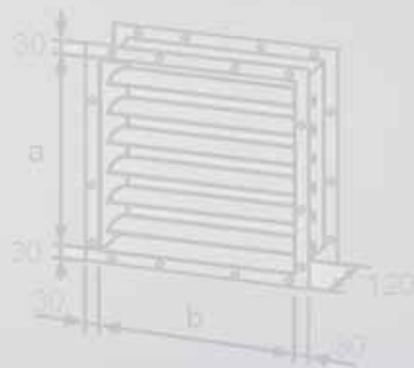


Technical documentation

Unit heater

LH



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Casing

Sectional frame, welded and galvanised, consisting of pentapost profiles.
Casing panels galvanised sheet steel.
Rear panel incorporates deep-drawn intake nozzle.
Discharge louvre with individually adjustable vanes.

Fan/Motors

Axial fan units consisting of a crescent-shaped fan blade, external rotor motor and protection screen. Silent fans, maintenance-free, suitable for any installed position.
Max. surrounding temperature: -20°C up to +40°C.

Standard configuration

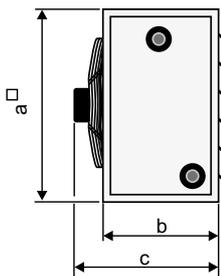
Three-phase motor 3 x 400 V, 50 Hz, star circuit: low speed; Delta circuit: high speed
Degree of protection IP 54, Insulation class F; Ball bearings with special grease filling for -25 to +140 °C, for any installed position, maintenance-free
Windings protected against temperature excursion by integral thermo contacts which shut down the motor if it overheats, by interrupting the control circuit in the single-stage/multi-stage switch or controller.
The drive restarts automatically when the temperature in the winding drops below the restart threshold.
Winding protection effective only in conjunction with a single-stage/multi-stage switch or automatic controller. See pages 23-27 for wiring options.
Use in conjunction with other, commercially available switches or speed controllers voids the manufacturer's guarantee for the motor.
See performance tables on Pages 6-13 for motor output ratings.

Special drives

Single-phase A.C. fan 230 V, 50 Hz, high speed only, low speed with 5-stage switch

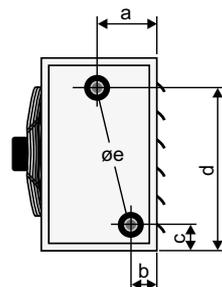
LH		25	40	63	100
Motor output max.	(kW)	0,17	0,28	0,39	-
Current consumption max.	(A)	0,73	1,25	1,78	-

Degree of protection IP 54, Insulation class F
Winding protection same as standard motor or thermo contacts connected in series with motor winding by others. The drive restarts automatically when the temperature in the winding drops below the restart threshold. See page 25 for external wiring.



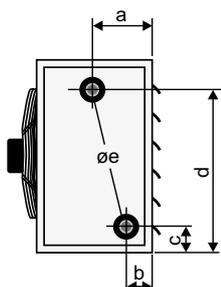
Dimensions, basic unit LH

LH	a	b	c
25	500	300	410
40	630	300	415
63	800	300	420
100	1000	340	470



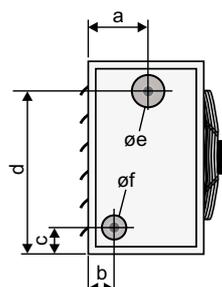
Connections, LH 25 - 100, Type 1 - 4, Co/Al

LH	a	b	c	d	øe
25-1	98	68	72	425	3/4"
25-2/-3/-4	158	68	75	425	1"
40-1	98	68	76	554	3/4"
40-2/-3/-4	143	83	80	550	1"
63-1	103	63	75	726	1"
63-2/-3/-4	143	83	78	722	1 1/4"
100-1	124	84	95	906	1"
100-2/-3/-4	179	89	89	912	1 1/2"



Connections, LH 25 - 100, Type 1 - 3, st.galv.

LH	a	b	c	d	øe
25-1	100	66	86	409	3/4"
24-2/-3/-4	158	68	86	405	1"
40-1	100	66	91	534	3/4"
40-2/-3/-4	158	68	91	530	1"
63-1	98	68	86	705	1"
63-2/-3/-4	153	73	86	695	1 1/4"
100-1	118	88	86	885	1"
100-2/-3/-4	168	98	86	865	1 1/2"



Connections, LH 25 - 100, Type steam, Co/Al

LH	a	b	c	d	øe	øf
25	160	90	61	421	DN40	DN20
40	158	99	60	561	DN40	DN20
63	152	84	63	725	DN50	DN25
100	165	100	85	894	DN65	DN32

Heat exchanger



Co/Al heat exchanger

Five types of heat exchangers per unit heater type for LPHW, MPHW or steam (code D).

Heat exchanger made of Co/Al, steel header, withdrawable to side
Galvanised sheet-steel frame
LPHW and MPHW threaded inlet/oulet (inch system)
Flange and mating flange for steam

Important note:

(Um die Wärmeleistung übertragen zu können, sind die Wärmetauscher im Gegenstrombetrieb anzuschließen)

For LPHW or MPHW: threaded adapters for PN 16 up to 140°C

Water inlet on air outlet at top/bottom

Water outlet on air intake at top/bottom

Connections on right/left hand side in direction of air flow

See performance table for pipe connection sizes

For steam: flange and mating flange for saturated steam, max. 9 bar

Steam connection at top

Condensate return at bottom

Connection on left hand side only in direction of air flow

See performance table for pipe connection sizes.

alternative:

Steel / galvanised heat exchanger.

Heat exchanger and header both made of galvanised steel and withdrawable to side suitable for LPHW, MPHW or steam D

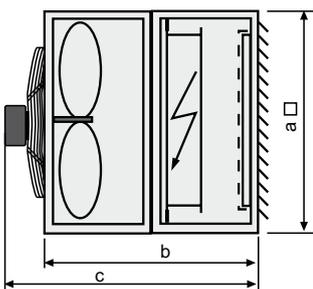
Frame made of galvanised sheet steel

LPHW and MPHW threaded inlet/oulet (inch system)

Flange and mating flange for steam

Electric heating coil

incl. highlimit lock out



Dimensions:

LH	25	40	63	100
a	500	630	800	1000
b	600	600	600	680
c	755	770	800	880

Heating output stages:

LH	25	40	63	100
a	12 kW	20 kW	25 kW	35 kW
b	Higher performance on request			

Circuiting:

12 kW:	4-stage	1/4, 2/4, 3/4, 4/4
20 kW:	4-stage	1/4, 2/4, 3/4, 4/4
25 kW:	5-stage	1/5, 2/5, 3/5, 4/5, 5/5
35 kW:	5-stage	1/5, 2/5, 3/5, 4/5, 5/5

To avoid overheating, pay attention to the following minimum air volumes:

LH	25	40	63	100
horizontal air flow \dot{V}_{min} (m ³ /h)	800	1600	2500	4000
vertikal air flow \dot{V}_{min} (m ³ /h)	1000	2200	3200	5000

Protective measures:

In any case it has to be secured that the electric heater is switched off when the air volume is falling below the indicated minimum. Additionally, the electric heater may only be set into operation by one or several magnetic switches whose control circuit leads over the automatic overheating controllers wired in line.

Casing



Explosion proof design for Ex-zone 2

II 3G c IIB T4 X

Suitable for wall or ceiling installation, fresh air, return air or mixed air operation, heating or ventilation

Sectional frame, welded and galvanised, consisting of pentapost profiles.

Casing panels galvanised sheet steel.

Rear panel incorporates deep-drawn intake nozzle.

Discharge louvre with individually adjustable vanes.

LH-ATEX	25	40	63	100
A	500	630	800	1000
B	300	300	300	340
C	345	350	355	405

Fan-motor assembly

Complete fan-motor-protection grille assembly, axial fan with aluminium impeller, impeller wings with plastic edges, maintenance-free low-noise motor, suitable for any installation position. Three-phase motor 3 x 400 V, 50 Hz, degree of protection IP44, thermal category CL F.

Star circuit: low speed, delta circuit: high speed

Max. surrounding temperature: -20°C up to +40°C, full motor protection by integrated thermostats.

LH-ATEX		25	40	63	100
Motor output max.	(kW)	0,14 / 0,11	0,33 / 0,25	0,33 / 0,24	0,50 / 0,34
Speed	(min ⁻¹)	1350 / 1000	1350 / 1000	900 / 700	900 / 700
Current consumption max.	(A)	0,28 / 0,19	0,66 / 0,44	0,60 / 0,40	0,89 / 0,55

Heat exchanger



Heat exchanger Co/Al

4 types of heat exchangers per unit heater type for LPHW or MPHW.

Heat exchanger made of Co/Al, steel header, withdrawable to side, galvanized sheetsteel frame, threaded connections.

Notice: Threaded connections for PN 16 up to 140°C, water inlet on air outlet side top/bottom, water outlet on air intake side top/bottom. Connections lhs/rhs in direction of air flow, see performance table for connection sizes.

Heat exchanger galvanized steel

3 types of heat exchangers per unit heater type for LPHW or MPHW.

Heat exchanger and header both made of galvanized steel, withdrawable to side. Frame made of galvanized sheet steel, connections with flange / mating flange.

Accessories



Explosion proof ATEX-terminal box

Fitted and wired,



Thermistor triggering unit

Suitable for installation in wiring board on site,

Notice: Triggering unit to be fitted outside the Ex-zone only



A1Ü controller

For full motor protection, single speed operation

control voltage 3 x 400 V, operating voltage 230 V, capacity 3 kW, degree of protection IP54

Notice: A1Ü controller (LH 40-ATEX, LH 63-ATEX, LH 100-ATEX only) to be fitted outside the Ex-zone only



Explosion-proof switch

For A1Ü automatic controller, operating voltage 690 V, max. current 16 A (4A), degree of protection IP 66

Performance tables

for LPHW

for saturated steam

Type	1				2				3				4				D						
Speed [min ⁻¹]	1350		1000		1350		1000		1350		1000		1350		1000		1350		1000				
Air vol. \dot{V}_0 [m ³ /h]	2100		1700		2000		1600		1800		1450		1700		1350		2100		1700				
	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}			
	t_{1E} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C		
LPHW 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	1,1 bar	- 15	26,3	18	23,2	21
	- 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		- 10	25,0	22	22,0	25
	- 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		- 5	22,4	30	19,7	33
	± 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		± 0	21,1	34	18,6	36
	+ 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		+ 5	19,9	38	17,5	40
	+ 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		+ 10	18,6	41	16,4	44
	+ 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		+ 15	18,6	41	16,4	44
+ 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	+ 20	17,4	45	15,3	47		
LPHW 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	1,5 bar	- 15	28,2	21	24,9	24
	- 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		- 10	26,9	25	23,7	28
	- 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		- 5	25,6	29	22,5	32
	± 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		± 0	24,3	33	21,4	35
	+ 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		+ 5	23,0	36	20,3	39
	+ 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		+ 10	21,8	40	19,2	43
	+ 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		+ 15	20,5	44	18,1	47
+ 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	+ 20	19,3	48	17,0	50		
LPHW 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	2,0 bar	- 15	30,1	23	26,5	26
	- 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		- 10	28,8	27	25,3	30
	- 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		- 5	27,5	31	24,2	34
	± 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		± 0	26,2	35	23,0	38
	+ 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		+ 5	24,9	39	21,9	42
	+ 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		+ 10	23,6	43	20,8	46
	+ 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		+ 15	22,4	47	19,7	49
+ 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	+ 20	21,1	50	18,6	53		
LPHW 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	3,0 bar	- 15	32,9	27	29,0	30
	- 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		- 10	31,6	31	27,8	34
	- 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		- 5	30,2	35	26,6	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		± 0	28,9	39	25,5	42
	+ 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		+ 5	27,6	43	24,3	46
	+ 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		+ 10	26,3	47	23,2	50
	+ 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		+ 15	25,1	50	22,1	53
+ 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	+ 20	23,8	54	21,0	57		
LPHW 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	5,0 bar	- 15	36,7	31	32,3	35
	- 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		- 10	35,3	36	31,1	40
	- 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		- 5	34,0	40	29,9	44
	± 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		± 0	32,7	44	28,8	48
	+ 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		+ 5	31,4	48	27,6	51
	+ 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		+ 10	30,1	52	26,5	55
	+ 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		+ 15	28,8	56	25,3	59
+ 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	+ 20	27,5	59	24,2	63		
LPHW 90/70	- 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	9,0 bar	- 15	41,5	37	36,5	42
	- 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		- 10	40,1	42	35,3	46
	- 5	16,5	17	14,7	19	23,2	27	20,2	30	27,2	37	23,6	40	33,5	49	38,2	53		- 5	37,4	50	32,9	54
	± 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		± 0	36,1	54	31,8	58
	+ 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		+ 5	34,8	58	30,6	62
	+ 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		+ 10	34,8	58	30,6	62
	+ 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		+ 15	33,5	62	29,5	66
+ 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	+ 20	32,2	66	28,3	70		
Motor output [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	max. 0,17	max. 0,10	max. 0,17	max. 0,10	max. 0,17	max. 0,10	max. 0,17	max. 0,10	max. 0,17	max. 0,10	max. 0,17	max. 0,10			
Curr. Consumpt. [A]	max. 0,32	max. 0,16	max. 0,32	max. 0,16	max. 0,32	max. 0,16	max. 0,32	max. 0,16	max. 0,32	max. 0,16	max. 0,32	max. 0,16	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, wall mounted [m ²]*	0,32	0,16	14,5	12	13	10,5	12,5	10	15,5	12,5													
Air throw, ceiling mount. [m ²]*	5,7	4,7	5,4	4,5	5,0	4,2	4,8	4,0	5,7	4,7													
Sound pressure level dB[A]**	56	50	56	50	56	50	56	50	56	50													
Water capacity [litres]	0,7		1,0		1,1		1,8																
Heat exchanger connections	R 3/4"		R 1"		R 1"		R 1"		DN 40 - DN 20														

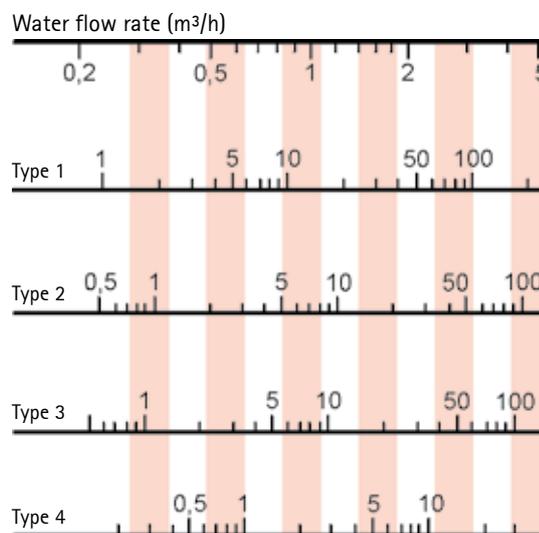
* $t_{1A} - t_{Raum} = 10K$

** Sound pressure level measured 5 m from intake, room with average absorption; enclosed space approx. 1500 m³.

for LPHW

Hydraulic resistance [kPa]

Type	1				2				3				
Speed [min ⁻¹]	1350		1000		1350		1000		1350		1000		
Air vol. \dot{V}_0 [m ³ /h]	2100		1700		2000		1600		1800		1450		
	\dot{Q}_0	t_A											
t_e [°C]	kW	°C											
LPHW 110/90	- 15	23,6	15	20,9	18	32,7	28	28,5	32	38,1	41	32,9	45
	- 10	22,3	19	19,8	21	31,0	32	27,0	36	36,1	44	31,2	48
	- 5	21,1	23	18,7	25	29,4	35	25,5	39	34,2	47	29,5	51
	± 0	19,9	27	17,6	29	27,7	39	24,1	42	32,3	50	27,9	54
	+ 5	18,7	30	16,6	33	26,1	42	22,7	46	30,4	53	26,2	57
	+ 10	17,5	34	15,6	37	24,5	46	21,3	49	28,5	56	24,6	59
	+ 15	16,4	38	14,5	40	22,9	49	19,9	52	26,7	59	23,1	62
+ 20	15,2	42	13,5	44	21,3	52	18,5	55	24,9	62	21,5	65	
LPHW 120/100	- 15	25,9	18	22,9	21	35,8	32	31,1	37	41,5	46	35,7	50
	- 10	24,6	22	21,8	25	34,1	36	29,6	40	39,5	49	34,1	53
	- 5	23,4	26	20,7	29	32,4	40	28,1	43	37,5	52	32,4	57
	± 0	22,2	30	19,6	32	30,7	43	26,7	47	35,6	56	30,7	59
	+ 5	21,0	34	18,6	36	29,1	47	25,3	50	33,7	59	29,1	62
	+ 10	19,8	37	17,5	40	27,4	50	23,9	53	31,9	61	27,5	65
	+ 15	18,6	41	16,5	44	25,8	53	22,5	57	30,0	64	25,9	68
+ 20	17,5	45	15,5	47	24,2	56	21,1	60	28,2	67	24,3	71	
LPHW 130/100	- 15	26,1	18	23,2	21	36,4	33	31,7	37	42,4	47	36,6	52
	- 10	24,9	22	22,1	25	34,7	37	30,2	41	40,4	51	34,9	55
	- 5	23,7	26	21,0	29	33,0	40	28,7	44	38,5	54	33,2	58
	± 0	22,4	30	19,9	33	31,3	44	27,3	48	36,5	57	31,6	61
	+ 5	21,2	34	18,8	37	29,7	47	25,8	51	34,6	60	29,9	64
	+ 10	20,1	38	17,8	40	28,0	51	24,4	54	32,8	63	28,3	67
	+ 15	18,9	42	16,8	44	26,0	51	24,4	54	32,8	63	28,3	67
+ 20	17,7	45	15,7	48	24,9	57	21,7	61	29,1	69	25,2	72	
LPHW 140/100	- 15	26,4	18	23,4	22	37,0	34	32,2	38	43,3	49	37,4	53
	- 10	25,2	22	22,3	26	35,3	38	30,8	42	41,3	52	35,7	57
	- 5	24,0	26	21,3	29	33,6	41	29,3	45	39,4	55	34,1	60
	± 0	22,7	30	20,2	33	31,9	45	27,9	49	37,4	58	32,4	63
	+ 5	21,6	34	19,1	37	30,3	48	26,4	52	35,5	61	30,8	66
	+ 10	20,4	38	18,1	41	28,7	52	25,0	55	33,7	64	29,2	68
	+ 15	19,2	42	17,1	45	27,1	55	23,6	59	31,8	67	27,6	71
+ 20	18,0	46	16,0	48	25,5	58	22,2	62	30,0	70	26,0	74	
LPHW 140/110	- 15	28,4	21	25,2	24	39,4	37	34,3	42	45,7	52	39,5	57
	- 10	27,2	25	24,1	28	37,7	41	32,8	45	43,8	56	37,7	60
	- 5	25,9	29	23,0	32	36,0	45	31,3	49	41,8	59	36,1	64
	± 0	24,7	33	21,9	36	34,3	48	29,8	52	39,9	62	34,4	67
	+ 5	23,5	37	20,8	40	32,7	52	28,4	56	38,0	65	32,8	70
	+ 10	22,3	41	19,8	44	31,0	55	27,0	59	36,1	68	31,2	72
	+ 15	21,1	45	18,7	48	29,4	58	25,6	62	34,2	71	29,6	75
+ 20	19,9	49	17,7	51	27,8	62	24,2	66	32,4	74	28,0	78	
Motor output [kW] (3 x 400 V)	max. 0,17		max. 0,10		max. 0,17		max. 0,10		max. 0,17		max. 0,10		
Curr. Consumpt. [A]	max. 0,32		max. 0,16		max. 0,32		max. 0,16		max. 0,32		max. 0,16		
Air throw, wall mounted [m ²]*	15,5		12,5		14,5		12		13		10,5		
Air throw, ceiling mount. [m]*	5,7		4,7		5,4		4,5		5,0		4,2		
Sound pressure level dB[A]**	56		50		56		50		56		50		
Water capacity [litres]	0,7				1,0				1,1				
Heat exchanger connections	R 3/4"				R 1"				R 1"				



Pages 39–41:

Air throws

(as influenced by heat increase and discharge accessories)

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Heating output

Air volume

and air outlet temperatures

(as influenced by accessories and speeds)

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Speeds table

(in combination with single-stage/multistage switches)

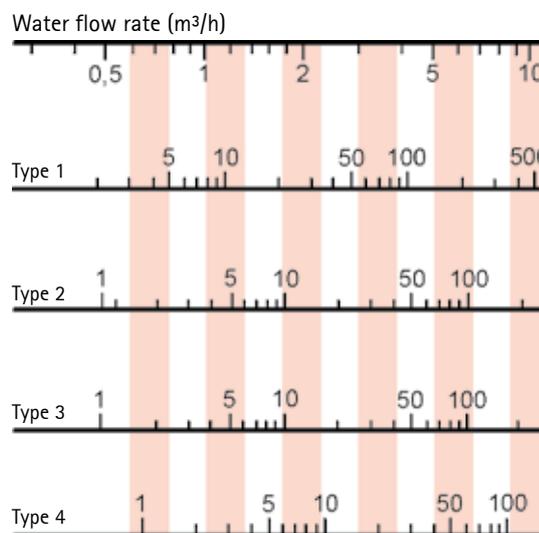
Sound pressure level

(as a function of speed)

for LPHW

Hydraulic resistance [kPa]

Type	1				2				3				
Speed [min ⁻¹]	1350		1000		1350		1000		1350		1000		
Air vol. \dot{V}_0 [m ³ /h]	3500		2500		3400		2400		3100		2200		
	\dot{Q}_0	t_A											
t_E [°C]	kW	°C											
LPHW 110/90	- 15	43,8	18	35,9	23	52,1	26	42,0	31	67,4	43	53,1	49
	- 10	41,5	22	34,1	27	49,4	29	39,8	35	63,9	46	50,4	52
	- 5	39,3	26	32,2	31	46,7	33	37,7	38	60,5	49	47,7	55
	± 0	37,1	30	30,4	34	44,1	36	35,6	42	57,2	52	45,1	58
	+ 5	4,9	33	28,6	38	41,5	40	33,5	45	53,8	55	42,5	60
	+ 10	32,7	37	26,9	41	38,9	43	31,4	48	50,6	57	40,0	63
	+ 15	30,6	41	25,1	45	36,4	47	29,4	51	47,4	60	37,4	65
+ 20	28,5	44	23,4	48	33,9	50	27,4	54	44,2	63	34,9	68	
LPHW 120/100	- 15	48,0	21	39,3	27	56,9	29	45,8	36	73,3	48	57,7	54
	- 10	45,7	25	37,4	30	54,2	33	43,7	39	69,8	51	54,9	58
	- 5	43,4	29	35,6	34	51,5	37	41,5	43	66,4	54	52,3	60
	± 0	41,2	33	33,8	38	48,9	40	39,4	46	63,0	57	49,6	63
	+ 5	39,0	37	31,9	42	46,2	44	37,3	49	59,7	60	47,0	66
	+ 10	36,8	41	30,2	45	43,7	47	35,2	53	56,4	63	44,5	69
	+ 15	34,6	44	28,4	49	41,1	51	33,1	56	53,2	66	41,9	71
+ 20	32,5	48	26,7	52	38,6	54	31,1	59	50,0	68	39,4	74	
LPHW 130/100	- 15	48,7	22	40,0	27	57,9	30	46,7	37	75,1	49	59,2	56
	- 10	46,4	26	38,1	31	55,2	34	44,5	40	71,6	52	56,5	59
	- 5	44,1	30	36,2	35	52,5	38	42,4	44	68,2	56	53,8	62
	± 0	41,9	34	34,4	39	49,8	41	40,2	47	64,8	59	51,2	65
	+ 5	39,7	37	32,6	42	47,2	45	38,1	50	61,5	62	48,6	68
	+ 10	37,5	41	30,8	46	44,6	48	36,1	54	58,2	65	46,0	71
	+ 15	35,3	45	29,1	49	42,1	52	34,0	57	55,0	67	43,5	73
+ 20	33,2	49	27,3	53	39,5	55	32,0	60	51,8	70	41,0	76	
LPHW 140/100	- 15	49,4	22	40,6	28	58,9	31	47,6	38	76,9	51	60,8	58
	- 10	47,1	26	38,8	32	56,1	35	45,4	41	73,5	54	58,1	61
	- 5	44,9	30	36,9	36	53,5	38	43,2	45	70,0	57	55,4	64
	± 0	42,6	34	35,1	39	50,8	42	41,1	48	66,7	60	52,8	67
	+ 5	40,4	38	33,3	43	48,2	45	39,0	51	63,3	63	50,2	70
	+ 10	38,3	42	31,5	47	45,6	49	36,9	55	60,0	66	47,6	73
	+ 15	36,1	46	29,8	50	43,0	52	34,9	58	56,8	69	45,0	76
+ 20	34,0	49	28,0	54	40,5	56	32,9	61	53,6	72	42,5	78	
LPHW 140/110	- 15	52,8	25	43,3	31	62,7	34	50,5	41	81,0	54	63,7	62
	- 10	50,5	29	41,4	35	60,0	38	48,3	44	77,5	58	61,0	65
	- 5	48,2	33	39,6	39	57,3	41	46,2	48	74,0	61	58,3	68
	± 0	46,0	37	37,7	42	54,6	45	44,0	51	70,6	64	55,7	71
	+ 5	43,7	41	35,9	46	52,0	49	41,9	55	67,3	67	53,1	74
	+ 10	41,5	45	34,1	50	49,4	52	39,8	58	64,0	70	50,5	77
	+ 15	39,4	48	32,3	53	46,8	56	37,8	62	60,7	73	47,9	79
+ 20	37,2	52	30,6	57	44,2	59	35,7	65	57,5	76	45,4	82	
Motor output [kW] (3 x 400 V)	max. 0,28		max. 0,22		max. 0,28		max. 0,22		max. 0,28		max. 0,22		
Curr. Consumpt. [A]	max. 0,6		max. 0,3		max. 0,6		max. 0,3		max. 0,6		max. 0,3		
Air throw, wall mounted [m ²]*	23		16		22,5		15		20		13,5		
Air throw, ceiling mount. [m]*	5,6		4,1		5,5		3,9		5,0		3,6		
Sound pressure level dB[A]**	60		54		60		54		60		54		
Water capacity [litres]	1,0				1,5				2,0				
Heat exchanger connections	R 3/4"				R 1"				R 1"				



Pages 39–41:

Air throws

(as influenced by heat increase and discharge accessories)

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Heating output

Air volume

and air outlet temperatures

(as influenced by accessories and speeds)

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Speeds table

(in combination with single-stage/multistage switches)

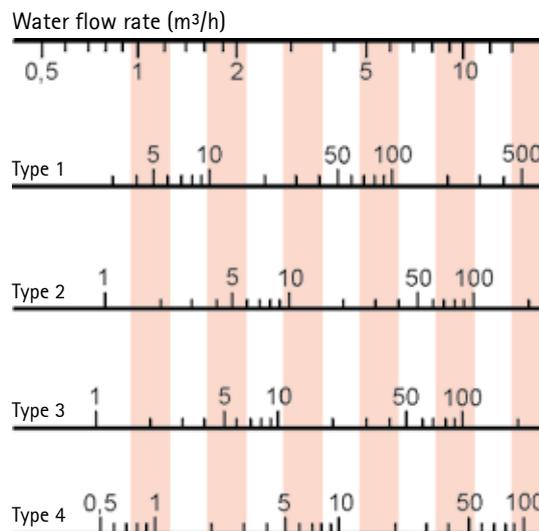
Sound pressure level

(as a function of speed)

for LPHW

Hydraulic resistance [kPa]

Type	1				2				3				
Speed [min ⁻¹]	900		700		900		700		900		700		
Air vol. \dot{V}_0 [m ³ /h]	5300		400		5200		3900		4600		3500		
	\dot{Q}_0	t_A											
t_e [°C]	kW	°C											
LPHW 110/90	- 15	72,2	21	61,0	25	93,2	33	77,5	38	106,3	46	87,7	51
	- 10	68,5	25	57,9	29	88,4	36	73,5	41	100,9	49	83,2	54
	- 5	64,8	29	54,8	33	83,7	39	69,6	44	95,6	52	78,9	57
	± 0	61,3	32	51,8	36	79,1	43	65,8	47	90,3	55	74,5	60
	+ 5	57,7	36	48,8	40	74,5	46	62,0	50	85,1	58	70,3	62
	+ 10	54,2	40	45,9	43	69,9	49	58,2	53	80,0	61	66,1	65
	+ 15	50,8	43	43,0	47	65,5	52	54,5	56	75,0	63	61,9	67
LPHW 120/100	- 15	78,8	24	66,5	29	101,6	37	84,4	42	115,5	52	95,1	57
	- 10	75,1	28	63,4	33	96,8	40	80,4	46	110,0	55	90,6	60
	- 5	71,4	32	60,3	37	92,0	44	76,4	49	104,7	58	86,2	63
	± 0	67,8	36	57,3	40	87,4	47	72,6	52	99,4	61	81,9	66
	+ 5	64,2	40	54,3	44	82,7	50	68,7	55	94,2	63	77,6	68
	+ 10	60,7	43	51,3	47	78,2	54	65,0	58	89,0	66	73,4	71
	+ 15	57,2	47	48,4	51	73,7	57	61,2	61	84,0	69	69,2	74
LPHW 130/100	- 15	80,5	25	68,1	30	103,9	38	86,4	44	118,6	53	97,9	59
	- 10	76,8	29	65,0	34	99,1	41	82,4	47	113,2	57	93,4	62
	- 5	73,2	33	61,9	38	94,3	45	78,5	50	107,8	60	89,0	65
	± 0	69,5	37	58,9	41	89,6	48	74,6	54	102,6	63	84,7	68
	+ 5	66,0	41	55,8	45	85,0	52	70,8	57	97,4	65	80,4	71
	+ 10	62,4	44	52,9	48	80,5	55	67,0	60	92,2	68	76,2	73
	+ 15	58,9	48	49,9	52	75,9	58	63,3	63	87,1	71	72,0	76
LPHW 140/100	- 15	82,3	26	69,7	31	106,5	39	88,5	45	121,8	55	100,7	61
	- 10	78,6	30	66,6	35	101,4	43	84,5	49	116,4	58	96,2	64
	- 5	74,9	34	63,5	39	96,6	46	80,5	52	111,0	61	91,8	67
	± 0	71,3	38	60,4	42	92,0	50	76,7	55	105,7	64	87,5	70
	+ 5	67,7	42	57,4	46	87,3	53	72,8	58	100,5	67	83,2	73
	+ 10	64,2	45	54,4	50	82,7	56	69,0	61	95,3	70	78,9	76
	+ 15	60,7	49	51,5	53	78,2	59	65,3	65	90,2	73	74,7	78
LPHW 140/110	- 15	87,1	29	73,6	34	112,3	42	93,2	48	127,7	59	105,2	65
	- 10	83,4	33	70,5	38	107,4	46	89,2	52	122,2	62	100,7	68
	- 5	79,7	36	67,4	41	102,6	49	85,3	55	116,9	65	96,3	71
	± 0	76,0	40	64,3	45	97,9	53	81,4	59	111,5	68	92,0	74
	+ 5	72,4	44	61,3	49	93,3	56	77,5	62	106,3	71	87,7	77
	+ 10	68,9	48	58,3	52	88,7	60	73,7	65	101,1	74	83,4	79
	+ 15	65,4	51	55,3	56	84,1	63	70,0	68	96,0	77	79,2	82
Motor output [kW] (3 x 400 V)	max. 0,34	max. 0,25											
Curr. Consumpt. [A]	max. 0,79	max. 0,35											
Air throw, wall mounted [m ²]*	26	18	24	17	21	15							
Air throw, ceiling mount. [m]*	7,1	5,3	6,9	5,1	6,1	4,5							
Sound pressure level dB[A]**	59	53	59	53	59	53							
Water capacity [litres]	2,5		3,5		3,5								
Heat exchanger connections	R 1"		R 1¼"		R 1¼"								



Pages 39–41:

Air throws

(as influenced by heat increase and discharge accessories)

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Heating output

Air volume

and air outlet temperatures

(as influenced by accessories and speeds)

Page 43:

Speeds table

(in combination with single-stage/multistage switches)

Sound pressure level

(as a function of speed)

Performance tables

for LPHW

for saturated steam

Type	1				2				3				4				D					
Speed [min ⁻¹]	900		700		900		700		900		700		900		700		900		700			
Air vol. \dot{V}_0 [m ³ /h]	9000		6700		8800		6500		8300		6000		7700		5600		9000		6700			
	\dot{Q}_0	t_{1A}	\dot{Q}_0	t_{1A}																		
t_{1E} [°C]	kW	°C	kW	°C																		
LPHW 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	- 15	121,8	21	101,8	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	- 10	115,8	25	96,8	29
	- 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	- 5	109,9	29	91,9	33
	± 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	± 0	104,1	33	87,0	36
	+ 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	+ 5	98,4	36	82,2	40
	+ 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	+ 10	92,7	40	77,5	44
	+ 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	+ 15	87,1	44	72,8	47
+ 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	+ 20	81,5	47	68,1	51	
LPHW 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	- 15	130,8	24	109,3	28
	- 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	- 10	124,8	28	104,3	32
	- 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	- 5	118,9	31	99,3	36
	± 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	± 0	113,0	35	94,4	40
	+ 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	+ 5	107,2	39	89,6	43
	+ 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	+ 10	101,5	43	84,8	47
	+ 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	+ 15	95,9	47	80,1	50
+ 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	+ 20	90,3	50	75,4	54	
LPHW 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	- 15	139,6	26	116,6	31
	- 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	- 10	133,6	30	111,6	35
	- 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	- 5	127,6	34	106,6	39
	± 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	± 0	121,7	38	101,6	43
	+ 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	+ 5	115,8	42	96,8	46
	+ 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	+ 10	110,1	46	92,0	50
	+ 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	+ 15	104,4	49	87,2	54
+ 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	+ 20	98,8	53	82,5	57	
LPHW 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	- 15	152,7	30	127,5	35
	- 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	- 10	146,6	34	122,4	39
	- 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	- 5	140,5	38	117,3	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	± 0	134,6	42	112,4	47
	+ 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	+ 5	128,7	46	107,5	51
	+ 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	+ 10	122,9	50	102,6	55
	+ 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	+ 15	117,2	54	97,8	58
+ 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	+ 20	111,5	57	93,1	62	
LPHW 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	- 15	170,5	35	142,3	41
	- 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	- 10	164,3	39	137,1	45
	- 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	- 5	158,2	43	132,0	49
	± 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	± 0	152,2	47	127,0	53
	+ 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	+ 5	146,2	51	122,0	57
	+ 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	+ 10	140,4	55	117,1	61
	+ 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	+ 15	134,6	59	112,3	65
+ 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	+ 20	128,8	63	107,5	68	
LPHW 90/70	- 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	- 15	193,1	42	161,0	49
	- 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	- 10	186,8	46	155,7	53
	- 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	- 5	180,6	50	150,6	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	± 0	174,5	54	145,5	61
	+ 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	+ 5	168,5	59	140,4	65
	+ 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	+ 10	162,5	63	135,4	69
	+ 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	+ 15	156,6	67	130,5	73
+ 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	+ 20	150,8	70	125,7	76	
Motor output [kW] (3 x 400 V)	max. 0,75	max. 0,50	max. 0,75	max. 0,50																		
Curr. Consumpt. [A]	max. 1,6	max. 0,85	max. 1,6	max. 0,55																		
Air throw, wall mounted [m ²]*	30	23	30	22	28	20	26	20	30	23	30	22	28	20	26	20	30	23	30	23		
Air throw, ceiling mount. [m ²]*	7,7	5,6	7,6	5,5	7,1	5,0	6,6	4,6	7,7	5,6	7,6	5,5	7,1	5,0	6,6	4,6	7,7	5,6	7,7	5,6		
Sound pressure level dB[A]**	64	58	64	58	64	58	64	58	64	58	64	58	64	58	64	58	64	58	64	58		
Water capacity [litres]	3,5		5,5		7,5		9,5		3,5		5,5		7,5		9,5		3,5		5,5			
Heat exchanger connections	R 1"		R 1 1/2"		DN 65 - DN 32																	

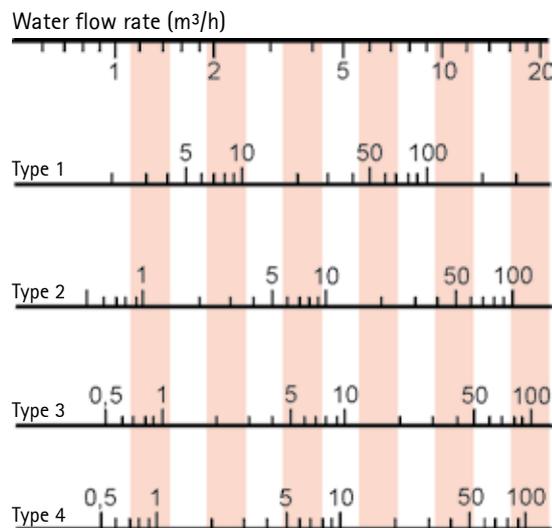
* $t_{1A} - t_{Raum} = 10K$

** Sound pressure level measured 5 m from intake, room with average absorption; enclosed space approx. 1500 m³.

for LPHW

Hydraulic resistance [kPa]

Type	1				2				3				
Speed [min ⁻¹]	900		700		900		700		900		700		
Air vol. \dot{V}_0 [m ³ /h]	9000		6700		8800		6500		8300		6000		
	\dot{Q}_0	t_A											
t_e [°C]	kW	°C											
LPHW 110/90	- 15	122,5	21	102,7	26	156,1	32	128,5	37	196,3	48	155,6	54
	- 10	116,3	25	97,5	29	148,1	35	122,0	41	186,3	51	147,7	57
	- 5	110,1	29	92,3	33	140,1	39	115,5	44	176,5	54	140,0	59
	± 0	104,0	32	87,2	37	132,3	42	109,1	47	166,8	56	132,4	62
	+ 5	98,0	36	82,2	40	124,6	45	102,7	50	157,3	59	124,8	64
	+ 10	92,0	40	77,2	44	117,0	49	96,5	53	147,8	62	117,4	67
	+ 15	86,2	43	72,3	47	109,5	52	90,3	56	138,5	64	110,1	69
+ 20	80,4	47	67,5	50	102,1	55	84,2	59	129,3	67	102,8	72	
LPHW 120/100	- 15	133,7	24	112,0	29	170,3	36	140,1	42	213,1	53	168,6	59
	- 10	127,4	28	106,8	33	162,2	40	133,4	45	203,1	56	160,7	62
	- 5	121,2	32	101,6	37	154,2	43	126,9	49	193,2	59	152,9	65
	± 0	115,1	36	96,4	40	146,3	47	120,4	52	183,5	62	145,3	68
	+ 5	109,0	40	91,4	44	138,6	50	114,1	55	173,8	65	137,7	71
	+ 10	103,0	43	86,4	47	130,9	53	107,8	58	164,4	68	130,2	73
	+ 15	97,1	47	81,4	51	123,3	56	101,6	61	155,0	70	122,9	76
+ 20	91,2	50	76,5	54	115,8	60	95,4	64	145,8	73	115,6	78	
LPHW 130/100	- 15	136,7	25	114,7	30	173,9	37	143,3	43	219,2	55	173,8	62
	- 10	130,4	29	109,4	34	165,8	41	136,6	47	209,1	58	165,9	65
	- 5	124,2	33	104,2	38	157,8	44	130,1	50	199,3	61	158,1	68
	± 0	118,0	37	99,1	41	149,9	48	123,7	53	189,6	64	150,5	70
	+ 5	112,0	41	94,0	45	142,2	51	117,3	57	180,0	67	142,9	73
	+ 10	106,0	44	89,0	49	134,5	54	111,0	60	170,4	70	135,4	76
	+ 15	100,0	48	84,0	52	126,9	58	104,8	63	161,0	72	128,0	78
+ 20	94,2	51	79,1	56	119,4	61	98,6	66	151,8	75	120,7	81	
LPHW 140/100	- 15	139,8	26	117,4	31	177,6	38	146,6	45	225,2	57	178,9	64
	- 10	133,5	30	112,1	35	169,5	42	139,9	48	215,3	60	171,0	67
	- 5	127,2	34	106,9	39	161,5	46	133,4	52	205,3	63	163,3	70
	± 0	121,1	38	101,7	43	153,6	49	126,9	55	195,5	66	155,6	73
	+ 5	115,0	41	96,7	46	145,8	52	120,5	58	185,9	69	148,0	75
	+ 10	109,0	45	91,6	50	138,1	56	114,2	61	176,4	72	140,5	78
	+ 15	103,0	49	86,7	53	130,5	59	108,0	64	167,0	75	133,1	81
+ 20	97,2	52	81,8	57	123,0	62	101,8	67	157,7	77	125,7	83	
LPHW 140/110	- 15	147,9	29	124,0	34	188,0	42	154,7	48	235,9	60	186,6	67
	- 10	141,5	33	118,6	38	179,8	45	148,0	52	225,7	63	178,7	70
	- 5	135,3	36	113,4	42	171,8	49	141,4	55	215,8	67	170,9	73
	± 0	129,1	40	108,2	45	163,9	52	134,9	58	206,0	70	163,2	76
	+ 5	123,0	44	103,1	49	156,1	56	128,5	61	196,3	73	155,6	79
	+ 10	116,9	48	98,1	53	148,3	59	122,2	65	186,8	75	148,1	82
	+ 15	110,9	51	93,1	56	140,7	62	116,0	68	177,4	78	140,7	84
+ 20	105,0	55	88,1	60	133,2	66	109,8	71	168,1	81	133,4	87	
Motor output [kW] (3 x 400 V)	max. 0,75		max. 0,50		max. 0,75		max. 0,50		max. 0,75		max. 0,50		
Curr. Consumpt. [A]	max. 0,1,6		max. 0,55		max. 1,6		max. 0,55		max. 1,6		max. 0,5		
Air throw, wall mounted [m ²]*	30		23		30		22		28		20		
Air throw, ceiling mount. [m]*	7,7		5,6		7,6		5,6		7,1		5,0		
Sound pressure level dB[A]**	64		58		64		58		64		58		
Water capacity [litres]	3,5				5,5				7,5				
Heat exchanger connections	R 1"				R 1 1/2"				R 1 1/2"				



Pages 39–41:

Air throws

(as influenced by heat increase and discharge accessories)

Page 42:

Heating output

Air volume

and air outlet temperatures

(as influenced by accessories and speeds)

Page 43:

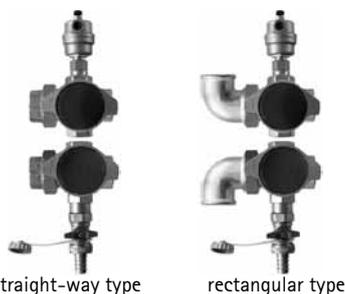
Speeds table

(in combination with single-stage/multistage switches)

Sound pressure level

(as a function of speed)

Shut-off sets for heat exchangers



straight-way type

rectangular type

Shut-off set straight way or rectangular type for flow and return of heat exchanger LH 25: type 2/3/4, LH 40: Type 2/3/4, LH 63: Type 1, LH 100: Type 1. suitable for LPHW/MPHW up to max 110°C and an operating pressure up to max. 10 bar, consisting of:

Screwed fitting 1" for connection of flow and return including flat sealing.

Air separator with automatic shut-off valve in the flow.

Filling and draining cock with cover and hose connection in the return.

Ball valves with internal thread 1" in both flow and return.

Connection possibility 3/4" external thread (i.e. for thermometer) in both flow and return.

Hydraulic 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

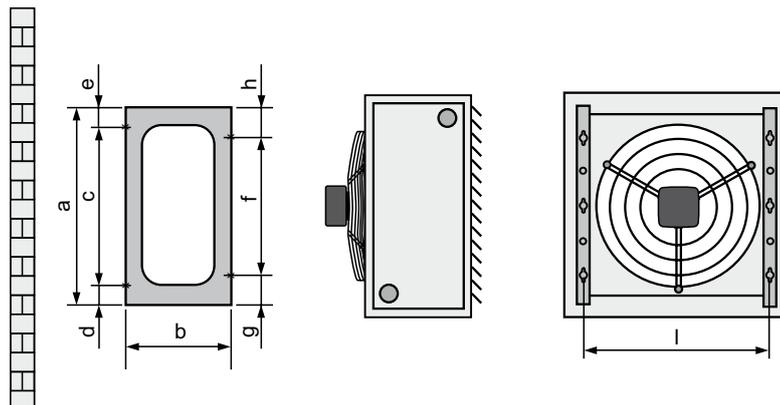
Fastening brackets

For wall and ceiling installation, of pentapost sheet steel 2mm, galvanized.

Complete set consisting of:

2 Brackets

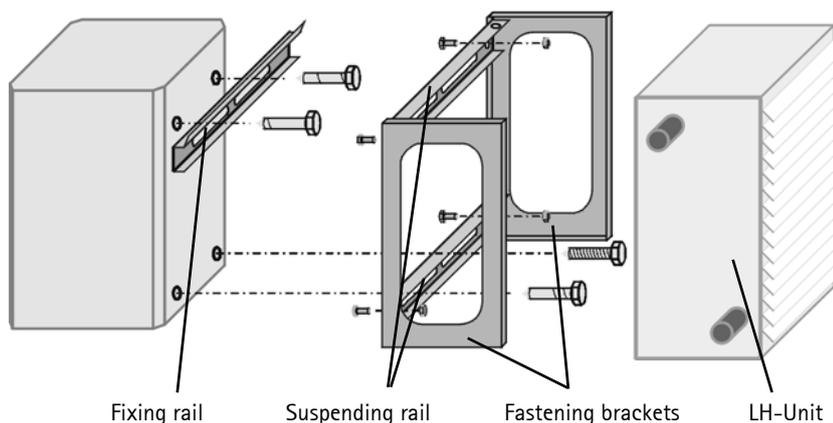
Hexagon screws for assembly to LH-Unit.



LH	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

Fastening set for concrete bar-vertical

For fastening an LH-Unit to a concrete bar by suspending it into a pre-assembled fixing rail. Dowels and screws to be provided on site. Set consisting of: fixing rail, 2 suspending rails (galvanized sheet steel), screws and nuts.



Fixing rail

Suspending rail

Fastening brackets

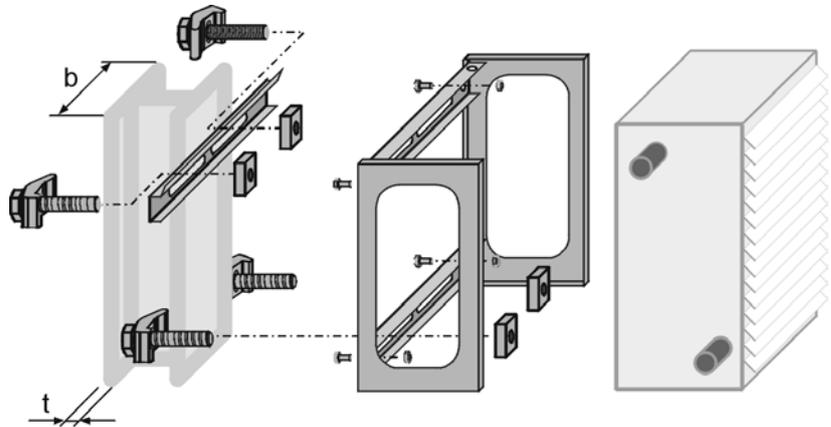
LH-Unit

Fastening set for steel bar-vertical

For fastening an LH-unit to a steel bar by suspending it into a preassembled (via clamping jaws) fixing rail. Suitable for all types of steel bars at a flange width „b” of 100-300 mm, and a flange thickness „t” of 6-21 mm.

Consisting of: Fixing bracket, 2 pcs. suspending rails (galvanized sheet steel), 4 pcs clamping jaws, screws and nuts.

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



Fastening set for steel bar - horizontal and inclined without inclination equalization.

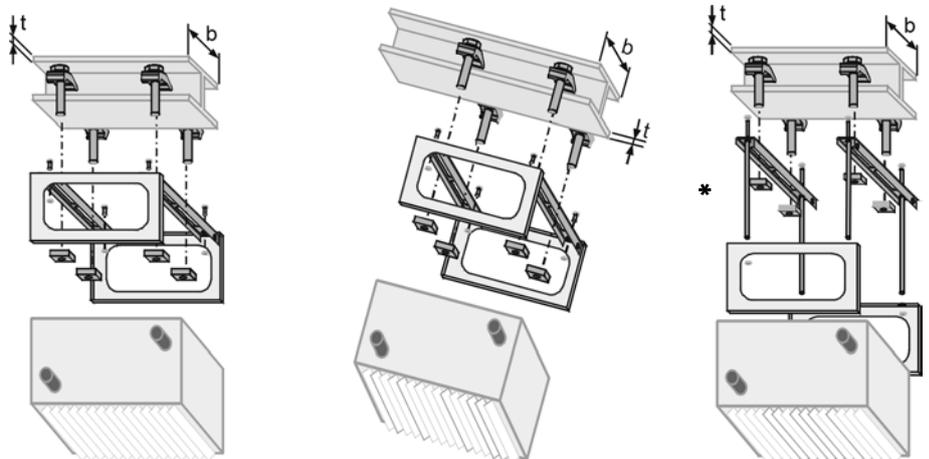
For fastening an LH-Unit to a horizontal or inclined steel bar at a flange width „b” of 100-300 mm, and a flange thickness „t” of 6-21 mm.

Consisting of: 2 pcs. suspending rails (galvanized sheet steel), 4 pcs clamping jaws, screws and nuts.

* Threaded rods size M8 on site.

Installation examples:

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



Direct fastening on horizontal steel bar

Direct fastening on inclined steel bar

Indirect fastening on horizontal steel bar

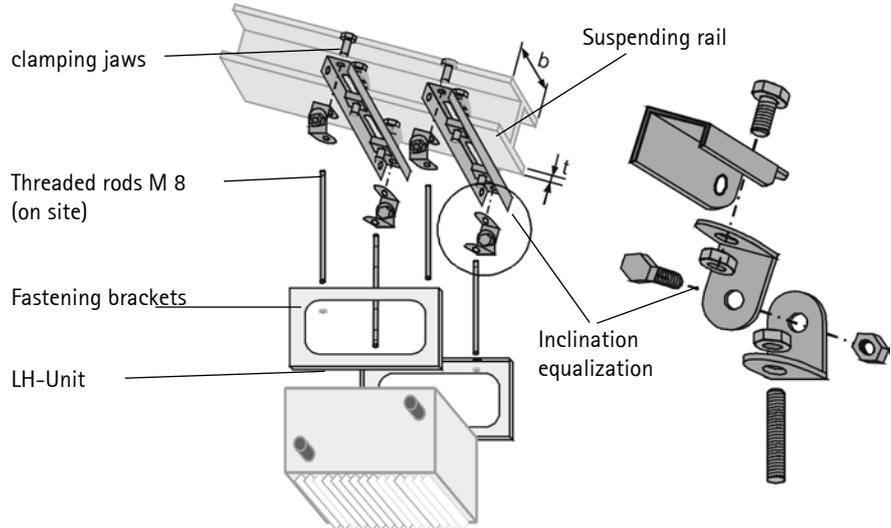
Attention:

Prior to the application of fastening sets the static conditions of the concrete or steel bars have to be checked and taken into account. Assembly exclusively with basic units at a total depth of 300 mm.

Fastening set for steel bar – inclined with inclination equalization

For fastening an LH-Unit to a steel bar at a flange width „b“ of 100-300 mm, and a flange thickness „t“ of 6-21 mm.

Consisting of: 2 pcs. suspending rails (galvanized sheet steel), 4 pcs. clamping jaws, 4 pcs. inclination equalization.

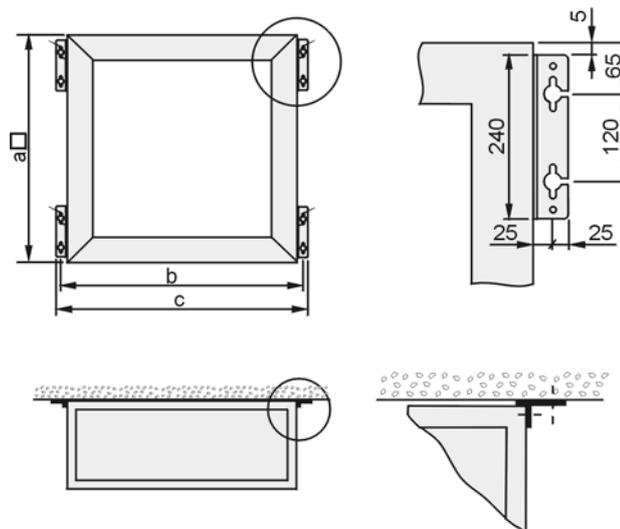


LH	b	t
25	100-300	6-21
40	100-300	6-21

Angle brackets

For wall-mount or ceiling-mount LH unit heaters complete with mixed air, recirculating air, fresh air or filter section galvanised.

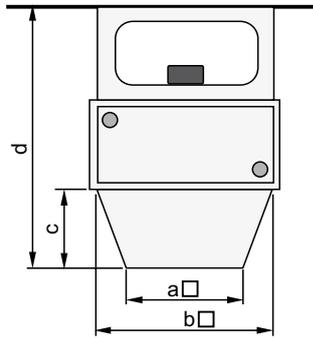
Four angle brackets are required for installation. These brackets are enclosed with the intake accessory, as appropriate. (sealing towards wall / ceiling on site)



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

Discharge cone

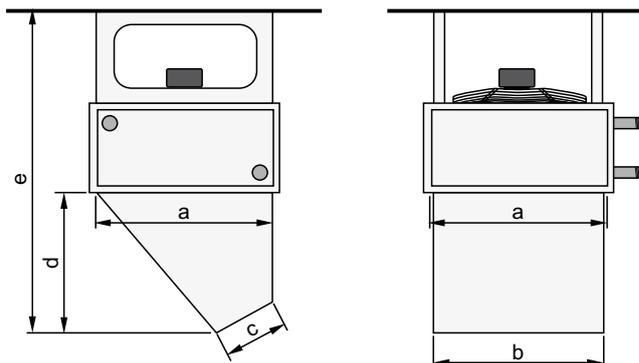
Increases the air throw of high-mounted unit heaters.
(See Page 39 for air throws)



LH	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

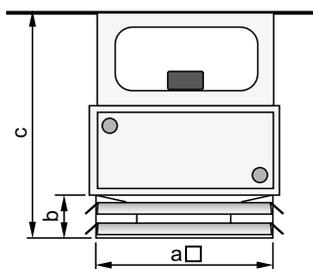
For long air throws, suitable for air curtains at doors.
Outlet temperature for air curtain approx. 10-15 °C higher than room temperature.
(See Page 39 for air throws)



LH	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

Four-way-discharge

With adjustable vanes, suitable for heating low-ceilinged rooms,
air is distributed uniformly to all four sides.



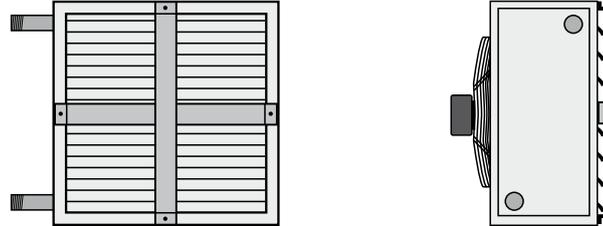
LH	a	b	c
25	500	149	705
40	630	159	705
63	800	159	805
100	1000	159	845

Discharge cross

Improves air flow through the room and temperature distribution by thoroughly mixing the current of warm air with the air in the room.

The temperature of the warm air stream is lower, so the air throw is longer.

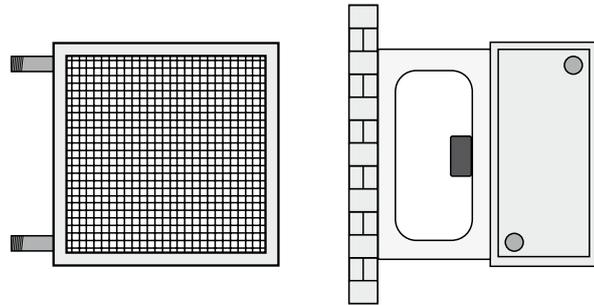
Reduces air temperature close to the ceiling, so less heat loss due to ventilation and transmission - up to 15% energy savings. (See Pages 39 for air throws).



Wide-spread discharge

Spreads the warm air stream discharged to the side.

Air discharge spread up to approx. 120°; louvre vanes individually adjustable, horizontally and vertically.



Induction louvre

Wall-mounted unit



Ceiling-mounted unit



Induction louvre for optimising air throw and temperature distribution

Functional description

The induction louvre divides the warm air stream from the unit heater and induces secondary air (ambient air) from behind the vanes directly into the core of the warm air stream.

The induced secondary air causes intensive mixing of the warm air with the ambient air over a very short distance, thus reducing the temperature of the warm air stream.

This temperature reduction decreases the ascending force of the warm air and increases the air throw, particularly when the unit heater is operating at high leaving air temperatures.

The induction louvre (and thus the direction of the warm air stream) is adjustable either by hand or with the aid of an actuator and can therefore be set to suit any operating conditions or room.

Energy savings

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

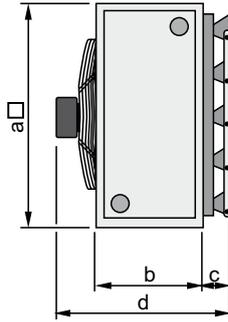
Easily retrofitted for upgrading

The induction louvre is easily installed, so upgrading existing systems poses no problems.

Scope of supply

Induction louvre mounted to LH-Unit, with actuator 230V/50 Hz suitable for drive via key button. Alternative: Induction louvre with secondary air cone, manually adjustable.

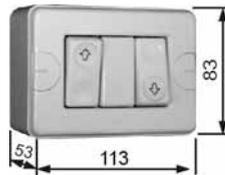
Dimensions basic unit with induction louvre



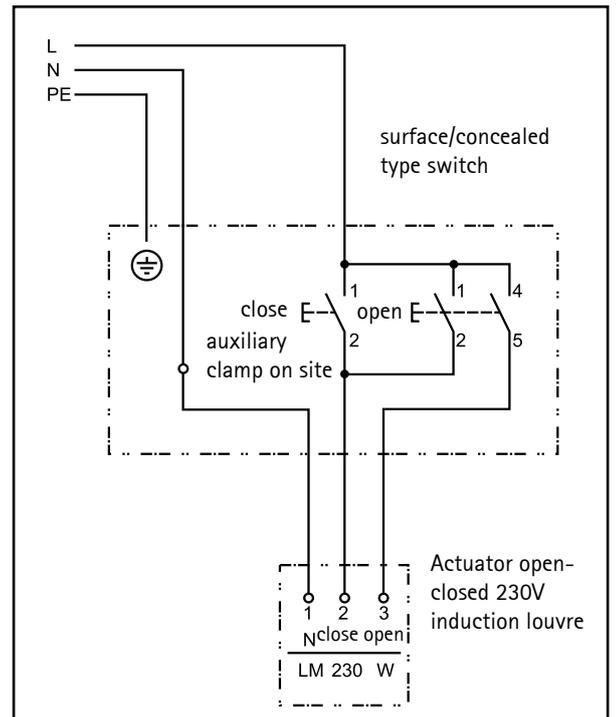
LH	a	b	c	d
25	500	300	120	530
40	630	300	120	535
63	800	300	120	540
100	1000	340	120	590

Key button for 230V / 50Hz Actuator for induction louvre

for surface / concealed type installation; for progressive adjustment of the induction louvre and optimisation of the airtrow.



Operating voltage	230 V
Current max.	10 A
Degree of protection	IP 20



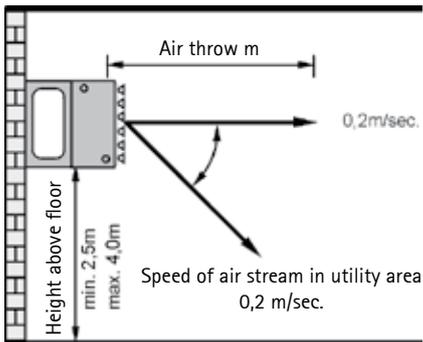
Clearances

Clearances for wall-mounted units and clearances for ceiling-mounted units, vanes vertical.

Ceiling-mounted unit, vanes deflected.

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

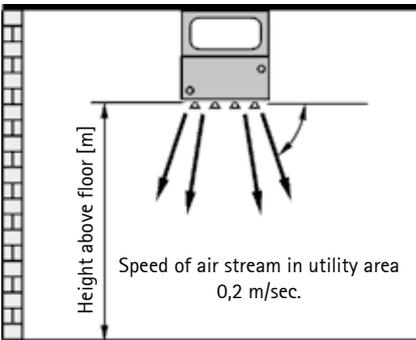
Air throw: wall-mounted unit



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

* Figures represent air throws at defined operating conditions. (mixing temperature 10 K above room temperature)

Height above floor, ceiling-mounted unit

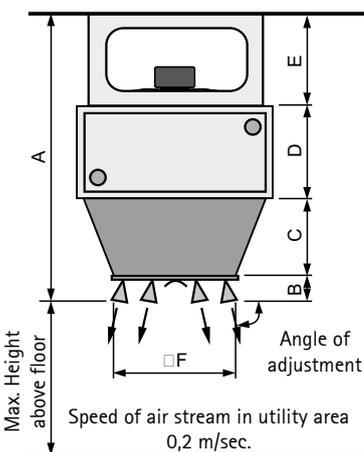


Requird height (m) * LH Type	25				40				63				100			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
$\Delta T=20K$; Vanes deflected	5	4,5	4	3,5	6	5,5	5	4,5	7	6,5	6	5,5	8	7,5	7	6,5
$\Delta T=20K$; Vanes vertical	6	5,5	5	4,5	7	6,5	6	5,5	8	7,5	7	6,5	9	8,5	8	7,5
$\Delta T=10K$; Vanes deflected	6	5,5	5	4,5	7	6,5	6	5,5	8	7,5	7	6,5	9	8,5	8	7,5
$\Delta T=10K$; Vanes vertical	7	6,5	6	5,5	8	7,5	7	6,5	9	8,5	8	7,5	10	9,5	9	8,5

* The optimum vane angle depends on the local situation, i. e. room geometry, furniture, temperature stratification and air distribution. The data are standard values for an approximate selection.

ΔT = Air outlet temperature - Air intake temperature

Height wall-mounted unit with adaption cone and induction louvre



	A	B	C	D	E	F
LH 63	1040	120	270	300	350	460
LH 100	1130	120	320	340	350	590

Max. height above floor (m) *	LH Type	63		100	
		1	2	1	2
Air volume	[m ³ /h]	3300	3200	5600	5500
$\Delta T=10K$; Vanes deflected		12	11	11	10
$\Delta T=10K$; Vanes vertical		13,5	12,5	12,5	11,5

* The optimum vane angle depends on the local situation, i. e. room geometry, furniture, temperature stratification and air distribution. The data are standard values for an approximate selection.

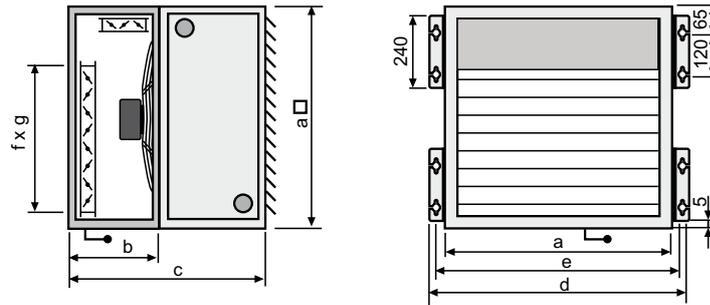
ΔT = Air outlet temperature - Air intake temperature

Extended heights on request

(for outside air/mixed air function the requirements in accordance with VDI 6022 have to be adhered to, in Germany)

Mixing box

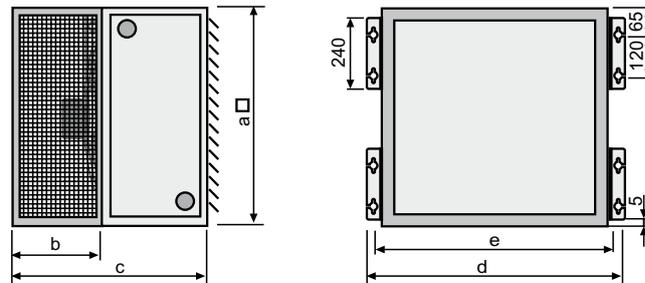
Mixing box galvanized. For adjusting the room's air change rate. Fresh air intake at rear, recirculated air intake at side or from above or below if mixing box is turned through 90°. Stepless adjustment from recirculated air only through mixed air to fresh air only, manual or with 230 V stepless actuator.



LH	a	b	c	d	e	f	g
25	500	500	800	600	550	400	400
40	630	500	800	730	680	360	530
63	800	500	800	900	850	530	700
100	1000	540	880	1100	1050	690	860

Return air box

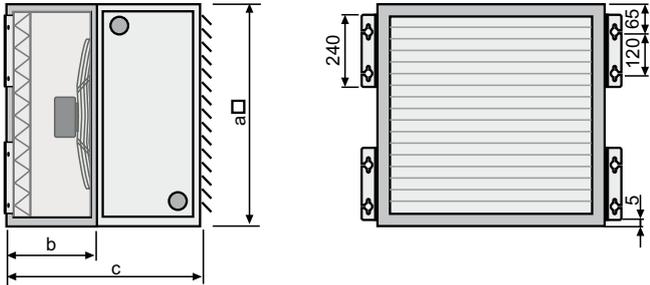
Return air box galvanized, has two side intake grilles for recirculating air; box can also be turned through 90° for intake from above and below.



LH	a	b	c	d	e
25	500	300	600	600	550
40	630	500	800	730	680
63	800	500	800	900	850
100	1000	540	880	1100	1050

Filter box

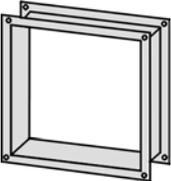
Galvanized filter box with dust trap for fresh or mixed air operation, G4 for LH 63, filter class G3 for LH 25, 40, 100. Angle brackets optional.



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

Flexible connection

Flexible connection, 4-hole profile; galvanized sheet steel.

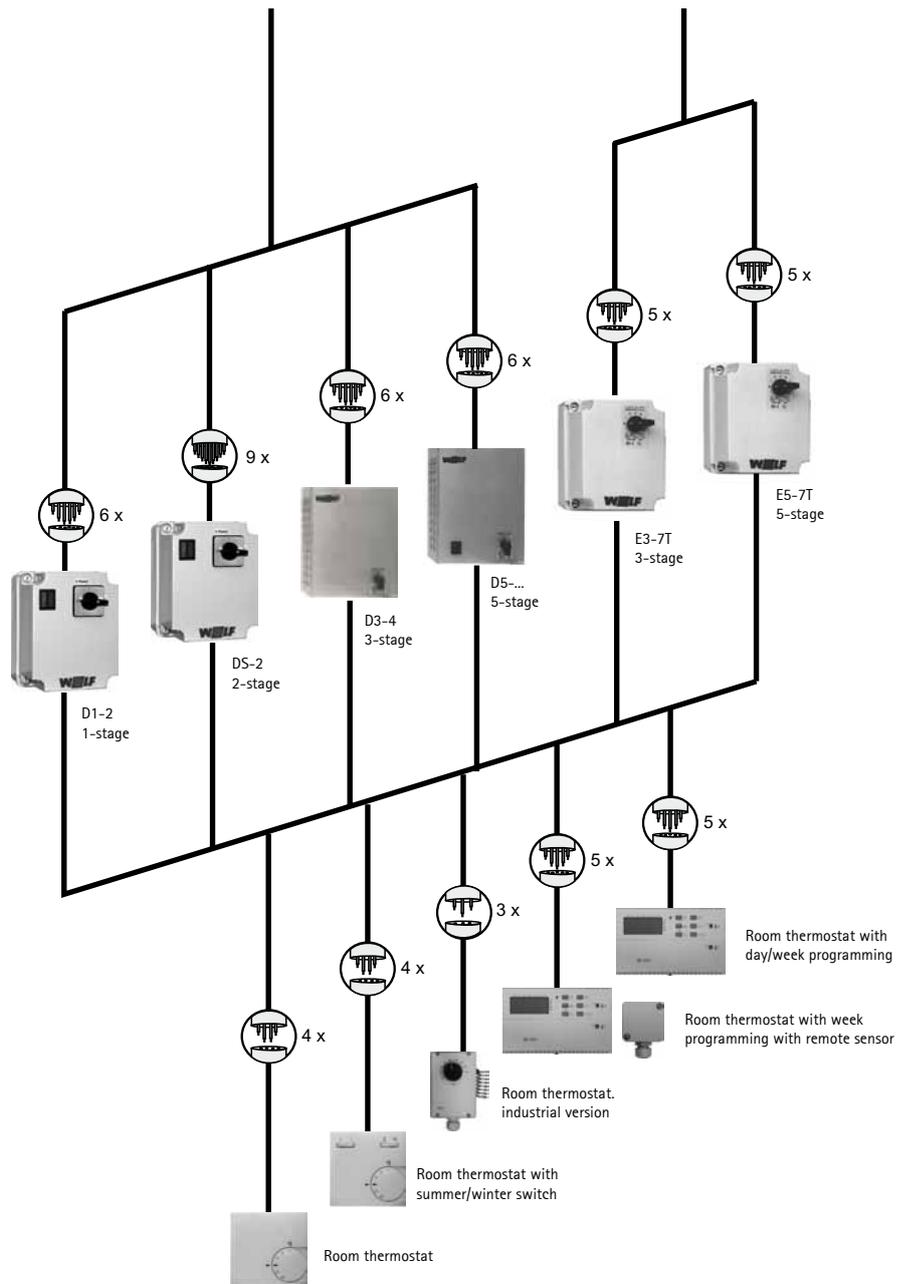




Three-phase motor
3 x 400 V



Single-phase a.c. motor
1 x 230 V



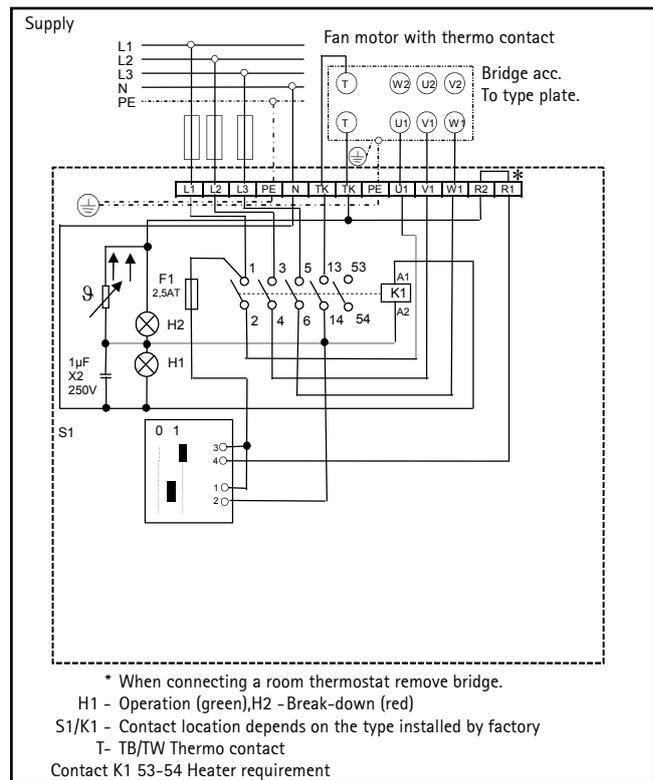
1-stage switch D1-2

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



Operating voltage	400 V
Control voltage	230 V
Capacity, max.	8 A
Weight	0,9 kg
Degree of protection	IP 54

Automatic restart when winding temperature drops (motor).
Restart by setting multistage switch to 0 position and then select desired speed.



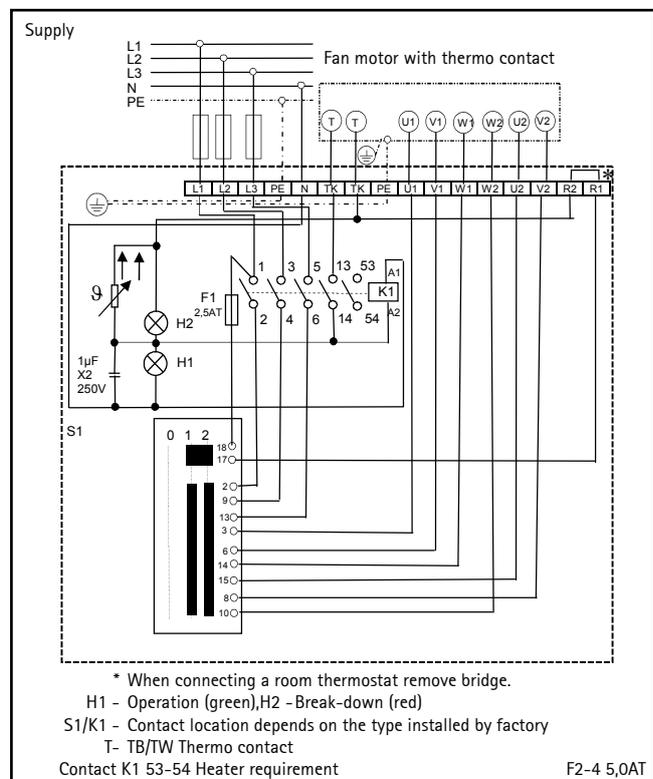
2-stage switch DS-2

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



Operating voltage	400 V
Control voltage	230 V
Capacity, max.	8 A
Weight	0,9 kg
Degree of protection	IP 54

Automatic restart when winding temperature drops (motor).
Restart by setting multistage switch to 0 position and then select desired speed.



Note:

Without switches for complete protection we do not give motor warranty!
When the winding temperature is being exceeded without a complete motor protection switch, the motor can get badly damaged.

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

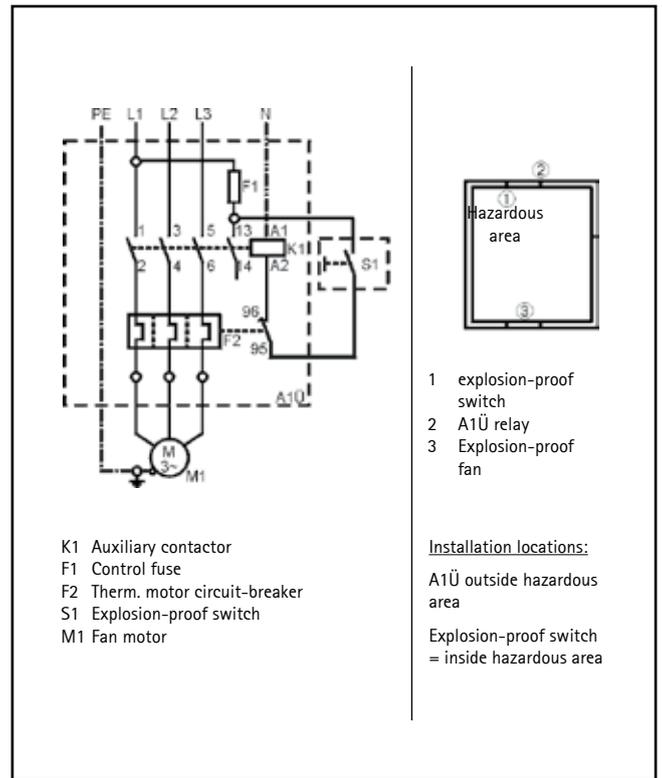
A1 Ü controller (without explosion-proof switch)

As full motor protection for single-speed LH motors, explosion-proof configuration.

The A1Ü controller must be installed outside the hazardous area.

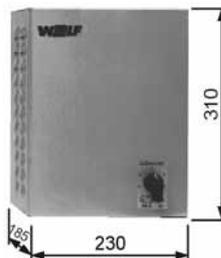


Operating voltage	3 x 400 V
Control voltage	230 V
Capacity, max.	2,7 A
Weight	0,6 kg
Degree of protection	IP 55

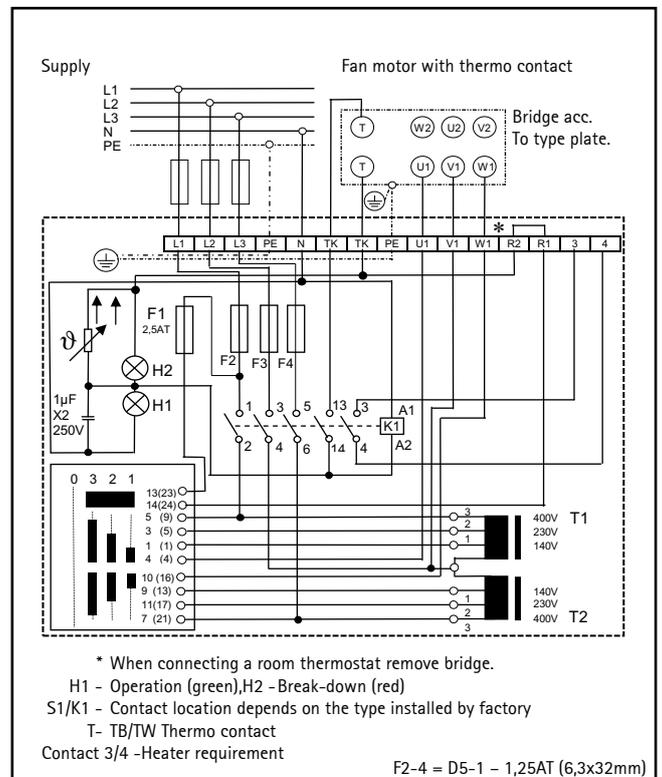


3-stage switch D 3-4 with restart disablement

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



Operating voltage	400 V
Control voltage	230 V
Current, max.	4 A
Weight	8,0 kg
Degree of protection	IP 20



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

Note:

Without switches for complete protection we do not give motor warranty!
When the winding temperature is being exceeded without a complete motor protection switch, the motor can get badly damaged.

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

5-stage switch D 5...

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



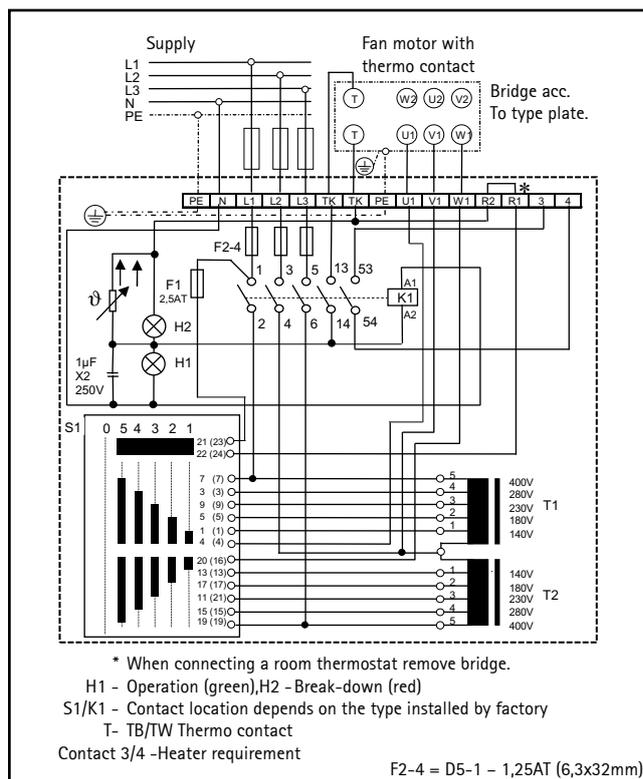
Dimensions

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
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
Current, max.	A	1	2	4	7	12
Weight	kg	4,5	7,0	9,0	19,0	27,0
Protection	IP	40	20	20	20	20

Note:

Without switches for complete protection we do not give motor warranty!
When the winding temperature is being exceeded without a complete motor protection switch, the motor can get badly damaged.

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



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

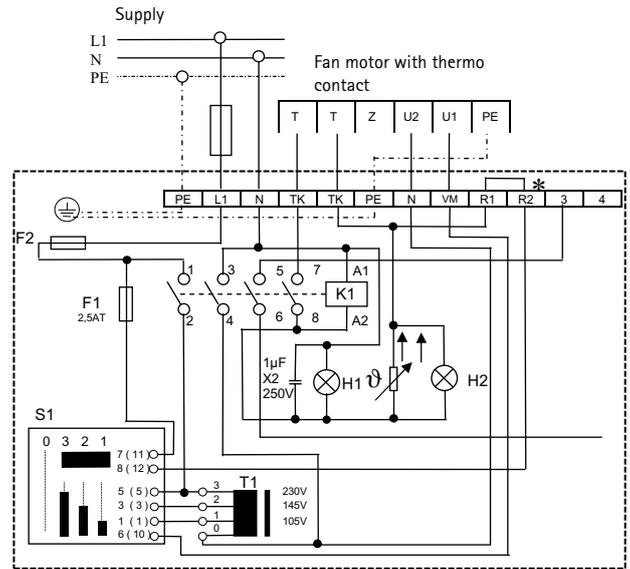
3-stage switch E 3-7T with restart disablement

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

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



* When connecting a room thermostat remove bridge.

H1 - Operation (green), H2 - Break-down (red)

S1/K1 - Contact location depends on the type installed by factory

T- TB/TW Thermo contact

Contact 3/4 -Heater requirement

F2 - 8,0AT (6,3x32mm)

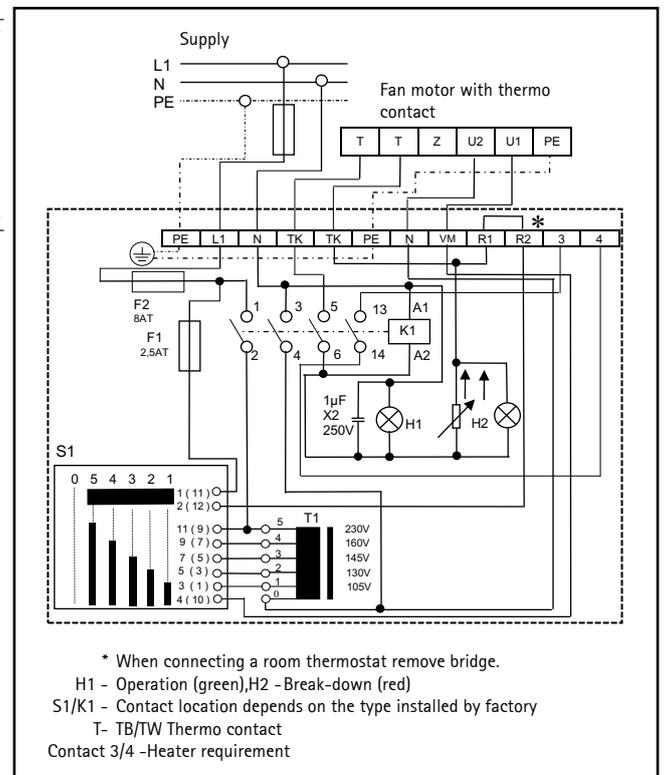
5-stage switch E 5-7T with restart disablement

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



Operating voltage	230 V
Current, max.	7 A
Weight	4,5 kg
Degree of protection	IP 40

Automatic restart when winding temperature drops (motor). Restart by setting multistage switch to 0 position and then select desired speed.



* When connecting a room thermostat remove bridge.

H1 - Operation (green), H2 - Break-down (red)

S1/K1 - Contact location depends on the type installed by factory

T- TB/TW Thermo contact

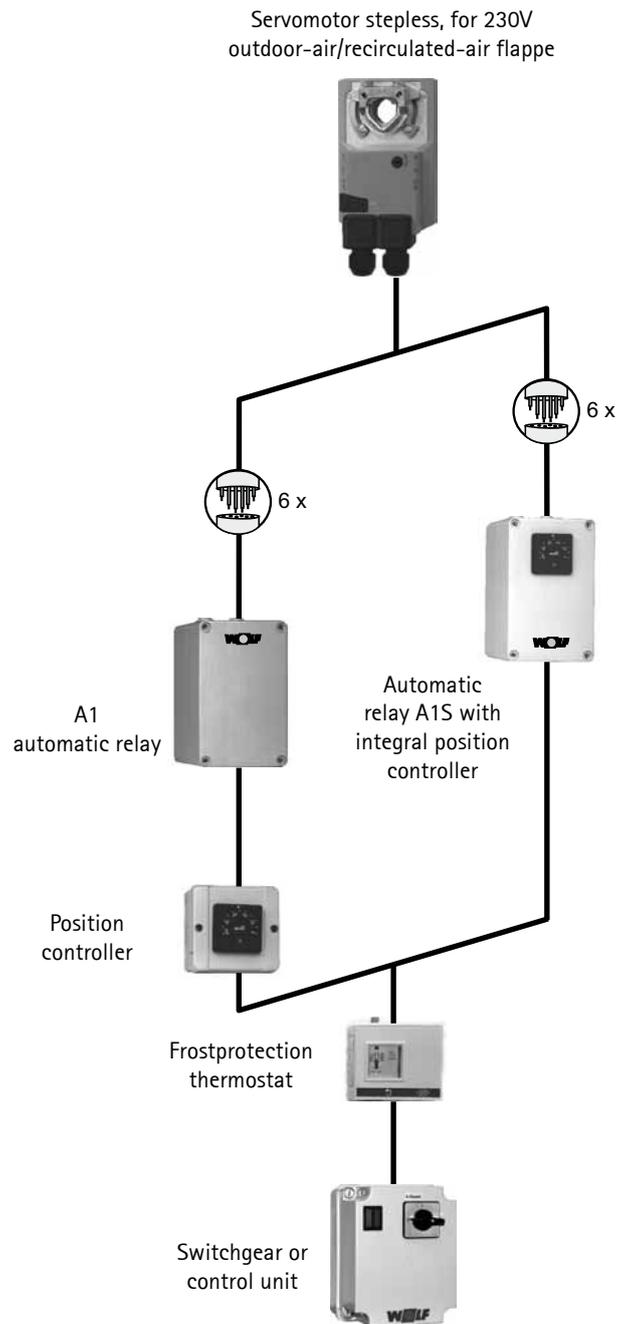
Contact 3/4 -Heater requirement

Note:

Without switches for complete protection we do not give motor warranty!

When the winding temperature is being exceeded without a complete motor protection switch, the motor can get badly damaged.

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



OPEN/CLOSED actuator 230 V

For motor-actuated operation of fresh air damper in conjunction with A1 automatic relay.

LH starts up → fresh air damper opens

LH shuts down or antifreeze watchdog trips → fresh air damper closes

Stepless actuator 230 V

For stepless, motor-actuated operation of fresh air/return air dampers in conjunction with A1 automatic relay and a position controller in the control cabinet or surface mounted or integrated in the A1S automatic relay.

LH starts up → fresh air damper opens to preset setting, return air damper closes to the corresponding setting.

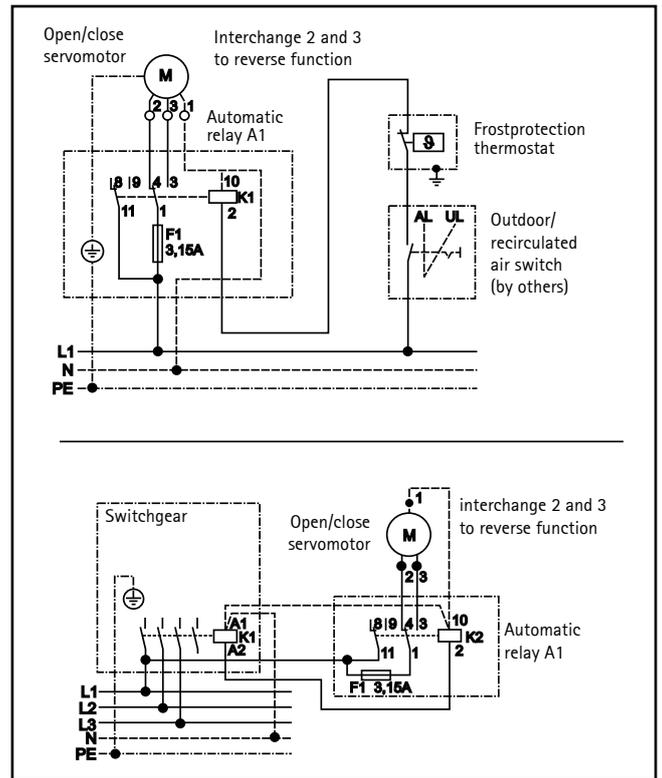
LH shuts down → fresh air damper closes, return air damper opens or antifreeze watchdog trips 100%.

Automatic relay, A1

Auxiliary relay for automatic actuation of the outdoor-air flap with 230 V servomotor for „open/close“.

When the LH switches off or the frost-protection thermostat trips, the A1 automatic relay moves the servomotor to the „closed“ position. When the LH switches on the A1 moves the servomotor to the „open“ position.

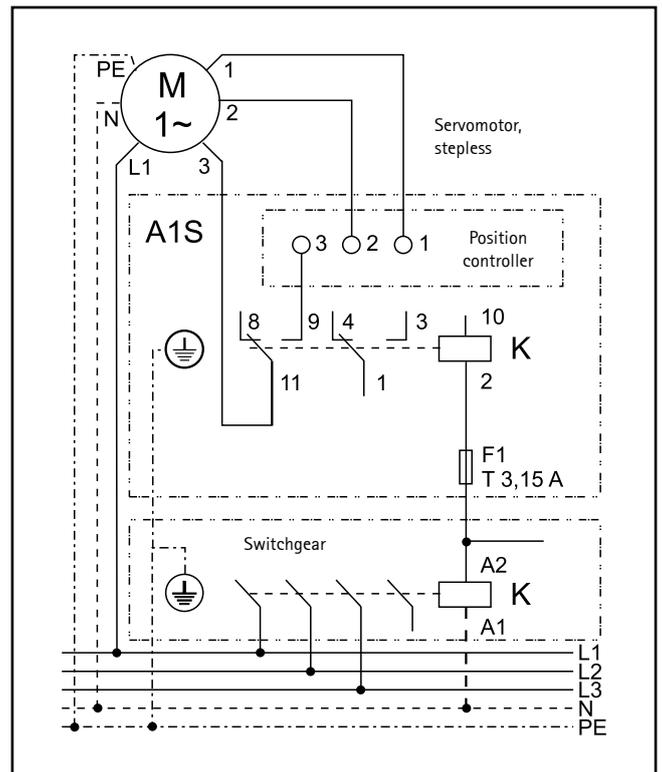
Control voltage	230 V
Capacity, max.	1,5 kW
Weight	0,5 kg
Degree of protection	IP 54



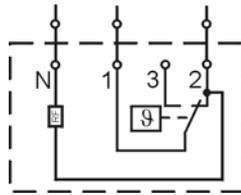
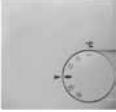
Automatic relay, A1S

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

The automatic relay A1S switches the actuator to the position set on the position transmitter, if the LH-unit is switched off or if the anti-frost thermostat is activated. Switching on the LH-unit, the actuator switches to the position set at the position transmitter.



Room Thermostat



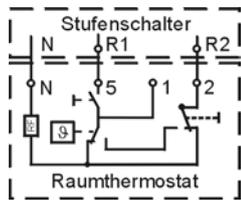
Plastic housing 75 x 75 x 25 mm for surface mounting.
Switching capacity: heating 10(4) A, cooling 5(2) A at 230 V / 50 Hz, thermal feedback.

Temperature range 5 - 30 °C

Switching differential 0,5 K

Degree of protection IP 30

Room thermostat with summer/winter switch



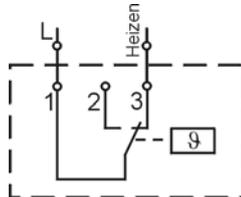
Plastic housing 75 x 75 x 25 mm for surface mounting.
Switching capacity: heating 10(4) A, cooling 5(2) A at 230 V / 50 Hz, thermal feedback.

Temperature range 5 - 30 °C

Switching differential 0,5 K

Degree of protection IP 30

Room thermostat, industrial grade



Plastic housing 150 x 110 x 72 mm for surface mounting.

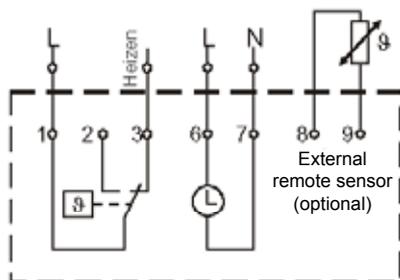
Switching capacity 16(4) A at 230 V / 50 Hz

Temperature range 0 - 40 °C

Switching differential $\pm 0,75$ K

Degree of protection IP 54

Thermostatic timer with week program



Plastic housing 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

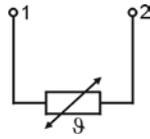
Switching capacity 10(4) A at 230 V / 50 Hz

Temperature range 5 - 40 °C

Switching differential can be adjusted by $\pm 0,1 - 3$ K

Degree of protection IP 20

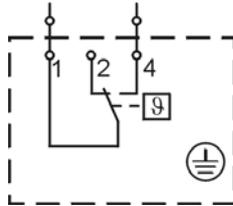
Remote sensor for room thermostat clock



Plastic housing 52 x 50 x 35 mm for installation in plug-in base.

Degree of protection IP 54

Frost-protection thermostat



If the air discharge temperature drops below a preset value the frost-protection thermostat switches off the LH to prevent frost damage to the heat exchanger. The LH 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 2 °C to 20 °C

Switching differential 2,5 K

Degree of protection 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 three LH heaters with 3 x 400V, 50Hz motors.

Degree of protection IP 54

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

All-pole Isolator AR8



fitted and wired

BML ventilation programming module



- Room-/weather-compensated temperature control
- LCD with background illumination
- Easy plain text guide through the menus
- Control by rotary selector with key function
- Four function keys for frequently used functions (Info, Temperature-, speed adjustment, fresh air proportion)
- Installation either inside the ventilation control unit or, as remote control, in a wall mounting base
- Only one BML ventilation programming modul required to control up to 7 zones
- Demand-optimised boiler water temperature demand via eBUS
- eBus interface

Wall mounting base



- Wall mounting base for use with the BML ventilation programming module as remote control.

LM1 ventilation control unit (incl. room temperature sensor)



- Ventilation module to control air heaters with a two-stage motor
- Easy controller configuration by selecting one of the preset system versions
- Demand-optimised room temperature control via air heater speed
- Control of the heating circuit pump
- Control of one heat source
- Demand-optimised boiler water temperature demand via eBUS
- eBus interface with automatic energy management
- BML ventilation programming module to clip into LM2 ventilation control unit

LM2 ventilation control unit



- Ventilation module LM2 to control the room temperature via speed or mixer
- 2-stage motor control in conjunction with ventilation module LM1 or 5-stage motor control via 0-10V signal in connection with 5-stage switch
- Easy controller configuration by selecting one of the preset system versions
- Control of one heat source
- Demand-optimised boiler water temperature demand via eBUS
- eBus interface with automatic energy management
- BML ventilation programming module to clip into LM2 ventilation control unit
- Control of mixed air damper (in connection with servomotor 24V)
- Induction louvre control

Outside-, ceiling- or room temperature sensor



Radio clock



- For synchronising the clock inside the control unit with the DC77 transmitter

Radio clock with outside temperature sensor



- For synchronising the clock inside the control unit with the DC77 transmitter, and capturing the outside temperature

Differential pressure switch



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

5-stage switch 0-10 V



- Electronic five-stage speed controller, input 0-10V

Supply air sensor and sensor retainer



- for measuring the supply air temperature

ISM 5 - LON-interface module



- to connect ventilation modules LM1 and LM2 to a building management system applying LON-standard network variables

LM1 ventilation control unit with BML

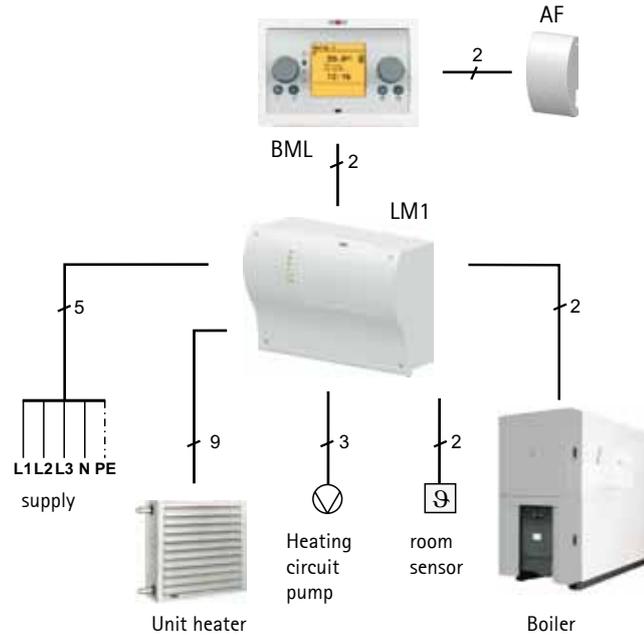
Description

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 source are switched on or off subject to demand.

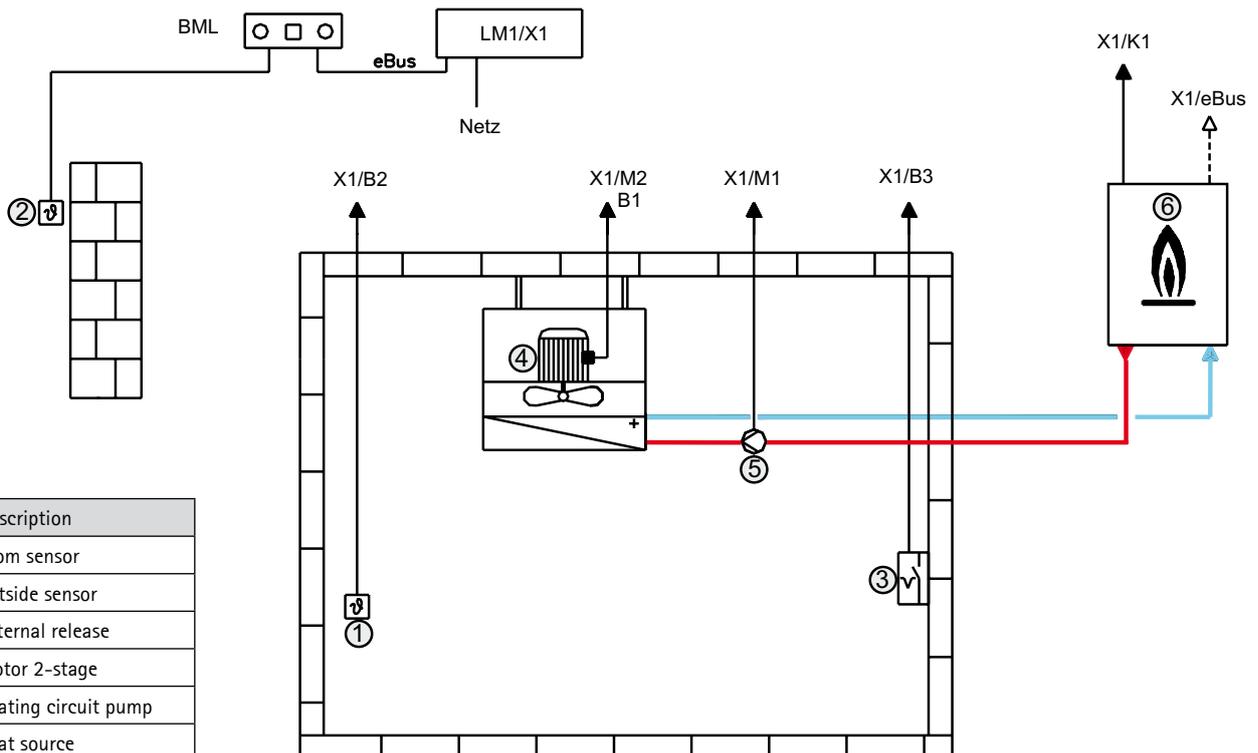
If the temperature deviation (set room temperature to actual room temperature) is low, the fan is operated in stage 1. If the temperature deviation is greater, it is switched to stage 2.

Example:

Unit heater, heating with room temperature control



Installation diagram:



Nr.	Description
1	room sensor
2	outside sensor
3	external release
4	motor 2-stage
5	heating circuit pump
6	heat source

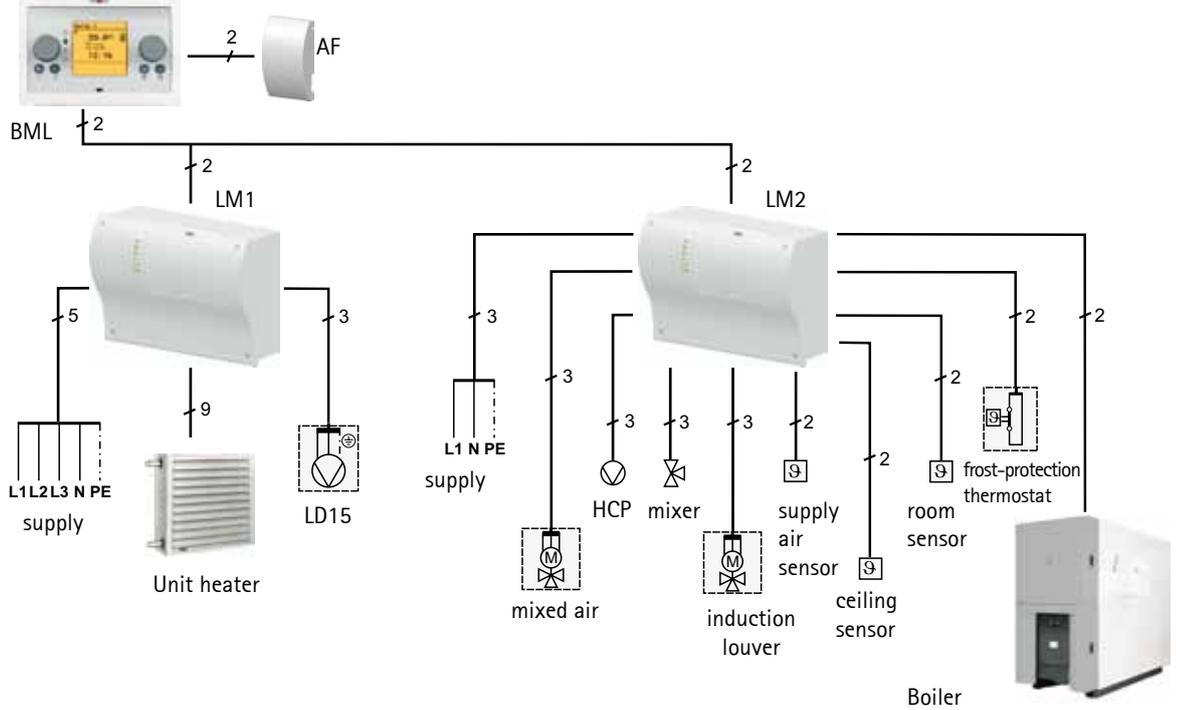
LM1 ventilation control and LM2 with BML

Description:

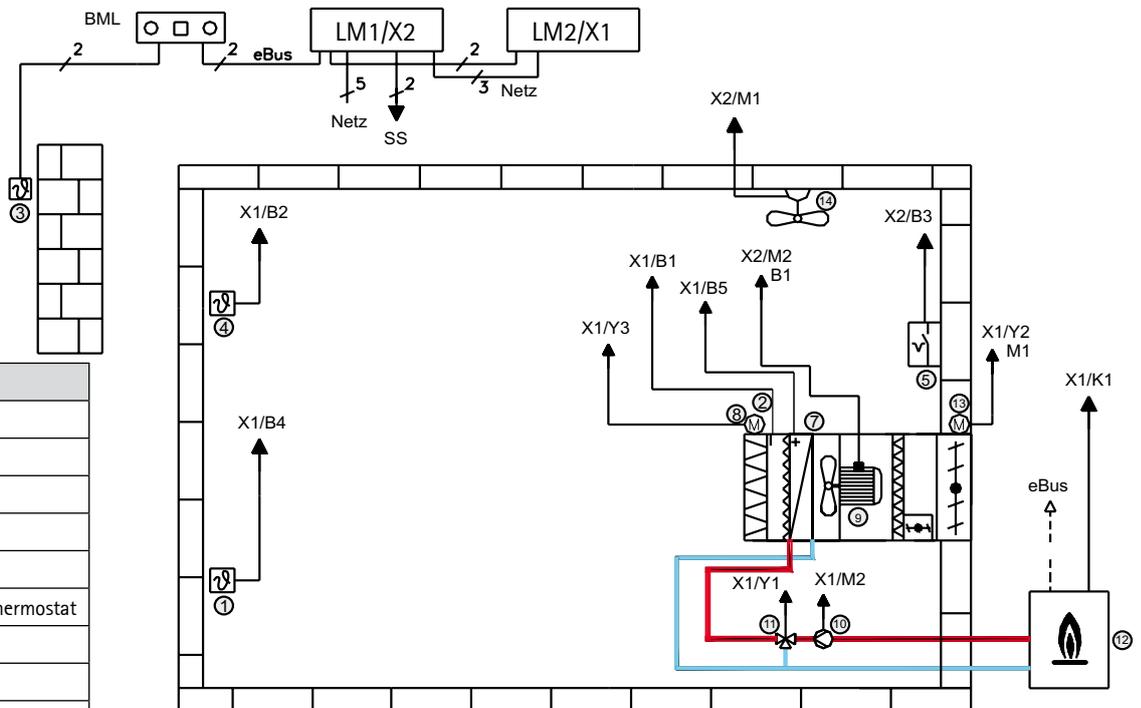
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat source are switched on or off subject to demand.

Example:

Unit heater, heating with room temperature control, Mmixer control, motor control, 2-stage



Installation diagram:



Nr.	Description
1	room sensor
2	supply air sensor
3	outside sensor
4	ceiling sensor
5	External release
7	Frost-protection thermostat
8	induction louver
9	motor 2-stage
10	heating circuit pump
11	heating circuit mixer
12	heat source
13	mixed air damper
14	LD15, ceiling fan

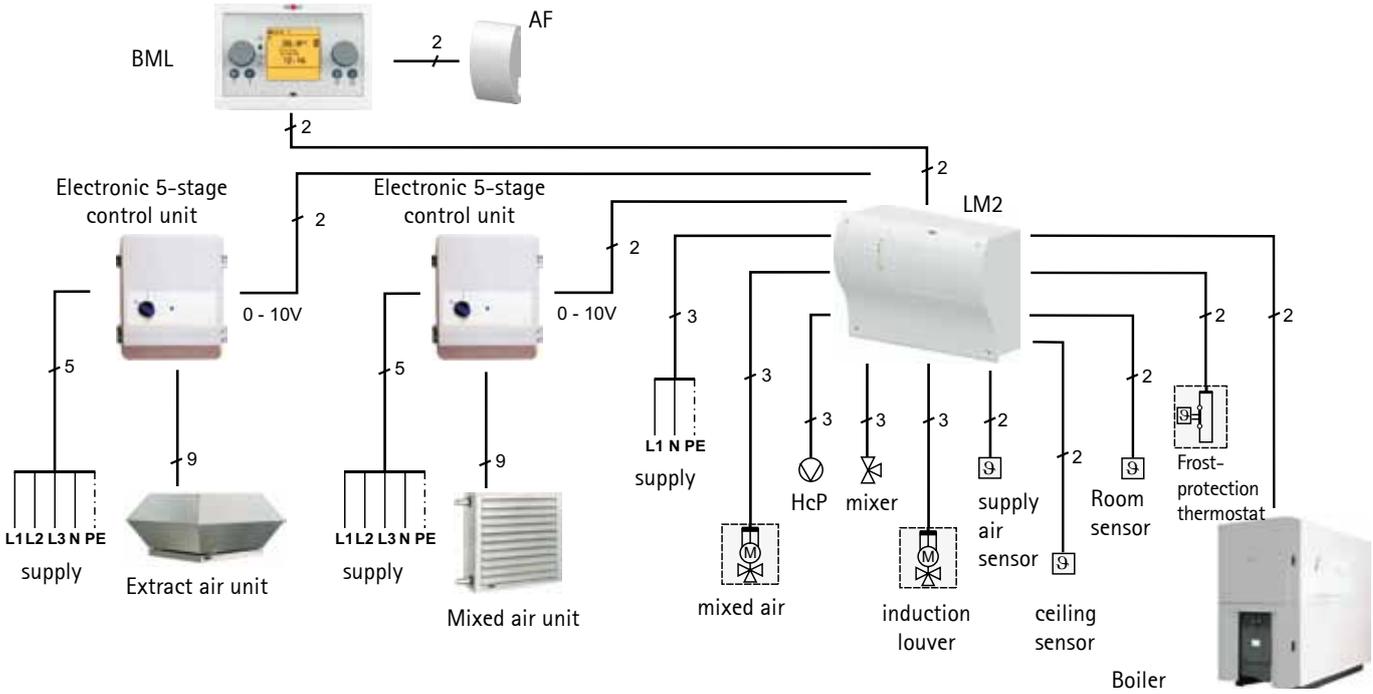
LM2 ventilation control unit with BML

Description:

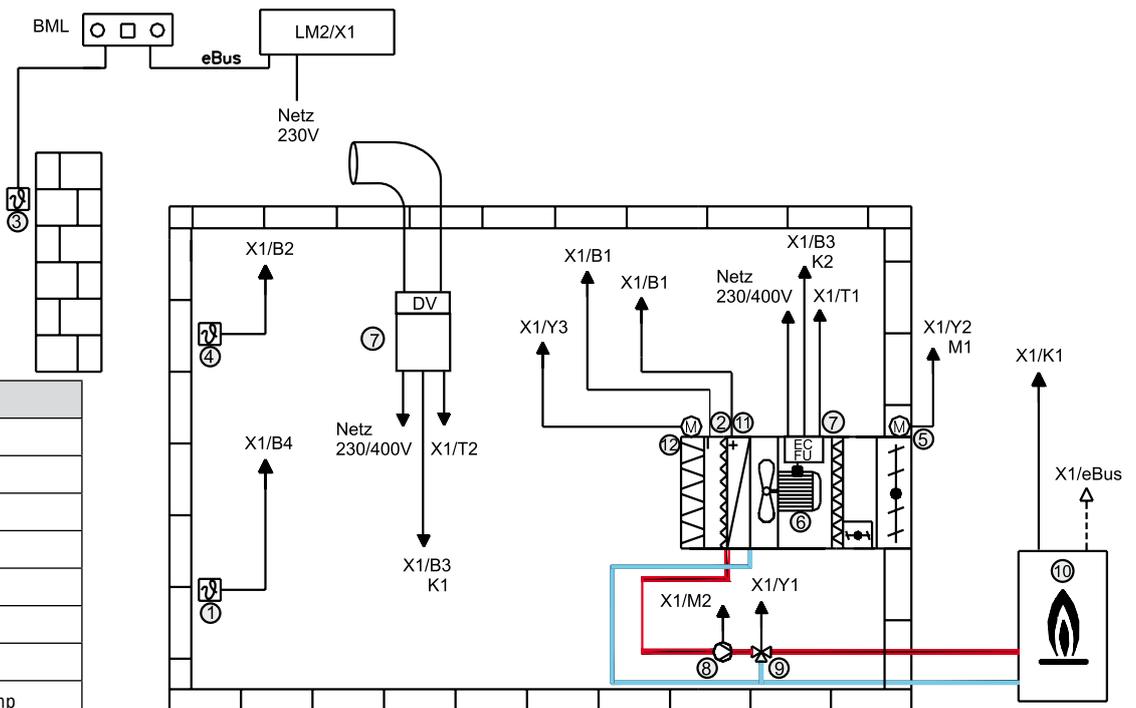
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat source are switched on or off subject to demand. The extract air fan is enabled subject to the fresh air proportion.

Example:

Unit Heater, heating with room temperature control, mixer control, motor control with electronic 5-stage speed regulator



Installation diagram:



Nr.	Description
1	room sensor
2	supply air sensor
3	outside sensor
4	ceiling sensor
5	mixed air damper
6	fan
7	frequency inverter
8	heating circuit pump
9	heating circuit mixer
10	heat source
11	frost-protection thermostat
12	induction louver

5-stage electronic switch 0 - 10V

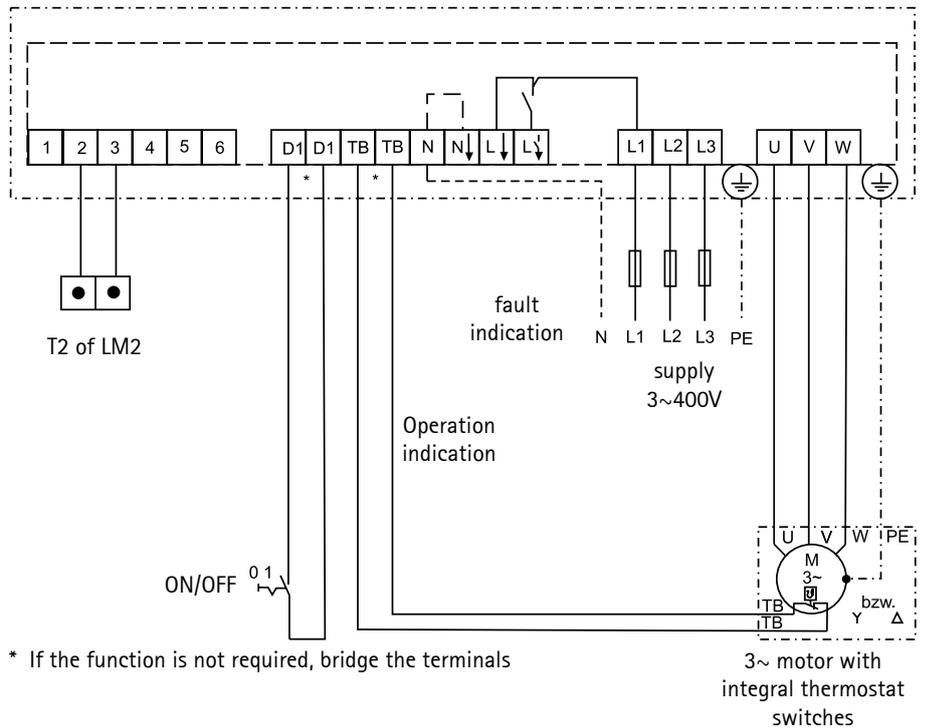
5-stage switch 0-10 V:



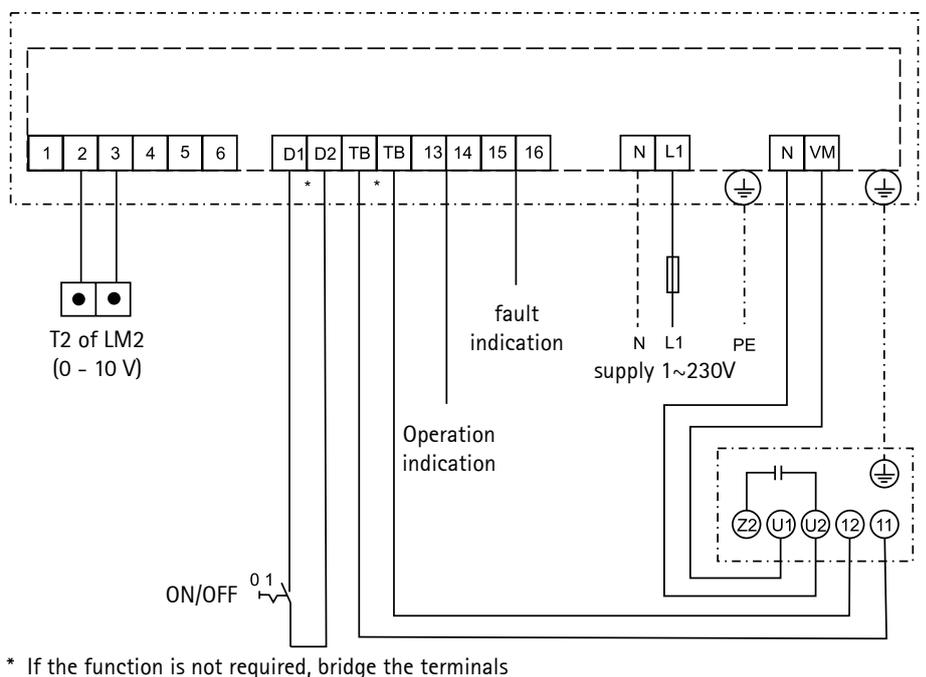
L=170 B=220 H=315

Switch type	D5-2F	D5-4F	E5-6F
Voltage	400 V	400 V	230 V
Capacity, max.	2 A	4 A	6 A
Weight	7,4 kg	11,0 kg	5,2 kg
Degree of protection	IP 21	IP 21	IP 20

Wiring diagram D5-.....



Wiring diagram E5-6F

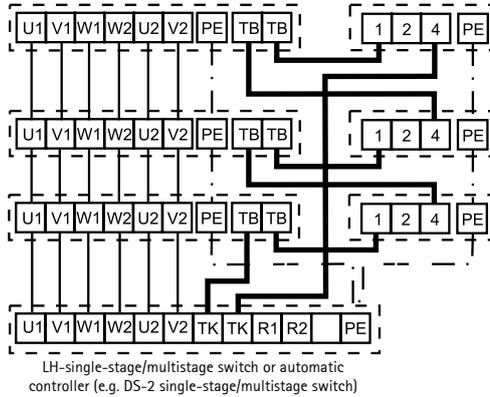


Note:

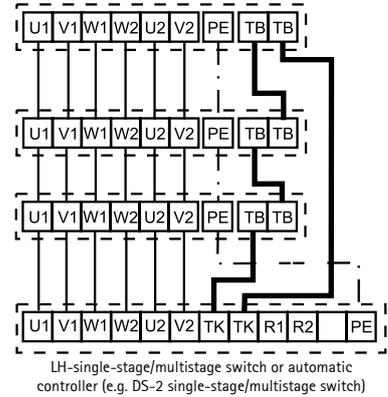
LH unit heaters of different sizes and ratings can be connected in parallel to a common switching controller with full motor protection: the configuration limit is imposed by the maximum permissible switching capacity or the maximum permissible current rating of the controller.

If multiple unit heaters are connected it is essential to ensure that the motor terminals are connected in parallel and that the thermo contacts and antifreeze thermostats are connected in series. Terminal 5 installed by others.

LH unit heaters with thermo contacts and antifreeze thermostats



LH unit heaters with thermostat



Number of conductors for connecting cables

Connection from	Switching controller								
	D1-2	DS-2	D3-4	D5...	E3-7T	E5-7T	A1Ü	A1	A1S
Mains supply	5	5	5	5	3	3	5	-	-
LH motor 3 x 400 V	6	9	6	6	-	-	4	-	-
LH motor 1 x 230 V	-	-	-	-	5	5	-	-	-
Room thermostat	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	3/4 ¹⁾	-	-	-
Room thermostat timer	5	5	5	5	5	-	-	6 ²⁾	-
Automatic relay A1	4	4	4	4	4	4	-	-	-
A1S autom. controller	4	4	-	4	-	4	-	-	-
Actuator	-	-	-	-	-	-	-	4	6
Explosion-proof switch	-	-	-	-	-	-	3	-	-

¹⁾ In conjunction with a room thermostat with thermal feedback signal.

²⁾ 2-stage

Use 3-core cable for connection to antifreeze thermostat.

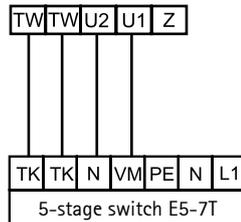
Single-phase a.c. motors 230 V/ 50 Hz

Single-phase a.c. motors are supplied adjusted to high speed up to LH 63 as standard.

No single-phase a.c. motor available for LH 100.

Thermo contacts in series with motor winding speed control with 5-stage switch type E5-3 for LH 25, 40, 63.

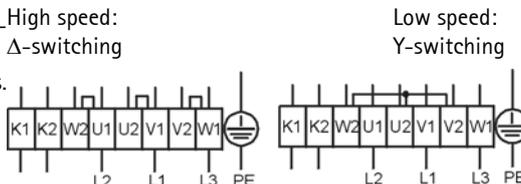
Thermo contact in series with motor winding



LH-ATEX Three-phase motor 3 x 400 V/ 50 Hz

- 1U = brown 2U = red K1 = white
- 1V = blue 2V = grey K2 = white
- 1W = black 2W = orange

Three-phase motor with 2 speeds via Δ/Y-switching. Full motor protection via integrated thermistors. Remove jumpers if speed controller is used.

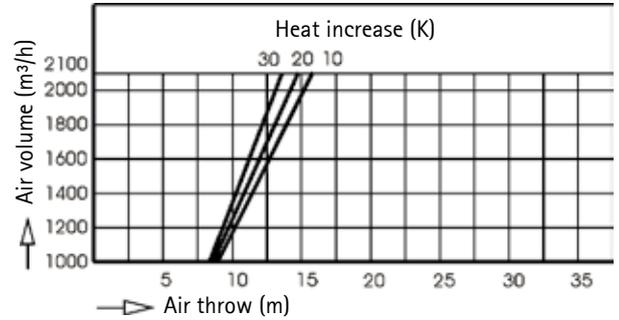
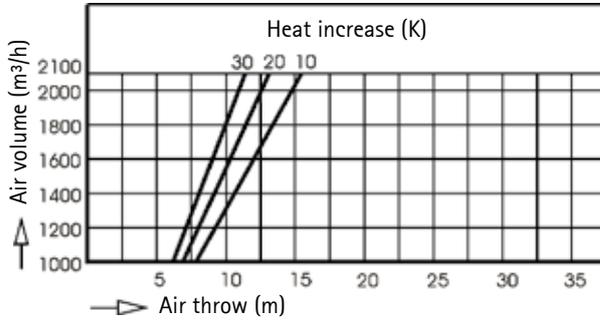


The horizontal air throw is the distance travelled by the warm air discharged by the wall-mounted LH unit heater

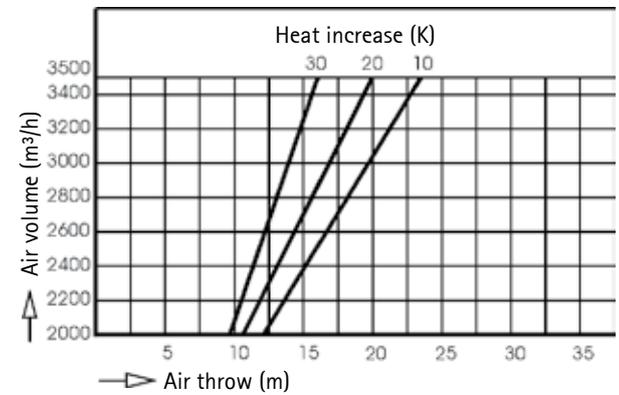
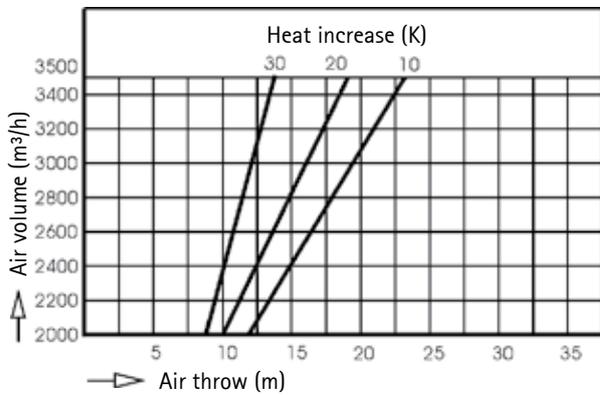
with discharge louvres or spread discharge

with discharge louvres or discharge cross

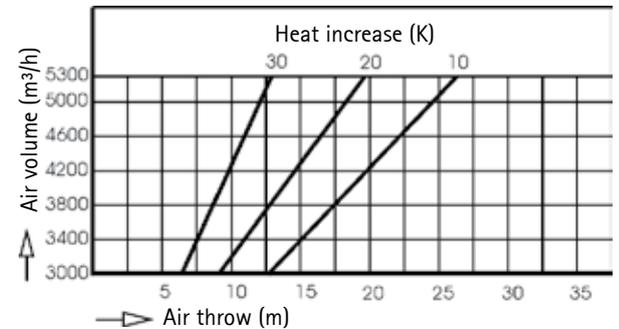
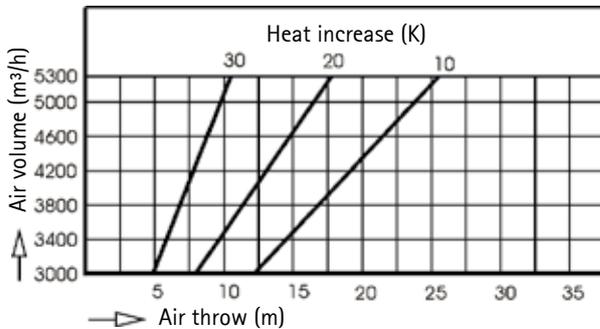
LH 25



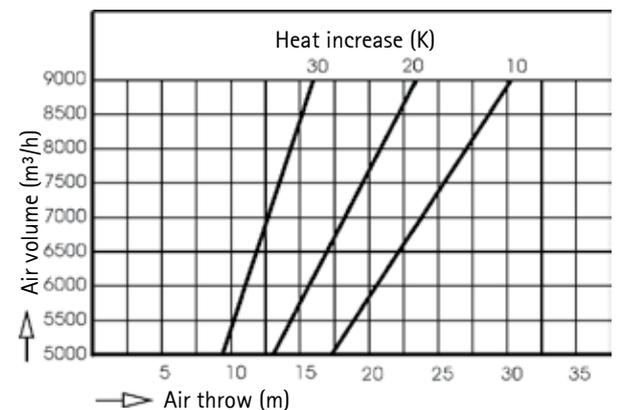
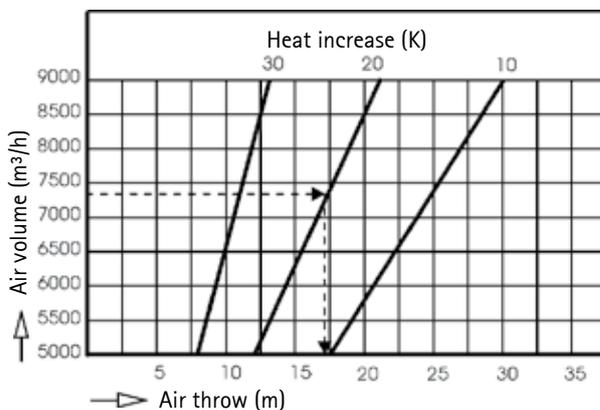
LH 40



LH 63



LH 100



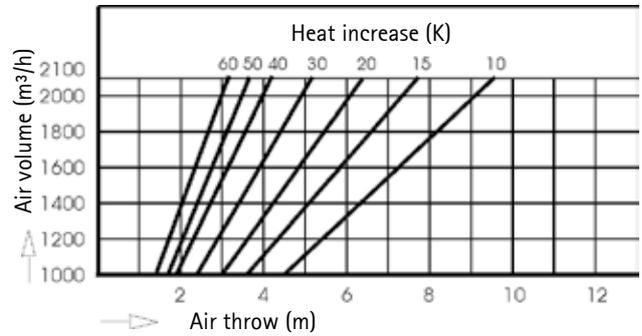
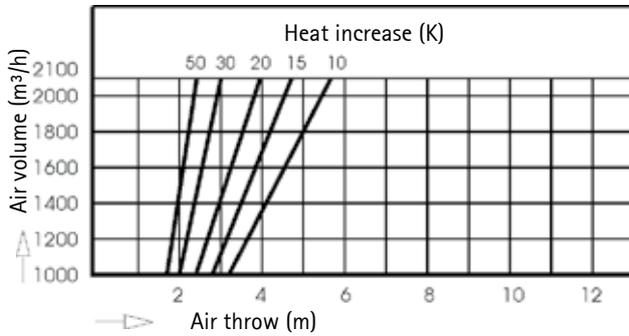
Example: LH 100 with discharge louvre; $\Delta t_A = t_{Aoff} - t_{room} = 20 \text{ K}$; air volume = 7 300 m³/h
 Result: horizontal air throw = 17 metres

The vertical air throw is the distance travelled by the warm air discharged by the LH unit heater

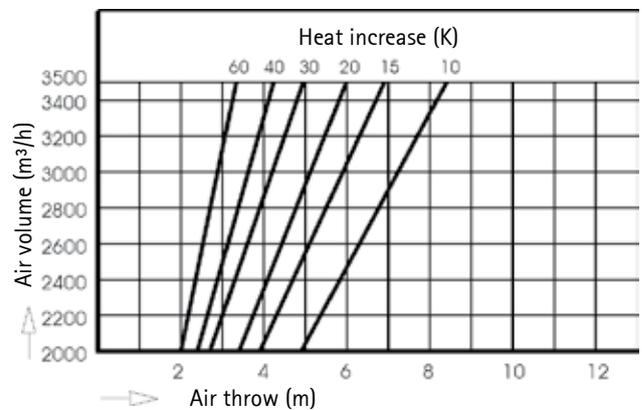
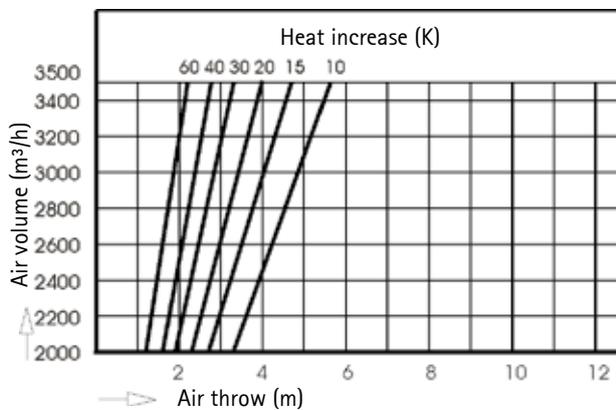
with discharge louvres/wide or spread discharge

with discharge louvres cone/discharge nozzle

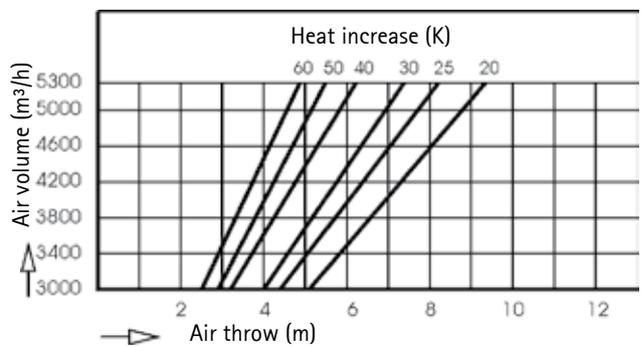
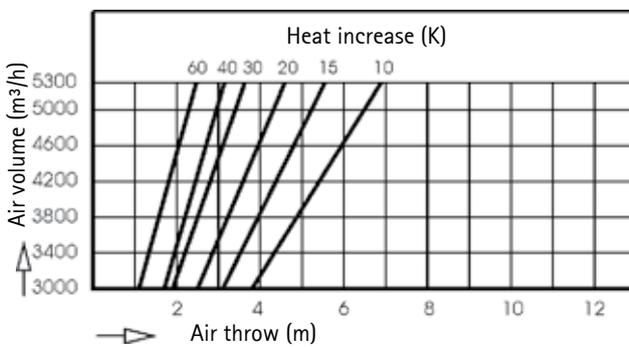
LH 25



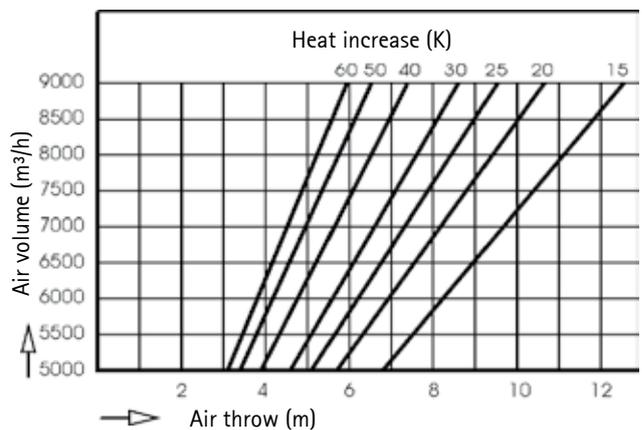
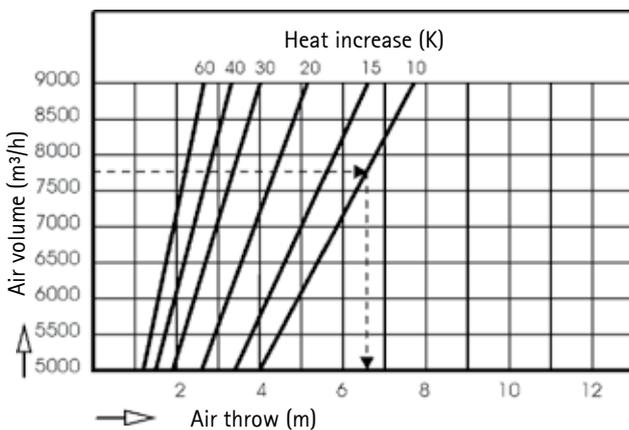
LH 40



LH 63



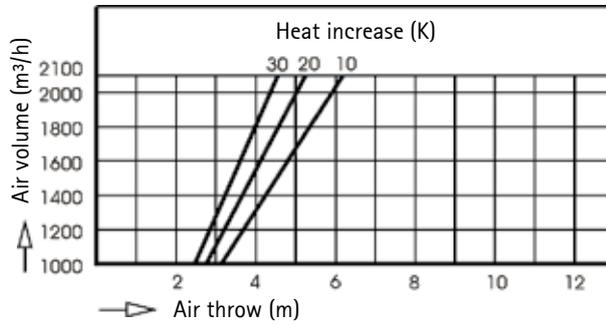
LH 100



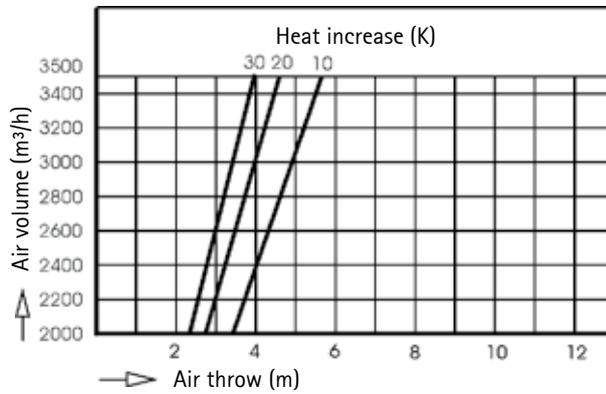
Example: LH 100 with discharge louvre; $\Delta t_A = t_{\text{Aff}} - t_{\text{room}} = 20 \text{ K}$; air volume = 7 750 m³/h
Result: horizontal air throw = 6,6 metres

with discharge louvres and discharge cross

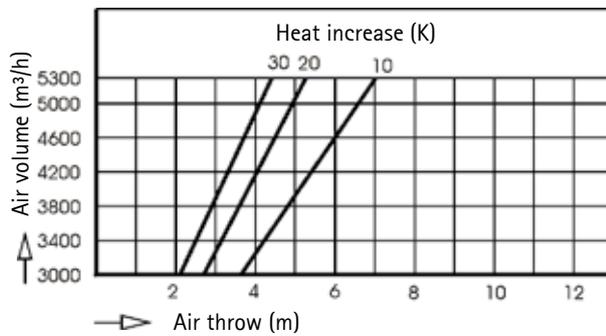
LH 25



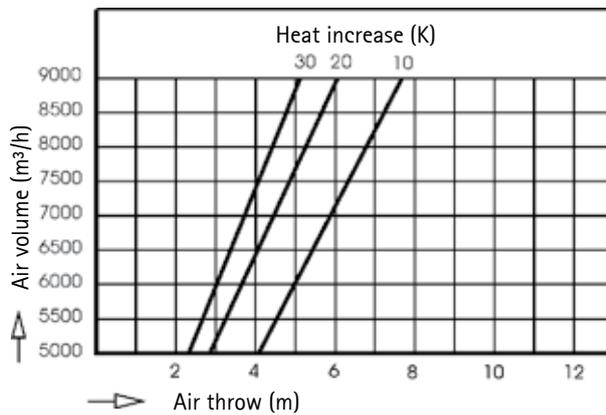
LH 40



LH 63



LH 100



Key to symbols

\dot{V}	= air volume	m ³ /h
\dot{V}_B	= reference air volume	m ³ /h
\dot{V}_O	= catalogue air volume	m ³ /h
\dot{V}_{eff}	= effective air volume	m ³ /h
t_{on}	= air intake temperature	°C
t_{off}	= air discharge temperature	°C
t_{Aoff}	= effective air discharge temperature	°C
Δt_A	= air heat increase	K
Δt_W	= temperature difference of water	K
W	= water flow rate	m ³ /h
\dot{Q}	= thermal output	kW
\dot{Q}_O	= catalogue thermal output	kW
\dot{Q}_{eff}	= effective thermal output	kW
Δp	= air resistance	Pa
Δp_W	= hydraulic resistance	kPa
e	= factor for heat-rise	
q_{eff}	= factor for heating output	
l_{eff}	= factor for air volume	
K	= accessory index of entire unit	

Conversion:

1 Pa = 0,1 mm WS
1 kPa = 1000 Pa

Accessory index k:

Mixing box	3
Four-way discharge	2
Discharge nozzle	2
Discharge cone	2
Wide-spread discharge	0
Filter, clean	5
Intake duct	2
Rain protection hood	2
Weatherproof louvre	7
Non-return flap	3
Fresh air box	0
Return air box	0
Intake hood	1
Discharge cross	1
Ind.louvre (wall-mounted)	2
Ind.louvre (ceiling-mounted)	3

To calculate k for accessories

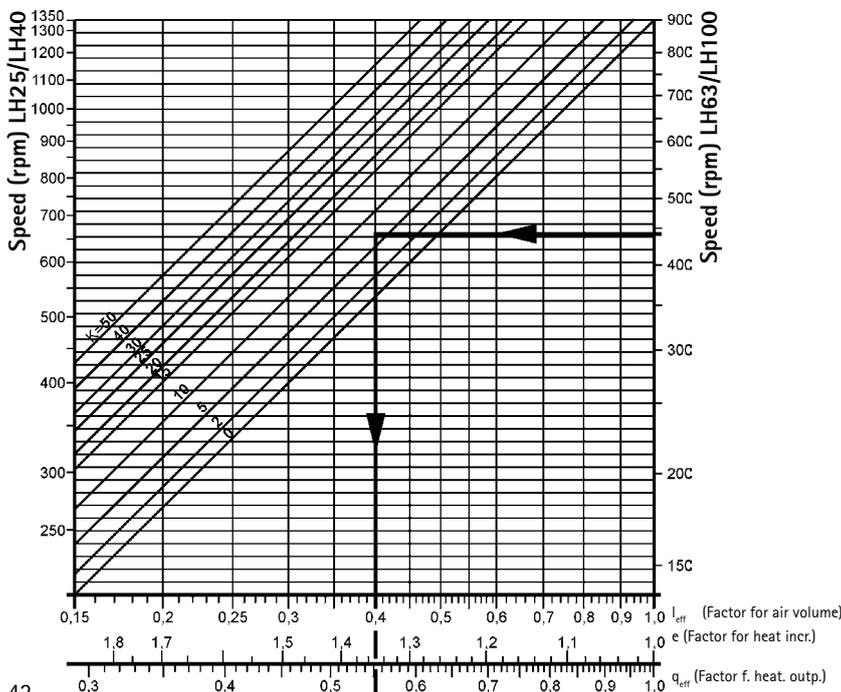
$$k = 0,1 \cdot \Delta p \cdot \left(\frac{\dot{V}_B}{\dot{V}} \right)^2$$

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

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

LH	\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



Example

Assuming:

LH 100 Type4, $t_{on} = -5^\circ\text{C}$, LPHW 50/40

From performance table on Page 6:
(always take figures for high speed, because factors correcting for operation at lower speed are taken into account in the characteristics graph).

$$\begin{aligned} \dot{V}_O &= 7700 \text{ m}^3/\text{h} \\ \dot{Q}_O &= 96,1 \text{ kW} \\ t_{off} &= 29^\circ\text{C} \\ \Delta t_{AO} &= (29+5) \text{ K} = 34 \text{ K} \end{aligned}$$

Mains supply 3 x 400 V Δ
5-stage switch, set to stage 1
from speeds table on Page 43: 440 rpm

Accessories: mixing box $k = 3$;
Accessories installed by others: Fresh air duct

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

$$k = 0,1 \cdot 10 \cdot \left(\frac{10000}{5000} \right)^2$$

$$k = 4$$

$$k = 3 + 4 = 7$$

LH 100, 440 rpm, $k = 7$

from characteristics graph:

$$\begin{aligned} l_{eff} &= 0,4 \\ e &= 1,35 \\ q_{eff} &= 0,55 \end{aligned}$$

Find:

Effective air volume	\dot{V}_{eff}
Effective air heat increase	Δt_{Aeff}
Effective air discharge temp.	t_{Aoff}
Effective heating output	\dot{Q}_{eff}
Water flow rate	W
Hydraulic resistance	Δp_W

Result:

$$\dot{V}_{eff} = \dot{V}_O \cdot l_{eff} = 7700 \text{ m}^3/\text{h} \cdot 0,4 = 3080 \text{ m}^3/\text{h}$$

$$\Delta t_{Aeff} = \Delta t_{AO} \cdot e = 34 \text{ K} \cdot 1,35 = 45,9 \text{ K}$$

$$t_{Aoff} = t_{on} + \Delta t_{Aeff} = -5 + 45,9^\circ\text{C} = 40,9^\circ\text{C}$$

$$\dot{Q}_{eff} = \dot{Q}_O \cdot q_{eff} = 96,1 \text{ kW} \cdot 0,55 = 52,9 \text{ kW}$$

$$W = \frac{0,86 \cdot \dot{Q}_{eff}}{\Delta t_W} = \frac{0,86 \cdot 52,9}{10} = 4,5 \text{ m}^3/\text{h}$$

Δp_W (see diagram, Page 13) = 8,5 kPa

Speeds table / sound pressure level

LH

Speeds table for LH fan motors

Line voltage	Stage	LH 25	LH 40	LH 63	LH 100
Single-stage switch					
		Speed rpm	Speed rpm	Speed rpm	Speed rpm
3 x 400 V Δ	-	1350	1350	900	900
3 x 400 V Y	-	1000	1000	700	700
3 x 230 V Δ	-	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
3 x 230 V Δ	II	1350	1350	900	900
Three-stage switch					
3 x 400 V Δ	III	1350	1350	900	900
230 V Δ	II	1150	1150	800	750
140 V Δ	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	900
145 V	II	1250	900	750	750
105 V	I	750	600	500	500
Five-stage switch					
3 x 400 V Δ	V	1350	1350	900	900
280 V Δ	IV	1280	1300	850	840
230 V Δ	III	1210	1200	800	750
180 V Δ	II	1050	1090	710	620
140 V	I	800	840	560	440
3 x 400 V Y	V	1000	1000	700	700
3 x 230 V Δ	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	860	530	400	

Sound pressure levels as a function of speed

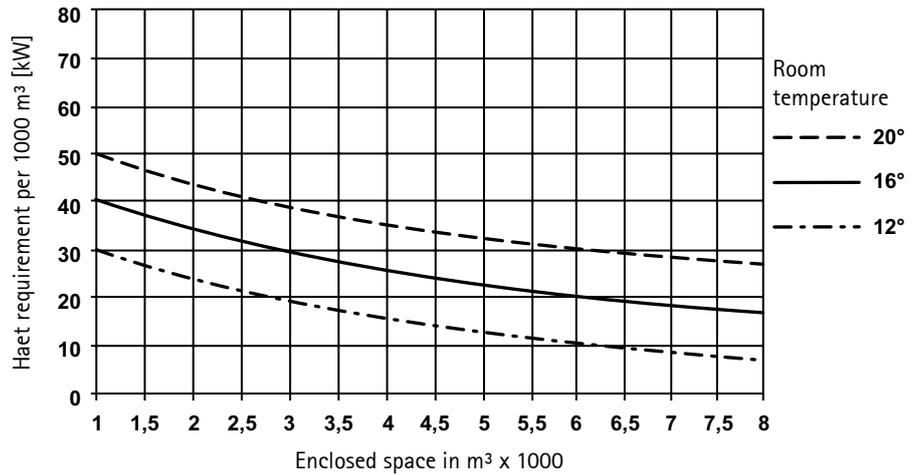
LH 25			LH40			LH63			LH100		
Speed rpm	Sound power level dBA	Sound pressure level* dBA 2 m									
1350	74	63	1350	78	67	900	77	66	900	82	71
1290	73	62	1300	77	66	850	76	65	840	80	69
1280	73	62	1200	75	64	800	74	63	750	78	67
1230	72	61	1140	74	63	750	73	62	700	76	65
1210	72	61	1090	73	62	710	71	60	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						

* Sound pressure levels measured in room with average absorption, enclosed space approx. ca. 1500 m³

Approximate determination of heat requirement

A precise calculation of the heat requirement in accordance with DIN 4701 is generally recommended as well for unit heaters. But it happens repeatedly that a precise calculation is not possible because of either lack of time or incomplete infos about the building's construction. With the help of the underneath diagramme it is possible to determine the approximate heat requirement.

Building construction: Exterior walls: 25 cm masonry equivalent
Roofing: lightweight concrete or equivalent
Heating in return air operation



Correction factors

Additional charge:
 For corrugated roofing, not insulated +40%
 For corrugated roofing, thin insulation (20 mm) +20%
 For wooden roof with tar-paper or sheet metal +20%
 For metal exterior wall, not insulated +20%
 For extremely narrow buildings +20%
 For large windows in exterior wall +10%

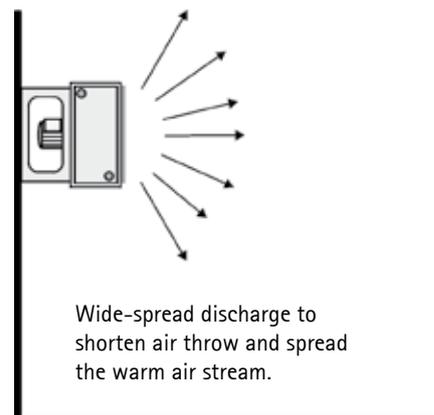
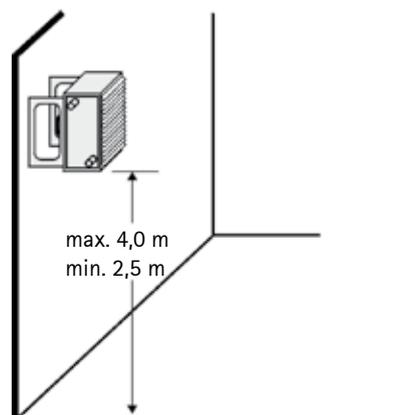
Deduction:

For exterior wall 75% adjoining another building -15%
 For exterior wall 50% adjoining another building -10%
 For exterior wall without windows, solid brick -30%
 For heated upper storey -30%
 For heated annex on each side -10%

General notes on planning

Required air volume (m³/h) at least 2.5 and preferably 3-4 times enclosed space.
 Make sure a current of warm air is not directed against persons.
 Distance between unit heaters 10-15 m.
 Distance from floor for wall-mounted units at least 2.5 m and max. 4 m.
 Take air throws into account.
 Use wide-spread discharge if unit heater is not far from opposite wall.
 Use discharge cone or induction louvre if air throw of ceiling-mounted unit with standard discharge louvres is insufficient.
 Use four-way discharge in low-ceilinged room if distance from bottom of discharge louvres to floor is less than approx. 2.5 m.

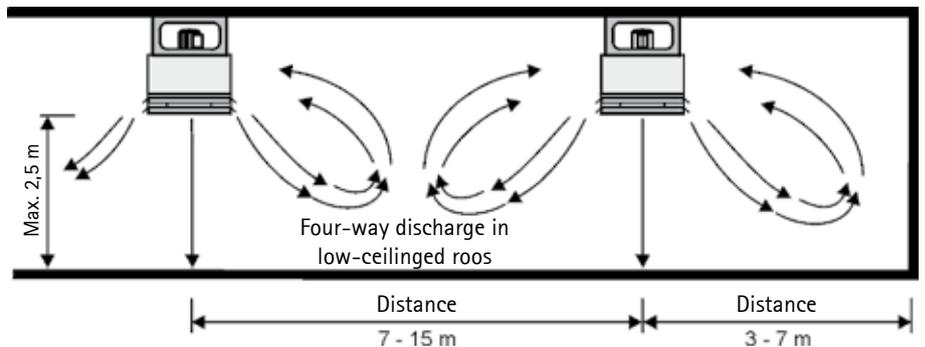
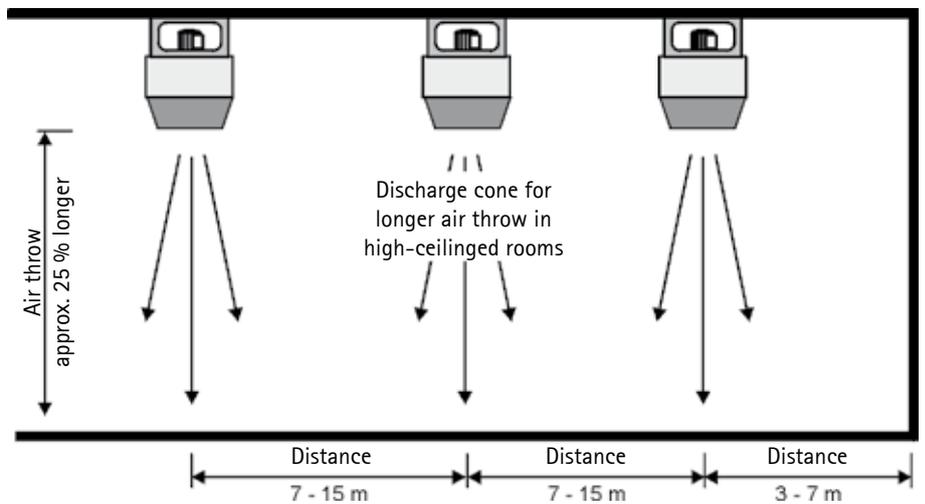
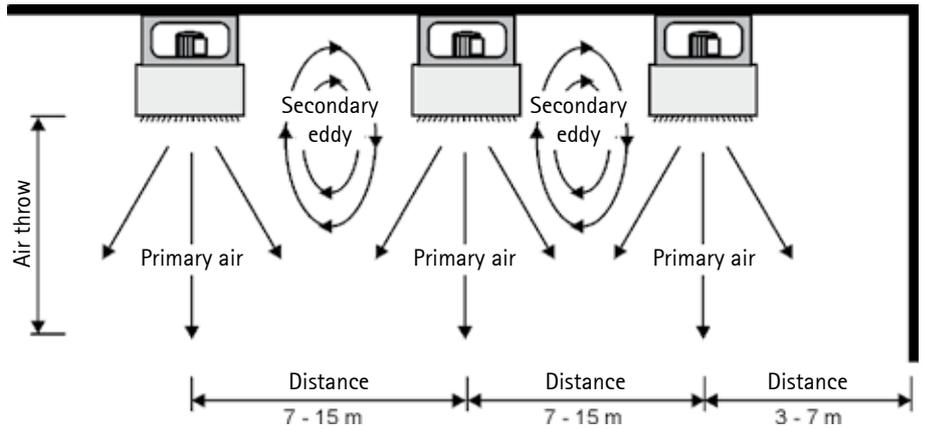
Wall-mounted unit



Ceiling-mounted units

Clearance for LH ceiling-mounted units in metres

LH	LH to LH	LH 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

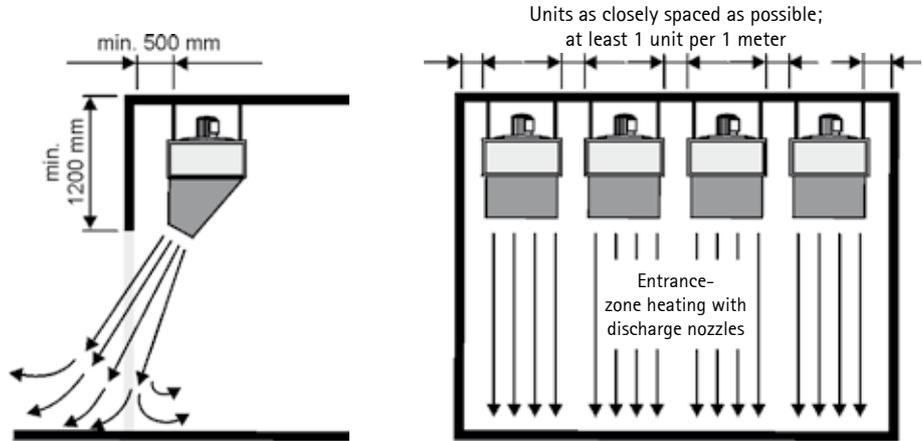
given the distances as stated above, air heat increase $\Delta t_A (= t_{outlet} - t_{room})$ of approx. 25 K and high speed.

LH	25	40	63	100
Distance: discharge to floor up to 2,5 m	Four way discharge	Four way discharge	Four way discharge	Four way discharge
3-4 m	Wide-spread discharge	Wide-spread discharge	Wide-spread discharge	Wide-spread discharge
4-5 m	Cone	Cone	Standard louvere	Wide-spr. dischar.
5-6 m	Cone	Cone	Cone	Standard louvere
for 6 m	Cone	Cone	Cone	Cone

This accessories table does not apply if the temperature differential Δt_A is superior to 30K, because at this delta penetration is reduced.

Door-curtain system with discharge nozzle

Position the unit heaters for a door-curtain system close together.
 If requirements are high use a double-row array.
 Discharge temperature 10-15 K above room temperature.



Additional LH unit heater without heat exchanger installed to improve air circulation



Air volumes for unit heaters without heat exchangers

	LH	25	40	63	100
Air volume	m ³ /h	1400/2400	2400/3950	3950/6000	6100/10700
Speed	rpm	1000/1350	1000/1350	700/900	700/900

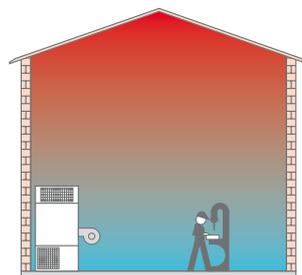
Consulting Advice on Ceiling Fans

LD 15

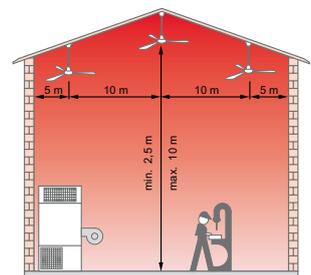
The air throw of the LD 15 is about 10 metres without stratification. In rooms with a ceiling height exceeding 7 metres, the LD 15 should be mounted vertically offset to achieve sufficient air throws. An LD 15 should be mounted at the highest point of the room to avoid warm air buffers under the ceiling.

By switching off the ceiling fans while the hangar doors are open (e.g. by using door switchers), warm air can better be kept in the room. The ceiling fans should be placed in such way that there are no workplaces directly in the outlet cone.

The distance between the LD 15 units should not exceed 10 metres and the distance to the side walls should not be longer than 5 metres. One LD 15 can be calculated for an area of around 100m².



Natural stratification



Comparative stratification

Ceiling fan LD 15



Depending on ceiling height and local conditions, approximately 2 units per 100m² can be calculated for a return air operation and ceiling installation with statically and dynamically balanced wings. Colour: white RAL 9016

By using ceiling fans in winter, the heat build-up in the ceiling area is pushed into the gathering zone again. Thanks to a better distribution of temperature, comfort increases and energy is saved at the same time. In summer, a comfortable room climate can be created by air circulation.

Technical Data

Type	LD 15	
Number of blades	3	
Diametre	cm	Ø 142
Unit height	cm	69
Air circulation	m ³ /h	15.000
Speed	min ⁻¹	300
Operating voltage	230 V / 50 Hz	
Power consumption	W	75
Current consumption max.	A	0,35
Sound pressure level*	dB(A)	34
Total weight	kg	10,5

* sound pressure level at a distance of 5m, measured in a room with average absorption, room size about 1500m³.

Warm air return control system



With the help of a warm air return control system, each temperature sensor records the surrounding temperature in the floor area and the ceiling area. The ceiling fan is switched on or off depending on the setting of the temperature differential.

Perm. surrounding temperature	-10 up to 50°C	
Operating voltage	230 V / 50 Hz	
Current max.	8 A (4A motor power)	
Switching contact	1 changeover, relay contact	
Switch-on difference	Δt On	1 bis 10 K (recommended 6 K)
Switch-off difference	Δt Off	1 bis 10 K (recommended 4 K)

Note:

When using warm air return control systems, the sensors should not be installed next to doors, windows or uninsulated warm water pipes. The positioning of the sensors and the setting of the temperature differential Dt-On and Dt-Off at the temperature difference circuit are significant for the wellbeing. If possible, it should be optimized by prior testing.

Stepless speed control



Speed control for a stepless operation of maximum **five** (3A) or rather **three** (1,5A) ceiling fans.

Perm. surrounding temperature	-10 up to 35°C	
Operating voltage	230 V / 50 Hz	
Current max.	1,5 A / 3A	

Suspension rod (on request)

To achieve sufficient air throws in high-ceilinged rooms (higher than 7 metres), suspension rods of different lengths are available on request for a vertically offset installation of ceiling fans.

Length - suspension rod	cm	20	90	150	200
Unit height - ceiling fan	cm	44	114	174	224

General guidelines:

Always position the Wolf unit heaters in such a way that a current of warm air is not directed against persons and machines.

It is advisable to use a number of small heaters instead of one large unit in order to achieve uniform temperature distribution. If possible, position the units in such a way that the currents of air assist air circulation, instead of counter-acting each other. Free intake of return air must be ensured at all times.

The air throw of Wolf unit heaters should be selected to suit the dimensions of the room. The figures in the performance tables are guideline values which can be varied to suit case-to-case requirements by installing accessories such as discharge cones, wide-spread discharges and four-way discharges.

The sound pressure levels of Wolf unit heaters are very low. The dB(A) values stated in the performance tables are averages measured in a room with average absorption at a distance of 5 metres from the unit heater.

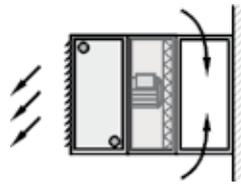
Ambient overheating can cause damage when the motors of ceiling-mounted unit heaters are at a standstill. Consequently, the flow temperature must be limited as follows:

- 115 °C in conjunction with a filter box
- 140 °C without externally mounted components

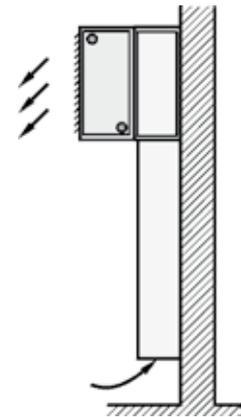
All control and shutoff valves must close automatically when the unit heater shuts down.

Wall-mounted LH

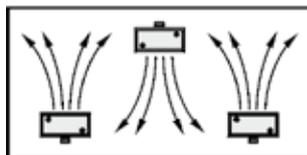
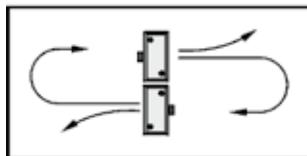
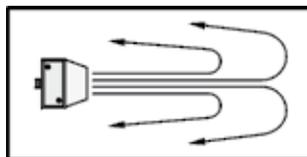
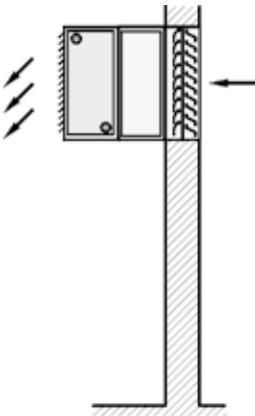
with filter box and brackets



with intake duct for return air

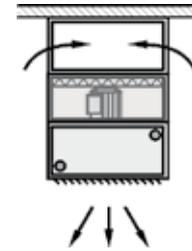


with weatherproof louvre on mixing box

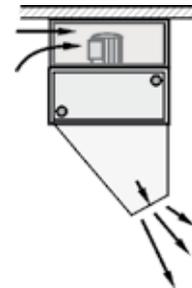


Ceiling-mounted LH

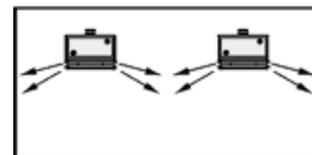
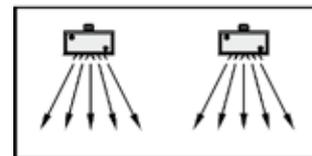
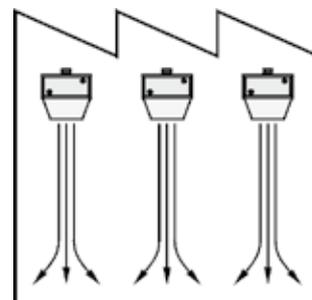
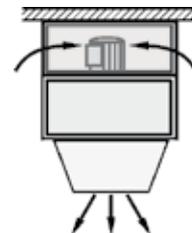
with filter box and brackets



with discharge nozzle



with discharge cone and brackets



Weights in kg

Basic units			LH25	LH40	LH63	LH100
LPHW	Unit heater, type 1	Cu/Al	24	32	48	76
and	Unit heater, type 2	Cu/Al	26	35	51	82
MPHW	Unit heater, type 3	Cu/Al	27	36	52	84
	Unit heater, type 4	Cu/Al	28	38	54	88
	Unit heater, type 2	St'verz	53	80	127	186
	Unit heater, type 3	St'verz	65	85	136	212
	Dampf Unit heater, type D	Cu/Al		45	65	97
	Unit heater 6 kW		35	on request	on request	on request
	Unit heater 9 kW		23			
	Unit heater 12 kW		23			
Accessories Intake						
	Mixing box		26	32	42	68
	Return air box		16	28	31	50
	Filter box		13	16	20	37
Accessories Discharge						
	Discharge nozzle		5	7	10	14
	Discharge cone		4	12	19	27
	Wide-spread discharge		4	7	11	16
	Four-way discharge		5	7	13	16
	Discharge cross		0,4	0,5	1,1	1,3
	Induction louvre		3	4	7	9
	Adaption cone				18	26
	Miscellan.Mounting brackets (1 set)		3	3	9	9

Unit heater–basic unit LH	LH	LH-ATEX																																																		
<p>for mixed air and return air modes for wall–mounting or ceiling mounting</p> <p>Casing welded, galvanised sectional steel frame. Casing panels galvanised; paint finish available on request in various RAL–colours</p> <p>Discharge louvre with manually adjustable guide vanes.</p> <p>Axial fan for quiet operation, with statically and dynamically balanced impeller and protection grille.</p> <p>Three–phase motor 3 x 400 V, 50 Hz; degree of protection IP 54, insulation class F; two–speed, high/low speed with Δ/Y; low–noise, maintenance–free, direct–drive, with amply dimensioned ball bearings and special grease filling for wide temperature spread, insulation class F, terminal box, motor protection by thermo contacts in the windings in conjunction with a single–stage/multi–stage switch or automatic controller.</p> <p>Alternatives: Single–phase a.c. motor 230 V, 50 Hz, insulation class F; high speed only, motor protection by thermo contacts in the windings in conjunction with a single–stage/multi–stage switch or automatic controller or thermo contacts connected in series with motor windings by others.</p> <p>Heat exchanger withdrawable, Co/Al for water or steam as heating medium. Inch–system threads or flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Alternatives: Heat exchanger withdrawable, galvanised steel for water or steam as heating medium. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Electric heater with overheat safety cut–off for 230 V/ 400V.</p> <p>Without heat exchanger</p>	<ul style="list-style-type: none"> • 																																																			
<p>Unit heater–basic unit LH–ATEX, Explosion proof design for Ex–zone 2 (II 3G c IIB T4 X)</p>																																																				
<p>for mixed air, fresh air and return air modes for wall–mounting or ceiling mounting</p> <p>Casing welded, galvanised sectional steel frame. Casing panels galvanised.</p> <p>Discharge louvre with manually adjustable guide vanes.</p> <p>Axial fan–motor assembly for low noise operation, impeller statically and dynamically balanced, protection grille included. Impeller wings with plastic edges. Three–phase motor 3 x 400 V, 50 Hz, degree of protection IP 44, thermal category CL F, with 2 speeds high/low Δ/Y, low noise and maintenance–free, full winding protection via integrated thermistors, max. surrounding temperature –20 °C up to +40 °C</p> <p>Heat exchanger withdrawable, Co/Al for LPHW or MPHW. Inch–system threads or flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Alternatives: Heat exchanger withdrawable, galvanised steel for LPHW or MPHW. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Without heat exchanger</p> <p>Technical data:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Air volume</td> <td style="width: 33%;">m³/h</td> <td style="width: 33%;">Dimensions:</td> <td style="width: 33%;">Length:</td> <td style="width: 33%;">mm</td> </tr> <tr> <td>Heating output</td> <td>kW</td> <td></td> <td>Width:</td> <td>mm</td> </tr> <tr> <td>Air temperature rise from</td> <td>to</td> <td></td> <td>Height:</td> <td>mm</td> </tr> <tr> <td>Heating medium</td> <td>/</td> <td></td> <td>Weight:</td> <td>kg</td> </tr> <tr> <td>Hydraulic resistance</td> <td>kPa</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Motor speed</td> <td>min–1</td> <td></td> <td>Make: Wolf</td> <td></td> </tr> <tr> <td>Motor output</td> <td>kW</td> <td></td> <td>Type: LH / LH ATEX</td> <td></td> </tr> <tr> <td>Operating voltage</td> <td>V</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Retard current</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Degree of protection</td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Air volume	m ³ /h	Dimensions:	Length:	mm	Heating output	kW		Width:	mm	Air temperature rise from	to		Height:	mm	Heating medium	/		Weight:	kg	Hydraulic resistance	kPa				Motor speed	min–1		Make: Wolf		Motor output	kW		Type: LH / LH ATEX		Operating voltage	V				Retard current					Degree of protection						<ul style="list-style-type: none"> • • • • • • • •
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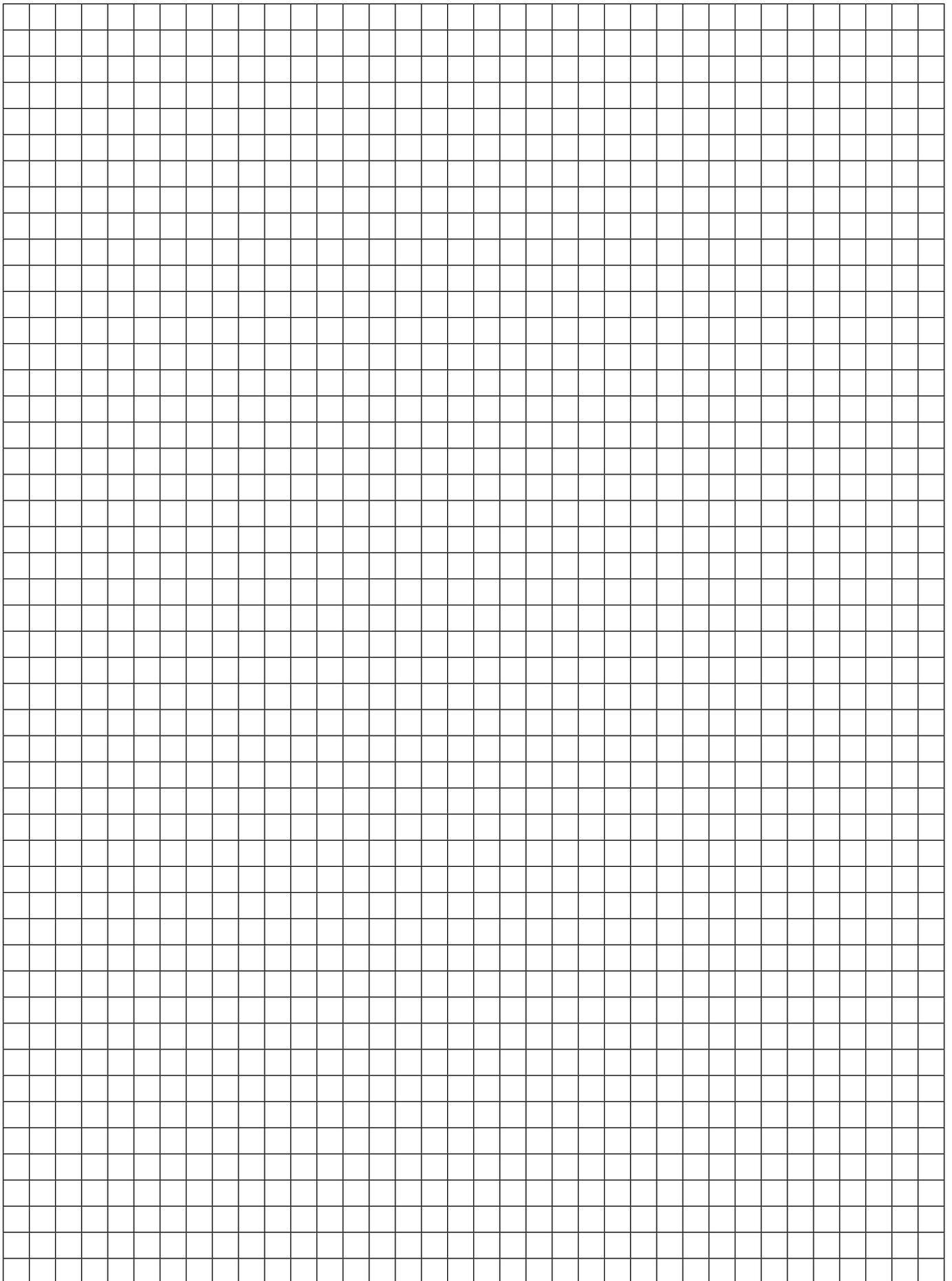
Intake accessories	LH	LH-ATEX
Mixing box galvanized, with two integrated dampers for fresh air at rear and return air at side; adjustment manual or with damper actuator.	•	on request
Return air box galvanized, with two side mesh guards for air intake from side or top and bottom	•	•
Filter box galvanized, with integrated replaceable filter element, filter class G 4	•	•
Discharge accessories		
Discharge nozzle for longer air throw, suitable for air curtains, galvanized sheet steel.	•	•
Discharge cone for high-ceilinged rooms, for longer air throws, galvanized sheet steel.	•	•
Wide-spread discharge with individually adjustable vertical and horizontal air vanes for spreading air current up to max.120° angle, galvanized sheet steel.	•	•
Four-way discharge with adjustable side vanes for low-ceilinged rooms, galvanized sheet steel.	•	•
Discharge cross for better ventilation and low air temperature close to ceiling, galvanized sheet steel.	•	•
Induction louvre for wall-mounted unit heaters with manual adjustment for optimising air throw and temperature distribution, galvanized sheet steel.	•	•
Induction louvre for wall-mounted unit heaters with 230 V actuator for optimising air throw and temperature distribution, galvanized sheet steel.	•	-
Induction louvre for wall-mounted unit heaters with manual adjustment for optimising air throw and temperature distribution, galvanized sheet steel.	•	•
Induction louvre for ceiling-mounted unit heaters with 230 V actuator for optimising air throw and temperature distribution, galvanized sheet steel	•	-
Induction louvre for wall-mounted unit heaters with 24 V actuator	•	-
Induction louvre for ceiling-mounted unit heaters with 24 V actuator	•	-

Options	LH	LH-ATEX
Shut-off set for flow and return, straight way type	●	●
Shut-off set for flow and return, rectangular type	●	●
Hydraulic balancing valve	●	●
Fastening brackets for wall and ceiling installation of LH-Unit, galvanized sheet steel	●	●
Fixing set for installing the LH-unit on a vertical concrete beam, sheet steel, galvanised for LH / LH-ATEX 25 - 40	●	●
Fixing set for installing the LH-unit on a vertical steel beam, sheet steel, galvanised for LH / LH-ATEX 25 - 40	●	●
Fastening set for the installation of an LH-Unit on a horizontal or inclined steel bar, without inclination equalization, galvanized sheet steel, für LH / LH-ATEX 25 - 40	●	●
Fastening set for the installation of an LH-Unit on an inclined steel bar, with inclination equalization, galvanized sheet steel, for LH / LH-ATEX 25 - 40	●	●
Angle brackets for wall or ceiling installation, of the air intake accessory, galvanized sheet steel.	●	●
Electrical accessories		
Single-stage switch, D1-2 Motor thermistor-type protection switch with restart disablement for single-speed fan operation. Capacity, max. 8A, Operating voltage 400V, Control voltage 230V, Degree of protection IP 54; dimensions W x H x D: 150 x 200 x 175mm.	●	● *
Two-stage switch, DS-2 Motor thermistor-type protection switch with restart disablement for two-speed fan operation. Capacity, max. 8A, Operating voltage 400V, Control voltage 230V, Degree of protection IP 54; dimensions W x H x D: 230 x 300 x 190mm.	●	● *
Three-stage switch E3-7T Motor thermistor-type protection switch with restart disablement for three-speed fan operation with single-phase AC-motor. Capacity, max 7A, Operating voltage 230V, Degree of protection IP 40, dimensions W x H x D: 150 x 200 x 175mm.	●	-
Three-stage switch, D3-4 Motor thermistor-type protection switch with restart disablement for three-speed fan operation. Capacity, max. 4A, Operating voltage 400V, Control voltage 230V, Degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185mm.	●	● *
Five-stage switch, D5-1 Motor thermistor-type protection switch with restart disablement for fivespeed fan operation. Capacity, max. 1A, Operating voltage 400V, Control voltage 230V, Degree of protection IP 40; dimensions W x H x D: 150 x 200 x 175mm.	●	● *
Five-stage switch D5-3 Motor-Vollschuttschalter mit Wiedereinschaltsperr für fünftourigen Ventilatorbetrieb Strom max. 2A, Betriebsspannung 400V, Steuerspannung 230V, Schutzart IP 20; Abmessungen B x H x T: 230 x 310 x 185mm.	●	● *
Five-stage switch D5-7 Motor-Vollschuttschalter mit Wiedereinschaltsperr für fünftourigen Ventilatorbetrieb Strom max. 4A, Betriebsspannung 400V, Steuerspannung 230V, Schutzart IP 20; Abmessungen B x H x T: 230 x 310 x 185mm.	●	● *
* Installation outside the Ex-zone only		

Electrical accessories	LH	LH-ATEX
<p>Five-stage switch D5-12 Full motor protection switch with restart disablement for five-speed fan operation. Max. current 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>Five-stage switch D5-19 Full motor protection switch with restart disablement for five-speed fan operation. Max. current 8 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 E5-7T Full motor protection for five speed fan operation with single-phase a.c. motor Max current 7 A, operating voltage 230 V, Degree of protection IP 40; dimensions W x H x D: 150 x 200 x 175 mm.</p>	●	-*
<p>A1Ü automatic controller (without explosion-proof switch) Full motor protection for single-speed fan operation with explosion-proof LH motors; max. switching capacity 3 kW, operating voltage 3 x 400 V, control voltage 230 V, degree of protection IP 55; dimensions W x H x D: 170 x 220 x 110 mm.</p>	●	●
<p>Explosion-proof switch for A1Ü automatic controller. operating voltage 690V, max. current 16(4)A, degree of protection IP 66</p>	●	●
<p>Explosion proof ATEX-terminal box. fitted and wired</p>	-	●
<p>Thermistor triggering unit suitable for installation in wiring board on site</p>	-	●
<p>Control interface box for connection to Wolf boiler control system.</p>	●	●
<p>Intermediate terminal box for parallel operation of max. 3 LH unit heaters</p>	●	-
<p>All-pole Isolator AR8, installed and fully wired.</p>	●	●
<p>Earthing strap for potential equalization</p>	●	-
<p>Antifreeze thermostat mounted on LH unit heater</p>	●	-
<p>Room thermostat for surface mounting with thermal feedback signal Switching capacity 10(4) A at 230 V, temperature range 5-30°C, degree of protection IP 30; dimensions W x H x D: 75 x 75 x 25 mm.</p>	●	-
<p>Room thermostat with summer/winter switch for heating/ventilation; for surface mounting, with thermal feedback signal. Switching capacity 6 (3) A at 230 V, temperature range 5-30 °C, degree of protection IP 30; dimensions W x H x D: 75 x 75 x 25 mm.</p>	●	-
<p>Room thermostat timer with weekly programming for socket installation, daytime and night-time temperatures can be set separately. Temperature decrease adjustable 2-10 K, Switching capacity 10(4) A at 230 V, temperature range 5-40 °C, degree of protection IP 20; dimensions W x H x D: 132 x 82 x 32 mm.</p>	●	-
<p>* Installation outside the Ex-zone only</p>		

Electrical accessories	LH	LH-ATEX
<p>Remote sensor for room thermostat timer for socket installation, degree of protection IP 54. dimensions W x H x D: 52 x 50 x 35 mm.</p> <p>Room thermostat, industrial version Switching capacity 16 (4) A at 230 V, temperature range 0-40 °C, degree of protection IP 54; dimensions W x H x D: 110 x 150 x 72 mm.</p> <p>Actuator for stepless control of damper or mixing valve 230 V / 50 Hz.</p> <p>Automatic relay A1 for open/closed actuator.</p> <p>Automatic relay A1S with position controller for stepless actuator.</p> <p>Position controller for installation on wiring board front for progressive actuator in connection with automatic relay A1.</p> <p>Position controller for front-panel installation in control cabinet for controlling the stepless actuator in conjunction with automatic relay A1.</p> <p>Key button for actuator 230 V / 50 Hz for induction louvre</p>	<ul style="list-style-type: none"> • • • • • • • 	<ul style="list-style-type: none"> - - - - - - -
<p>Electrical accessories WRS</p>		
<p>BML ventilation programming module room temperature-dependent control for regulating up to 7 zones with eBUS interface</p> <p>Wall mounting base for use with the BML ventilation programming module as remote control</p> <p>LM1 ventilation control unit (incl. room temperature sensor) for room temperature-dependent control of air heaters with 2-stage motor</p> <p>LM2 ventilation control unit room temperature controlled via mixer or speed in conjunction with EC motors with additional LM1 module, 2-stage motor control</p> <p>Outside or room temperature sensor</p> <p>Radio clock for synchronising the clock inside the control unit with the DC77 transmitter</p> <p>Radio clock with outside temperature sensor for synchronising the clock inside the control unit with the DC77 transmitter and capturing the outside temperature</p> <p>Supply air sensor and sensor retainer</p> <p>Differential pressure switch 20 - 300Pa; degree of protection IP 54 for filter monitoring</p> <p>5-stage electronic switch D5-2F, D5-4F 400V/2A/4A To control air heaters Speed via an external 0-10 V signal</p> <p>5-stage electronic switch E5-6F 230V/6A To control air heaters Speed via an external 0-10 V signal</p> <p>ISM 5 - LON-interface module to connect ventilation modules LM1 and LM2 to a building management system applying LON-standard network variables</p>	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> -

Notice





The comprehensive equipment range from system supplier Wolf offers the ideal solution for commercial and industrial buildings, for new build and for modernisation projects alike. The range of Wolf control units fulfils every need where heating convenience is concerned. The products are easy to operate, energy-efficient and reliable. Photovoltaic and solar heating systems can be quickly integrated into existing systems. All Wolf products can be easily and rapidly commissioned and maintained.

Wolf GmbH, PO Box 1380, D-84048 Mainburg, Tel.: +49 87 51 / 74-0, Fax: +49 87 51 / 74-1600, Internet: www.wolf-heiztechnik.de



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