

Fan Coil Units for Ceiling Installation



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Components for Room Air Technology

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Sales area:

PLZ 54, 55, 60, 63, 64, 66-69, 97
 Sontraer Str. 27
 D-60386 Frankfurt am Main
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 E-mail: Bergmann@LTG-AG.de

Central office (Herborn)

Sales area:

PLZ 30, 31, 34-38, 56, 57, 61, 65
 Sperberweg 16
 D-35745 Herborn
 Herr Hartmann
 ☎ (02772) 570-725, Fax -727
 E-mail: Hartmann@LTG-AG.de

Eastern office (Berlin)

Sales area:

PLZ 10-25, 29, 39
 Eisenhutweg 51a
 D-12487 Berlin
 Herr Linke
 ☎ (030) 63 22 87-74, Fax -75
 E-mail: Linke@LTG-AG.de

Eastern office (Chemnitz)

Sales area:

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 Johannes-Ebert-Straße 20
 D-09128 Chemnitz
 Herr Schenfeld
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 GB-Essex SS11 8YU
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 E-Mail: info@opticlina.nl

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 E-Mail: info@htk-went.pl

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 E-Mail: info@argelo.pt

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 E-Mail: info@energoplus.si

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 Ch-3400 Burgdorf
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 E-Mail: info@laminair.ch

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Yali Yolu Sokak, Turanlı Apt. No: 24 D.1
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The Program for Room Air Technology

Components

Air diffusers for walls, floors and ceilings · LTG System clean[®] · linear diffusers Coandatrol[®] · ceiling air diffusers Coadavent[®] · displacement diffusers · LTG chilling fans cool wave[®] · induction units Klimavent[®] · fan coil units Raumluft · ceiling fan coil units Ventotel[®] · facade fan coil units · airflow control units · labair[®] system

Engineering services

Technical services for investors, architects, engineers and plant builders during design, construction and operation of buildings. Reliable and precise data relating to the ventilation of air conditioning system are given already before realization of the project, determined by measurements, calculations, building simulations and experiments.

Components for Process Air Technology

Japan

Toho Engineering Co. Ltd.

14-11, Shimizu 3-Chome, Kita Ku
 Japan 462 Nagoya
 ☎ (052) 9 91-10 40, Fax (052) 9 14-98 22
 E-Mail: main@tohoeng.com

The Program for Process Air Technology

Components

Axial-flow, centrifugal and tangential fans · Collector system for: coarse and fine particle filtration, separating and compacting, compressing and humidifying.

Engineering services

Technical services for construction engineers and plant designers during development and operation of assembly groups, machines and plants.

LTG A/C Components -The Cost-Effective Alternative

LTG Fan Coil Units Raumluft

Function

Fan Coil Units Raumluft use an integrated fan that draws in the ambient air. In a water-fed heat exchanger this air is cooled or heated, then discharged again into the room. The heat exchanger is usually equipped with a filter for protection.

Among the fan types used are cross-flow fans and centrifugal fans (for type VKE) all of which are low-noise and maintenance-free. Fan speed control is realized through a factory-mounted transformer with 5 secondary voltages, triggered through separate switches. The use of a bank of transformers offers the possibility to trigger several units at a time using only one switch.

The fan coil units re-circulate room air. However, on request they may also be delivered with a connection for fresh air.

The solid construction and finish of the fan coil units ensure both reliability and long-term functional safety.

Advantages

- **Versatile Range**
 - two- and four-pipe systems
 - different sizes
- **Features**
 - low-noise cross-flow or centrifugal fan
 - energy-saving fan operation
 - units with fresh air supply (option)
- **Indoor air flow**
 - uniform air discharge over the entire unit length by a cross-flow fan
 - inlet and outlet grille with adjustable air guidance for optimum indoor air flow
 - a variety of flow patterns
- **Installation properties**
 - compact construction and minimum unit height
 - low installation depth
- **Complete packaged systems**
 - integrated control systems
 - integrated ventilation systems, including fan coil units and linear diffusers
- **Maintenance**
 - easily removable, maintenance-free fan
 - easy replacement of filter, filter class G2 (EU2)
 - convenient, accessible heat exchanger on the suction side

Product range

- Ceiling fan coil unit
Type VKE (see page 4)
- Ceiling fan coil unit Ventotel®
Type VKH for hotels (see page 15)
- Ceiling fan coil unit
Type VDC (see page 24)
- Ceiling fan coil unit
Type VFC (see page 30)
- Air conditioning system Indivent®
Ceiling fan coil unit
Type LVC (see page 39)

All fan coil units are available in several sizes:

Type VKE in size 1100

Type VKH in sizes 630, 800, 1000 and 1250

Type VDC in size 1000

Type VFC in sizes 500, 630, 800, 1000 and 1250

Type LVC in sizes 630, 800, 1000 and 1250

Accessories / Special versions

(see brochure

"Accessories for LTG Air Conditioning Systems")

- Units without secondary air filter and safety grille on the outlet (standard version with filter and grille)
- Condensate tray with drainage spigot
- For water-side unit connection:
transition 1/2"
or air bleed fitting, flexible connection hoses with or without venting
- Air outlet grille and frame
- Fresh air inlet through a nozzle tube
- Control accessories

Tolerances

- For the dimensions stated in this brochure, general tolerances apply according to DIN ISO 2768-vL.
For the outlet grille - special tolerances stated in the drawing apply.
- Straightness and torsion tolerances - for aluminum extrusion sections - according to DIN EN 12020-2.

Finish

- The surface finish is designed to meet the requirements for applications in buildings - room climate according to DIN 1946 Part 2. Other requirements on request.

You will find the actual **tender documentations** at the end of this document.

They are available in word format at your local dealership or at www.LTG-AG.de.

Ceiling Fan Coil Unit Type VKE



Ceiling fan coil unit type VKE

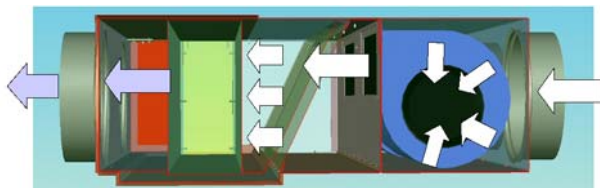
The ceiling fan coil unit type VKD is specifically designed for versatile application in hotels and office buildings and offers a wide range of possibilities for air distribution system designs.

Advantages

- LTG system with LTG diffusers
- Individual adjustment of the cooling capacity
- Low-noise operation
- Low installation costs since all the components are factory-wired and integrated in the unit
- Energy efficient by optimisation controls
- Maintenance-friendly design

Function

The fan draws in ambient air which is then led through a heat exchanger and discharged back into the room. The heat exchanger is fed with cold water for cooling and hot water for heating.



Function fan coil unit type VKE

Design

Ceiling fan coil unit VKD with two or four-pipe heat exchanger for a high capacity, made of copper pipe with press-fitted aluminum fins, for a maximum operating pressure of 10 bar, for connection to a cold and/or hot water system, with water-side control through high-precision valves.

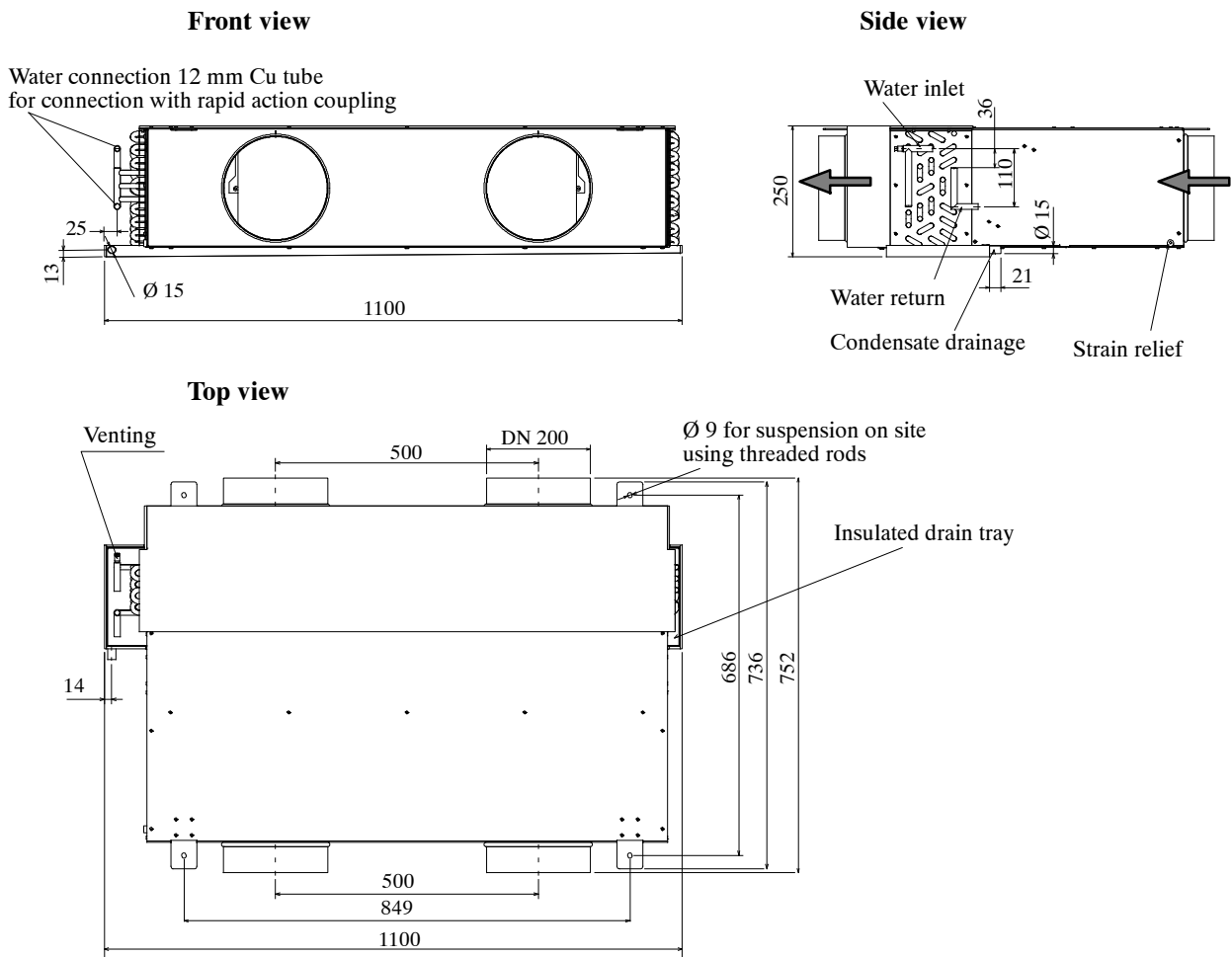
Fan impeller made of plastic, inflammable according to UL 94 HB (non inflammable version on request).

Always insulated version for condensate formation during operation.

Fan features: safe starting, steady characteristic and low noise level, 6-pole single-phase motor with running capacitor.

Size 1100

Ceiling Coil Unit Type VKE - Dimensions

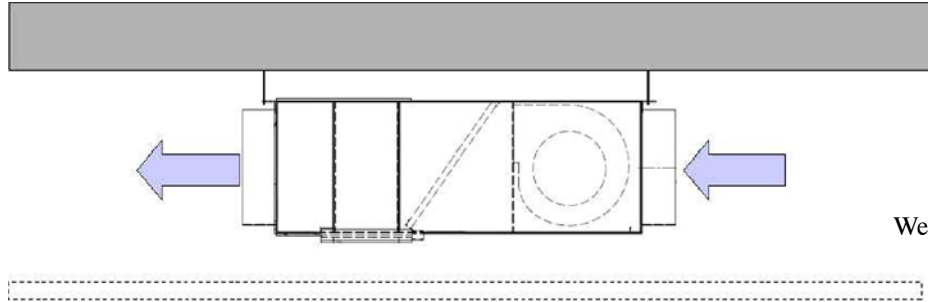


Ceiling fan coil unit type VKE (shown 2-pipe unit), water connection left, as shown

Ceiling Fan Coil Unit Type VKE-4-1100 - Technical Data

Standard application 0-0, free suction, free discharge

Acoustics data without impact of ceiling, including diffuser insertion loss and flow noise (improved sound levels depending on the outlets' position in the ceiling and the ceiling's insulating properties)



Weight: 42 kg

n [-]	Δp_{ext} [Pa]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _k /Δt [W/K]	Q _h /Δt [W/K]	w _{ok} /Δp _w [kg/h]/[kPa]	w _{oh} /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	0	221	21	27	66	43	300/6	100/7	9
II		291	26	32	85	53			13
III		412	34	41	115	67			49
IV		569	43	50	149	77			60
V		728	49	55	178	79			75
I	10	136	25	32	42	28			9
II		224	29	35	67	44			13
III		357	35	42	102	61			47
IV		518	42	49	139	75			58
V		677	47	54	170	79			74
I	20	49	30	37	16	11			9
II		155	32	39	48	32			14
III		296	37	43	86	54			46
IV		462	42	49	126	71			57
V		620	47	54	159	79			72
II	30	84	35	42	27	18			14
III		231	39	45	69	45			44
IV		400	43	49	112	66			55
V		558	47	54	147	77			70
III	40	160	40	47	49	33			43
IV		332	44	50	96	58			54
V		490	47	54	133	73			69
III	50	84	42	48	27	18			41
IV		258	44	51	76	49			52
V		416	47	54	116	67			67
IV	60	179	45	52	54	36	50		
V		337	47	54	97	59	65		
IV	70	93	46	53	29	20	48		
V		252	48	54	75	48	63		
V	80	162	48	55	50	33	61		
V	90	66	49	55	21	15	59		

Ceiling Fan Coil Unit Type VKE-4-1100 - Technical Data

Condensing Operation (cold water inlet temperature 6 °C)

Standard application 0-0

n [-]	Δp_{ext} [Pa]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k tot} [W]	Q _{k sens} [W]	Q _h / Δt [W/K]	w _{ok} / Δp_w [kg/h]/[kPa]	w _{oh} / Δp_w [kg/h]/[kPa]	P _{el} [W]	T _{Ausblas} [°C]
I	0	221	21	27	1975	1258	43	300/6	100/7	9	8.9
II		291	26	32	2379	1549	53			13	10.0
III		412	34	41	2873	1973	67			49	11.6
IV		569	43	50	3294	2451	77			60	13.1
V		728	49	55	3607	2907	79			75	14.0
I	10	136	25	32	1330	834	28			9	7.6
II		224	29	35	1994	1271	44			13	9.0
III		357	35	42	2675	1790	61			47	10.9
IV		518	42	49	3173	2300	75			58	12.7
V		677	47	54	3522	2767	79			74	13.7
I	20	49	30	37	514	323	11			9	6.4
II		155	32	39	1492	937	32			14	7.9
III		296	37	43	2406	1570	54			46	10.1
IV		462	42	49	3024	2130	71			57	12.2
V		620	47	54	3409	2603	79			72	13.4
II	30	84	35	42	860	538	18			14	6.8
III		231	39	45	2036	1300	45			44	9.1
IV		400	43	49	2833	1934	66			55	11.5
V		558	47	54	3269	2419	77			70	13.0
III	40	160	40	47	1530	962	33			43	8.0
IV		332	44	50	2572	1702	58	54	10.6		
V		490	47	54	3101	2216	73	69	12.4		
III	50	84	42	48	862	539	18	41	6.8		
IV		258	44	51	2202	1417	49	52	9.5		
V		416	47	54	2887	1987	67	67	11.7		
IV	60	179	45	52	1674	1056	36	50	8.3		
V		337	47	54	2594	1721	59	65	10.7		
IV	70	93	46	53	947	592	20	48	7.0		
V		252	48	54	2168	1393	48	63	9.4		
V	80	162	48	55	1543	971	33	61	8.0		
V	90	66	49	55	679	425	15	59	6.7		

Legend

- n - speed
 Δp_{ext} - external pressure loss without filter and connection boxes
V - flow rate (approx. values, tolerance $\pm 10\%$)
L_{A18} - sound pressure level, 18 m² Sabine
L_{wA} - sound power level ± 3 dB(A) including suction-side, discharge-side, and structure-borne sounds
Q_{k tot} - total cooling capacity at 26 °C / 50% rF and 6 °C cold water inlet temperature
Q_{k sens} - sensible cooling capacity at 26 °C / 50% rF and 6 °C cold water inlet temperature
Q_h - total heating capacity

- Δt - temperature difference between suction air temperature before entering the heat exchanger and water supply
w_{ok} - standard flow rate at cooling capacity
w_{oh} - standard flow rate at heating capacity
 Δp_w - water-side pressure loss
P_{el} - electric power consumption ($\pm 20\%$)

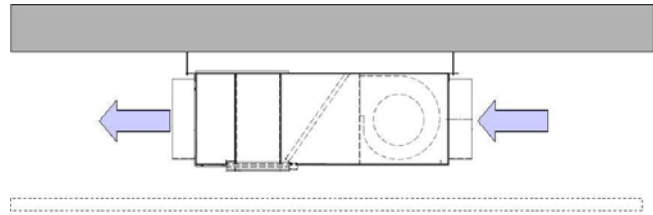
Speed control wiring diagram

(see page 12)

LTG A/C System VKE-4-1100 - Technical Data

Standard application 0-0, free suction, free discharge

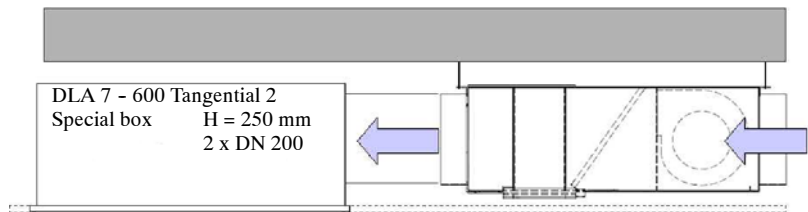
Acoustics data without impact of ceiling, including diffuser insertion loss and flow noise (improved sound levels depending on the outlets' position in the ceiling and the ceiling's insulating properties)



n [-]	Pressure increase			L _{wA} [dB(A)]	V [m ³ /h]	P _{el} [W]	Q _k [W/K]	Q _h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	0	0	0,0	27	221	9	66	43
II	0	0	0,0	32	291	13	85	53
III	0	0	0,0	41	412	46	115	67
IV	0	0	0,0	50	569	55	149	77
V	0	0	0,0	55	728	68	178	79

Standard application DLA 7-0

Acoustics data without impact of ceiling, including DLA 7 insertion loss and diffuser flow noise (maximum improvement of sound levels ~ 2 dB depending on the outlets' position in the ceiling and the ceiling's insulating properties)

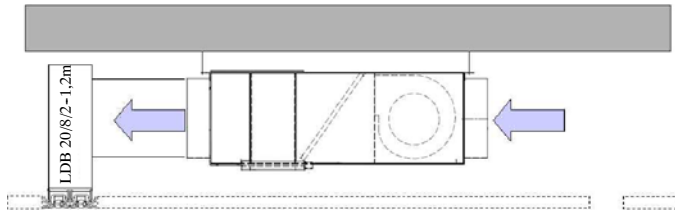


n [-]	Pressure increase			L _{wA} [dB(A)]	V [m ³ /h]	P _{el} [W]	Q _k [W/K]	Q _h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	0	2,7	2,7	27	198	9	60	39
II	0	4,5	4,5	32	261	13	77	49
III	0	9,3	9,3	42	361	47	103	62
IV	0	17	17,0	49	479	57	130	72
V	0	26	26,0	54	584	71	152	78

LTG A/C System VKE-4-1100 - Technical Data

Standard application Z2-0, LDB 20/8/2 pressure side

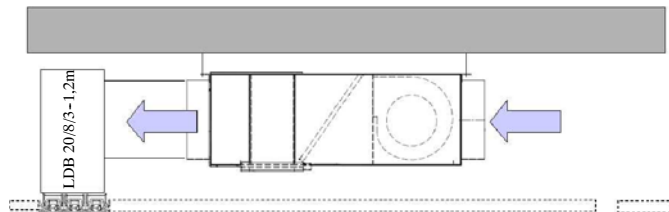
Acoustics data without impact of ceiling, including diffuser insertion loss and flow noise (maximum improvement of sound levels ~ 2 dB depending on the outlets' position in the ceiling and the ceiling's insulating properties)



n [-]	Pressure increase			L_{wA} [dB(A)]	V [m ³ /h]	P_{el} [W]	Q_k [W/K]	Q_h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	0	5	5,0	29	179	9	54	36
II	0	8,5	8,5	35	234	13	70	45
III	0	16,8	16,8	44	316	46	92	57
IV	0	28,3	28,3	51	411	55	115	67
V	0	41,2	41,2	55	481	68	131	73

Standard application Z3-0, LDB 20/8/3 pressure side

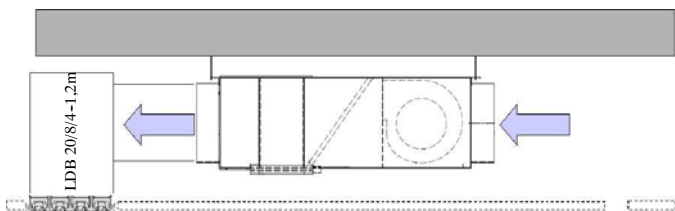
Acoustics data without impact of ceiling, including diffuser insertion loss and flow noise (maximum improvement of sound levels ~ 2 dB depending on the outlets' position in the ceiling and the ceiling's insulating properties)



n [-]	Pressure increase			L_{wA} [dB(A)]	V [m ³ /h]	P_{el} [W]	Q_k [W/K]	Q_h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	0	2,6	2,6	28	199	9	60	40
II	0	4,9	4,9	33	258	13	77	49
III	0	9,5	9,5	42	359	46	102	62
IV	0	17,3	17,3	49	478	55	130	72
V	0	26,2	26,2	55	582	68	152	78

Standard application Z4-0, LDB 20/8/4 pressure side

Acoustics data without impact of ceiling, including diffuser insertion loss and flow noise (maximum improvement of sound levels ~ 2 dB depending on the outlets' position in the ceiling and the ceiling's insulating properties)



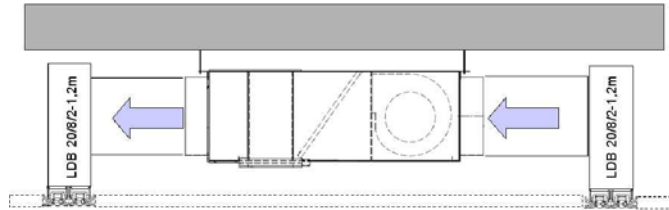
n [-]	Pressure increase			L_{wA} [dB(A)]	V [m ³ /h]	P_{el} [W]	Q_k [W/K]	Q_h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	0	1,7	1,7	28	207	9	62	41
II	0	3,2	3,2	33	270	13	80	50
III	0	5,9	5,9	44	380	46	107	64
IV	0	10,9	10,9	49	513	55	140	75
V	0	16,5	16,5	55	641	68	163	79

LTG A/C System VKE-4-1100 - Technical Data

Standard application Z2-A2, LDB 20/8/2 pressure side, LDB 20/8/2 suction side

Since structure-borne sound is low, ceiling will not result in significant improvement of sound levels.

Acoustics data without impact of ceiling

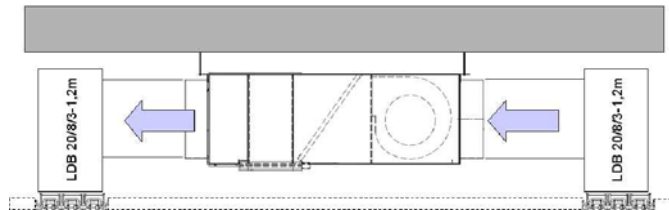


n [-]	Pressure increase			L _{wA} [dB(A)]	V [m ³ /h]	P _{el} [W]	Q _k [W/K]	Q _h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	-7,7	3,1	10,8	31	129	9	40	27
II	-12,9	6,1	19,0	37	162	13	50	33
III	-22,9	10,4	33,3	46	208	46	63	41
IV	-36,1	16,8	52,9	51	236	55	70	45
V	-47,3	22,1	69,4	55	257	68	76	49

Standard application Z3-A3, LDB 20/8/3 pressure side, LDB 20/8/3 suction side

Since structure-borne sound is low, ceiling will not result in significant improvement of sound levels.

Acoustics data without impact of ceiling

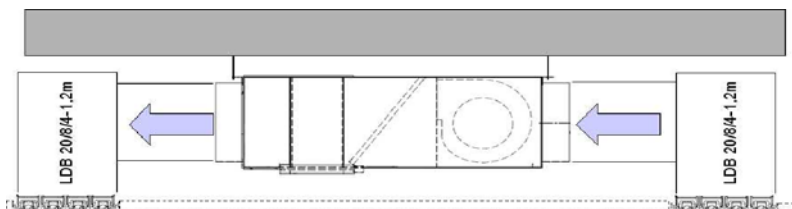


n [-]	Pressure increase			L _{wA} [dB(A)]	V [m ³ /h]	P _{el} [W]	Q _k [W/K]	Q _h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	-5,3	2,3	7,6	29	157	9	48	32
II	-8,5	3,6	12,1	35	210	13	63	41
III	-16,6	6,3	22,9	44	278	46	82	51
IV	-28	11,3	39,3	50	337	55	97	59
V	-39,2	15,5	54,7	54	380	68	107	64

Standard application Z4-A4, LDB 20/8/4 pressure side, LDB 20/8/4 suction side

Since structure-borne sound is low, ceiling will not result in significant improvement of sound levels.

Acoustics data without impact of ceiling



n [-]	Pressure increase			L _{wA} [dB(A)]	V [m ³ /h]	P _{el} [W]	Q _k [W/K]	Q _h [W/K]
	Return air [Pa]	Supply air [Pa]	Δp [Pa]					
I	-4,4	1,7	6,1	28	169	9	52	35
II	-6,9	2,7	9,6	33	227	13	68	44
III	-13	5,2	18,2	43	307	46	89	55
IV	-22,9	9,1	32,0	50	387	55	109	64
V	-33,3	13,1	46,4	55	443	68	122	70

Ceiling Fan Coil Unit Type VKE

Installation and Maintenance

Installation

For installation on site the units are provided with 9 mm Ø through holes (fixing material by customer).

To avoid structure-borne sound transmission use vibration dampers when installing the unit and avoid any direct contact with ceiling elements.

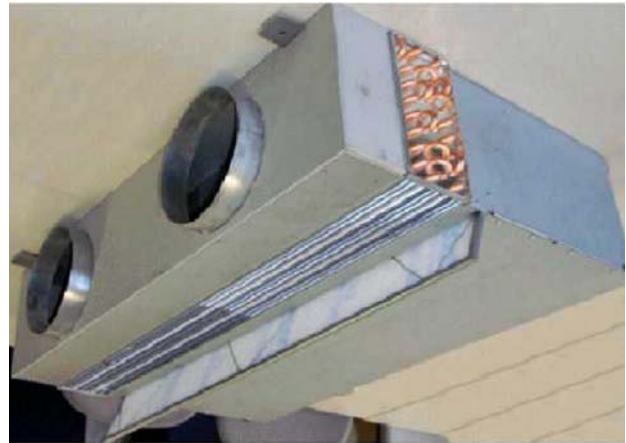
Maintenance

The fan coil unit VKE is maintenance-friendly. Major components may be removed as shown below.

Repair and maintenance of the units must be carried out in compliance with applicable regulations.



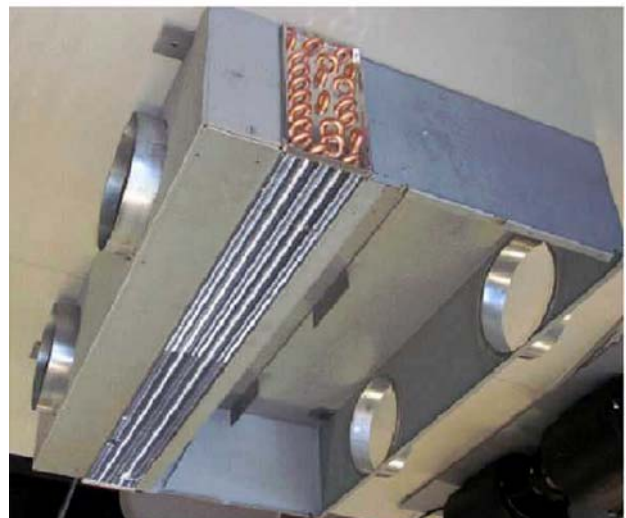
1. Removal/cleaning of condensate tray



2. Replacement of plug-in filter



3. Removal of lower plate / vacuum-cleaning of heat exchanger on the pressure side



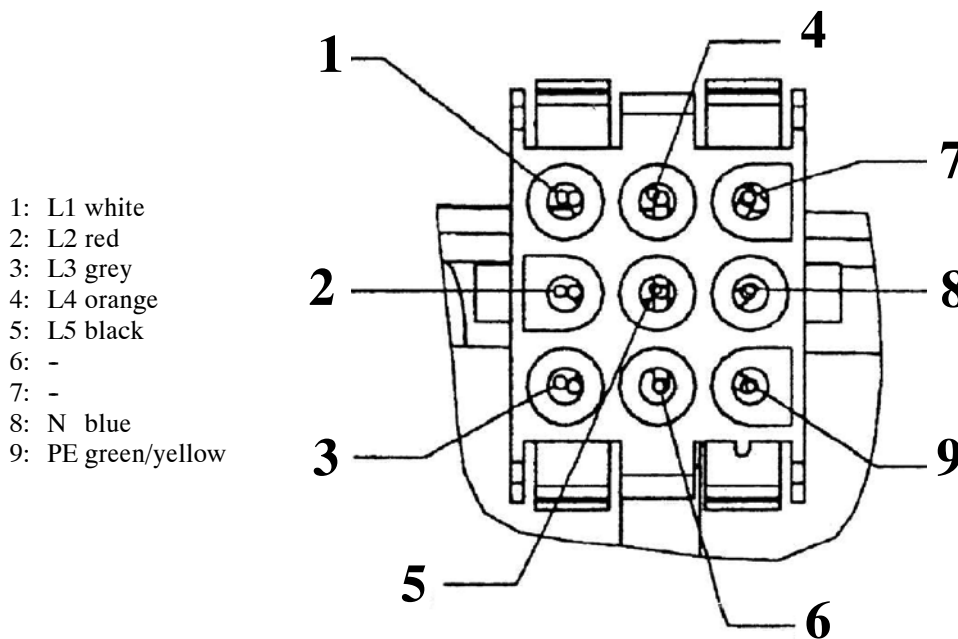
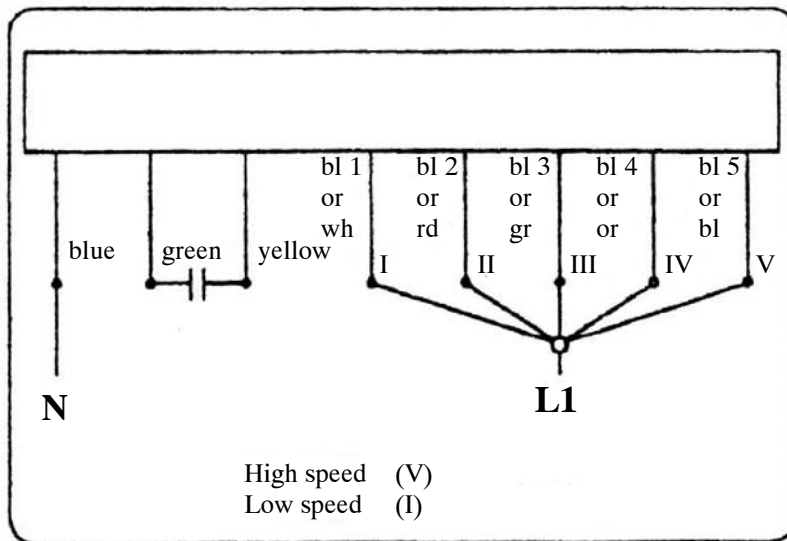
4. Removal of fan unit including mounting flange

Ceiling Fan Coil Unit Type VKE

Speed Control Wiring Diagram

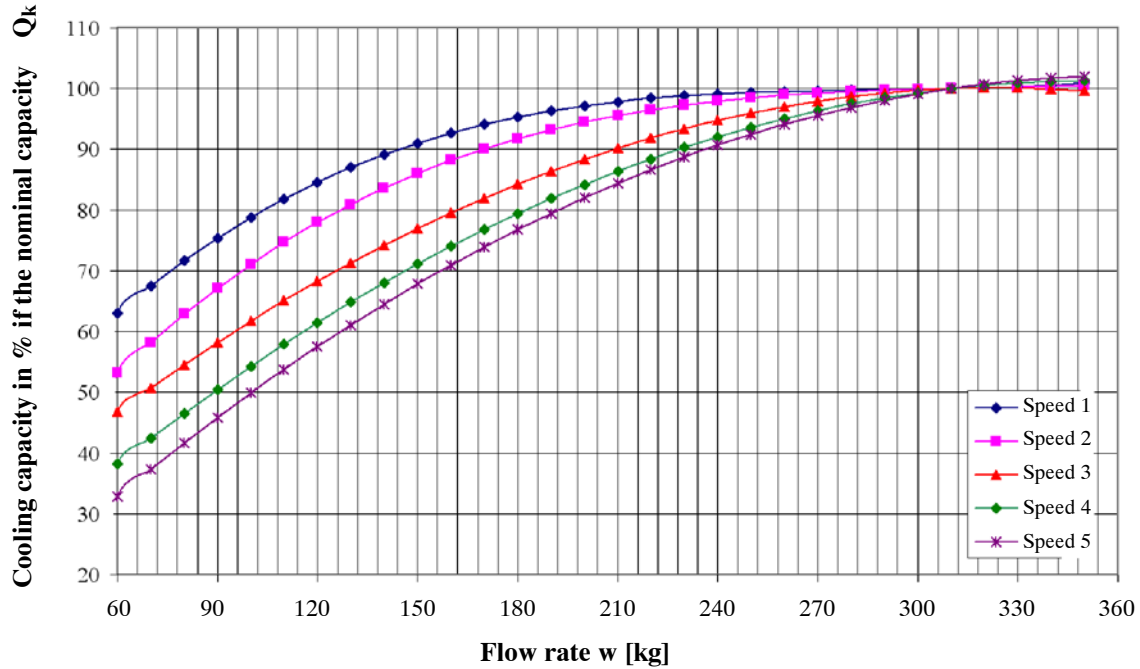
- Note:** - 5-speed capacitor motor (internal switching of temperature controller)
 - group activation possible
 - for power consumption and output refer to technical data

A 2.3 m cable and mating connector are included in the delivery.

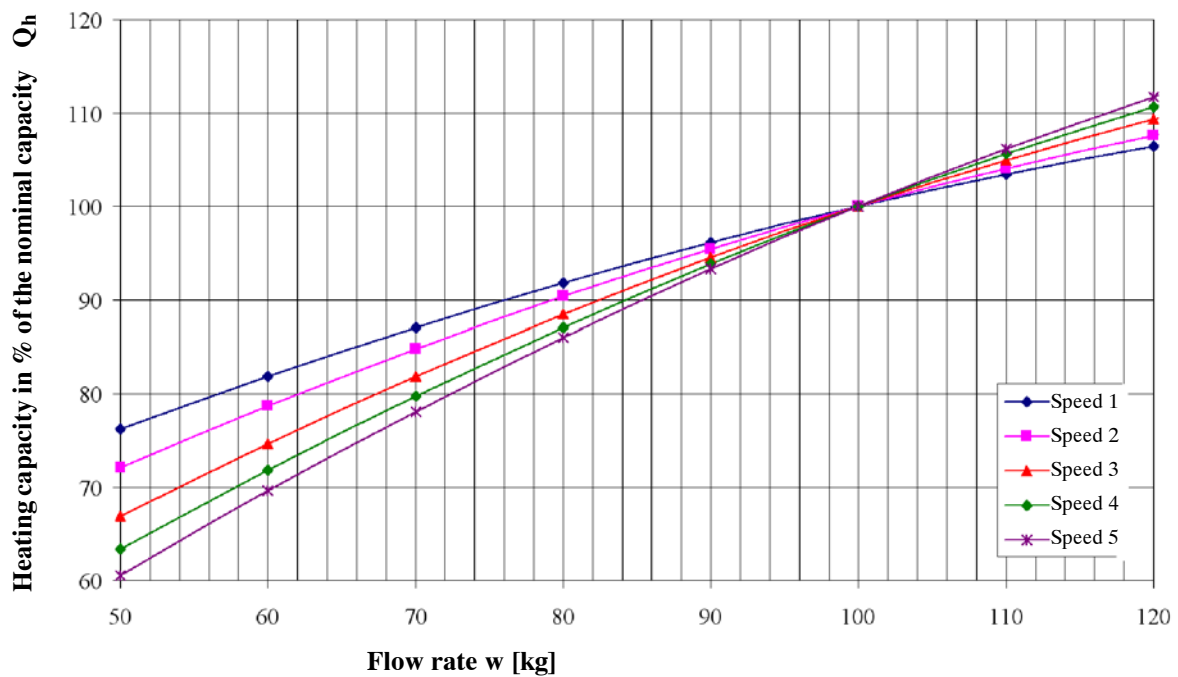


Ceiling Fan Coil Unit Type VKE

Cooling capacity for different water flow rates



Heating capacity for different water flow rates



Ceiling Fan Coil Unit Type VKE

Nomenclature

VKE - 2 1100 / F / L / 2A200 / 2A200 / D

2-pipe unit	2					
4-pipe unit (valve controlled)	4					
size	1100					
without filter	-					
with filter	F					
water connection on the left	L					
pressure-side socket	Ø 200		2A200			
suction-side socket	Ø 200		2A200			
straight-way 3-point valve			D			
3-way-3-point valve			3			

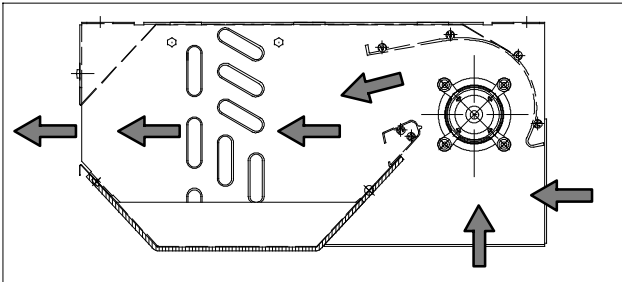
Ceiling Fan Coil Unit Ventotel® Type VKH for Hotels

Specification

The ceiling fan coil unit type VKH is specifically designed for use in hotels. It offers versatile possibilities for design of air distribution systems and is made for installation in a ceiling bulkhead.

Function

The VKH's cross flow fan draws air through the heating/cooling heat exchanger laterally and discharges it from the opposite side.



Operation principle VKH

Design

Ceiling fan coil unit type VKH:

- a 2-pipe system for cooling only or heating only (VKH-2A)
- a 4-pipe system for cooling and heating (VKH-4A)
- with attached primary air box (accessory)

Advantages

- Low-noise operation.
- Low installation height of only 218 mm.
- Easy access to the filter from below.
- Easy replacement of the filter.
- Insulation of the unit suitable for operation with 6°C cooling water.
- Drain tray, 40 mm high, suitable for use in conjunction with condensate pump.
- Low water-side pressure loss
- Energy-saving fan operation
- Primary air box may be attached to the unit. Thus, primary air and recirculating air may be discharged through the same grille.
- Maintenance-friendly design. Motor, impeller and heat exchanger are accessible from below.



Ceiling fan coil unit type VKH-4A 800 (4-pipe system)

Ceiling Fan Coil Unit Ventotel® Type VKH-4A - Technical Data

Size 630 - 4-pipe system - heating and cooling - VKH-4A 630

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	w _{ok} /Δp _w	Q _h /Δt	Q _h ³	w _{oh} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[kg/h]/[kPa]	[W/K]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	160	24	30	43	1032	728	250/9.6	26	1040	100/0.8	22	170
II	235	30	36	56	1344	1070		32	1280		26	
III	310	34	40	66	1492	1245		35	1400		28	
IV	390	39	45	73	1606	1394		38	1520		32	
V	495	46	52	83	1793	1668		41	1640		39	

Size 800 - 4-pipe system - heating and cooling - VKH-4A 800

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	w _{ok} /Δp _w	Q _h /Δt	Q _h ³	w _{oh} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[kg/h]/[kPa]	[W/K]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	191	22	28	51	1226	865	250/12.2	31	1240	100/1	22	170
II	274	28	34	66	1611	1281		37	1480		26	
III	368	33	39	78	1771	1478		40	1600		28	
IV	457	38	44	86	1889	1639		42	1680		32	
V	582	46	52	98	2120	1974		46	1840		39	

Size 1000 - 4-pipe system - heating and cooling - VKH-4A 1000

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	w _{ok} /Δp _w	Q _h /Δt	Q _h ³	w _{oh} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[kg/h]/[kPa]	[W/K]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	220	24	30	60	1426	1005	250/14.8	36	1440	100/1.2	22	180
II	330	30	36	78	1891	1504		44	1760		27	
III	430	36	42	91	2069	1727		47	1880		29	
IV	535	42	48	102	2243	1947		50	2000		33	
V	680	47	53	115	2484	2313		54	2160		39	

Size 1250 - 4-pipe system - heating and cooling - VKH-4A 1250

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	w _{ok} /Δp _w	Q _h /Δt	Q _h ³	w _{oh} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[kg/h]/[kPa]	[W/K]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	265	24	30	70	1678	1183	250/17.8	42	1680	100/1.5	22	180
II	395	31	37	93	2241	1782		52	2080		27	
III	505	36	42	108	2441	2037		56	2240		29	
IV	625	41	47	122	2685	2330		60	2400		33	
V	800	47	53	136	2940	2737		64	2560		39	

Values are given for the unit without ceiling coffer but including the filter and the air outlet grille, 8 W motor.

¹ Water inlet: 16°C; suction air temperature before entering the heat exchanger: 26°C; non condensing operation.

² Water inlet: 6°C; suction air temperature before entering the heat exchanger: 26°C; relative air humidity: 50%.

³ Water inlet: 60°C; suction air temperature before entering the heat exchanger: 20°C

Legend

- n** - speed
- V** - flow rate (approx. values, tolerance ±10%)
- L_{A18}** - sound pressure level, 18 m² Sabine
- L_{wA}** - sound power level ±3 dB(A) (without casing)
- Δt** - temperature difference between suction air temperature before entering the heat exchanger and water supply
- Q_k** - total cooling capacity

- Q_{k sens}** - sensible cooling capacity
 - w_{ok}** - standard flow rate at cooling capacity*
 - Δp_w** - water-side pressure loss
 - Q_h** - total heating capacity
 - w_{oh}** - standard flow rate at heating capacity*
 - P_{el}** - electric power consumption (± 20%)
 - I_{max}** - maximum current input at speed V
- *correction for other flow rates see page 20,21

Speed control wiring diagram

(see page 52)

Ceiling Fan Coil Unit Ventotel® Type VKH-2A - Technical Data

Size 630 - 4-pipe system - heating and cooling - VKH-2A 630

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	Q _h ³	w _{ok} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	160	24	30	45	1080	762	1800	250/13.5	22	170
II	235	30	36	59	1416	1127	2360		26	
III	310	34	40	69	1559	1305	2760		28	
IV	390	39	45	79	1738	1509	3160		32	
V	495	46	52	90	1944	1808	3600		39	

Size 800 - 4-pipe system - heating and cooling - VKH-2A 800

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	Q _h ³	w _{ok} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	188	24	30	53	1274	988	2120	250/17	22	170
II	269	30	36	69	1662	1385	2760		26	
III	350	34	40	82	1868	1596	3280		28	
IV	426	39	45	93	2034	1800	3720		32	
V	540	46	52	106	2293	2143	4240		39	

Size 1000 - 4-pipe system - heating and cooling - VKH-2A 1000

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	Q _h ³	w _{ok} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	220	24	30	62	1490	1050	2480	250/21	22	180
II	330	30	36	81	1978	1573	3240		27	
III	430	36	42	95	2164	1806	3800		29	
IV	535	42	48	110	2422	2102	4400		33	
V	680	47	53	124	2683	2497	4960		39	

Size 1250 - 4-pipe system - heating and cooling - VKH-2A 1250

n	V	L _{A18}	L _{wA}	Q _k /Δt ¹	Q _k ²	Q _{k sens} ²	Q _h ³	w _{ok} /Δp _w	P _{el}	I _{max}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[kg/h]/[kPa]	[W]	[mA]
I	265	24	30	73	1752	1235	2920	250/26	22	180
II	395	31	37	97	2328	1852	3880		27	
III	505	36	42	113	2554	2131	4520		29	
IV	625	41	47	132	2904	2520	5280		33	
V	800	47	53	147	3175	2955	5880		39	

Values are given for the unit without ceiling coffer but including the filter and the air outlet grille, 8 W motor.

¹ Water inlet: 16°C; suction air temperature before entering the heat exchanger: 26°C; non condensing operation.

² Water inlet: 6°C; suction air temperature before entering the heat exchanger: 26°C; relative air humidity: 50%.

³ Water inlet: 60°C; suction air temperature before entering the heat exchanger: 20°C

Legend

- n** - speed
- V** - flow rate (approx. values, tolerance ±10%)
- L_{A18}** - sound pressure level, 18 m² Sabine
- L_{wA}** - sound power level ±3 dB(A) (without casing)
- Δt** - temperature difference between suction air temperature before entering the heat exchanger and water supply
- Q_k** - total cooling capacity

- Q_{k sens}** - sensible cooling capacity
 - w_{ok}** - standard flow rate at cooling capacity*
 - Δp_w** - water-side pressure loss
 - Q_h** - total heating capacity
 - P_{el}** - electric power consumption (± 20%)
 - I_{max}** - maximum current input at speed V
- *correction for other flow rates see page 22

Speed control wiring diagram

(see page 52)

Ceiling Fan Coil Unit Ventotel® Type VKH - Accessories

Accessories / Special versions

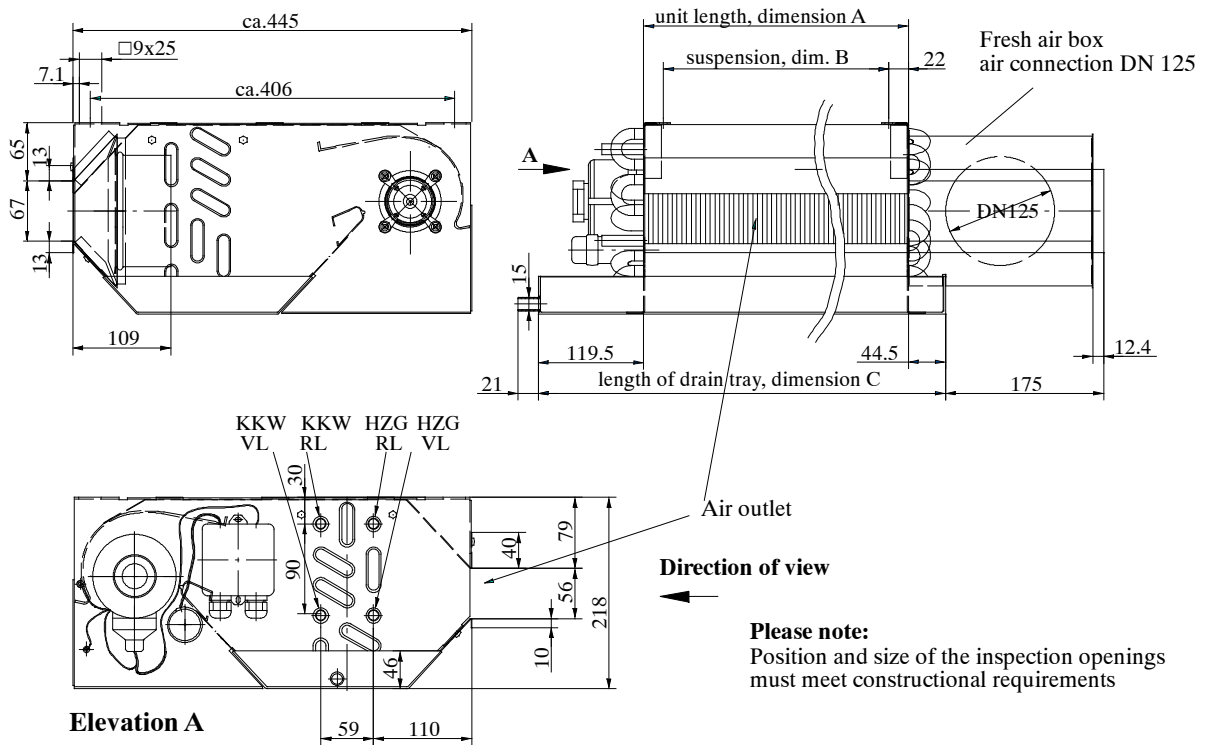
- straight-way valve with three-position actuator (24 V)
- straight-way valve with electro-thermal actuator
- three-step switch (OFF / 3 / 2 / 1)
- easy-to-replace, self-extinguishing filter

Accessory fresh air box

Length including fresh air box:
 Air distribution box always opposite of the water connection

Dimensions

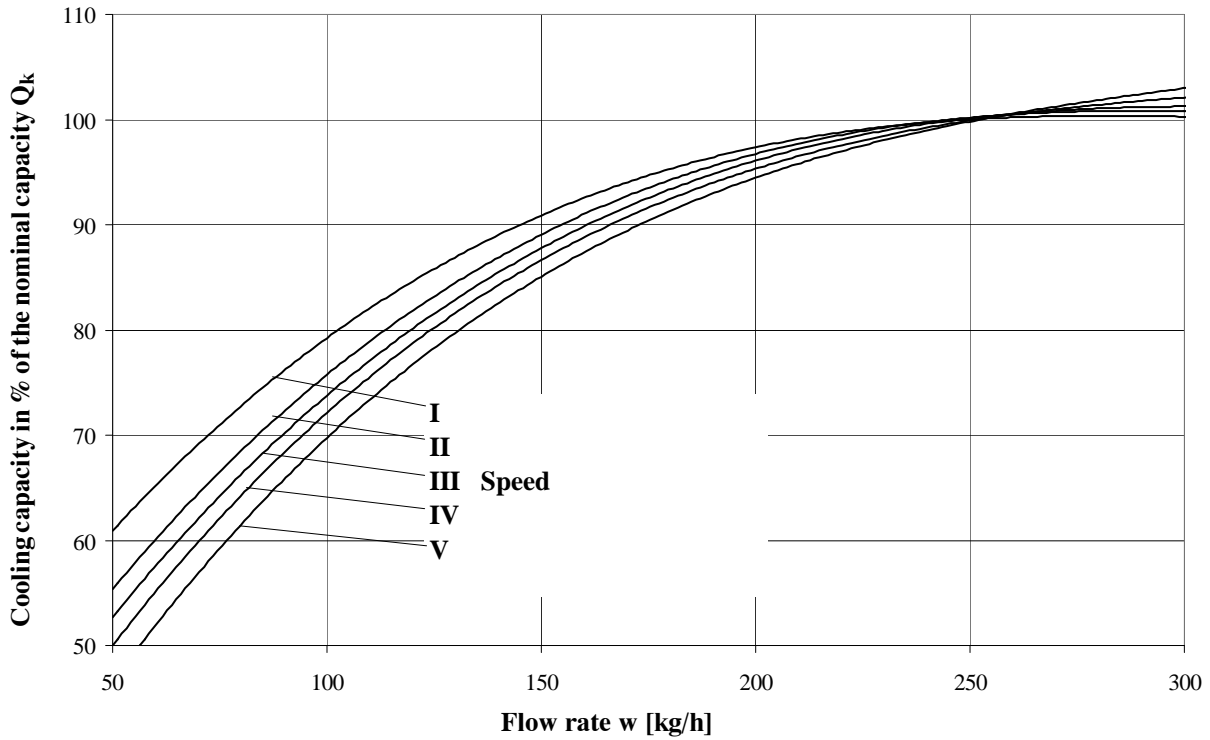
Size	A [mm]	B [mm]	C [mm]	Weight [kg]
630	616	572	780	19
800	846	802	1010	24
1000	1046	1002	1210	29
1250	1246	1202	1410	34



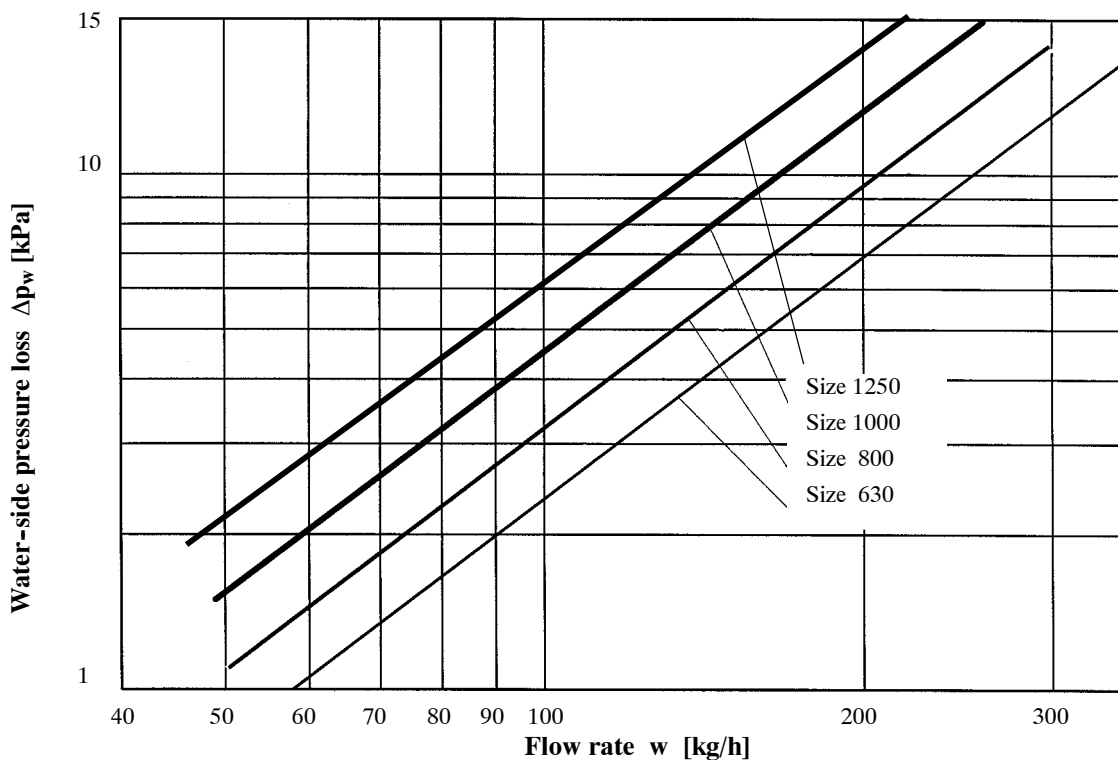
Ceiling fan coil unit type VKH with fresh air box

Ceiling Fan Coil Unit Ventotel® Type VKH-4A

Cooling capacity for different water flow rates

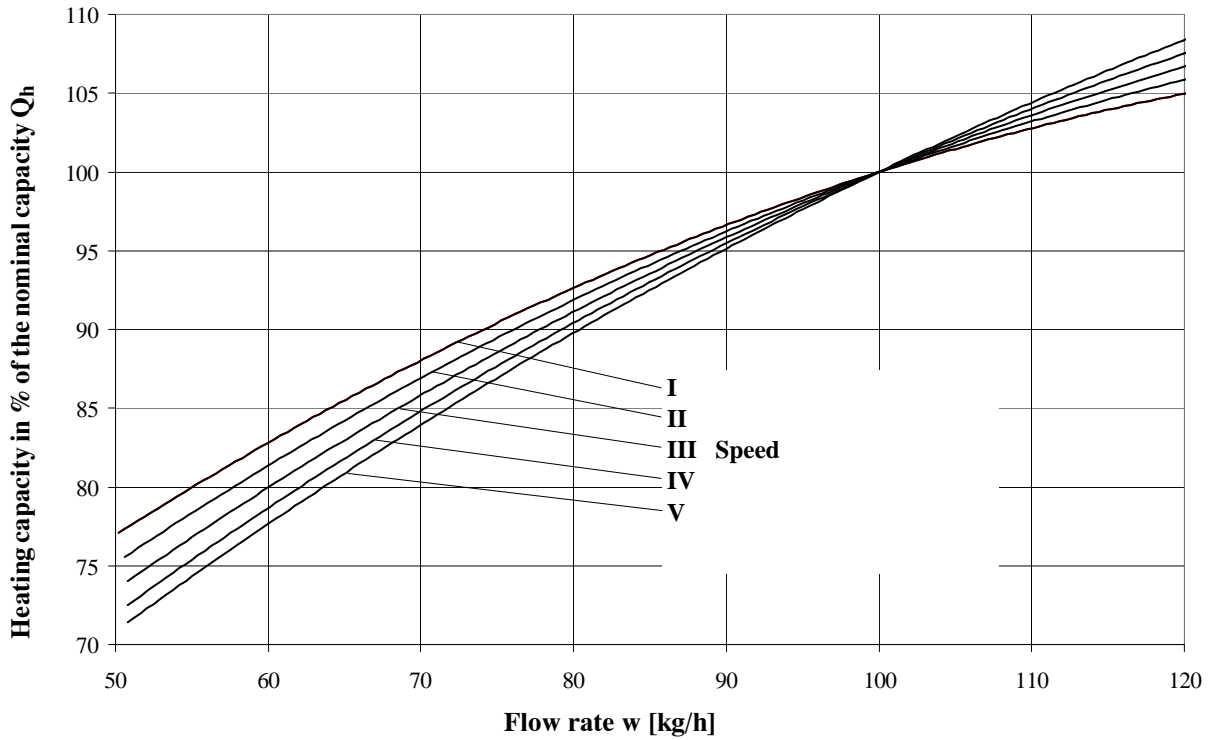


Water-side pressure loss of the cooler for different water flow rates

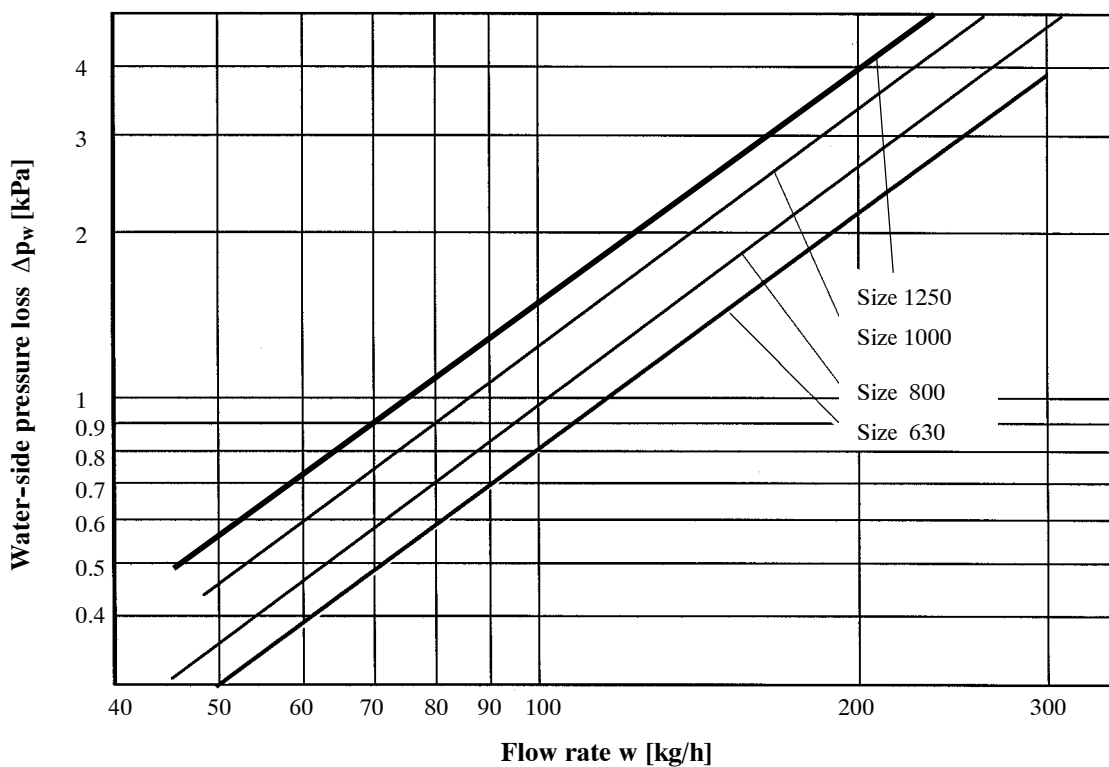


Ceiling Fan Coil Unit Ventotel® Type VKH-4A

Heating capacity for different water flow rates

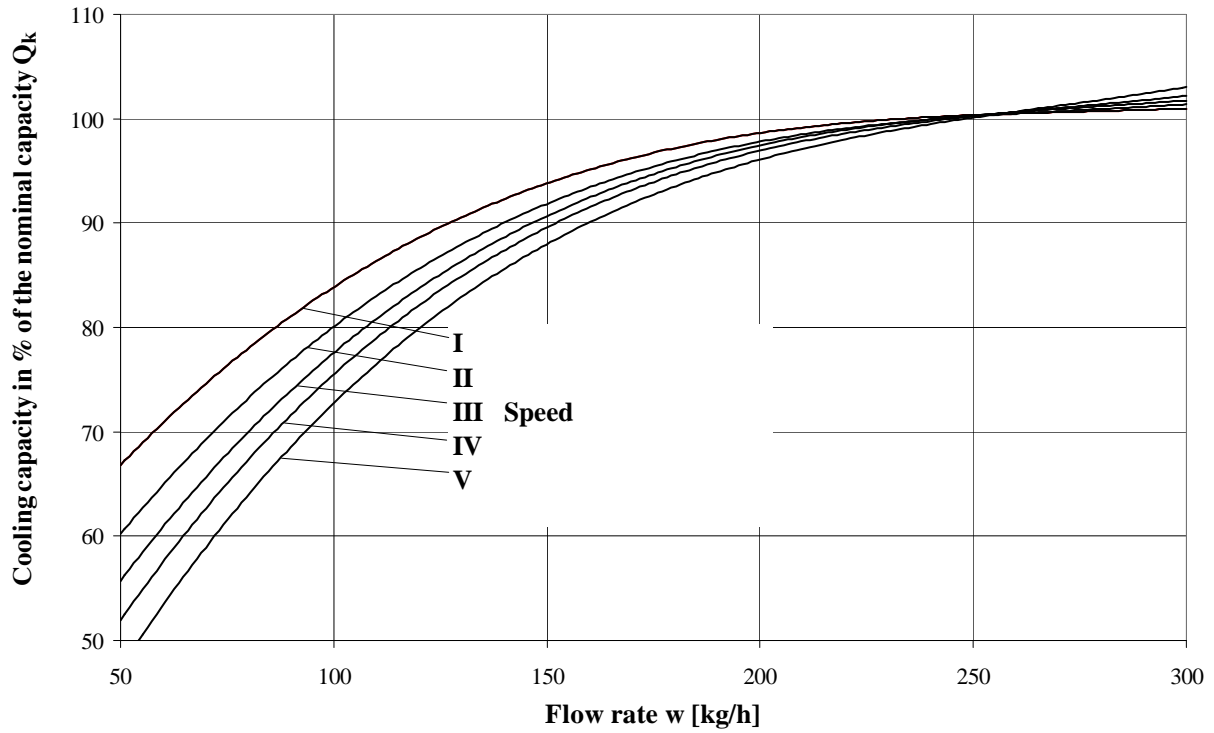


Water-side pressure loss of the heater for different water flow rates

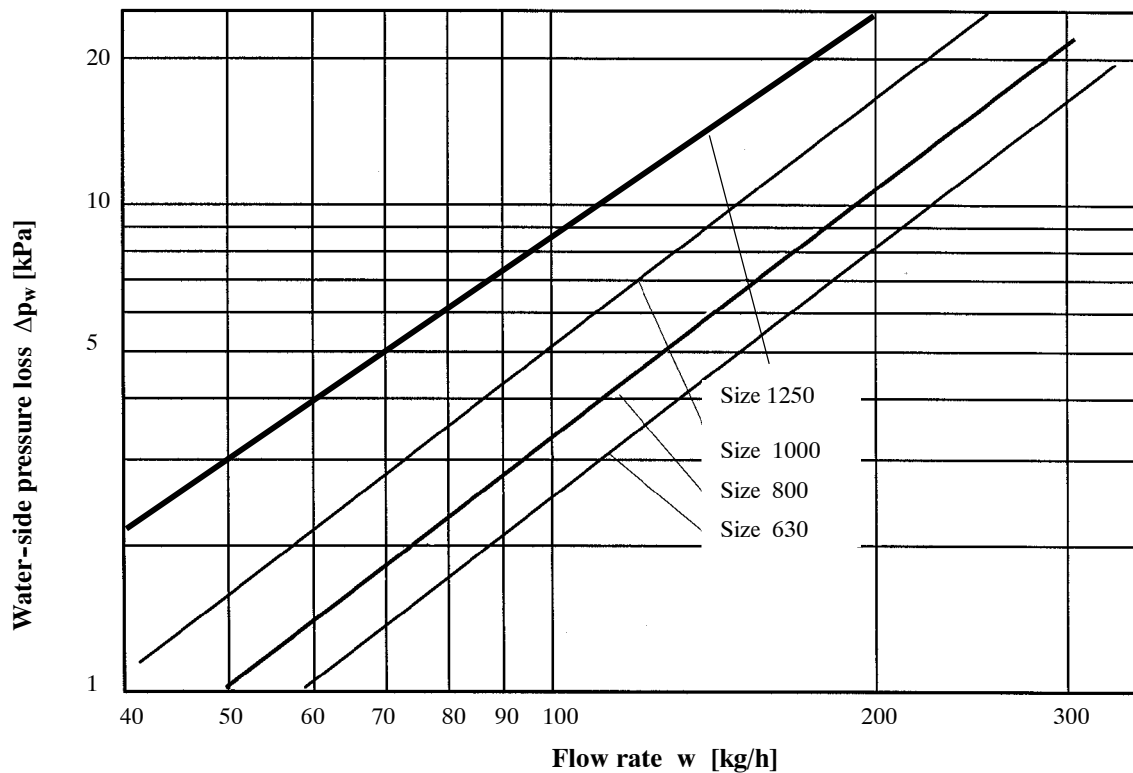


Ceiling Fan Coil Unit Ventotel® Type VKH-2A

Cooling capacity for different water flow rates



Water-side pressure loss of the cooler for different water flow rates



Ceiling Fan Coil Unit Ventotel® Type VKH

Nomenclature

VKH - 2 800 / A / F / L / - - - / D

2-pipe unit	2					
4-pipe unit (valve-controlled)	4					
size		630				
		800				
		1000				
		1250				
A = optimized capacity			A			
without filter				-		
with filter				F		
water connection on the left					L	
water connection on the right					R	
without fresh air connection						- - -
fresh air connection on the left						L . .
fresh air connection on the right						R . .
straight-way 3-point valve						D
3-way 3-point valve						3
straight-way valve, thermal						T

Ceiling Fan Coil Unit Type VDC

Specification

The ceiling fan coil unit Type VDC is specifically designed for installation in false ceilings. In the cooling mode room air is heated at the façade, entrained into the unit, cooled and recirculated to the space.

Function

The fan draws room air from the facade area and passes this through the heat exchanger. This air is then passed through the adjacent slot diffuser.

Versions

The ceiling fan coil unit Type VDC model 1000 is available:

- as a 2-pipe system for cooling or heating

Advantages

- Low installation height (240 mm)
- Attractive design of the combined air intake/outlet grille, colors according to RAL, flanged or recessed installation.
- High thermal comfort in the occupied zone
- Maintenance-free design. Valves and heat exchanger are easily accessible by removing the grille.
- Energy efficient by use of low primary flow rates and low static pressure at the primary air duct
- Virtually noiseless operation



Ceiling fan coil unit type VDC 1000 (2-pipe system)

Ceiling Fan Coil Unit Type VDC - Technical Data

Size 1000 - 2-pipe system - heating or cooling

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _k /Δt [W/K]	Q _k ¹ [W]	w _{ok} /Δp _w [kg/h]/[kPa]	P _{el} [W]	I _{max} [mA]
I	200	23	29	35	350	200/9.5	22	170
II	290	32	38	48	480		26	
III	350	39	45	56	560		28	
IV	420	44	50	62	620		33	
V	450	49	55	66	660		39	

Data is based on the unit with the inlet/outlet grille installed.

Standard flow rate cooling 200 kg/h

¹ Water inlet: 16°C; air inlet: 26°C at a height of 1.1 m; non condensing operation.

Legend

- n - speed
- V - flow rate (±10%)
- L_{A18} - sound pressure level, 18 m² Sabine
- L_{wA} - sound power level ±3 dB(A) (without casing)
- Q_k - cooling capacity
- Δt - temperature difference between t_{vL} - t_R

- w_{ok} - standard flow rate at cooling capacity*
- Δp_w - water-side pressure loss
- t_{vL} - water supply temperature
- t_R - room temperature at height of 1.1 m
- *correction for other flow rates see page 29

Dimensions

(suitable for plank tiles 300 wide x 1200 or 1250 long)

Flanged installation

Size 1000 - length x width x height =
approx. 1240 x 340 x 240 mm

Recessed installation

Size 1000 - length x width x height =
approx. 1320 x 300 x 240 mm

Accessories / Special versions

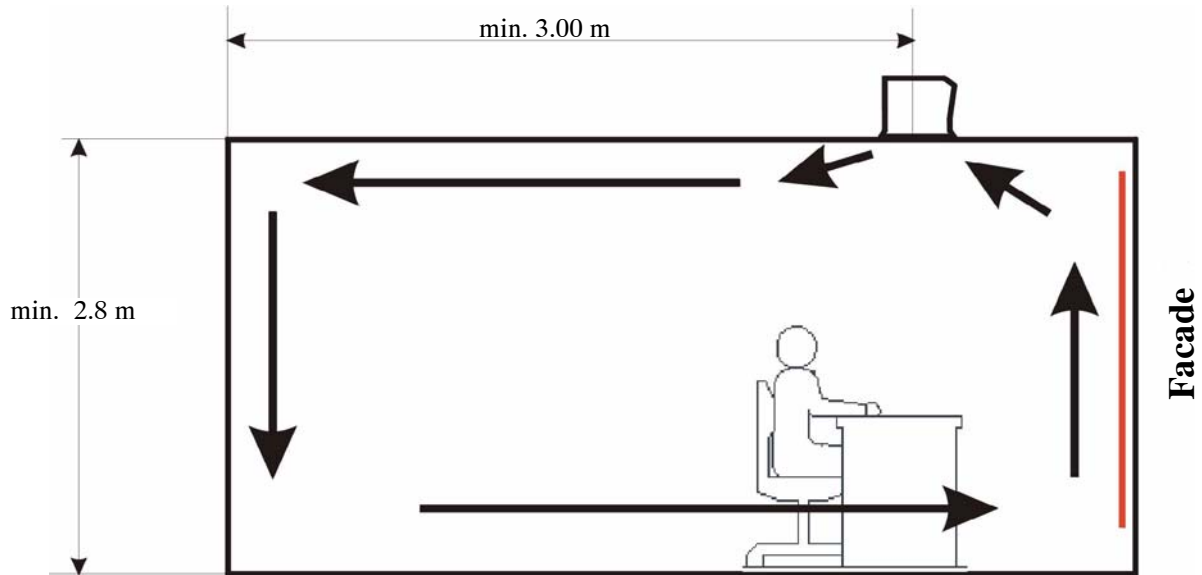
- straight-way valve with electro-thermal actuator



View from above: ceiling fan coil unit type VDC 1000

Ceiling Fan Coil Unit Type VDC - Indoor Air Flow

Typical arrangement



Section through a typical office room, length: 6 m, height: 2.8 m. Schematic illustration of indoor air flow.

Cooling mode

Room air heated at façade is drawn directly into the unit where it is cooled. Supply air is diffused along the ceiling, mixes with the ambient air to reduce air speed and temperature difference.

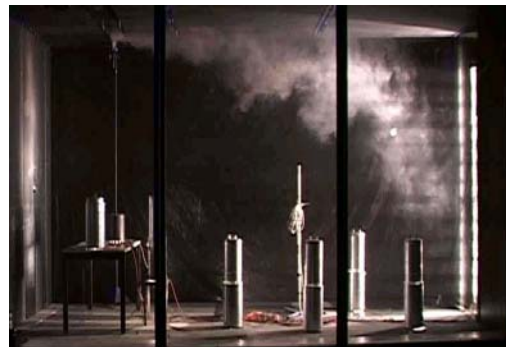
High thermal comfort up to 50 W/m² in speed 1

Indoor air flow

Speed 1



Speed 2

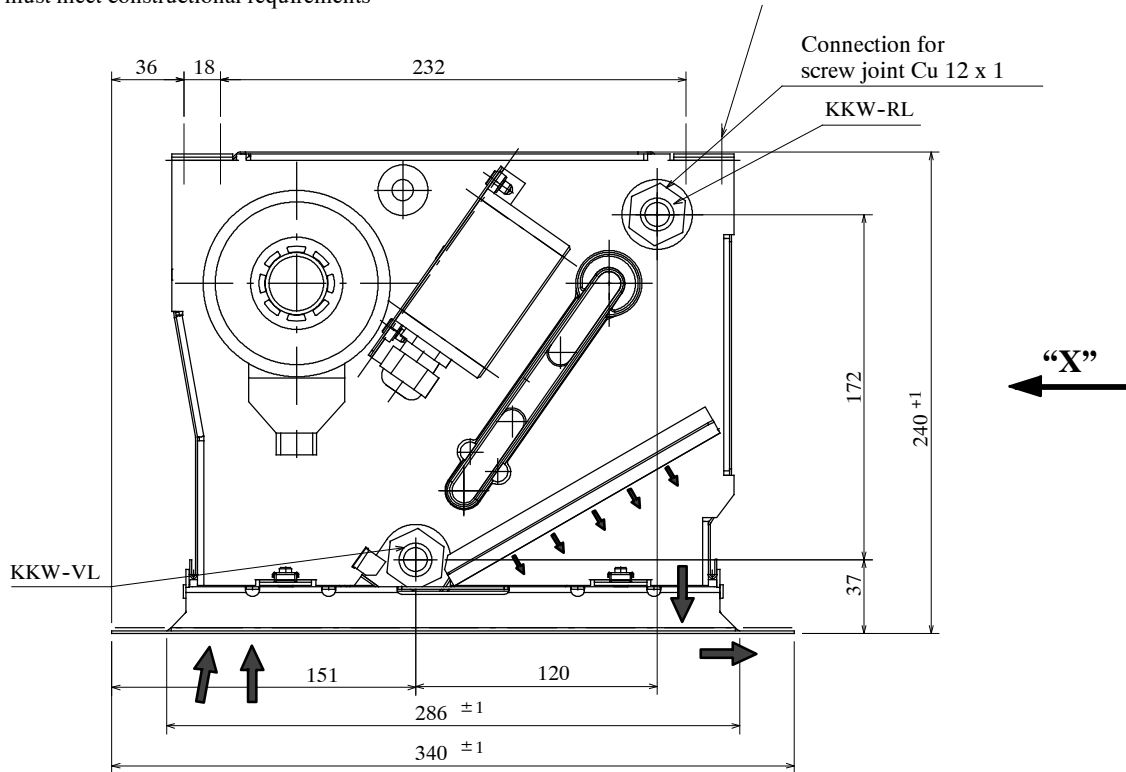


Ceiling Fan Coil Unit Type VDC - Dimensions Flanged Installation

Please note:

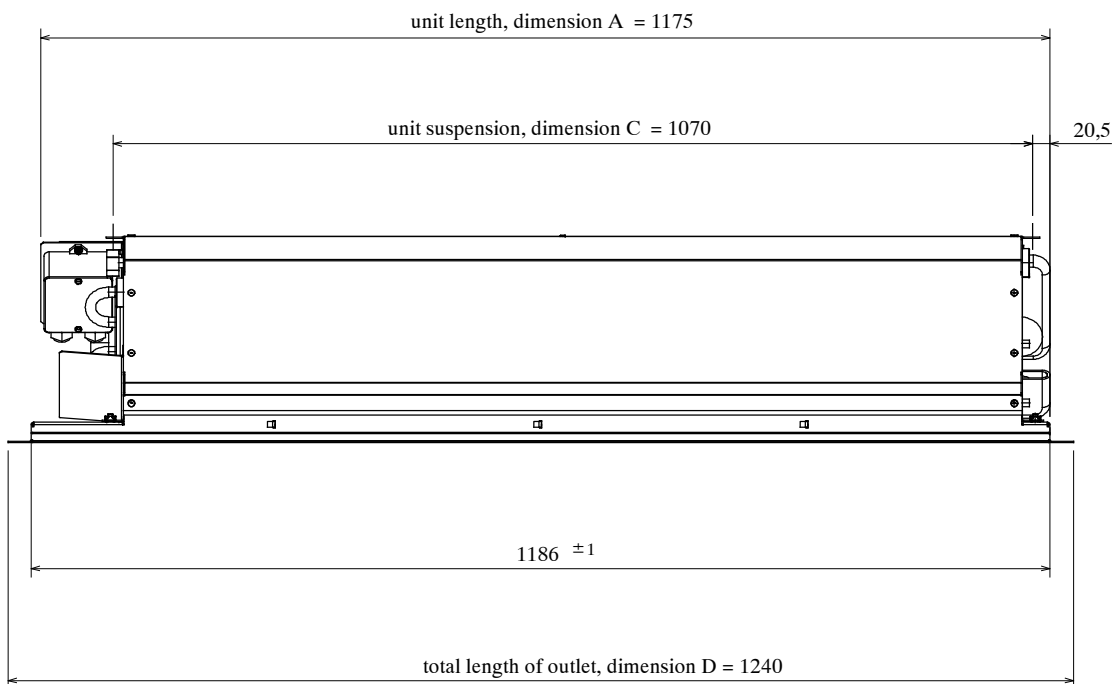
Position and size of the inspection openings must meet constructional requirements

Hole 9 x 18 for threaded rod M8,
 max. permissible length of threaded rod: 350 mm



KKW-VL = cooling - water inlet
 KKW-RL = cooling - water return

View "X"

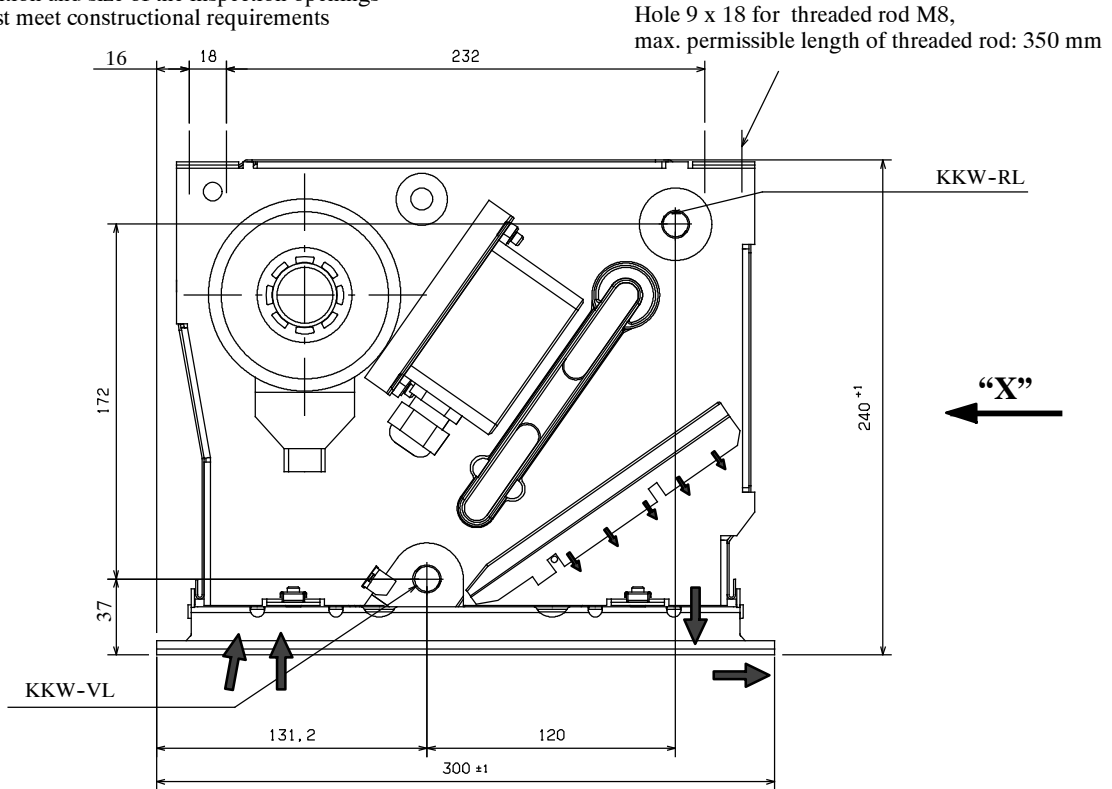


Ceiling fan coil unit type VDC 1000 (2-pipe-system), flanged installation

Ceiling Fan Coil Unit Type VDC - Dimensions Recessed Installation

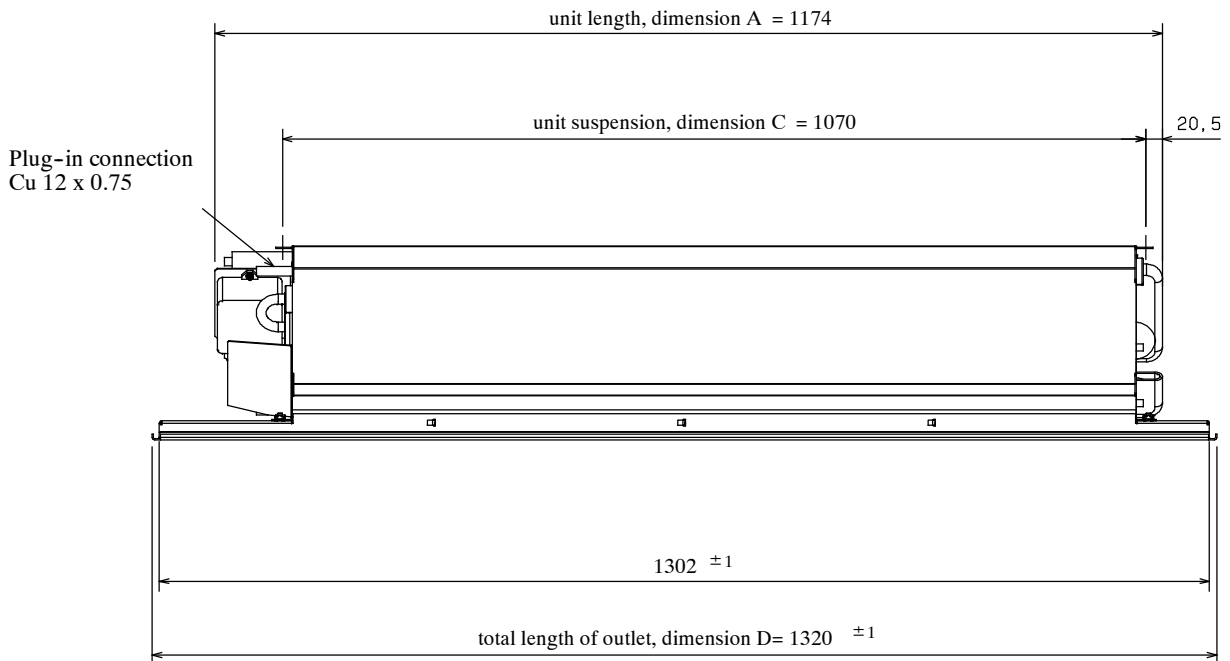
Please note:

Position and size of the inspection openings must meet constructional requirements



KKW-VL = cooling - water inlet
 KKW-RL = cooling - water return

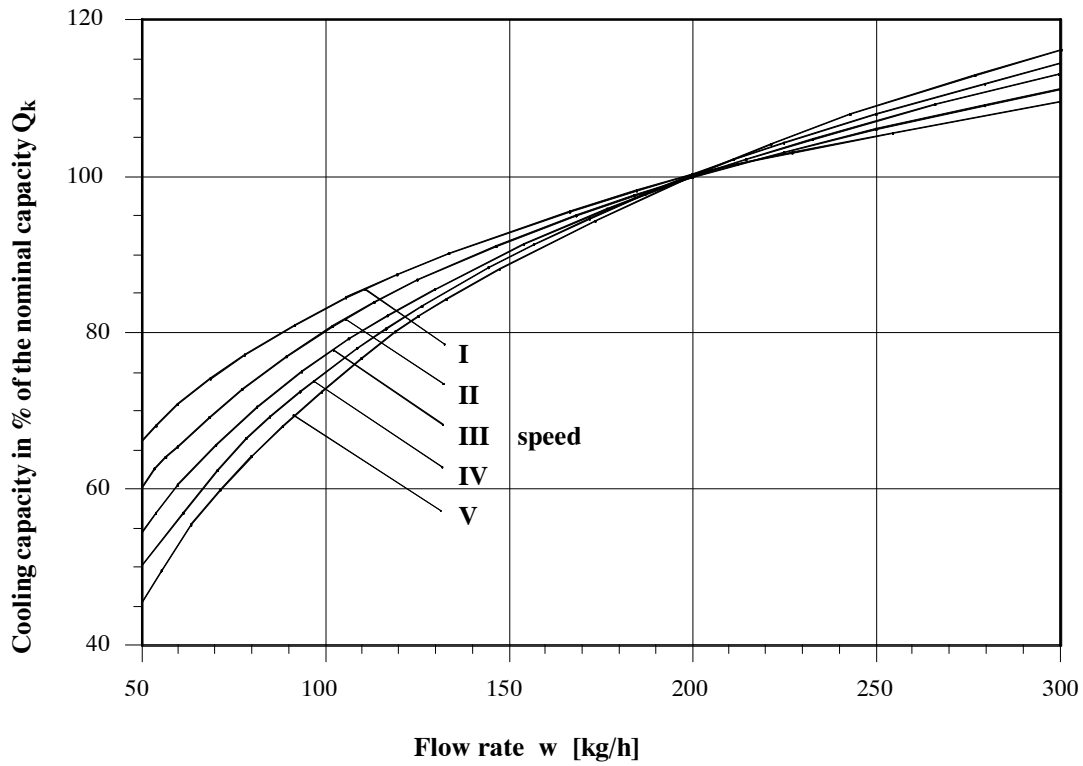
View “X”



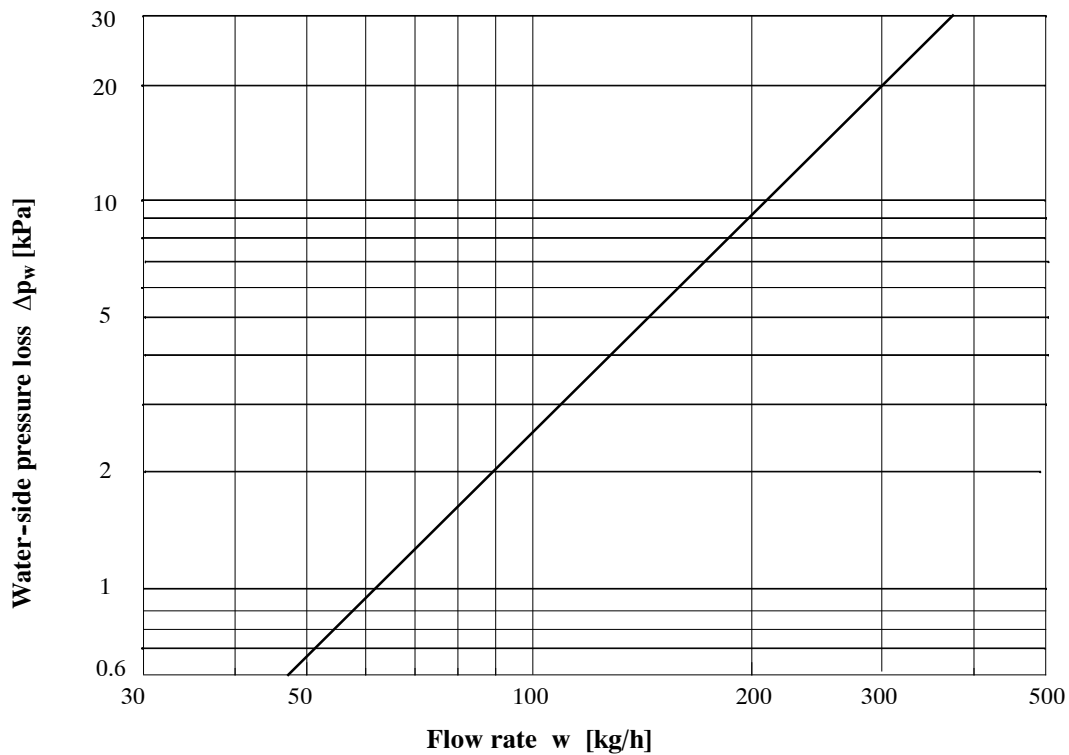
Ceiling fan coil unit type VDC 1000 (2-pipe-system), recessed installation

Ceiling Fan Coil Unit Type VDC

Cooling capacity for different water flow rates



Water-side pressure loss of the cooler for different water flow rates



Ceiling Fan Coil Unit Type VFC

Specification

The ceiling fan coil unit type VFC is specifically designed for use in hotels and office buildings with strict acoustic requirements. It offers versatile possibilities for design of air distribution systems and is made for installation in a ceiling bulkhead.

Function

The VFC's cross flow fan draws air through the heating/cooling heat exchanger laterally and discharges it from the opposite side.

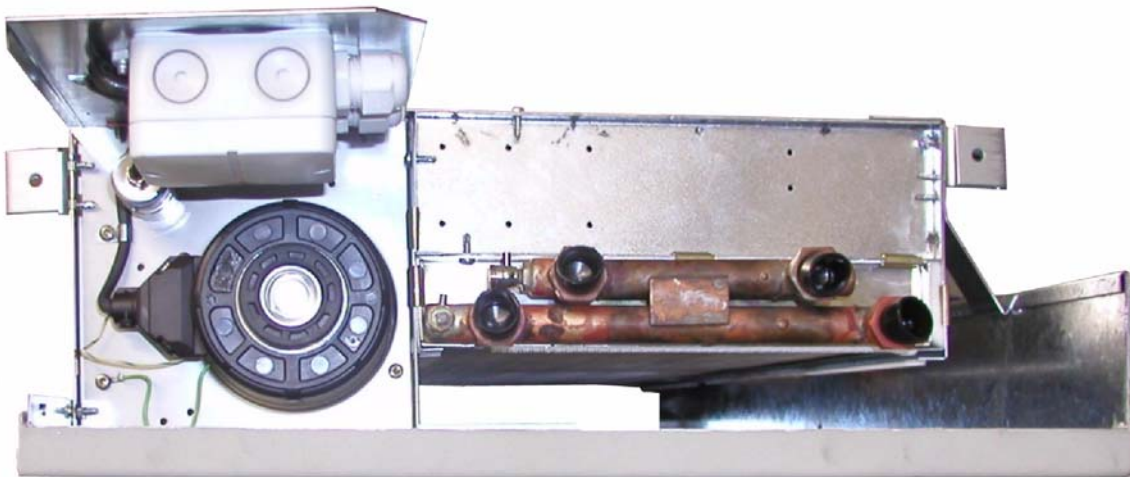
Design

Ceiling fan coil unit type VFC:

- a 2-pipe system for cooling only or heating only (VFC-2)
- a 4-pipe system for cooling and heating (VFC-4)

Advantages

- Low-noise operation.
- Low installation height of only 178 mm
- Insulation of the unit suitable for operation with 6°C cooling water.
- Oversize drain tray, suitable for use in conjunction with condensate pump.
- Low-cost due to energy-saving fan operation
- Maintenance-friendly design.
 Motor, impeller and heat exchanger are accessible from below.



Ceiling fan coil unit type VFC

Ceiling Fan Coil Unit Type VFC-4 - Specification, Dimensions

Specification

Fan coil unit with one heat exchanger and two separate circuits for heating and cooling the ambient air.

Water-side control by valves.

Particularly low "built-in" depth and height, therefore especially appropriate for a room-saving installation in ceilings.

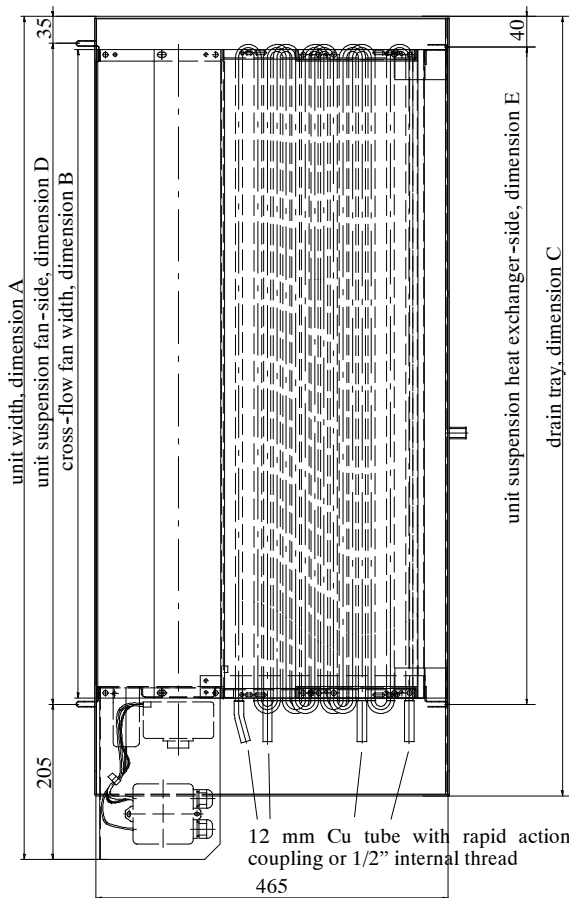
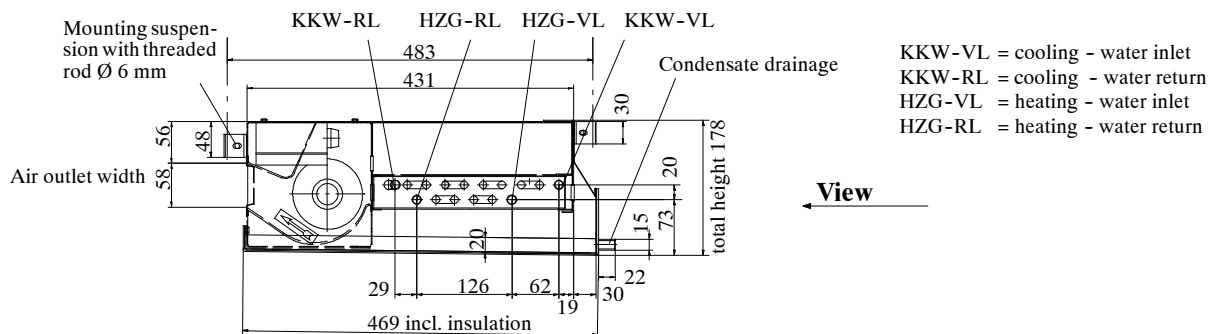
For extremely low inlet temperatures an insulated drain tray is available for insertion on site.

Horizontal installation (in the ceiling).

Water connection on the right or left with 1/2" internal thread and venting.

Dimensions

Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight [kg]
500	784	527	725	543	538	15
630	884	627	870	643	638	18
800	1114	857	1030	873	868	23
1000	1314	1057	1230	1073	1068	28
1250	1514	1257	1470	1273	1268	33



Hint for Installation

For horizontal installation, the cooler must be angled by 10° in order to allow the condensate drainage and to avoid condensate between the blades of the heat exchanger.

This special arrangement will only be required if a constant condensate formation is to be expected, i.e. if the temperature of the cold water supply will constantly remain more than 2 K below the dew point of the ambient air.

Water connection:

View: direction of air (arrow)

Unit as illustrated: Water connection on the left (or on the right, as required)
 Motor always on the left

If water connection on the right, unit width (dim. A) is extended by 80 mm

Connection heat exchanger:

shown 12 mm Cu-tube, other dimensions with connection 1/2" internal thread.

Please note:

Position and size of the inspection openings must meet constructional requirements

Top view

Ceiling fan coil unit type VFC (4-pipe)

Ceiling Fan Coil Unit Type VFC-4 - Technical Data

Size 500

n	V	L _{A18}	L _{wA}	Q _{k oF/Δt¹}	Q _{k mF/Δt¹}	Q _{k mF²}	Q _{k sens mF²}	Q _{h oF/Δt}	Q _{h mF/Δt}	w _{ok} / Δp _w	w _{oh} / Δp _w	P _{el}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W/K]	[W]	mF ² [W]	[W/K]	[W/K]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
I	160	24	30	34	28	672	560	21	19	200 / 13	100 / 2.5	12
II	240	29	35	46	45	1080	900	28	28			15
III	290	35	41	54	54	1220	1080	32	32			18
IV	340	38	44	60	60	1320	1200	35	35			20
V	430	45	51	68	68	1468	1360	40	40			27

Size 630

n	V	L _{A18}	L _{wA}	Q _{k oF/Δt¹}	Q _{k mF/Δt¹}	Q _{k mF²}	Q _{k sens mF²}	Q _{h oF/Δt}	Q _{h mF/Δt}	w _{ok} / Δp _w	w _{oh} / Δp _w	P _{el}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W/K]	[W]	mF ² [W]	[W/K]	[W/K]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
I	170	23	29	41	36	864	720	26	23	200 / 14	100 / 2.7	12
II	260	27	33	52	51	1224	1020	32	31			15
III	310	34	40	60	60	1356	1200	35	35			18
IV	370	38	44	67	67	1474	1340	39	39			20
V	480	45	51	76	76	1641	1520	43	43			27

Size 800

n	V	L _{A18}	L _{wA}	Q _{k oF/Δt¹}	Q _{k mF/Δt¹}	Q _{k mF²}	Q _{k sens mF²}	Q _{h oF/Δt}	Q _{h mF/Δt}	w _{ok} / Δp _w	w _{oh} / Δp _w	P _{el}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W/K]	[W]	mF ² [W]	[W/K]	[W/K]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
I	220	23	29	47	42	1008	840	29	26	200 / 16	100 / 3.1	12
II	320	26	32	64	60	1440	1200	38	36			15
III	380	32	38	74	71	1604	1420	42	41			18
IV	460	36	42	82	81	1782	1620	47	47			20
V	580	43	49	92	91	1965	1820	51	51			28

Size 1000

n	V	L _{A18}	L _{wA}	Q _{k oF/Δt¹}	Q _{k mF/Δt¹}	Q _{k mF²}	Q _{k sens mF²}	Q _{h oF/Δt}	Q _{h mF/Δt}	w _{ok} / Δp _w	w _{oh} / Δp _w	P _{el}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W/K]	[W]	mF ² [W]	[W/K]	[W/K]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
I	300	25	31	58	53	1272	1060	36	33	200 / 18	100 / 3.4	22
II	420	28	34	76	71	1704	1420	47	44			26
III	470	33	39	85	82	1853	1640	54	51			28
IV	570	37	43	95	92	2024	1840	59	57			32
V	720	45	51	107	105	2268	2100	65	65			39

Size 1250

n	V	L _{A18}	L _{wA}	Q _{k oF/Δt¹}	Q _{k mF/Δt¹}	Q _{k mF²}	Q _{k sens mF²}	Q _{h oF/Δt}	Q _{h mF/Δt}	w _{ok} / Δp _w	w _{oh} / Δp _w	P _{el}
[-]	[m ³ /h]	[dB(A)]	[dB(A)]	[W/K]	[W/K]	[W]	mF ² [W]	[W/K]	[W/K]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
I	360	25	31	74	68	1632	1360	46	43	200 / 20	100 / 3.6	22
II	470	28	34	90	85	2040	1700	54	51			26
III	570	33	39	98	96	2196	1920	61	58			28
IV	690	37	43	106	104	2288	2080	63	61			32
V	830	44	50	118	116	2505	2320	69	67			39

¹) Specific cooling capacity (noncondensing operation)

²) Cooling capacity with the following parameters: water inlet: 6°C, suction air temperature before entering the heat exchanger: 26°C, 50% rel. humidity

Legend

- n** - speed
- V** - flow rate (approx. values, tolerance ±10%)
- L_{A18}** - sound pressure level, 18 m² Sabine
- L_{wA}** - sound power level ±3 dB(A) (without casing)
- Q_{k oF}** - cooling capacity (without filter)
- Q_{k mF}** - cooling capacity (with filter)
- Q_{h oF}** - heating capacity (without filter)
- Q_{h mF}** - heating capacity (with filter)
- Q_{k sens mF}** - sensible cooling capacity (with filter)

- Δt** - temperature difference between suction air temperature before entering the heat exchanger and water supply
- w_{ok}** - standard flow rate at cooling capacity*
- w_{oh}** - standard flow rate at heating capacity*
- Δp_w** - water-side pressure loss
- P_{el}** - electric power consumption (± 20%)

*correction for other flow rates see page 35, 36

Speed control wiring diagram

(see page 52)

Ceiling Fan Coil Unit Type VFC-2 - Specification, Dimensions

Specification

Fan coil unit with one heat exchanger for heating or cooling the ambient air.

Water-side control by valves.

Particularly low “built-in” depth and height, therefore especially appropriate for a room-saving installation in ceilings.

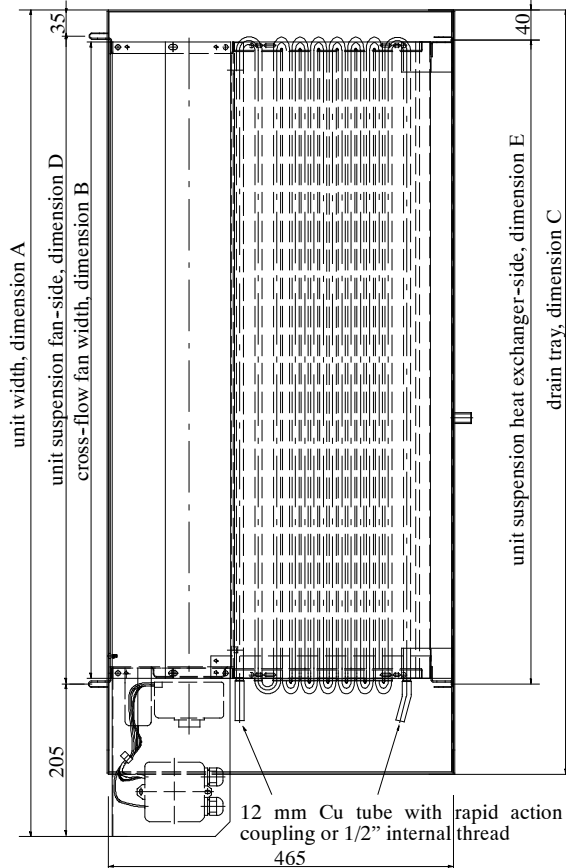
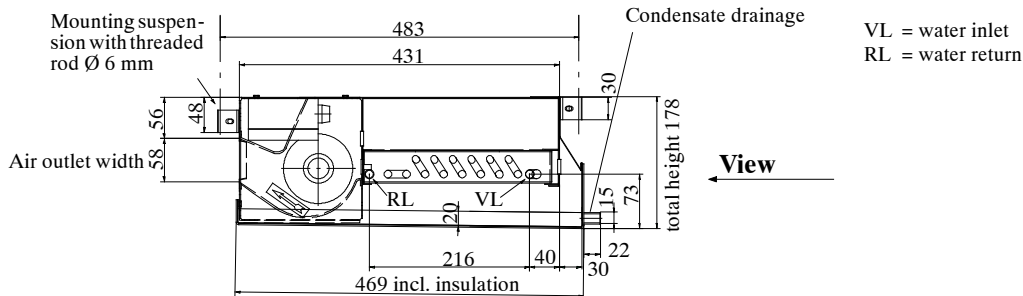
For extremely low inlet temperatures an insulated drain tray is available for insertion on site.

Horizontal installation (in the ceiling).

Water connection on the right or left with 1/2” internal thread and venting.

Dimensions

Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	Weight [kg]
500	784	527	725	543	538	15
630	884	627	870	643	638	18
800	1114	857	1030	873	868	23
1000	1314	1057	1230	1073	1068	28
1250	1514	1257	1470	1273	1268	33



Top view

Hint for Installation:

For horizontal installation, the cooler must be angled by 10° in order to allow the condensate drainage and to avoid condensate between the blades of the heat exchanger. This special arrangement will only be required if a constant condensate formation is to be expected, i.e. if the temperature of the cold water supply will constantly remain more than 2 K below the dew point of the ambient air.

View

Water connection:

View: direction of air (arrow)

Unit as illustrated: Water connection on the left (or on the right, as required)
 Motor always on the left

If water connection on the right, unit width (dim. A) is extended by 80 mm

Connection heat exchanger:

shown 12 mm Cu-tube, other dimensions with connection 1/2” internal thread.

Please note:

Position and size of the inspection openings must meet constructional requirements

Ceiling fan coil unit type VFC (2-pipe)

Ceiling Fan Coil Unit Type VFC-2 - Technical Data

Size 500

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k oF} /Δt ¹ [W/K]	Q _{k mF} /Δt ¹ [W/K]	Q _{k mF} ² [W]	Q _{k sens mF} ² [W]	w _o /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	160	24	30	37	36	864	720	200/18	12
II	240	29	35	49	48	1152	960		15
III	290	35	41	57	56	1265	1120		18
IV	340	38	44	64	64	1408	1280		20
V	430	45	51	73	73	1576	1460		27

Size 630

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k oF} /Δt ¹ [W/K]	Q _{k mF} /Δt ¹ [W/K]	Q _{k mF} ² [W]	Q _{k sens mF} ² [W]	w _o /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	170	23	29	48	43	1032	860	200/20	12
II	260	27	33	59	59	1416	1180		15
III	310	34	40	68	68	1536	1360		18
IV	370	38	44	76	76	1672	1520		20
V	480	45	51	87	87	1879	1740		27

Size 800

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k oF} /Δt ¹ [W/K]	Q _{k mF} /Δt ¹ [W/K]	Q _{k mF} ² [W]	Q _{k sens mF} ² [W]	w _o /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	220	23	29	52	48	1152	960	200/22	12
II	320	26	32	72	64	1536	1280		15
III	380	32	38	83	78	1762	1560		18
IV	460	36	42	95	92	2024	1840		20
V	580	43	49	105	105	2268	2100		28

Size 1000

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k oF} /Δt ¹ [W/K]	Q _{k mF} /Δt ¹ [W/K]	Q _{k mF} ² [W]	Q _{k sens mF} ² [W]	w _o /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	300	25	31	62	59	1488	1180	200/23	22
II	420	28	34	82	76	1968	1520		26
III	470	33	39	92	89	2079	1780		28
IV	570	37	43	104	102	2288	2040		32
V	720	45	51	114	114	2462	2280		39

Size 1250

n [-]	V [m ³ /h]	L _{A18} [dB(A)]	L _{wA} [dB(A)]	Q _{k oF} /Δt ¹ [W/K]	Q _{k mF} /Δt ¹ [W/K]	Q _{k mF} ² [W]	Q _{k sens mF} ² [W]	w _o /Δp _w [kg/h]/[kPa]	P _{el} [W]
I	360	25	31	80	73	1752	1460	200/25	22
II	470	28	34	98	92	2208	1840		26
III	570	33	39	107	104	2350	2080		28
IV	690	37	43	116	113	2486	2260		32
V	830	44	50	128	124	2678	2480		39

¹) Specific cooling capacity (noncondensing operation)

²) Cooling capacity with the following parameters: water inlet: 6°C, suction air temperature before entering the heat exchanger: 26°C, 50% rel. humidity

Legend

n	- speed
V	- flow rate (approx. values, tolerance ±10%)
L_{A18}	- sound pressure level, 18 m ² Sabine
L_{wA}	- sound power level ±3 dB(A) (without casing)
Q_{k oF}	- cooling capacity (without filter)
Q_{k mF}	- cooling capacity (with filter)
Q_{k mF}	- total cooling capacity (with filter)
Q_{k sens mF}	- sensible cooling capacity (with filter)

Δt - temperature difference between suction air temperature before entering the heat exchanger and water supply

w_o - standard flow rate*

Δp_w - water-side pressure loss

P_{el} - electric power consumption (± 20%)

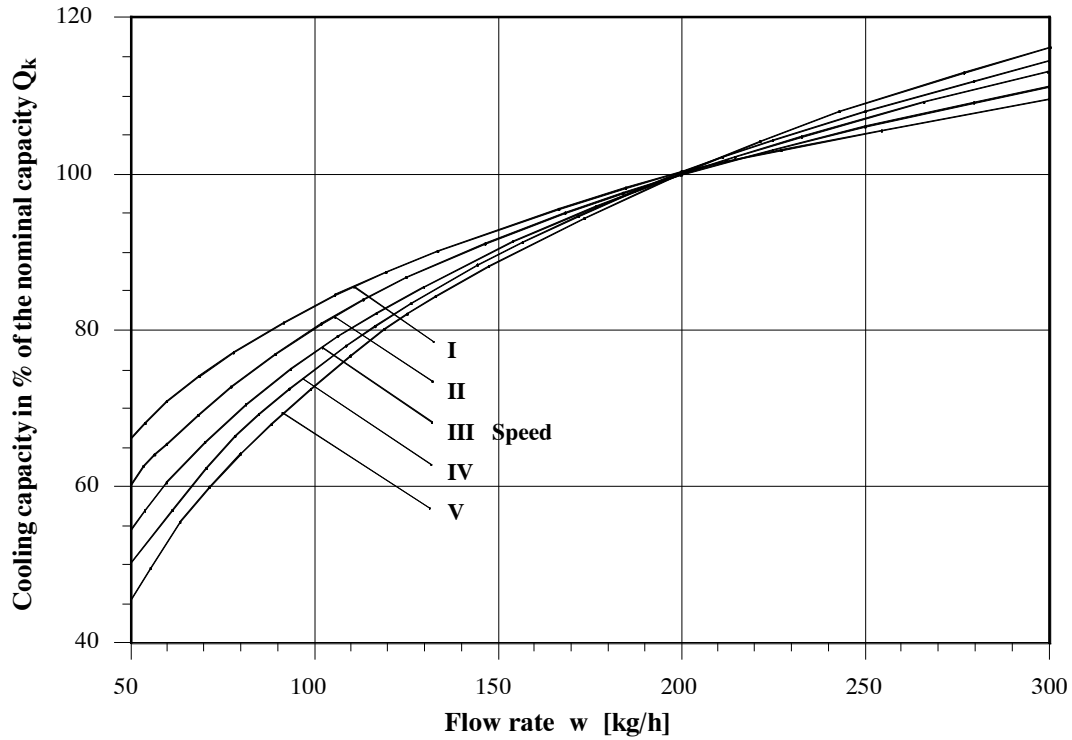
*correction for other flow rates see page 37

Speed control wiring diagram

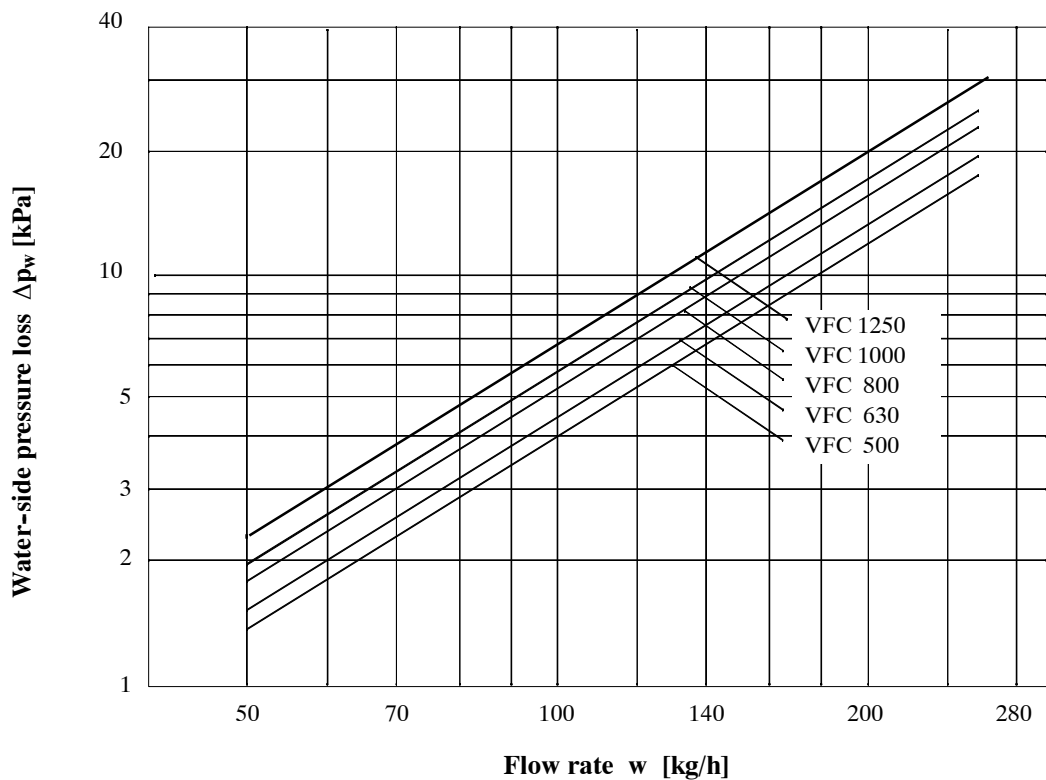
(see page 52)

Ceiling Fan Coil Unit Type VFC - 4-pipe Unit

Cooling capacity for different water flow rates

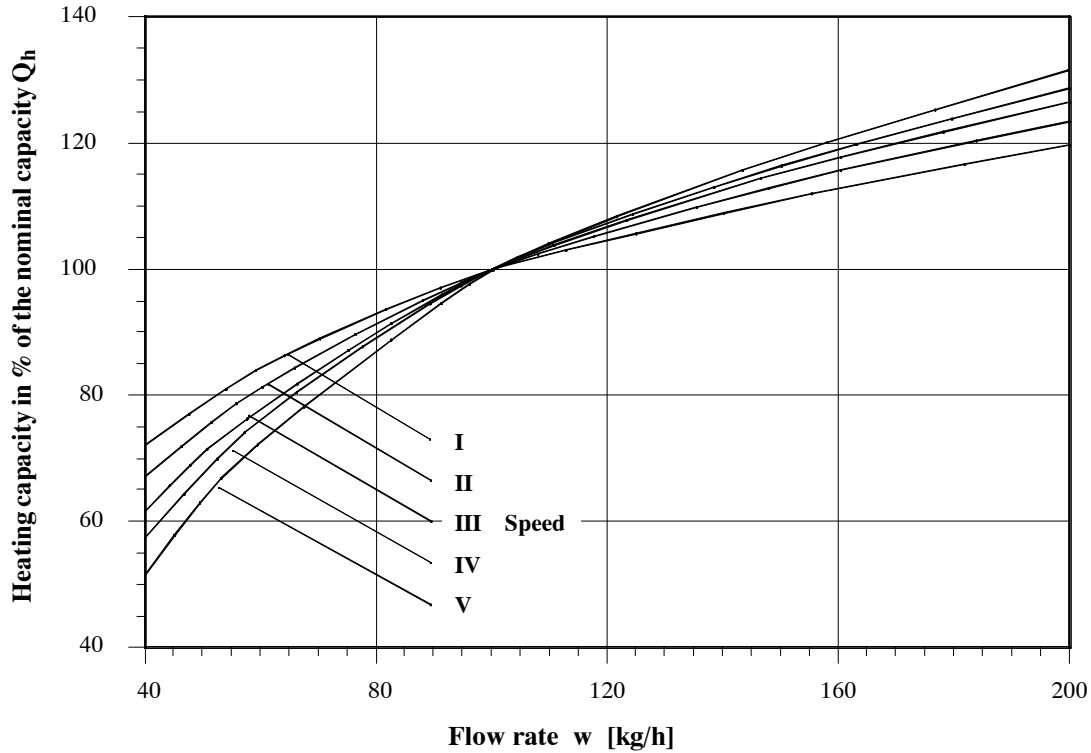


Water-side pressure loss of the cooler for different water flow rates

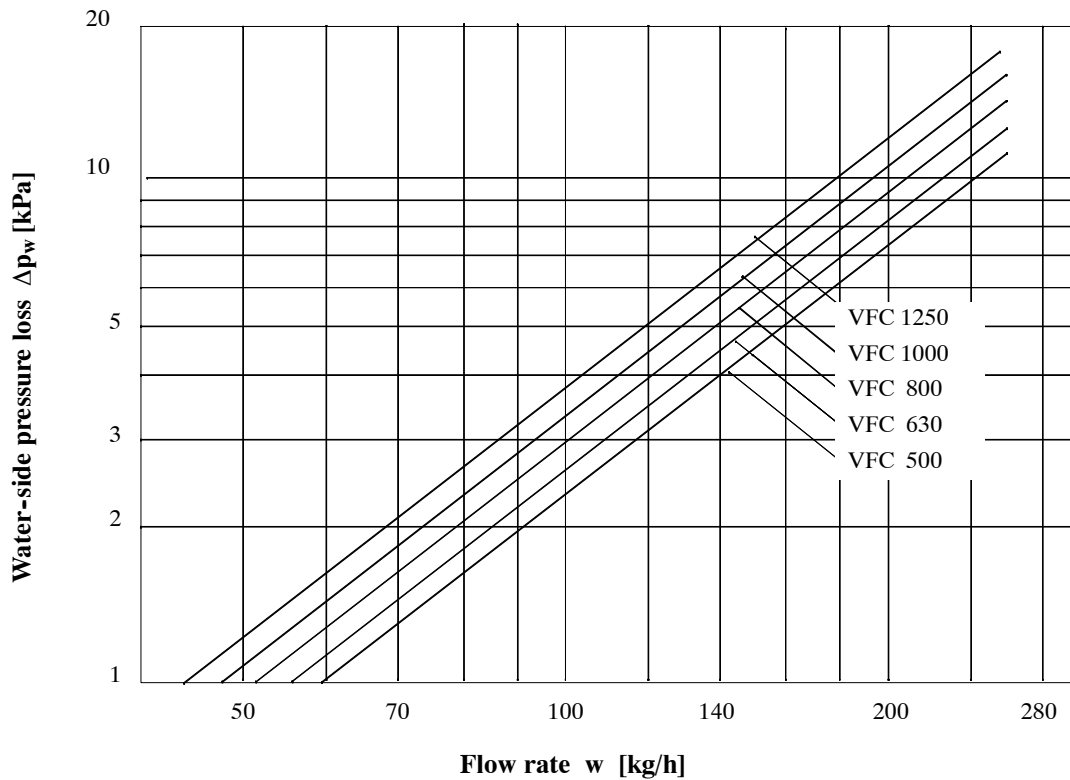


Ceiling Fan Coil Unit Type VFC - 4-pipe Unit

Heating capacity for different water flow rates

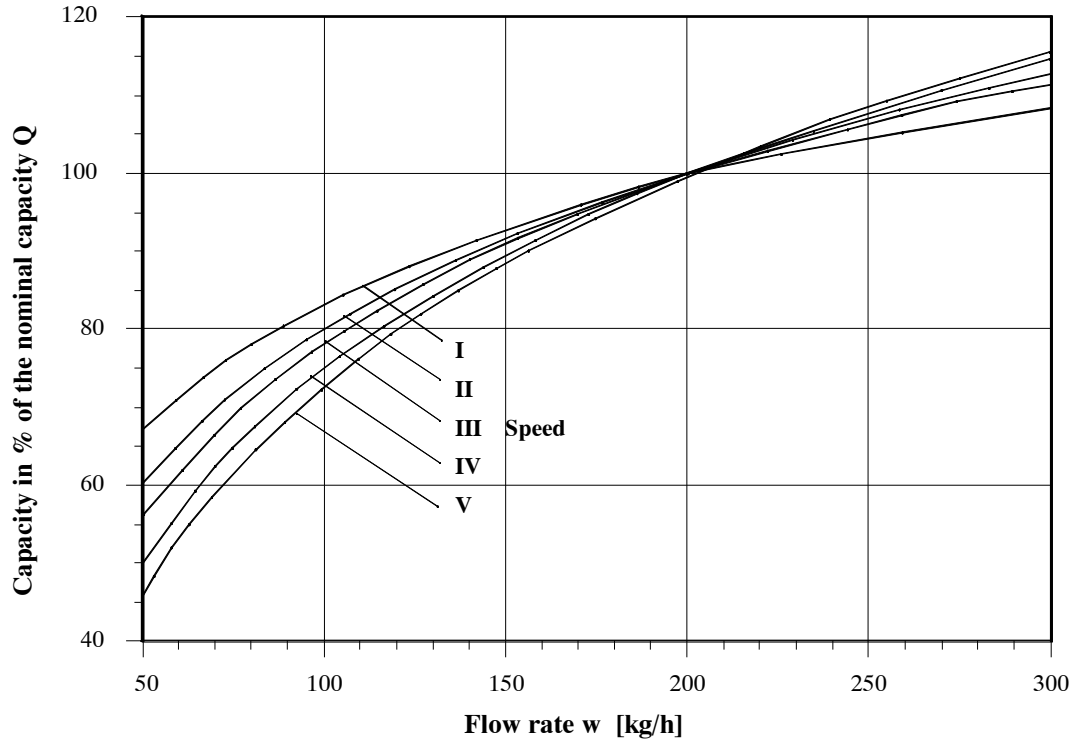


Water-side pressure loss of the heater for different water flow rates

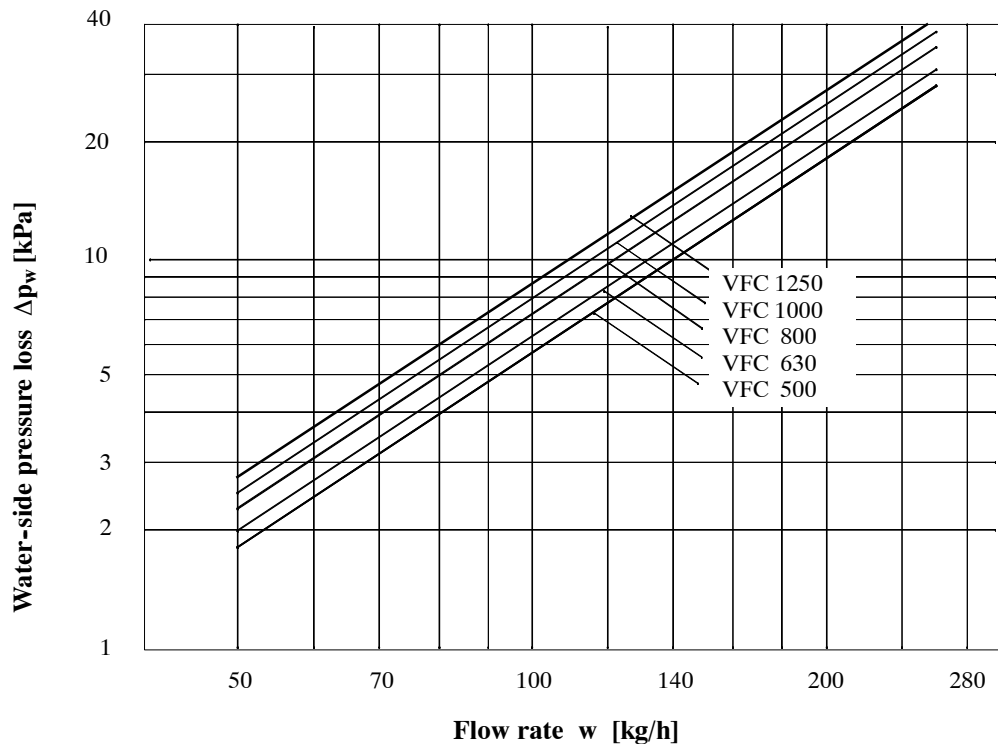


Ceiling Fan Coil Unit Type VFC - 2-pipe Unit

Capacity with different water flow rates



Water-side pressure loss for different water flow rates



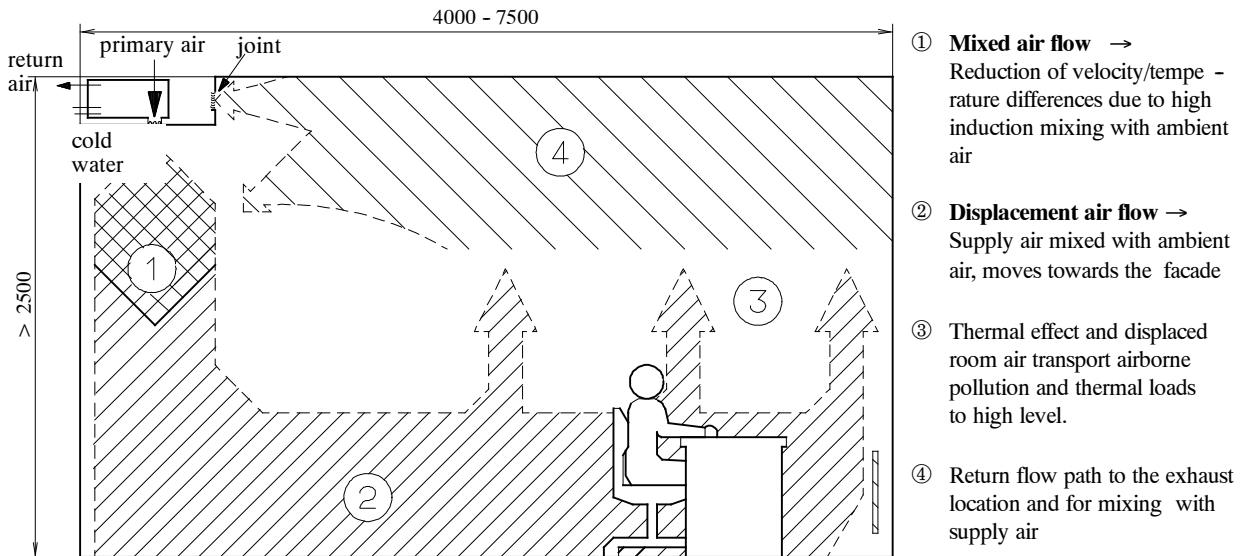
Ceiling Fan Coil Unit Type VFC

Nomenclature

VFC - 2 800 / D / F / L / - - - / D

2-pipe unit	2					
4-pipe unit (valve-controlled)	4					
size		500				
		630				
		800				
		1000				
		1250				
D = ceiling installation			D			
F = sill installation			F			
without filter				-		
with filter				F		
water connection on the left					L	
water connection on the right					R	
without fresh air connection						- - -
with fresh air connection						P . .
straight-way 3-point valve						D
3-way 3-point valve						3
straight-way valve, thermal						T

Air Conditioning System Indivent®



Scheme of Indivent® system flow pattern

Requirements

Modern air conditioning systems are required to remove heat loads and airborne substances from the occupied space in a safe and effective manner, without producing any draft. The air conditioning system's construction, however, must leave room for flexibility with view to the appearance and use of the room. Furthermore, the system must be cost effective within a wide performance range.

Solution

The LTG system Indivent® meets these requirements. It offers high thermal comfort by combining the advantages of both a mixed and a displacement air flow.

Advantages

- **Comfort**
 - High cooling capacities and uniform temperatures in the entire occupied space.
 - High thermal comfort due to low air speeds and low turbulence.
 - High Air Quality - Heat and airborne pollution are exhausted at high level.
- **Economy**
 - The Indivent system requires only one compact, room saving air duct system since the heat loads are being removed via a compact chilled water system.
- **Flexibility**
 - Interior design of ceiling, lighting and window elements is permitted.
 - Workplaces in the room may be arranged according to requirement, without any restrictions.

Function

The LDB Linear Diffuser with integrated cooling is installed in the ceiling over the core wall while heating is provided through radiators located under the window. With this configuration, identical flow patterns during summer and winter are achieved. Further enhancements allow for over-window locations.

Recirculated air is drawn in from the room and across a cooling coil. The mixture of fresh air and recirculated air is blown into the room through a linear diffuser. In the local mixed air zone ① the temperature/velocity differences between the ambient air and the supply air are reduced.

Close to the floor, the cooled air jet ② directs itself at low speed and with little turbulence across the occupied space towards the window. The air speed is virtually independent of the cooling load. The temperature difference between the head and the foot level is less than 1K.

Air heated by room loads rises to high level ③.

Above the occupied space a cushion of warm room air with an increased pollution concentration is formed and removed from the room. In this way the formation of temperature layers ensures cost effective system operation ④.

Range of products

The core element of the Indivent system is the LDB Linear Diffuser with integrated cooling, the Indivent unit. The following types are available:

Type LVC

Fan coil unit for recirculated air operation, water-side valve control, on request with separate fresh air connection. Available in four sizes.

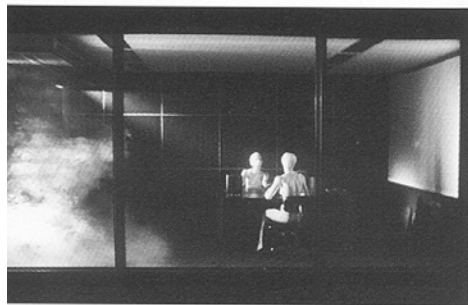
Air Conditioning System Indivent® Ceiling Fan Coil Unit Type LVC

Installation

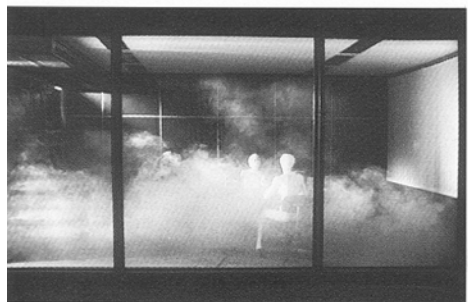
Units are usually installed over the 'core' wall, in a ceiling bulkhead or in a suspended ceiling. Indivent units require connection to the air conditioning system's primary air supply and the chilled water system.



Local mixed air zone



Deflection of the air flow near the floor



Air heated by occupants or equipment rises to high level

Proposed installation

The **best installation position for the linear diffusers** depends on:

- use of the room
- type of room
- ceiling design
- return air path inside the false ceiling.

Flexibility of diffuser design and adjustment, ensures a perfect solution from both flow technology and aesthetic aspects, for example:

Ideal location for the induction unit/ fan coil unit with return air is within an **open grid ceiling**.

Equally successful are **closed false ceilings or ceiling bulkheads** that are separated through walls extending to the room soffit. Shadow joints in the ceiling boxes or in the marginal gap serve as return air openings.

The average speed in these openings should not exceed 0.6 to 0.9 m/s (jet contraction not considered).

For installation of LTG Linear Diffusers in the area close to the corridor, the following is recommended:

- If there are no ceiling bulkheads separating the supply air from the return air, a distance of about 1 m must be kept between the return air opening and the air outlet.
- Install the linear diffuser in parallel to the corridor wall. Optimum distance: 0.6 to 1 m.
- When using full height cupboards, a minimum distance of 0.2 m between the air outlet and the cupboard front must be provided.
- Cabinets directly underneath linear diffusers will have no impact on the indoor air flow if a clearance of about 0.4 m to the ceiling is allowed.



Installation example for the Air Conditioning System Indivent®

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2

The air conditioning system Indivent type LVC has been designed for two-pipe systems with water-side control valves.

Function

LTG type LVC units incorporate a built-in cross-flow fan which draws in air from the ceiling void and cools it within a heat exchanger. The heat exchanger is fitted with an intake filter.

The cross-flow fans are low-noise and maintenance-free. The speed control is performed through a pole-changing internal rotor motor with five speeds, wired to a factory-mounted terminal box (for terminal connection refer to page 45).

The fan coil units are essentially recirculation type air units but a connection for fresh air is available on request. With that option, the fresh air is supplied through a separate, one-row supply air slot.

Design

LDB linear diffuser

Cylinders:	polystyrene black, mat polystyrene white, mat
Rails:	aluminum natural anodised painted (similar to RAL) or high-gloss chromium-plated
Air distribution box:	galvanized steel

Integrated cooling

Housing:	galvanized steel
Heat exchanger:	copper pipe with pressed-on aluminum fins
Filter:	Class EU2

Attention: The water inlet temperature must stay above dew-point ($\geq 16^{\circ}\text{C}$) since the unit is not designed for operation with condensate formation.

Advantages

- **Several sizes**
four sizes for capacity range
- **Low-noise operation**
efficient cross-flow fan
- **Cost effective**
low-energy fan operation
- **Easy control**
single or group control
- **Flexibility**
on request, the unit is also available with connection for fresh air
- **Adaptability**
adjustable outlet for optimising room air flow
- **Design**
the slot profiles are available in a variety of versions and colours.
- **Space saving**
compact construction suits low ceiling voids.
- **Maintenance-friendly**
easy-to-replace filter and a maintenance-free motor.

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 with Linear Diffuser LDB 20/8/4 or LDB 12/8/4

Specification, Dimensions, Technical Data

Specification

Fan coil unit with one heat exchanger for heating or cooling the ambient air.

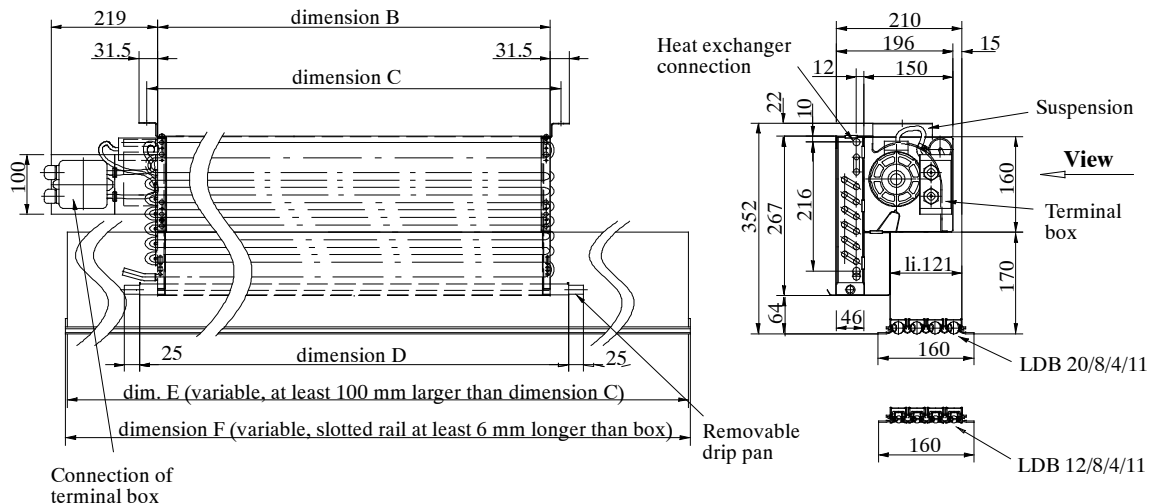
Central water-side control.

Vertical or horizontal installation (in the ceiling).

Water connection on the right or left with 1/2" internal thread and venting.

Dimensions

Size	B [mm]	C [mm]	D [mm]	Weight [kg] with slot length [mm]
500	527	563	685	21 / 1250
630	627	663	885	26 / 1250
800	857	893	1085	31 / 1500
1000	1057	1093	1335	37 / 1750
1250	1257	1293	1535	44 / 2000



Connection of terminal box

View always on outlet

- cross-flow fan motor always on the left
- side water connection LHS or RHS (picture shows LHS)

Connection heat exchanger:

shown 12 mm Cu-tube, other dimensions with connection 1/2" internal thread.

Please note:

Position and size of the inspection openings must meet constructional requirements

Ceiling fan coil unit type LVC with LDB 20/8/4/11 (LDB 12/8/4/11)

Technical specifications

Electrical current and power consumption for units with and without filter

Size	I _{max} [mA]	Electrical power consumption P _{el} (± 20 %) [W]				
		Speed				
		I	II	III	IV	V
630 and 800	90	17 W	18 W	19 W	20 W	22 W
1000 and 1250	130	16 W	18 W	20 W	22 W	24 W

for more technical data, refer to the next page

Speed control wiring diagram

(see page 52)

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 with Linear Diffuser LDB 20/8/4 - Technical Data

Size 630

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]
I	190	36	48	170	37	43	200	35	45	180	36	42
II	230	43	54	210	42	47	240	39	54	210	41	48
III	270	50	60	240	47	55	280	45	61	250	49	55
IV	310	50	67	280	50	63	320	48	66	290	52	63
V	350	50	70	310	54	68	360	50	69	320	54	66

w_{ok} / Δp_w = 200 [kg/h] / 20 [kPa]

Size 800

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]
I	180	34	50	170	37	45	190	34	54	180	35	50
II	220	41	58	200	41	54	240	39	62	210	40	57
III	260	48	66	240	45	63	290	44	70	260	45	66
IV	310	49	73	290	49	71	330	46	78	300	49	75
V	350	50	80	330	51	77	380	49	83	340	51	80

w_{ok} / Δp_w = 200 [kg/h] / 22 [kPa]

Size 1000

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]
I	190	26	50	180	29	44	180	26	48	180	29	46
II	280	35	70	260	39	64	280	35	70	270	39	65
III	370	43	84	330	46	78	390	42	84	360	46	80
IV	450	48	97	400	51	90	490	47	98	440	51	91
V	580	55	112	510	57	108	670	56	113	610	58	106

w_{ok} / Δp_w = 200 [kg/h] / 23 [kPa]

Size 1250

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF} /Δt [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF} /Δt [W/K]
I	180	30	55	170	30	47	200	26	54	190	30	47
II	280	37	78	250	37	70	310	36	76	270	37	72
III	370	45	91	330	45	85	410	43	92	360	46	86
IV	450	50	112	410	50	98	490	48	106	440	51	101
V	590	54	120	530	58	118	630	54	122	570	58	116

w_{ok} / Δp_w = 200 [kg/h] / 25 [kPa]

V - flow rate (approx. values, tolerance ±10%)
L_{wA} - sound power level ±3 dB(A) (without casing)
Δt - temperature difference between suction air temperature before entering the heat exchanger and water supply

Q_{k oF} - cooling capacity (without filter)
Q_{k mF} - cooling capacity (with filter)
w_{ok} - standard flow rate at cooling capacity*
Δp_w - water-side pressure loss

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 with Linear Diffuser LDB12/8/4 - Technical Data

Size 630

Speed	Box length 1000 mm						Box length 1500 mm					
	without Filter			with Filter			without Filter			with Filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	180	39	45	160	39	40	190	39	47	180	38	42
II	220	45	52	190	44	46	220	42	53	210	43	47
III	250	50	56	220	47	50	370	47	59	250	48	53
IV	290	52	61	260	52	58	310	51	64	280	50	61
V	320	53	70	290	54	63	340	52	70	310	58	63

w_{ok} / Δp_w = 200 [kg/h] / 20 [kPa]

Size 800

Speed	Box length 1000 mm						Box length 1500 mm					
	without Filter			with Filter			without Filter			with Filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	170	36	48	150	36	44	200	37	49	160	36	43
II	200	42	57	180	41	51	240	42	57	200	41	52
III	250	48	63	220	45	59	290	48	65	240	46	60
IV	290	49	69	260	49	65	340	51	73	290	49	67
V	330	52	76	290	52	71	390	52	79	330	51	73

w_{ok} / Δp_w = 200 [kg/h] / 22 [kPa]

Size 1000

Speed	Box length 1500 mm						Box length 2000 mm					
	without Filter			with Filter			without Filter			with Filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	170	27	48	160	30	43	240	26	60	170	29	44
II	250	40	67	230	39	64	300	38	72	260	39	64
III	320	46	79	290	46	75	440	46	83	330	47	77
IV	390	51	91	360	52	86	480	50	96	430	52	90
V	490	57	105	450	58	100	590	56	107	560	58	103

w_{ok} / Δp_w = 200 [kg/h] / 23 [kPa]

Size 1250

Speed	Box length 1500 mm						Box length 2000 mm					
	without Filter			with Filter			without Filter			with Filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	150	27	54	150	28	48	180	26	57	170	29	48
II	200	39	74	230	39	67	230	38	77	250	39	70
III	290	47	89	300	46	81	270	45	92	330	45	83
IV	370	51	100	340	50	94	320	51	103	370	50	96
V	480	57	116	440	57	107	360	58	118	480	58	113

w_{ok} / Δp_w = 200 [kg/h] / 25 [kPa]

V - flow rate (approx. values, tolerance ±10%)
L_{wA} - sound power level ±3 dB(A) (without casing)
Δt - temperature difference between suction air temperature before entering the heat exchanger and water supply

Q_{k oF} - cooling capacity (without filter)
Q_{k mF} - cooling capacity (with filter)
w_{ok} - standard flow rate at cooling capacity*
Δp_w - water-side pressure loss

Air Conditioning System Indivent® Ceiling Fan Coil Unit Type LVC-2 with separate Fresh Air Box and Linear Diffuser LDB 20/8/4 or LDB 12/8/4 Specification, Dimensions, Technical Specifications

Specification

Fan coil unit with one heat exchanger for heating or cooling the ambient air.

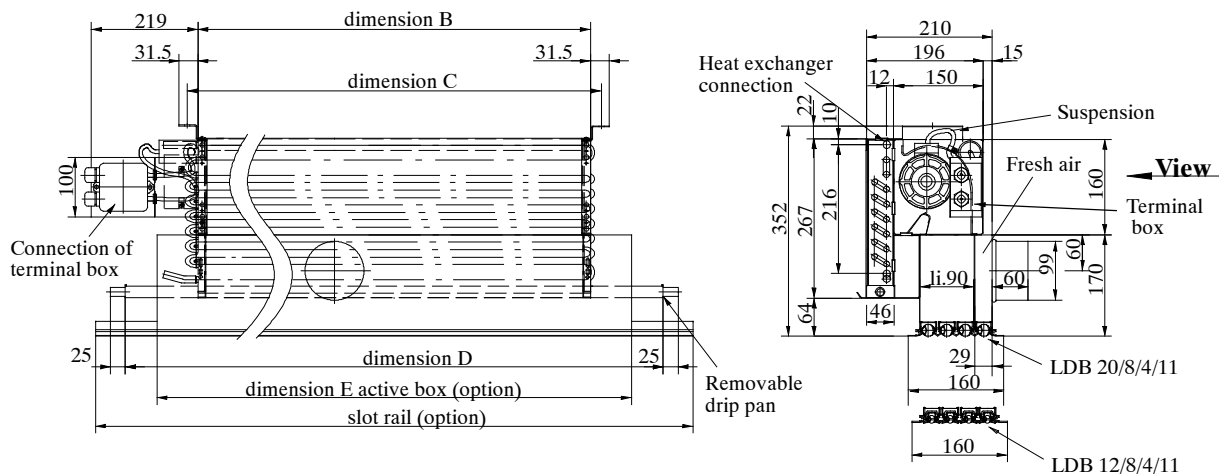
Central water-side control.

Vertical or horizontal installation (in the ceiling).

Water connection on the right or left with 1/2" internal thread and venting.

Dimensions

Size	B [mm]	C [mm]	D [mm]	Weight [kg] with slot length [mm]
500	527	563	685	21 / 1250
630	627	663	885	26 / 1250
800	857	893	1085	31 / 1500
1000	1057	1093	1335	37 / 1750
1250	1257	1293	1535	44 / 2000



View always on outlet
- cross-flow fan motor always on the left
- side water connection LHS or RHS
(picture shows LHS)

Connection heat exchanger:

shown 12 mm Cu-tube,
other dimensions with connection 1/2" internal thread.

Please note:

Position and size of the inspection openings
must meet constructional requirements

*Ceiling fan coil unit type LVC
with separate fresh air box with LDB 20/8/4 or LDB 12/8/4*

Technical specifications

Electrical current and power consumption for units with and without filter

Size	I _{max} [mA]	Electrical power consumption P _{el} (± 20 %)				
		[W]				
		Speed				
		I	II	III	IV	V
630 and 800	90	17 W	18 W	19 W	20 W	22 W
1000 and 1250	130	16 W	18 W	20 W	22 W	24 W

for more technical data, refer to pages 47 and 48

Speed control wiring diagram
(see page 52)

Air Conditioning System Indivent® Ceiling Fan Coil Unit Type LVC-2 with Linear Diffuser LDB 20/8/3 or LDB 12/8/3

Specification, Dimensions, Technical Specifications

Specification

Fan coil unit with one heat exchanger for heating or cooling the ambient air.

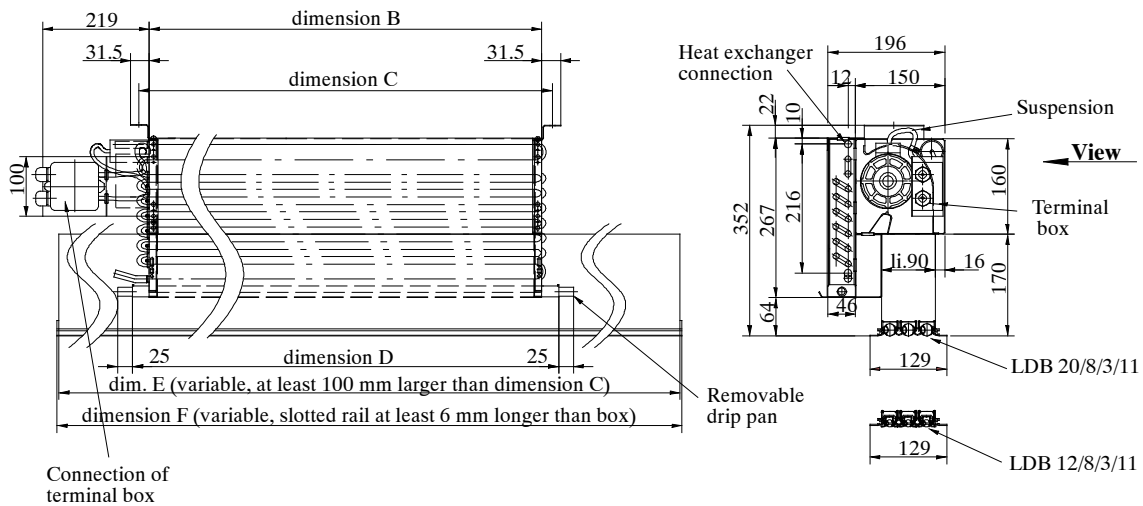
Central water-side control.

Vertical or horizontal installation (in the ceiling).

Water connection on the right or left with 1/2" internal thread and venting.

Dimensions

Size	B [mm]	C [mm]	D [mm]	Weight [kg] with slot length [mm]
500	527	563	685	21 / 1250
630	627	663	885	26 / 1250
800	857	893	1085	31 / 1500
1000	1057	1093	1335	37 / 1750
1250	1257	1293	1535	44 / 2000



View always on outlet
 - cross-flow fan motor always on the left
 - side water connection LHS or RHS
 (picture shows LHS)

Connection heat exchanger:

shown 12 mm Cu-tube,
 other dimensions with connection 1/2" internal thread.

Please note:

Position and size of the inspection openings
 must meet constructional requirements

Ceiling fan coil unit type LVC with LDB 20/8/3 or LDB 12/8/3

Technical specifications

Electrical current and power consumption for units with and without filter

Size	I _{max} [mA]	Electrical power consumption P _{el} (± 20 %) [W]				
		Speed				
		I	II	III	IV	V
630 and 800	90	17 W	18 W	19 W	20 W	22 W
1000 and 1250	130	16 W	18 W	20 W	22 W	24 W

for more technical data, refer to pages 47 and 48

Speed control wiring diagram
 (see page 52)

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 with LDB 20/8/4 with separate Fresh Air Box or with LDB 20/8/3

Size 630

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	180	40	46	180	40	43	190	37	47	180	38	45
II	210	45	52	190	43	48	220	43	53	210	42	50
III	260	51	58	230	48	55	260	47	61	240	48	57
IV	300	51	64	260	51	61	310	51	65	280	52	62
V	340	57	68	290	55	65	350	55	70	290	56	68

w_{ok} / Δp_w = 200 [kg/h] / 20 [kPa]

Size 800

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	190	34	49	170	35	46	200	38	52	160	36	47
II	210	40	57	200	40	52	240	44	59	200	41	54
III	250	47	64	240	45	61	280	47	71	240	46	62
IV	290	51	71	280	48	68	330	51	75	280	49	70
V	330	54	77	310	51	74	360	53	81	310	52	74

w_{ok} / Δp_w = 200 [kg/h] / 22 [kPa]

Size 1000

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	160	27	49	140	30	44	210	26	51	170	29	44
II	250	41	68	230	39	60	300	37	69	250	39	63
III	330	47	81	300	46	76	390	44	84	330	45	77
IV	410	52	92	360	52	86	450	51	93	390	51	87
V	520	57	103	450	57	100	630	56	110	510	57	101

w_{ok} / Δp_w = 200 [kg/h] / 23 [kPa]

Size 1250

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	160	27	53	140	27	47	180	25	54	160	27	47
II	250	36	74	230	37	66	280	36	74	250	35	67
III	320	47	88	300	45	82	360	45	89	330	43	83
IV	400	51	99	360	49	93	440	51	102	390	50	95
V	520	58	112	470	56	109	560	56	116	510	56	109

w_{ok} / Δp_w = 200 [kg/h] / 25 [kPa]

Acoustic power level for separate fresh air box:

V _{prim} [m ³ /(hm)]	80	90	100
L _{wA P} [dB(A)]	25	28	31

The total acoustic power level may be calcul. as follows:
L_{wA} = 10 * log (10^{0.1 * L_{wA P}} + 10^{0.1 * L_{wA, LVC}})

- V** - flow rate (approx. values, tolerance ±10%)
L_{wA} - sound power level ±3 dB(A) (without casing)
Δt - temp. diff. between suction air temperature before entering the heat exchanger and water supply
V_P - fresh air flow rate

- Q_{k oF}** - cooling capacity (without filter)
Q_{k mF} - cooling capacity (with filter)
w_{ok} - standard flow rate at cooling capacity
Δp_w - water-side pressure loss
L_{wA P} - sound power level fresh air

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 with LDB 12/8/4 with separate Fresh Air Box or with LDB 12/8/3

Size 630

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	170	39	43	160	40	39	180	40	44	170	37	42
II	190	45	49	180	45	45	210	45	51	200	43	49
III	220	51	54	210	48	51	240	49	58	220	48	54
IV	250	53	58	230	52	58	270	52	66	250	51	60
V	270	57	60	250	55	61	300	56	69	270	55	63

w_{ok} / Δp_w = 200 [kg/h] / 20 [kPa]

Size 800

Speed	Box length 1000 mm						Box length 1500 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	160	36	44	140	36	39	180	36	49	160	35	44
II	190	41	52	170	40	47	200	41	53	190	40	53
III	220	46	60	200	45	54	250	49	64	220	45	61
IV	250	48	65	230	48	62	290	51	72	270	49	67
V	280	51	74	260	50	67	320	53	78	300	51	73

w_{ok} / Δp_w = 200 [kg/h] / 22 [kPa]

Size 1000

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	150	28	44	140	29	40	180	28	47	160	30	42
II	210	40	62	200	39	57	250	41	65	260	39	60
III	270	47	75	250	45	68	320	48	77	300	46	73
IV	330	52	82	300	50	78	400	52	88	360	51	83
V	410	57	95	370	56	94	510	58	101	460	57	95

w_{ok} / Δp_w = 200 [kg/h] / 23 [kPa]

Size 1250

Speed	Box length 1500 mm						Box length 2000 mm					
	without filter			with filter			without filter			with filter		
	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k oF/Δt} [W/K]	V [m ³ /h]	L _{wA} [dB(A)]	Q _{k mF/Δt} [W/K]
I	130	28	49	120	23	42	150	25	49	140	27	45
II	210	40	67	180	34	61	240	36	69	200	36	65
III	270	44	80	240	43	75	310	45	85	270	48	77
IV	330	50	90	300	49	87	370	51	96	330	51	91
V	410	57	104	380	56	101	490	56	111	420	58	101

w_{ok} / Δp_w = 200 [kg/h] / 25 [kPa]

Acoustic power level for separate fresh air box:

V _{prim} [m ³ /(hm)]	80	90	100
L _{wA P} [dB(A)]	25	28	31

The total acoustic power level may be calcul. as follows:
 $L_{wA} = 10 * \log(10^{0.1 * L_{wA P}} + 10^{0.1 * L_{wA, LVC}})$

V - flow rate (approx. values, tolerance ±10%)
L_{wA} - sound power level ±3 dB(A) (without casing)
Δt - temp. diff. between suction air temperature before entering the heat exchanger and water supply
V_p - fresh air flow rate

Q_{k oF} - cooling capacity (without filter)
Q_{k mF} - cooling capacity (with filter)
w_{ok} - standard flow rate at cooling capacity
Δp_w - water-side pressure loss
L_{wA P} - sound power level fresh air

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2 Selection Example

given values:

Required cooling capacity:	$Q_{k \text{ soll}} = 840 \text{ W}$
Water inlet temperature:	$t_{VL} = 16 \text{ °C}$
Room temperature/ Suction air temperature before entering the heat exchanger:	$t_R/t_A = 26 \text{ °C}$
Fresh air flow rate:	$V_P = 150 \text{ m}^3/\text{h}$
Fresh air temperature:	$t_P = 18 \text{ °C}$
Installation dimensions / slot length:	$L_S = 1500 \text{ mm}$
Cooling capacity fresh air:	$Q_P = 400 \text{ W}$ (with $\Delta t_P = t_R - t_P = 8 \text{ K}$)
Secondary cooling capacity (heat exch.):	$Q_k = Q_{k \text{ soll}} - Q_P = 440 \text{ W}$
With $\Delta t = t_A - t_{VL} = 10 \text{ K}$ specific secondary cooling capacity	$Q_k/\Delta t = 44 \text{ W/K}$

With a given box length of 1500 mm and $Q_k/\Delta t = 47 \text{ W/K}$, the following unit may be selected:

→ LVC, Size 800 with LDB 20/8/4 with separate fresh air box at speed I

The following total cooling capacity is obtained:

Total cooling capacity at

standard water flow rate: ($Q_{k \text{ mF}} + Q_P$): $Q_{k \text{ ges}} 470 \text{ W} + 400 \text{ W} = 870 \text{ W}$

The total cooling capacity is larger than the required cooling capacity. Since the fresh air cooling capacity depends on the fresh air flow rate, and the latter is fixed by the required air change rate, the secondary cooling capacity may be reduced by changing the nominal water volume.

Required secondary

cooling capacity: ($Q_{k \text{ soll}} - Q_P$) $Q_{k \text{ erf}} 840 \text{ W} - 400 \text{ W} = 440 \text{ W}$

Share of the secondary cooling capacity in % when

using the nominal water volume: $440 \text{ W} / 470 \text{ W} = 0.93 \rightarrow 93 \%$

According to the diagrams on page 39 the following is obtained:

Flow rate

at a 94% secondary cooling capacity: **160 kg/h**

Pressure loss at 160 kg/h: **abt. 16 kPa** (reading)

The secondary cooling capacity may be influenced by the choice of the size, the slot length and by the modification of the water flow rate.

Calculation of the total acoustic power level

The total acoustic power level is calculated by adding up the individual acoustic power levels:

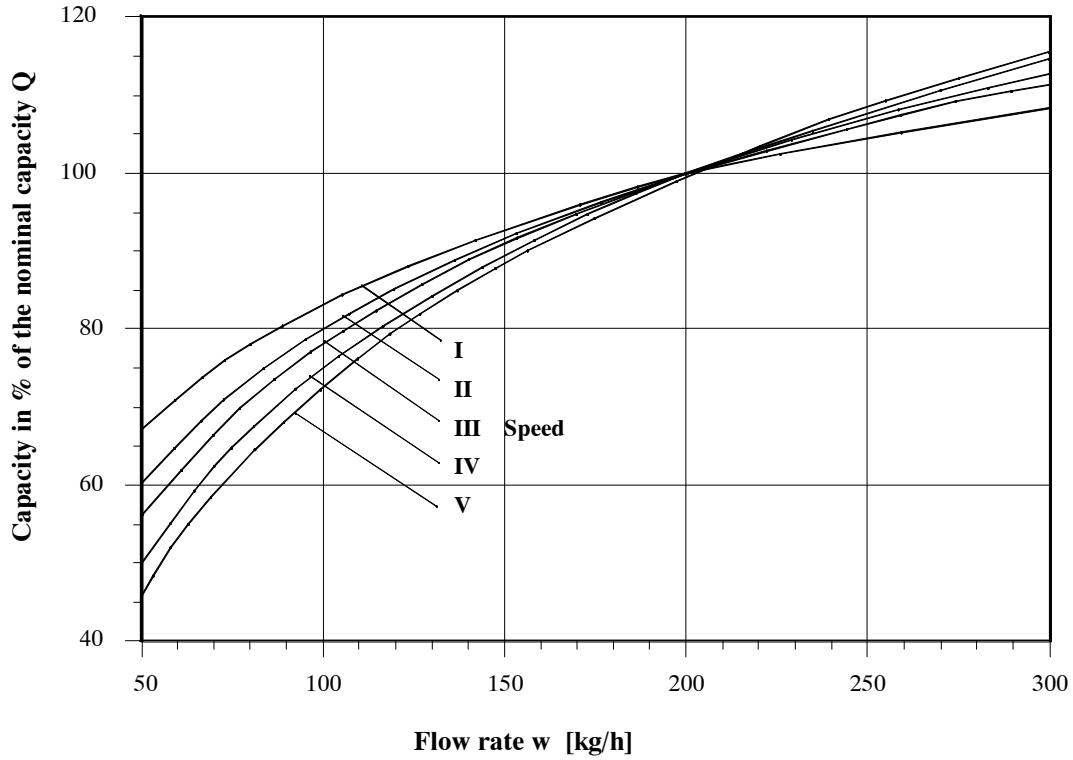
Acoustic power level of the unit: $L_{wA, LVC} = 36 \text{ dB(A)}$ (from the selection chart)

Acoustic power of fresh air: $L_{wA P} = 31 \text{ dB(A)}$ ($V_P = 100 \text{ m}^3/\text{hm}$)

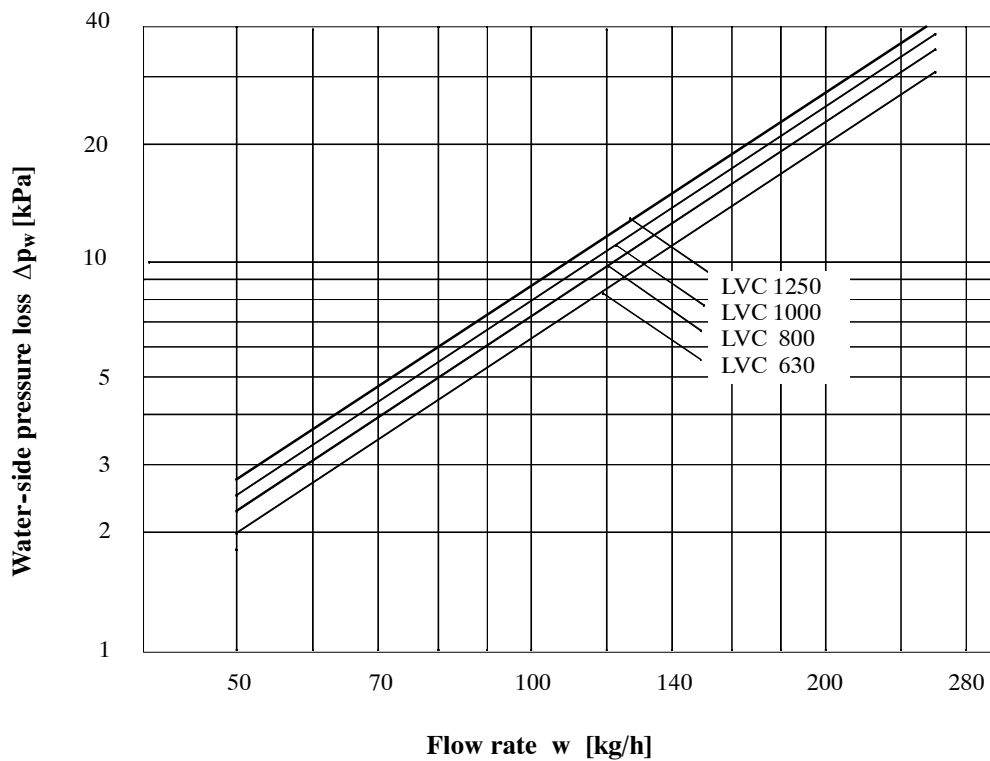
total acoustic power level of: $L_{wA} = 10 * \log (10^{0.1*31} + 10^{0.1*35}) = 37.4 \text{ dB(A)}$

Air Conditioning System Indivent[®] Ceiling Fan Coil Unit Type LVC-2

Capacity with different water flow rates



Water-side pressure loss for different water flow rates



Air Conditioning System Indivent® Ceiling Fan Coil Unit Type LVC

Nomenclature **LVC - 2 800 / S / F / L / - - - / D**

2-pipe unit	2						
4-pipe unit (valve-controlled)	4						
size	630 800 1000 1250						
S = standard version		S					
without filter			-				
with filter			F				
water connection on the left				L			
water connection on the right				R			
without fresh air connection					- - -		
with separate fresh air box					P . .		
straight-way 3-point valve						D	
3-way 3-point valve						3	
straight-way valve, thermal						T	

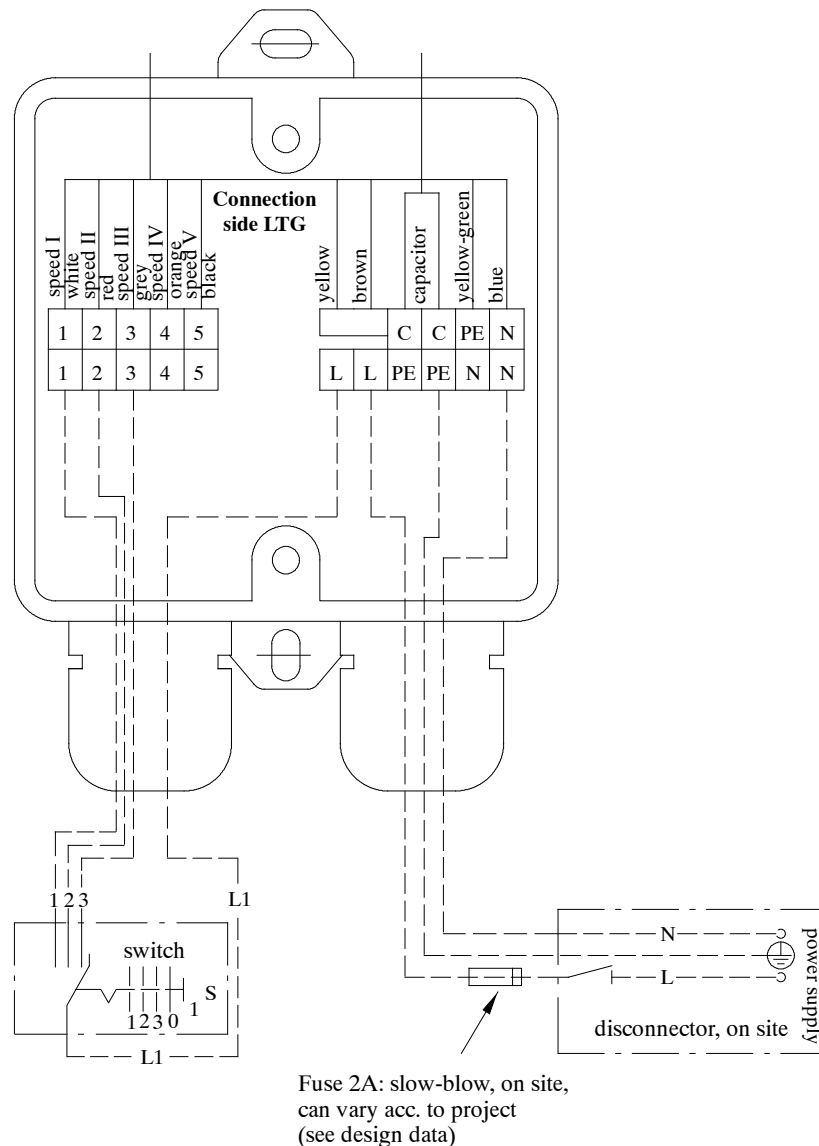
Nomenclature **LDB 20 / 8 / 3 / 00 / - - / E6 - EV1 / 2000 / S / 1**

diffuser type	LDB 12/8 LDB 20/8							
no. of slots		3 4						
border profile left - right			(0...8)					
additional profile left - right				(-, 1..7)				
surface	E2 = anodized, brushed; E6 = anodized, unbrushed							
	LG = painted, gloss; LM = painted, matt							
	C = chromium-plated; R = unfinished; X = special finish							
colour	painted = RAL-shade ; anodized = anodizin shade							
					slot length	[mm]		
nozzle colour	S = black; W = white; G = grey aluminum; C = chromium-plated							
end caps	- = without; 1 = both sides 2 = left; 3 = right							

Speed Control Wiring Diagram Type VKH, VFC and LVC

- Note:**
- Capacitor motor with 5 tapplings.
 - Multiple unit triggering possible.
 - The technical data contain details about the current consumption and the corresponding electrical power.

Note :
For a smooth and safe start of the fan coil units, it is necessary to use speed III.



Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-4

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Qty.	Description	Unit Price in €	Total price in €
	<p style="text-align: center;">Ceiling fan coil unit for 4-pipe systems, compact design, Type VKE 1100-4 (heating and cooling)</p> <p><u>Fan coil unit</u> for ceiling installation without casing. Easy maintenance thanks to large opening for easy cleaning of the heat exchanger. The entire fan unit may be removed from the device when installed.</p> <p>Recirculated air mode with cooling and heating, <u>consisting of</u>:</p> <ul style="list-style-type: none"> - Galvanized steel housing, partly with thermal insulation and attachment links. Insulated diffusion box with two sockets DN 200, minimum surface to minimize energy loss. Suction box integrated in the unit with two sockets DN 200. - AC twin centrifugal fan with stable characteristic, low noise, two-side suction, direct drive including maintenance-free slide bearing. 5-speed external-rotor capacitor motor, ready for plug-in with connector. Motor protected by integrated thermal circuit breaker. Energy-saving operation due to motor with low power consumption. Vibration isolation integrated in both blower sides. - 4-row heat exchanger with optimized interconnection for high caloric output, made of copper tubing with press-fitted aluminum fins for operating pressures not exceeding 10 bar, designed for connection to hot/cold water systems. - Condensate tray made of stainless steel including condensate sockets, insulated for use with low water inlet temperatures, easy removal for cleaning - Plug-in filter class G2, easy replacement. Static pressure recovery for optimized heat exchanger inflow. <p>Exterior dimensions (B x L x H) 1100 x 640 x 250 mm</p> <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VKE 1100-4</p> <p style="text-align: center;">-2-</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-4

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water up to supply temperatures of 50 °C, operating pressure 10 bar o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Plug-in connections with 1/2" internal thread for direct valve connection o 2 x Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o 2 x Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) two-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) three-way valve 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-4

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Heating mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Heating capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-2

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Qty.	Description	Unit Price in €	Total price in€
	<p style="text-align: center;">Ceiling fan coil unit for 2-pipe systems, compact design, Type VKE 1100-2 (heating or cooling)</p> <p><u>Fan coil unit</u> for ceiling installation without casing. Easy maintenance thanks to large opening for easy cleaning of the heat exchanger. The entire fan unit may be removed from the device when installed.</p> <p>Recirculated air mode with cooling and heating, <u>consisting of</u>:</p> <ul style="list-style-type: none"> - Galvanized steel housing, partly with thermal insulation and attachment links. Insulated diffusion box with two sockets DN 200, minimum surface to minimize energy loss. Suction box integrated in the unit with two sockets DN 200. - AC twin centrifugal fan with stable characteristic, low noise, two-side suction, direct drive including maintenance-free slide bearing. 5-speed external-rotor capacitor motor, ready for plug-in with connector. Motor protected by integrated thermal circuit breaker. Energy-saving operation due to motor with low power consumption. Vibration isolation integrated in both blower sides. - 2-row heat exchanger with optimized interconnection for high caloric output, made of copper tubing with press-fitted aluminum fins for operating pressures not exceeding 10 bar, designed for connection to hot/cold water systems. - Condensate tray made of stainless steel including condensate sockets, insulated for use with low water inlet temperatures, easy removal for cleaning - Plug-in filter class G2, easy replacement. Static pressure recovery for optimized heat exchanger inflow. <p>Exterior dimensions (B x L x H) 1100 x 640 x 250 mm</p> <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VKE 1100-2</p> <p style="text-align: center;">-2-</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-2

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water up to supply temperatures of 50 °C, operating pressure 10 bar o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Plug-in connections with 1/2" internal thread for direct valve connection o Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o Reversible motor drive for continuous water-side control (3-step action) two-way valve o Reversible motor drive for continuous water-side control (3-step action) three-way valve 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKE 1100-2

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Heating mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Heating capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-4A

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Qty.	Description	Unit Price in €	Total price in€
	<p style="text-align: center;">Ceiling fan coil unit for 4-pipe systems for water-side control by valves Type: VKH-4A (heating and cooling)</p> <p>Fan coil unit for ceiling installation and low ceiling heights, easy maintenance from below (without casing). Recirculated air mode with cooling and heating. Motor connections on the right (in direction of air discharge) Water connections on the right or on the left. <u>Unit consisting of:</u></p> <ul style="list-style-type: none"> - Housing of galvanized sheet steel. - Low-noise cross-flow fan with bushing-type bearing. Direct drive by 5-speed capacitor motor, 230 V ~/50 Hz. Motor with low energy consumption ensures a cost-effective operation. Integrated thermal circuit breaker for motor protection. Completely wired on terminal strip, ready-to-connect. Triggering through individual switch or controller (accessory). - Heat exchanger with 2 separate water circuits, consisting of smooth 12 mm copper tubes with pressed-on aluminium fins for a high caloric output and high natural convection. Operating pressure up to 12 bar, water-side connection of quick release couplings. - Condensate receiver of galvanized steel, 40 mm high, suitable for use of a condensate pump, DN 15 mm condensate drainage socket. - Easy-to-replace, self-extinguishing air filter of polyamide fibers, synthetic resin bonded. - With water vapour diffusion resistant heat insulation for a water supply temperature of 6 °C. <p>Exterior dimensions (Width x Height) 445 x 218 mm</p> <p>Sizes: o 630 o 800 o 1000 o 1250</p> <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VKE-4A</p> <p style="text-align: center;">-2-</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-4A

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water up to supply temperatures of 50 °C, operating pressure 10 bar o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Plug-in connections with 1/2" internal thread for direct valve connection o 2 x Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o 2 x Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) two-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) three-way valve <p>Variants:</p> <ul style="list-style-type: none"> o Fresh air box on the water connection's opposite side 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-4A

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Heating mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Heating capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-2A

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Qty.	Description	Unit Price in €	Total price in €
	<p style="text-align: center;">Ceiling fan coil unit for 2-pipe systems for water-side control by valves Type: VKH-2A (heating or cooling)</p> <p>Fan coil unit for ceiling installation and low ceiling heights, easy maintenance from below (without casing). Recirculated air mode with cooling and heating. Motor connections on the right (in direction of air discharge) Water connections on the right or on the left. <u>Unit consisting of:</u></p> <ul style="list-style-type: none"> - Housing of galvanized sheet steel. - Low-noise cross-flow fan with bushing-type bearing. Direct drive by 5-speed capacitor motor, 230 V ~/50 Hz. Motor with low energy consumption ensures a cost-effective operation. Integrated thermal circuit breaker for motor protection. Completely wired on terminal strip, ready-to-connect. Triggering through individual switch or controller (accessory). - Heat exchanger with 1 water circuit, consisting of smooth 12 mm copper tubes with pressed-on aluminium fins for a high caloric output and high natural convection. Operating pressure up to 12 bar, water-side connection of quick release couplings. - Condensate receiver of galvanized steel, 40 mm high, suitable for use of a condensate pump, DN 15 mm condensate drainage socket. - Easy-to-replace, self-extinguishing air filter of polyamide fibers, synthetic resin bonded. - With water vapour diffusion resistant heat insulation for a water supply temperature of 6 °C. <p>Exterior dimensions (Width x Height) 445 x 218 mm</p> <p>Sizes: o 630 o 800 o 1000 o 1250</p> <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VKE-2A</p> <p style="text-align: center;">-2-</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-2A

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water up to supply temperatures of 50 °C, operating pressure 10 bar o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Plug-in connections with 1/2" internal thread for direct valve connection o Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o Reversible motor drive for continuous water-side control (3-step action) two-way valve o Reversible motor drive for continuous water-side control (3-step action) three-way valve <p>Variants:</p> <ul style="list-style-type: none"> o Fresh air box on the water connection's opposite side 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VKH-2A

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Heating mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Heating capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VDC

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Qty.	Description	Unit Price in €	Total price in €
	<p style="text-align: center;">Fan coil unit for 2-pipe systems for water-side control by valves Type VDC-2 1000 for low intermediate ceilings (cooling)</p> <p><u>Fan coil unit</u> for ceiling installation and low ceiling heights, easy maintenance from below thanks to removable air outlet grille. Recirculated air mode with cooling. Ceiling installation on site using threaded rods. Recirculated air mode: return air and supply air handled via same grille. No additional air intake via floor cavity. <u>Unit consisting of:</u></p> <ul style="list-style-type: none"> - Housing of galvanized sheet steel. - Low-noise cross-flow fan with steady characteristic and 5-speed internal rotor capacitor motor, terminal box wired, with low energy consumption. Motor connections on the right (in direction of air discharge) - Heat exchanger for cooling. Connection 12 mm copper tube. For a high caloric output, consisting of copper tubes with pressed-on aluminium fins. Operating pressure up to 10 bar. Water connections on the right or on the left. - Removable air outlet grille for easy cleaning of the heat exchanger. - Condensate receiver integrated in the grille, without condensate drainage socket. Valve and electro-thermal actuator revision possible after removal of the outlet grille. <p>Dimensions (length x width x height): 1240 x 340 x 240 mm (overlap installation)</p> <p>Dimensions (length x width x height): 1198 x 298 x 240 mm (non-overlap installation)</p> <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VDC-2 1000</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VDC

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p>or <u>standard hose</u>:</p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o Reversible motor drive for continuous water-side control (3-step action) two-way valve o Reversible motor drive for continuous water-side control (3-step action) three-way valve 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VDC

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VFC-4

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Qty.	Description	Unit Price in €	Total price in€
	<p style="text-align: center;">Ceiling fan coil unit for 4-pipe systems for water-side control by valves Type VFC-4 (heating and cooling)</p> <p><u>Fan coil unit</u> for ceiling installation, for low intermediate ceiling heights, with a high natural convection capacity in the heating mode. Output control via valve with electric actuator (separate accessory). Triggering through individual switch (separate accessory). Motor connections on the right (in direction of air discharge)</p> <p><u>Unit consisting of:</u></p> <ul style="list-style-type: none"> - Housing of galvanized sheet steel. - Low-noise cross-flow fan with bushing-type bearing. Direct drive by 5-speed capacitor motor, 230 V ~/50 Hz. Motor with low energy consumption ensures a cost-effective operation. Integrated thermal circuit breaker for motor protection. Completely wired on terminal strip, ready-to-connect. - Large galvanized sheet steel condensate receiver over the entire width of the heat exchanger, with angle brackets for on-site ceiling installation using threaded rods, without drainage socket. - Heat exchanger with separate water circuits for cooling and heating, on the suction side to ensure easy maintenance, for a high caloric output at low flow rates, made of copper tubing with press-fitted aluminium fins for a maximum operating pressure of 10 bar. Water connections ½“ internal thread. - Easy-to-replace, self-extinguishing secondary air filter of polyamide fibers, synthetic resin bonded. <p>Exterior dimensions: (width x height): 465 mm x 178 mm</p> <p>Model sizes:</p> <ul style="list-style-type: none"> o 500 o 630 o 800 o 1000 o 1250 <p>Manufacturer: LTG Aktiengesellschaft Series: Fan Coils Type: VFC/4</p> <p style="text-align: center;">-2-</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VFC-4

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version (optional, at extra charge):</u></p> <ul style="list-style-type: none"> o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water up to supply temperatures of 50 °C, operating pressure 10 bar o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, without insulation for hot water o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o 2 x Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o 2 x Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) two-way valve o 2 x Reversible motor drive for continuous water-side control (3-step action) three-way valve o Neoprene insulated condensate receiver for cold water supply 6 – 12 °C 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type VFC-4

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Technical Specification

Cooling mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Cooling capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Heating mode

Induction air temperature	[°C]			
Water supply temperature	[°C]			
		Speed I	Speed II	Speed III
Flow rate	[m ³ /h]			
Heating capacity	[W]			
Sound power level L_{WA}	[dB(A)]			
Sound pressure level at 18 m ² Sabine L_{pA}	[dB(A)]			
Electric power consumption	[W]			

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type LVC-2

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Qty.	Description	Unit Price in €	Total price in€
	<p style="text-align: center;">LTG A/C Sytem Indivent® Ceiling fan coil unit type LVC-2 (cooling)</p> <p>Compact ceiling <u>fan coil unit</u> with low space requirement, combined with air diffuser, either with or without additional separate fresh air outlet, with integrated cooling for a constant primary air flow rate, to produce a combined mixed / displacement air flow with low air speed, avoiding temperature layer formations in the occupied zone.</p> <p><u>Unit consisting of:</u></p> <ul style="list-style-type: none"> - Housing of galvanized sheet steel. Angle brackets of sheet steel for on-site ceiling fixation using threaded rods. - Cross-flow fan with steady characteristic and 5-speed internal rotor capacitor motor with low energy consumption, terminal box wired. Triggering through individual switch. - Heat exchanger for cooling for a high caloric output, made of copper tubing with press-fitted aluminium fins for a maximum operating pressure of the standard version of 10 bar, designed for connection to a chilled water supply system. Water connection ½"-internal thread - Condensate receiver of galvanized sheet steel - Linearly adjustable air diffuser with cylindrical slot nozzles of natural colour anodized aluminium profiles. Direction of blown out air even subsequently adjustable by 180° without need for any additional mechanism, individually factory-set. Alternating long and short cylinders providing flow patterns from a flat jet close to the ceiling to a wide spreading of 17micro-jets per meter diffuser length, with air distribution box of galvanized sheet steel. <p>Sizes:</p> <ul style="list-style-type: none"> o 630 o 800 o 1000 o 1250 <p>Manufacturer: LTG Aktiengesellschaft Series: A/C System Indivent® Ceiling Fan Coil Unit Type: LVC-2</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type LVC-2

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Options:</u></p> <p>Number of slot rows: _____</p> <p>Length of slot rows: _____ mm</p> <p>Colour of the cylinders: o black o white o aluminium grey</p> <p>Colour of the slot profiles: _____</p> <p><input type="checkbox"/> Aluminium profile finish <input type="checkbox"/> painted according to RAL No.: _____ <input type="checkbox"/> anodized _____</p> <p><input type="checkbox"/> Profile adaptation to the ceiling using: <input type="checkbox"/> special profile No.: _____ <input type="checkbox"/> additional profile No.: _____</p> <p><input type="checkbox"/> End piece on the face side of the profiles <input type="checkbox"/> 15 mm wide <input type="checkbox"/> 25 mm wide</p> <p><input type="checkbox"/> Variable diffuser neck length (max. 170 mm) desired length _____ mm</p>		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type LVC-2

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Qty.	Description	Unit Price in €	Total price in€
	<p><u>Accessories/special version</u> (optional, at extra charge):</p> <ul style="list-style-type: none"> o With separate 1-slot supply air outlet, socket diameter _____ mm o Condensate receiver <u>with</u> socket o Primary air throttling element KLX 100/ 1 o Aluminium return air grille, natural colour anodized Length: _____ mm Width: _____ mm Installation type: o vertical / horizontal Type LDC o Air outlet frame for return air grille o special version: grille / frame powder coated similar to RAL-No. _____ o Aluminium profile finish o chromium-plated o Flexible hose, oxygen diffusion tight version (Oxiblock, PE), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water <p><u>or standard hose:</u></p> <ul style="list-style-type: none"> o Flexible hose, (EPDM-core), with stainless steel braiding, quick release coupling on one side, other side optional, length: 500 mm, with insulation for cold water o Electro-thermal actuator for water-side on/off control (2-step action) two-way valve o Electro-thermal actuator for water-side on/off control (2-step action) three-way valve o Reversible motor drive for continuous water-side control (3-step action) two-way valve o Reversible motor drive for continuous water-side control (3-step action) three-way valve 		

Specification and Schedule of Prices

Ceiling Fan Coil Unit Type LVC-2

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Technical Specification

Cooling mode

Induction air temperature

[°C]

Water supply temperature

[°C]

Speed I Speed II Speed III

Flow rate

[m³/h]

	Speed I	Speed II	Speed III

Cooling capacity

[W]

Sound power level L_{WA}

[dB(A)]

Sound pressure level at 18 m² Sabine L_{pA}

[dB(A)]

Electric power consumption

[W]