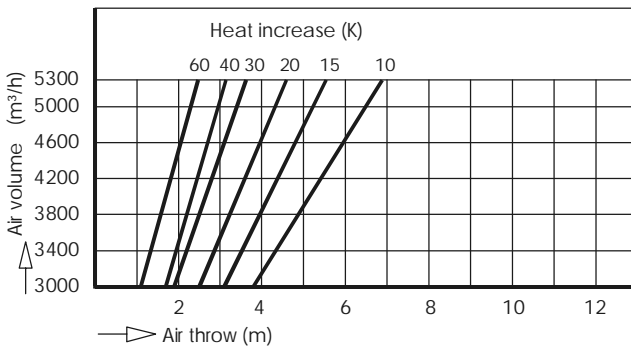
TLH 25



TLH 40



TLH 63



TLH 100

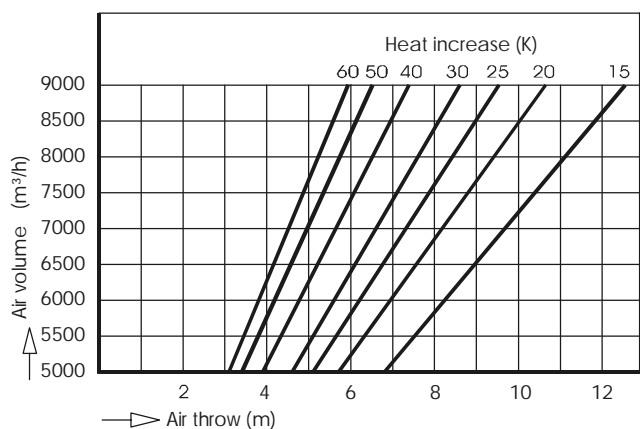
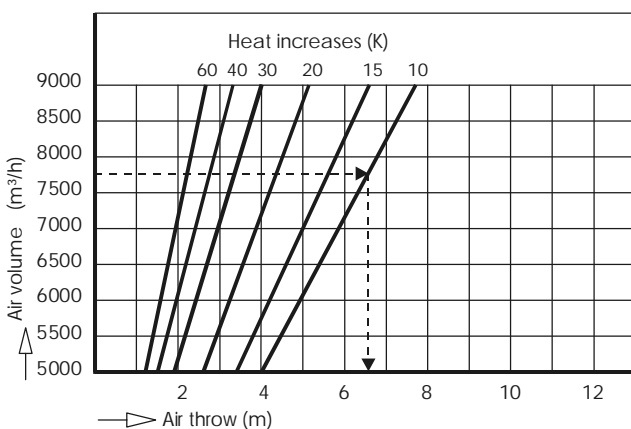


Table of speeds for TLH fan motors

Line voltage	Stage	TLH 25	TLH 40	TLH 63	TLH 100
Single-stage switch					
		Speed min ⁻¹	Speed min ⁻¹	Speed min ⁻¹	Speed min ⁻¹
3 x 400 V Δ	-	1350	1350	900	900
3 x 400 V Y	-	1000	1000	700	700
Two-stage switch					
3 x 400 V Δ	II	1350	1350	900	900
3 x 400 V Y	I	1000	1000	700	700
Three-stage switch					
3 x 400 V Δ	III	1350	1350	900	900
	II	1150	1150	800	750
	I	750	800	550	500
3 x 400 V Y	III	1000	1000	700	700
	II	700	800	500	500
	I	400	450	300	300
1 x 230 V	III	1350	1350	900	900
	II	1250	900	750	750
	I	750	600	500	500
Five-stage switch					
3 x 400 V Δ	V	1350	1350	900	900
	IV	1280	1250	850	800
	III	1150	1150	800	750
	II	950	950	700	650
	I	750	800	550	500
3 x 400 V Y	V	1000	1000	700	700
	IV	900	900	600	600
	III	700	800	500	500
	II	550	600	400	350
	I	400	450	300	300
1 x 230 V	V	1350	1350	900	900
	IV	1300	1100	800	800
	III	1250	900	750	750
	II	1200	750	650	650
	I	750	600	500	500

Sound pressure levels / sound power levels as a function of 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	dB(A)	dB(A) 2 m	rpm	dB(A)	dB(A) 2 m	rpm	dB(A)	dB(A) 2 m	rpm	dB(A)	dB(A) 2 m
3 x 400 V			3 x 400 V			3 x 400 V			3 x 400 V		
1350	70	59	1350	74	63	900	70	59	900	74	63
1280	69	58	1250	72	61	850	69	58	800	71	60
1150	67	56	1150	71	60	800	67	56	750	70	59
1000	64	53	1000	68	57	700	65	54	700	69	58
950	63	52	950	66	55	600	61	50	650	67	56
900	61	50	900	65	54	550	59	48	600	65	54
750	57	46	800	63	52	500	57	46	500	61	50
700	56	45	600	56	45	400	52	41	350	54	43
550	51	40	450	50	39	300	46	35	300	50	39
400	44	33	400	48	37	260	43	32	260	47	36
360	41	30	360	45	34	210	39	28	210	43	32
280	36	25	280	40	29	160	33	22	160	37	26
210	30	19	210	34	23						
160	24	13	160	28	17						
1 x 230 V			1 x 230 V			1 x 230 V			1 x 230 V		
1350	70	59	1350	72	61	900	70	59	900	76	65
1300	69	58	1100	68	57	800	67	56	800	73	62
1250	68	57	900	63	52	750	66	55	750	72	61
1200	68	57	750	59	48	650	63	52	650	69	58
750	57	46	600	54	43	500	57	46	500	63	52
630	54	43	500	51	40	430	54	43	430	60	49
500	49	38	430	47	36	360	50	39	360	56	45
430	45	34	360	43	32	280	45	34	280	51	40
360	41	30	280	38	27	210	39	28	210	45	34
280	36	25	210	32	21	160	33	22	160	39	28
210	30	19	160	26	15						
160	24	13									

* Sound pressure level for a room with medium absorption characteristics, enclosed space approximately 1500 m³.

Symbols in formula

\dot{V}	= Volume flow	m ³ /h
\dot{V}_B	= Reference volume flow	m ³ /h
\dot{V}_O	= Catalog volume flow	m ³ /h
\dot{V}_{eff}	= Effective volume flow	m ³ /h
t_{LE}	= Air intake temperature	°C
t_{LA}	= Air discharge temperature	°C
t_{LAeff}	= Effective air discharge temperature	°C
Δt_L	= Air-temperature increase	K
Δt_w	= Temp. spread of the water	K
W	= Water flow rate	m ³ /h
\dot{Q}	= Heating power	kW
\dot{Q}_O	= Catalog heating power	kW
\dot{Q}_{eff}	= Effective heating power	kW
Δp	= Air resistance	Pa
Δp_w	= Water resistance	kPa
e	= Heat-rise factor	
q_{eff}	= Heating power factor	
l_{eff}	= Air flow rate factor	
k	= Accessory index of the entire heater	

Conversion:

1 Pa = 0.1 mm WG
1 kPa = 1000 Pa

Accessory index k:

Mixed-air box	3
Four-way discharge	2
Discharge nozzle	2
Discharge cone	2
Wide discharge	0
Swirl-wide discharge	1
Filter, clean	5
Intake duct	2
Rain cowl	2
Weatherproof screen	7
Weatherproof screen with flow-stop louver	9
Flow-stop louver	3
Outdoor-air box	0
Recirculated-air box	0
Intake cowl	1
Induction louver with secondary-air cone	2

Calculate k for non-Wolf accessories as follows:

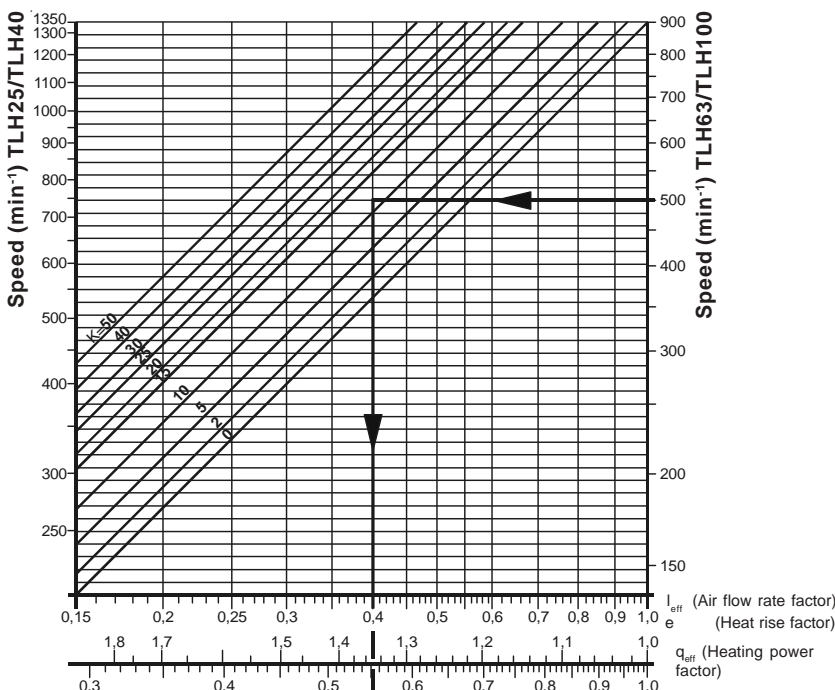
$$k = 0.1 \cdot \Delta p \cdot \left(\frac{\dot{V}_B}{\dot{V}} \right)^2$$

Δp = Air resistance (Pa) at V (m³/h)

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

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

Characteristics graph



Worked example

Given:

TLH 100 type 4, $t_{LE} = -5^\circ\text{C}$, PWW 50/40

from performacne table on page 7:

(always read off the higher speed, because correction factors for operation at lower speeds are taken into account in the charactersitics graph.)

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

Line voltage 3 x 400 V Δ with

5-stage switch, switch stage 1

from speeds table on page 31: 500 rpm

Accessories: mixed-air box and filter

accessories by others: fresh-air duct

$\Delta p = 10 \text{ Pa}$ at 5000 m³/h

$$k = 0.1 \cdot 10 \cdot \left(\frac{10000}{5000} \right)^2$$

$k = 4$ (duct),

$k = 3$ (mixed-air box)

$k = 5$ (filter)

$$k_{tot} = 4 + 3 + 5 = 12$$

TLH 100, 500 rpm, $k = 12$

from characteristics graph:

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

Find:

Effective air flow rate	\dot{V}_{eff}
Effective air-temp. increase	$\Delta t_{L eff}$
Effective air discharge temp.	$t_{LA eff}$
Effective heating power	\dot{Q}_{eff}
Water throughput	W
Water resistance	Δt_w

Solution:

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

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

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

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

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

Δp_w (from diagram on page 28) = 0.85 kPa

Weights in kg

Basic unit		TLH25	TLH40	TLH63	TLH100
PWW	Unit heater, type 1 Cu/Al	24	32	48	76
	Unit heater, type 2 Cu/Al	26	35	51	82
	Unit heater, type 3 Cu/Al	27	36	52	84
	Unit heater, type 4 Cu/Al	28	38	54	88
Intake accessories					
	Mixed-air box	26	32	42	68
	Outdoor-air box	15	27	29	47
	Recirculated-air box	16	28	31	50
	Intake duct for recirc. air	34	44	73	97
	Filter box	13	16	20	37
	Rain cowl	13	19	30	43
	Roof penetration	22	27	37	48
	Intake cowl	2	5	6	20
	Flow-stop louver	2	2	4	5
	Weatherproof screen	6	9	14	20
	Weatherproof screen with flow-stop louver	8	11	18	25
Discharge accessories					
	Discharge nozzle	5	7	10	14
	Discharge cone	4	12	19	27
	Wide discharge	4	7	11	16
	Swirl-wide discharge	4	7	11	16
	Four-way discharge	5	7	13	16
	Induction louver with secondary-air cone	4	5	8	10
Other supporting brackets (1set)		3	3	9	9

Item	Qty.	Part No.	Unit price	Total price
		<p>Unit heater, basic unit for operation in mixed-air, outdoor-air and recirculated-air modes and for wall-mount and ceiling-mount installation.</p> <p>Housing welded, galvanized and powder-coated sectional frame, skin panels powder-coated, color standard white RAL 9016 with bonded PU soft-foam insulation, 24mm thick.</p> <p>Discharge louver with individually adjustable deflector vanes, powder-coated, color Wolf silver, similar to RAL 9006.</p> <p>Axial-flow fan with aluminum crescent-wing rotor, for low-noise operation, with protective screen.</p> <p>Fan/motor unit on vibration damper, 230 V, 50 Hz, alternatively 3 x 400 V, 50 Hz, degree of protection IP 54, heat class CL F, up to five selectable speeds with switchgear unit, black plastic-coated, RAL 9005. Winding protection by integral thermal contacts.</p> <p>Heat exchanger pulls to one side for removal, Cu/Al, manifold steel (or copper as alternative), ports with inch-system threads, threaded adapters for PN 16 up to 140°C. Water flow/return on air discharge side top/bottom.</p> <p>Technical specifications:</p> <p>Volume flow rate m³/h Heating power kW Air temp. rise from to °C Heating medium / °C Water resistance kPa Motor speed rpm Motor power kW Operating voltage V Rated current A Degree of protection IP</p> <p>Dimensions: Length: mm Width: mm Height: mm Weight: kg</p> <p>Make: Wolf Type: TLH</p> <p>Intake accessories (powder-coated, color standard white RAL 9016)</p> <p>Mixed-air box with two flaps for outdoor air at the rear and recirculated air at the side; adjustable manually or by means of electric motor.</p> <p>Outdoor-air box with air intake at the rear for connection to a wall penetration or outdoor-air duct.</p> <p>Louver flap for outdoor-air box.</p> <p>Recirculated-air box with two side screens for recirculated-air intake.</p> <p>Filter box complete with replaceable filter element, filter class G4.</p> <p>Rain cowl with birdproof screen, sheet steel, galvanized.</p> <p>Roof penetration, sheet steel, galvanized.</p> <p>Flashing for roof penetration, sheet steel, galvanized.</p> <p>Intake cowl with birdproof screen, sheet steel, galvanized.</p> <p>Flow-stop louver for rain/intake cowl, sheet steel, galvanized.</p> <p>Weatherproof screen with birdproof screen without flow-stop louver, sheet steel, galvanized.</p> <p>Weatherproof screen with birdproof screen and flow-stop louver, sheet steel, galvanized.</p> <p>Sailcloth adapter on 4-hole sectional frame, sheet steel, galvanized</p>		

Item	Qty.		Part No.	Unit price	Total price
		<p>Discharge accessories (powder-coated, color standard white RAL 9016)</p> <p>Discharge nozzle for extra-long throw, suitable for use as air curtain.</p> <p>Discharge cone for high-ceilinged rooms to extend throw.</p> <p>Four-way discharge with adjustable side deflector vanes for low-ceilinged rooms. Vanes Wolf silver (similar to RAL9005)</p> <p>Induction louver with secondary-air cone, color standard white RAL 9016 for wall-mounted heater with 230 V / 50 Hz servomotor for optimized throw and temperature distribution. Alternative: Manually adjustable induction louver without electric motor.</p> <p>Induction louver with secondary-air cone, color standard white RAL 9016 for ceiling-mounted heater with 230 V / 50 Hz servomotor for optimized throw and temperature distribution. Alternative: Manually adjustable induction louver without electric motor.</p> <p>Wide discharge with individually adjustable vertical and horizontal deflector vanes for warm-air current up to 120° spread, powder-coated, color Wolf silver, similar to RAL 9006.</p> <p>Swirl wide discharge with individually adjustable vertical and horizontal deflector vanes for warm-air current up to 120° spread, powder-coated, color Wolf silver, similar to RAL 9006.</p> <p>Miscellaneous</p> <p>Supporting brackets for wall-mount and ceiling-mount installation of the TLH heater, powder-coated, color standard white RAL 9016.</p> <p>Suspension brackets for wall-mount and ceiling-mount installation of the intake accessories, powder-coated, color standard white RAL 9016.</p> <p>Hangers for horizontal or vertical installation of the TLH heater, powder-coated, color standard white RAL 9016.</p> <p>Electrical accessories</p> <p>Single-stage switch, D1 Motor thermistor-type protection switch for single-speed fan operation. Capacity, max. 3 kW, operating voltage 400 V, control voltage 230 V, degree of protection IP 54; dimensions W x H x D: 105 x 170 x 135 mm.</p> <p>Two-stage switch, DS Motor thermistor-type protection switch for two-speed fan operation. Capacity, max. 4 kW, operating voltage 400 V, control voltage 230 V, degree of protection IP 54; dimensions W x H x D: 105 x 170 x 135 mm.</p> <p>Three-stage switch, D3-4 Motor thermistor-type protection switch with restart disablement for three-speed fan operation. Current, max. 4 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 300 x 165 mm.</p> <p>Five-stage switch, D5-1 Motor thermistor-type protection switch for five-speed fan operation. Current, max. 1 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 40; dimensions W x H x D: 150 x 200 x 175 mm.</p> <p>Five-stage switch, D5-3 Motor thermistor-type protection switch with restart disablement for five-speed fan operation. Current, max. 2 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.</p> <p>Five-stage switch, D5-7 Motor thermistor-type protection switch for five-speed fan operation. Current, max. 4 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.</p> <p>Five-stage switch, D5-12 Motor thermistor-type protection switch for five-speed fan operation. Current, max. 7 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.</p> <p>Three-stage switch, E3-7T Motor thermistor-type protection switch with restart disablement for three-speed fan operation with single-phase AC motor. Current, max. 7 A, operating voltage 230 V, degree of protection IP 40; dimensions W x H x D: 150 x 200 x 150 mm.</p>			

Item	Qty.	Part No.	Unit price	Total price
Electrical accessories				
<p>Five-stage switch, E5-3 Motor thermistor-type protection switch for five-speed fan operation with single-phase AC motor. Current max. 3 A, operating voltage 230 V, degree of protection IP 40; Dimensions W x H x D: 150 x 200 x 175 mm.</p>				
<p>Control unit, A2 for automatic two-speed fan operation, only in conjunction with a 2-stage room thermostat, Part No. 27 34 600, or a 2-stage thermostatic timer, Part No. 27 35 400; Dimensions W x H x D: 170 x 220 x 110 mm.</p>				
<p>Control connection box for Wolf boiler controller.</p>				
<p>All-pole-isolating repair switch type AR6.</p>				
<p>Intermediate terminal box for parallel operation of up to 3 TLH heaters.</p>				
<p>Frost-protection thermostat mounted on the TLH heater</p>				
<p>Room thermostat for surface mounting with thermal feedback. Switching capacity 10(4) A at 230 V, temperature range 5-30°C, degree of protection IP 30; dimensions W x H x D: 71 x 71 x 30 mm.</p>				
<p>Room thermostat with 2-stage control for surface mounting, with thermal feedback, in conjunction with the A2 control unit suitable for automatic 2-speed operation of the TLH fan. Switching capacity 10(4) A at 230 V, temperature range 5-30°C, degree of protection IP 30; dimensions W x H x D: 71 x 71 x 30 mm. Switching differential stage I = 1.0 K stage II = 1.5 K</p>				
<p>Room thermostat with summer/winter switch for switching from heating to ventilation; for surface mounting, with thermal feedback. Switching capacity 6 (3) A at 230 V, temperature range 5-30° C, degree of protection IP 30; dimensions W x H x D: 117 x 71 x 30 mm.</p>				
<p>Room thermostat, industrial grade Switching capacity 10 (3) A at 230 V, temperature range 0-35° C, degree of protection IP 54; dimensions W x H x D: 87 x 123 x 83 mm.</p>				
<p>Thermostatic timer with day and week programs for back mount, day or week program (selectable) for day and night temperatures separately selectable. Switching capacity 5 A at 230 V, temperature range 6-26° C, degree of protection IP 30; dimensions W x H x D: 162 x 80 x 44 mm.</p>				
<p>Thermostatic timer with 2-stage control, with day and week programs Day or week program (selectable) for day and night temperatures separately selectable; in conjunction with the A2 control unit suitable for automatic 2-speed operation of the TLH fan.</p>				
<p>Thermostatic timer with day and week programs and remote temperature sensor Day or week program (selectable) for day and night temperatures separately selectable; temperature sensor with 2 m cable and wall bracket for sensor. Switching capacity 10 A at 230 V, temperature range 6-34 °C, degree of protection IP 30. dimensions W x H x D: 162 x 80 x 44 mm.</p>				
<p>Servomotor for stepless flap control or stepless mixer control, 230 V.</p>				
<p>Servomotor for flap open/close or mixer open/close 230 V.</p>				
<p>Automatic relay, A1 for servomotor (open/close).</p>				
<p>Automatic relay, A1S with position controller for servomotor (stepless).</p>				
<p>Position controller for installation in front panel of switchgear cabinet for actuating the servomotor (stepless) in conjunction with automatic relay A1.</p>				
<p>Position controller for surface mounting for actuating the servomotor (stepless) in conjunction with automatic relay A1.</p>				
<p>Button for servo drive for induction louver with secondary-air cone.</p>				