

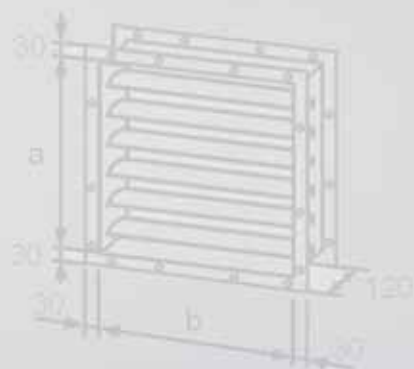


Energy saving and environmental protection included

Technical documentation

Unit heater

LH



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Casing



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

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.

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/outlet (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

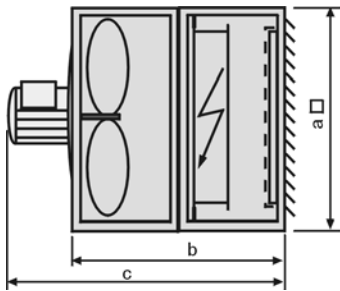
See performance table for pipe connection sizes.

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 | \dot{V}_{min} (m ³ /h) | 800 | 1600 | 2500 | 4000 |
| vertikal air flow | \dot{V}_{min} (m ³ /h) | 1000 | 2200 | 3200 | 5000 |

Protective measures:

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

Casing



| 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 category CL F.

Star circuit: low speed, delta circuit: high speed

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

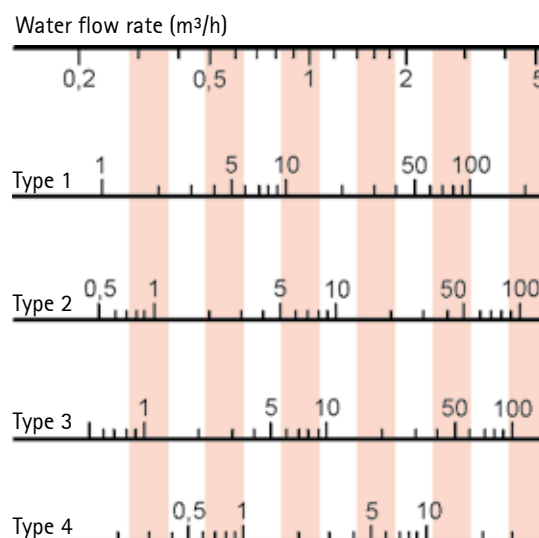
Explosion-proof switch

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

for MPHWH

Hydraulic resistance [kPa]

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



Pages 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)

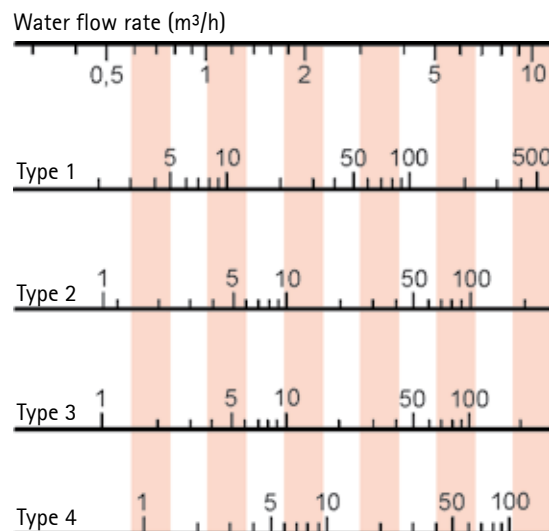
Sound pressure level

(as a function of speed)

for MPHWH

Hydraulic resistance [kPa]

| Type | 1 | | | | 2 | | | | 3 | | | | |
|---|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----|
| Speed [min ⁻¹] | 1350 | | 1000 | | 1350 | | 1000 | | 1350 | | 1000 | | |
| Air vol. V ₀ [m ³ /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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 [m ²]* | 23 | | 16 | | 22,5 | | 15 | | 20 | | 13,5 | | |
| Air throw, ceiling mount. [m]* | 5,6 | | 4,1 | | 5,5 | | 3,9 | | 5,0 | | 3,6 | | |
| Sound pressure level dB[A]** | 60 | | 54 | | 60 | | 54 | | 60 | | 54 | | |
| Water capacity [litres] | 1,0 | | | | 1,5 | | | | 2,0 | | | | |
| Heat exchanger connections | R 3/4" | | | | R 1" | | | | R 1" | | | | |



Pages 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 _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | Q _o | t _{off} | | | |
| t _{om} [°C] | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | t _{om} [°C] | kW | °C | kW | °C | | |
| LPHW 45/35 | -15 | 33,6 | 2 | 28,6 | 4 | 43,6 | 7 | 36,5 | 10 | 50,7 | 14 | 42,1 | 17 | 61,3 | 22 | 50,5 | 24 | 1,1 bar | -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 |
| | ±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 | | ±0 | 61,8 | 33 | 52,1 | 37 |
| | +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 | | +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 |
| LPHW 50/40 | -15 | 37,1 | 4 | 31,5 | 6 | 48,1 | 10 | 40,2 | 12 | 55,7 | 17 | 46,2 | 20 | 67,1 | 25 | 55,2 | 28 | 1,5 bar | -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 |
| | ±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 | | ±0 | 67,1 | 36 | 56,5 | 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 | | +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 |
| LPHW 60/40 | -15 | 38,0 | 4 | 32,4 | 6 | 49,3 | 10 | 41,3 | 13 | 57,8 | 18 | 48,2 | 22 | 70,5 | 27 | 58,3 | 30 | 2,0 bar | -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 |
| | ±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 | | ±0 | 72,2 | 38 | 60,8 | 43 |
| | +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 | | +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 |
| LPHW 70/50 | -15 | 45,0 | 8 | 38,3 | 10 | 58,3 | 15 | 48,8 | 18 | 67,9 | 24 | 56,5 | 28 | 82,2 | 35 | 67,7 | 38 | 3,0 bar | -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 |
| | ±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 | | ±0 | 79,9 | 42 | 67,3 | 47 |
| | +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 | | +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 |
| LPHW 80/60 | -15 | 51,9 | 11 | 44,1 | 14 | 67,3 | 19 | 56,2 | 23 | 77,8 | 30 | 64,5 | 34 | 93,5 | 41 | 76,9 | 45 | 5,0 bar | -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 |
| | ±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 | | ±0 | 90,3 | 48 | 76,0 | 53 |
| | +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 | | +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 |
| LPHW 90/70 | -15 | 58,8 | 14 | 49,8 | 18 | 76,0 | 24 | 63,4 | 28 | 87,5 | 35 | 72,4 | 40 | 104,5 | 48 | 85,7 | 52 | 9,0 bar | -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 |
| | ±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 | | ±0 | 103,5 | 55 | 87,0 | 61 |
| | +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 | | +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 1 1/4" | | | | R 1 1/4" | | | | R 1 1/4" | | | | DN 50 - DN 25 | | | | | | |

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

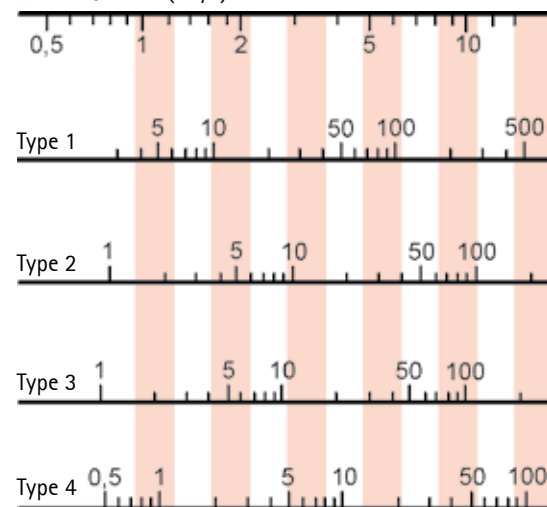
** Sound pressure level measured 5 m from intake, room with average absorption; enclosed space approx. 1500 m³.

for MPHWH

Hydraulic resistance [kPa]

| Type | 1 | | | | 2 | | | | 3 | | | | |
|---|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----|
| | 900 | | 700 | | 900 | | 700 | | 900 | | 700 | | |
| Air vol. V ₀ [m ³ /h] | 5300 | | 4000 | | 5200 | | 3900 | | 4600 | | 3500 | | |
| t _{on} [°C] | Q ₀ | t _{off} | Q ₀ | t _{off} | Q ₀ | t _{off} | Q ₀ | t _{off} | Q ₀ | t _{off} | Q ₀ | t _{off} | |
| | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | kW | °C | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 [m ²]* | 26 | | 18 | | 24 | | 17 | | 21 | | 15 | | |
| Air throw, ceiling mount. [m]* | 7,1 | | 5,3 | | 6,9 | | 5,1 | | 6,1 | | 4,5 | | |
| Sound pressure level dB[A]** | 59 | | 53 | | 59 | | 53 | | 59 | | 53 | | |
| Water capacity [litres] | 2,5 | | | | 3,5 | | | | 3,5 | | | | |
| Heat exchanger connections | R 1" | | | | R 1 1/4" | | | | R 1 1/4" | | | | |

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)

Performance tables

for LPHW

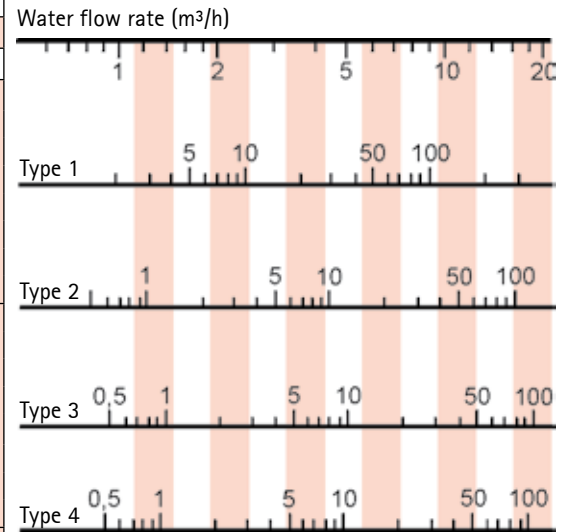
for saturated steam

| Type | 1 | | | | 2 | | | | 3 | | | | 4 | | | | | D | | | | | |
|--------------------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----|-------|----|
| | 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 | kW | °C | kW | °C | | | |
| LPHW 45/35 | -15 | 57,1 | 2 | 48,1 | 4 | 72,8 | 7 | 60,4 | 10 | 93,9 | 15 | 75,1 | 18 | 107,5 | 22 | 84,5 | 25 | 1,1 bar | -15 | 121,8 | 21 | 101,8 | 25 |
| | -10 | 51,2 | 5 | 43,1 | 7 | 65,2 | 10 | 54,1 | 12 | 84,3 | 17 | 67,5 | 20 | 96,8 | 24 | 76,1 | 27 | | -10 | 115,8 | 25 | 96,8 | 29 |
| | -5 | 45,3 | 9 | 38,2 | 11 | 57,7 | 13 | 47,9 | 15 | 74,8 | 20 | 60,0 | 23 | 86,1 | 26 | 67,9 | 28 | | -5 | 109,9 | 29 | 91,9 | 33 |
| | ±0 | 39,6 | 12 | 33,4 | 14 | 50,3 | 16 | 41,8 | 18 | 65,5 | 22 | 52,5 | 25 | 75,7 | 28 | 59,7 | 30 | | ±0 | 104,1 | 33 | 87,0 | 36 |
| | +5 | 33,9 | 16 | 28,6 | 17 | 43,0 | 19 | 35,7 | 21 | 56,3 | 24 | 45,2 | 27 | 65,4 | 29 | 51,7 | 31 | | +5 | 98,4 | 36 | 82,2 | 40 |
| | +10 | 28,3 | 19 | 23,9 | 20 | 35,7 | 22 | 29,8 | 23 | 47,2 | 27 | 38,0 | 28 | 55,1 | 31 | 43,7 | 33 | | +10 | 92,7 | 40 | 77,5 | 44 |
| | +15 | 22,8 | 22 | 19,3 | 24 | 28,6 | 25 | 23,9 | 26 | 38,2 | 29 | 30,9 | 30 | 45,0 | 32 | 35,8 | 34 | | +15 | 87,1 | 44 | 72,8 | 47 |
| | +20 | 17,3 | 26 | 14,7 | 27 | 21,6 | 27 | 18,1 | 28 | 29,3 | 31 | 23,8 | 32 | 35,0 | 34 | 27,9 | 35 | | +20 | 81,5 | 47 | 68,1 | 51 |
| | +20 | 17,3 | 26 | 14,7 | 27 | 21,6 | 27 | 18,1 | 28 | 29,3 | 31 | 23,8 | 32 | 35,0 | 34 | 27,9 | 35 | | +20 | 81,5 | 47 | 68,1 | 51 |
| LPHW 50/40 | -15 | 62,9 | 4 | 53,0 | 6 | 80,4 | 9 | 66,5 | 12 | 103,1 | 18 | 82,3 | 21 | 117,5 | 25 | 92,2 | 29 | 1,5 bar | -15 | 130,8 | 24 | 109,3 | 28 |
| | -10 | 57,0 | 7 | 48,0 | 9 | 72,7 | 12 | 60,2 | 15 | 93,4 | 20 | 74,7 | 24 | 106,7 | 27 | 83,8 | 30 | | -10 | 124,8 | 28 | 104,3 | 32 |
| | -5 | 51,1 | 11 | 43,0 | 13 | 65,1 | 15 | 54,0 | 18 | 83,9 | 23 | 67,1 | 26 | 96,1 | 29 | 75,5 | 32 | | -5 | 118,9 | 31 | 99,3 | 36 |
| | ±0 | 45,3 | 14 | 38,2 | 16 | 57,7 | 18 | 47,8 | 21 | 74,6 | 25 | 59,7 | 28 | 85,6 | 31 | 67,4 | 34 | | ±0 | 113,0 | 35 | 94,4 | 40 |
| | +5 | 39,6 | 18 | 33,4 | 19 | 50,3 | 21 | 41,8 | 23 | 65,3 | 27 | 52,3 | 30 | 75,2 | 33 | 59,3 | 35 | | +5 | 107,2 | 39 | 89,6 | 43 |
| | +10 | 33,9 | 21 | 28,7 | 22 | 43,0 | 24 | 35,8 | 26 | 56,2 | 30 | 45,1 | 32 | 65,0 | 35 | 51,3 | 37 | | +10 | 101,5 | 43 | 84,8 | 47 |
| | +15 | 28,4 | 24 | 24,0 | 26 | 35,9 | 27 | 29,9 | 29 | 47,2 | 32 | 37,9 | 34 | 54,9 | 36 | 43,5 | 38 | | +15 | 95,9 | 47 | 80,1 | 50 |
| | +20 | 22,9 | 28 | 19,4 | 29 | 28,8 | 30 | 24,0 | 31 | 38,2 | 34 | 30,9 | 35 | 44,9 | 38 | 35,7 | 39 | | +20 | 90,3 | 50 | 75,4 | 54 |
| | +20 | 22,9 | 28 | 19,4 | 29 | 28,8 | 30 | 24,0 | 31 | 38,2 | 34 | 30,9 | 35 | 44,9 | 38 | 35,7 | 39 | | +20 | 90,3 | 50 | 75,4 | 54 |
| LPHW 60/40 | -15 | 64,6 | 4 | 54,5 | 7 | 81,9 | 10 | 68,2 | 13 | 107,3 | 19 | 86,2 | 23 | 124,4 | 28 | 98,3 | 32 | 2,0 bar | -15 | 139,6 | 26 | 116,6 | 31 |
| | -10 | 58,6 | 8 | 49,5 | 10 | 74,3 | 13 | 61,9 | 16 | 97,6 | 22 | 78,5 | 25 | 113,6 | 30 | 89,8 | 33 | | -10 | 133,6 | 30 | 111,6 | 35 |
| | -5 | 52,8 | 11 | 44,6 | 13 | 66,8 | 16 | 55,7 | 19 | 88,1 | 24 | 70,9 | 28 | 102,9 | 32 | 81,5 | 35 | | -5 | 127,6 | 34 | 106,6 | 39 |
| | ±0 | 47,0 | 15 | 39,8 | 17 | 59,3 | 19 | 49,5 | 21 | 78,7 | 27 | 63,5 | 30 | 92,3 | 34 | 73,2 | 37 | | ±0 | 121,7 | 38 | 101,6 | 43 |
| | +5 | 41,3 | 18 | 35,0 | 20 | 52,0 | 22 | 43,5 | 24 | 69,4 | 29 | 56,1 | 32 | 81,9 | 35 | 65,1 | 38 | | +5 | 115,8 | 42 | 96,8 | 46 |
| | +10 | 35,6 | 22 | 30,2 | 23 | 44,7 | 25 | 37,5 | 27 | 60,2 | 31 | 48,7 | 34 | 71,5 | 37 | 57,0 | 40 | | +10 | 110,1 | 46 | 92,0 | 50 |
| | +15 | 30,1 | 25 | 25,5 | 26 | 37,5 | 28 | 31,5 | 29 | 51,1 | 33 | 41,5 | 35 | 61,2 | 39 | 48,9 | 41 | | +15 | 104,4 | 49 | 87,2 | 54 |
| | +20 | 24,5 | 28 | 20,9 | 29 | 30,4 | 30 | 25,6 | 32 | 42,0 | 35 | 34,2 | 37 | 50,9 | 40 | 40,8 | 42 | | +20 | 98,8 | 53 | 82,5 | 57 |
| | +20 | 24,5 | 28 | 20,9 | 29 | 30,4 | 30 | 25,6 | 32 | 42,0 | 35 | 34,2 | 37 | 50,9 | 40 | 40,8 | 42 | | +20 | 98,8 | 53 | 82,5 | 57 |
| LPHW 70/50 | -15 | 76,5 | 8 | 64,4 | 10 | 97,3 | 14 | 80,7 | 18 | 125,9 | 25 | 100,8 | 30 | 144,5 | 35 | 113,7 | 39 | 3,0 bar | -15 | 152,7 | 30 | 127,5 | 35 |
| | -10 | 70,5 | 11 | 59,4 | 14 | 89,5 | 18 | 74,3 | 21 | 116,2 | 28 | 93,0 | 32 | 133,6 | 37 | 105,2 | 41 | | -10 | 146,6 | 34 | 122,4 | 39 |
| | -5 | 64,5 | 15 | 54,4 | 17 | 81,9 | 21 | 68,1 | 24 | 106,6 | 30 | 85,4 | 34 | 122,9 | 39 | 96,9 | 43 | | -5 | 140,5 | 38 | 117,3 | 43 |
| | ±0 | 58,7 | 18 | 49,5 | 21 | 74,4 | 24 | 61,9 | 27 | 97,1 | 33 | 77,9 | 36 | 112,3 | 41 | 88,6 | 44 | | ±0 | 134,6 | 42 | 112,4 | 47 |
| | +5 | 52,9 | 22 | 44,7 | 24 | 67,0 | 27 | 55,7 | 30 | 87,8 | 35 | 70,5 | 39 | 101,9 | 43 | 80,5 | 46 | | +5 | 128,7 | 46 | 107,5 | 51 |
| | +10 | 47,2 | 25 | 39,9 | 27 | 59,6 | 30 | 49,7 | 32 | 78,5 | 38 | 63,2 | 41 | 91,5 | 45 | 72,4 | 48 | | +10 | 122,9 | 50 | 102,6 | 55 |
| | +15 | 41,5 | 29 | 35,2 | 31 | 52,4 | 33 | 43,7 | 35 | 69,4 | 40 | 55,9 | 43 | 81,3 | 46 | 64,5 | 49 | | +15 | 117,2 | 54 | 97,8 | 58 |
| | +20 | 35,9 | 32 | 30,5 | 34 | 45,2 | 35 | 37,8 | 37 | 60,3 | 42 | 48,7 | 44 | 71,1 | 48 | 56,6 | 50 | | +20 | 111,5 | 57 | 93,1 | 62 |
| | +20 | 35,9 | 32 | 30,5 | 34 | 45,2 | 35 | 37,8 | 37 | 60,3 | 42 | 48,7 | 44 | 71,1 | 48 | 56,6 | 50 | | +20 | 111,5 | 57 | 93,1 | 62 |
| LPHW 80/60 | -15 | 88,2 | 11 | 74,2 | 14 | 112,3 | 19 | 93,0 | 23 | 144,0 | 31 | 114,9 | 36 | 164,0 | 41 | 128,6 | 46 | 5,0 bar | -15 | 170,5 | 35 | 142,3 | 41 |
| | -10 | 82,1 | 15 | 69,1 | 18 | 104,5 | 22 | 86,6 | 26 | 134,3 | 34 | 107,2 | 38 | 153,0 | 44 | 120,1 | 48 | | -10 | 164,3 | 39 | 137,1 | 45 |
| | -5 | 76,1 | 18 | 64,1 | 21 | 96,8 | 25 | 80,2 | 29 | 124,6 | 36 | 99,6 | 41 | 142,3 | 46 | 111,8 | 50 | | -5 | 158,2 | 43 | 132,0 | 49 |
| | ±0 | 70,2 | 22 | 59,1 | 25 | 89,2 | 28 | 74,0 | 32 | 115,1 | 39 | 92,0 | 43 | 131,7 | 48 | 103,5 | 52 | | ±0 | 152,2 | 47 | 127,0 | 53 |
| | +5 | 64,4 | 25 | 54,2 | 28 | 81,7 | 32 | 67,8 | 35 | 105,7 | 41 | 84,6 | 45 | 121,3 | 50 | 95,4 | 54 | | +5 | 146,2 | 51 | 122,0 | 57 |
| | +10 | 58,6 | 29 | 49,4 | 31 | 74,3 | 35 | 61,7 | 38 | 96,4 | 44 | 77,2 | 47 | 110,9 | 52 | 87,4 | 55 | | +10 | 140,4 | 55 | 117,1 | 61 |
| | +15 | 52,9 | 32 | 44,6 | 35 | 67,0 | 38 | 55,7 | 40 | 87,2 | 46 | 70,0 | 49 | 100,7 | 54 | 79,4 | 57 | | +15 | 134,6 | 59 | 112,3 | 65 |
| | +20 | 47,2 | 36 | 39,9 | 38 | 59,7 | 40 | 49,7 | 43 | 78,2 | 48 | 62,8 | 51 | 90,6 | 55 | 71,6 | 58 | | +20 | 128,8 | 63 | 107,5 | 68 |
| | +20 | 47,2 | 36 | 39,9 | 38 | 59,7 | 40 | 49,7 | 43 | 78,2 | 48 | 62,8 | 51 | 90,6 | 55 | 71,6 | 58 | | +20 | 128,8 | 63 | 107,5 | 68 |
| LPHW 90/70 | -15 | 99,7 | 14 | 83,8 | 18 | 127,1 | 23 | 105,0 | 28 | 161,8 | 37 | 128,8 | 42 | 182,9 | 48 | 143,0 | 53 | 9,0 bar | -15 | 193,1 | 42 | 161,0 | 49 |
| | -10 | 93,6 | 18 | 78,7 | 22 | 119,3 | 27 | 98,6 | 31 | 152,0 | 39 | 121,0 | 45 | 172,0 | 50 | 134,5 | 55 | | -10 | 186,8 | 46 | 155,7 | 53 |
| | -5 | 87,6 | 22 | 73,6 | 25 | 111,5 | 30 | 92,2 | 34 | 142,2 | 42 | 113,3 | 47 | 161,2 | 53 | 126,2 | 57 | | -5 | 180,6 | 50 | 150,6 | 57 |
| | ±0 | 81,6 | 25 | 68,6 | 29 | 103,8 | 33 | 85,8 | 37 | 132,7 | 45 | 105,8 | 49 | 150,6 | 55 | 118,0 | 59 | | ±0 | 174,5 | 54 | 145,5 | 61 |
| | +5 | 75,7 | 29 | 63,7 | 32 | 96,2 | 36 | 79,6 | 40 | 123,2 | 47 | 98,3 | 52 | 140,1 | 57 | 109,8 | 61 | | +5 | 168,5 | 59 | 140,4 | 65 |
| | +10 | 69,8 | 33 | 58,3 | 36 | 88,7 | 39 | 73,5 | 43 | 113,9 | 50 | 90,9 | 54 | 129,7 | 59 | 101,8 | 63 | | +10 | 162,5 | 63 | 135,4 | 69 |
| | +15 | 64,1 | 36 | 54,0 | 39 | 81,3 | 42 | 67,4 | 46 | 104,7 | 52 | 83,6 | 56 | 119,5 | 61 | 93,9 | 65 | | +15 | 156,6 | 67 | 130,5 | 73 |
| | +20 | 58,4 | 40 | 49,2 | 42 | 74,0 | 45 | 61,4 | 48 | 95,6 | 55 | 76,4 | 58 | 109,4 | 63 | 86,0 | 66 | | +20 | 150,8 | 70 | 125,7 | 76 |
| | +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 | | | | |

for MPHWH

Hydraulic resistance [kPa]

| Type | 1 | | | | 2 | | | | 3 | | | | |
|---|----------------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----|
| Speed [min ⁻¹] | 900 | | 700 | | 900 | | 700 | | 900 | | 700 | | |
| Air vol. V ₀ [m ³ /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 |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 | |
| MPHWH 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 [m ²]* | 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" | | | |



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 for heat exchangers

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:



straight-way type Part.-No. 20 08 030 rectangular type Part.-No. 20 08 040

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.

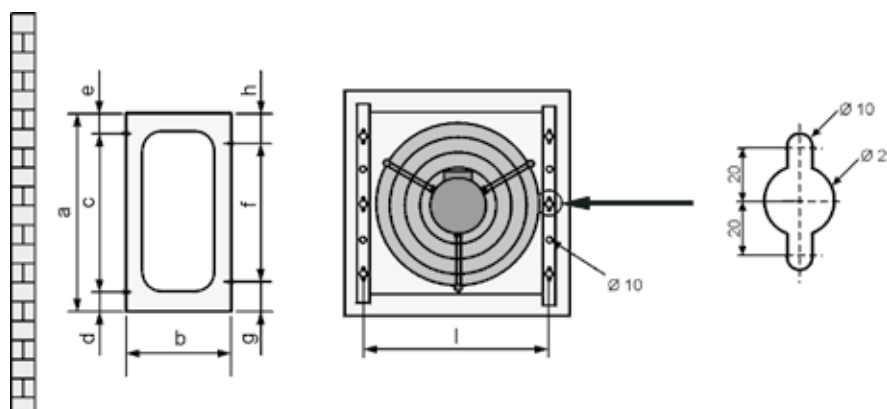
Fastening brackets

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

Complete set consisting of:

2 Brackets

Hexagon screws for assembly to LH-Unit.

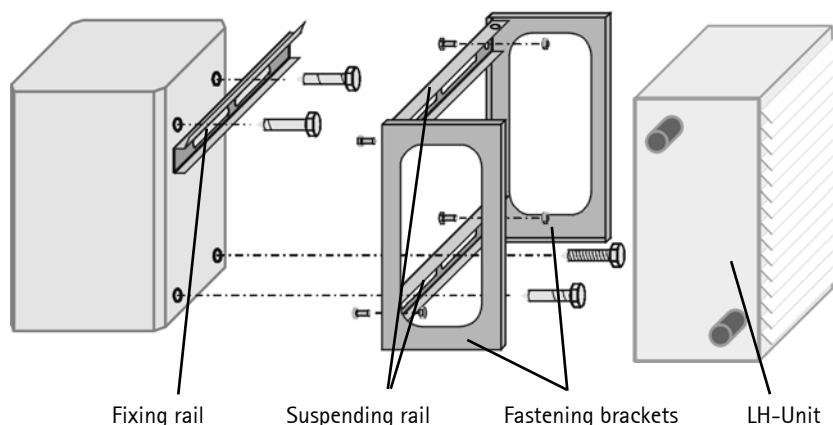


| LH | a | b | c | d | e | f | g | h | i | Part.No. |
|-----|-----|-----|-------------|----|----|-------|-----|-----|-----|-----------|
| 25 | 480 | 250 | 380 | 70 | 30 | 170 | 155 | 155 | 434 | 65 00 638 |
| 40 | 480 | 250 | 2x170 | 90 | 50 | 2x170 | 70 | 70 | 564 | 65 00 638 |
| 63 | 784 | 350 | 170+340+170 | 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.

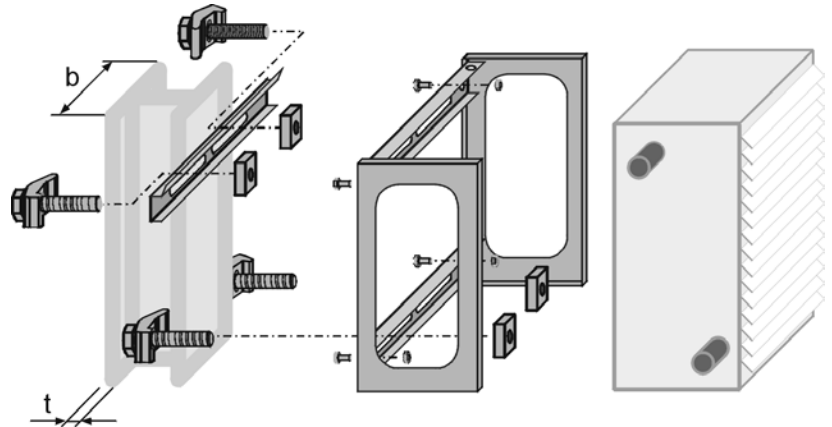
| LH | Part.No. |
|----|-----------|
| 25 | 65 00 781 |
| 40 | 65 00 782 |



Fastening set for steel bar - vertical

For fastening an LH-unit to a steel bar by suspending it into a preassembled (via clamping jaws) fixing rail. Suitable for all types of steel bars at a flange width „b” of 100-300 mm, and a flange thickness „t” of 6-21 mm. Consisting of: Fixing bracket, 2 pcs. suspending rails (galvanized sheet steel), 4 pcs clamping jaws, screws and nuts.

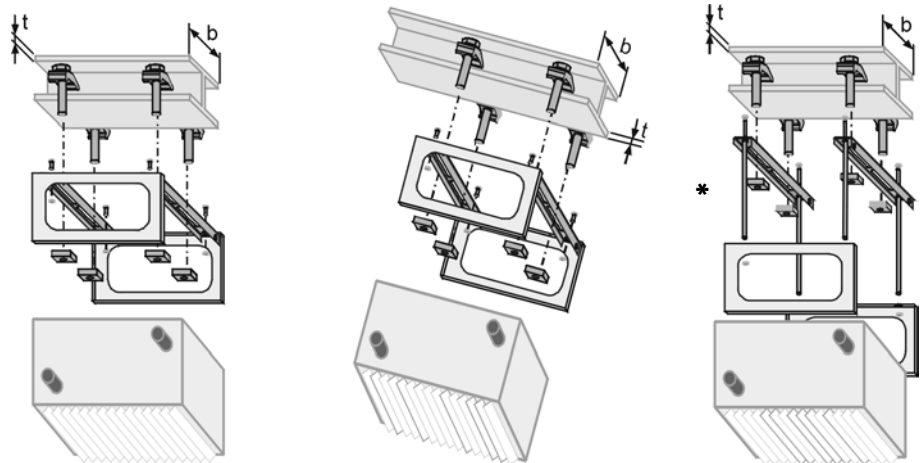
| LH | b | t | Part.No. |
|----|---------|------|-----------|
| 25 | 100-300 | 6-21 | 65 00 783 |
| 40 | 100-300 | 6-21 | 65 00 784 |



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

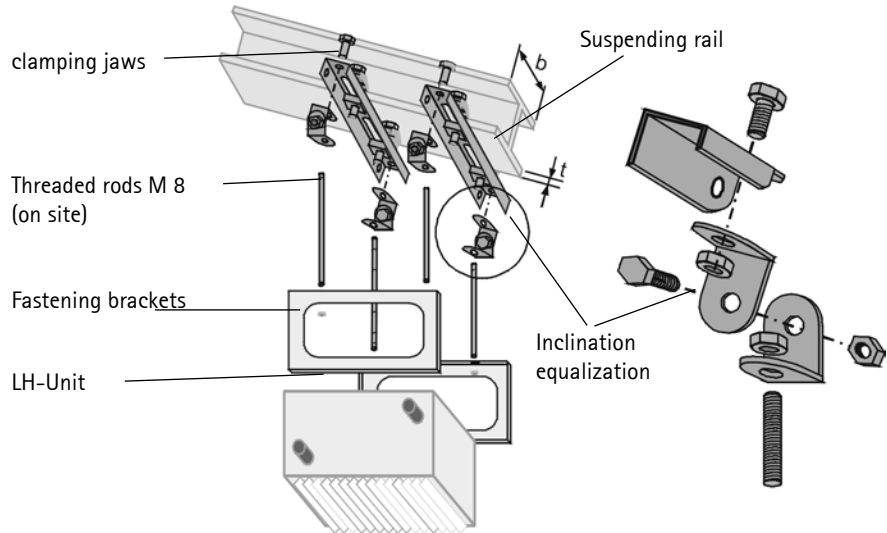
Indirect fastening on horizontal steel bar

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 set for steel bar - inclined with inclination equalization

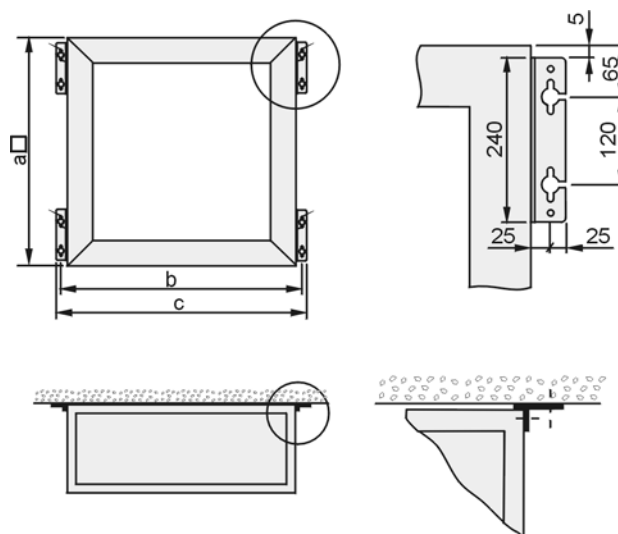
For fastening an LH-Unit to a steel bar at a flange width „b“ of 100-300 mm, and a flange thickness „t“ of 6-21 mm.
Consisting of: 2 pcs. suspending rails (galvanized sheet steel), 4 pcs. clamping jaws, 4 pcs. inclination equalization.



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

Angle brackets

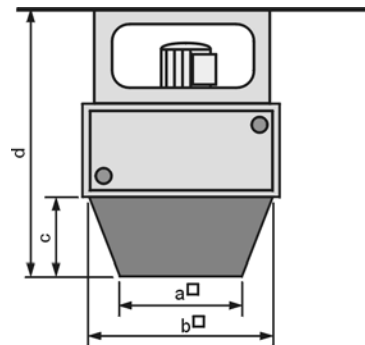
For wall-mount or ceiling-mount LH unit heaters complete with mixed air, recirculating air, fresh air or filter section galvanized.
Four angle brackets are required for installation. These brackets are enclosed with the intake accessory, as appropriate. (sealing towards wall / ceiling on site)



| 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 cone

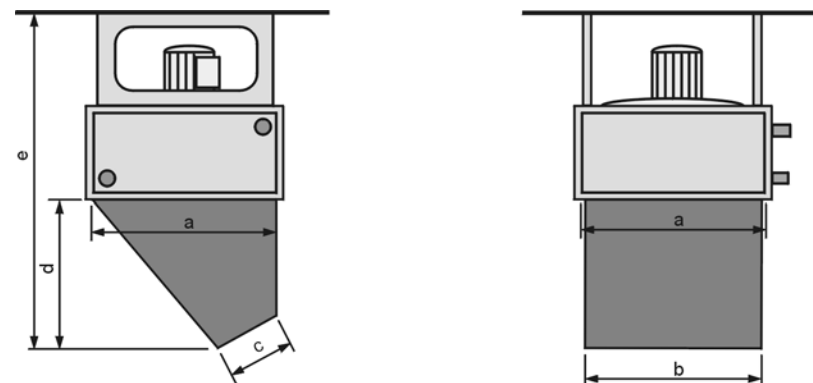
Increases the air throw of high-mounted unit heaters.
(See Page 40 for air throws)



| 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

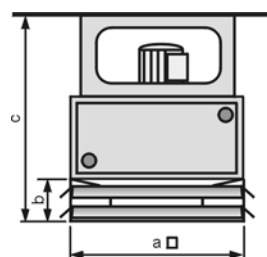
For long air throws, suitable for air curtains at doors.
Outlet temperature for air curtain approx. 10-15 °C higher than room temperature.
(See Page 40 for air throws)



| 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.



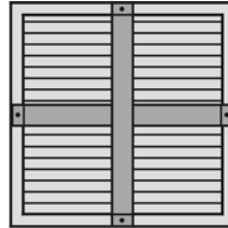
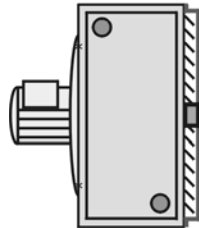
| LH | a | b | c | Part.No. |
|-----|------|-----|-----|-----------|
| 25 | 500 | 149 | 705 | 65 13 061 |
| 40 | 630 | 159 | 705 | 65 13 062 |
| 63 | 800 | 159 | 805 | 65 13 063 |
| 100 | 1000 | 159 | 845 | 65 13 064 |

Discharge 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).

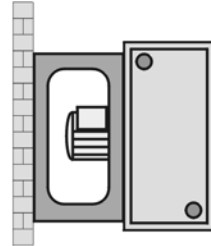
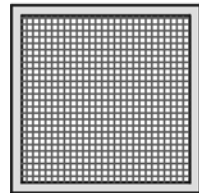


| LH | Part.No. |
|-----|-----------|
| 25 | 65 13 821 |
| 40 | 65 13 822 |
| 63 | 65 13 823 |
| 100 | 65 13 824 |

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



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.

Ceiling-mounted unit



Energy savings

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

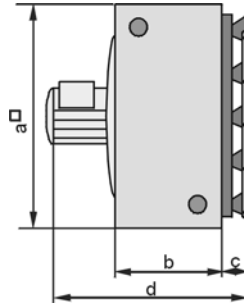
Easily retrofitted for upgrading

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

Scope of supply

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

Induction louvre for ceiling-mounted unit

manual setting

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

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 00 475 |
| 40 | 65 00 487 |
| 63 | 65 00 504 |
| 100 | 65 00 515 |

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

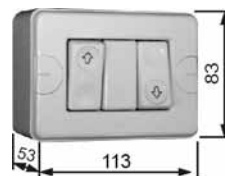
| LH | Part.No |
|-----|-----------|
| 25 | 65 00 957 |
| 40 | 65 00 958 |
| 63 | 65 00 959 |
| 100 | 65 00 960 |

with actuator 24V

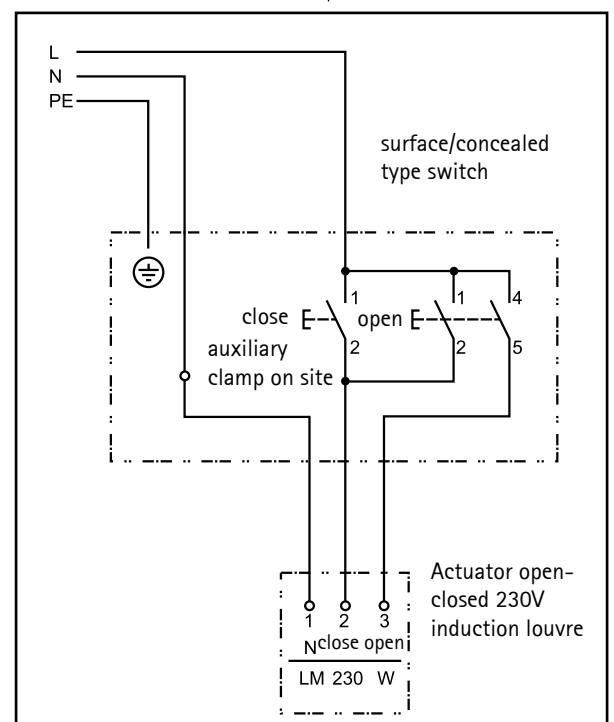
| LH | Part.No |
|-----|-----------|
| 25 | 65 00 961 |
| 40 | 65 00 962 |
| 63 | 65 00 963 |
| 100 | 65 00 964 |

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 airtthrow.



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



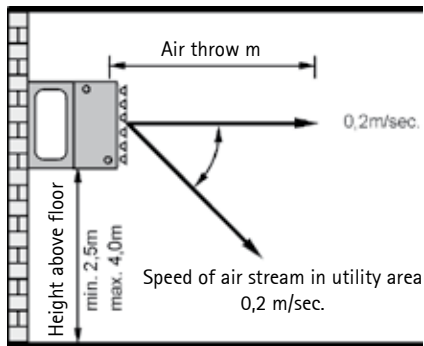
Clearances

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

Ceiling-mounted unit, vanes deflected.

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

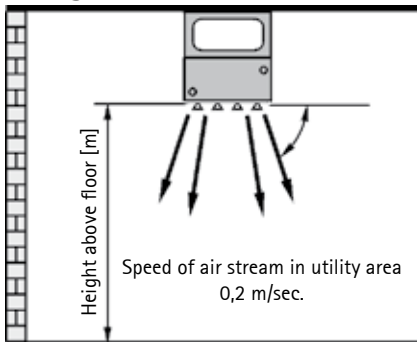
Air throw: wall-mounted unit



| LH | 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

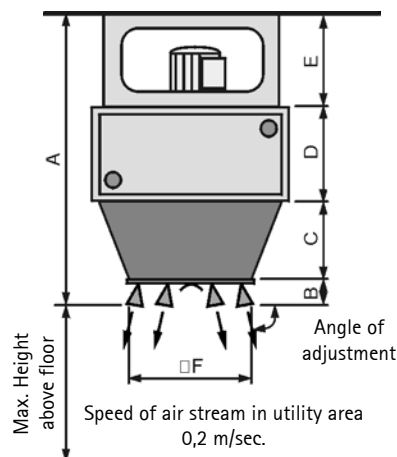


| Requird height (m) * | LH Type | 25 | | | | 40 | | | | 63 | | | | 100 | | | |
|----------------------------------|---------|----|-----|---|-----|----|-----|---|-----|----|-----|---|-----|-----|-----|---|-----|
| $\Delta T=20K$; Vanes deflected | | 5 | 4,5 | 4 | 3,5 | 6 | 5,5 | 5 | 4,5 | 7 | 6,5 | 6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

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

ΔT = Air outlet temperature - Air intake temperature

Height wall-mounted unit with adaption cone and induction louvre



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

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

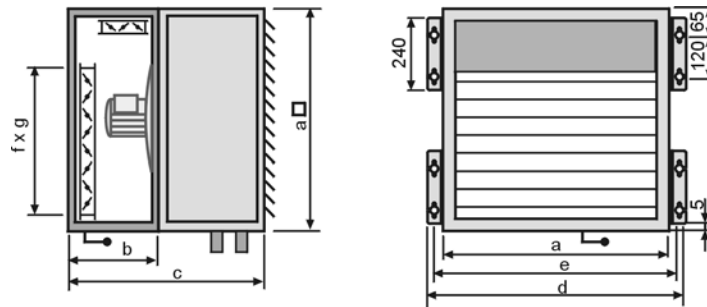
* The optimum vane angle depends on the local situation, i. e. room geometry, furniture, temperature stratification and air distribution. The data are standard values for an approximate selection.

ΔT = Air outlet temperature - Air intake temperature

Extended heights on request

Mixing box

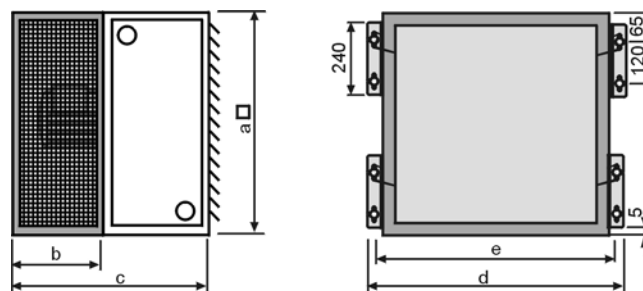
Mixing box galvanized. For adjusting the room's air change rate. Fresh air intake at rear, recirculated air intake at side or from above or below if mixing box is turned through 90°. Stepless adjustment from recirculated air only through mixed air to fresh air only, manual or with 230 V stepless actuator.



| 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.

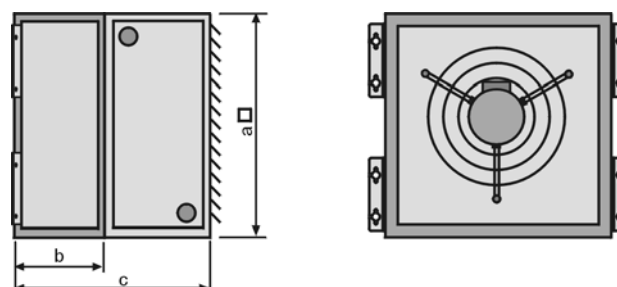


| LH | a | b | c | d | e | Part.No. |
|-----|------|-----|-----|------|------|-----------|
| 25 | 500 | 300 | 600 | 600 | 550 | 65 13 251 |
| 40 | 630 | 500 | 800 | 730 | 680 | 65 13 252 |
| 63 | 800 | 500 | 800 | 900 | 850 | 65 13 253 |
| 100 | 1000 | 540 | 880 | 1100 | 1050 | 65 13 254 |

Fresh air box

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

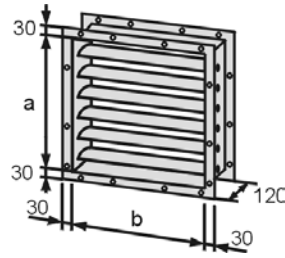
| LH | a | b | c | Part.No. |
|-----|------|-----|-----|-----------|
| 25 | 500 | 300 | 600 | 65 13 261 |
| 40 | 630 | 500 | 800 | 65 13 262 |
| 63 | 800 | 500 | 800 | 65 13 263 |
| 100 | 1000 | 540 | 880 | 65 13 264 |



Damper for fresh air box

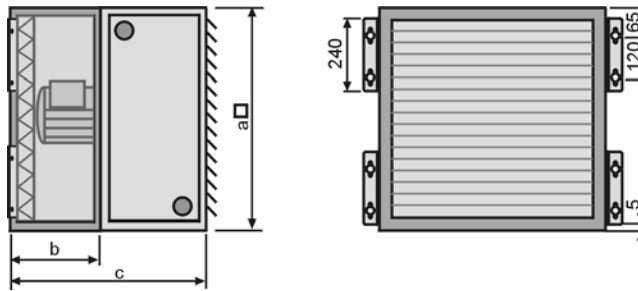
Galvanized damper for installation into fresh air box, sheet steel galvanized.
For damper actuators see page 31.

| 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

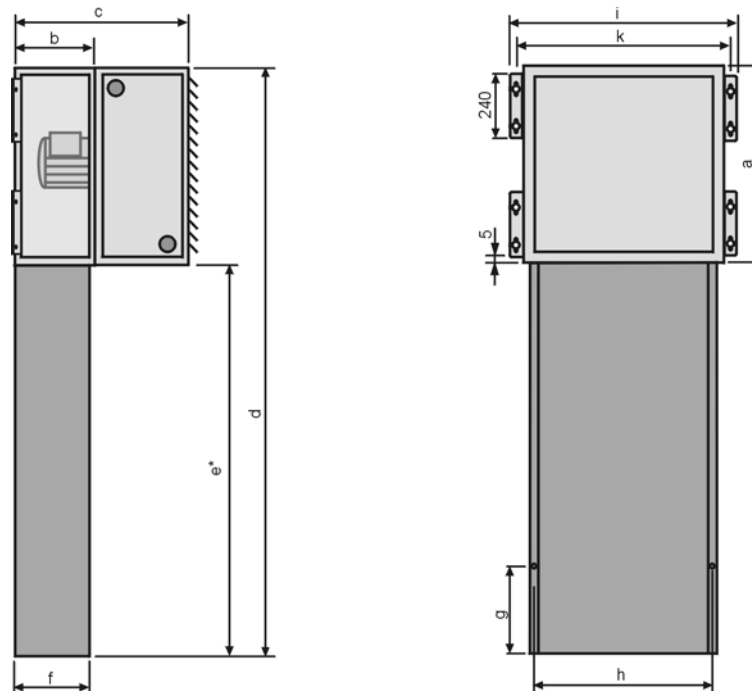
Galvanized filter box with dust trap for fresh or mixed air operation, G4 for LH 63, filter class G3 for LH 25, 40, 100. Angle brackets optional.



| 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.

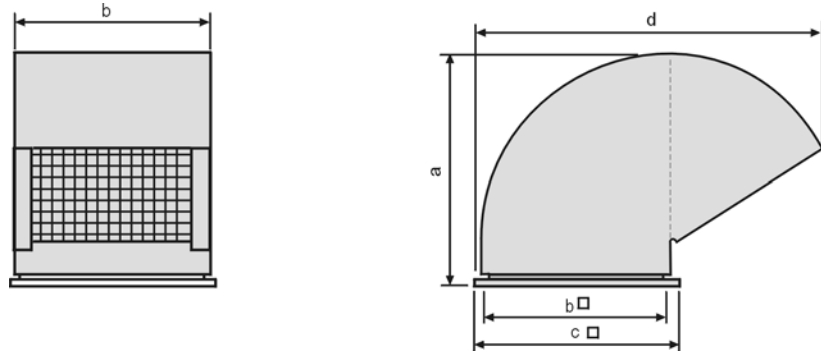


| LH | a | b | c | d | e* | f | g | h | i | k | Part.No. |
|-----|------|-----|-----|------|------|-----|-----|-----|------|------|-----------|
| 25 | 500 | 300 | 600 | 1460 | 960 | 260 | 180 | 450 | 600 | 550 | 65 13 161 |
| 40 | 630 | 500 | 800 | 1840 | 1210 | 460 | 180 | 570 | 730 | 680 | 65 13 162 |
| 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

Rain protection hood

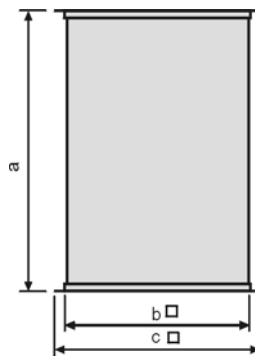
With bird screen (non-return flap optional) for roof-level fresh air intake. Connects to LH unit heater by means of roof lead-in box.



| 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

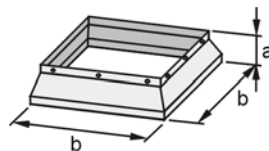
Connects the LH unit heater to the rain protection hood. Roof sealing on site. Galvanised sheet steel.



| 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

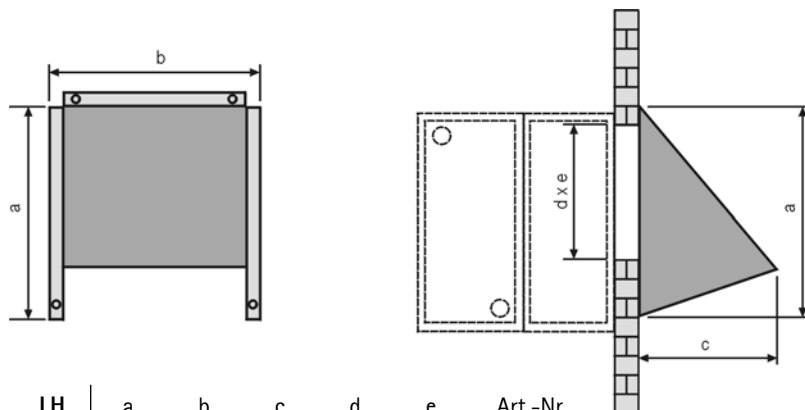
For roof passage. Galvanized sheet steel



| 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

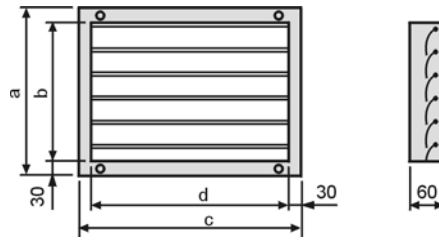
With bird screen, for fresh air intake through the wall (non-return flap optional). Galvanized sheet steel.



| 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 |

Non return-flap for rain protection/intake hood

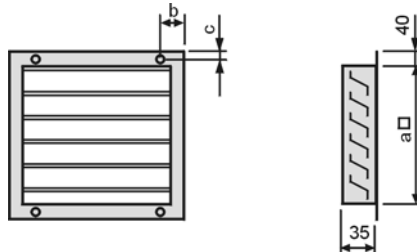
For installation in rain protection hood or in wall penetration for intake hood. Galvanised sheet steel.



| 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

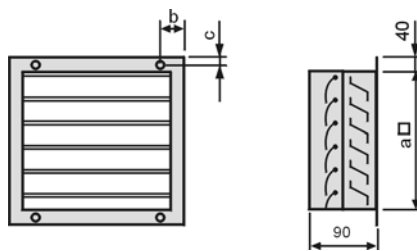
Weatherproof louvre incorporating bird screen. Galvanised sheet steel.



| 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

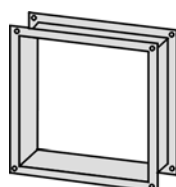
Weatherproof louvre incorporating bird screen and non-return flap. Galvanised sheet steel.



| 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.



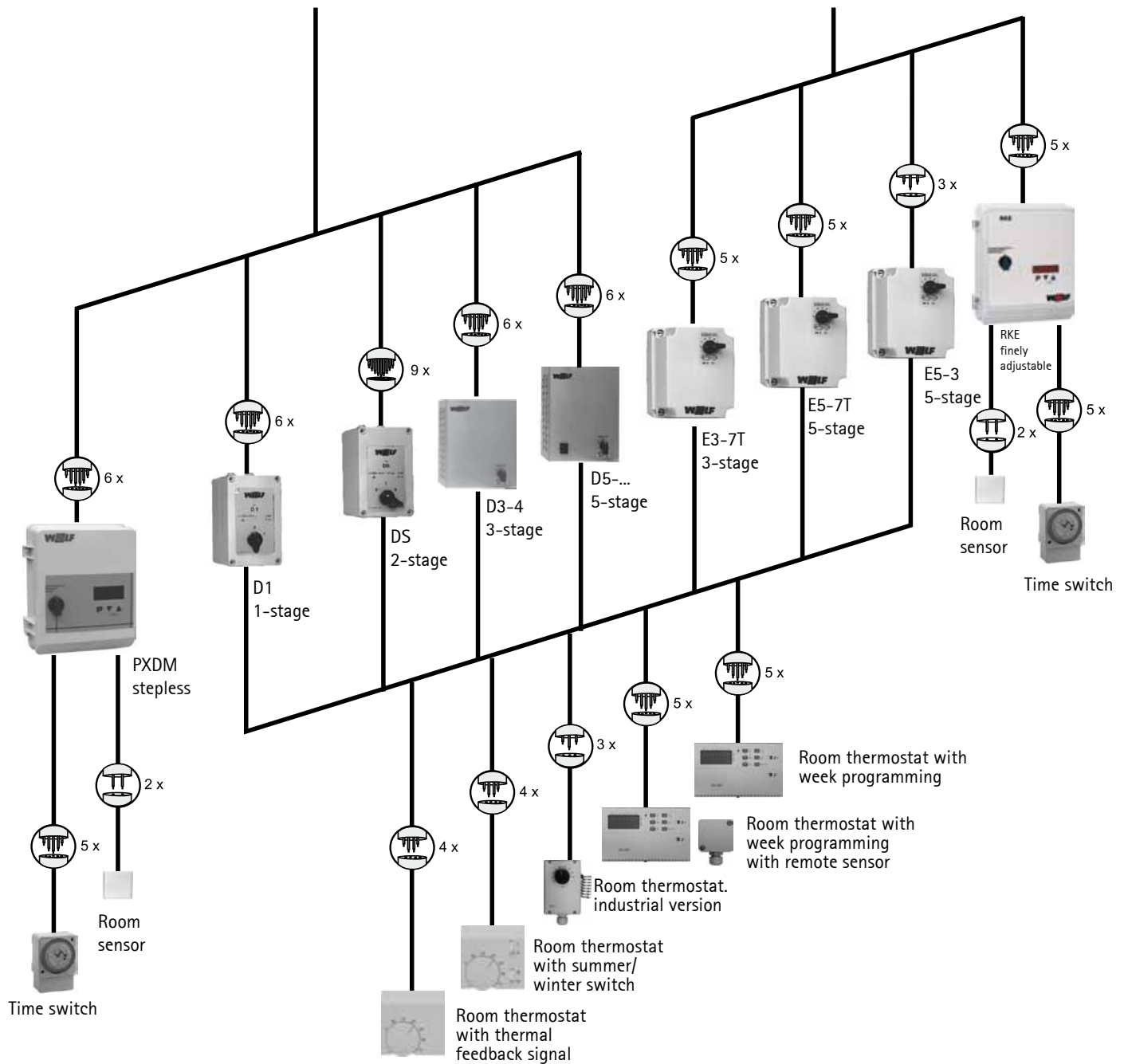
| LH | Art.-Nr. |
|-----|-----------|
| 25 | 25 25 025 |
| 40 | 25 25 040 |
| 63 | 25 25 063 |
| 100 | 25 25 100 |



Three-phase motor
3 x 400 V



Single-phase a.c. motor
230 V



Switching controllers

LH

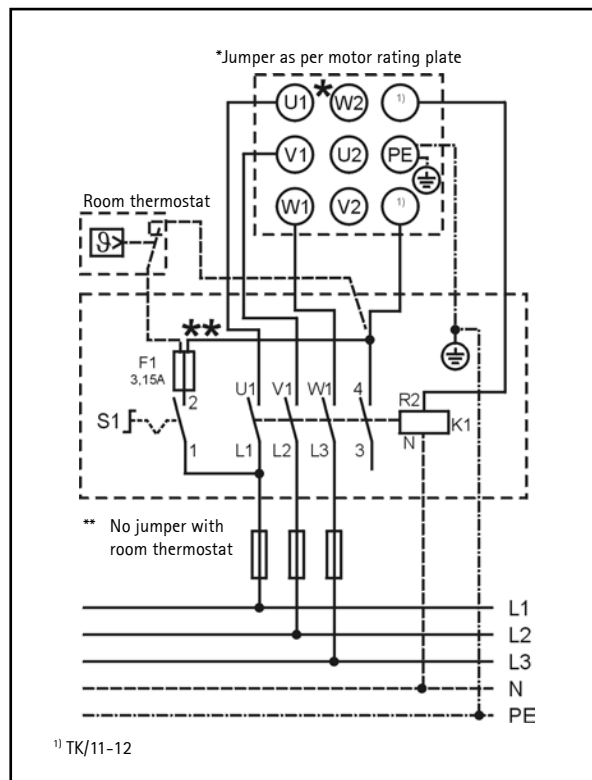
1-stage switch D1

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).



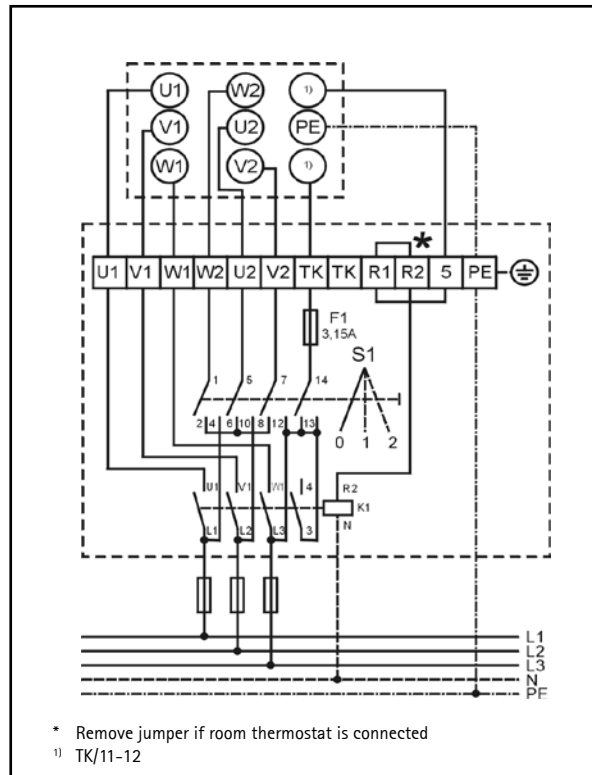
2-stage switch DS

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).



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.

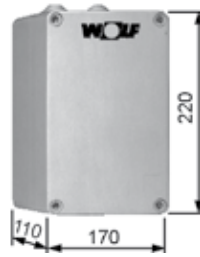
Full motor protection switches for 3 x 230 V available on request.

Switching controllers

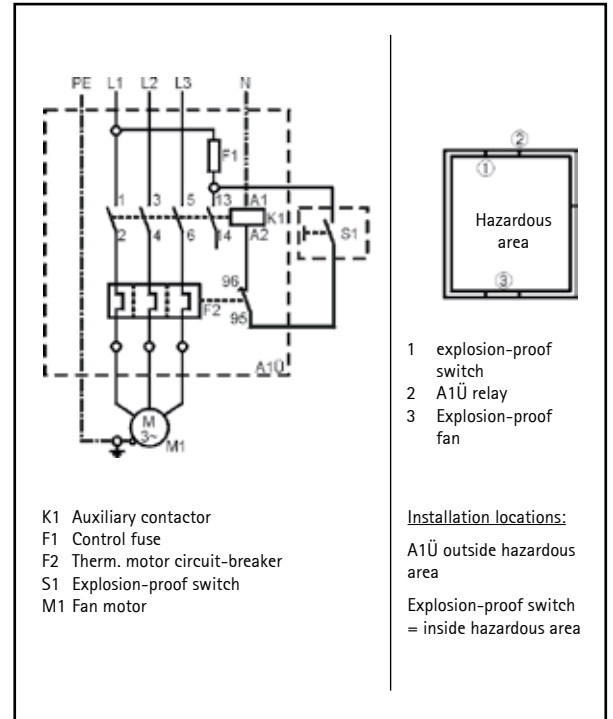
A1 Ü controller (without explosion-proof switch)

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

The A1Ü controller must be installed outside the hazardous area.

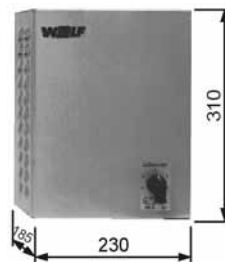


| | |
|--|-----------|
| Operating voltage | 3 x 400 V |
| Control voltage | 230 V |
| Switching capacity, max. | 3 kW |
| Weight | 0,6 kg |
| Degree of protection | IP 55 |
| Part.No. without explosionproof switch | 79 65 030 |
| Part.No. with explosionproof switch | 27 39 000 |



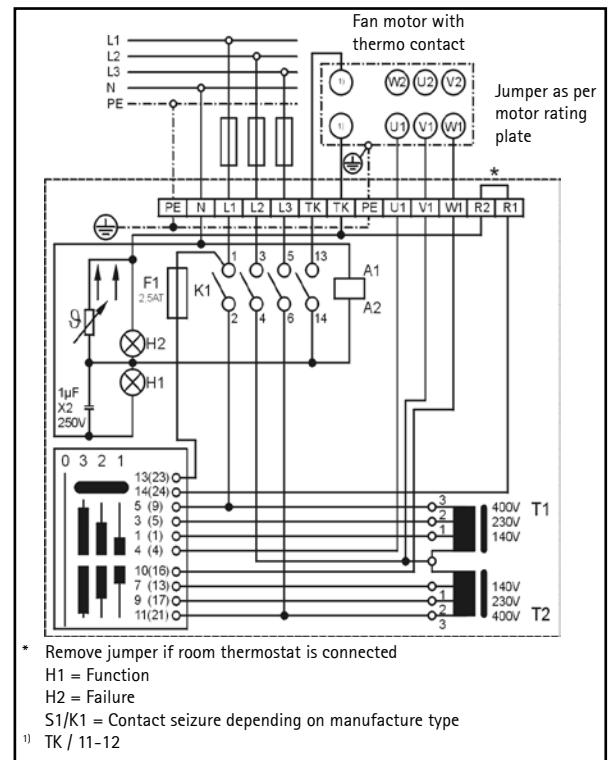
3-stage switch D 3- 4 with reclosing lock-out

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.



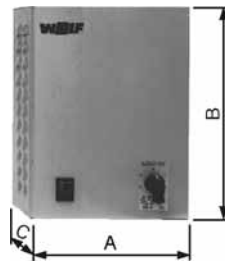
Switching controllers

5-stage switch D 5-...

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

Part numbers:

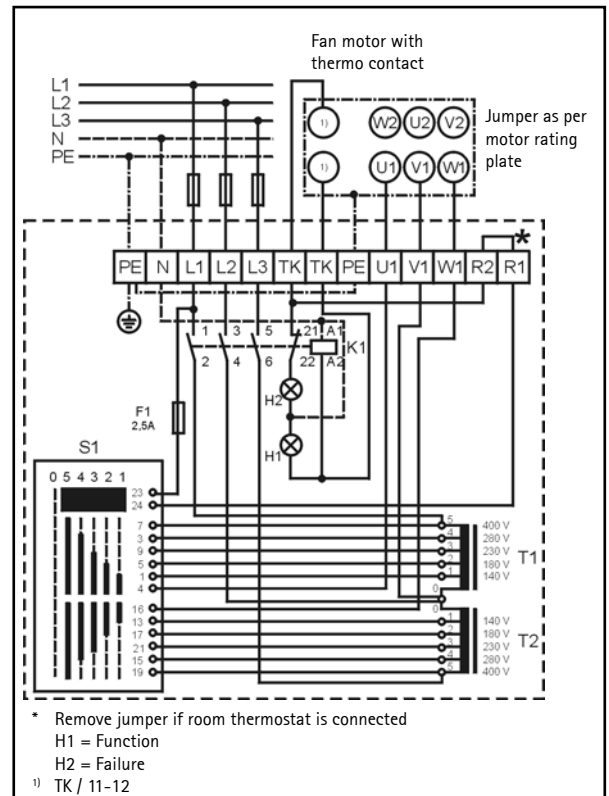
| Type | Part. No. |
|-------|-----------|
| D5-1 | 27 40 015 |
| D5-3 | 27 40 010 |
| D5-7 | 27 40 013 |
| D5-12 | 27 40 014 |
| D5-19 | 27 40 017 |



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 |



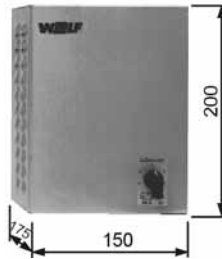
Locking switch-off at winding overtemperature (motor):
 Reclosing: switch position 0, then select required stage.

Switching controllers

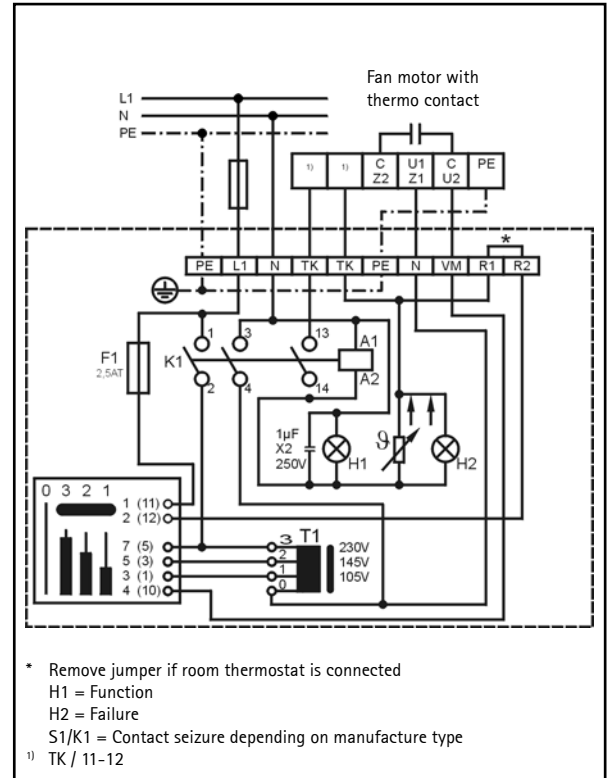
3-stage switch E 3-7T with reclosing lock-out

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.



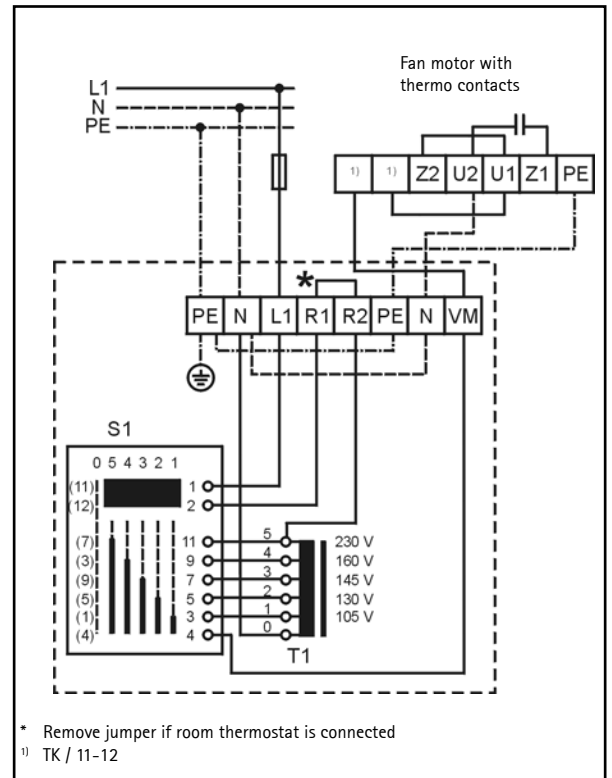
5-stage switch E 5-3 / E 5-7

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 |



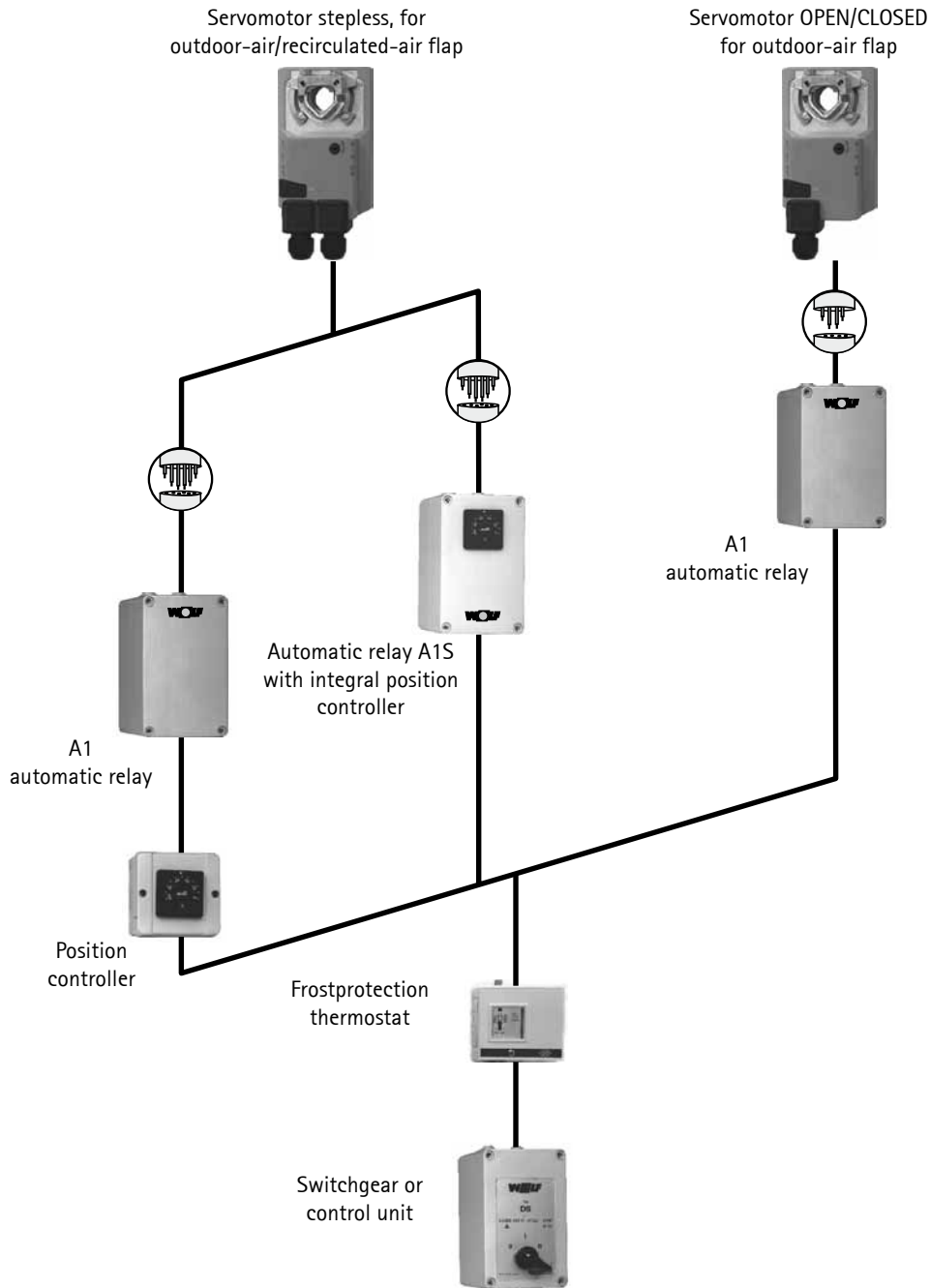
Automatic start-up when winding temperature drops (motor).



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.



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.

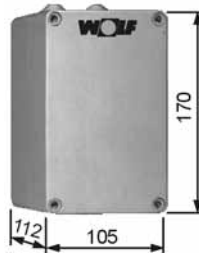
LH starts up → fresh air damper opens to preset setting, return air damper closes to the corresponding setting.

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

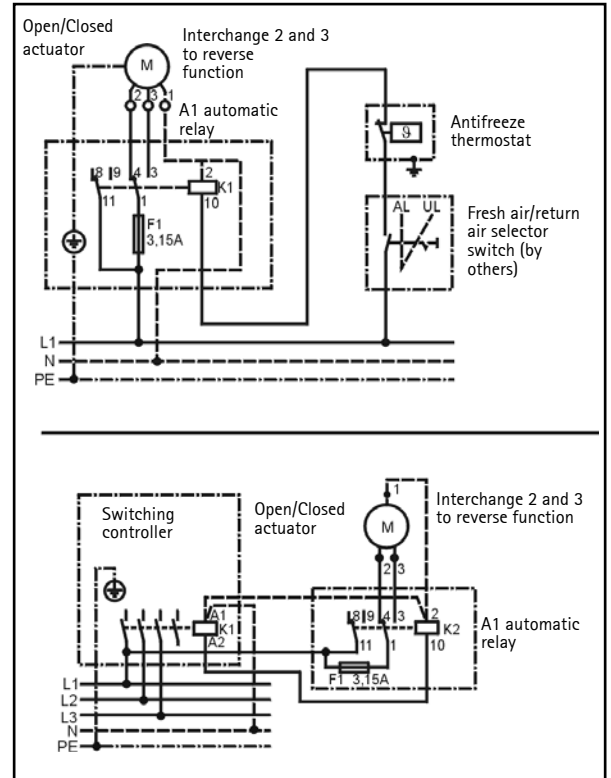
A1 automatic relay

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.



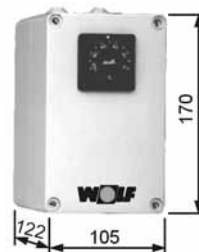
| | |
|--------------------------|-----------|
| Control voltage | 230 V |
| Switching capacity, max. | 3 kW |
| Weight | 0,5 kg |
| Degree of protection | IP 54 |
| Part.No. | 79 65 020 |



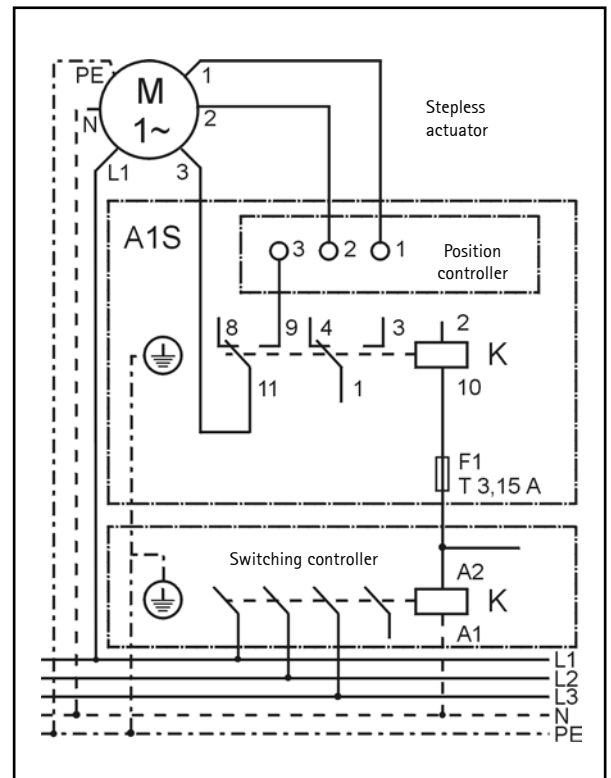
A1S automatic relay

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 anti-freeze 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.



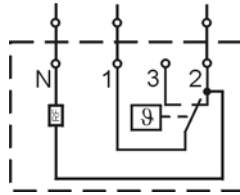
| | |
|--------------------------|-----------|
| Control voltage | 230 V |
| Switching capacity, max. | 3 kW |
| Weight | 0,5 kg |
| Degree of protection | IP 54 |
| Part.No. | 79 40 101 |



Room thermostats

LH

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.

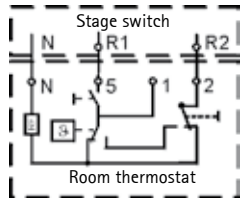
Temperature range 5 - 30 °C

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 230V/ 50 Hz, thermal feedback signal.

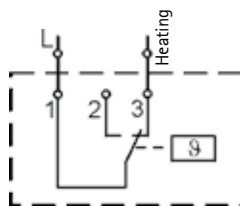
Temperature range 5 - 30 °C

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

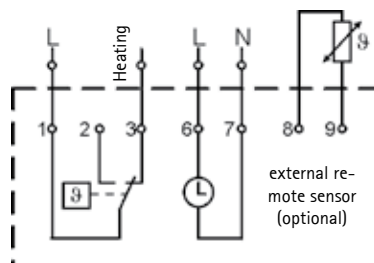
Temperature range 0 - 35 °C

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 $\pm 0,1 - 3$ K

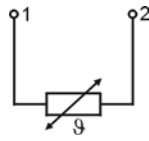
Degree of protection IP 20

Part.No. 27 44 079

Thermostats, control interface box

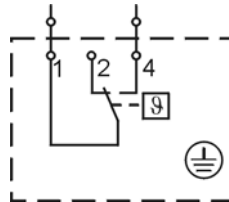
LH

Remote sensor for room thermostat timer



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



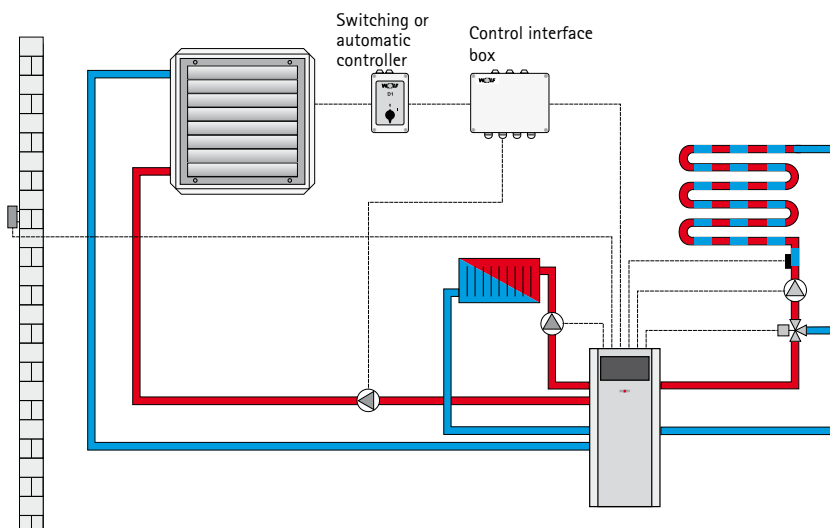
Intermediate terminal box for parallel connection of max. 3 LH unit heaters with 3 x 400V, 50Hz motors.

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

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

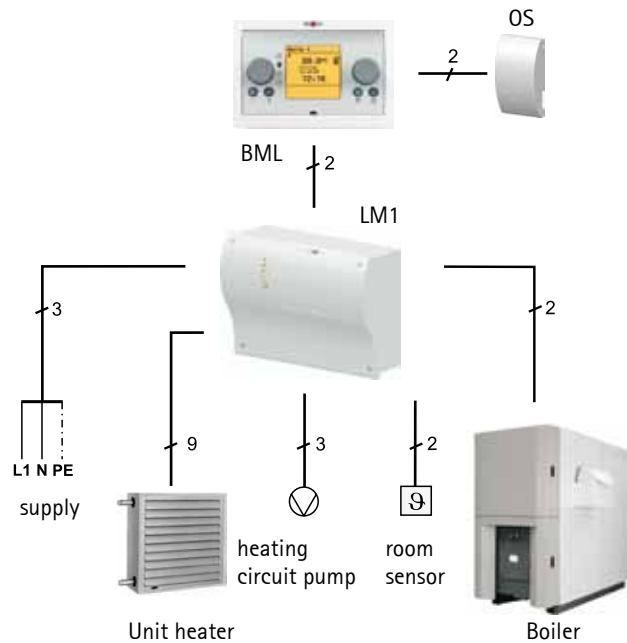
Description

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.

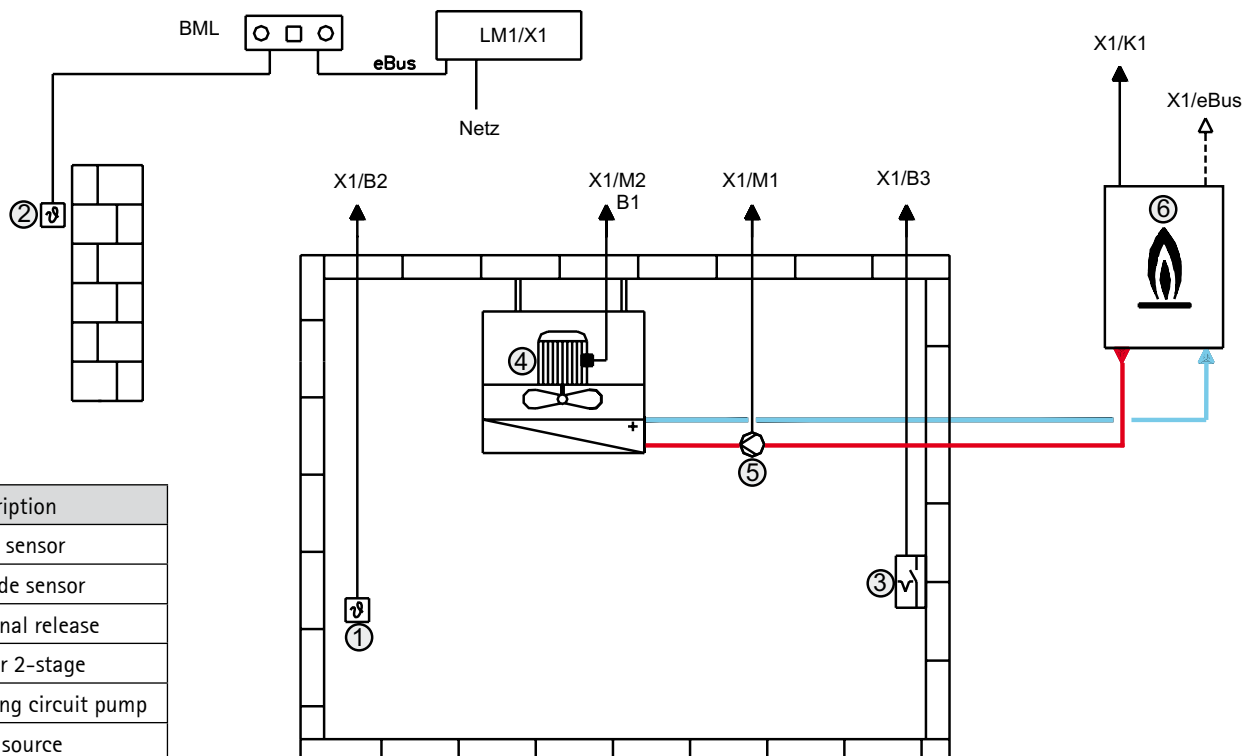
If the temperature deviation (set room temperature to actual room temperature) is low, the fan is operated in stage 1. If the temperature deviation is greater, it is switched to stage 2.

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 |

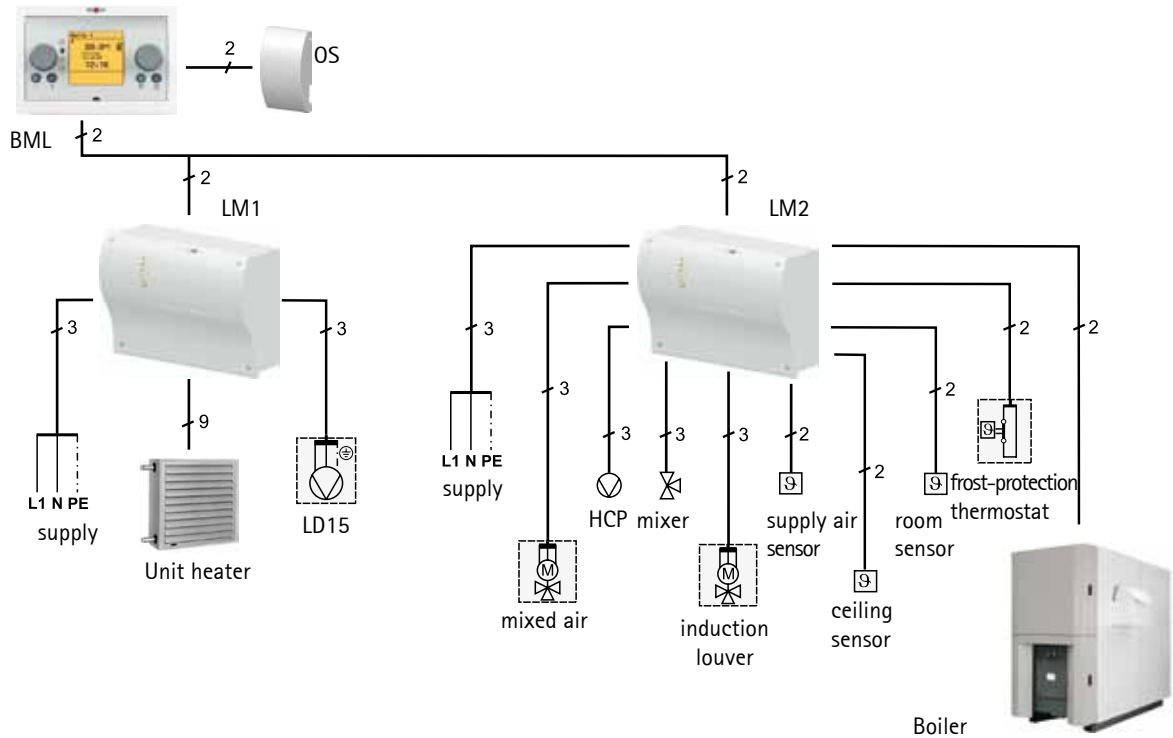
LM1 ventilation control and LM2 with BML

Description

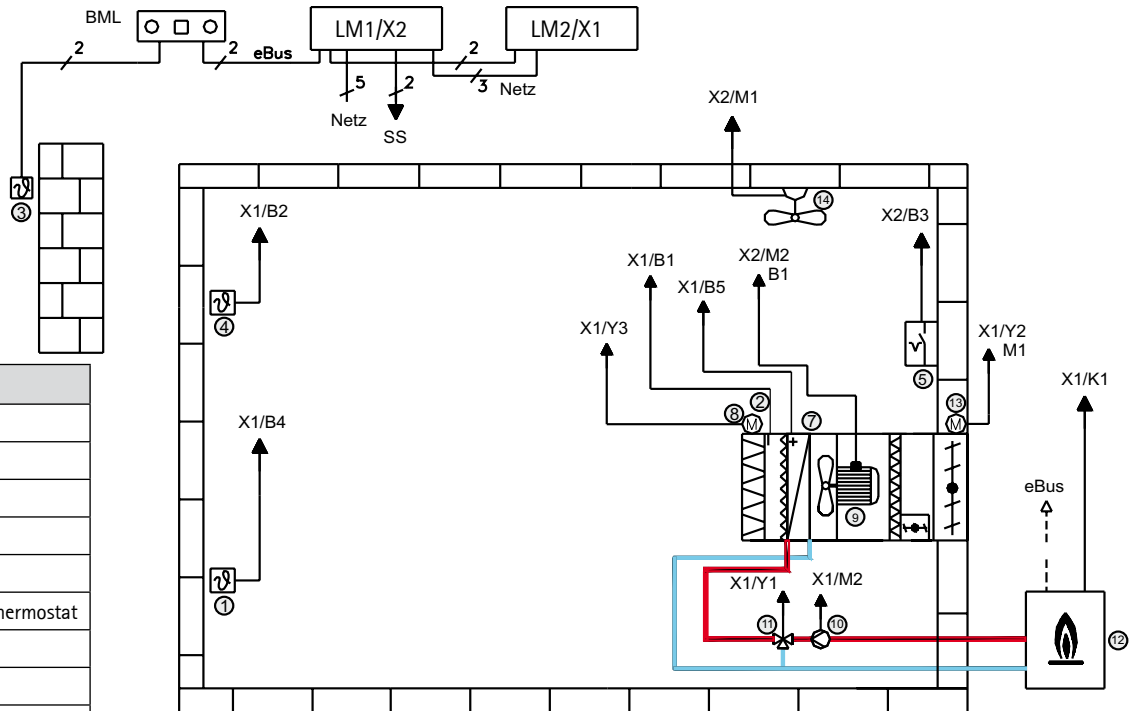
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat source are switched on or off subject to demand.

Example:

Unit heater, heating with room temperature control, Mixer 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 |

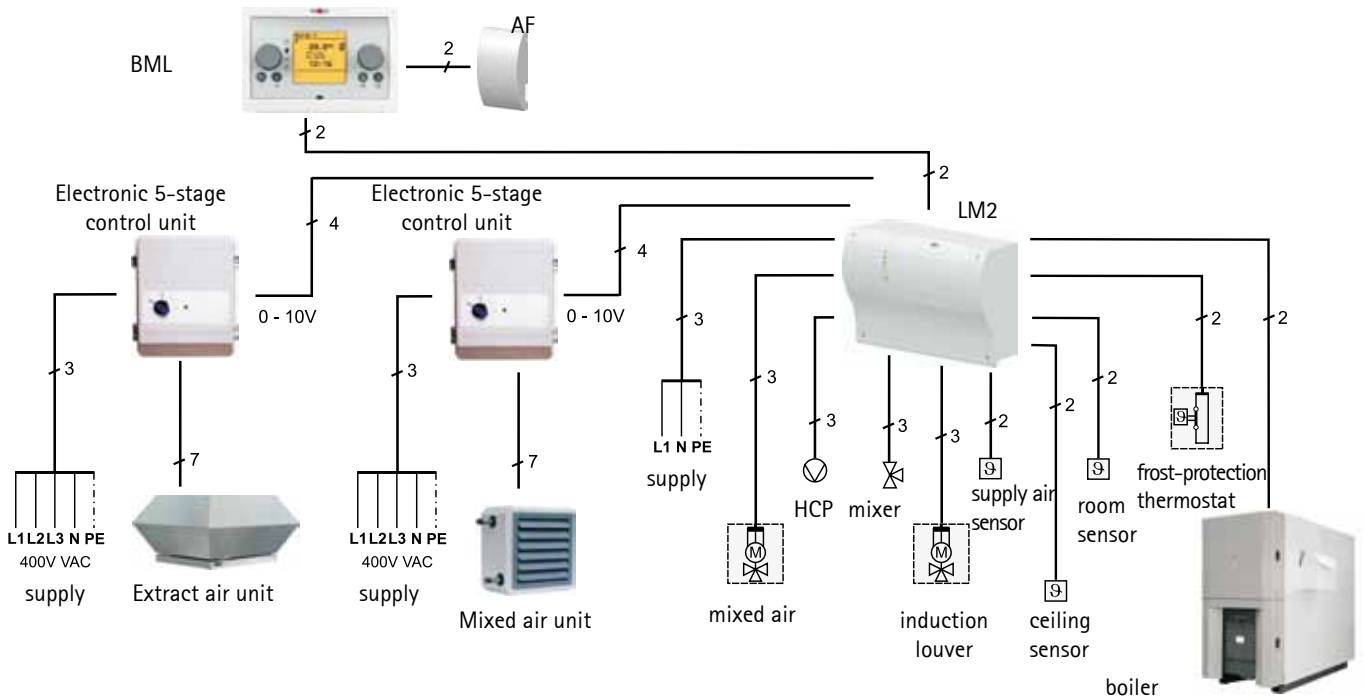
LM2 ventilation control unit with BML

Description:

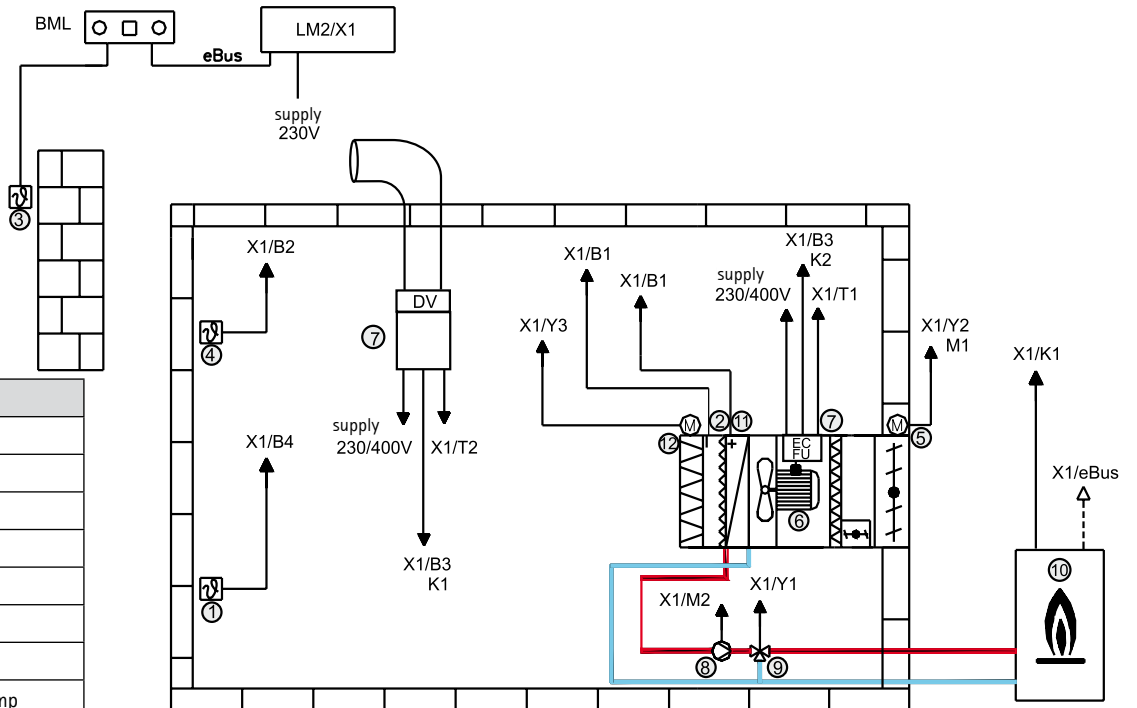
This configuration is used for heating buildings in conjunction with air heaters. The room temperature is captured by a sensor, and the fans, heating circuit pump, heating circuit mixer and heat source are switched on or off subject to demand. The extract air fan is enabled subject to the fresh air proportion.

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

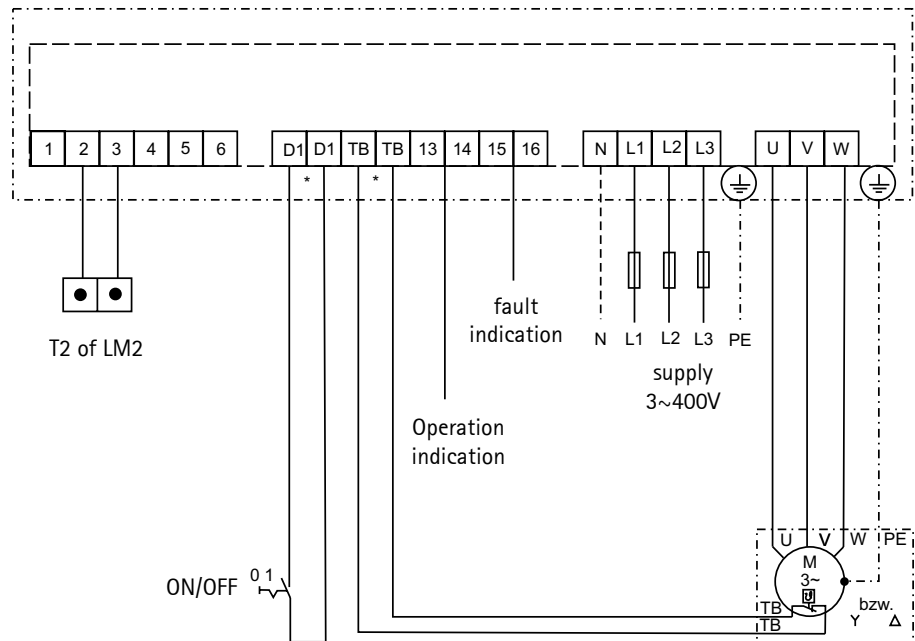
5-stage switch 0-10 V:



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 |

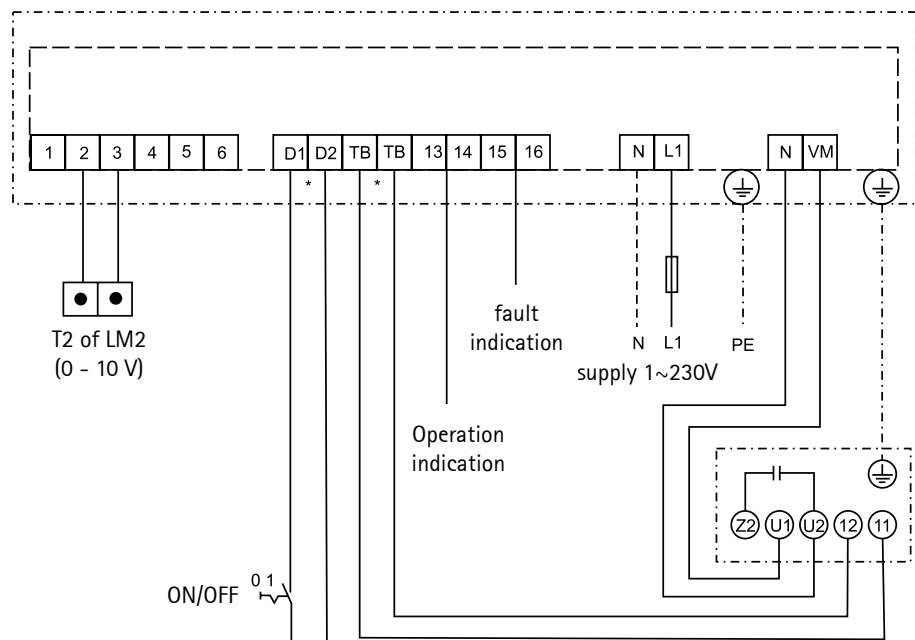
Wiring diagram D5-.....



* If the function is not required, bridge the terminals

3~ motor with integral thermostat switches

Wiring diagram E5-6F



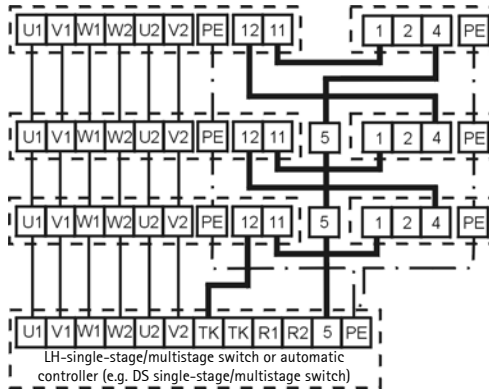
* If the function is not required, bridge the terminals

Note:

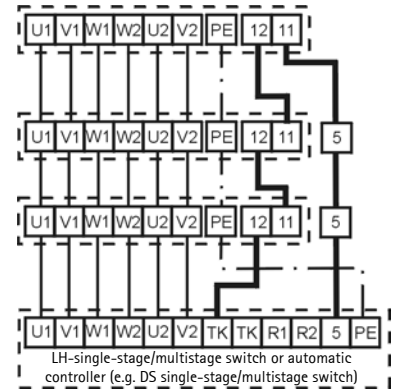
LH unit heaters of different sizes and ratings can be connected in parallel to a common switching controller with full motor protection: the configuration limit is imposed by the maximum permissible switching capacity or the maximum permissible current rating of the controller.

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

LH unit heaters with thermo contacts and antifreeze thermostats



LH unit heaters with thermostat



Number of conductors for connecting cables

| Connection from to | Switching controller | | | | | | | | | |
|------------------------|----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----|----|-----------------|-----|
| | 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.

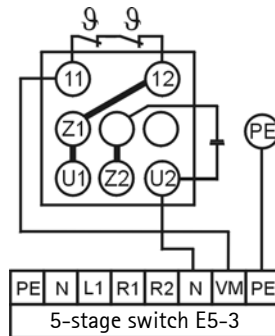
Single-phase a.c. motors 230 V/ 50 Hz

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

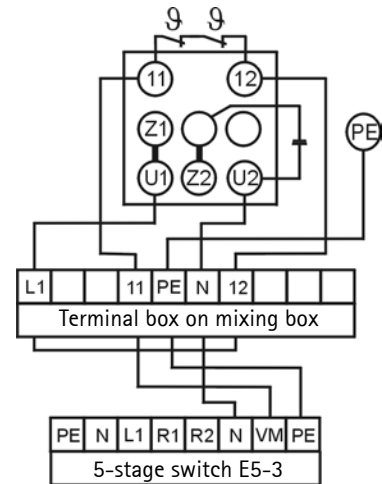
No single-phase a.c. motor available for LH 100.

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



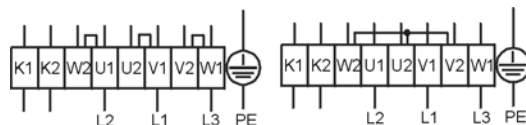
LH-ATEX Three-phase motor 3 x 400 V/ 50 Hz

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

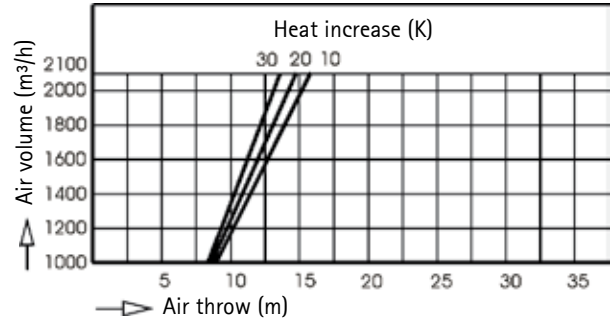
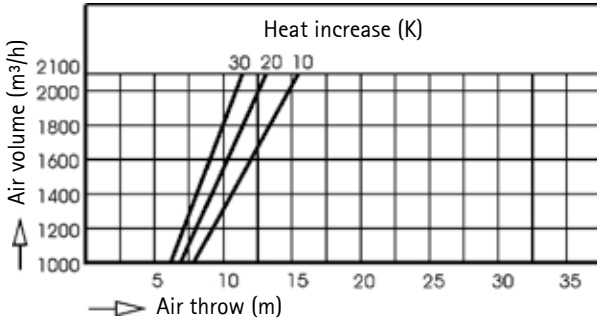
LH

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

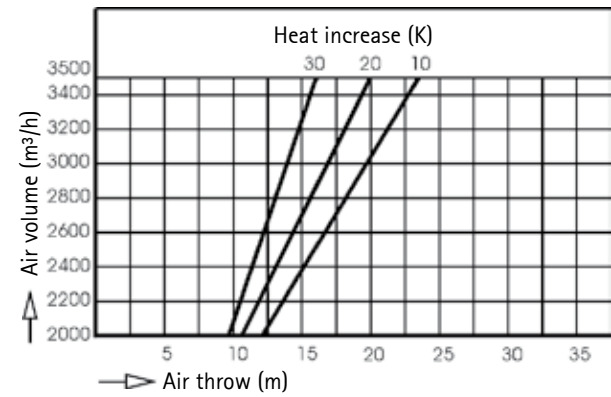
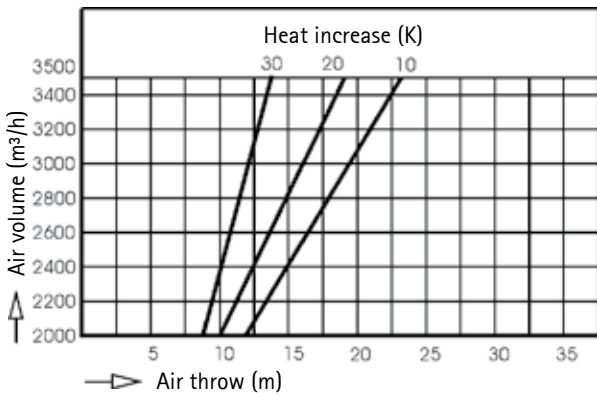
with discharge louvres or spread discharge

with discharge louvres or discharge cross

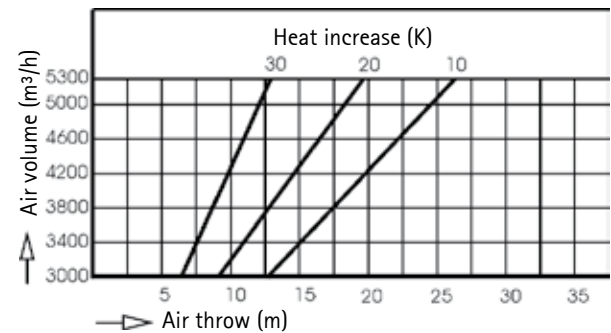
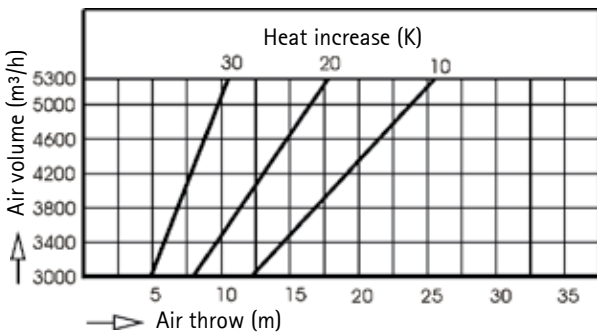
LH 25



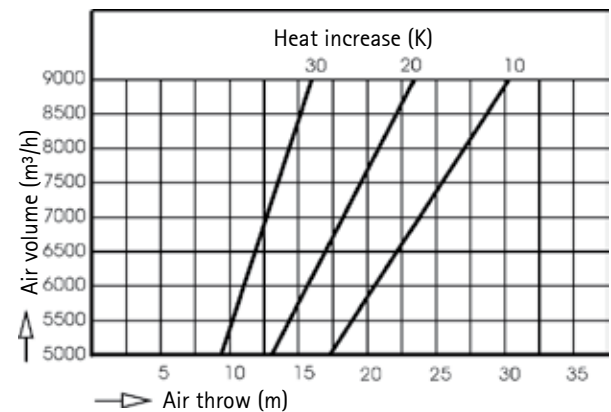
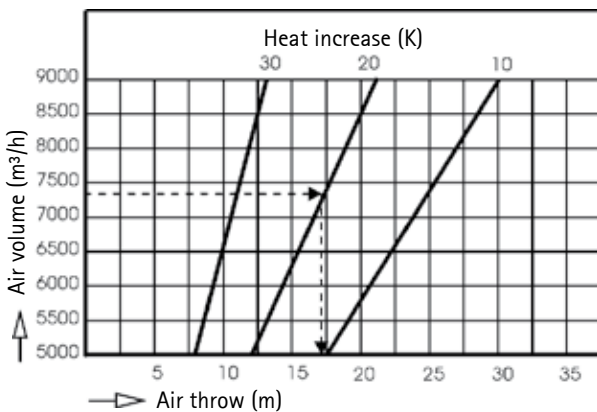
LH 40



LH 63



LH 100



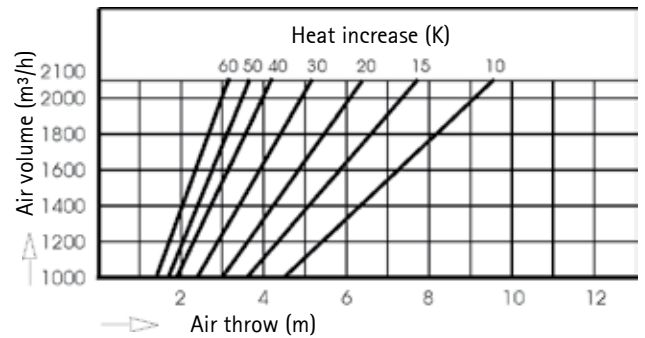
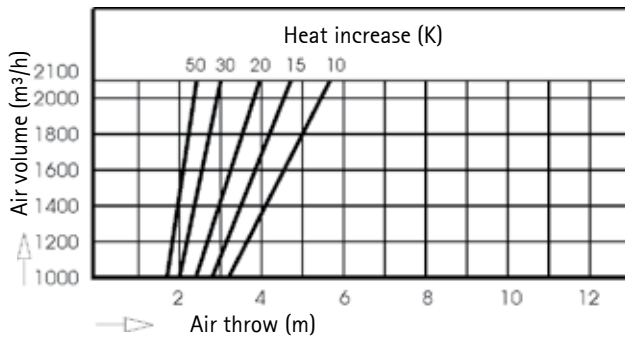
Example: LH 100 with discharge louvre; $\Delta t_A = t_{Aoff} - t_{room} = 20$ K; air volume = 7 300 m³/h
Result: horizontal air throw = 17 metres

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

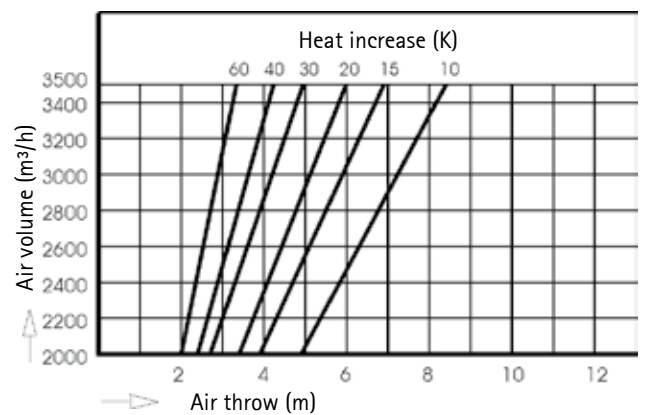
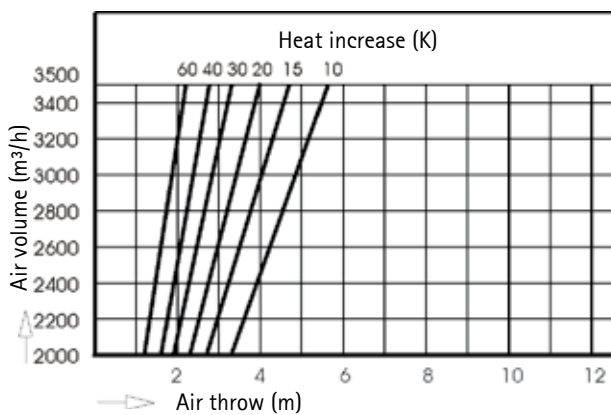
with discharge louvres/wide or spread discharge

with discharge louvres cone/discharge nozzle

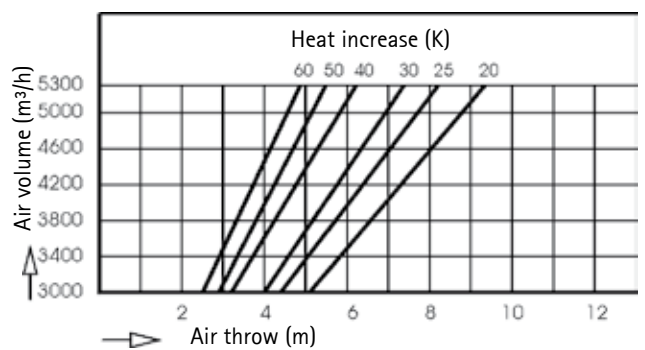
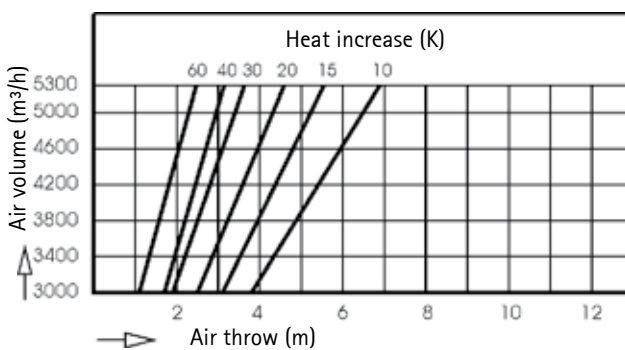
LH 25



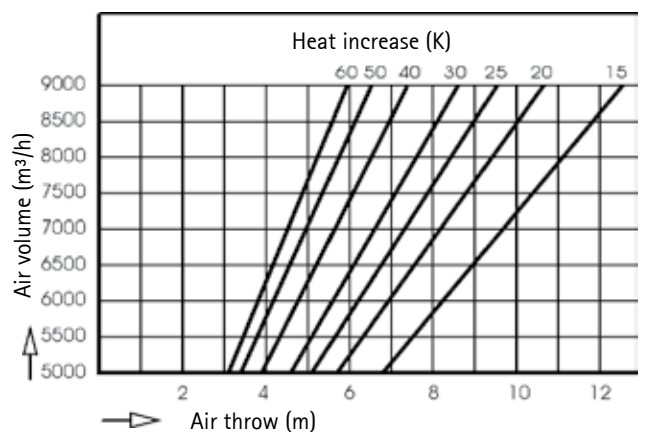
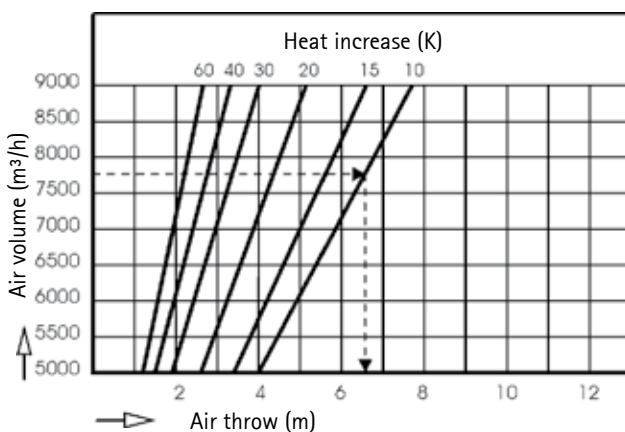
LH 40



LH 63



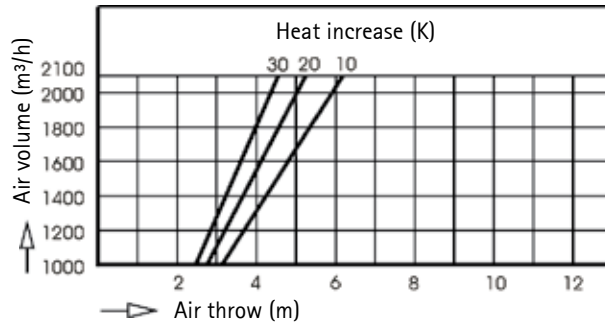
LH 100



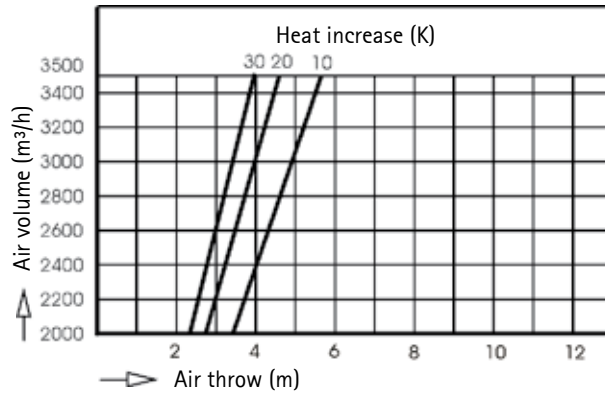
Example: LH 100 with discharge louvre; $\Delta t_A = t_{\text{Aoff}} - t_{\text{room}} = 20 \text{ K}$; air volume = 7 750 m³/h
Result: horizontal air throw = 6,6 metres

with discharge louvres and discharge cross

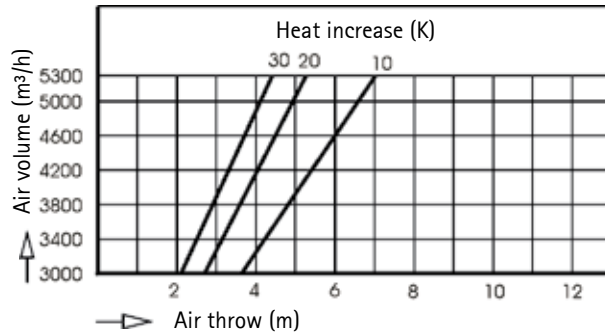
LH 25



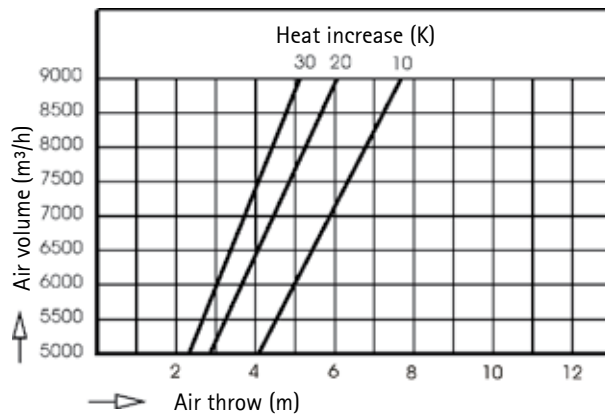
LH 40



LH 63



LH 100



Key to symbols

Conversion:

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

| | | |
|-----------------|---------------------------------------|-------------------|
| \dot{V} | = air volume | m ³ /h |
| \dot{V}_B | = reference air volume | m ³ /h |
| \dot{V}_0 | = catalogue air volume | m ³ /h |
| \dot{V}_{eff} | = effective air volume | m ³ /h |
| t_{on} | = air intake temperature | °C |
| t_{off} | = air discharge temperature | °C |
| t_{Aoff} | = effective air discharge temperature | °C |
| Δt_A | = air heat increase | K |
| Δt_W | = temperature difference of water | K |
| W | = water flow rate | m ³ /h |
| \dot{Q} | = thermal output | kW |
| \dot{Q}_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 | |

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 louver | 7 |
| Non-return flap | 3 |
| Fresh air box | 0 |
| Return air box | 0 |
| Intake hood | 1 |
| Discharge cross | 1 |
| Ind.louver (wall-mounted) | 2 |
| Ind.louver (ceiling-mounted) | 3 |

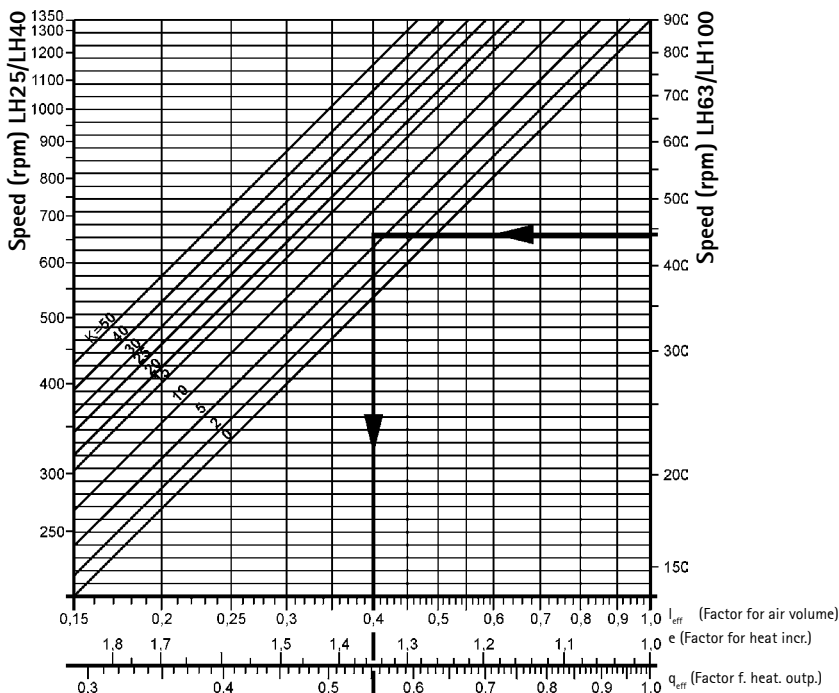
To calculate k for accessories

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

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

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

Characteristics graph



Example

Assuming:

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

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

$$\begin{aligned} \dot{V}_0 &= 7700 \text{ m}^3/\text{h} \\ \dot{Q}_0 &= 96,1 \text{ kW} \\ t_{off} &= 29^\circ\text{C} \\ \Delta t_{AO} &= (29+5) \text{ K} = 34 \text{ K} \end{aligned}$$

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

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

$$\Delta p = 10 \text{ Pa at } 5000 \text{ m}^3/\text{h}$$

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

LH 100, 440 rpm, $k = 7$

from characteristics graph:

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

Find:

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

Result:

$$\dot{V}_{eff} = \dot{V}_0 \cdot l_{eff} = 7700 \text{ m}^3/\text{h} \cdot 0,4 = 3080 \text{ m}^3/\text{h}$$

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

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

$$\dot{Q}_{eff} = \dot{Q}_0 \cdot q_{eff} = 96,1 \text{ kW} \cdot 0,55 = 52,9 \text{ kW}$$

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

$$\Delta p_W \text{ (see diagram, Page 13)} = 8,5 \text{ kPa}$$

Speeds table / sound pressure level

LH

Speeds table for LH fan motors

| Line voltage | Stage | LH 25 | LH 40 | LH 63 | LH 100 |
|----------------------------|-------|-----------|-----------|-----------|-----------|
| Single-stage switch | | | | | |
| | | Speed rpm | Speed rpm | Speed rpm | Speed rpm |
| 3 x 400 V Δ | - | 1350 | 1350 | 900 | 900 |
| 3 x 400 V Y | - | 1000 | 1000 | 700 | 700 |
| 3 x 230 V Δ | - | 1000 | 1000 | 700 | 700 |
| 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

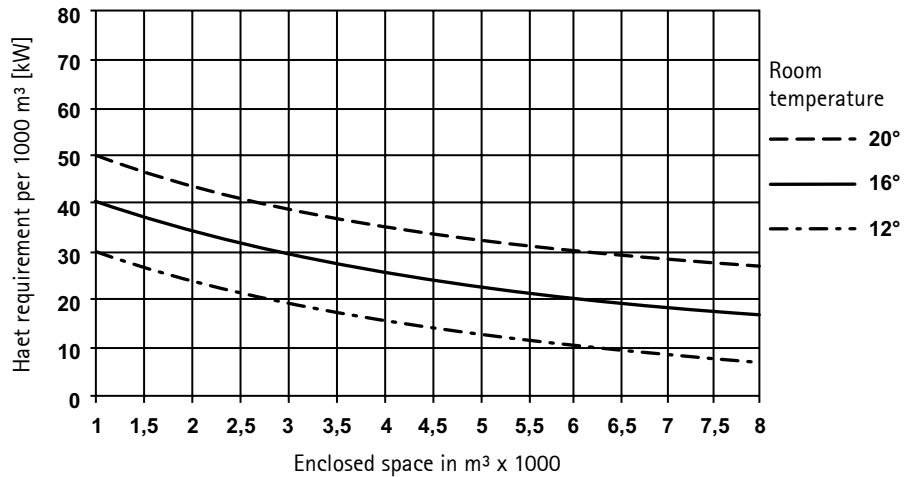
| LH 25 | | | LH40 | | | LH63 | | | LH100 | | |
|-------|-------------------|-----------------------|-------|-------------------|-----------------------|-------|-------------------|-----------------------|-------|-------------------|-----------------------|
| Speed | Sound power level | Sound pressure level* | Speed | Sound power level | Sound pressure level* | Speed | Sound power level | Sound pressure level* | Speed | Sound power level | Sound pressure level* |
| rpm | dBA | dBA 2 m | rpm | dBA | dBA 2 m | rpm | dBA | dBA 2 m | rpm | dBA | dBA 2 m |
| 1350 | 74 | 63 | 1350 | 78 | 67 | 900 | 77 | 66 | 900 | 82 | 71 |
| 1290 | 73 | 62 | 1300 | 77 | 66 | 850 | 76 | 65 | 840 | 80 | 69 |
| 1280 | 73 | 62 | 1200 | 75 | 64 | 800 | 74 | 63 | 750 | 78 | 67 |
| 1230 | 72 | 61 | 1140 | 74 | 63 | 750 | 73 | 62 | 700 | 76 | 65 |
| 1210 | 72 | 61 | 1090 | 73 | 62 | 710 | 71 | 60 | 620 | 74 | 63 |
| 1160 | 71 | 60 | 1000 | 72 | 61 | 700 | 71 | 60 | 540 | 71 | 60 |
| 1050 | 68 | 57 | 960 | 71 | 60 | 640 | 70 | 59 | 440 | 66 | 55 |
| 1000 | 68 | 57 | 840 | 68 | 57 | 590 | 68 | 57 | 350 | 61 | 50 |
| 860 | 64 | 53 | 780 | 66 | 55 | 560 | 67 | 56 | 270 | 56 | 45 |
| 800 | 63 | 52 | 700 | 64 | 53 | 540 | 66 | 55 | 220 | 51 | 40 |
| 660 | 58 | 47 | 580 | 60 | 49 | 500 | 64 | 53 | 160 | 44 | 33 |
| 530 | 53 | 42 | 550 | 58 | 47 | 400 | 59 | 48 | | | |
| 490 | 52 | 41 | 530 | 58 | 47 | 360 | 57 | 46 | | | |
| 430 | 49 | 38 | 490 | 56 | 45 | 300 | 53 | 42 | | | |
| 360 | 45 | 34 | 400 | 51 | 40 | 280 | 52 | 41 | | | |
| 320 | 43 | 32 | 380 | 50 | 39 | 210 | 45 | 34 | | | |
| 240 | 36 | 25 | 280 | 44 | 33 | | | | | | |

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

Approximate determination of heat requirement

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

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



Correction factors

Additional charge:

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

Deduction:

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

General notes on planning

Required air volume (m³/h) at least 2.5 and preferably 3-4 times enclosed space.

Make sure a current of warm air is not directed against persons.

Distance between unit heaters 10-15 m.

Distance from floor for wall-mounted units at least 2.5 m and max. 4 m.

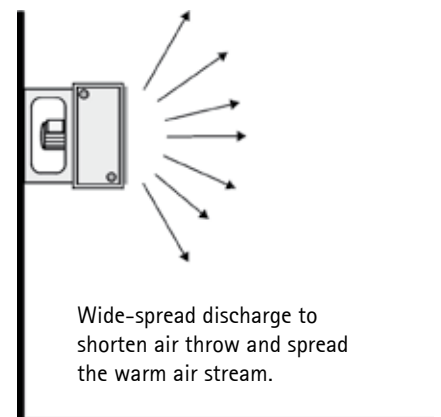
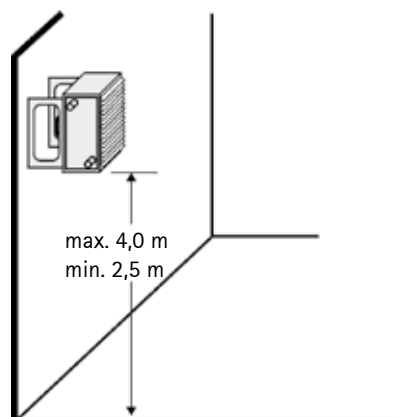
Take air throws into account.

Use wide-spread discharge if unit heater is not far from opposite wall.

Use discharge cone or induction louvre if air throw of ceiling-mounted unit with standard discharge louvres is insufficient.

Use four-way discharge in low-ceilinged room if distance from bottom of discharge louvres to floor is less than approx. 2.5 m.

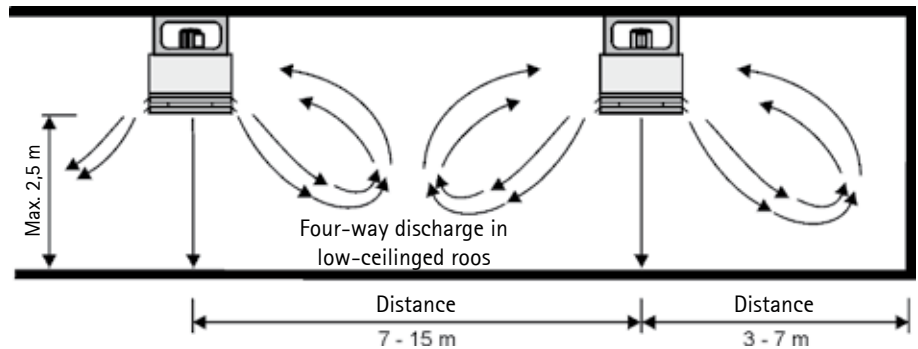
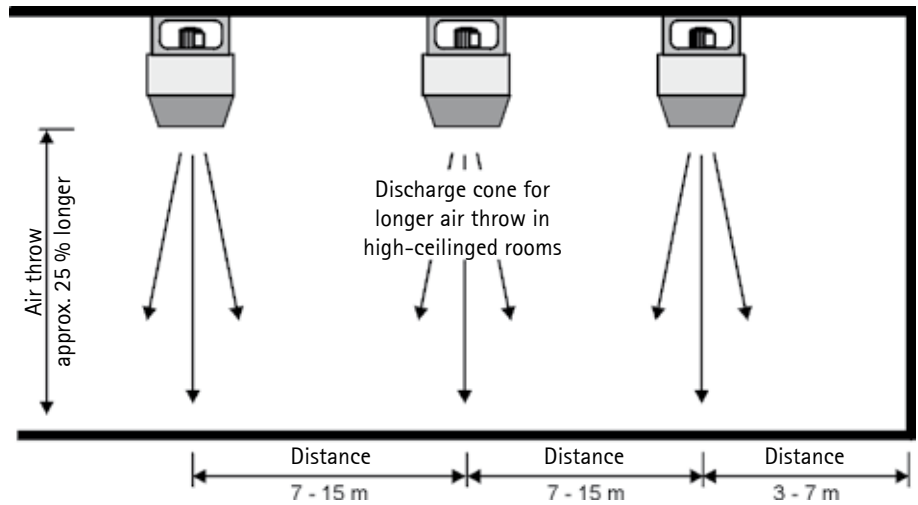
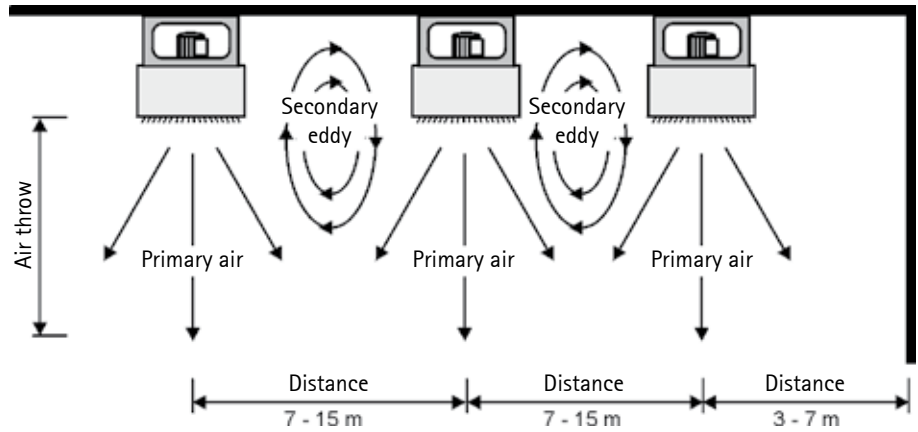
Wall-mounted unit



Ceiling-mounted units

Clearance for LH ceiling-mounted units in metres

| LH | LH to LH | LH to wall |
|-----|----------|------------|
| 25 | 7 - 9 | 3 - 4 |
| 40 | 9 - 11 | 3 - 5 |
| 63 | 11 - 13 | 4 - 6 |
| 100 | 13 - 15 | 5 - 7 |



Discharge accessories for optimum air distribution

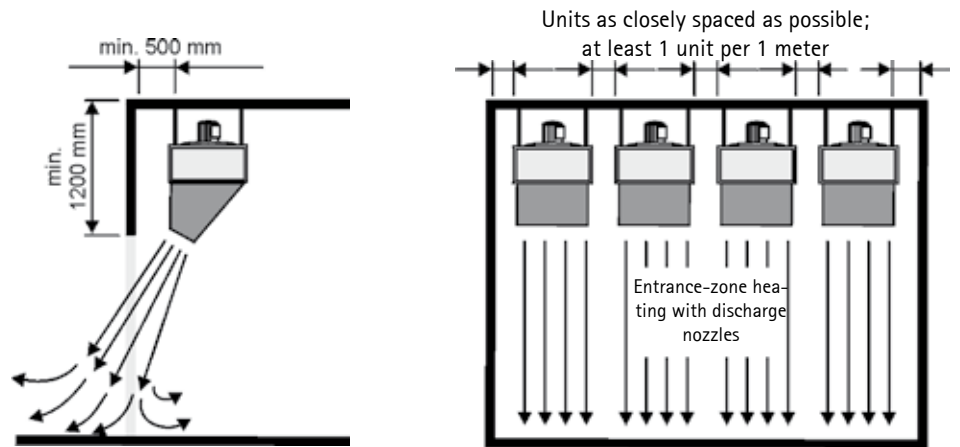
given the distances as stated above, air heat increase $\Delta t_A (= t_{outlet} - t_{room})$ of approx. 25 K and high speed.

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

Door-curtain system with discharge nozzle

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



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

Air volumes for unit heaters without heat exchangers

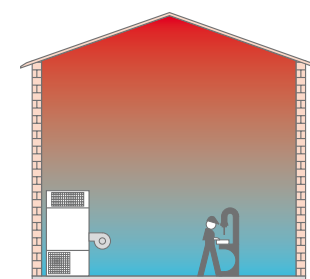
| | LH | 25 | 40 | 63 | 100 |
|------------|-------------------|-----------|-----------|-----------|------------|
| Air volume | m ³ /h | 1400/2400 | 2400/3950 | 3950/6000 | 6100/10700 |
| Speed | rpm | 1000/1350 | 1000/1350 | 700/900 | 700/900 |



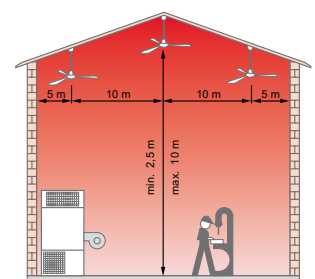
Consulting Advice on Ceiling Fans

LD 15

The air throw of the LD 15 is about 10 metres without stratification. In rooms with a ceiling height exceeding 7 metres, the LD 15 should be mounted vertically offset to achieve sufficient air throws.
An LD 15 should be mounted at the highest point of the room to avoid warm air buffers under the ceiling.
By switching off the ceiling fans while the hangar doors are open (e.g. by using door switchers), warm air can better be kept in the room. The ceiling fans should be placed in such way that there are no workplaces directly in the outlet cone.
The distance between the LD 15 units should not exceed 10 metres and the distance to the side walls should not be longer than 5 metres. One LD 15 can be calculated for an area of around 100m².



Natural stratification



Comparative stratification

Ceiling fan LD 15



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 | m ³ /h | 15.000 |
| Speed | min ⁻¹ | 300 |
| Operating voltage | | 230 V / 50 Hz |
| Power consumption | W | 75 |
| Current consumption max. | A | 0,35 |
| Sound pressure level* | dB(A) | 34 |
| Total weight | kg | 10,5 |

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

Warm air return control system



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 |

General guidelines:

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

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

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

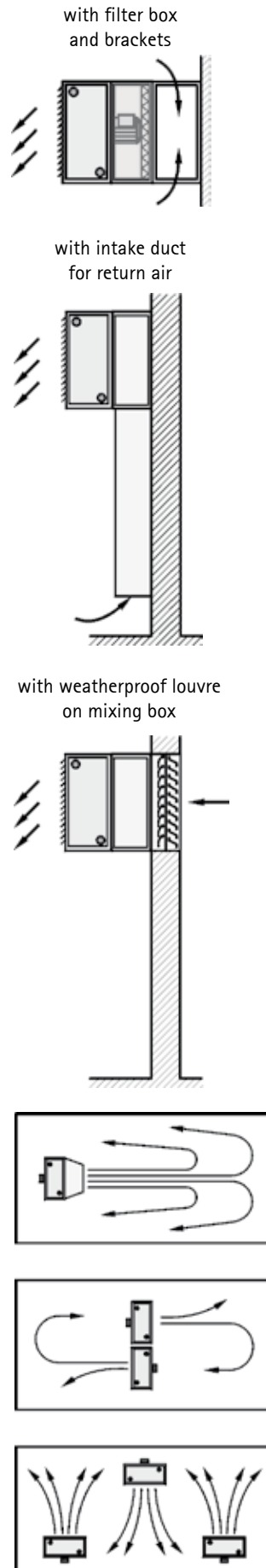
The sound pressure levels of Wolf unit heaters are very low. The dB(A) values stated in the performance tables are averages measured in a room with average absorption at a distance of 5 metres from the unit heater.

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

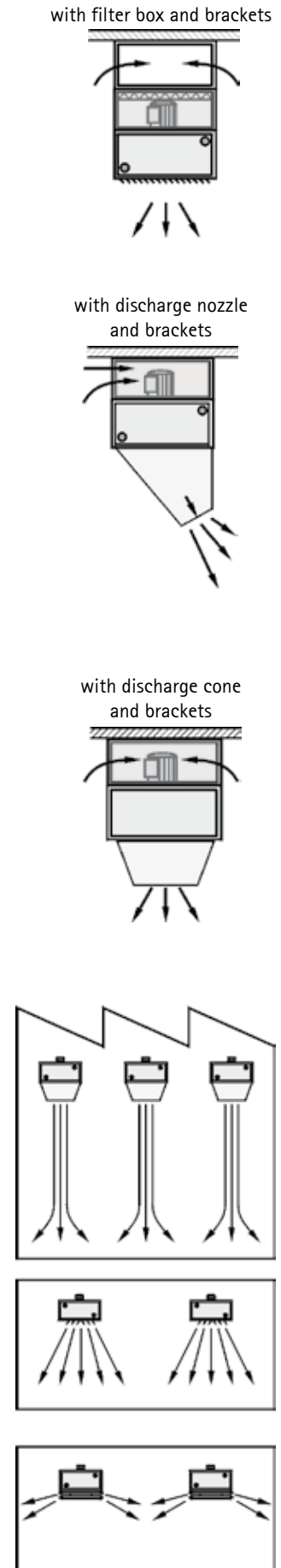
- 115 °C in conjunction with a filter box
- 140 °C without externally mounted components

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

Wall-mounted LH



Ceiling-mounted LH



Weights in kg

| Basic units | | | LH25 | LH40 | LH63 | LH100 |
|------------------------------|-------------------------------------|---------|------|------------|------------|------------|
| LPHW | Unit heater, type 1 | CoAl | 24 | 32 | 48 | 76 |
| and | Unit heater, type 2 | CoAlI | 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 | | | |
| | Unit heater 9 kW | | 23 | on request | on request | on request |
| | 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 heater–basic unit LH | LH | LH-ATEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|------------------------|--------------------|---------|---------|----------------|---------|--------|---------|----------------------|--------------------|--|---------|---------|----------------|---------------|--|---------|---------|----------------------|----------|--|--|--|-------------|------------|--|-------|------|--------------|---------|--|-------|--|-------------------|--------|--|--|--|----------------|--------|--|--|--|----------------------|--|--|--|--|--|---|
| <p>for mixed air, fresh air and return air modes for wall-mounting or ceiling mounting</p> <p>Casing welded, galvanised sectional steel frame. Casing panels galvanised; paint finish available on request.</p> <p>Discharge louvre with manually adjustable guide vanes.</p> <p>Axial fan for quiet operation, with statically and dynamically balanced impeller and protection grille.</p> <p>Three-phase motor 3 x 400 V, 50 Hz; degree of protection IP 54, insulation class F; two-speed, high/low speed with Δ/Y; low-noise, maintenance-free, direct-drive, with amply dimensioned ball bearings and special grease filling for wide temperature spread, insulation class F, terminal box, motor protection by thermo contacts in the windings in conjunction with a single-stage/multi-stage switch or automatic controller.</p> <p>Alternatives:</p> <p>Single-phase a.c. motor 230 V, 50 Hz, insulation class F; high speed only, motor protection by thermo contacts in the windings in conjunction with a single-stage/multi-stage switch or automatic controller or thermo contacts connected in series with motor windings by others.</p> <p>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.</p> <p>Heat exchanger withdrawable, Co/Al for water or steam as heating medium. Inch-system threads or flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Alternatives:</p> <p>Heat exchanger withdrawable, galvanised steel for water or steam as heating medium. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Electric heater with overheat safety cut-off for 230 V/ 400 V.</p> <p>Without heat exchanger</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Unit heater–basic unit LH-ATEX, Explosion proof design for Ex-zone 2 (II 3G c IIB T4 X)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>for mixed air, fresh air and return air modes for wall-mounting or ceiling mounting</p> <p>Casing welded, galvanised sectional steel frame. Casing panels galvanised.</p> <p>Discharge louvre with manually adjustable guide vanes.</p> <p>Axial fan–motor assembly for low noise operation, impeller statically and dynamically balanced, protection grille included. Impeller wings with plastic edges. Three-phase motor 3 x 400 V, 50 Hz, degree of protection IP 44, thermal category CL F, with 2 speeds high/low Δ/Y, low noise and maintenance-free, full winding protection via integrated thermistors, max. surrounding temperature -20 °C up to +40 °C</p> <p>Heat exchanger withdrawable, Co/Al for LPHW or MPH. Inch-system threads or flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Alternatives:</p> <p>Heat exchanger withdrawable, galvanised steel for LPHW or MPH. Connections with flange and mating flange. Pipe penetrations fitted with rosettes.</p> <p>Without heat exchanger</p> <p>Technical data:</p> <table border="0"> <tr> <td>Air volume</td> <td>.....m³/h</td> <td rowspan="2">Dimensions:</td> <td>Length:</td> <td>.....mm</td> </tr> <tr> <td>Heating output</td> <td>.....kW</td> <td>Width:</td> <td>.....mm</td> </tr> <tr> <td>Air temperature rise</td> <td>from.....to.....°C</td> <td></td> <td>Height:</td> <td>.....mm</td> </tr> <tr> <td>Heating medium</td> <td>...../.....°C</td> <td></td> <td>Weight:</td> <td>.....kg</td> </tr> <tr> <td>Hydraulic resistance</td> <td>.....kPa</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Motor speed</td> <td>.....min-1</td> <td></td> <td>Make:</td> <td>Wolf</td> </tr> <tr> <td>Motor output</td> <td>.....kW</td> <td></td> <td>Type:</td> <td></td> </tr> <tr> <td>Operating voltage</td> <td>.....V</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Retard current</td> <td>.....A</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Degree of protection</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> | Air volume |m ³ /h | Dimensions: | Length: |mm | Heating output |kW | Width: |mm | Air temperature rise | from.....to.....°C | | Height: |mm | Heating medium |/.....°C | | Weight: |kg | Hydraulic resistance |kPa | | | | Motor speed |min-1 | | Make: | Wolf | Motor output |kW | | Type: | | Operating voltage |V | | | | Retard current |A | | | | Degree of protection | | | | | | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>LH / LH ATEX</p> |
| Air volume |m ³ /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: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating voltage |V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Retard current |A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Degree of protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| 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 louver with bird screen without non-return flap, galvanized sheet steel | ● | ● |
| Weatherproof louver 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 louver for wall-mounted unit heaters with manual adjustment for optimising air throw and temperature distribution, galvanized sheet steel. | ● | ● |
| Induction louver for wall-mounted unit heaters with 230 V actuator for optimising air throw and temperature distribution, galvanized sheet steel. | ● | - |
| Induction louver for wall-mounted unit heaters with manual adjustment for optimising air throw and temperature distribution, galvanized sheet steel. | ● | ● |
| Induction louver for ceiling-mounted unit heaters with 230 V actuator for optimising air throw and temperature distribution, galvanized sheet steel. | ● | - |
| Induction louver for wall-mounted unit heaters with 24 V actuator | ● | - |
| Induction louver for ceiling-mounted unit heaters with 24 V actuator | ● | - |

| Options | LH | LH-ATEX |
|--|---|--|
| <p>Shut-off set for flow and return, straight way type</p> <p>Shut-off set for flow and return, rectangular type</p> <p>Fastening brackets for wall and ceiling installation of LH-Unit, galvanized sheet steel,</p> <p>Fastening set for the installation of an LH-Unit on a vertical concrete bar, galvanized sheet steel, for LH / LH-ATEX 25 - 40</p> <p>Fastening set for the installation of an LH-Unit on a vertical concrete bar, galvanized sheet steel, for LH / LH-ATEX 25 - 40</p> <p>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</p> <p>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</p> <p>Angle brackets for wall or ceiling installation, of the air intake accessory, galvanized sheet steel.</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> |
| <p>Electrical accessories</p> | | |
| <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>* Installation outside the Ex-zone only</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> | <p>● *</p> <p>● *</p> <p>-</p> <p>● *</p> <p>● *</p> <p>● *</p> <p>● *</p> |

| Electrical accessories | LH | LH-ATEX |
|---|----|---------|
| <p>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.</p> | ● | ● * |
| <p>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.</p> | ● | - |
| <p>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.</p> | ● | - |
| <p>A1Ü automatic controller (without explosion-proof switch) Full motor protection for single-speed fan operation with explosion-proof LH motors; max. switching capacity 3 kW, operating voltage 3 x 400 V, control voltage 230 V, degree of protection IP 55; dimensions B x H x T: 170 x 220 x 110 mm.</p> | ● | ● |
| <p>Explosion-proof switch for A1Ü automatic controller. operating voltage 690V, max. current 16(4)A, degree of protection IP 66</p> | ● | ● |
| <p>Explosion proof ATEX-terminal box. fitted and wired</p> | - | ● |
| <p>Thermistor triggering unit suitable for installation in wiring board on site</p> | - | ● |
| <p>Control interface box for connection to Wolf boiler control system.</p> | ● | ● |
| <p>Intermediate terminal box for parallel operation of max. 3 LH unit heaters</p> | ● | - |
| <p>All-pole Isolator ARB, installed and fully wired.</p> | ● | ● |
| <p>Earthing strap for potential equalization</p> | ● | - |
| <p>Antifreeze thermostat mounted on LH unit heater</p> | ● | - |
| <p>Room thermostat for surface mounting with thermal feedback signal. Switching capacity 10(4) A at 230 V, temperature range 5-30°C, degree of protection IP 30; dimensions B x H x T: 75 x 75 x 25 mm.</p> | ● | - |
| <p>Room thermostat with summer/winter switch for heating/ventilation; for surface mounting, with thermal feedback signal. Switching capacity 6 (3) A at 230 V, temperature range 5-30 °C, degree of protection IP 30; dimensions B x H X T: 117 x 71 x 30 mm.</p> | ● | - |
| <p>Room thermostat timer with weekly programming for socket installation, daytime and night-time temperatures can be set separately. Temperature decrease adjustable 2-10 K, Switching capacity 10(4) A at 230 V, temperature range 5-40 °C, degree of protection IP 20; dimensions B x H X T: 132 x 82 x 32 mm.</p> | ● | - |
| <p>* Installation outside the Ex-zone only</p> | | |

| Electrical accessories | LH | LH-ATEX |
|---|---|---|
| <p>Remote sensor for room thermostat timer for socket installation, degree of protection IP 54. dimensions B x H x T: 52 x 50 x 35 mm.</p> <p>Room thermostat, industrial version Switching capacity 16 (4) A at 230 V, temperature range 0-40 °C, degree of protection IP 54; dimensions B x H x T: 110 x 156 x 72 mm.</p> <p>Actuator for stepless control of damper or mixing valve 230 V / 50 Hz .</p> <p>Actuator for damper open/closed 230 V / 50 Hz.</p> <p>Automatic relay A1 for open/closed actuator.</p> <p>Automatic relay A1S with position controller for stepless actuator.</p> <p>Position controller for installation on wiring board front for progressive actuator in connection with automatic relay A1.</p> <p>Position controller for front-panel installation in control cabinet for controlling the stepless actuator in conjunction with automatic relay A1.</p> <p>Key button for actuator 230 V / 50 Hz for induction louvre</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> | <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> |
| <p>Electrical accessories WRS</p> | | |
| <p>BML ventilation programming module room temperature-dependent control for regulating up to 7 zones with eBUS interface</p> <p>Wall mounting base for use with the BML ventilation programming module as remote control</p> <p>LM1 ventilation control unit (incl. room temperature sensor) for room temperature-dependent control of air heaters with 2-stage motor</p> <p>LM2 ventilation control unit room temperature controlled via mixer or speed in conjunction with EC motors with additional LM1 module, 2-stage motor control</p> <p>Outside or room temperature sensor</p> <p>Radio clock for synchronising the clock inside the control unit with the DC77 transmitter</p> <p>Radio clock with outside temperature sensor for synchronising the clock inside the control unit with the DC77 transmitter and capturing the outside temperature</p> <p>Supply air sensor and sensor retainer</p> | <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> <p>●</p> | <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> <p>-</p> |



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