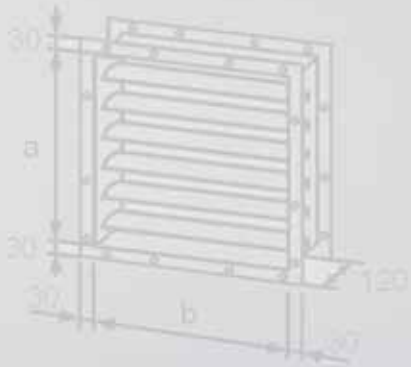
WOLF

Energy saving and environmental protection included

Technical documentation

Unit heater

LH



Contents

Basic unit

LH

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.

Dimensions:

LH	25	40	63	100
A	500	630	800	1000
B	300	300	300	340
C	455	470	500	540

Fan/Motors

Axial fan with aluminium impeller, steel hub and protection grille.
Low-noise, maintenance-free motors, direct drive to impeller, suitable for any installed position.
Max. surrounding temperature: -20°C up to +40°C.

Heat exchanger: **Copper-Aluminium / galvanized steel**	**LH 25** Part.No.	**LH 40** Part.No.	**LH 63** Part.No.	**LH 100** Part.No.
Type 1	85 13 000 / 85 13 011	85 23 000 / 85 23 011	85 33 000 / 85 33 011	85 43 000 / 85 43 011
Type 2	85 13 002 / 85 13 012	85 23 002 / 85 23 012	85 33 002 / 85 33 012	85 43 002 / 85 43 012
Type 3	85 13 003 / 85 13 013	85 23 003 / 85 23 013	85 33 003 / 85 33 013	85 43 003 / 85 43 013
Type 4	85 13 004 / -	85 23 004 / -	85 33 004 / -	85 43 004 / -
Type D	85 13 005 / 85 13 015	85 23 005 / 85 23 015	85 33 005 / 85 33 015	85 43 005 / 85 43 015

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 bis + 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 25-29 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. motor 230 V, 50 Hz, high speed only, low speed with 5-stage switch

LH		25	40	63	100
Motor output	(kW)	0,14	0,14	0,18	-
Current consumption Y/Δ	(A)	2,0	2,0	2,2	-
Part.No.		22 32 040	22 32 040	22 32 063	-

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.

Progressive three-phase motor 3x400V, 50 Hz, für erhöhte Umgebungstemperatur +80°C (FU fester Motor)

LH		25	40	63	100
Motor output	(kW)	0,075	0,14	0,2	0,45
Current consumption Y/Δ	(A)	0,4	0,6	0,85	1,7
Part.No.		22 40 027	22 40 042	22 40 062	22 40 102

Degree of protection P 54, insulaton class F, ball bearing with special grease for -25 upto +140°C, suitable for any installation position, maintenance-free.
Winding protection by integrated thermo-contacts, which interrupts the control current circuit in the switch or control box and shuts down the motor consequently in case of overheating.
The drive restarts automatically when the temperature in the winding drops below the restart threshold.
Winding protection effective only in conjunction with a switch or controller.

Basic unit

LH

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

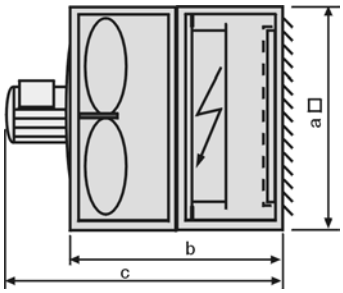
For steam: flange and mating flange for saturated steam, max. 9 bar
- Steam connection at top
- Condensate return at bottom
- Connection on left hand side only in direction of air flow
- See performance table for pipe connection sizes.

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
Flange/mating flange connections

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	V̇min (m³/h)	800	1600	2500	4000
vertikal air flow	V̇min (m³/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.

Basic unit

LH-ATEX

Casing

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

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.

Heat exchanger	LH 25-ATEX Part.No.	LH 40-ATEX Part.No.	LH 63-ATEX Part.No.	LH 100-ATEX Part.No.
Copper-Aluminium				
Type 1	65 23 013	65 23 020	65 23 027	65 23 034
Type 2	65 23 014	65 23 021	65 23 028	65 23 035
Type 3	65 23 015	65 23 022	65 23 029	65 23 036
Type 4	65 23 016	65 23 023	65 23 030	65 23 037
Galvanized steel				
Type 1	65 23 017	65 23 024	65 23 031	65 23 038
Type 2	65 23 018	65 23 025	65 23 032	65 23 039
Type 3	65 23 019	65 23 026	65 23 033	65 23 040

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 cotegory CL F.
Star circuit: low speed, delta circuit: high speed
Max. surrounding temperature: -20°C up to +40°C, full motor protection by integrated thermistors.

LH-ATEX		25	40	63	100
Motor output	(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	(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, Part.No. 65 23 042

Thermistor triggering unit
Suitable for installation in wiring board on site, Part.No. 22 10 060
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. V_0 [m³/h]		2100		1700		2000		1600		1800		1450		1700		1350			2100		1700	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}		Q_0	t_{off}	Q_0	t_{off}
t_{on} [°C]		kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	t_{on} [°C]	kW	°C	kW	°C
	- 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	- 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	23,7	26	20,9	29
LPHW	± 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	**1,1**	± 0	22,4	30	19,7	33
45/35	+ 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	bar	+ 5	21,1	34	18,6	36
	+ 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	19,9	38	17,5	40
	+ 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
	- 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		- 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
LPHW	± 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	**1,5**	± 0	24,3	33	21,4	35
50/40	+ 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	**bar**	+ 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
	- 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		- 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
LPHW	± 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	**2,0**	± 0	26,2	35	23,0	38
60/40	+ 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	**bar**	+ 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
	- 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		- 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
LPHW	± 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	**3,0**	± 0	28,9	39	25,5	42
70/50	+ 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	**bar**	+ 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
	- 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		- 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
LPHW	± 0	13,0	17	11,6	19	18,5	26	16,1	28	21,8	34	19,0	37	27,0	45	22,8	47	**5,0**	± 0	32,7	44	28,8	48
80/60	+ 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	**bar**	+ 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
	- 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		- 15	41,5	37	36,5	42
	- 10	17,7	13	15,7	15	24,9	24	21,7	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	28,2	53		- 5	38,8	46	34,1	50
LPHW	± 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	**9,0**	± 0	37,4	50	32,9	54
90/70	+ 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	**bar**	+ 5	36,1	54	31,8	58
	+ 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	62		+ 20	32,2	66	28,3	70
Motor output [kW] (3x400V)		min. 0,075		min. 0,027		min. 0,075		min. 0,027		min. 0,075		min. 0,027		min. 0,075		min. 0,027			min. 0,075		min. 0,027	
Curr. Consumpt. [A]		max. 0,4		max. 0,25		max. 0,4		max. 0,25		max. 0,4		max. 0,25		max. 0,4		max. 0,25			max. 0,4		max. 0,25	
Air throw, wall mounted [m²]*		15,5		12,5		14,5		12		13		10,5		12,5		10			15,5		12,5	
Air throw,ceiling mount. [m]*		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 ¾"				R 1"				R 1"				R 1"					DN 40 - DN 20			

* t_{off} - t_{room} = 10 K

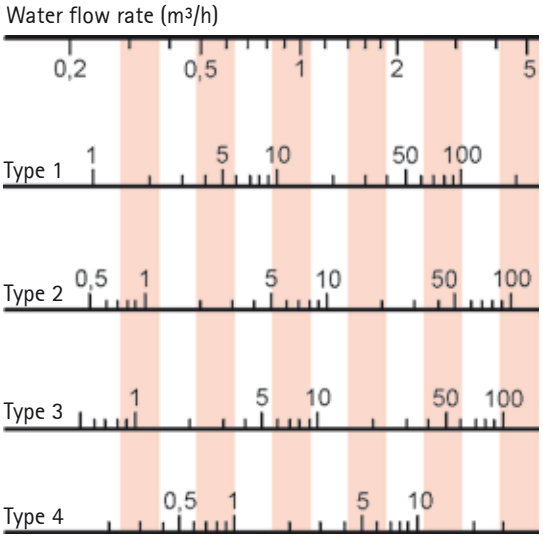
** Sound pressure level measured 5 m from intake, room with average absorption; enclosed space approx. 1500 m³.

for MPHW

Type		1				2				3			
Speed [min^{-1}]		1350		1000		1350		1000		1350		1000	
Air vol. V_0 [m³/h]		2100		1700		2000		1600		1800		1450	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}
t_{on} [°C]		kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
	- 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
MPHW	± 0	19,9	27	17,6	29	27,7	39	24,1	42	32,3	50	27,9	54
110/90	+ 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
	- 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
MPHW	± 0	22,2	30	19,6	32	30,7	43	26,7	47	35,6	56	30,7	59
120/100	+ 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
	- 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
MPHW	± 0	22,4	30	19,9	33	31,3	44	27,3	48	36,5	57	31,6	61
130/100	+ 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	26,4	54	23,0	58	30,9	66	26,7	70
	+ 20	17,7	45	15,7	48	24,9	57	21,7	61	29,1	69	25,2	72
	- 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
MPHW	± 0	22,7	30	20,2	33	31,9	45	27,9	49	37,4	58	32,4	63
140/100	+ 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
	- 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
MPHW	± 0	24,7	33	21,9	36	34,3	48	29,8	52	39,9	62	34,4	67
140/110	+ 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] (3x400V)	min. 0,075	min. 0,027	min. 0,075	min. 0,027	min. 0,075	min. 0,027
Curr. Consumpt. [A]	max. 0,4	max. 0,25	max. 0,4	max. 0,25	max. 0,4	max. 0,25
Air throw, wall mounted [m²]*	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 ¾"		R 1"		R 1"	

Hydraulic resistance [kPa]



Pages 40–42:
Air throws
(as influenced by heat increase and discharge accessories)

Page 43:
Heating output
Air volume
and air outlet temperatures
(as influenced by accessories and speeds)

Page 44:
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}]		1350		1000		1350		1000		1350		1000		1350		1000			1350		1000	
Air vol. V_0 [m³/h]		3500		2500		3400		2400		3100		2200		2800		2000			3500		2500	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}		Q_0	t_{off}	Q_0	t_{off}
	t_{on}[°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	t_{on} [°C]	kW	°C	kW	°C
	- 15	20,1	0	16,5	3	24,0	4	19,5	7	31,9	12	25,3	16	36,3	19	28,4	23	- 15	43,8	18	35,7	23
	- 10	17,9	4	14,8	6	21,4	7	17,4	10	28,6	15	22,7	18	32,6	21	25,5	24	- 10	41,6	22	34,0	27
	- 5	15,8	7	13,1	9	18,9	10	15,4	13	25,3	17	20,2	20	28,9	23	22,7	26	- 5	39,4	26	32,2	31
LPHW	± 0	13,7	11	11,3	13	16,4	14	13,4	16	22,1	20	17,6	22	25,3	25	19,9	28	**1,1**	± 0	37,3	30	30,5	34
45/35	+ 5	11,7	15	9,7	16	14,0	17	11,4	19	18,9	22	15,1	25	21,7	27	17,1	29	**bar**	+ 5	35,2	34	28,8	38
	+ 10	9,6	18	8,0	19	11,6	20	9,5	21	15,8	25	12,7	27	18,2	29	14,4	31		+ 10	33,2	38	27,1	42
	+ 15	7,7	21	6,4	23	9,2	23	7,5	24	12,7	27	10,2	29	14,7	31	11,6	32		+ 15	31,1	41	25,4	45
	+ 20	5,7	25	4,8	26	6,9	26	5,7	27	9,7	29	7,8	31	11,2	32	8,9	33		+ 20	29,1	45	23,8	49
	- 15	22,2	2	18,3	4	26,6	6	21,5	9	35,1	15	27,9	19	39,9	23	31,1	26		- 15	47,0	21	38,4	26
	- 10	20,1	5	16,5	8	24,0	9	19,4	12	31,7	18	25,2	21	36,1	25	28,2	28		- 10	44,8	25	36,6	30
	- 5	17,9	9	14,8	11	21,4	12	17,4	15	28,5	20	22,7	23	32,5	27	25,4	30		- 5	42,6	29	34,8	33
LPHW	± 0	15,8	13	13,1	15	18,9	16	15,4	18	25,2	23	20,1	26	28,8	29	22,6	32	**1,5**	± 0	40,6	33	33,1	37
50/40	+ 5	13,8	16	11,4	18	16,5	19	13,4	21	22,1	25	17,6	28	25,2	31	19,8	33	**bar**	+ 5	38,4	36	31,4	41
	+ 10	11,7	20	9,7	21	14,0	22	11,4	24	18,9	28	15,1	30	21,7	33	17,0	35		+ 10	36,3	40	29,7	45
	+ 15	9,7	23	8,0	25	11,6	25	9,5	27	15,8	30	12,7	32	18,2	34	14,3	36		+ 15	34,3	44	28,0	48
	+ 20	7,7	27	6,4	28	9,3	28	7,6	30	12,8	32	10,2	34	14,7	36	11,6	38		+ 20	32,2	48	26,3	52
	- 15	22,3	2	18,4	5	26,7	6	21,8	9	36,1	16	28,9	20	41,5	24	32,6	28		- 15	50,1	23	40,9	28
	- 10	20,1	6	16,7	8	24,2	9	19,7	12	32,8	19	26,2	22	37,7	26	29,7	30		- 10	47,9	27	39,1	32
	- 5	18,0	9	14,9	11	21,6	13	17,7	15	29,5	21	23,7	25	34,0	28	26,8	32		- 5	45,8	31	37,4	36
LPHW	± 0	15,9	13	13,2	15	19,2	16	15,7	18	26,3	24	21,1	27	30,4	30	24,0	34	**2,0**	± 0	43,6	35	35,6	40
60/40	+ 5	13,9	16	11,6	18	16,7	19	13,7	21	23,1	26	18,6	29	26,7	32	21,2	35	**bar**	+ 5	41,5	39	33,9	44
	+ 10	11,9	20	9,9	22	14,3	22	11,8	24	20,0	29	16,1	31	23,2	34	18,4	37		+ 10	39,4	43	32,2	47
	+ 15	9,9	23	8,3	25	11,9	25	9,8	27	16,8	31	13,6	33	19,6	36	15,6	38		+ 15	37,3	47	30,5	51
	+ 20	7,9	27	6,6	28	9,6	28	7,9	30	13,7	33	11,1	35	16,1	37	12,9	39		+ 20	35,3	50	28,8	55
	- 15	26,7	5	22,0	8	31,9	10	25,9	14	42,6	21	33,9	26	48,6	31	38,0	35		- 15	54,8	27	44,7	23
	- 10	24,5	9	20,3	12	29,4	13	23,9	17	39,3	24	31,3	28	44,9	33	35,1	37		- 10	52,6	31	42,9	36
	- 5	22,4	13	18,5	15	26,8	17	21,8	20	36,0	27	28,7	31	41,2	35	32,3	39		- 5	50,4	35	41,1	40
LPHW	± 0	20,3	16	16,8	19	24,3	20	19,8	23	32,7	30	26,1	33	37,5	38	29,4	41	**3,0**	± 0	48,2	39	39,4	44
70/50	+ 5	18,2	20	15,1	22	21,8	23	17,8	26	29,5	32	23,6	36	33,9	40	26,6	43	**bar**	+ 5	46,1	43	37,6	48
	+ 10	16,1	23	13,4	26	19,3	27	15,8	29	26,3	35	21,1	38	30,3	41	23,9	45		+ 10	44,0	47	35,9	52
	+ 15	14,1	27	11,7	29	16,9	30	13,8	32	23,2	37	18,6	40	26,7	43	21,1	46		+ 15	41,9	50	34,2	55
	+ 20	12,1	30	10,1	32	14,5	33	11,9	35	20,1	39	16,2	42	23,2	45	18,4	48		+ 20	39,8	54	32,5	59
	- 15	31,1	9	25,6	12	37,1	14	30,1	18	49,0	27	38,9	32	55,6	38	43,3	42		- 15	61,2	31	49,9	38
	- 10	28,9	12	23,8	16	34,5	17	27,9	21	45,6	30	36,2	35	51,8	40	40,4	45		- 10	58,9	36	48,1	42
	- 5	26,7	16	22,0	19	31,9	21	25,9	25	42,3	33	33,6	37	48,1	42	37,5	47		- 5	56,7	40	46,2	46
LPHW	± 0	24,5	20	20,2	23	29,3	24	23,8	28	39,0	35	31,0	40	44,4	44	34,7	49	**5,0**	± 0	54,5	44	44,5	50
80/60	+ 5	22,4	23	18,5	26	26,8	28	21,8	31	35,8	38	28,5	42	40,8	47	31,9	51	**bar**	+ 5	52,3	48	42,7	54
	+ 10	20,3	27	16,8	30	24,3	31	19,8	34	32,6	41	26,0	44	37,2	49	29,1	52		+ 10	50,2	52	40,9	58
	+ 15	18,3	30	15,1	33	21,9	34	17,8	37	29,4	43	23,5	47	33,6	51	26,4	54		+ 15	48,1	56	39,2	61
	+ 20	16,2	34	13,4	36	19,4	37	15,9	40	26,3	46	21,0	49	30,1	52	23,7	56		+ 20	46,0	60	37,5	65
	- 15	35,4	12	29,1	16	42,1	18	34,1	23	55,2	32	43,7	38	62,4	44	48,5	49		- 15	69,3	38	56,4	45
	- 10	33,1	16	27,3	19	39,5	21	32,0	26	51,8	35	41,1	40	58,6	47	45,5	52		- 10	67,0	42	54,6	49
	- 5	30,9	19	25,5	23	36,9	25	29,9	29	48,5	38	38,4	43	54,8	49	42,7	54		- 5	64,7	46	52,7	53
LPHW	± 0	28,8	23	23,7	27	34,3	28	27,8	32	45,2	41	35,8	46	51,1	51	39,8	56	**9,0**	± 0	62,5	50	50,9	57
90/70	+ 5	26,6	27	21,9	30	31,8	32	25,7	36	41,9	44	33,3	48	47,5	53	37,0	58	**bar**	+ 5	60,3	54	49,1	61
	+ 10	24,5	30	20,2	33	29,2	35	23,7	39	38,7	46	30,7	51	43,9	56	34,2	60		+ 10	58,1	58	47,3	65
	+ 15	22,4	34	18,5	37	26,8	38	21,7	42	35,5	49	28,2	53	40,3	58	31,5	62		+ 15	56,0	62	45,6	69
	+ 20	20,3	37	16,8	40	24,3	42	19,7	45	32,4	51	25,8	55	36,8	60	28,8	63		+ 20	53,8	66	43,9	73
Motor output [kW] (3x400V)		0,14		0,065		0,14		0,065		0,14		0,065		0,14		0,065			0,14		0,065	
Curr. Consumpt. [A]		0,6		0,4		0,6		0,4		0,6		0,4		0,6		0,4			0,6		0,4	
Air throw, wall mounted [m²]*		23		16		22,5		15		20		13,5		18		12			23		16	
Air throw,ceiling mount. [m]*		5,6		4,1		5,5		3,9		5,0		3,6		4,5		3,3			5,6		4,1	
Sound pressure level dB[A]**		60		54		60		54		60		54		60		54			60		54	
Water capacity [litres]		1,0				1,5				2,0				2,5								
Heat exchanger connections		R ¾"				R 1"				R 1"				R 1"					DN 40 - DN 20			

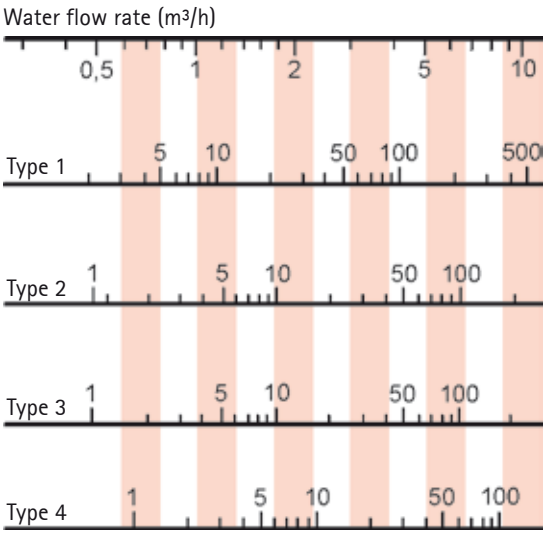
* $t_{off} - t_{room}$ = 10 K

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

for MPHW

Type		1				2				3			
Speed [min^{-1}]		1350		1000		1350		1000		1350		1000	
Air vol. V_0 [m³/h]		3500		2500		3400		2400		3100		2200	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}
	t_{on}[°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
MPHW 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	34,9	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
MPHW 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
MPHW 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
MPHW 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
MPHW 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] (3x400V)		0,14		0,065		0,14		0,065		0,14		0,065	
Curr. Consumpt. [A]		0,6		0,4		0,6		0,4		0,6		0,4	
Air throw, wall mounted [m²]*		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 ¾"				R 1"				R 1"			

Hydraulic resistance [kPa]



Pages 40–42:
Air throws
(as influenced by heat increase and discharge accessories)

Page 43:
Heating output
Air volume
and air outlet temperatures
(as influenced by accessories and speeds)

Page 44:
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. V_0 [m³/h]		5300		4000		5200		3900		4600		3500		4400		3400			5300		4000	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}		Q_0	t_{off}	Q_0	t_{off}
	t_{on} [°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	t_{on} [°C]	kW	°C	kW	°C
	- 15	33,6	2	28,6	4	43,6	7	36,5	10	50,7	14	42,1	17	61,3	22	50,5	24	- 15	72,4	21	61,0	25
	- 10	30,2	5	25,6	7	39,1	10	32,7	13	45,5	17	37,8	19	55,1	24	45,4	26	- 10	68,8	25	58,0	29
	- 5	26,7	9	22,7	11	34,6	13	29,0	15	40,4	19	33,6	21	49,0	26	40,4	28	- 5	65,3	29	55,0	33
LPHW	± 0	23,3	12	19,8	14	30,2	16	25,3	18	35,3	22	29,4	24	42,9	27	35,5	29	**1,1** ± 0	61,8	33	52,1	37
45/35	+ 5	20,0	16	17,0	17	25,8	19	21,7	21	30,3	24	25,3	26	37,0	29	30,6	31	**bar** + 5	58,4	37	49,2	40
	+ 10	16,7	19	14,2	20	21,5	22	18,1	23	25,4	26	21,2	28	31,1	31	25,8	32	+ 10	55,0	40	46,4	44
	+ 15	13,4	22	11,5	23	17,3	25	14,6	26	20,5	28	17,2	30	25,3	32	21,0	33	+ 15	51,7	44	43,5	47
	+ 20	10,2	26	8,7	27	13,1	28	11,1	29	15,7	30	13,2	31	19,5	33	16,3	34	+ 20	48,3	47	40,7	51
	- 15	37,1	4	31,5	6	48,1	10	40,2	12	55,7	17	46,2	20	67,1	25	55,2	28	- 15	77,7	24	65,5	28
	- 10	33,6	7	28,5	9	43,5	13	36,4	15	50,5	20	41,9	22	60,9	27	50,1	30	- 10	74,2	28	62,5	32
	- 5	30,1	11	25,6	13	39,0	16	32,6	18	45,3	22	37,6	25	54,8	29	45,1	32	- 5	70,6	32	59,5	36
LPHW	± 0	26,7	14	22,7	16	34,6	19	28,9	21	40,2	25	33,5	27	48,7	31	40,1	33	**1,5** ± 0	67,1	36	56,5	40
50/40	+ 5	23,3	18	19,8	19	30,2	22	25,3	24	35,2	27	29,3	29	42,8	33	35,3	35	**bar** + 5	63,7	39	53,6	43
	+ 10	20,0	21	17,0	22	25,9	24	21,7	26	30,3	29	25,2	31	36,9	34	30,5	36	+ 10	60,2	43	50,8	47
	+ 15	16,7	24	14,2	26	21,6	27	18,1	29	25,4	31	21,2	33	31,0	36	25,7	37	+ 15	56,9	47	47,9	50
	+ 20	13,5	28	11,5	29	17,4	30	14,6	31	20,6	33	17,2	35	25,3	37	21,0	39	+ 20	53,5	50	45,1	54
	- 15	38,0	4	32,4	6	49,3	10	41,3	13	57,8	18	48,2	22	70,5	27	58,3	30	- 15	82,9	27	69,9	31
	- 10	34,6	8	29,4	10	44,7	13	37,5	16	52,6	21	43,9	24	64,2	29	53,2	32	- 10	79,3	31	66,8	35
	- 5	31,1	11	26,5	13	40,2	16	33,8	19	47,4	23	39,6	26	58,1	31	48,1	34	- 5	75,8	34	63,8	39
LPHW	± 0	27,7	15	23,6	17	35,8	19	30,1	22	42,3	26	35,4	28	52,0	33	43,2	36	**2,0** ± 0	72,2	38	60,8	43
60/40	+ 5	24,3	18	20,8	20	31,4	22	26,5	24	37,3	28	31,2	31	46,0	35	38,2	37	**bar** + 5	68,8	42	57,9	46
	+ 10	21,0	22	18,0	23	27,1	25	22,8	27	32,3	30	27,1	33	40,0	36	33,3	39	+ 10	65,3	46	55,0	50
	+ 15	17,7	25	15,2	26	22,8	28	19,3	30	27,4	33	23,0	34	34,1	38	28,5	40	+ 15	61,9	50	52,2	54
	+ 20	14,4	28	12,4	29	18,5	31	15,7	32	22,5	35	19,0	36	28,1	39	23,6	41	+ 20	58,6	53	49,4	57
	- 15	45,0	8	38,3	10	58,3	15	48,8	18	67,9	24	56,5	28	82,2	35	67,7	38	- 15	90,7	30	76,3	36
	- 10	41,5	11	35,3	14	53,7	18	45,0	21	62,6	27	52,1	30	75,9	37	62,6	40	- 10	87,0	34	73,3	40
	- 5	38,0	15	32,3	17	49,2	21	41,2	24	57,5	29	47,8	33	69,7	39	57,6	42	- 5	83,4	38	70,2	43
LPHW	± 0	34,6	18	29,4	21	44,7	24	37,5	27	52,3	32	43,6	35	63,7	41	52,6	43	**3,0** ± 0	79,9	42	67,3	47
70/50	+ 5	31,2	22	26,5	24	40,3	27	33,8	30	47,3	34	39,4	37	57,6	42	47,7	45	**bar** + 5	76,4	46	64,3	51
	+ 10	27,8	25	23,7	27	35,9	30	30,2	32	42,3	37	35,3	39	51,7	44	42,8	47	+ 10	72,9	50	61,4	55
	+ 15	24,5	29	20,9	30	31,6	33	26,6	35	37,3	39	31,2	41	45,8	46	38,0	48	+ 15	69,5	54	58,5	58
	+ 20	21,2	32	18,1	34	27,3	36	23,0	38	32,4	41	27,2	43	39,9	47	33,2	49	+ 20	66,1	58	55,7	62
	- 15	51,9	11	44,1	14	67,3	19	56,2	23	77,8	30	64,5	34	93,5	41	76,9	45	- 15	101,3	36	85,2	42
	- 10	48,4	15	41,0	18	62,6	23	52,3	26	72,5	33	60,2	36	87,2	44	71,7	47	- 10	97,6	40	82,1	46
	- 5	44,8	18	38,1	21	58,0	26	48,5	29	67,3	35	55,9	39	81,1	46	66,7	49	- 5	93,9	44	79,0	49
LPHW	± 0	41,4	22	35,1	25	53,5	29	44,7	32	62,1	38	51,6	41	74,9	48	61,7	51	**5,0** ± 0	90,3	48	76,0	53
80/60	+ 5	37,9	25	32,2	28	49,0	32	41,0	35	57,0	40	47,4	44	68,9	50	56,8	53	**bar** + 5	86,8	52	73,0	57
	+ 10	34,5	29	29,3	31	44,6	35	37,4	38	52,0	43	43,3	46	63,0	52	52,0	54	+ 10	83,3	56	70,0	61
	+ 15	31,2	32	26,5	35	40,2	38	33,7	41	47,0	45	39,2	48	57,1	53	47,1	56	+ 15	79,8	60	67,1	65
	+ 20	27,8	36	23,7	38	35,9	41	30,1	43	42,1	48	35,1	50	51,3	55	42,4	58	+ 20	76,4	63	64,3	68
	- 15	58,8	14	49,8	18	76,0	24	63,4	28	87,5	35	72,4	40	104,5	48	85,7	52	- 15	114,6	42	96,3	49
	- 10	55,1	18	46,7	22	71,3	27	59,5	31	82,2	38	68,0	43	98,2	50	80,6	54	- 10	110,9	47	93,2	53
	- 5	51,6	22	43,7	25	66,7	30	55,6	34	76,9	41	63,7	45	92,0	53	75,5	56	- 5	107,2	51	90,1	57
LPHW	± 0	48,1	25	40,8	29	62,1	34	51,9	37	71,7	44	59,4	48	86,1	55	70,6	58	**9,0** ± 0	103,5	55	87,0	61
90/70	+ 5	44,6	29	37,8	32	57,6	37	48,1	40	66,6	46	55,2	50	79,9	57	65,6	60	**bar** + 5	99,9	59	84,0	65
	+ 10	41,2	33	34,9	35	53,2	40	44,4	43	61,5	49	51,0	52	73,9	59	60,8	62	+ 10	96,4	63	81,0	69
	+ 15	37,8	36	32,1	39	48,8	43	40,8	46	56,5	51	46,9	55	68,0	61	56,0	64	+ 15	92,9	67	78,0	73
	+ 20	34,4	40	29,2	42	44,4	46	37,2	49	51,6	54	42,9	57	62,2	63	51,2	65	+ 20	89,4	71	75,1	77
Motor output [kW] (3x400V)		0,2		0,06		0,2		0,06		0,2		0,06		0,2		0,06			0,2		0,06	
Curr. Consumpt. [A]		0,85		0,45		0,85		0,45		0,85		0,45		0,85		0,45			0,85		0,45	
Air throw, wall mounted [m²]*		26		18		24		17		21		15		20		14			26		18	
Air throw,ceiling mount. [m]*		7,1		5,3		6,9		5,1		6,1		4,5		5,8		4,4			7,1		5,3	
Sound pressure level dB[A]**		59		53		59		53		59		53		59		53			59		53	
Water capacity [litres]		2,5				3,5				3,5				5,5								
Heat exchanger connections		R 1"				R 1¼"				R 1¼"				R 1¼"					DN 50 -DN 25			

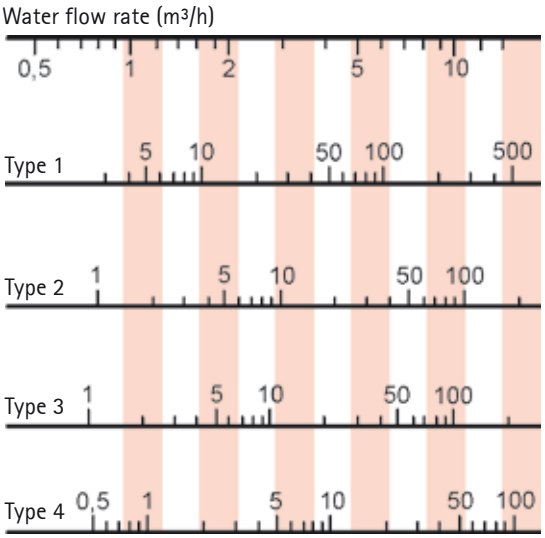
* t_{off} - t_{room} = 10 K

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

for MPHW

Type		1				2				3			
Speed [min^{-1}]		900		700		900		700		900		700	
Air vol. V_0 [m³/h]		5300		4000		5200		3900		4600		3500	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}
	t_{on}[°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
MPHW 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
	+ 20	47,3	47	40,1	50	61,0	55	50,8	59	70,0	66	57,8	70
MPHW 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
	+ 20	53,7	51	45,5	54	69,2	60	57,5	64	78,9	72	65,1	76
MPHW 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
	+ 20	55,5	52	47,0	55	71,5	61	59,6	66	82,1	74	67,9	78
MPHW 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
	+ 20	57,2	52	48,6	57	73,8	63	61,6	68	85,2	76	70,6	81
MPHW 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
	+ 20	61,9	55	52,4	59	79,6	66	66,2	71	91,0	80	75,1	85
Motor output [kW] (3x400V)		0,2		0,06		0,2		0,06		0,2		0,06	
Curr. Consumpt. [A]		0,85		0,45		0,85		0,45		0,85		0,45	
Air throw, wall mounted [m²]*		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 1 ¼"				R 1¼"			

Hydraulic resistance [kPa]



Page 40-42:
Air throws
(as influenced by heat increase and discharge accessories)

Page 43:
Heating output
Air volume
and air outlet temperatures
(as influenced by accessories and speeds)

Page 44:
Speeds table
(in combination with single-stage/ mulitstage switches)
Sound pressure
(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. V_0 [m³/h]		9000		6700		8800		6500		8300		6000		7700		5600			9000		6700	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}		Q_0	t_{off}	Q_0	t_{off}
t_{on} [°C]		kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	t_{on} [°C]	kW	°C	kW	°C
	- 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
LPHW	± 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	**1,1**	± 0	104,1	33	87,0	36
45/35	+ 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	**bar**	+ 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
	- 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
LPHW	± 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	**1,5**	± 0	113,0	35	94,4	40
50/40	+ 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	**bar**	+ 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
	- 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
LPHW	± 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	**2,0**	± 0	121,7	38	101,6	43
60/40	+ 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	**bar**	+ 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
	- 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
LPHW	± 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	**3,0**	± 0	134,6	42	112,4	47
70/50	+ 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	**bar**	+ 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
	- 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
LPHW	± 0	70,2	22	59,1	25	89,2	28	74,0	32	115,1	39	92,0	43	131,7	48	103,5	52	**5,0**	± 0	152,2	47	127,0	53
80/60	+ 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	**bar**	+ 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
	- 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
LPHW	± 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	**9,0**	± 0	174,5	54	145,5	61
90/70	+ 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	**bar**	+ 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] (3x400V)		0,45		0,15		0,45		0,15		0,45		0,15		0,45		0,15			0,45		0,15	
Curr. Consumpt. [A]		1,7		1,1		1,7		1,1		1,7		1,1		1,7		1,1			1,7		1,1	
Air throw, wall mounted [m²]*		30		23		30		22		28		20		26		20			30		23	
Air throw,ceiling mount. [m]*		7,7		5,6		7,6		5,5		7,1		5,0		6,6		4,6			7,7		5,6	
Sound pressure level dB[A]**		64		58		64		58		64		58		64		58			64		58	
Water capacity [litres]		2,5				3,5				3,5				5,5								
Heat exchanger connections		R 1"				R 1½"				R 1½"				R 1½"					DN 65 -DN 32			

* $t_{off} - t_{room} = 10$ K

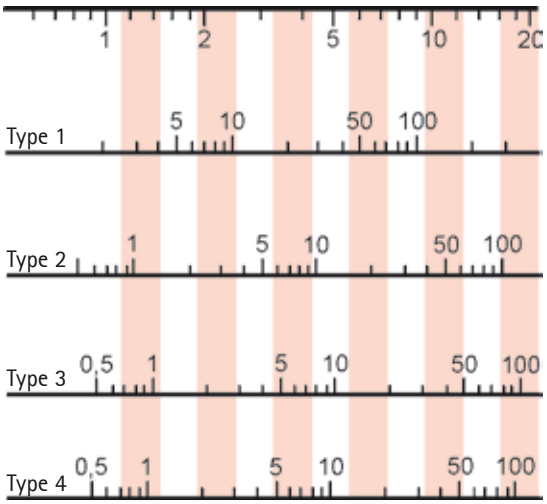
** Sound pressure level measured 5 m from intake, room with average absorption; enclosed space approx. 1500 m³.

for MPHW

Type		1				2				3			
Speed [min^{-1}]		900		700		900		700		900		700	
Air vol. V_0 [m³/h]		5300		4000		5200		3900		4600		3500	
		Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}	Q_0	t_{off}
	t_{on}[°C]	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C	kW	°C
MPHW 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	54
	+ 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
MPHW 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
MPHW 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
MPHW 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
MPHW 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] (3x400V)		0,45		0,15		0,45		0,15		0,45		0,15	
Curr. Consumpt. [A]		1,7		1,1		1,7		1,1		1,7		1,1	
Air throw, wall mounted [m²]*		30		23		30		22		28		20	
Air throw,ceiling mount. [m]*		7,7		5,6		7,6		5,5		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 1½"				R 1½"			

Hydraulic resistance [kPa]

Water flow rate (m³/h)



Page 40-42:
Air throws
(as influenced by heat increase and discharge accessories)

Page 43:
Heating output
Air volume
and air outlet temperatures
(as influenced by accessories and speeds)

Page 44:
Speeds table
(in combination with single-stage/ multistage switches)
Sound pressure
(as a function of speed)

Shut-off sets / Fastening accessories LH

Shut-off sets for heat exchangers

straight-way type
Part.-No. 20 08 030

rectangular type
Part.-No. 20 08 040

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

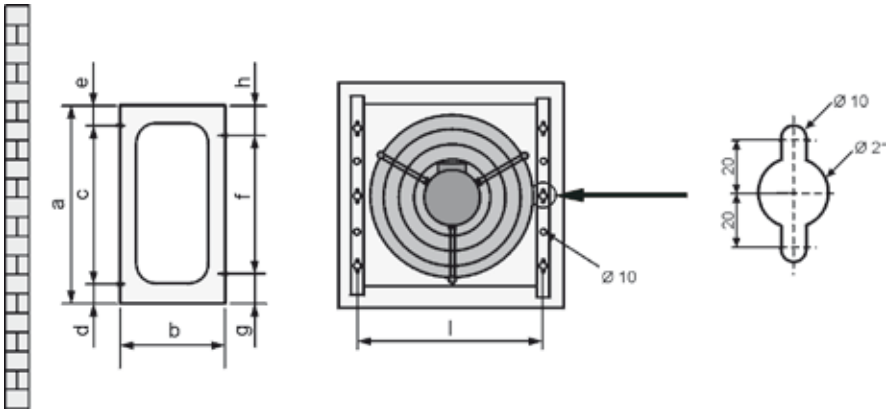
Fastening brackets

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

Complete set consisting of:

2 Brackets

Hexagon screws for assembly to LH-Unit.

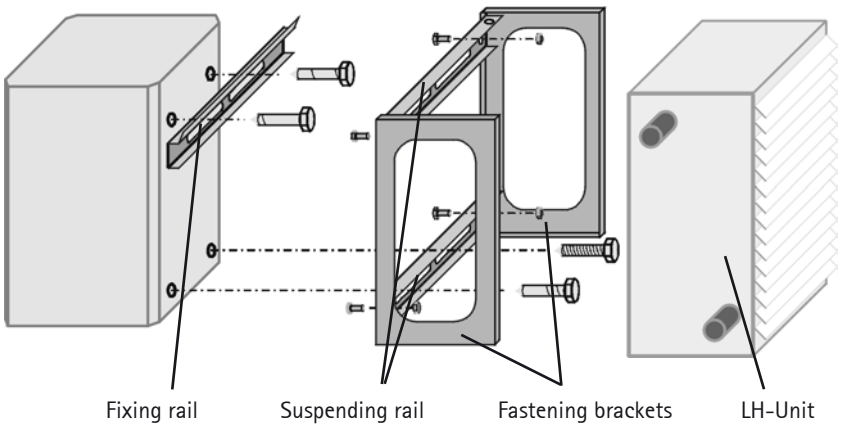


LH	a	b	c	d	e	f	g	h	i	Part.No.
25	480	250	380	70	30	170	155	155	434	65 00 638
40	480	250	2x170	90	50	2x170	70	70	564	65 00 638
63	784	350	170+340+170	72	32	3x170	137	137	734	65 00 639
100	784	350	170+340+170	72	32	3x170	137	137	894	65 00 639

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.

LH	Part.No.
25	65 00 781
40	65 00 782

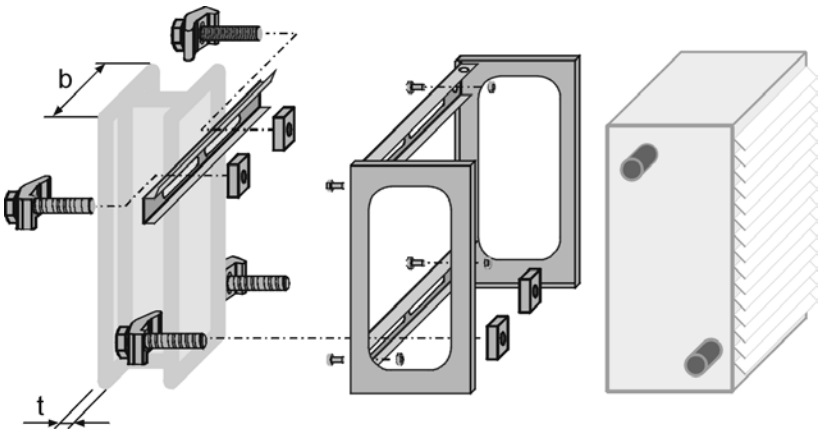


Fastening accessories LH

Fastening set fot 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.

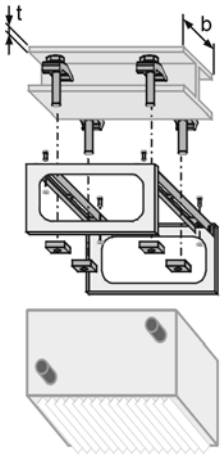
LH	b	t	Part.No.
25	100-300	6-21	65 00 783
40	100-300	6-21	65 00 784



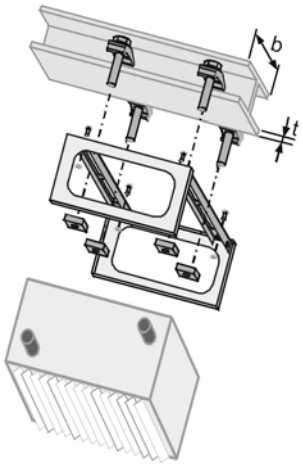
Fastening set for steel bar - horizontal and inclined without inclination equalization.

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:

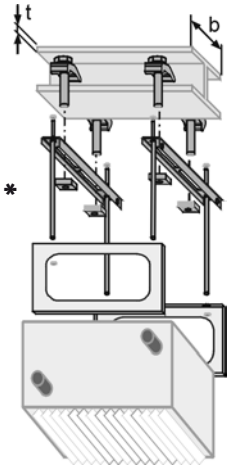
LH	b	t	Part.No.
25	100-300	6-21	65 00 785
40	100-300	6-21	65 00 786



Direct fastening on horizontal steel bar



Direct fastening on inclined steel bar



Indirect fastening on horizontal steel bar

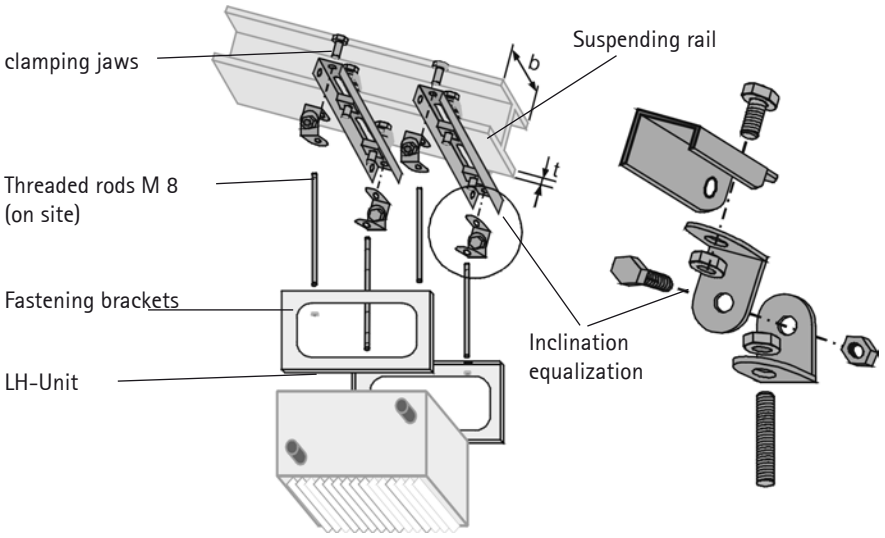
Attention:

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 accessories LH

Fastening set for steel bar – inclined with inclination equalization

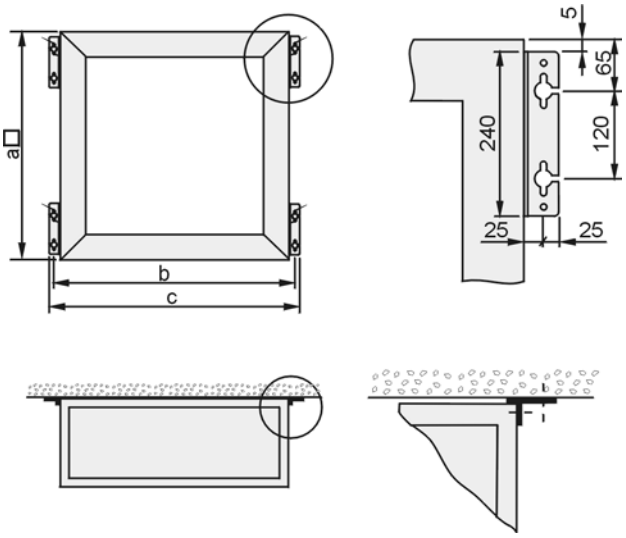
For fastening an LH-Unit to a steel bar at a flange width „b" of 100-300 mm, and a flange thickness „t" of 6-21 mm.
Consisting of: 2 pcs. suspending rails (galvanized sheet steel), 4 pcs. clamping jaws, 4 pcs. inclination equalization.



LH	b	t	Part.No.
25	100-300	6-21	65 00 787
40	100-300	6-21	65 00 788

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)

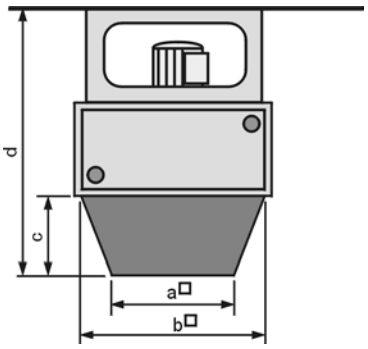


LH	b	b	c	Part.No.
25	500	550	600	65 11 454
40	630	680	730	65 11 454
63	800	850	900	65 11 454
100	1000	1050	1100	65 11 454

Discharge accessories

Discharge cone

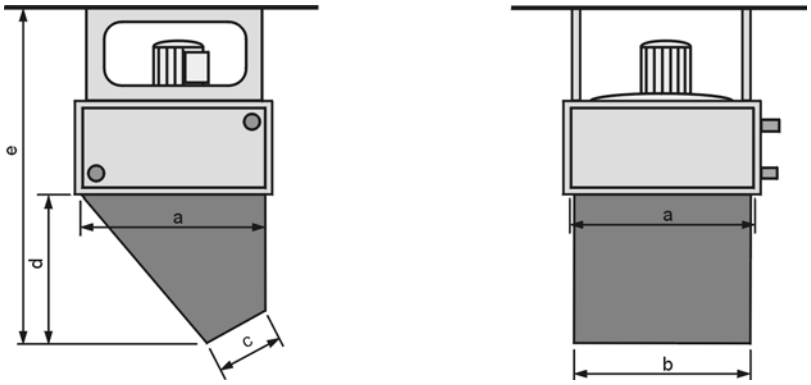
Increases the air throw of high-mounted unit heaters.
(See Page 40 for air throws)



LH	a	b	c	d	Part.No.
25	280	460	200	750	65 13 541
40	370	590	240	790	65 13 542
63	430	760	270	920	65 13 543
100	530	920	320	1010	65 13 544

Discharge nozzle

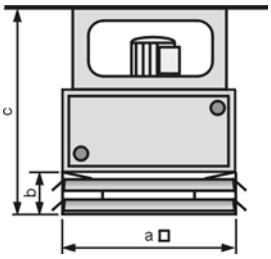
For long air throws, suitable for air curtains at doors.
Oulet temperature for air curtain approx. 10-15 °C higher than room temperature.
(See Page 40 for air throws)



LH	a	b	c	d	e	Part.No.
25	460	420	190	390	940	65 13 051
40	590	550	250	480	1030	65 13 052
63	760	720	260	585	1235	65 13 053
100	920	880	320	685	1375	65 13 054

Four-way-discharge

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



LH	a	b	c	Part.No.
25	500	149	705	65 13 061
40	630	159	705	65 13 062
63	800	159	805	65 13 063
100	1000	159	845	65 13 064

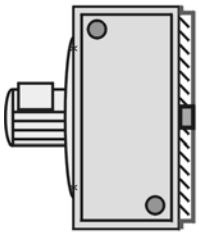
Discharge accessories LH

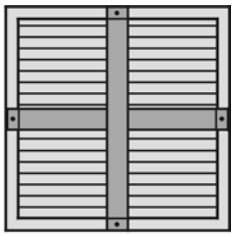
Discharge cross

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 40-42 for air throws).



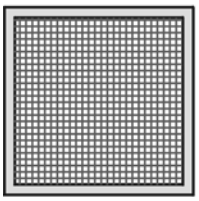


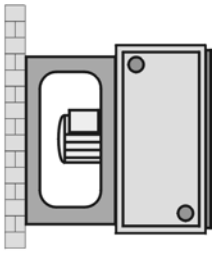
LH	Part.No.
25	65 13 821
40	65 13 822
63	65 13 823
100	65 13 824

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.





LH	Part.No.
25	25 65 020
40	25 65 120
63	25 65 220
100	25 65 320

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 inducts secondary air (ambient air) from behind the vanes directly into the core of the warm air stream.

The inducted 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.

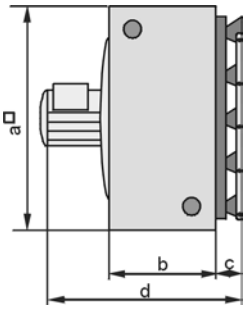
Easily retrofitted for upgrading

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

Scope of supply

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

Dimensions basic unit with induction louvre



LH	a	b	c	d
25	500	300	120	575
40	630	300	120	590
63	800	300	120	620
100	1000	340	120	660

Induction louvre for wall-mounted unit

manual setting

LH	Art.-Nr.
25	65 00 473
40	65 00 485
63	65 00 502
100	65 00 513

with actuator 230 V

LH	Part.No
25	65 00 475
40	65 00 487
63	65 00 504
100	65 00 515

with actuator 24V

LH	Part.No
25	65 00 957
40	65 00 958
63	65 00 959
100	65 00 960

Induction louvre for ceiling-mounted unit

manual setting

LH	Part.No
25	65 00 474
40	65 00 486
63	65 00 503
100	65 00 514

with actuator 230 V

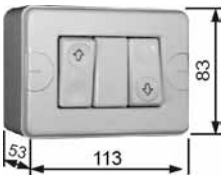
LH	Part.No
25	65 00 476
40	65 00 488
63	65 00 505
100	65 00 516

with actuator 24V

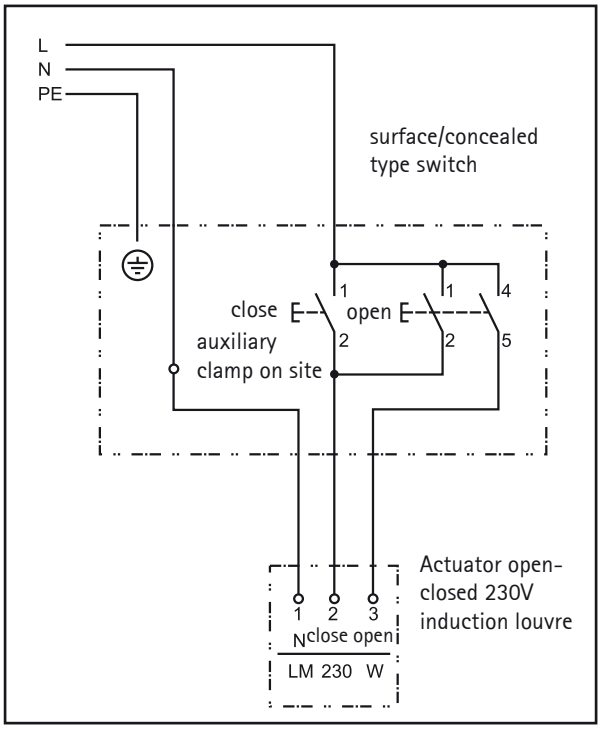
LH	Part.No
25	65 00 961
40	65 00 962
63	65 00 963
100	65 00 964

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 airthrow.



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



Induction louvre consulting advice LH

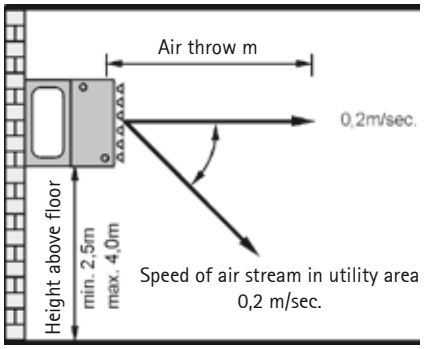
Clearances

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

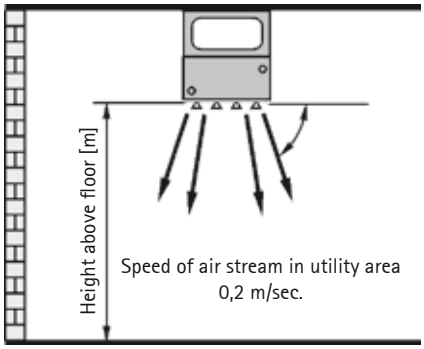
Air throw: wall-mounted unit



LH	25				40				63				100			
Type	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)

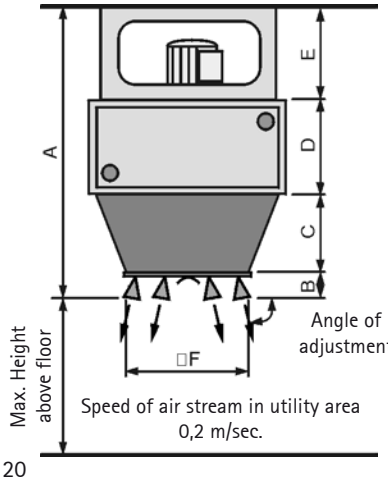
Height above floor, ceiling-mounted unit



Requird height (m) *	LH	25				40				63				100			
	Type	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ΔT=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
ΔT=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
ΔT=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
ΔT=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	63		100	
	Type	1	2	1	2
Air volume	[m³/h]	3300	3200	5600	5500
ΔT=10K; Vanes deflected		12	11	11	10
ΔT=10K; Vanes vertical		13,5	12,5	12,5	11,5

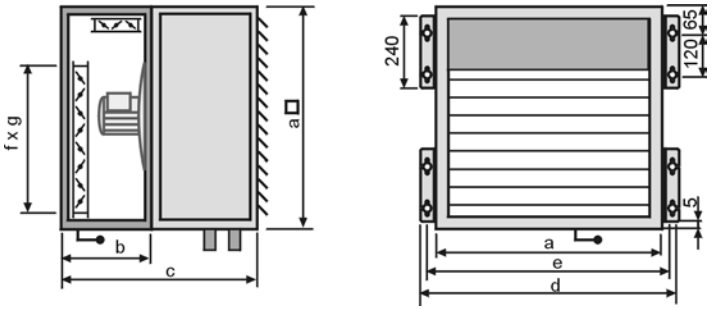
* The optimum vane angle depends on the local situation, i. e. room geometry, furniture, temperature stratification and air distribution. The data are standard values for an approximate selection.
ΔT = Air outlet temperature - Air intake temperature

Extended heights on request

Intake accessories

Mixing box

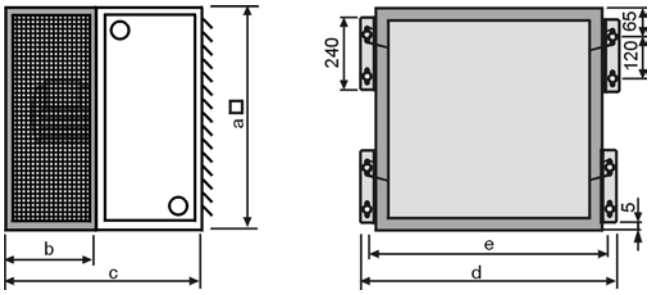
Mixing box galvanized. For adjusting the room's air change rate. Fresh air intake at rear, recirculated air intake at side or from above or below if mixing box is turned through 90°. Stepless adjustment from recirculated air only through mixed air to fresh air only, manual or with 230 V stepless actuator.



LH	a	b	c	d	e	f	g	Part.No.
25	500	500	800	600	550	400	400	65 13 021
40	630	500	800	730	680	360	530	65 13 022
63	800	500	800	900	850	530	700	65 13 023
100	1000	540	880	1100	1050	690	860	65 13 024

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.

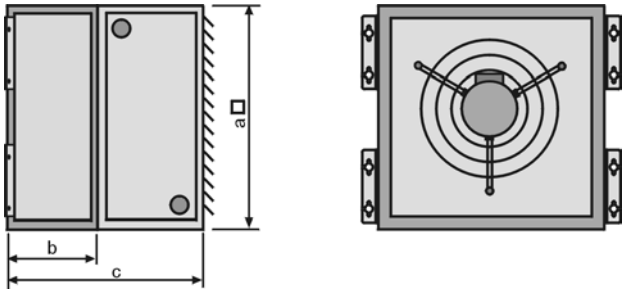


LH	a	b	c	d	e	Part.No.
25	500	300	600	600	550	65 13 251
40	630	500	800	730	680	65 13 252
63	800	500	800	900	850	65 13 253
100	1000	540	880	1100	1050	65 13 254

Fresh air box

Fresh air box galvanized, with intake at rear, for connection to a wall shaft or fresh air duct.

LH	a	b	c	Part.No.
25	500	300	600	65 13 261
40	630	500	800	65 13 262
63	800	500	800	65 13 263
100	1000	540	880	65 13 264

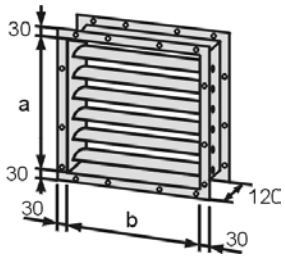


Intake accessories LH

Damper for fresh air box

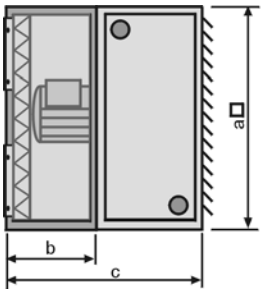
Galvanized damper for installation into fresh air box, sheet steel galvanized.
For damper actuators see page 31.

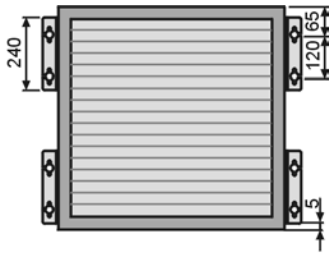
LH	a	b	Part.No.
25	400	400	25 75 987
40	530	530	25 75 962
63	700	700	25 75 963
100	860	860	25 75 964



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.

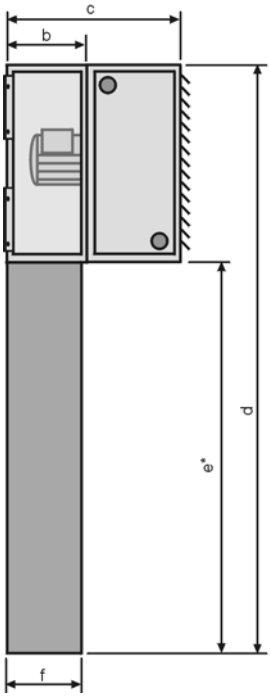


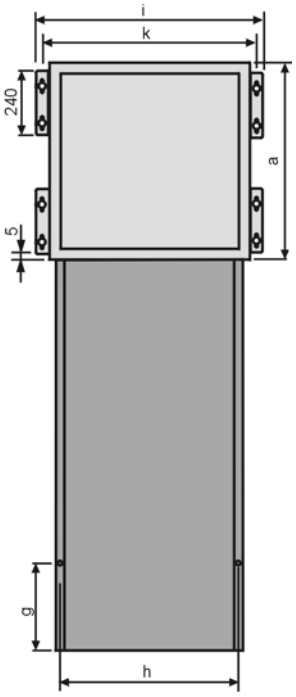


LH	a	b	c	Part.No.
25	500	300	600	65 03 091
40	630	300	600	65 03 092
63	800	300	600	65 03 093
100	1000	340	680	65 03 094

Intake duct

For recirculating air: improves circulation of air at floor level. Galvanised sheet steel.





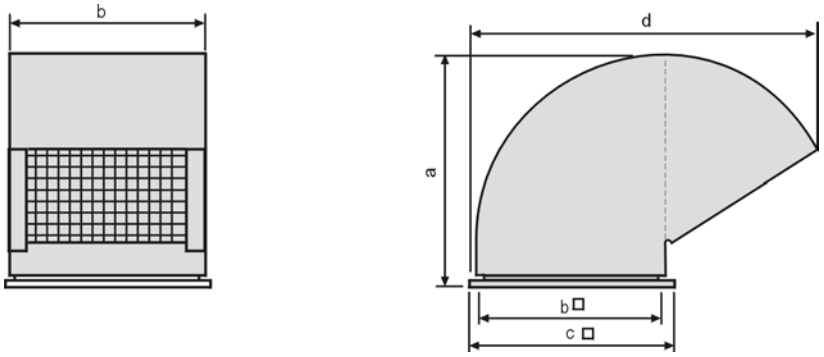
LH	a	b	c	d	e*	f	g	h	i	k	Part.No.
25	500	300	600	1460	960	260	180	450	600	550	65 13 161
40	630	500	800	1840	1210	460	180	570	730	680	65 13 162
63	800	500	800	2260	1460	460	180	750	900	850	65 13 163
100	1000	540	880	2460	1460	480	180	940	1100	1050	65 13 164

* 1 m additional length according to price list

Intake accessories LH

Rain protection hood

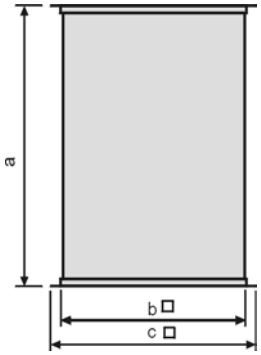
With bird screen (non-return flap optional) for roof-level fresh air intake. Connects to LH unit heater by means of roof lead-in box.



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

Roof lead-in box

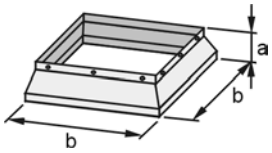
Connects the LH unit heater to the rain protection hood.
Roof sealing on site. Galvanised sheet steel.



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

Covering collar

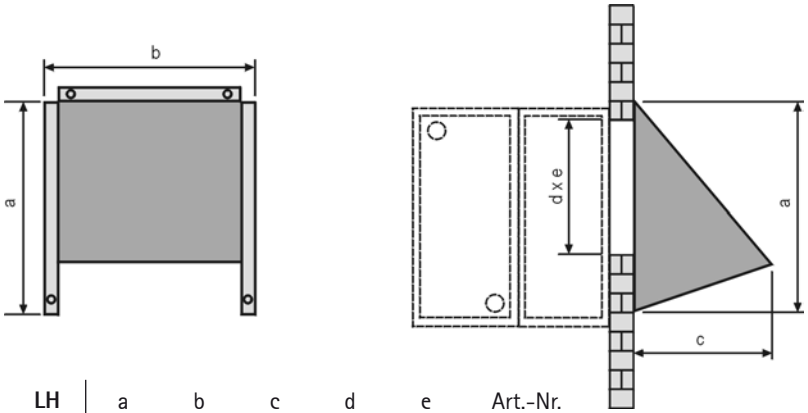
For roof passage. Galvanized sheet steel



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

Intake hood with bird screen

With bird screen, for fresh air intake through the wall (non-return flap optional). Galvanized sheet steel.

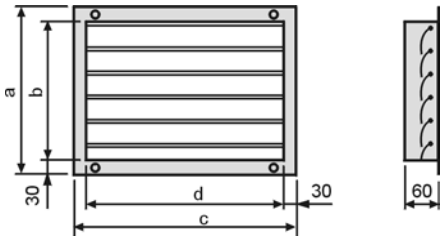


LH	a	b	c	d	e	Art.-Nr.
25	470	480	330	320	420	60 12 951
40	600	610	420	380	550	60 12 952
63	770	780	545	550	720	60 12 953
100	960	960	980	710	880	60 12 954

Intake accessories

Non return-flap for rain protection/intake hood

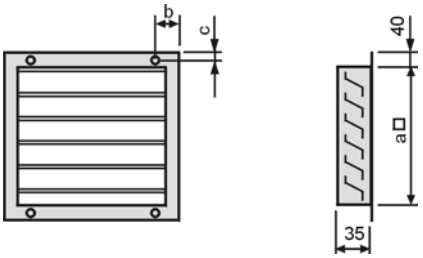
For installation in rain protection hood or in wall penetration for intake hood.
Galvanised sheet steel.



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

Weatherproof louvre

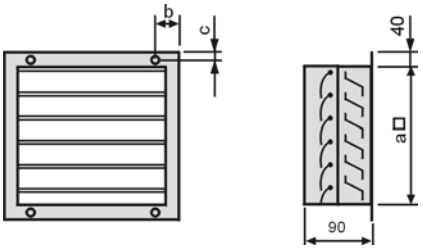
Weatherproof louvre incorporating bird screen. Galvanised sheet steel.



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

Weatherproof louvre with non-return flap

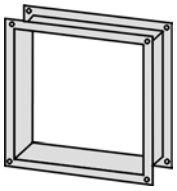
Weatherproof louvre incorporating bird screen and non-return flap.
Galvanised sheet steel.



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

Flexible connection

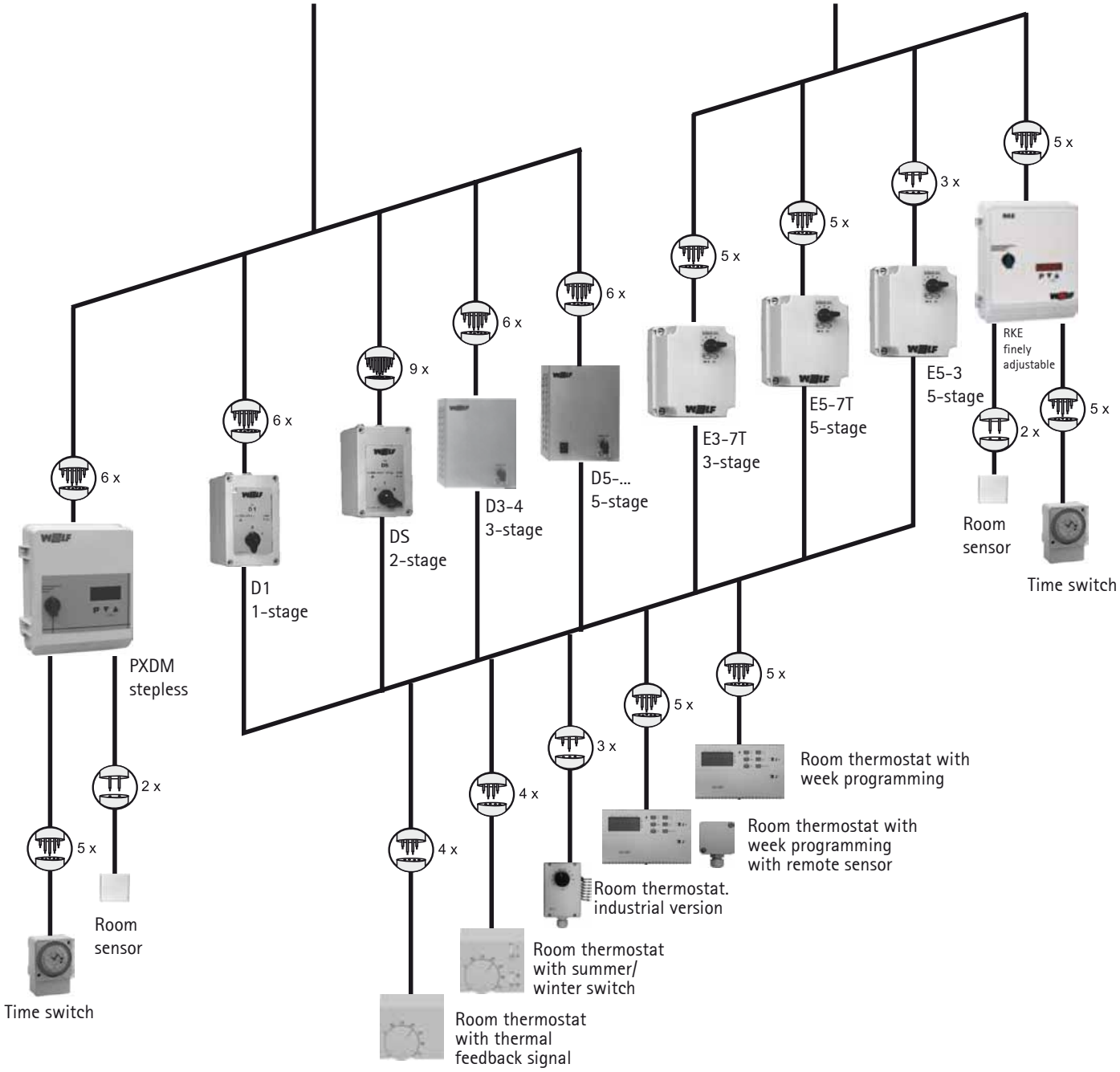
Flexible connection, 4-hole profile; galvanized sheet steel.



LH	Art.-Nr.
25	25 25 025
40	25 25 040
63	25 25 063
100	25 25 100

Three-phase motor
3 x 400 V

Single-phase a.c. motor
230 V



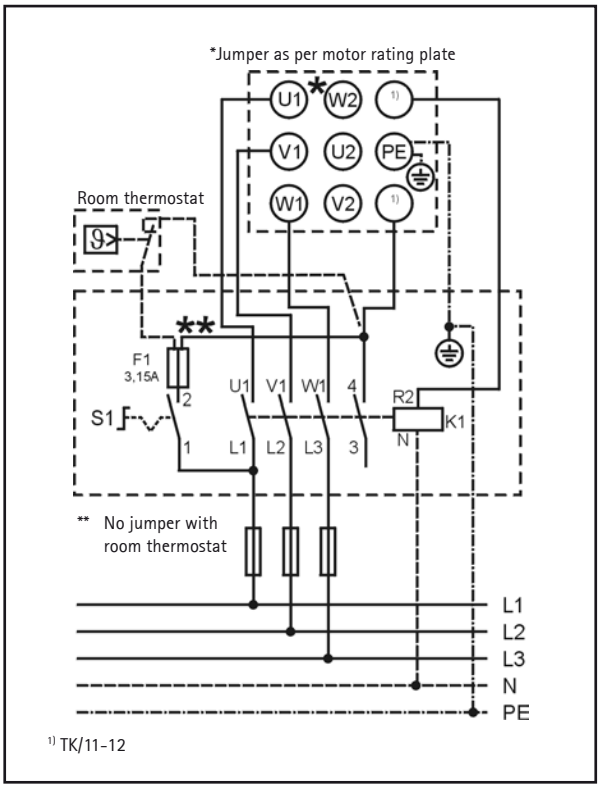
Switching controllers LH

1-stage switch D1

for single-speed (on/off) control of one or more unit heaters with full motor protection.

Operating voltage	400 V
Control voltage	230 V
Performance max.	3 kW
Weight	0,9 kg
Degree of protection	IP 54
Part.No.	79 40 001

Automatic start-up when winding temperature drops (motor).



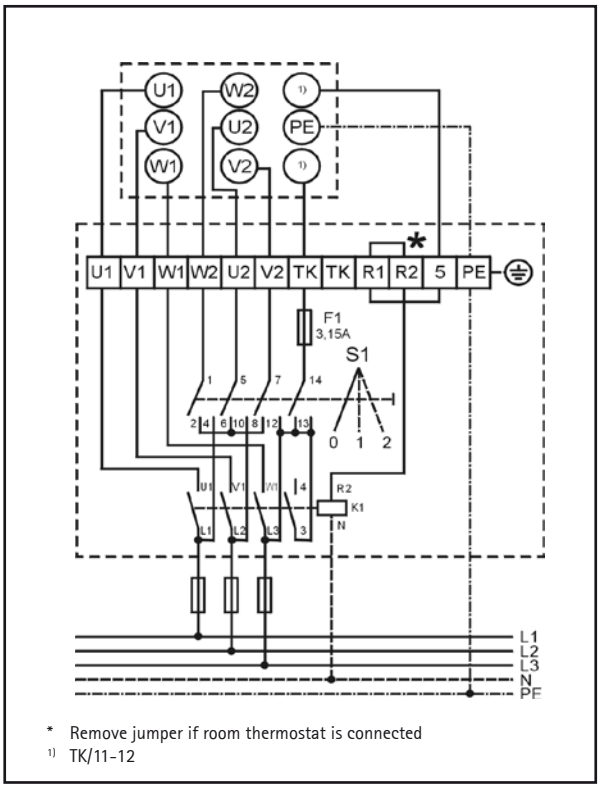
[1] TK/11-12

2-stage switch DS

for two-speed control of one or more unit heaters with full motor protection.

Operating voltage	400 V
Control voltage	230 V
Switching capacity, max.	4 kW
Weight	0,9 kg
Degree of protection	IP 54
Part.No.	79 25 110

Automatic start-up when winding temperature drops (motor).



* Remove jumper if room thermostat is connected
[1] TK/11-12

Note:

Use without switching controller for full motor protection voids the manufacturer's guarantee for the motor!
Install in accordance with local power-utility regulations.

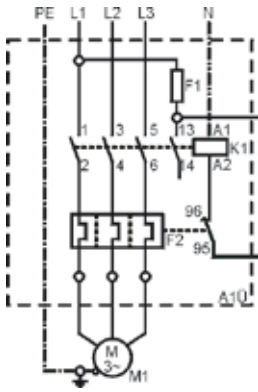
Full motor protection switches for 3 x 230 V available on request.

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 hazar-dous area.

Operating voltage	3 x 400 V
Control voltage	230 V
Switching capacity, max.	3 kW
Weight	0,6 kg
Degree of protection	IP 55
Part.No. without explosionproof switch	79 65 030
Part.No. with explosionproof switch	27 39 000



K1 Auxiliary contactor
F1 Control fuse
F2 Therm. motor circuit-breaker
S1 Explosion-proof switch
M1 Fan motor

1 explosion-proof switch
2 A1Ü relay
3 Explosion-proof fan

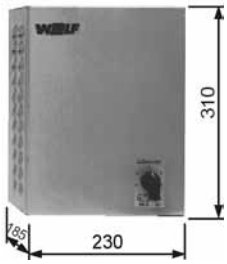
Installation locations:

A1Ü outside hazardous area

Explosion-proof switch = inside hazardous area

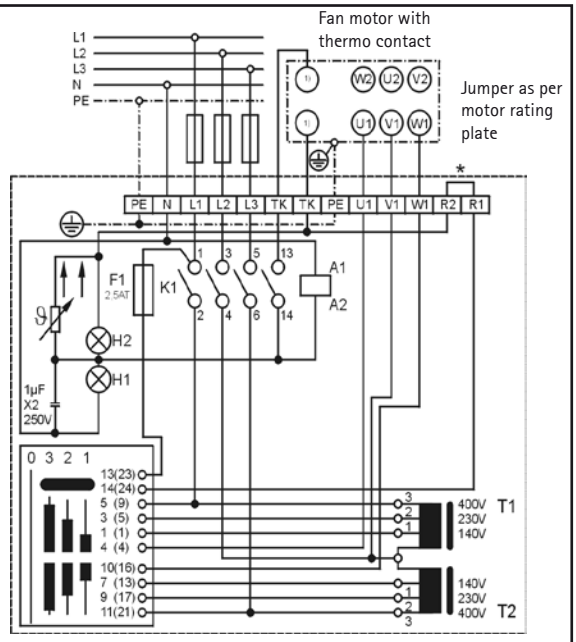
3-stage switch D 3- 4 with reclosing lock-out

for three-speed control of one or more unit heaters with full motor protection.



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

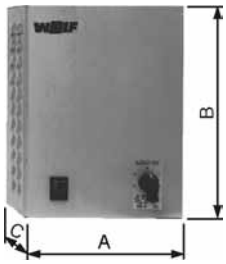
Locking switch-off at winding overtemperature (motor): Reclosing: switch position 0, then select required stage.



* Remove jumper if room thermostat is connected
H1 = Function
H2 = Failure
S1/K1 = Contact seizure depending on manufacture type
1) TK / 11-12

5-stage switch D 5-...

for five-stage control of one or more unit heaters with full motor protection.



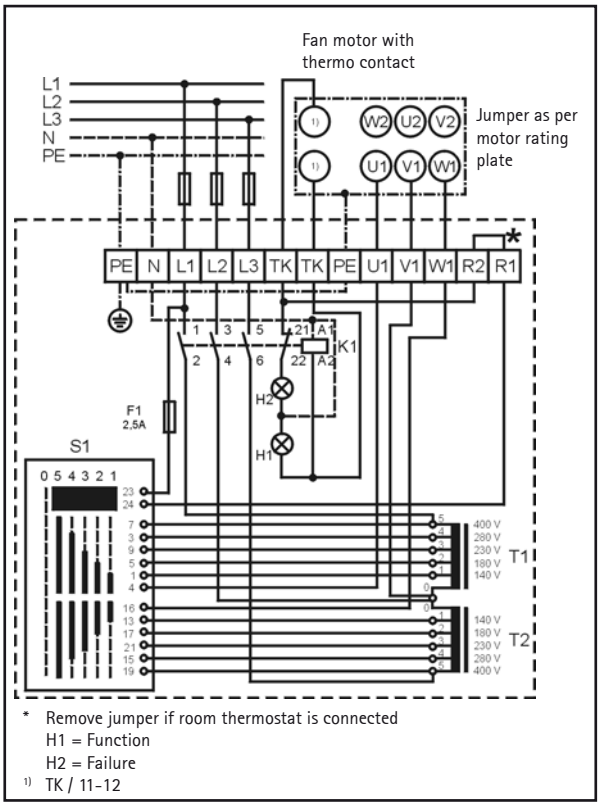
Part numbers:

Type	Part. No.
D5-1	27 40 015
D5-3	27 40 010
D5-7	27 40 013
D5-12	27 40 014
D5-19	27 40 017

Dimensions

Type		D5-1	D5-3	D5-7	D5-12	D5-19
Width	A	150	230	230	230	230
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	kW	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
Degree of protection	IP	40	20	20	20	20



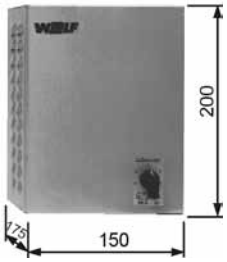
Locking switch-off at winding overtemperature (motor):
Reclosing: switch position 0, then select required stage.

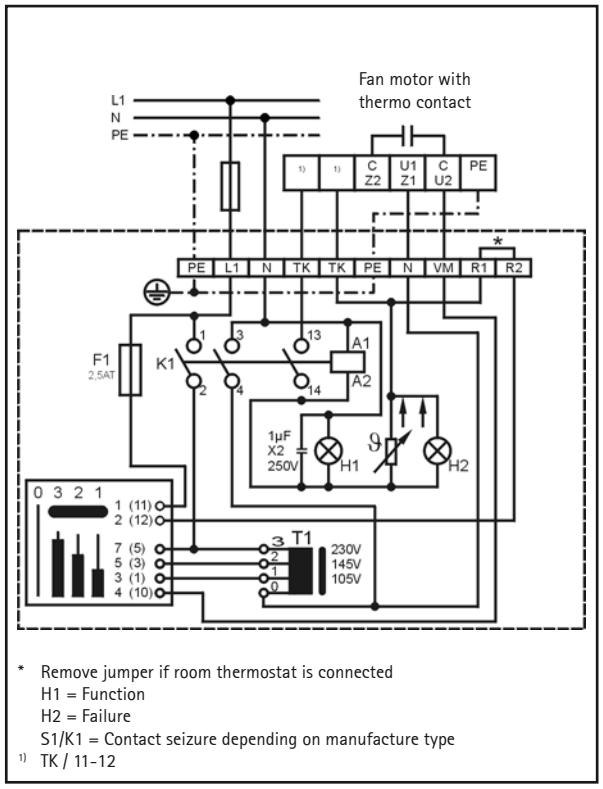
3-stage switch E 3-7T with reclosing lock-out

for three-speed control of one or more unit heaters with single-phase a.c. motors and full motor protection.

Operating voltage	230 V
Current max.	7 A
Weight	4,5 kg
Degree of saturation	IP 40
Part.No.	27 01 064

Locking switch-off at winding overtemperature (motor).
Reclosing: switch position 0, then select required stage.





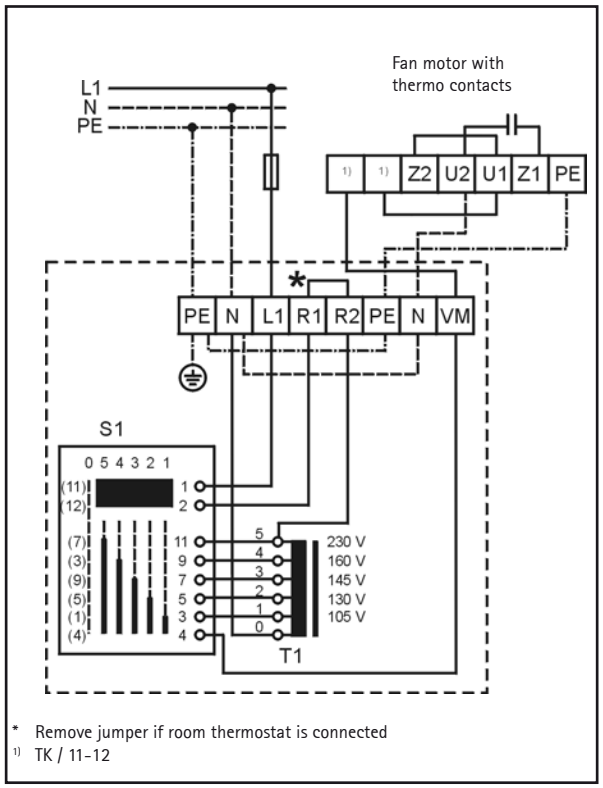
* Remove jumper if room thermostat is connected
H1 = Function
H2 = Failure
S1/K1 = Contact seizure depending on manufacture type
[1] TK / 11-12

5-stage switch E 5-3 / E 5-7

for five-stage control of one or more unit heaters with single-phase a.c. motors and full motor protection.

Type	E 5-3	E 5-7
Operating voltage	230 V	230 V
Current. max.	3 A	7 A
Weight	4,0 kg	6,0 kg
Degree of saturation	IP 40	IP 40
Part.No.	27 40 006	27 40 005

Automatic start-up when winding temperature drops (motor).



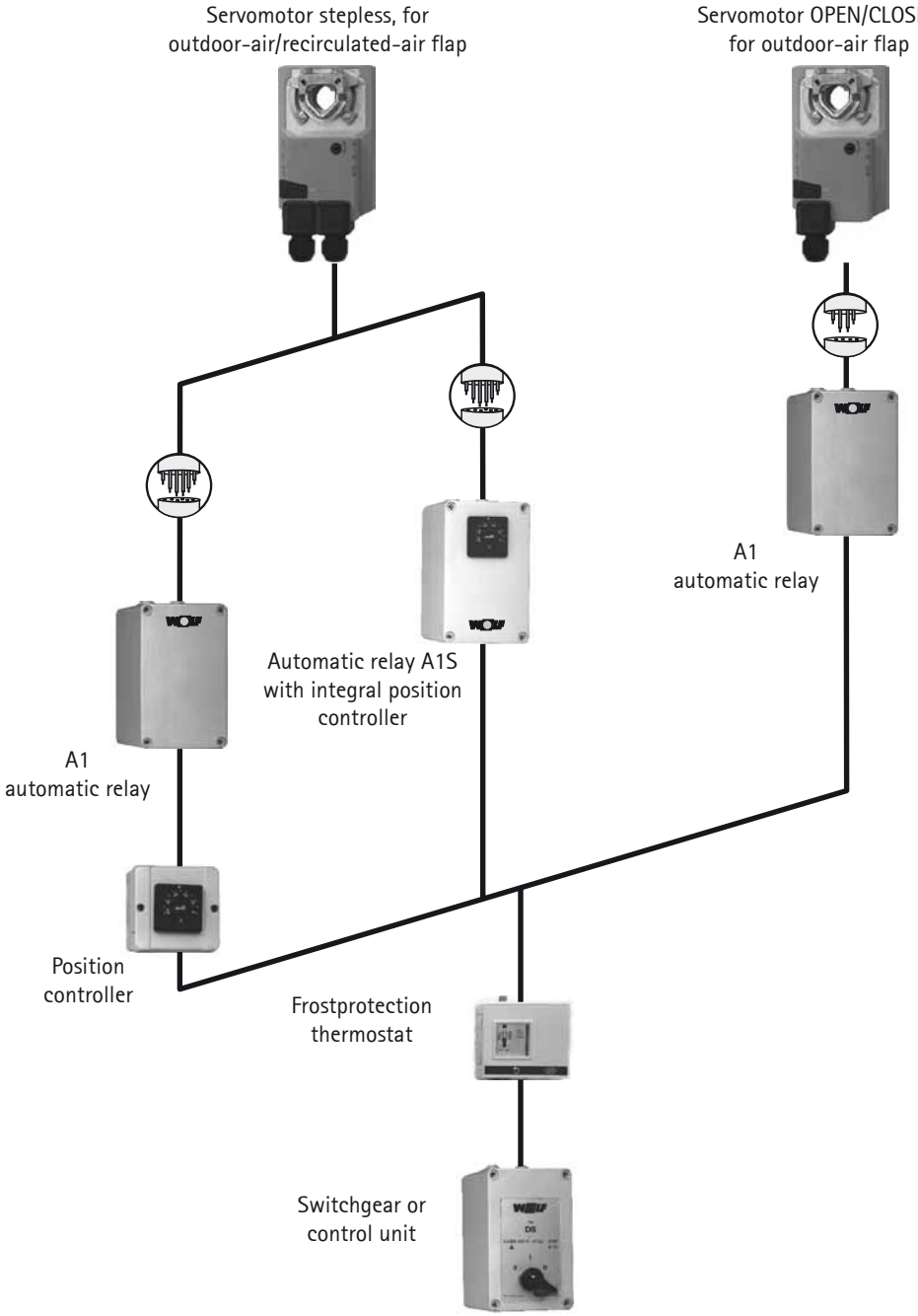
* Remove jumper if room thermostat is connected
[1] TK / 11-12

Note:

Use without switching controller for full motor protection voids the manufacturer's guarantee for the motor.
Install in accordance with local power-utility regulations.

Full motor protection switches for 3 x 230 V available on request.

Actuators for fresh air or mixed air LH



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%.

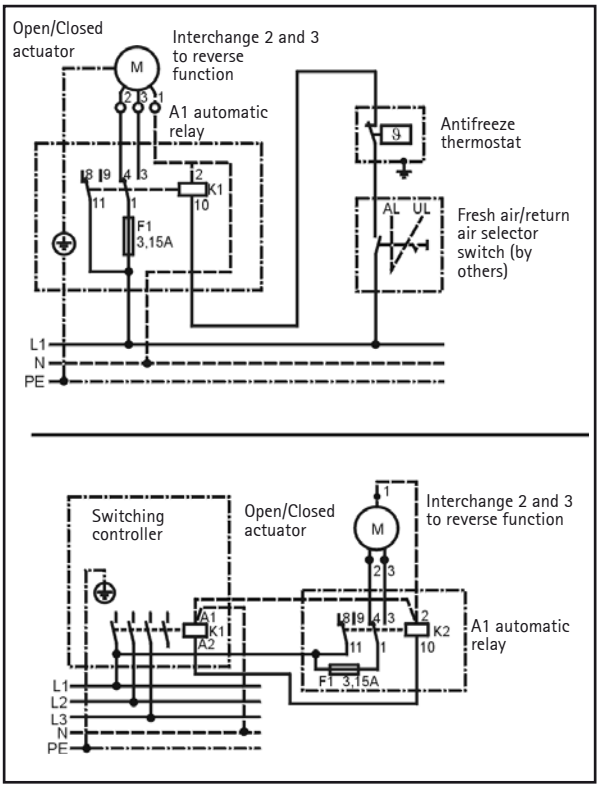
Automatic controllers for damper actuators LH

A1 automatic relay

Auxiliary relay for automatic actuation of the fresh air damper with 230 V OPEN/CLOSED actuator.

When the LH unit heater shuts down or the antifreeze thermostat trips, the A1 automatic relay sets the actuator to the CLOSED position. When the LH starts up the relay sets the actuator to the OPEN position.

Control voltage	230 V
Switching capacity, max.	3 kW
Weight	0,5 kg
Degree of protection	IP 54
Part.No.	79 65 020

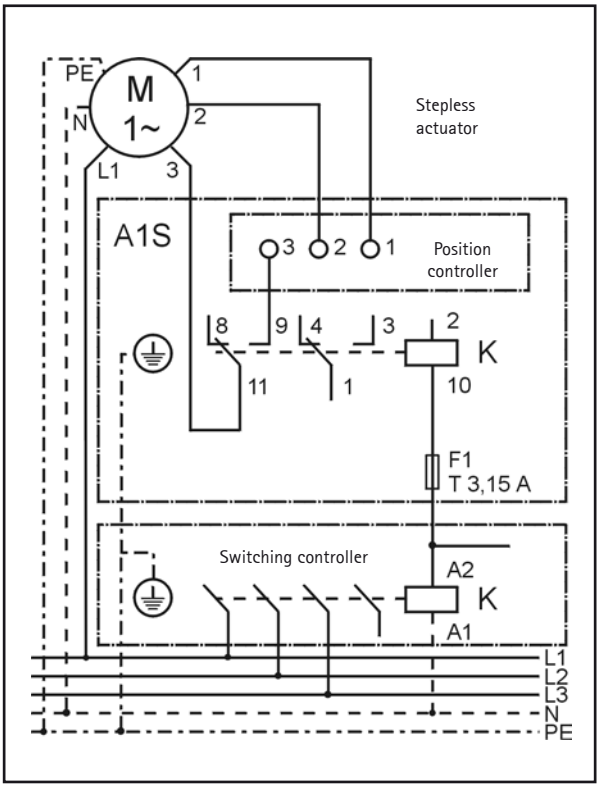


A1S automatic relay

Auxiliary relay with integral position controller for automatic actuation of the fresh air/return air dampers with 230 V stepless actuator.

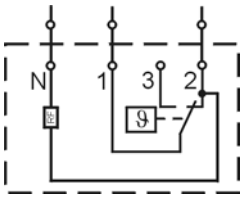
When the LH unit heater shuts down or the antifreeze thermostat trips, the A1S automatic relay sets the actuator to the CLOSED position. When the LH starts up the relay sets the actuator to the position determined by the position controller.

Control voltage	230 V
Switching capacity, max.	3 kW
Weight	0,5 kg
Degree of protection	IP 54
Part.No.	79 40 101



Room thermostats

Room thermostat



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

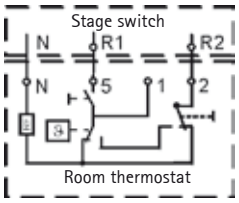
Temperature range 5 - 30 °C

Switching differential 0,5 K

Degree of protection IP 30

Part.No. 27 34 000

Room thermostat with summer/winter switch



Plastic housing, 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 signal.

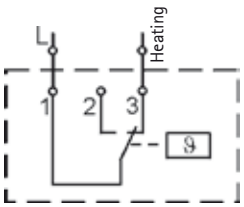
Temperature range 5 - 30 °C

Switching differential 0,5 K

Degree of protection IP 30

Part.No. 27 34 700

Room thermostat industrial version



In metal housing with plastic front panel, 117 x 71 x 30 mm for surface-mounting.

Switching capacity 15(8) A at 230 V / 50 Hz

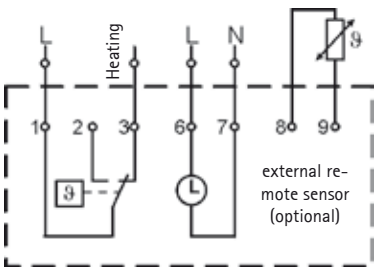
Temperature range 0 - 35 °C

Switching differential 0,5 K

Degree of saturation IP 54

Part. No. 27 35 300

Room thermostat timer with weekly programming



Plastic housing, 132 x 82 x 32 mm for socket installation, daytime and night-time temperatures can be set separately.

Temperature decrease adjustable 2 - 10 K

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

Temperature range 5 - 40 °C

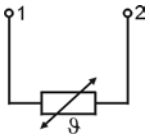
Switching differential ±0,1 - 3 K

Degree of protection IP 20

Part.No. 27 44 079

Thermostats, control interface box LH

Remote sensor for room thermostat timer

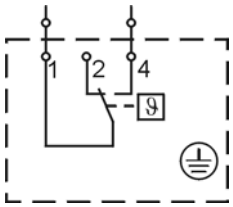


In plastic housing 52 x 50 x 35 mm for socket installtion

Degree of protection IP 54

Part.No. 27 44 051

Antifreeze thermostat mounted



If the air outlet temperature drops below a preset value the antifreeze thermostat shuts down the LH unit heater, thus preventing frost damage to the heat exchanger. The LH unit heater restarts automatically when the air outlet temperature rises.

The antifreeze thermostat must be connected in series with the thermo 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 B x H x T 85 x 75 x 40 mm

LH	25	40	63	100
Part.No.	27 30 050			27 30 150

Differential pressure gauge

Differential pressure gauge (loose) for on site control

LH	25	40	63	100
Part.No.	27 44 030			

Intermediate terminal box

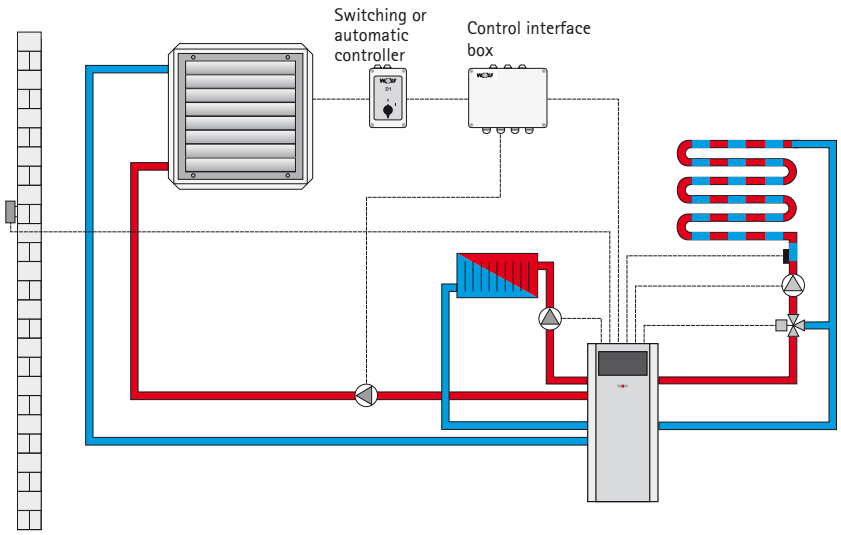
Intermediate terminal box for parallel connection of max. 3 LH unit heaters with 3 x 400V, 50Hz motors.

Degree of protection IP 54

Dimensions B x H x T 105 x 170 x 112 mm

Part.No. 79 65 043

Control interface box



For operating an LH unit in conjunction with a Wolf boiler.

- Outdoor-temperature-sensitive control for radiators and underfloor heating.
- Complete wiring with plugs
- Priority circuit LH/SHW-storage to be selected deliberately via jumper
- Connection for LH-circulating pump and SHW-storage charging pump
- Storage thermostat SP 1 (substitute for electronic sensor) included in scope of supply
- Application for swimming pool heating possible
- Drive via potential free contact or drive phase of motor or thermostat drive

Degree of protection IP 54

Dimensions B x H x T 220 x 170 x 110 mm

Part.No. 88 52 933

Control options WRS

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 variable motor control in conjunction with EC motor or external inverter (0-10 V)
- 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
- Induction louvre control

Outside 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

Supply air sensor and sensor retainer

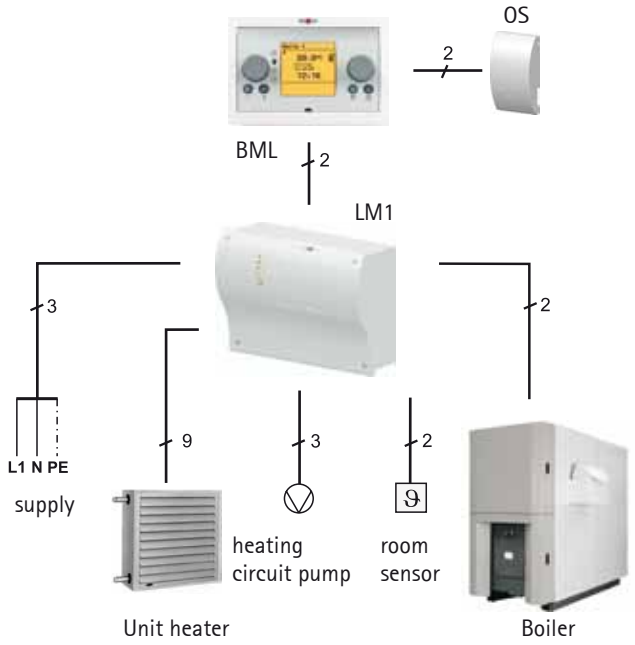
LM1 ventilation control unit with BML

Description

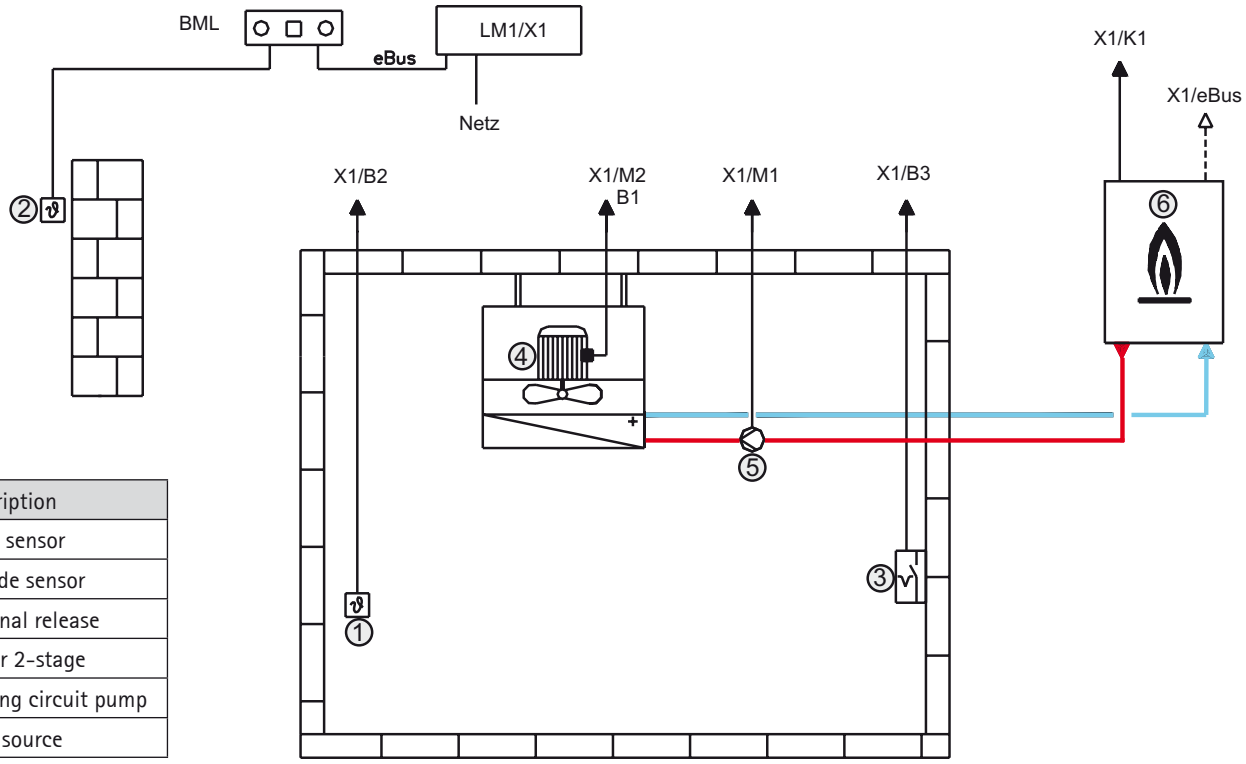
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor and the fan, heating circuit pump and heat source are switched on or off subject to demand.

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:



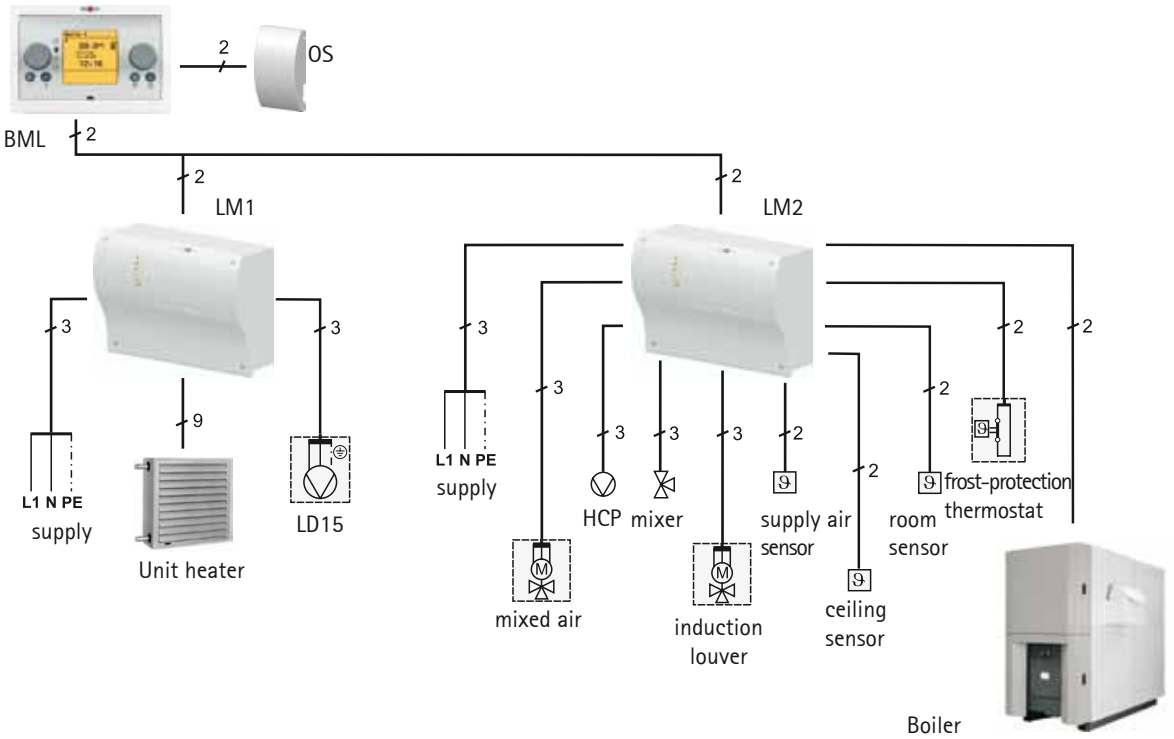
No.	Description
1	room sensor
2	outside sensor
3	External release
4	motor 2-stage
5	heating circuit pump
6	Heat source

LM1 ventilation control and LM2 with BML

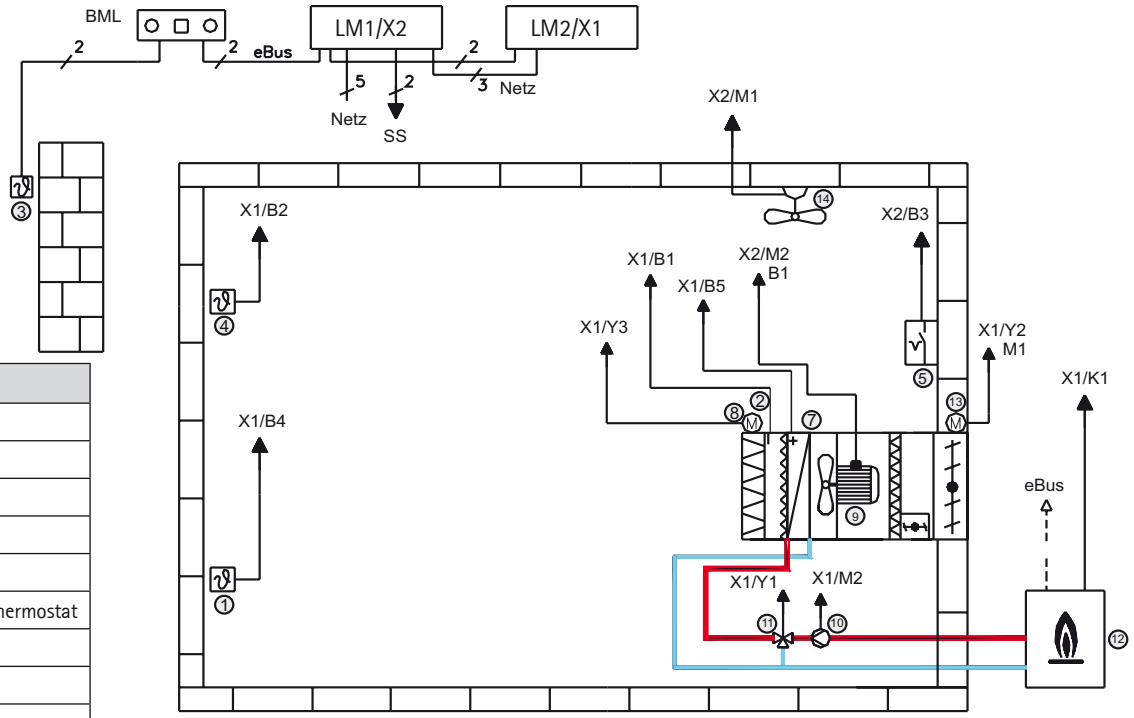
Description

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:



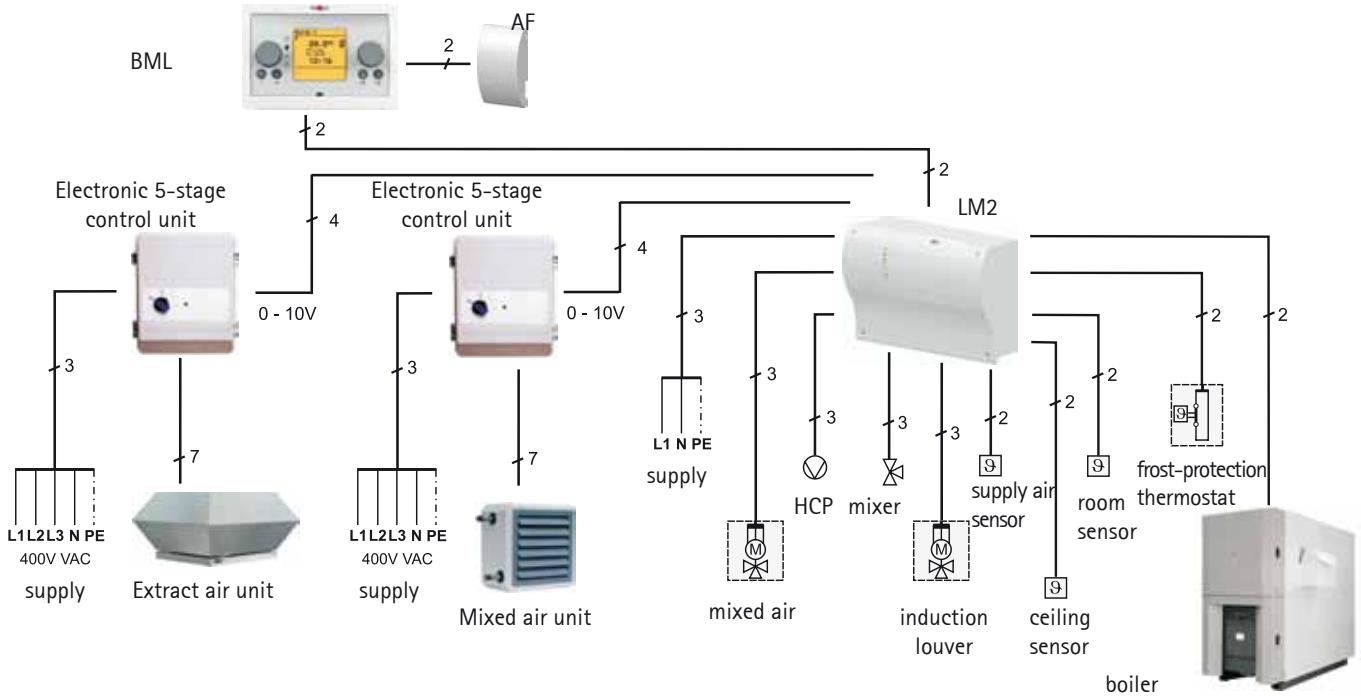
No.	Description
1	room sensor
2	supply air sensor
3	outside sensor
4	ceiling sensor
5	External release
7	Frost-protection thermostat
8	induction louver
9	motor 2-stage
10	heating circuit pump
11	heating circuit mixer
12	Heat source
13	mixed air damper
14	LD15, ceiling fan

LM2 ventilation control unit with BML

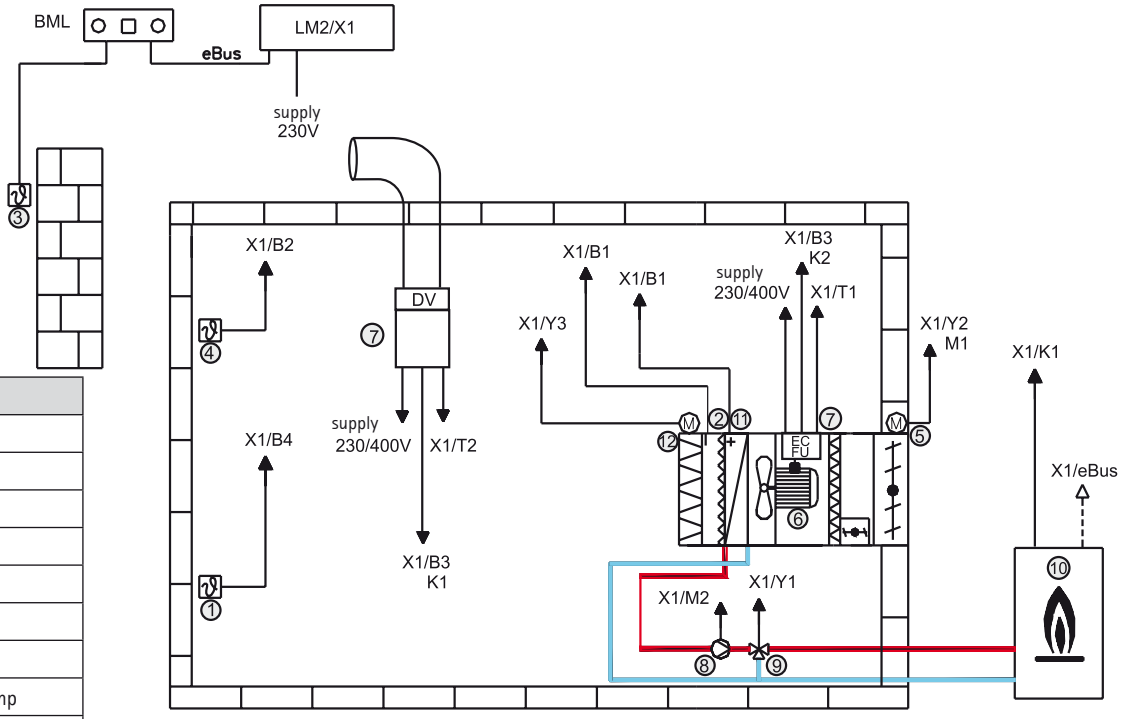
Description:

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:



No.	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

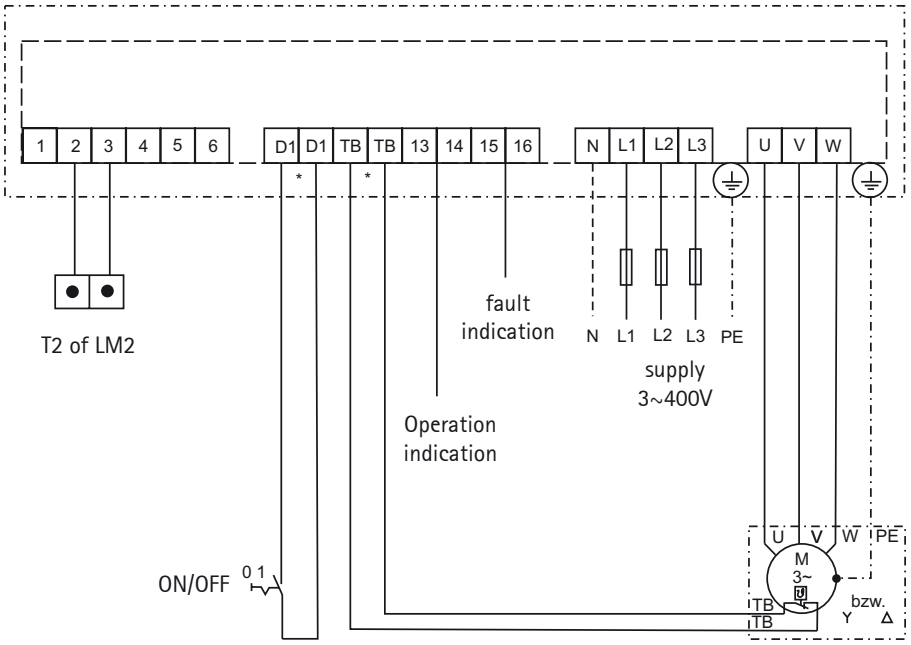
5-stage electronic switch 0 - 10V LH

5-stage switch 0-10 V:

D=170 W=220 H=315

Switch type	D5-2F	D5-4F	E5-6F
Part No.	2744840	2744841	2745066
Spannung	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

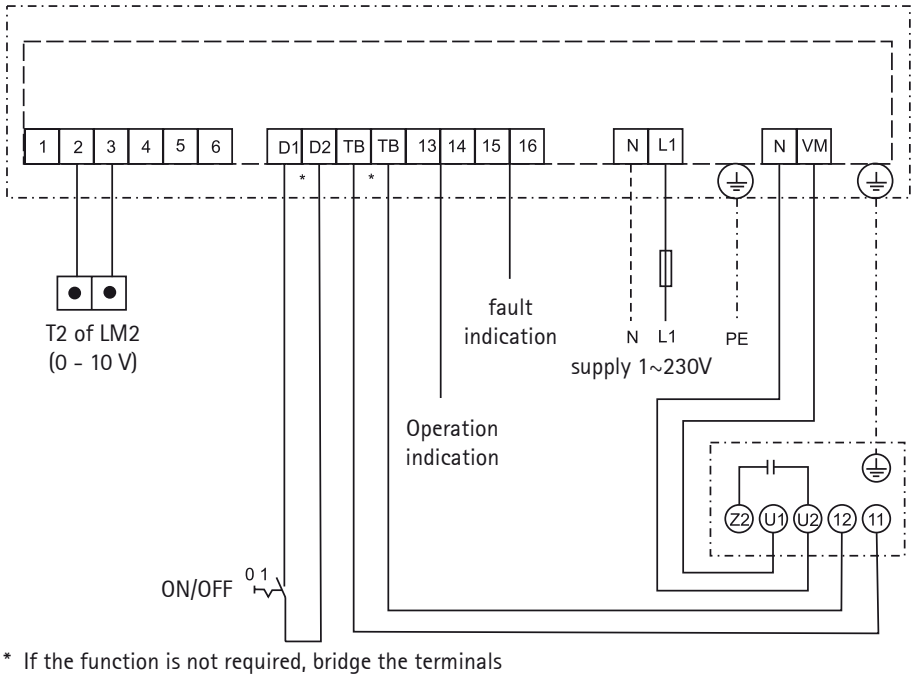
Wiring diagram D5-.....



* If the function is not required, bridge the terminals

3~ motor with integral thermostat switches

Wiring diagram E5-6F



* If the function is not required, bridge the terminals

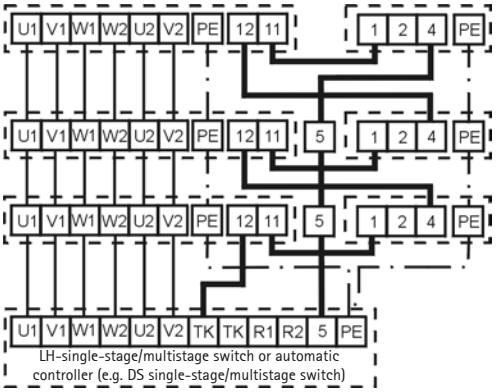
Electrical connection/special drives

Note:

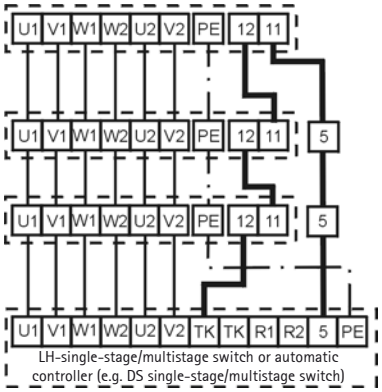
LH unit heaters of different sizes and ratings can be connected in parallel to a common switching controller with full motor protection: the configuration limit is imposed by the maximum permissible switching capacity or the maximum permissible current rating of the controller.

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. Therminal 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									
to	D1	DS	D3-4	D5...	E3-7T	E5-3	A1Ü	A1	A2	A1S
Mains supply	5	5	5	5	3	3	5	-	5	-
LH motor 3 x 400 V	6	9	6	6	5	3	4	-	9	-
LH motor 1 x 230 V	-	-	-	-	5	3	-	-	-	-
Room thermostat	3/4[1]	3/4[1]	3/4[1]	3/4[1]	3/4[1]	3/4[1]	-	-	5[2]	-
Room thermostat timer	5	5	5	5	5	5	-	-	6[2]	-
Automatic relay A1	4	4	4	4	4	4	-	4	-	-
A1S autom. controller	4	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.

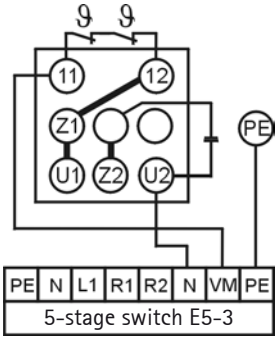
Single-phase a.c. motors 230 V/ 50 Hz

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

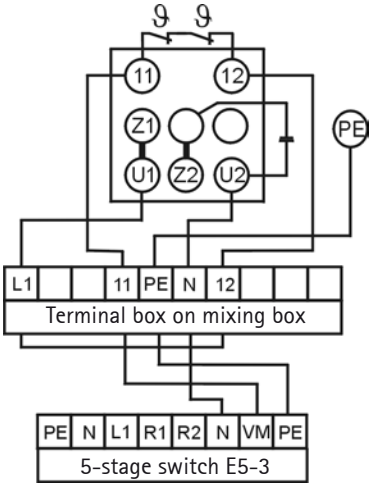
No single-phase a.c. motor available for LH 100.

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



Thermo contact in control circuit



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

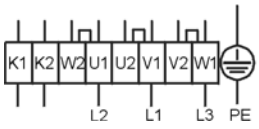
Three-phase motor with 2 speeds via Δ/Y-switching.
Full motor protection via integrated thermistors.
Remove jumpers if speed controller is used.

1U = brown
1V = blue
1W = black

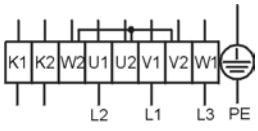
2U = red
2V = grey
2W = orange

K1 = white
K2 = white

High speed:
Δ-switching



Low speed:
Y-switching



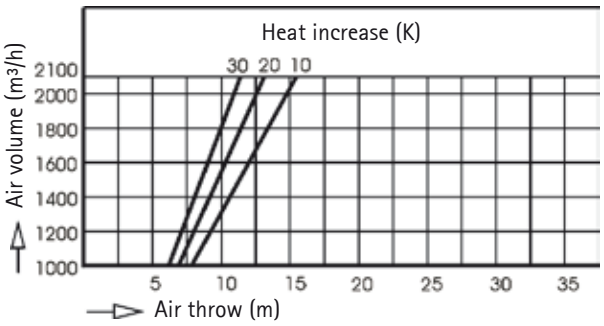
Consulting advice horizontal air throws LH

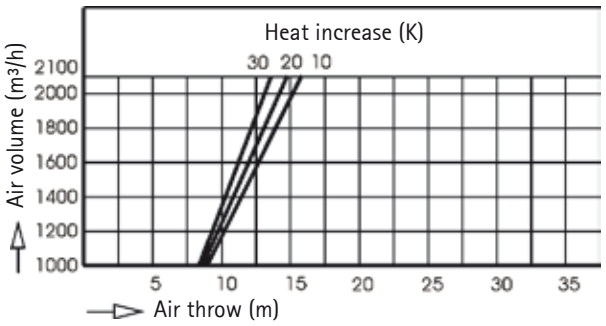
The horizontal air throw is the distance travelled by the warm air discharged by the wall-mounted LH unit heater

with discharge louvres or spread discharge

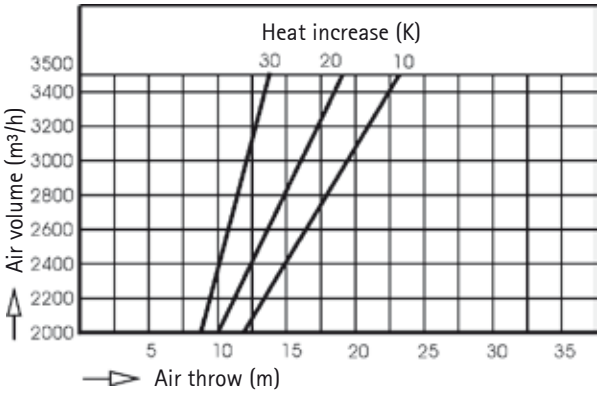
with discharge louvres or discharge cross

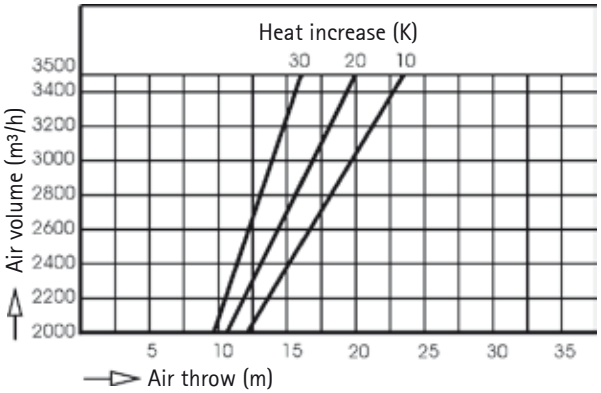
LH 25



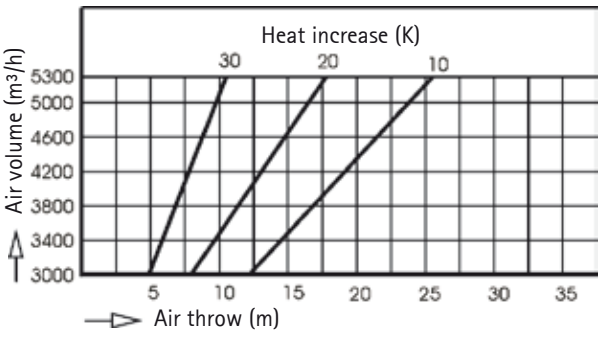


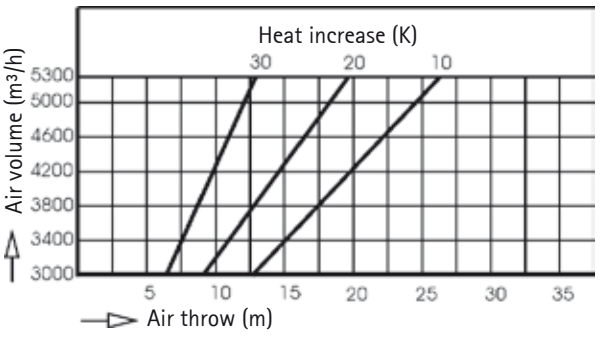
LH 40



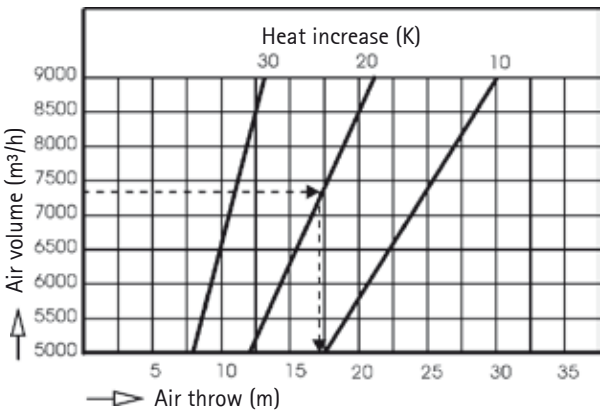


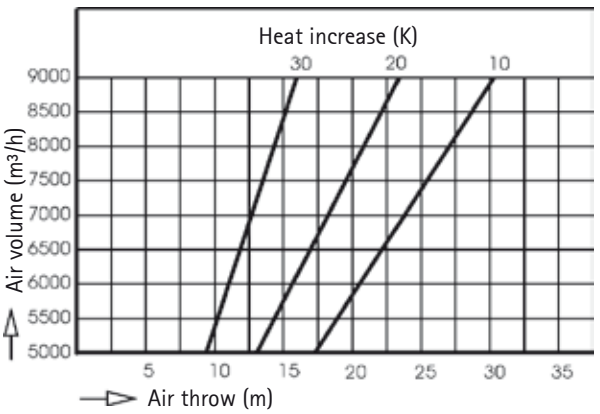
LH 63





LH 100





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

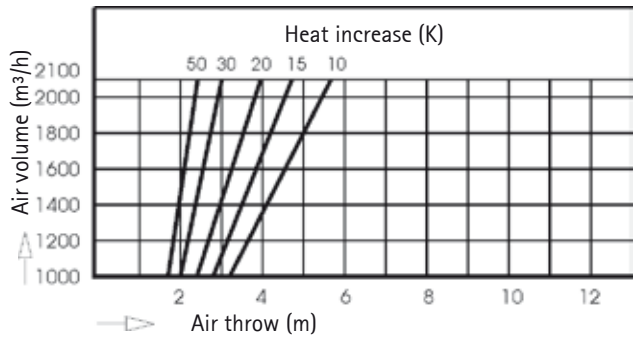
Consulting advice Vertical Air throws LH

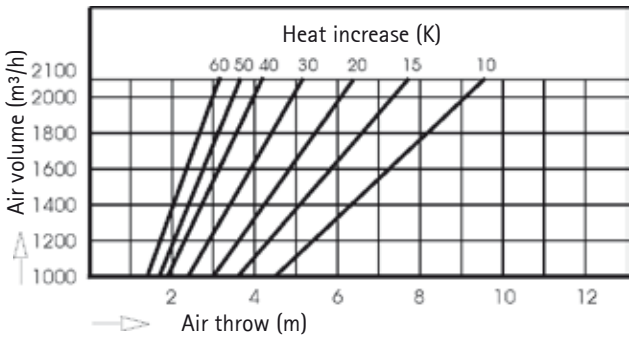
The vertical air throw is the distance travelled by the warm air discharged by the LH unit heater

with discharge louvres/wide or spread discharge

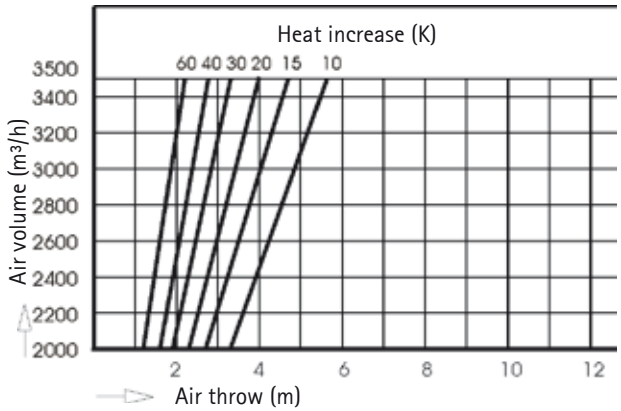
with discharge louvres cone/discharge nozzle

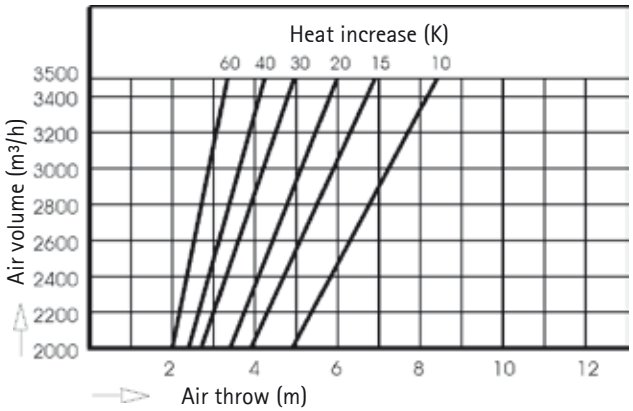
LH 25



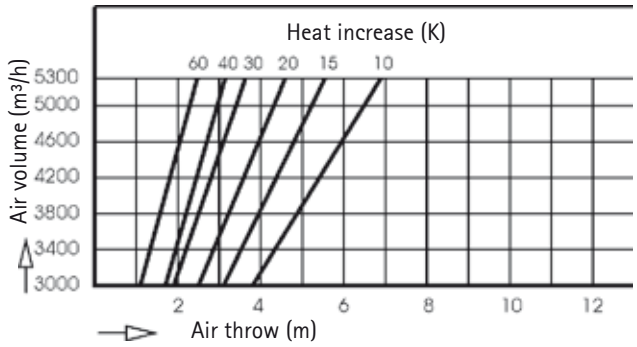


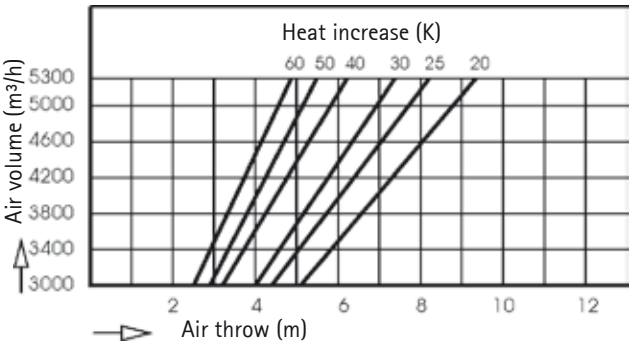
LH 40



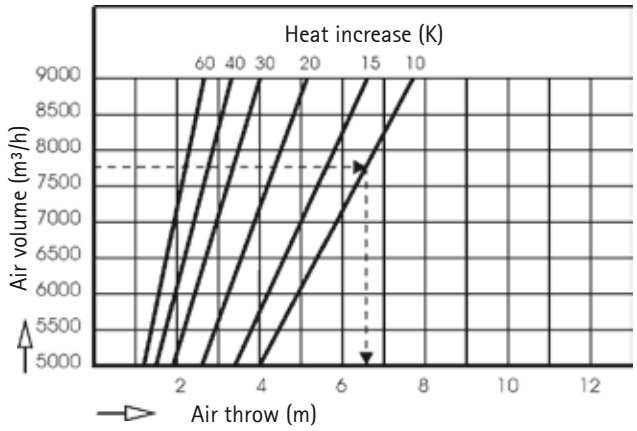


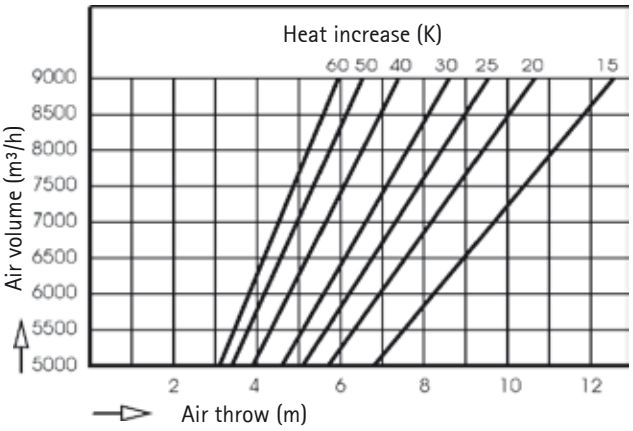
LH 63





LH 100



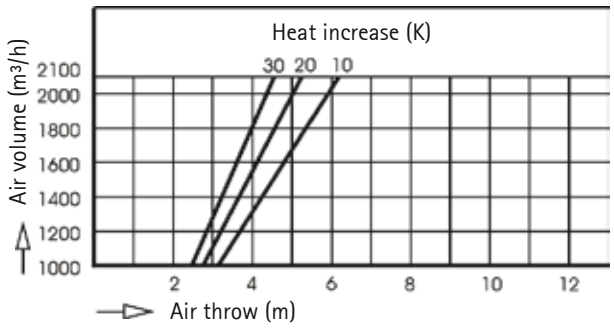


Example: LH 100 with discharge louvre; $\Delta t_A = t_{Aoff} - t_{room}$ = 20 K; air volume = 7 750 m³/h
Result: horizontal air throw = 6,6 metres

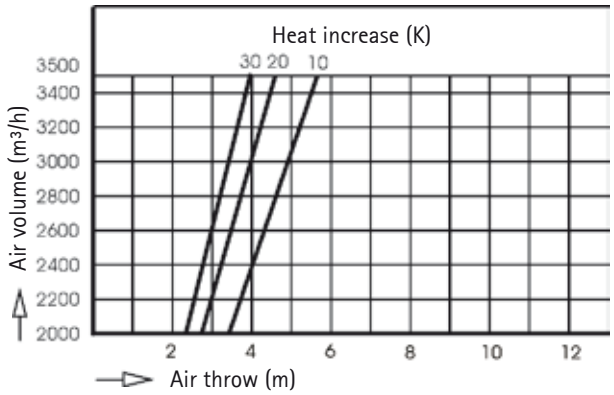
Consulting advice vertical air throws LH

with discharge louvres and discharge cross

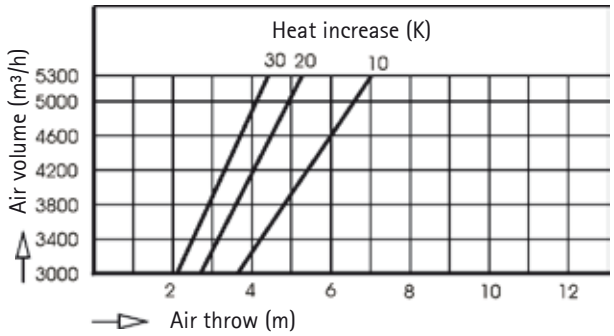
LH 25



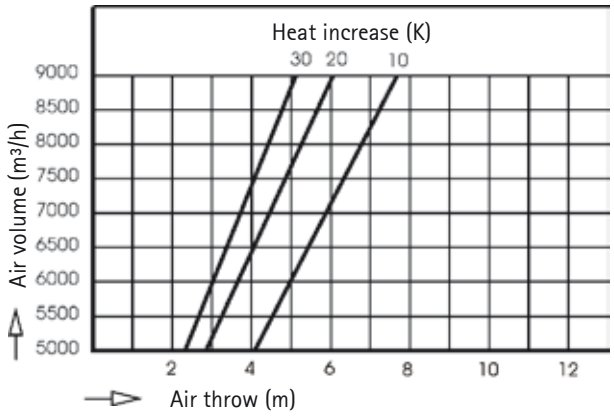
LH 40



LH 63



LH 100



Performance and influence of accessories LH

Key to symbols

$\dot{V}$	= air volume	m³/h
$\dot{V}_B$	= reference air volume	m³/h
$\dot{V}_0$	= catalogue air volume	m³/h
$\dot{V}_{eff}$	= effective air volume	m³/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	m³/h
$\dot{Q}$	= thermal output	kW
$\dot{Q}_0$	= 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

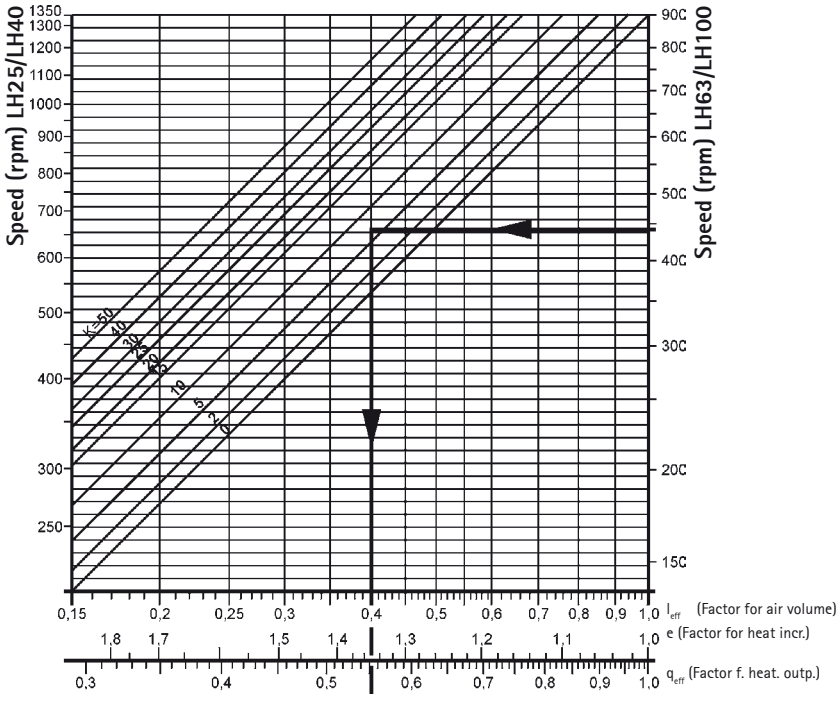
To calculated k for accessories

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

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

LH	$\dot{V}_B$
25	2000 m³/h
40	3000 m³/h
63	6000 m³/h
100	10000 m³/h

Characteristics graph



Example

Assuming:

LH 100 Type4, t_{on} = -5°C, LPHW 50/40

From performance table on Page 12:
(always take figures for high speed, because factors correcting for operation at lower speed are taken into account in the characteristics graph).

$\dot{V}_0$ = 7700 m³/h
$\dot{Q}_0$ = 96,1 kW
t_{off} = 29 °C
Δt_{A0} = (29+5) K = 34 K

Mains supply 3 x 400 V Δ
5-stage switch, set to stage 1
from speeds table on Page 47: 440 rpm

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

Δp = 10 Pa at 5000 m³/h

k = 0,1 10 $\left(\frac{10000}{5000}\right)^2$
k = 4
k = 3 + 4 = 7

LH 100, 440 rpm, k = 7

from characteristics graph:

l_{eff} = 0,4
e = 1,35
q_{eff} = 0,55

Find:

Effective air volume	$\dot{V}_{eff}$
Effective air heat increase	Δt_{Aeff}
Effective air discharge temp.	$t_{A\,off}$
Effective heating output	$\dot{Q}_{eff}$
Water flow rate	W
Hydraulic resistance	Δp_w

Result:

$\dot{V}_{eff} = \dot{V}_0 \quad l_{eff} = 7700$ m³/h 0,4 = 3080 m³/h
$\Delta t_{A\,eff} = \Delta t_{A0}$ e = 34 K 1,35 = 45,9 K
$t_{A\,off} = t_{on} + \Delta t_{A\,eff}$ = -5 + 45,9 °C = 40,9 °C
$\dot{Q}_{eff} = \dot{Q}_0 \quad q_{eff} = 96{,}1$ kW 0,55 = 52,9 kW

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

Δp_w (see diagram, Page 13) = 8,5 kPa

Speeds table / sound pressure level

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
3 x 400 V Y	-	660	700	500	440
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
3 x 400 V Y	I	660	700	500	440
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
3 x 230 V Y	V	660	700	500	440
	IV	530	580	400	350
	III	430	490	360	270
	II	320	380	280	220
	I	240	280	210	160
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	Speed rpm	Sound power level dBA	Sound pressure level* dBA 2 m	Speed rpm	Sound power level dBA	Sound pressure level* dBA 2 m	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						

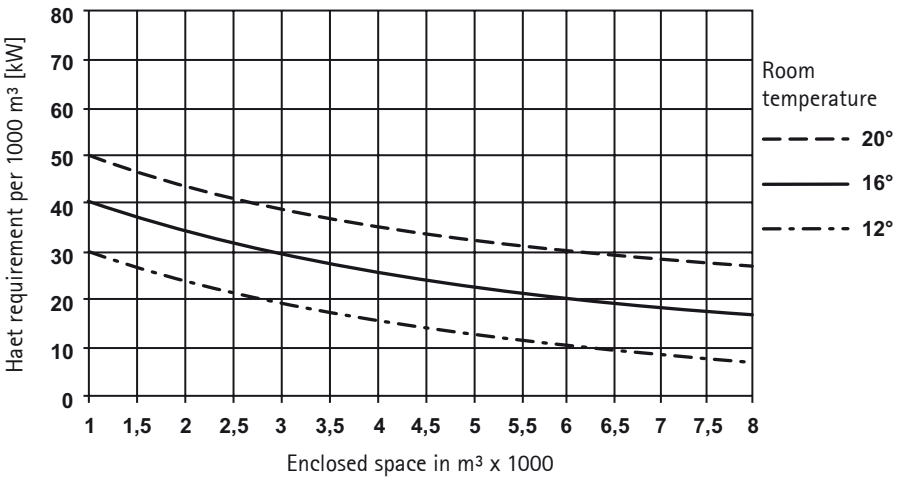
* Sound pressure levels measured in room with average absorption, enclosed space approx. ca. 1500 m³

Consulting advice Notes on configuration LH

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%

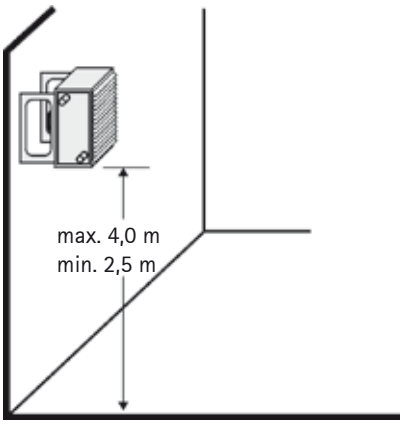
Deduction:

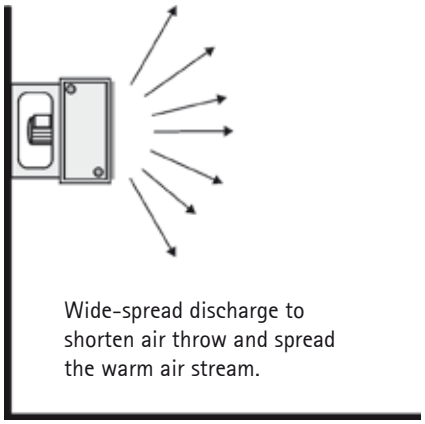
For exterior wall 75% adjoining another building	-15%
For exterior wall 50% adjoining another building	-10%
For exterior wall without windows, solid brick	-30%
For heated upper storey	-30%
For heated annex on each side	-10%

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 insuffient.
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

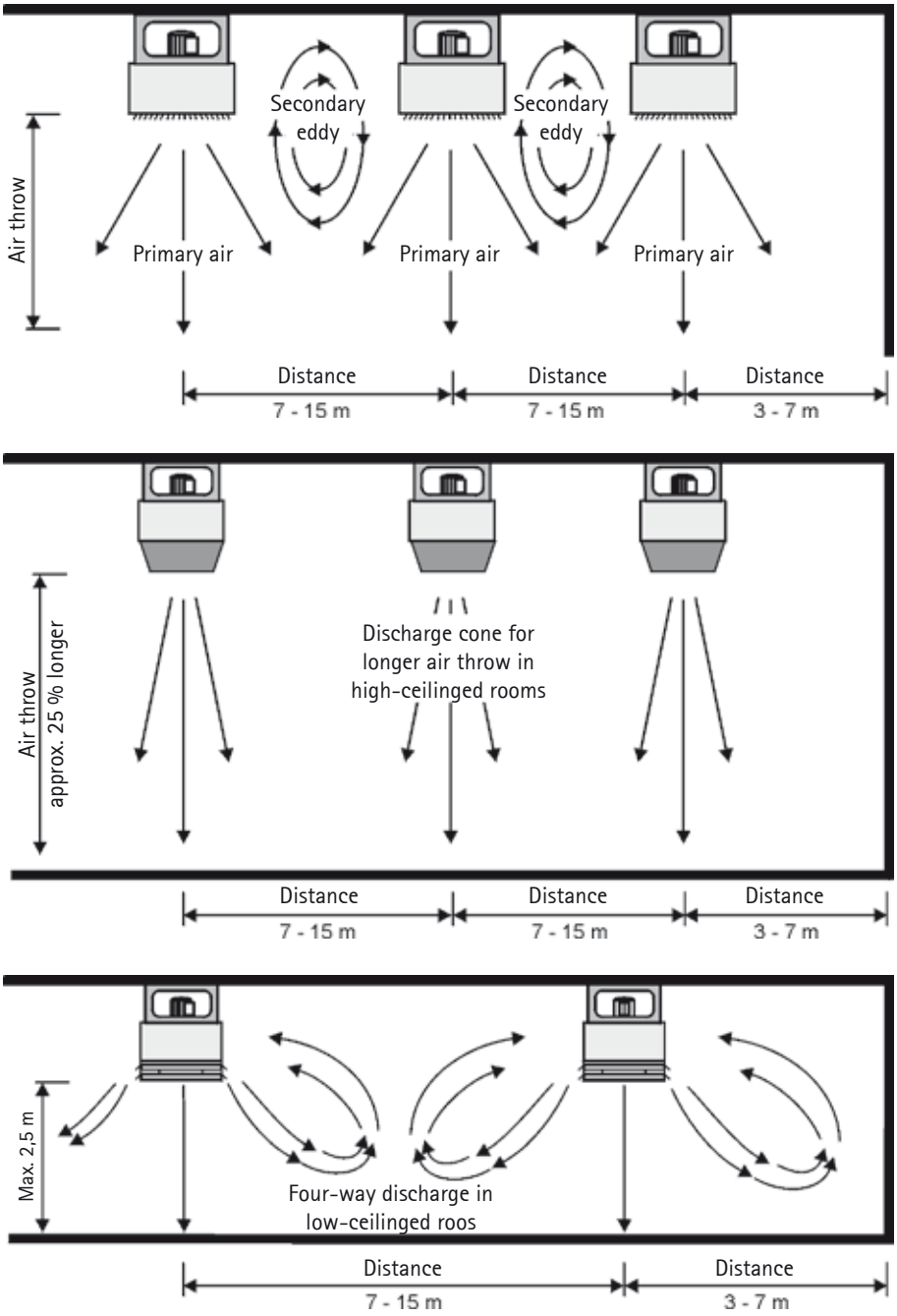




Ceiling-mounted units

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 Δt_A (= t_{outlet} - t_{room}) of approx. 25 K and high speed.

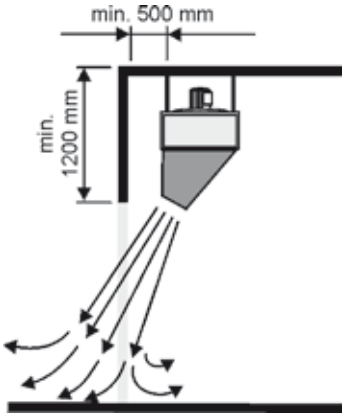
LH	25	40	63	100
Distance: discharge to floor				
up to 2,5 m	Four way discharge	Four way discharge	Four way discharge	Four way dischar-ge
3-4 m	Wide-spread discharge	Wide-spread discharge	Wide-spread discharge	Wide-spread discharge
4-5 m	Cone	Cone	Standard louvree	Wide-spr. dischar.
5-6 m	Cone	Cone	Cone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

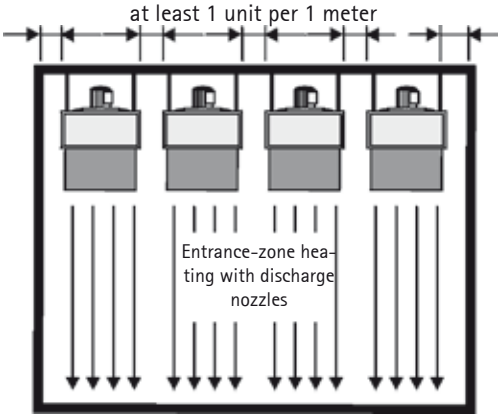
Consulting advice Notes on configuration LH

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.



Units as closely spaced as possible; at least 1 unit per 1 meter



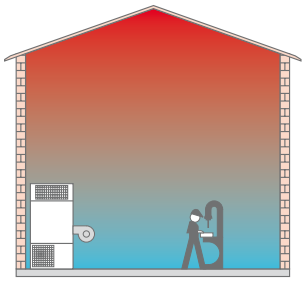
Additional LH unit heater without heat exchanger installed to improve air circulation

Air volumes for unit heaters without heat exchangers

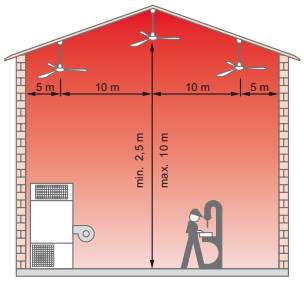
	LH	25	40	63	100
Air volume	m³/h	1400/2400	2400/3950	3950/6000	6100/10700
Speed	rpm	1000/1350	1000/1350	700/900	700/900

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 / Accessories LD 15

Ceiling fan LD 15

Part No. 22 40 050

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	m³/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

Part No. 27 01 060

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 Art.-No. 27 44 439
Current max.	3,0 A Art.-No. 27 01 062

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**

Installation examples

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 assit 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.

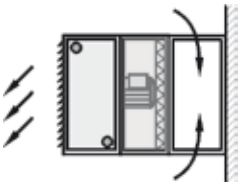
Ambient overheating can cause damage when the motors of ceiling-mounted unit heaters are at a standstill. Consequently, the flow temperature must be limited as follows:

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

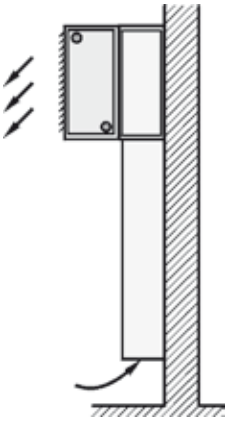
All control and shutoff valves must close automatically when the unit heater shuts down.

Wall-mounted LH

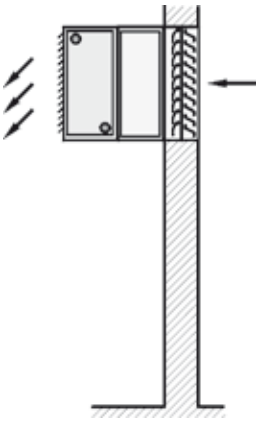
with filter box and brackets

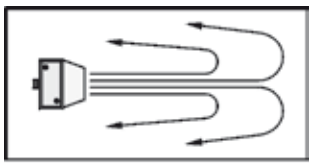


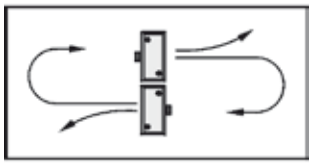
with intake duct for return air

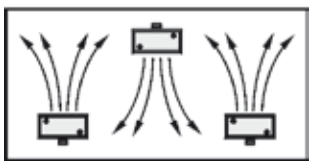


with weatherproof louvre on mixing box



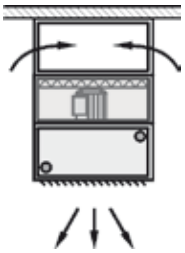




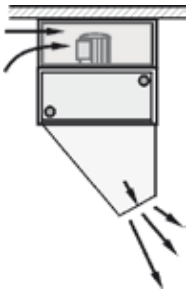


Ceiling-mounted LH

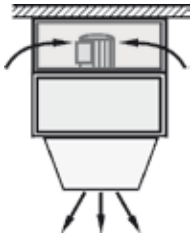
with filter box and brackets

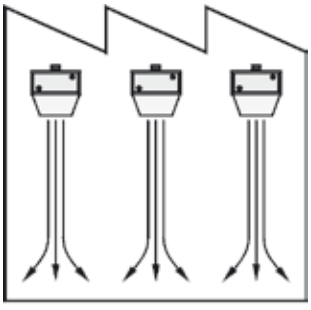


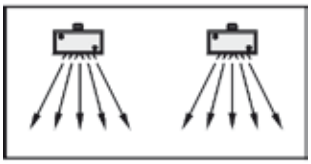
with discharge nozzle and brackets

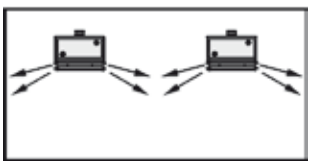


with discharge cone and brackets









Weights

Weights in kg

Basic units			LH25	LH40	LH63	LH100
LPHW	Unit heater, type 1	CoAl	24	32	48	76
and	Unit heater, type 2	CoAll	26	35	51	82
MPHW	Unit heater, type 3	CoAl	27	36	52	84
	Unit heater, type 4	CoAl	28	38	54	88
	Unit heater, type 2	St'galv	53	80	127	186
	Unit heater, type 3	St'galv	65	85	136	212
	Unit heater, type D	CoAl	35	45	65	97
	Unit heater 6 kW		23	on request	on request	on request
	Unit heater 9 kW		23			
	Unit heater 12 kW		23			
Accessories Intake						
	Mixing box		26	32	42	68
	Fresh air box		15	27	29	47
	Return air box		16	28	31	50
	Filter box		13	16	20	37
	Intake duct for recirc.		34	44	73	97
	Intake duct: 1 m extra		24	30	36	44
	Rain protection hood		13	19	30	43
	Roof lead-in box		22	27	37	48
	Intake hood		2	5	6	20
	Non-return flap		2	2	4	5
	Weatherproof louvre		6	9	14	20
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 description / Scope of supply LH / LH-ATEX

Unit heater-basic unit LH	LH	LH-ATEX
for mixed air, fresh air and return air modes for wall-mounting or ceiling mounting	●	
Casing welded, galvanised sectional steel frame. Casing panels galvanised; paint finish available on request.	●	
Discharge louvre with manually adjustable guide vanes.	●	
Axial fan for quiet operation, with statically and dynamically balanced impeller and protection grille.	●	
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.	●	
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.	●	
Progressive three-phase current motor 3x400V 50Hz, for control system DigiPro; protection class IP54, insulation class F, low noise level, maintenance free, direct drive, with well dimensioned ball bearings with special lubricant from -25 to +140°C for a large temperature range, terminal box, full motor protection via thermal cutouts in the windings in combination with control system DigiPro.	●	
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.	●	
Alternatives:		
Heat exchanger withdrawable, **galvanised steel** for water or steam as heating medium. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.	●	
Electric heater with overheat safety cut-off for 230 V/ 400 V.	●	
Without heat exchanger	●	
Unit heater-basic unit LH-ATEX, Explosion proof design for Ex-zone 2 (II 3G c IIB T4 X)		
for mixed air, fresh air and return air modes for wall-mounting or ceiling mounting		●
Casing welded, galvanised sectional steel frame. Casing panels galvanised.		●
Discharge louvre with manually adjustable guide vanes.		●
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		●
Heat exchanger withdrawable, Co/Al for LPHW or MPHW. Inch-system threads or flange and mating flange. Pipe penetrations fitted with rosettes.		●
Alternatives:		
Heat exchanger withdrawable, **galvanised steel** for LPHW or MPHW. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.		●
Without heat exchanger		●

Technical data:

Air volume	..... m³/h	**Dimensions:**	Length:	.....	mm
Heating output	..... kW		Width:	.....	mm
Air temperature rise	from ..... to ..... °C		Height:	.....	mm
Heating medium	..... / ..... °C		Weight:	.....	kg
Hydraulic resistance	..... kPa				
Motor speed	..... min-1	Make:	Wolf		
Motor output	..... kW	Type:	LH / LH ATEX		
Operating voltage	 V				
Retad current	..... A				
Degree of protection					

Unit description / Scope of supply LH / LH-ATEX

Intake accessories	LH	LH-ATEX
Mixing box galvanised, with two integrated dampers for fresh air at rear and return air at side; adjustment manual or with damper actuator.	●	on request
Fresh air box galvanised, with air intake at rear for connection to a wall shaft or air intake duct	●	●
Damper for fresh air, galvanized	●	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 at LH63, filter class G3 at LH 25, LH 40, LH 100	●	●
Intake duct for return air length ..... m	●	●
Rain protection hood with intake hood and bird screen, galvanized sheet steel.	●	●
Roof lead-in box, galvanized sheet steel	●	●
Covering collar for roof passage, galvanized sheet steel	●	●
Intake hood with bird screen, galvanized sheet steel	●	●
Non-return flap for rain protection hood/intake hood	●	●
Weatherproof louvre with bird screen without non-return flap, galvanized sheet steel	●	●
Weatherproof louvre with bird screen and non-return flap, galvanized sheet steel	●	●
Flexible connection 4-hole profile, galvanized sheet steel.	●	●
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,	●	●
Fastening set for the installation of an LH-Unit on a vertical concrete bar, galvanized sheet steel, for LH / LH-ATEX 25 - 40	●	●
Fastening set for the installation of an LH-Unit on a vertical concrete bar, galvanized sheet steel, 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 accessery, galvanized sheet steel.	●	●
Electrical accessories		
Single-stage switch D1 Full motor protection for single-speed fan operation. Max switching 3 kW, operating voltage 400 V, control voltage 230 V, degree of protection IP 54; dimensions B x H x T:105 x 170 x 135 mm.	●	● *
Two-stage switch DS Full motor protection for two-speed fan operation. Max. switching 4 kW, operating voltage 400 V, control voltage 230 V, degree of protection IP 54; dimensions W x H x D: 105 x 170 x 135 mm.	●	● *
Three-stage switch E3-7T Full motor protection with reclosing lock-out for three- speed fan operation with single-phase AC-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.	●	-
Three-stage switch D 3-4 Full motor protection with reclosing lock-out for three-speed fan operation. Max. current 4 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.	●	● *
Five-stage switch D5-1 Full motor protection for five-speed fan operation. Max. current 1 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 40; dimensions W x H x D: 150 x 200 x 175 mm.	●	● *
Five-stage switch D5-3 Full motor protection for five-speed fan operation. Max. current 2 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.	●	● *
Five-stage switch D5-7 Full motor protection for five-speed fan operation. Max. current 4 A, operating voltage 400 V, control voltage 230 V, degree of protection IP 20; dimensions W x H x D: 230 x 310 x 185 mm.	●	● *

* Installation outside the Ex-zone only

Electrical accessories	LH	LH-ATEX
Five-stage switch D5-12 Full motor protection 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.	●	● *
Five-stage switch E5-3 Full motor protection for five-speed fan operation with single-phase a.c. motor Max. current 3 A, operating voltage 230 V, degree of protection IP 40; dimensions B x H x T: 150 x 200 x 175 mm.	●	–
Five-stage switch E5-7 T 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 B x H x T: 150 x 200 x 175 mm.	●	–
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 B x H x T: 170 x 220 x 110 mm.	●	●
Explosion-proof switch for A1Ü automatic controller. operating voltage 690V, max. current 16(4)A, degree of protection IP 66	●	●
Explosion proof ATEX-terminal box. fitted and wired	–	●
Thermistor triggering unit suitable for installation in wiring board on site	–	●
Control interface box for connection to Wolf boiler control system.	●	●
Intermediate terminal box for parallel operation of max. 3 LH unit heaters	●	–
All-pole Isolator AR8, installed and fully wired.	●	●
Earthing strap for potential equalization	●	–
Antifreeze thermostat mounted on LH unit heater	●	–
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 B x H x T: 75 x 75 x 25 mm.	●	–
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 B x H X T: 117 x 71 x 30 mm.	●	–
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 B x H X T: 132 x 82 x 32 mm.	●	–

* Installation outside the Ex-zone only

Electrical accessories	LH	LH-ATEX
Remote sensor for room thermostat timer for socket installation, degree of protection IP 54. dimensions B x H x T: 52 x 50 x 35 mm.	●	–
Room thermostat, industrial version Switching capacity 16 (4) A at 230 V, temperature range 0-40 °C, degree of protection IP 54; dimensions B x H x T: 110 x 156 x 72 mm.	●	–
Actuator for stepless control of damper or mixing valve 230 V / 50 Hz .	●	–
Actuator for damper open/closed 230 V / 50 Hz.	●	–
Automatic relay A1 for open/closed actuator.	●	–
Automatic relay A1S with position controller for stepless actuator.	●	–
Position controller for installation on wiring board front for progressive actuator in connection with automatic relay A1.	●	–
Position controller for front-panel installation in control cabinet for controlling the stepless actuator in conjunction with automatic relay A1.	●	–
Key button for actuator 230 V / 50 Hz for induction louvre	●	–
Electrical accessories WRS		
BML ventilation programming module room temperature-dependent control for regulating up to 7 zones with eBUS interface	●	–
Wall mounting base for use with the BML ventilation programming module as remote control	●	–
LM1 ventilation control unit (incl. room temperature sensor) for room temperature-dependent control of air heaters with 2-stage motor	●	–
LM2 ventilation control unit room temperature controlled via mixer or speed in conjunction with EC motors with additional LM1 module, 2-stage motor control	●	–
Outside 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	●	–
Supply air sensor and sensor retainer	●	–

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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.

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