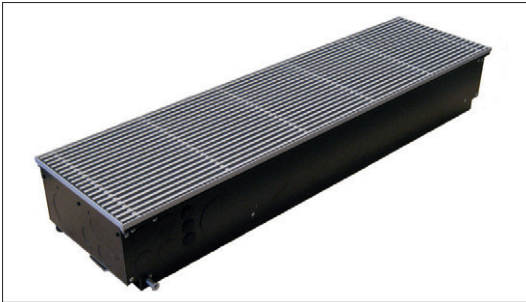


Translation of Original Installation/Use/Maintenance Instructions

# LTG Air-Water Systems

**LTG FanPower**

Fan Coil Units VKB



Floor installation

<b>LTG Comfort Air Technology</b>
<b>Air-Water Systems</b>
Air Diffusers
Air Distribution

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## EC Declaration of conformity

### EC Declaration of conformity



## EC declaration of conformity

As defined by the EC Council Directive on Machinery 2006/42/EC, Annex II, Nr. 1A

We herewith declare that the machine described in the following conforms to all relevant provisions of the EC Machinery Directive 2006/42/EC.

Manufacturer: **LTG Aktiengesellschaft  
Grenzstr. 7, 70435 Stuttgart,  
Germany**

Designation of machinery: **Fan Coil Unit**

Machinery type: **VKB**

Relevant EC Council Directives: **Machinery Directive 2006/42/EC,  
Low Voltage Directive 2014/35/EU**

Applied harmonized standards, in particular: **DIN EN ISO 12100, DIN EN ISO 13857,  
DIN EN ISO 13854, DIN EN 60335-2-40**

Other standards: **DIN EN 60034-1, DIN EN 60204-1, DIN EN ISO 5801**

Stuttgart, 09.09.2021

Signature of manufacturer



Wagner

Position of signatory:



ppa. Dehlwes

#### Innovative Solutions for Humans and Products.

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VKB-Konformitätserklärung-GB/page 1 of 1

## 1. Safety instructions



Assembly, dismantling and maintenance must be performed by trained personnel in order to achieve reliability, safety and best results.

### 1.1 Explanation of symbols and hints

#### Operating safety symbol



This symbol is placed alongside every operating safety instruction in these operating instructions, wherever there is a danger to life and limb. Observe these instructions and in such cases proceed with extreme caution. Pass on all the operating safety instructions to other users. In addition to the instructions contained in these operating instructions, the generally applicable safety and accident prevention regulations must be observed; as shown here, for example: Warning of hazard point.

#### Information symbol



This information symbol is placed alongside those points in the manual which must be specifically observed in order to ensure that the guidelines, regulations, instructions and correct operating sequences are observed and to prevent damage to or destruction of the unit and/or other components in the system.



These mandatory symbols are linked to the operating safety instructions and show which protective measures must be complied with at the appropriate workstations and therefore specifically mandate a certain action, as shown here as an example: Wear protective gloves.



These prohibition symbols are linked to the operating safety instructions banning a dangerous or risky action, as shown here as an example: Do not touch.

## 1.2 Operating safety instructions

Carefully read the safety instructions before using any LTG fan coil unit VKB.

**Always follow the safety instructions!**

The fan coil units VKB meet any pertinent safety standards.



The installation and maintenance of air conditioning units may be dangerous because of high pressures and electrical components being live. Therefore, the installation, maintenance, and repair must be performed by qualified and trained staff only.

In particular, electrical connections are to be provided, removed, or modified by authorised persons only observing all relevant safety instructions.

Safety instructions in the technical documentation and on unit labels must be followed at all times.

Do not open the unit for cleaning, maintenance, or repair and do not remove covers and casings (air diffuser) unless all conducting lines have been completely disconnected. Do not connect or remove the plug-in connector when under tension.

Any work regarding the electrical equipment is to be performed by skilled and trained staff only. Connections to the main power supply and the safety earth terminal must be executed exactly as described in the wiring diagram.

Electrical operation of the unit in a partly disassembled condition or of individual components is not permitted since earth terminals might be interrupted.

## Continuation 1.2 Operating safety instructions



The standard version of the heat exchangers is designed for an operating pressure of 10 bar (test pressure 16 bar). High water pressures may be hazardous. Higher operating pressures, therefore, require LTG's express permission. Wear safety glasses.



During continuous operation the motor may reach temperatures of up to +65 °C. If necessary, allow the motor to cool off or wear gloves.

In the heating mode a temperature of up to 80 °C may be reached. Water-carrying parts may be hot, so do not touch with your bare hands to avoid burns.



Be careful when performing work on the heat exchangers. Blades and housing parts are sharp-edged. Wear gloves during work and handling.



Be careful when working overhead and provide protection against parts falling from above.



Keep objects and dirt from entering the impeller. A damaged fan impeller or objects being ejected by the impeller may be hazardous.



Never remove the protective grille of the fan impeller and the motor cover during operation.

The casing on site also serves as a protection and should be removed for maintenance and cleaning only.

Avoid any additional load to the unit or the suspensions since stability might be insufficient.

**The unit must be checked by an expert immediately**

- if it has been mechanically damaged
- if it is suffering from a water damage,
- if the fan shows signs of damage (imbalance, damage to the bearing or motor),
- if the suspension or the casing show clear signs of corrosion or ageing.

Do not put the unit back into operation before all necessary maintenance and repair has been performed by an expert!

Take the unit entirely off the main power supply until all repairs have been completed by an expert even if this might result in not being able to operate undamaged units.

It is in any case imperative to take a damaged unit completely off the main power supply!

## Transport/storage/delivery

### 2. Transport, storage

The unit requires dry and dust-free conditions during transport, storage, installation, and operation.

Units are stacked on Euro or single trip pallets and secured with straps. Pallets may be moved using forklifts or cranes.

Do not remove the packaging unless immediately prior to installation on site to protect the unit from pollution and damages.



The protective board (chipboard) serves to protect the unit from dust and damages. Do not remove it during construction!

In case it is indispensable to remove the protective board, e.g. for installation or a check of the flexible water connection hoses, it will have to be reinstalled right afterwards in its original position (clean side to the bottom). Be careful to keep any dust from entering the unit during removal or re-installation of the protective board.

Do not replace the protective board with the grille unless any pollution of or damage to the unit is excluded, i.e. any subsequent work or activities in the unit's vicinity have been completed.



LTG Aktiengesellschaft will not take responsibility for any pollution of or damages to the unit.

### 2.1 Transport instructions

Handle units appropriately and with care during transport.

Do not throw, let drop to the ground or bump into other items or walls.

Make sure that units are safely fastened during transport and avoid damage through other items.

It is recommended to always have units handled by at least two persons.

The packaging is not weather-resistant.

### 2.2 Storage

Make sure that units are entirely protected against weathering, humidity, and other adverse conditions that might result in damages during storage.

The storage location must meet the following climatic requirements:

Temperature between +5...+55 °C with a relative humidity of 90 % max. (non-condensing).

### 2.3 Delivery

**Standard units are normally delivered as follows:**

- on Euro or single trip pallets, secured with straps and/or with the pallet sealed in film.
- fitting/regular accessories packaged with them in separate boxes

Disposal of the packaging material in accordance with local regulations.

## Function

### 3. Function

Fan coil units of type VKB are recirculating air units for cooling (2-pipe) or for cooling and heating (4-pipe) with an option for primary air supply.

These fan coil units have been designed for installation in false floors in office and conference rooms, hotel rooms and other closed rooms for indoor air treatment.

The fan sucks in ambient air on the side facing the room via a heat exchanger heating or cooling the air and reintroducing it into the room on the facade side.

Uniform distribution of the air across the entire fan is ensured by a cross-flow impeller extending over the entire width. Usually, no filter is provided for before entering the heat exchanger.

Thermal energy transport to the heat exchanger is performed by water.

For reasons of hygiene, the unit should be dimensioned in a way to ensure that no condensation occurs during standard operation.

Fan speed control via five-speed capacitor motor or energy-efficient EC motor.

Actuation is by individual switch (AC motor) or using a 1...10 V signal (EC motor).

For group activation a total of 5 units may be connected in parallel.

Take care to connect in parallel identical speeds only, i.e. connect speed I of unit 1 to speed I of unit 2, etc.

With view to dimensioning, the most important data are the caloric output, the sound power level and the air flow rate.

The units' caloric output is determined through the fan speed, the water flow rate, and the valve setting which may be controlled by a regulating device.

The units' sound power and the air flow rate are determined through the fan speed.

### 3.1 Intended use

The fan coil unit type VKB has been designed exclusively for use in closed rooms.

The fan coil unit is designed for ambient temperatures of +5...+40 °C and a maximum relative humidity of up to 90 % (non-condensing).

In order to ensure safe motor functioning the ambient temperature when installed should not exceed +40 °C.

The maximum admissible supply temperature is, therefore, limited to +80 °C.



Any other operating conditions require the express and written permission of LTG Aktiengesellschaft.

LTG Aktiengesellschaft does not assume responsibility for any damages resulting from unintended use.

## Function

### 3.2 Decentralised control LTG Connected Intelligence

#### Application

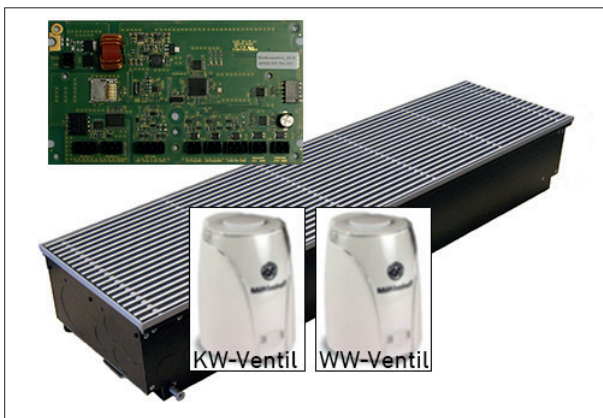
„Connected Intelligence“ (CI) is a control concept for decentralized control of air-water systems of LTG Aktiengesellschaft. The core piece is the individually parameterizable CI board, which is installed in each unit (decentralized ventilation unit FVPpulse, fan coil unit or induction unit). It offers the possibility to control decentralised ventilation units, fan coil units and induction units.

„Connected Intelligence“ communicates via Modbus RTU and functions as a slave field unit, but can also take over master functions. In the building, both stand-alone solutions and zone solutions with a higher-level building management system can be implemented.

#### Function

The CI board controls the room temperature and air quality. As input variable, it only requires information on the desired operating mode and the setpoints and actual values in the control zone. The CI board independently controls the fan, cycle time, heating and cooling valve at decentralised unit level. It communicates via Modbus RTU with other bus subscribers or higher-level instances depending on the implemented concept for the building management system (BMS).

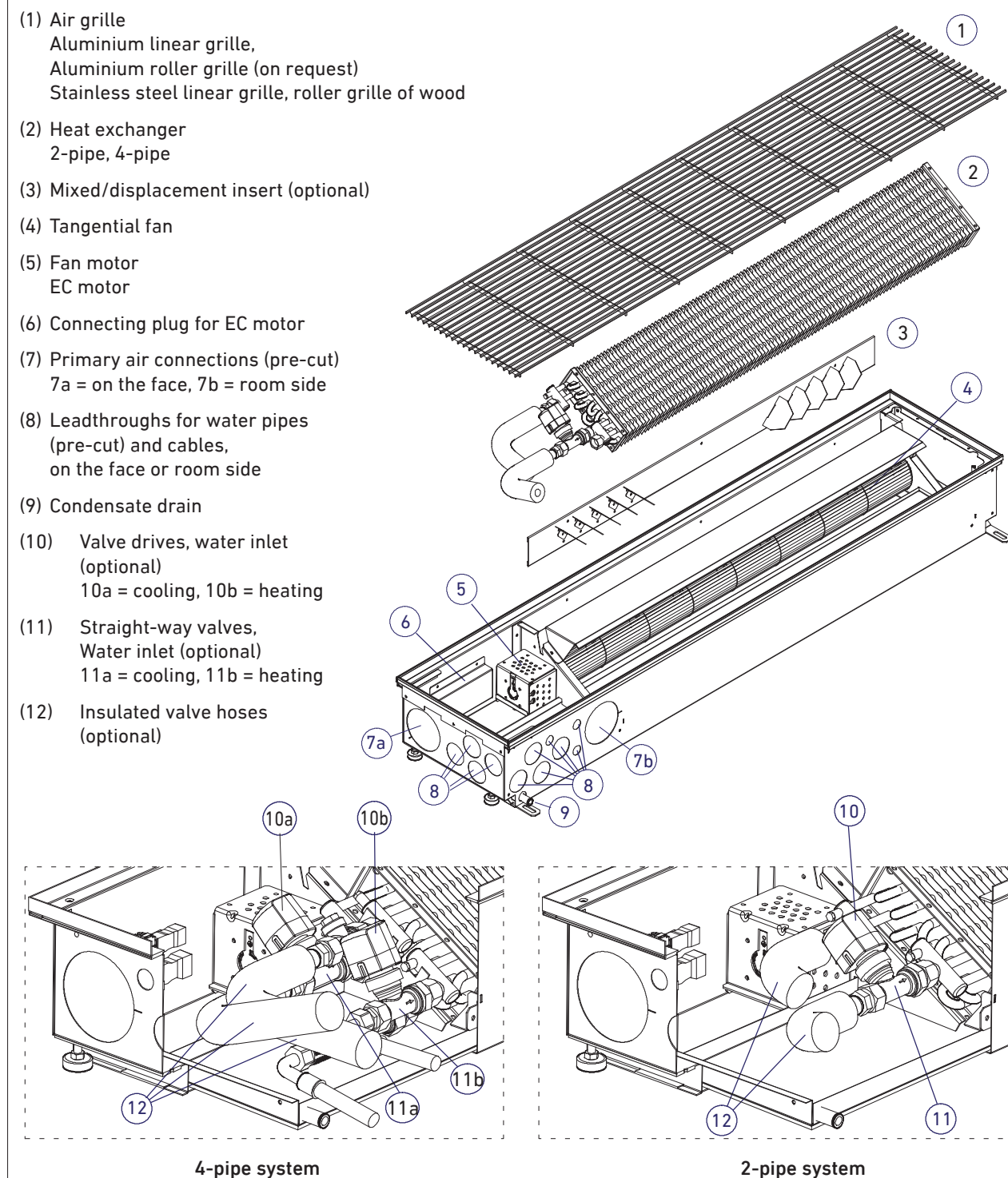
Unit, CI board and valves form a unit and are completely wired together at the factory.



## Technical data

### 4. Technical data

#### 4.1 Unit configuration



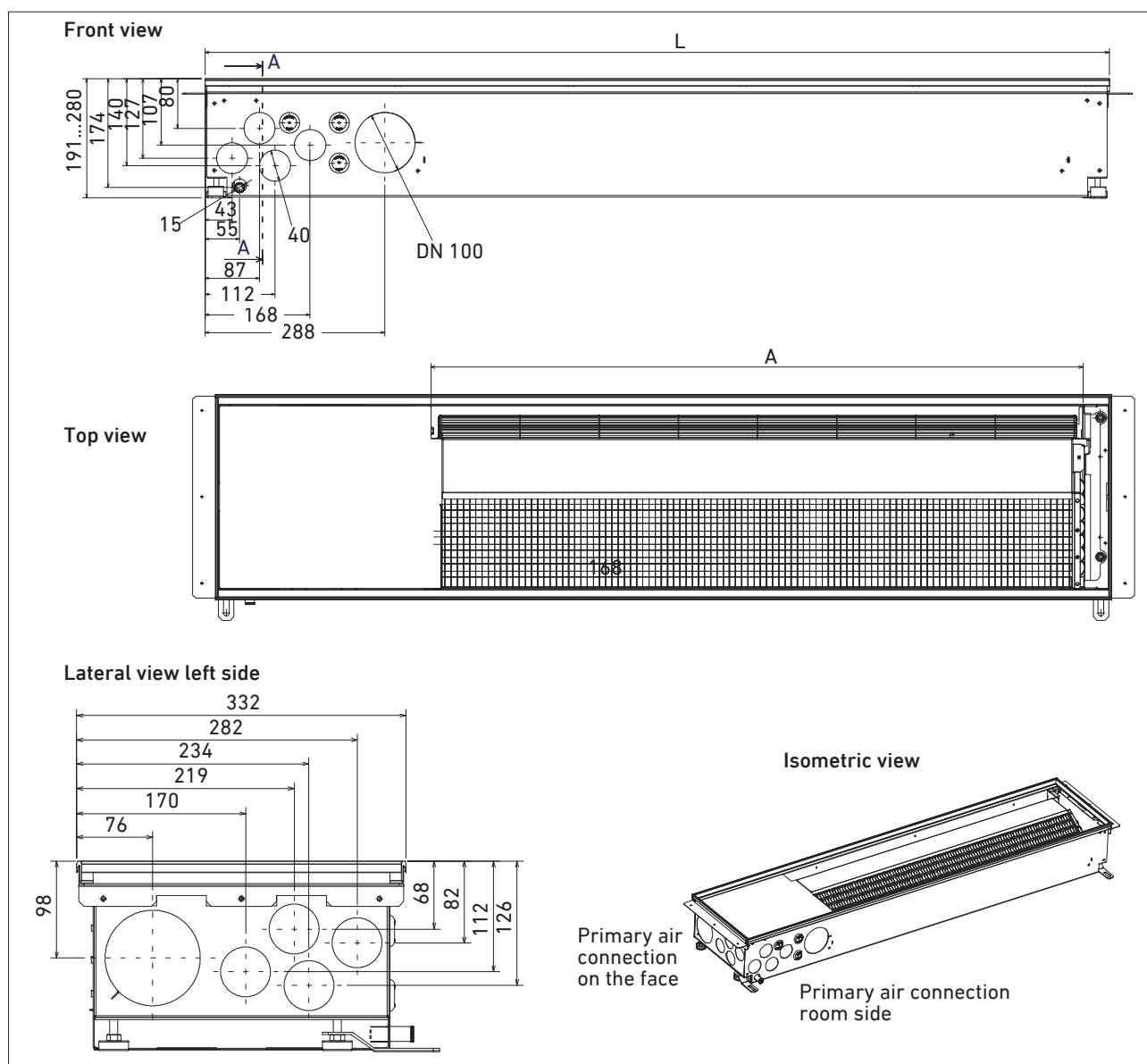
## Technical data

### 4.2 Technical data type VKB-0/2 and VKB-0/4

#### 4.2.1 Dimensions, weight, acoustics

Size	Total length L [mm]	Air outlet width A [mm]	Weight [kg]	Water content		2-pipe
				4-pipe		
				Cooling circuit [l]	Heating circuit [l]	
630	1020	625	27	0.6	0.16	0.8
800	1200/1250 *	855	31	0.9	0.21	1.1
1000	1450	1055	37	1.1	0.26	1.4
2000	2450	2038	65	2.1	0.53	2.8

\* Length depending on the desired connection type



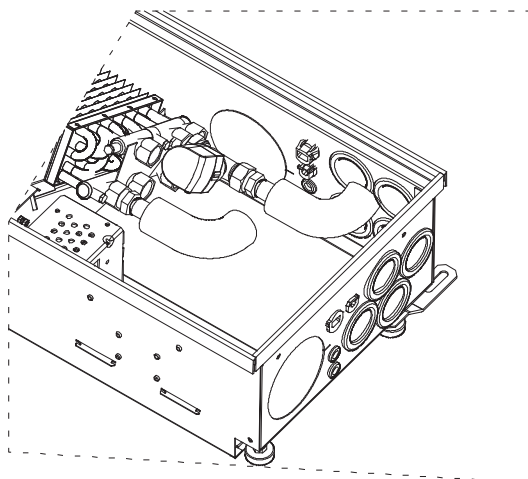
1 socket (DN 100), with grille, with integrated displacement air diffuser, separated (type VKB-0/.../FQ)

Primary air flow rate	V <sub>P</sub>	[m³/(h)]	50	70	90	110	130	The total acoustic power level may be calculated as follows: $L_{wA} = 10 * \log (100,1 * L_{wA P} + 100,1 * L_{wA, VKB})$
Acoustic power level	L <sub>wA P</sub>	[dB(A)]	26	27	29	34	39	
Pressure loss		[Pa]	2	4	6	11	13	

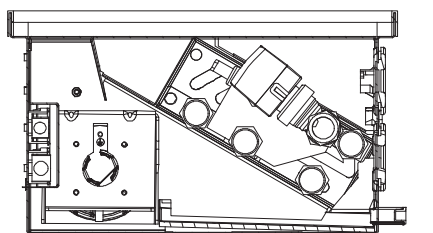
## Technical data

### Continuation 4.2.1 Dimensions, weight, acoustics, type VKB-0/2 and VKB-0/4

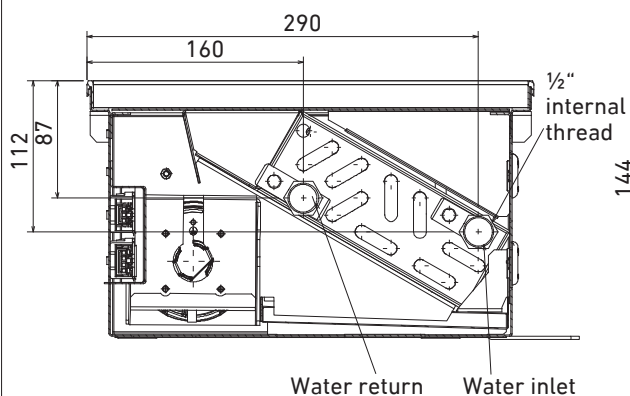
2-pipe system



Isometric view

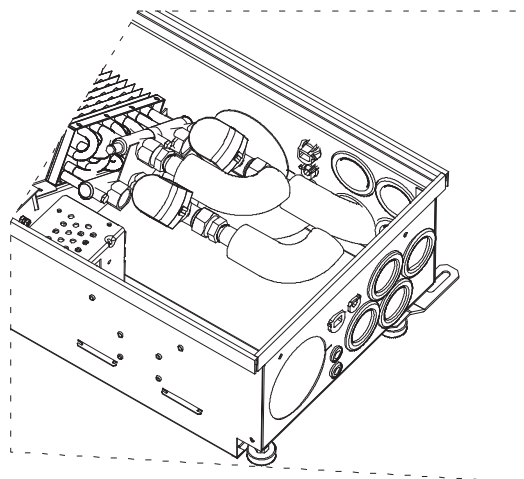


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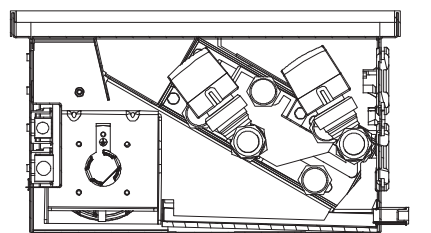


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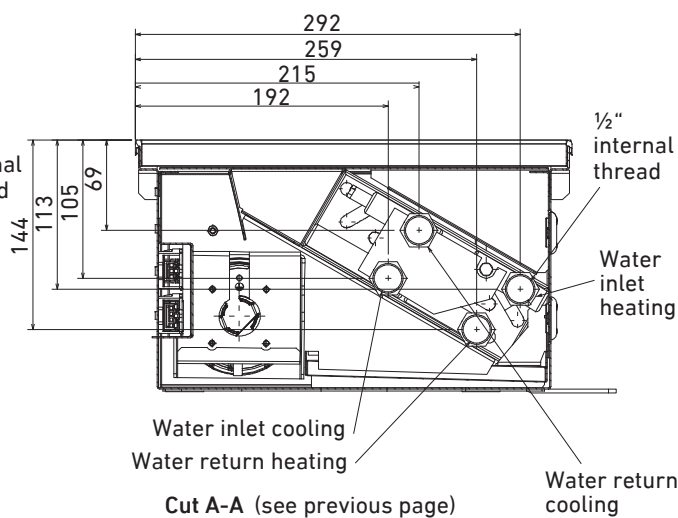
4-pipe system



Isometric view



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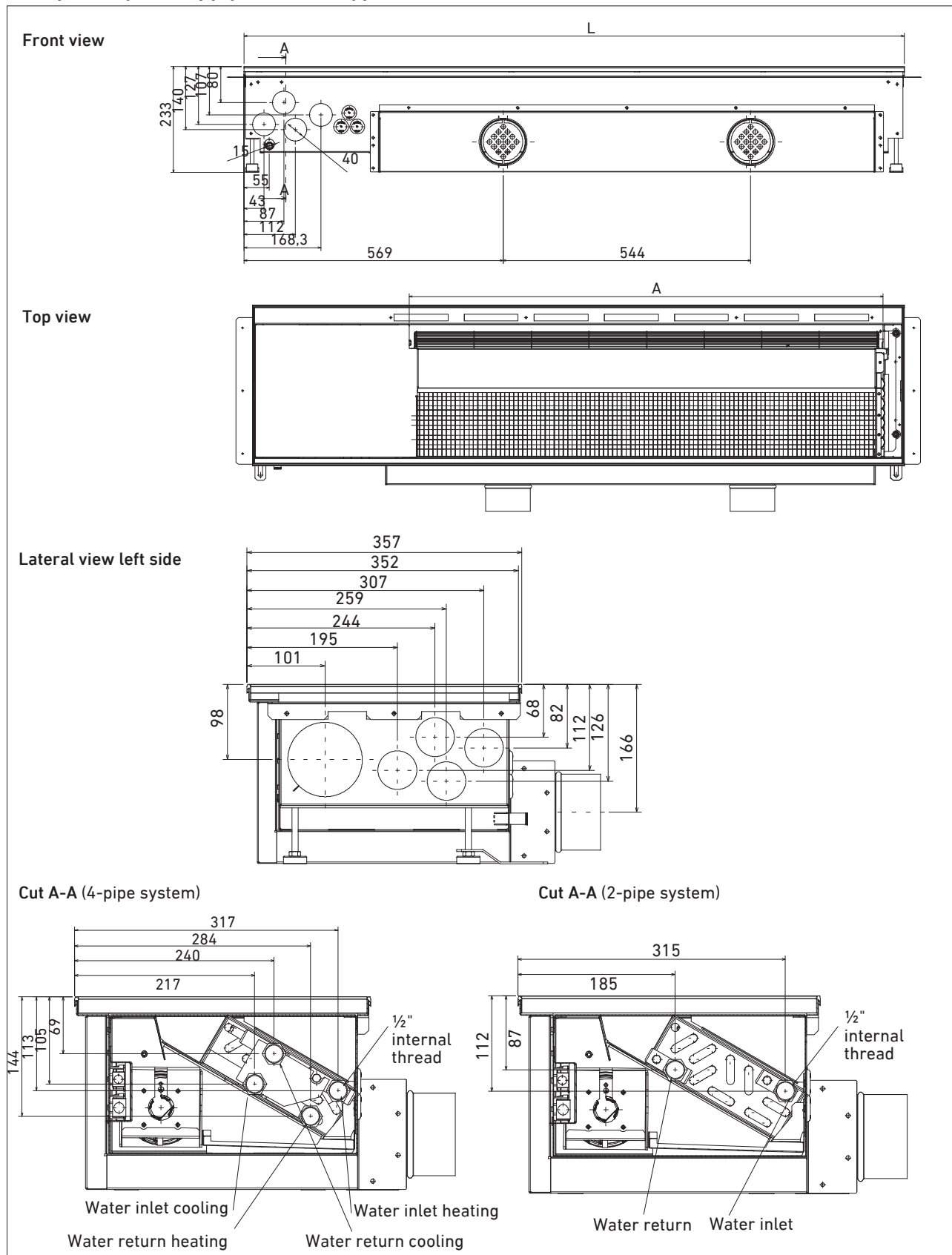


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## Technical data

### Continuation 4.2.1 Dimensions, weight, acoustics, type VKB-0/2 and VKB-0/4

With primary air supply (in front) (type VKB-0/2/.../FL and VKB 0/4/.../FL)



## Technical data

### Continuation 4.2.1 Dimensions, weight, acoustics, type VKB-0/2 and VKB-0/4

#### With primary air supply (in front) (type VKB-0/2/.../FL and VKB 0/4/.../FL)

Size	Total length L [mm]	Air outlet width A [mm]	Weight [kg]	Water content		
				4-pipe		2-pipe
				Cooling circuit [l]	Heating circuit [l]	
630	1020	625	28	0.6	0.16	0.8
800	1250	855	32	0.9	0.21	1.1
1000	1450	1055	38	1.1	0.26	1.4
2000	2450	2038	66	2.1	0.53	2.8

#### Acoustic power level for separate socket for primary air supply (must be added to the unit's power level)

1 socket (DN 100), with aluminium linear grille

	V <sub>P</sub>	[m <sup>3</sup> /(h)]	40	60	80	100
Size 630	L <sub>WA P</sub>	[dB(A)]	29	38	-	-
	Pressure loss	[Pa]	1	3	-	-
Size 800	L <sub>WA P</sub>	[dB(A)]	27	30	37	47
	Pressure loss	[Pa]	1	1	2	4
Size 1000	L <sub>WA P</sub>	[dB(A)]	27	28	31	37
	Pressure loss	[Pa]	0	1	2	3

2 sockets (DN 100), with aluminium linear grille

	V <sub>P</sub>	[m <sup>3</sup> /(h)]	50	100	150	200	250
Size 630	L <sub>WA P</sub>	[dB(A)]	27	31	41	-	-
	Pressure loss	[Pa]	2	7	16	-	-
Size 800	L <sub>WA P</sub>	[dB(A)]	27	28	32	40	-
	Pressure loss	[Pa]	2	4	9	16	-
Size 1000	L <sub>WA P</sub>	[dB(A)]	27	28	30	36	43
	Pressure loss	[Pa]	2	3	5	9	15

4 sockets (DN 100), with aluminium linear grille

	V <sub>P</sub>	[m <sup>3</sup> /(h)]	40	60	80	100
Size 2000	L <sub>WA P</sub>	[dB(A)]	30	31	33	39
	Pressure loss	[Pa]	2	3	5	9

The total acoustic power level may be calculated as follows:

$$L_{WA} = 10 * \log (10^{0,1 * L_{WA P}} + 10^{0,1 * L_{WA VKB}})$$

## Technical data

### 4.2.2 Technical data type VKB-0/4, 4-pipe system

#### Size 630, type VKB-0/4/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> / Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>2)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	180	25	31	37	370	22	120	200 / 18	100 / 1.3	3
4	240	30	36	50	500	25				4
5	290	33	39	58	580	27				5
6	360	38	44	66	660	29				7
8	460	46	52	76	760	32				11

#### Size 800, type VKB-0/4/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> / Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>2)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	250	25	31	52	520	30	160	200 / 23	100 / 1.6	3
4	330	30	36	67	670	33				4
5	410	33	39	78	780	36				5
6	510	38	44	88	880	39				8
8	640	46	52	100	1000	43				15

#### Size 1000, type VKB-0/4/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> / Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>2)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	310	27	33	64	640	37	200	200 / 26	100 / 1.8	3
4	410	29	35	80	800	40				5
5	510	34	40	93	930	43				7
6	630	39	45	103	1030	46				10
8	790	47	53	115	1150	51				19

#### Size 2000, type VKB-0/4/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> / Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>2)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	510	27	33	100	1000	68	400	400 / 28	150 / 6.2	8
4	680	32	38	128	1280	74				10
5	830	37	43	154	1540	78				13
6	870	42	48	169	1690	82				18
8	1210	51	57	203	2030	92				32

Values are given for the unit including the air outlet grille, without spreading vanes, without filter. The spreading vanes have the effect of reducing capacity by max. 10 %

Nominal water flow rate cooling 200 kg/h.

1) For 16 °C water supply temperature  
26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.)  
non-condensing operation

2) For 55 °C water supply temperature  
20 °C room air temperature

- U - Control voltage fan
- V - Flow rate (± 10 %)
- L<sub>A18</sub> - Sound pressure level
- L<sub>WA</sub> - Sound power level ± 3 dB(A)
- Q<sub>k</sub> - Total cooling capacity
- Q<sub>h</sub> - Total heating capacity
- Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply
- Q<sub>st</sub> - Heating capacity for natural convection
- w<sub>ok</sub> - Standard water flow rate (cooling) \*
- w<sub>oh</sub> - Standard water flow rate (heating) \*
- Δp<sub>w</sub> - Water-side pressure loss
- P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 16...18

## Technical data

### Continuation 4.2.2 Technical data type VKB-0/4, 4-pipe system

#### Size 630, type VKB-0/4/.../E, condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>k</sub> <sup>2)</sup> [W]	Q <sub>ksens</sub> <sup>2)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	180	25	31	36	360	949	636	22	120	200 / 18	100 / 1.3	3
4	240	30	36	48	480	1165	848	24				4
5	290	33	39	56	560	1304	990	26				5
6	360	38	44	64	640	1446	1131	28				7
8	460	46	52	73	730	1552	1290	31				11

#### Size 800, type VKB-0/4/.../E, condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>k</sub> <sup>2)</sup> [W]	Q <sub>ksens</sub> <sup>2)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	250	25	31	50	500	1318	884	29	160	200 / 22	100 / 1.6	3
4	330	30	36	65	650	1577	1149	32				4
5	410	33	39	76	760	1769	1343	35				6
6	510	38	44	85	850	1920	1502	38				8
8	640	46	52	97	970	2062	1714	42				14

#### Size 1000, type VKB-0/4/.../E, condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>k</sub> <sup>2)</sup> [W]	Q <sub>ksens</sub> <sup>2)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	310	27	33	62	620	1634	1096	36	200	200 / 26	100 / 1.8	3
4	410	29	35	78	780	1893	1379	39				5
5	510	34	40	90	900	2095	1591	42				7
6	630	39	45	100	1000	2259	1767	45				10
8	790	47	53	112	1120	2381	1980	49				19

#### Size 2000, type VKB-0/4/.../E, condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>k</sub> <sup>2)</sup> [W]	Q <sub>ksens</sub> <sup>2)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]
3	510	27	33	95	950	2500	1680	65	400	400 / 28	150 / 6.3	8
4	680	32	38	122	1220	2960	2160	70				10
5	830	37	43	146	1460	3400	2580	74				13
6	870	42	48	161	1610	3640	2850	78				18
8	1210	51	57	193	1930	4100	3411	87				32

Values are given for the unit with air outlet grille, without spreading vanes, without filter. The spreading vanes have the effect of reducing capacity by max. 10 %.

1) For 16 °C water supply temperature,  
26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.), non-condensing operation

2) For 6 °C water supply temperature,  
26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.), condensing operation,  
50 % relative humidity.

3) For 55 °C water supply temperature,  
20 °C room air temperature

U - Control voltage fan

V - Flow rate (± 10 %)

L<sub>A18</sub> - Sound pressure level

L<sub>wA</sub> - Sound power level ± 3 dB(A)

Q<sub>k</sub> - Total cooling capacity

Q<sub>ksens</sub> - Sensible cooling capacity

Q<sub>h</sub> - Total heating capacity

Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply

Q<sub>st</sub> - Heating capacity for natural convection

w<sub>ok</sub> - Standard water flow rate (cooling) \*

w<sub>oh</sub> - Standard water flow rate (heating) \*

Δp<sub>w</sub> - Water-side pressure loss

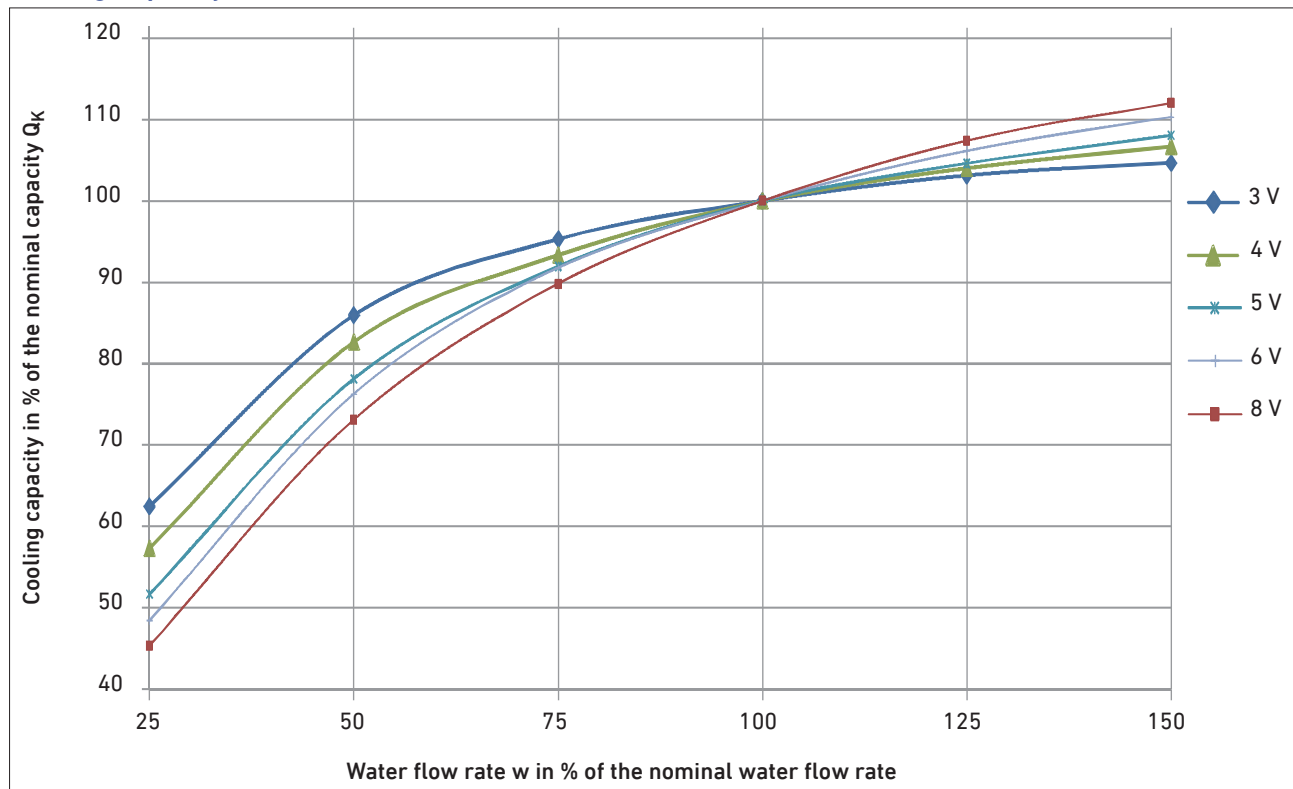
P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 16...18

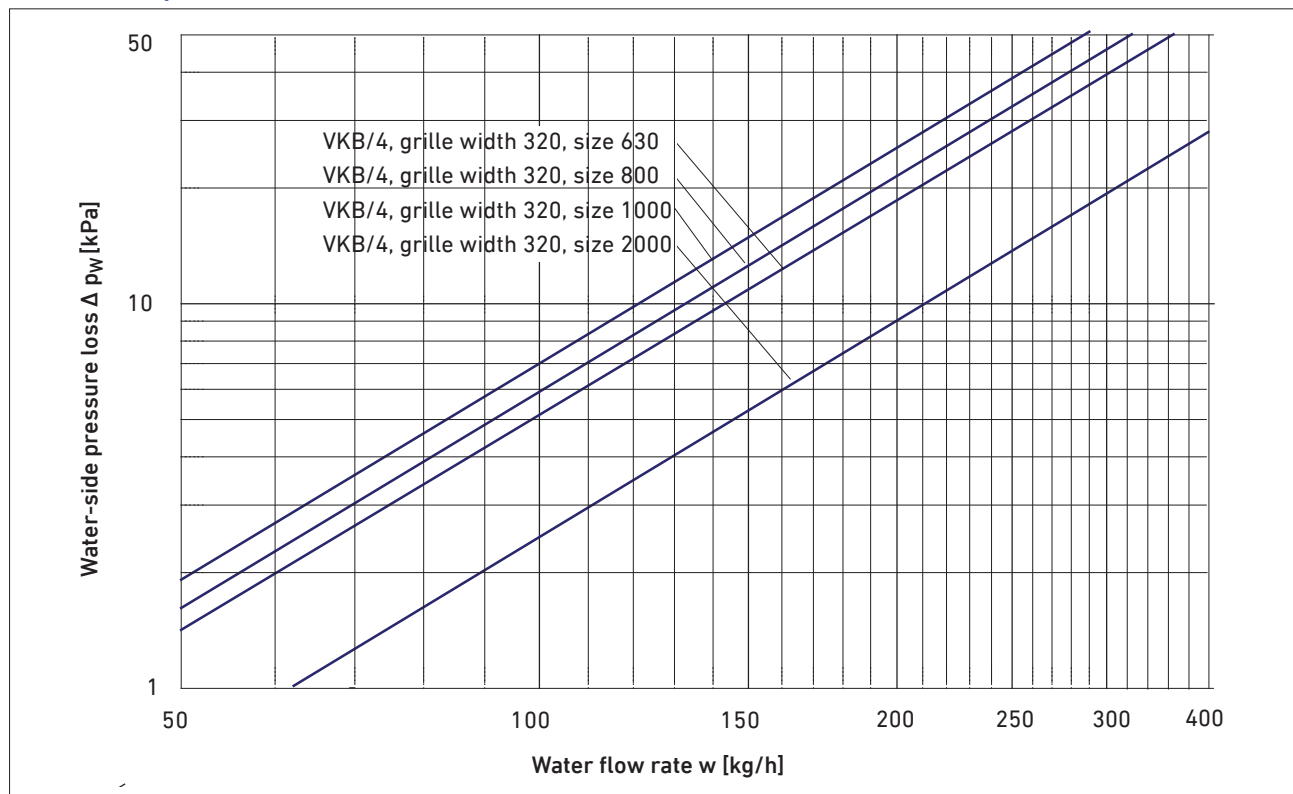
## Technical data

### 4.2.3 Correction charts type VKB-0/4, 4-pipe system

#### Cooling capacity for different water flow rates



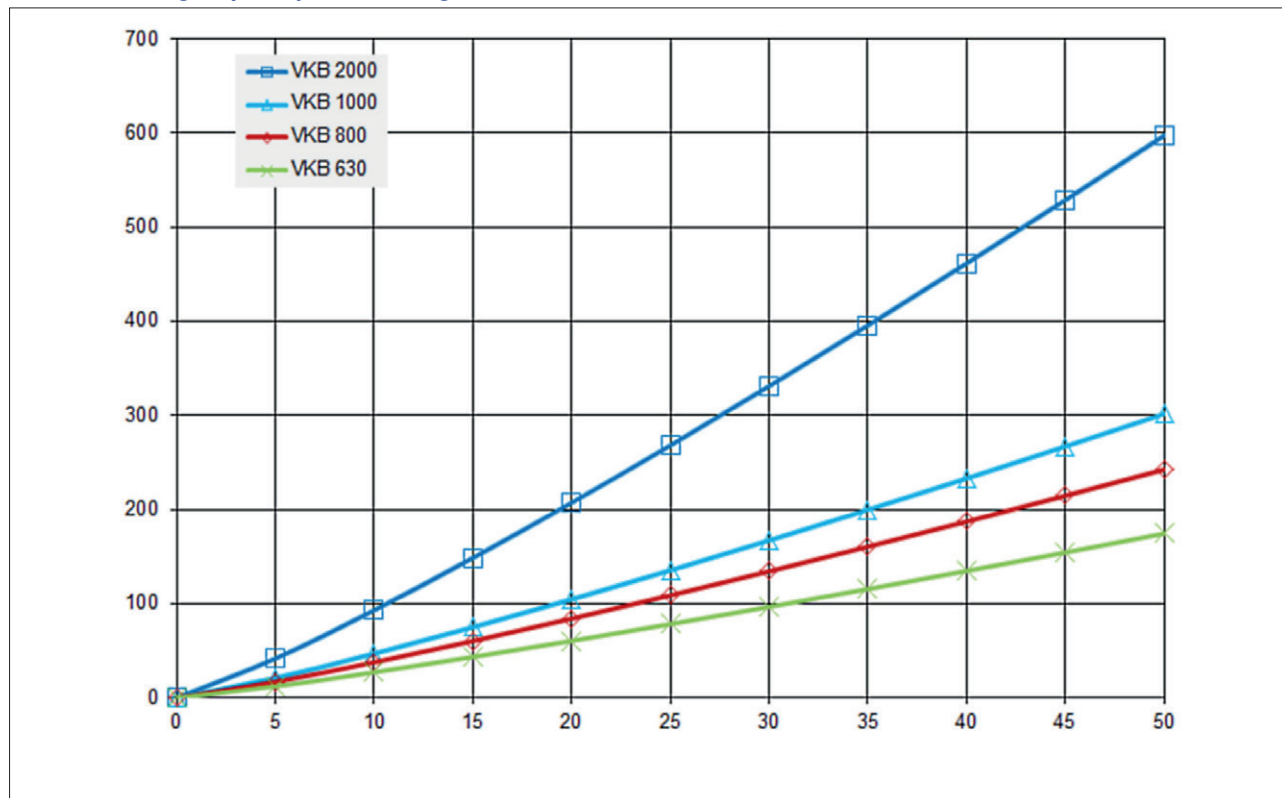
#### Water-side pressure loss of the cooler for different water flow rates



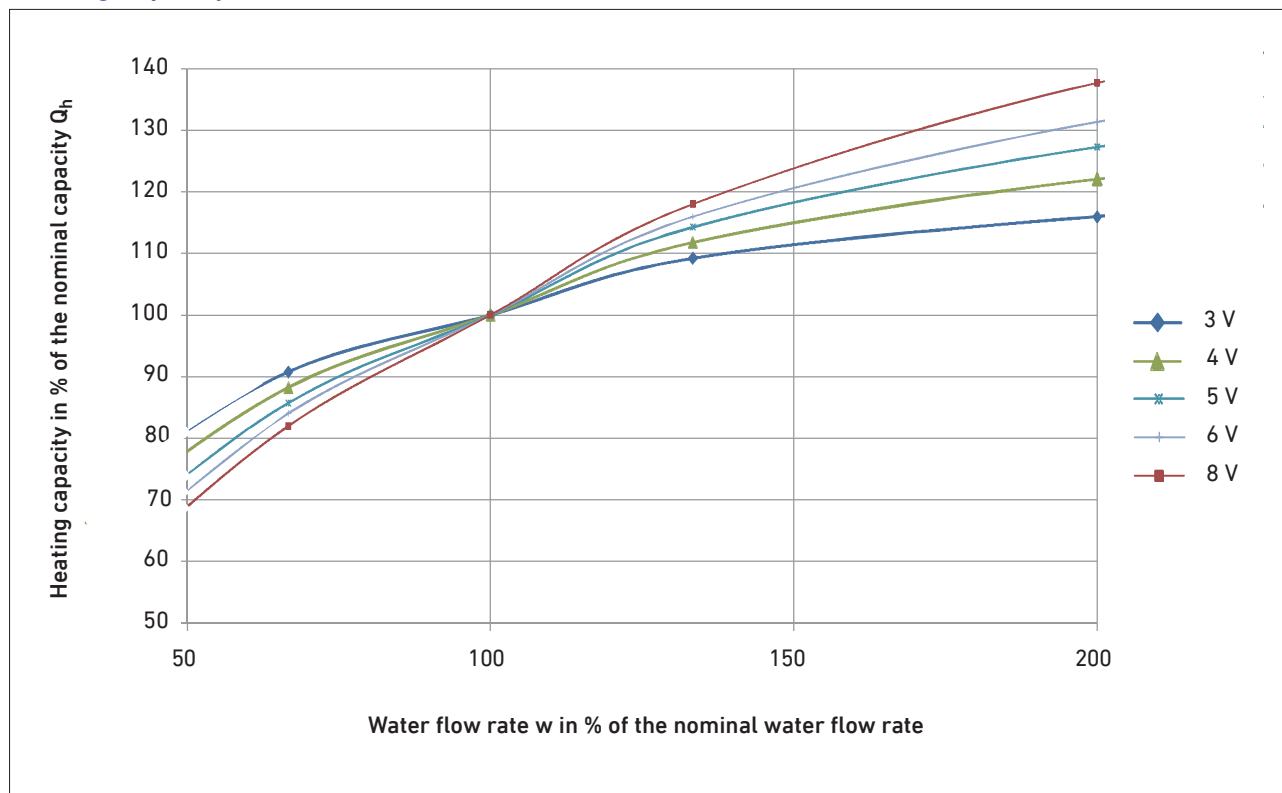
## Technical data

### Continuation 4.2.3 Correction charts type VKB-0/4, 4-pipe system

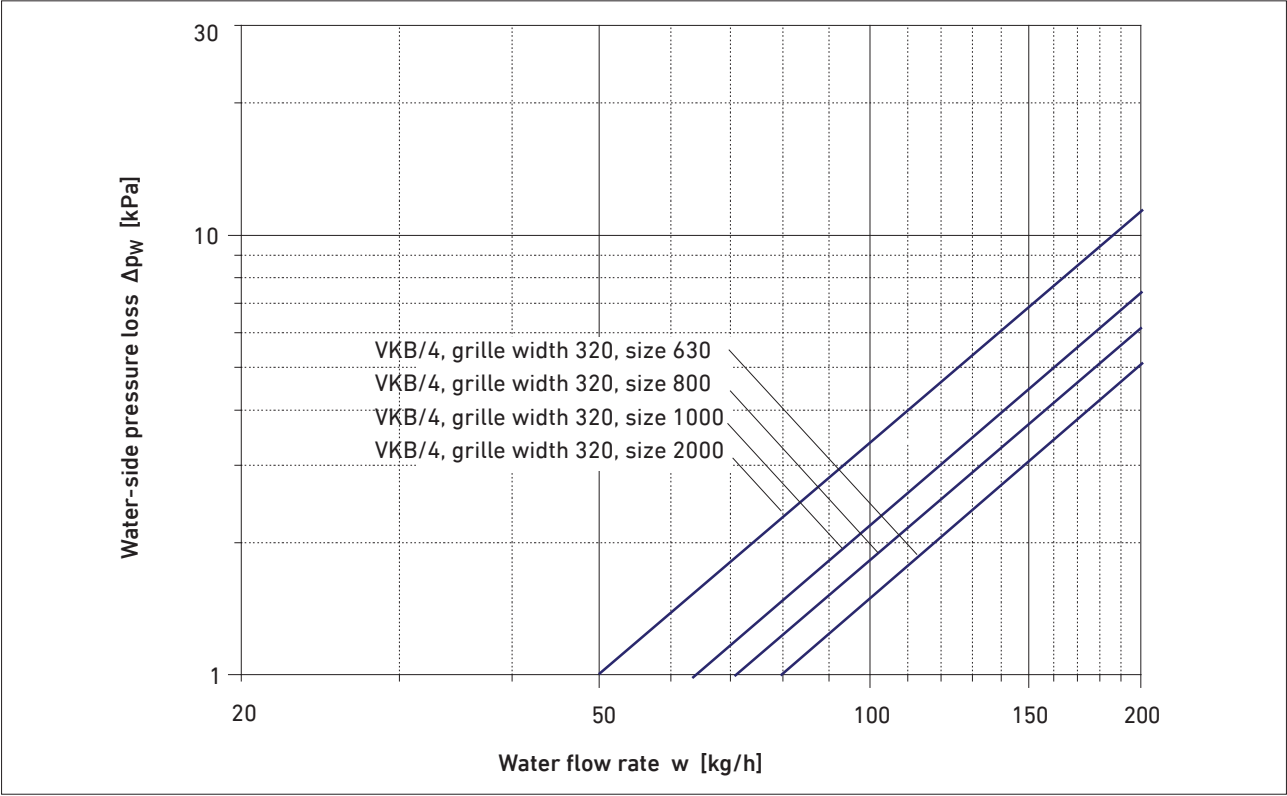
#### Static heating capacity for 100 kg/h



#### Heating capacity for different water flow rates



Continuation 4.2.3 Correction charts type VKB-0/4, 4-pipe system  
**Water-side pressure loss of the heater for different water flow rates**



## Technical data

### 4.2.4 Technical data type VKB-0/2, 2-pipe system

#### Size 630, type VKB-0/2.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	180	25	31	42	420	37	120	300 / 7	150 / 2	3
4	240	30	36	54	540	45				4
5	290	33	39	64	640	51				5
6	360	38	44	74	740	57				7
8	460	46	52	86	860	64				11

#### Size 800, type VKB-0/2.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	230	25	31	54	540	47	160	300 / 8	150 / 2.6	3
4	330	30	36	71	710	59				4
5	410	33	39	86	860	69				6
6	510	38	44	99	990	77				8
8	640	46	52	112	1120	83				14

#### Size 1000, type VKB-0/2.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	310	27	33	59	590	51	200	300 / 10	150 / 2.9	3
4	410	29	35	76	760	63				5
5	510	34	40	92	920	74				7
6	630	39	45	106	1060	82				10
8	790	47	53	122	1220	90				19

#### Size 2000, type VKB-0/2.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	510	27	33	106	1060	80	400	400 / 9	150 / 1.5	8
4	680	32	38	137	1370	92				10
5	830	37	43	163	1630	102				13
6	870	42	48	179	1790	112				18
8	1210	51	57	214	2140	118				32

Values are given for the unit including the air outlet grille, without spreading vanes. The spreading vanes have the effect of reducing capacity by max. 10 %.

1) For 16 °C water supply temperature

26 °C suction air temperature before entering the heat exchanger (may vary from the room air temp.) non-condensing operation

2) For 55 °C water supply temperature

20 °C room air temperature

U - Control voltage fan

V - Flow rate (± 10 %)

L<sub>A18</sub> - Sound pressure level

L<sub>WA</sub> - Sound power level ± 3 dB(A)

Q<sub>k</sub> - Total cooling capacity

Q<sub>h</sub> - Total heating capacity

Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply

Q<sub>st</sub> - Heating capacity for natural convection

w<sub>ok</sub> - Standard water flow rate (cooling) \*

w<sub>oh</sub> - Standard water flow rate (heating) \*

Δp<sub>w</sub> - Water-side pressure loss

P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 21/22

## Technical data

### Continuation 4.2.4 Technical data type VKB-0/2, 2-pipe system

#### Size 630, type VKB-0/2.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>ksens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub>
[V DC]	[m³/h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	180	25	31	40	400	1040	690	35	120	300 / 7	150 / 2	3
4	240	30	36	51	510	1290	900	42				4
5	290	33	39	61	610	1460	1050	49				5
6	360	38	44	70	700	1610	1210	55				7
8	460	46	52	82	820	1810	1450	61				11

#### Size 800, type VKB-0/2.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>ksens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub>
[V DC]	[m³/h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	250	25	31	51	510	1330	880	45	160	300 / 8	150 / 2.6	3
4	330	30	36	68	680	1690	1180	57				4
5	410	33	39	82	820	1960	1410	66				6
6	510	38	44	94	940	2160	1620	73				8
8	640	46	52	106	1060	2330	1860	79				14

#### Size 1000, type VKB-0/2.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>ksens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub>
[V DC]	[m³/h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	310	27	33	56	565	1470	970	49	200	300 / 10	150 / 2.9	3
4	410	29	35	73	726	1816	1270	61				5
5	510	34	40	88	876	2102	1510	70				7
6	630	39	45	100	1005	2311	1730	78				10
8	790	47	53	116	1155	2542	2030	86				19

#### Size 2000, type VKB-0/2.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>ksens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub>
[V DC]	[m³/h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	510	27	33	101	1010	2660	1780	74	400	400 / 9	100 / 2.1	8
4	680	32	38	130	1300	3155	2300	83				10
5	830	37	43	155	1550	3630	2760	89				13
6	870	42	48	170	1700	3840	3000	99				18
8	1210	51	57	203	2030	4310	3590	101				32

Values are given for the unit including the air outlet grille, without spreading vanes. The spreading vanes have the effect of reducing capacity by max. 10 %.

1) For 16 °C water supply temperature,  
26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.), non-condensing operation.

2) For 6 °C water supply temperature,  
26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.) condensing operation, 50 % relative humidity

3) For 55 °C water supply temperature  
20 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.)

\*

U - Control voltage fan

V - Flow rate (± 10 %)

L<sub>A18</sub> - Sound pressure level

L<sub>WA</sub> - Sound power level ± 3 dB(A)

Q<sub>k</sub> - Total cooling capacity

Q<sub>ksens</sub> - Sensible cooling capacity

Q<sub>h</sub> - Total heating capacity

Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply

Q<sub>st</sub> - Heating capacity for natural convection

w<sub>ok</sub> - Standard water flow rate (cooling) \*

w<sub>oh</sub> - Standard water flow rate (heating) \*

Δp<sub>w</sub> - Water-side pressure loss

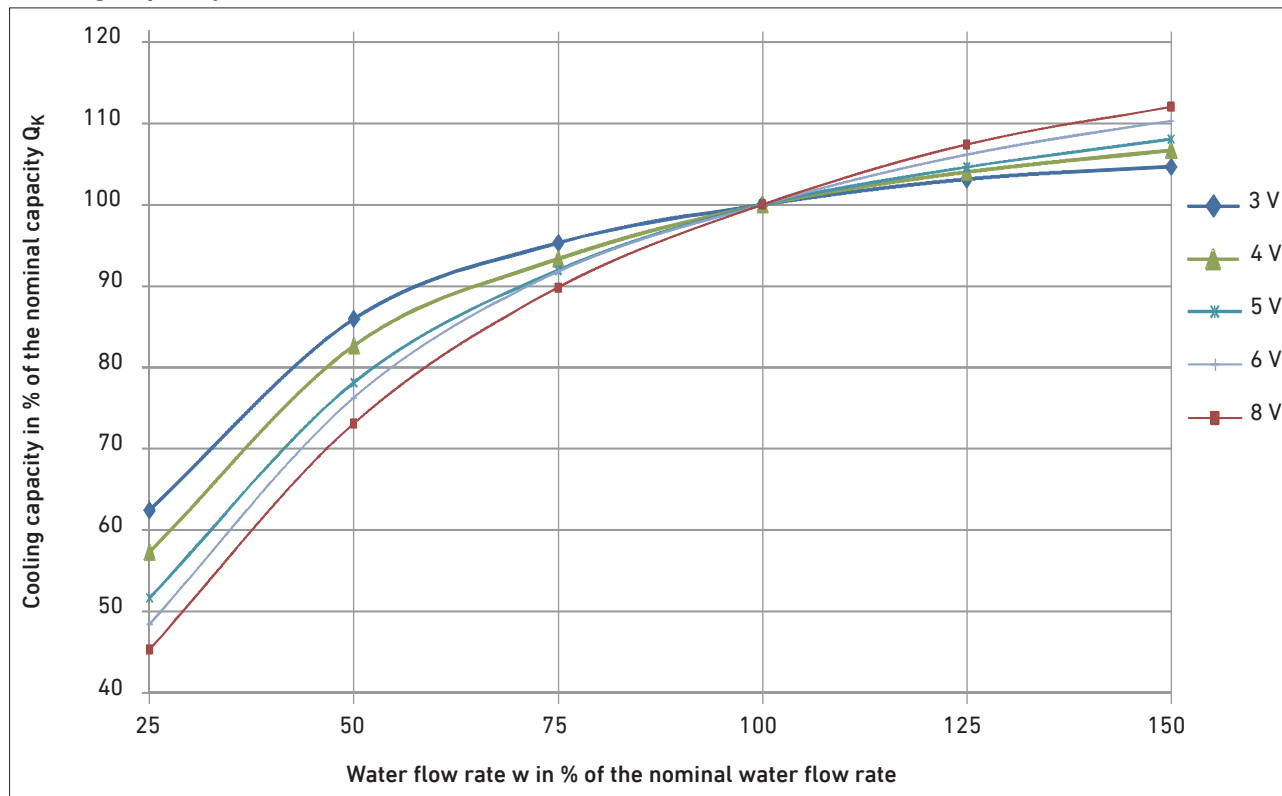
P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 21/22

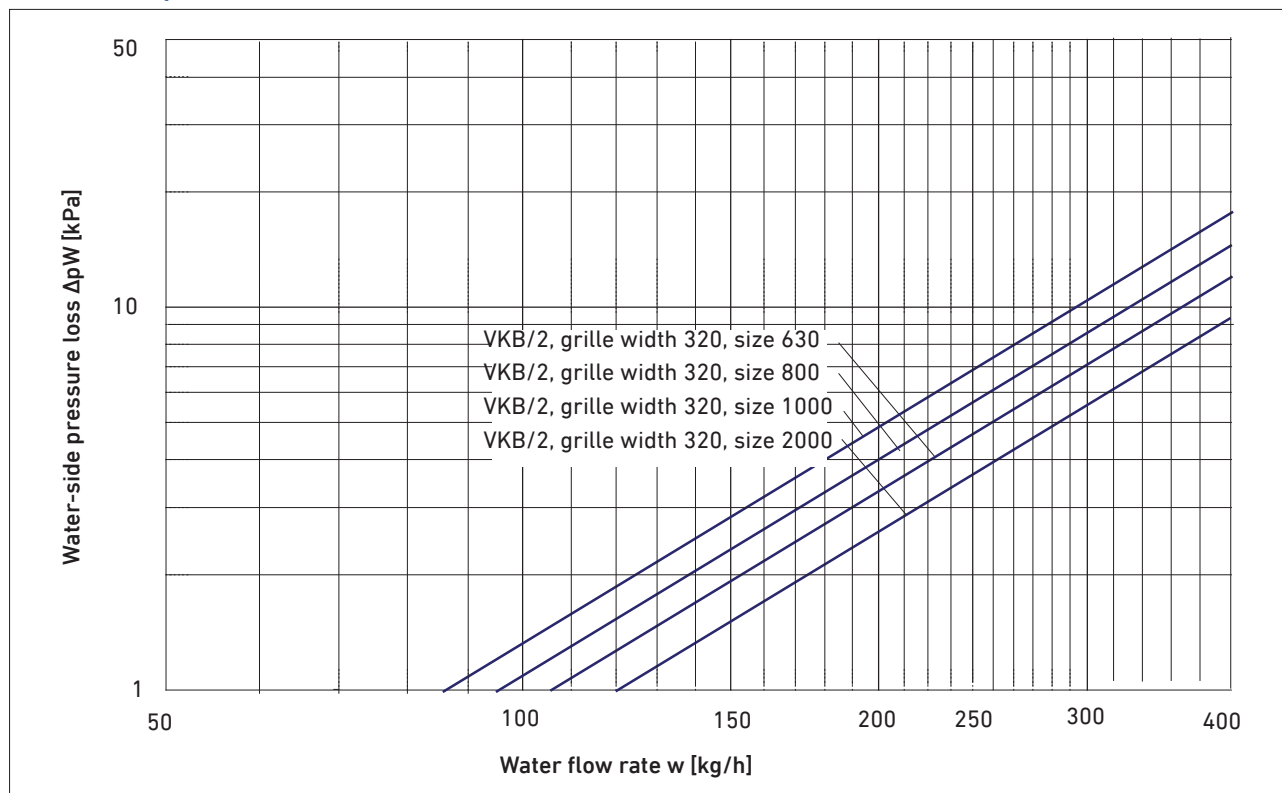
## Technical data

### 4.2.5 Correction charts type VKB-0/2, 2-pipe system

#### Cooling capacity for different water flow rates



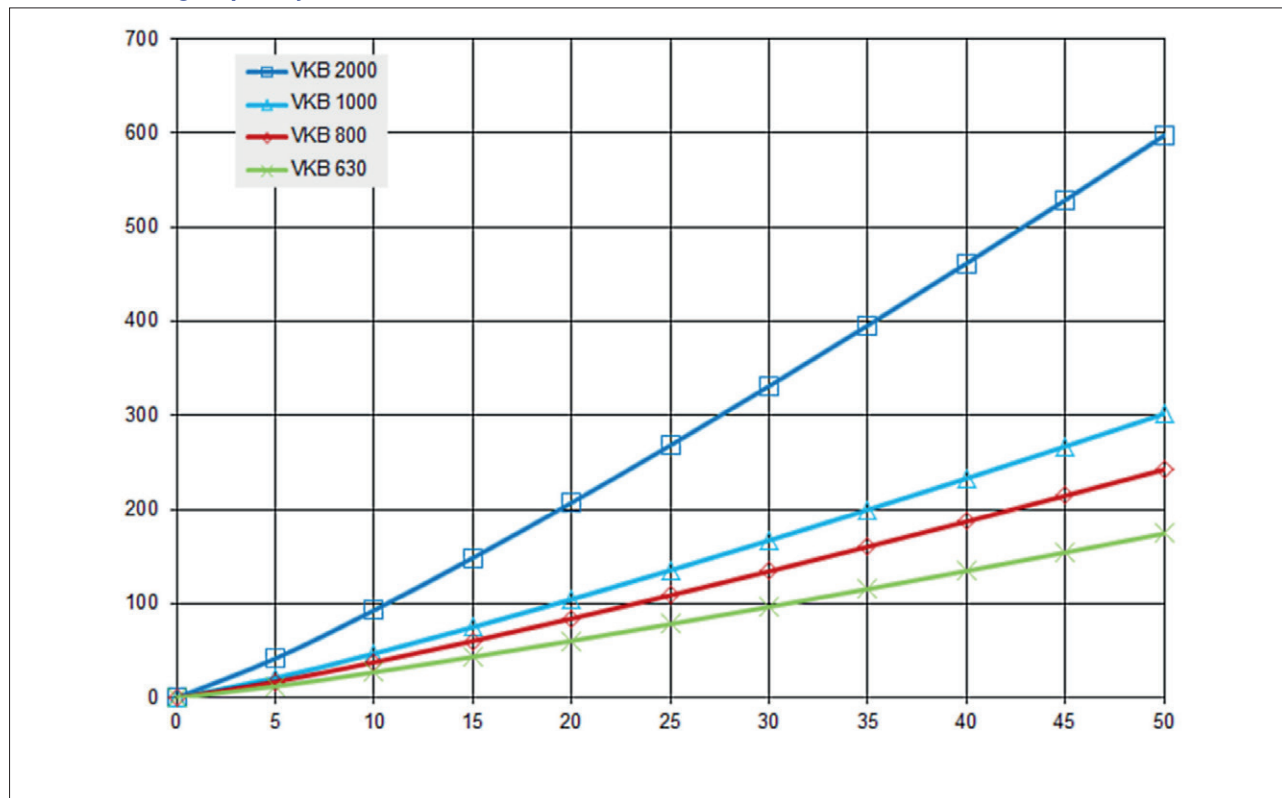
#### Water-side pressure loss for different water flow rates



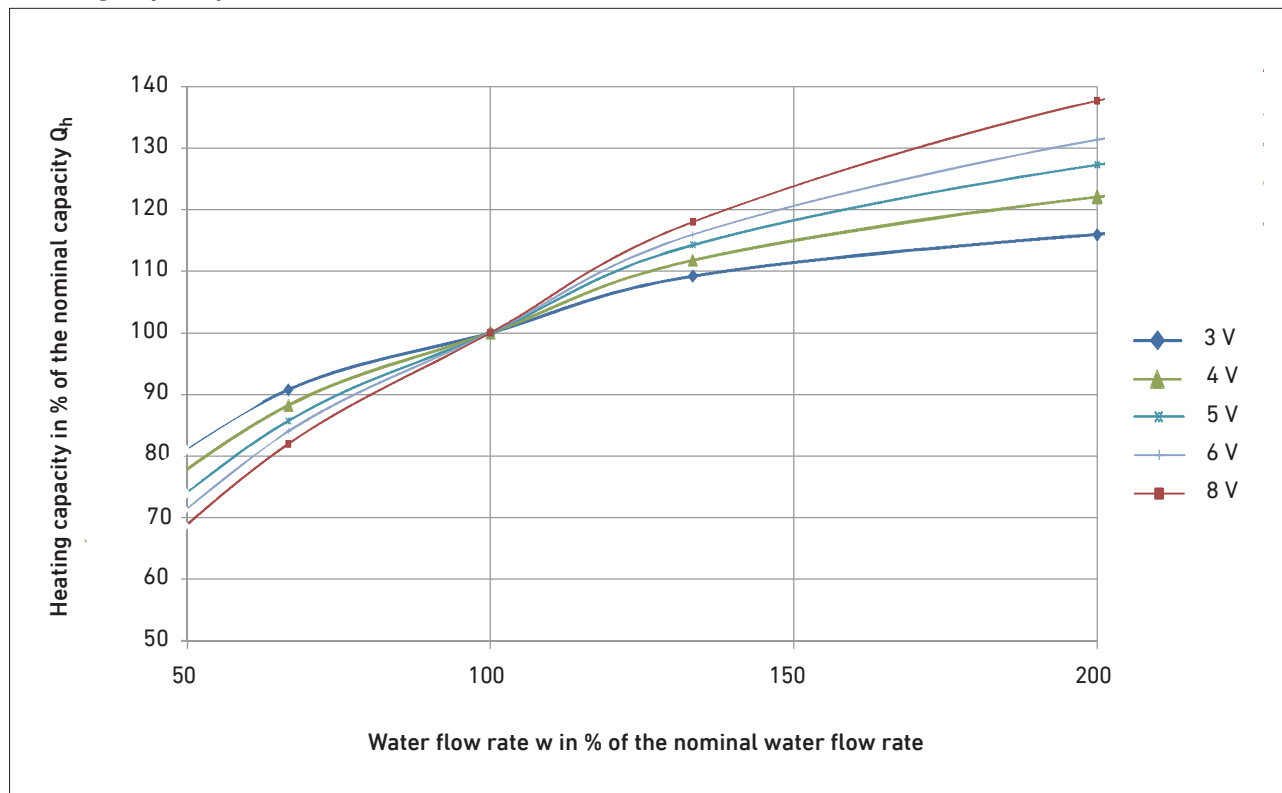
## Technical data

### Continuation 4.2.5 Correction charts type VKB-0/2, 2-pipe system

#### Static heating capacity



#### Heating capacity for different water flow rates

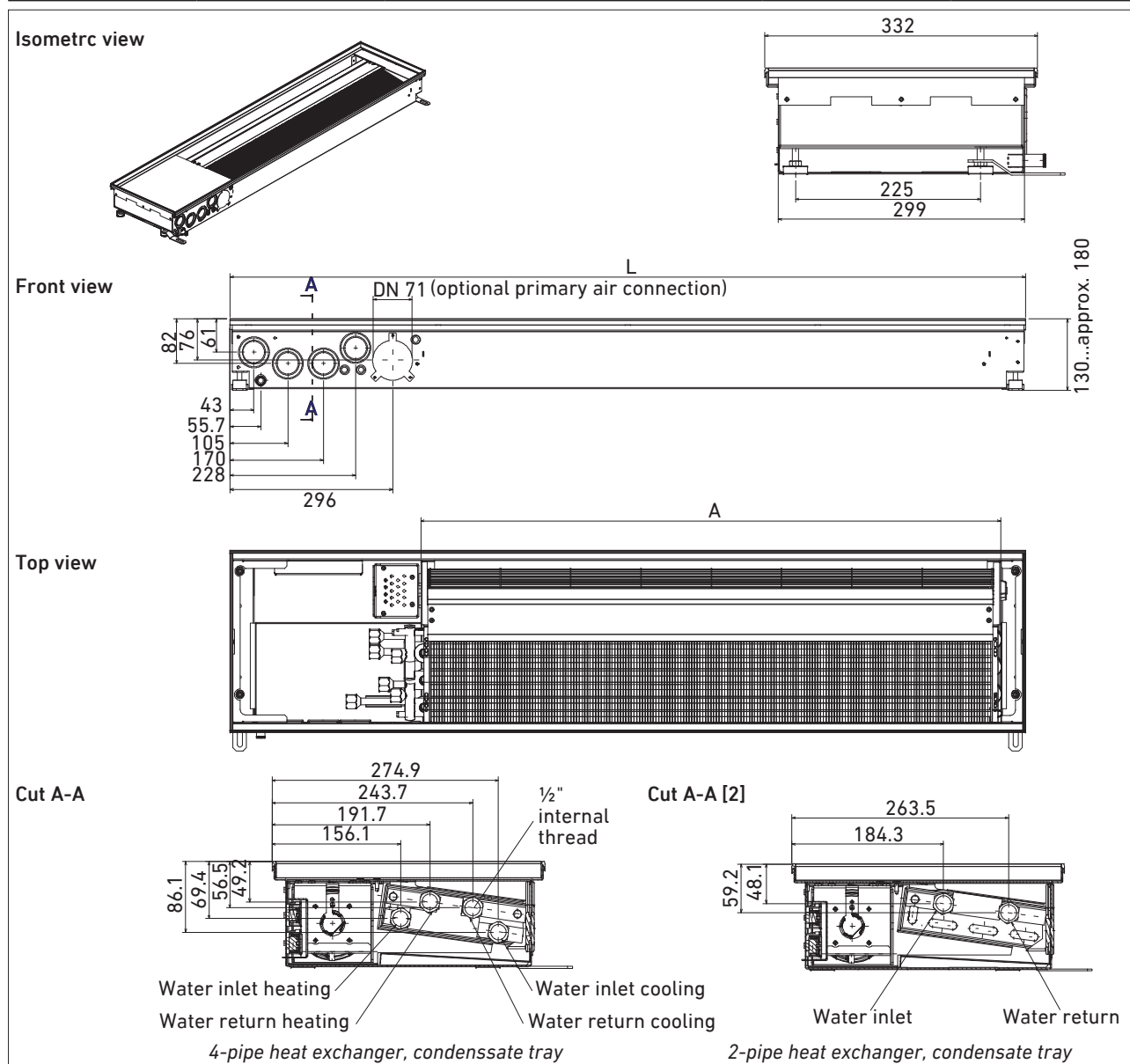


## Technical data

### 4.3 Technical data type VKB-N/., grille width 320 mm, low height

#### 4.3.1 Dimensions, weights, acoustics

Size	Total length L [mm]	Air outlet width A [mm]	Weight [kg]	Water content	
				Heating circuit [l]	Cooling circuit [l]
630	1020	625	20	0.35	0.35
800	1250	855	23	0.40	0.40
1000	1450	1055	26	0.50	0.50



1 socket (DN 71) with grille	Primary air flow rate	$V_p$	[m <sup>3</sup> /(h)]	40	60	80	100	The total acoustic power level may be calculated as: $L_{wA} = 10 \cdot \log (100,1 \cdot L_{wA P} + 100,1 \cdot L_{wA, VKB})$
	Sound power level	$L_{wA P}$	[dB(A)]	<27	32	40	47	
	Pressure loss		[Pa]	<1	5	8	12	

## Technical data

### 4.3.2 Technical data type VKB-N/4, 4-pipe system

#### Size 630, type VKB-N/4/.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	140	25	31	20	270	18	90	200 / 13	100 / 1.8	3
4	170	27	33	27	310	23				4
5	220	33	39	34	370	30				5
6	250	37	43	38	410	34				7
8	330	46	52	48	480	40				11

#### Size 800, type VKB-N/4/.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	190	25	31	27	270	24	120	200 / 15	100 / 2.2	3
4	240	27	33	37	370	31				4
5	300	33	39	45	450	39				5
6	350	37	43	52	520	45				7
8	460	46	52	64	640	52				12

#### Size 1000, type VKB-N/4/.../T, non condensing

U [V DC]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	240	25	31	33	330	29	160	200 / 17	100 / 2.5	3
4	300	27	33	45	450	37				5
5	370	33	39	55	550	46				7
6	440	37	43	65	650	53				10
8	570	46	52	78	780	62				19

Values are given for the unit without air outlet grille, without filter.

1) For 16 °C water supply temperature, 26 °C suction air temperature before entering the heat exchanger (may vary from room temperature), non condensing operation

2) For 55 °C water supply temperature, 20 °C room air temperature

U - Control voltage fan

V - Flow rate (± 10 %)

L<sub>A18</sub> - Sound pressure level

L<sub>WA</sub> - Sound power level ± 3 dB(A)

Q<sub>k</sub> - Total cooling capacity

Q<sub>k sens</sub> - Sensible cooling capacity

Q<sub>h</sub> - Total heating capacity

Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply

Q<sub>st</sub> - Heating capacity for natural convection

w<sub>ok</sub> - Standard water flow rate (cooling) \*

w<sub>oh</sub> - Standard water flow rate (heating) \*

Δp<sub>w</sub> - Water-side pressure loss

P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 26...28

## Technical data

### Continuation 4.3.2 Technical data type VKB-N/4, 4-pipe system

#### Size 630, type VKB-N/4/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	140	25	31	17	170	470	310	16	90	200 / 13	100 / 1.8	3
4	170	30	36	23	230	590	400	22				4
5	220	33	39	29	290	720	510	27				5
6	250	38	44	33	330	800	570	31				7
8	330	46	52	41	410	940	710	38				11

#### Size 800, type VKB-N/4/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	190	25	31	24	240	650	440	21	120	200 / 15	100 / 2.2	3
4	240	30	36	34	340	900	600	30				4
5	300	33	39	42	420	1100	740	35				5
6	350	38	44	49	490	1210	850	40				7
8	460	46	52	63	630	1440	1260	49				12

#### Size 1000, type VKB-N/4/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	240	25	31	28	280	760	510	26	160	200 / 17	100 / 2.5	3
4	300	27	33	38	380	970	670	35				5
5	370	33	39	47	470	1180	830	42				7
6	440	37	43	55	550	1330	960	48				10
8	570	46	52	65	650	1510	1100	58				19

Values are given for the unit including the air outlet grille, without filter.

- 1) For 16 °C water supply temperature, 26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.), non-condensing operation
- 2) For 6 °C water supply temperature, 26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.), non condensing operation
- 3) For 55 °C water supply temperature, 20 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.)

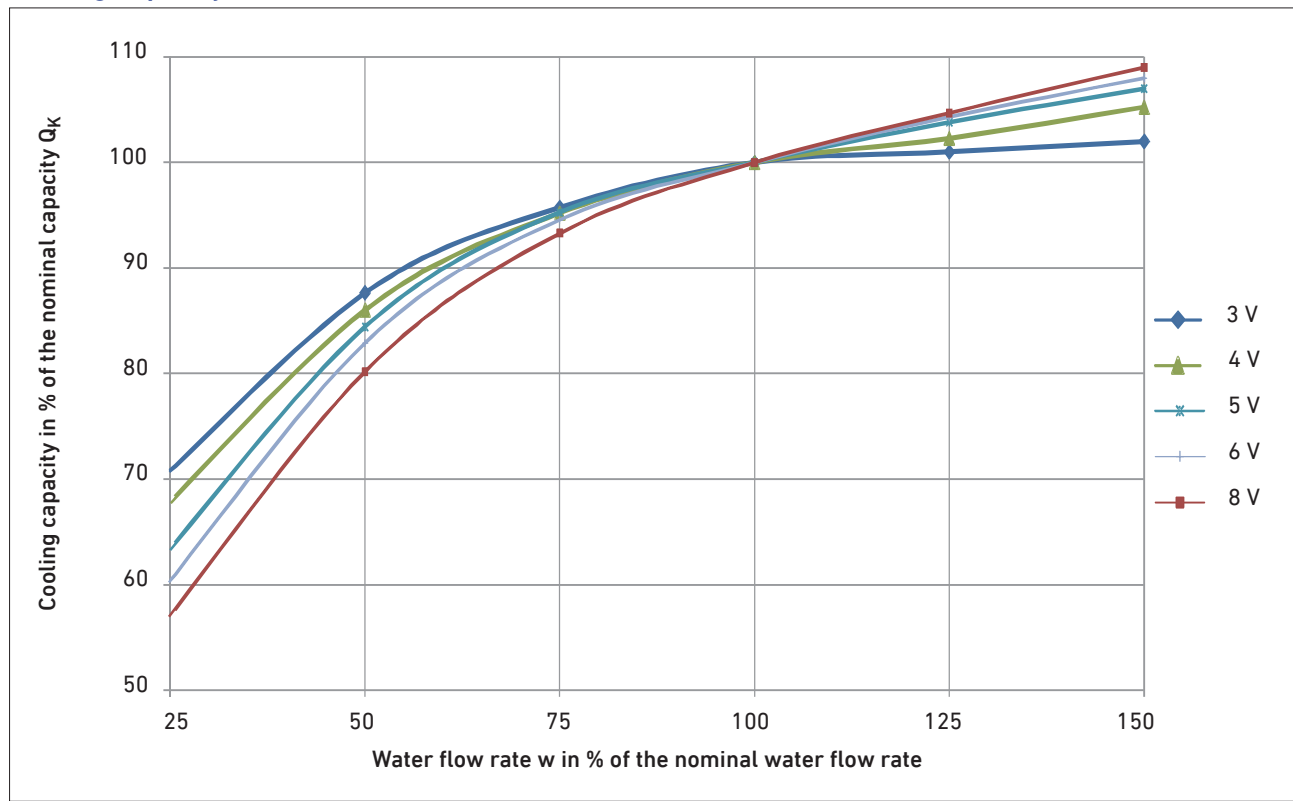
- U - Control voltage fan
- V - Flow rate (± 10 %)
- L<sub>A18</sub> - Sound pressure level
- L<sub>WA</sub> - Sound power level ± 3 dB(A)
- Q<sub>k</sub> - Total cooling capacity
- Q<sub>k sens</sub> - Sensible cooling capacity
- Q<sub>h</sub> - Total heating capacity
- Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply
- Q<sub>st</sub> - Heating capacity for natural convection
- w<sub>ok</sub> - Standard water flow rate (cooling) \*
- w<sub>oh</sub> - Standard water flow rate (heating) \*
- Δp<sub>w</sub> - Water-side pressure loss
- P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 26...28

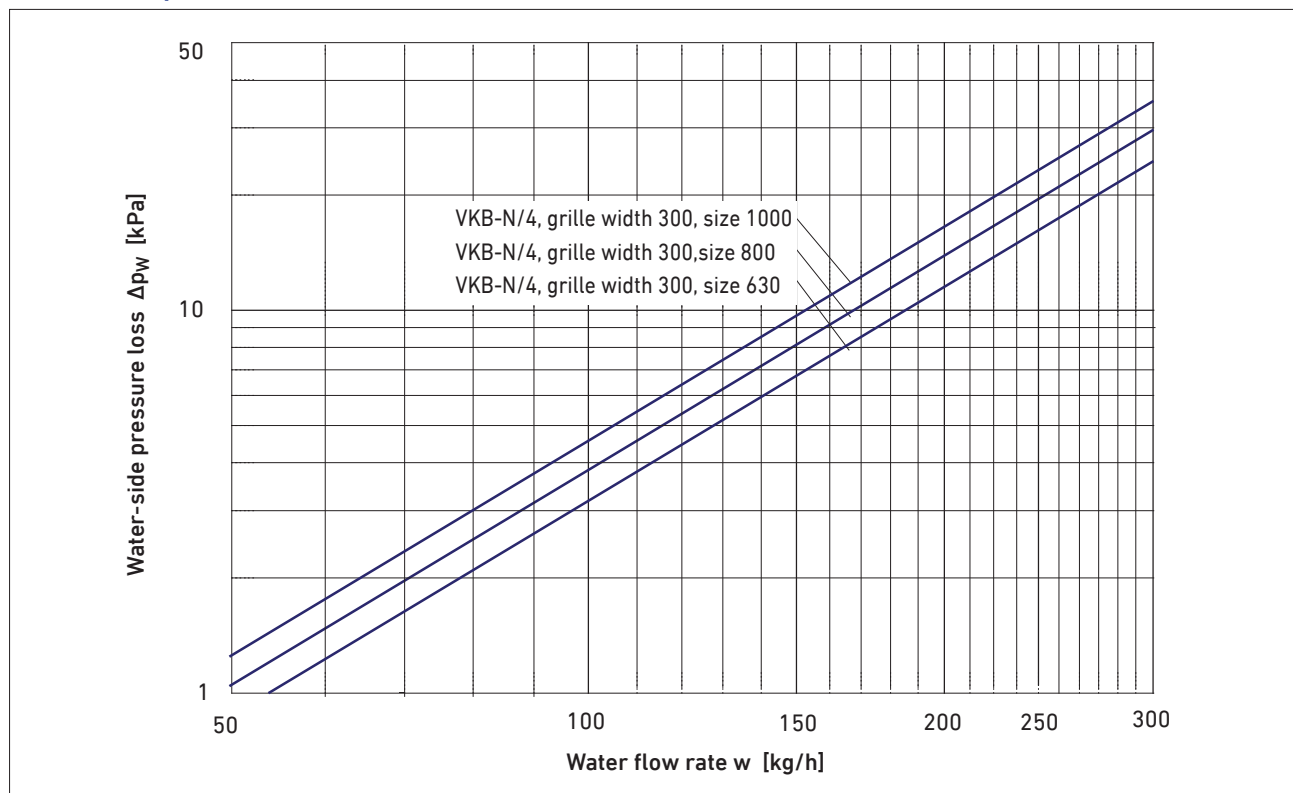
## Technical data

### 4.3.3 Correction charts type VKB-N/4, 4-pipe system

#### Cooling capacity for different water flow rates

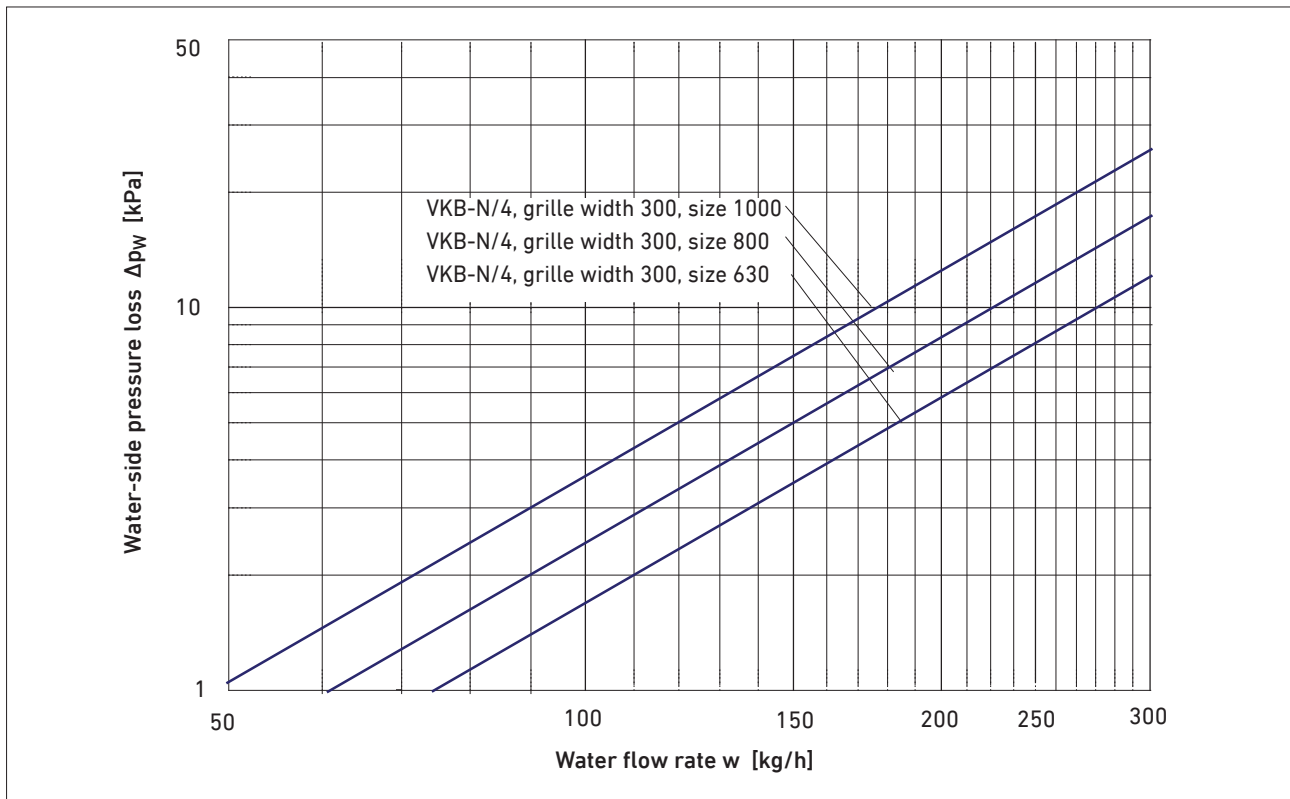


#### Water-side pressure loss of the cooler for different water flow rates



Continuation 4.3.3 Correction charts type VKB-N/4, 4-pipe system

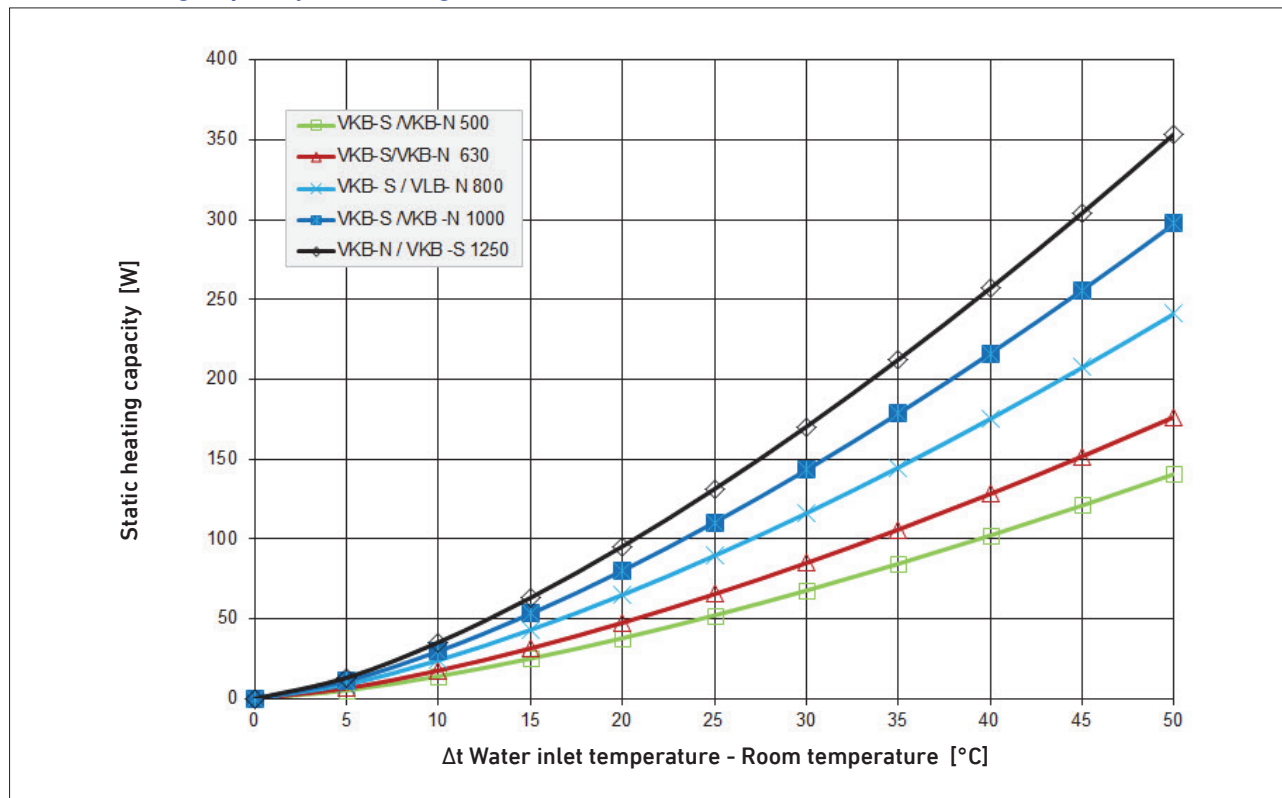
Water-side pressure loss of the heater for different water flow rates



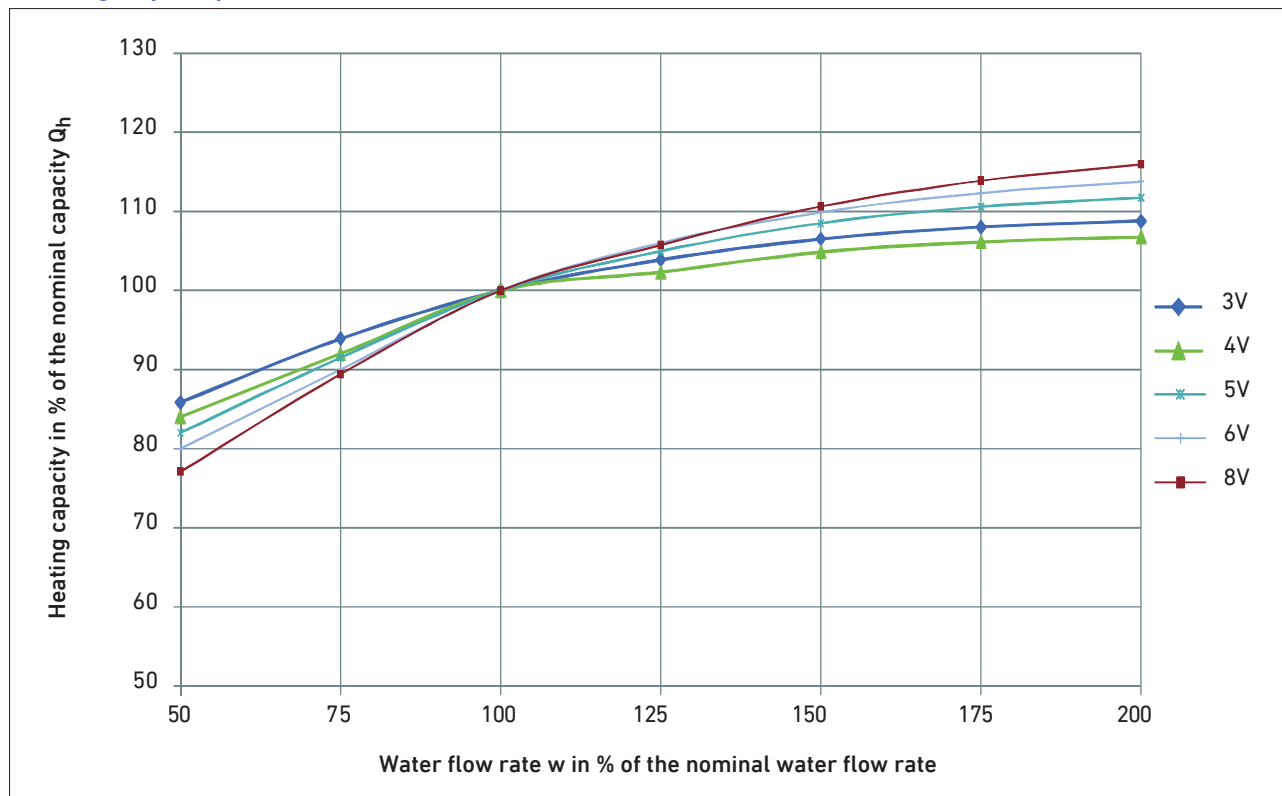
## Technical data

### Continuation 4.3.3 Correction charts type VKB-N/4, 4-pipe system

#### Static heating capacity for 100 kg/h



#### Heating capacity for different water flow rates



## Technical data

### 4.3.4 Technical data type VKB-N/2, 2-pipe system,

#### Size 630, type VKB-N/2/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	140	25	31	22	270	19	90	200 / 16	100 / 5	3
4	170	27	33	30	310	25				4
5	220	33	39	40	370	32				5
6	250	37	43	47	410	37				7
8	330	46	52	57	570	43				11

#### Size 800, type VKB-N/2/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	190	25	31	30	300	26	120	200 / 19	100 / 6	3
4	240	27	33	42	420	35				4
5	300	33	39	53	530	43				5
6	350	37	43	63	630	50				7
8	460	46	52	75	750	57				12

#### Size 1000, type VKB-N/2/.../T, non condensing

U [V DC]	V [m <sup>3</sup> /h]	L <sub>A18</sub> [dB(A)]	L <sub>wA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)/Δt</sup> [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> (EC) [W]
3	240	27	33	38	380	29	160	200 / 21	100 / 6	3
4	300	27	33	51	510	39				4
5	370	33	39	64	640	47				5
6	440	37	43	77	770	55				7
8	570	46	52	90	900	59				19

Values are given for the unit without air outlet grille, without filter.

- 1) For 16 °C water supply temperature,  
26 °C suction air temperature before entering the heat exchanger (may vary from room temperature), non condensing operation.
- 2) For 55 °C water supply temperature,  
20 °C suction air temperature before entering the heat exchanger (may vary from room temperature),

- U - Control voltage fan  
V - Flow rate (± 10 %)  
L<sub>A18</sub> - Sound pressure level  
L<sub>wA</sub> - Sound power level ± 3 dB(A)  
Q<sub>k</sub> - Total cooling capacity  
Q<sub>h</sub> - Total heating capacity  
Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply  
Q<sub>st</sub> - Heating capacity for natural convection  
w<sub>ok</sub> - Standard water flow rate (cooling) \*  
w<sub>oh</sub> - Standard water flow rate (heating) \*  
Δp<sub>w</sub> - Water-side pressure loss  
P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 31/32

## Technical data

### Continuation 4.3.4 Technical data type VKB-N/2, 2-pipe system

#### Size 630, type VKB-N/2/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	140	25	31	20	200	530	360	15	90	200 / 16	100 / 5	3
4	170	27	33	28	280	720	490	20				4
5	220	33	39	37	370	920	660	25				5
6	250	37	43	43	430	1040	750	27				7
8	330	46	52	56	560	1280	970	32				11

#### Size 800, type VKB-N/2/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
3	190	25	31	27	270	730	490	19	120	200 / 15	100 / 6	3
4	240	27	33	38	380	980	670	25				4
5	300	33	39	49	490	1210	860	28				5
6	350	37	43	59	590	1420	1020	31				7
8	460	46	52	73	730	1680	1240	35				12

#### Size 1000, type VKB-N/2/.../E, condensing

U	V	L <sub>A18</sub>	L <sub>WA</sub>	Q <sub>k</sub> <sup>1)/Δt</sup>	Q <sub>k</sub> <sup>1)</sup>	Q <sub>k</sub> <sup>2)</sup>	Q <sub>k sens</sub> <sup>2)</sup>	Q <sub>h</sub> /Δt	Q <sub>st</sub> <sup>3)</sup>	w <sub>ok</sub> /Δp <sub>w</sub>	w <sub>oh</sub> /Δp <sub>w</sub>	P <sub>el</sub> (EC)
[V DC]	[m <sup>3</sup> /h]	[dB(A)]	[dB(A)]	[W/K]	[W]	[W]	[W]	[W/K]	[W]	[kg/h]/[kPa]	[kg/h]/[kPa]	[W]
4	240	25	31	34	340	780	600	23	160	200 / 17	100 / 7	3
4	300	27	33	47	470	1200	830	30				5
5	370	33	39	60	600	1460	1050	35				7
6	440	37	43	71	710	1700	1240	38				10
8	570	46	52	65	650	1510	1100	58				19

Values are given for the unit including the air outlet grille.

1) For 16 °C water supply temperature

26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.) non-condensing operation

2) For 6 °C water supply temperature

26 °C suction air temp. before entering the heat exchanger (may vary from the room air temp.) condensing operation

3) For 55 °C water supply temperature

20 °C room air temperature

U - Control voltage fan

V - Flow rate (± 10 %)

L<sub>A18</sub> - Sound pressure level

L<sub>WA</sub> - Sound power level ± 3 dB(A)

Q<sub>k</sub> - Total cooling capacity

Q<sub>k sens</sub> - Sensible cooling capacity

Q<sub>h</sub> - Total heating capacity

Δt - Temp. difference between suction air temp. before entering the heat exchanger and water supply

Q<sub>st</sub> - Heating capacity for natural convection

w<sub>ok</sub> - Standard water flow rate (cooling) \*

w<sub>oh</sub> - Standard water flow rate (heating) \*

Δp<sub>w</sub> - Water-side pressure loss

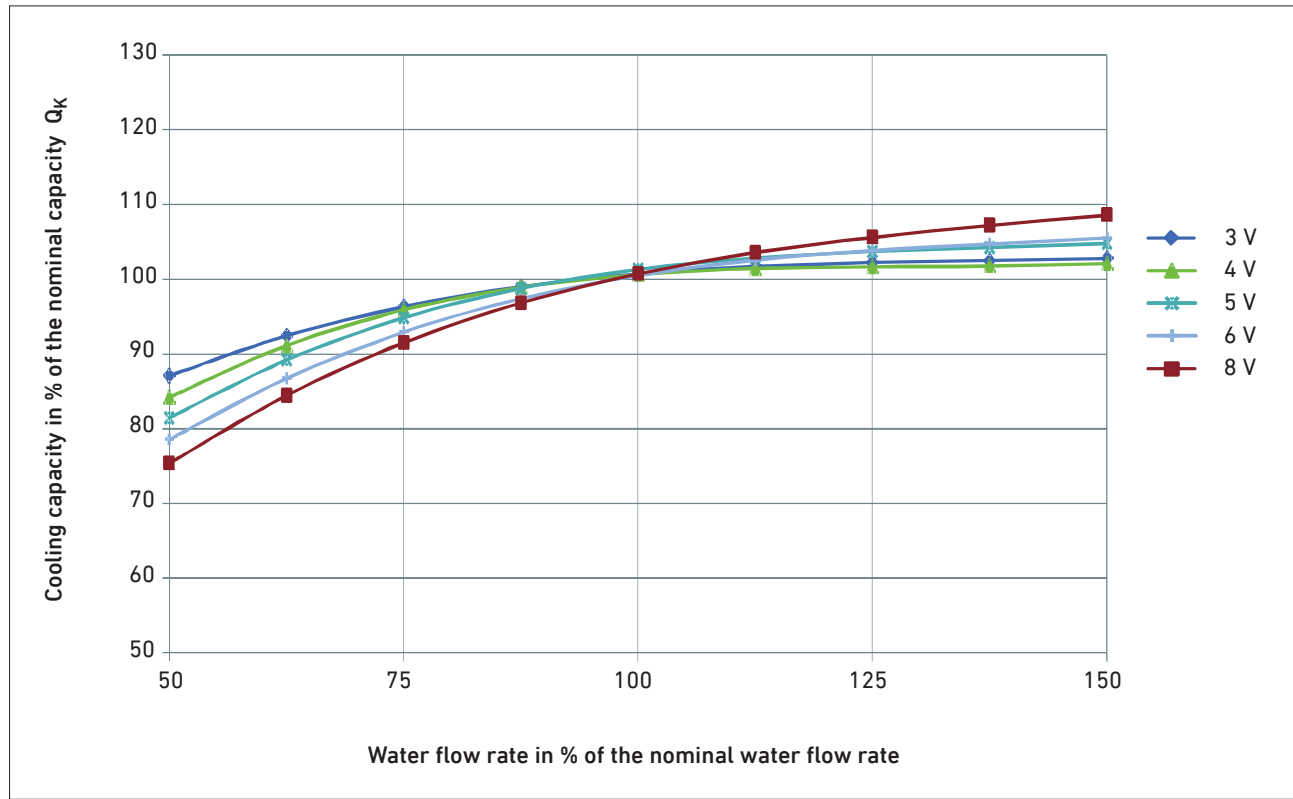
P<sub>el</sub> - Electric power consumption (± 10 %)

\* Correction for other water flow rates see pages 31/32

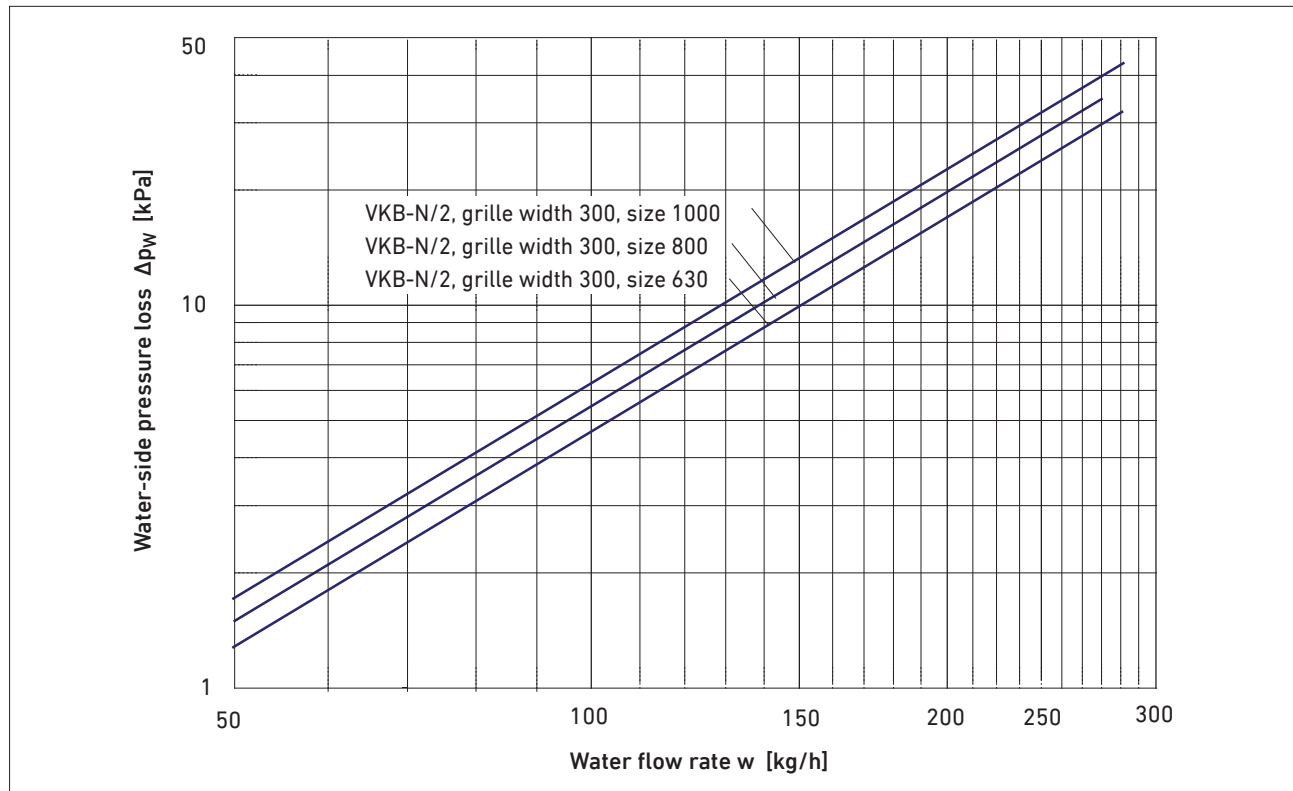
## Technical data

### 4.3.5 Correction charts type VKB-N/2, 2-pipe system

#### Cooling capacity for different water flow rates



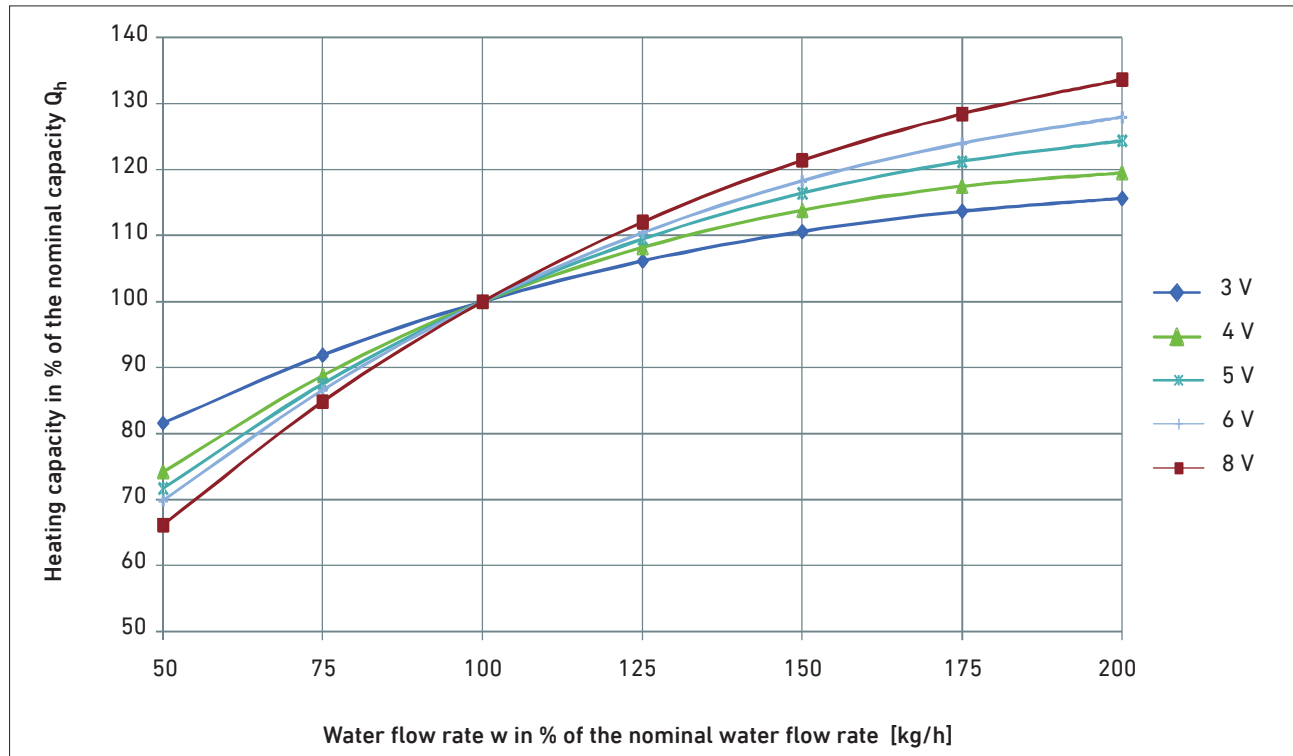
#### Water-side pressure loss of the cooler for different water flow rates



## Technical data

### Continuation 4.3.5 Correction charts type VKB-N/2, 2-pipe system

#### Heating capacity for different water flow rates

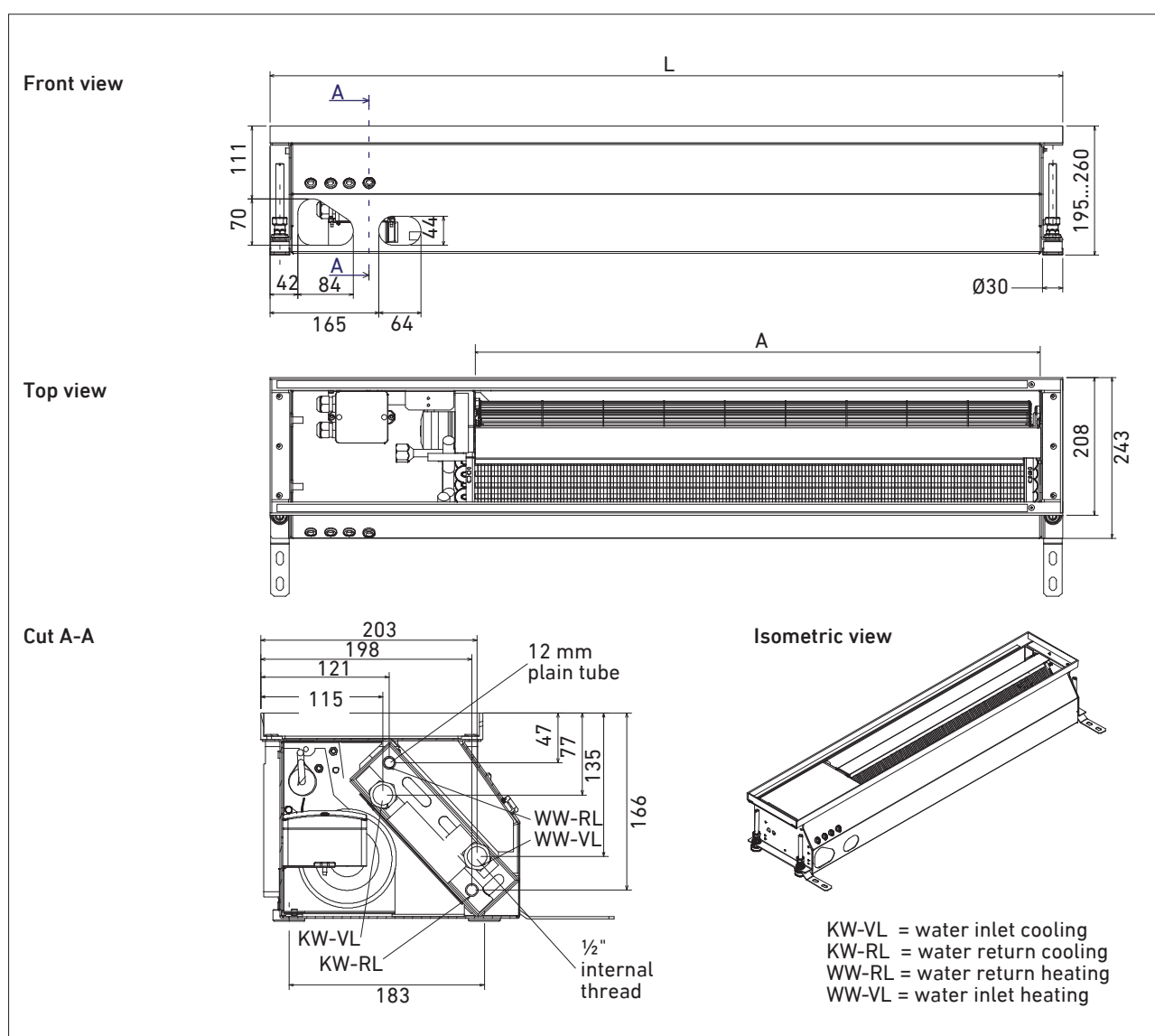


## Technical data

### 4.4 Technical data type VKB-S/4, 4-pipe system, grille width 200 mm

#### 4.4.1 Dimensions, weight, acoustics

Size	Total length L	Air outlet width A	Minimal height H <sub>min</sub>	Total width B	Weight [kg]	Water content	
						Heating circuit [l]	Cooling circuit [l]
500	898	526	with stainless steel linear grille: 195   205 with aluminium roller grille (on request): 201   208 with aluminium linear grille: 201   208		19	0.25	0.25
630	988	626			21	0.35	0.35
800	1198	856			25	0.40	0.40
1000	1398	1056			31	0.50	0.50
1250	1598	1256			36	0.60	0.60

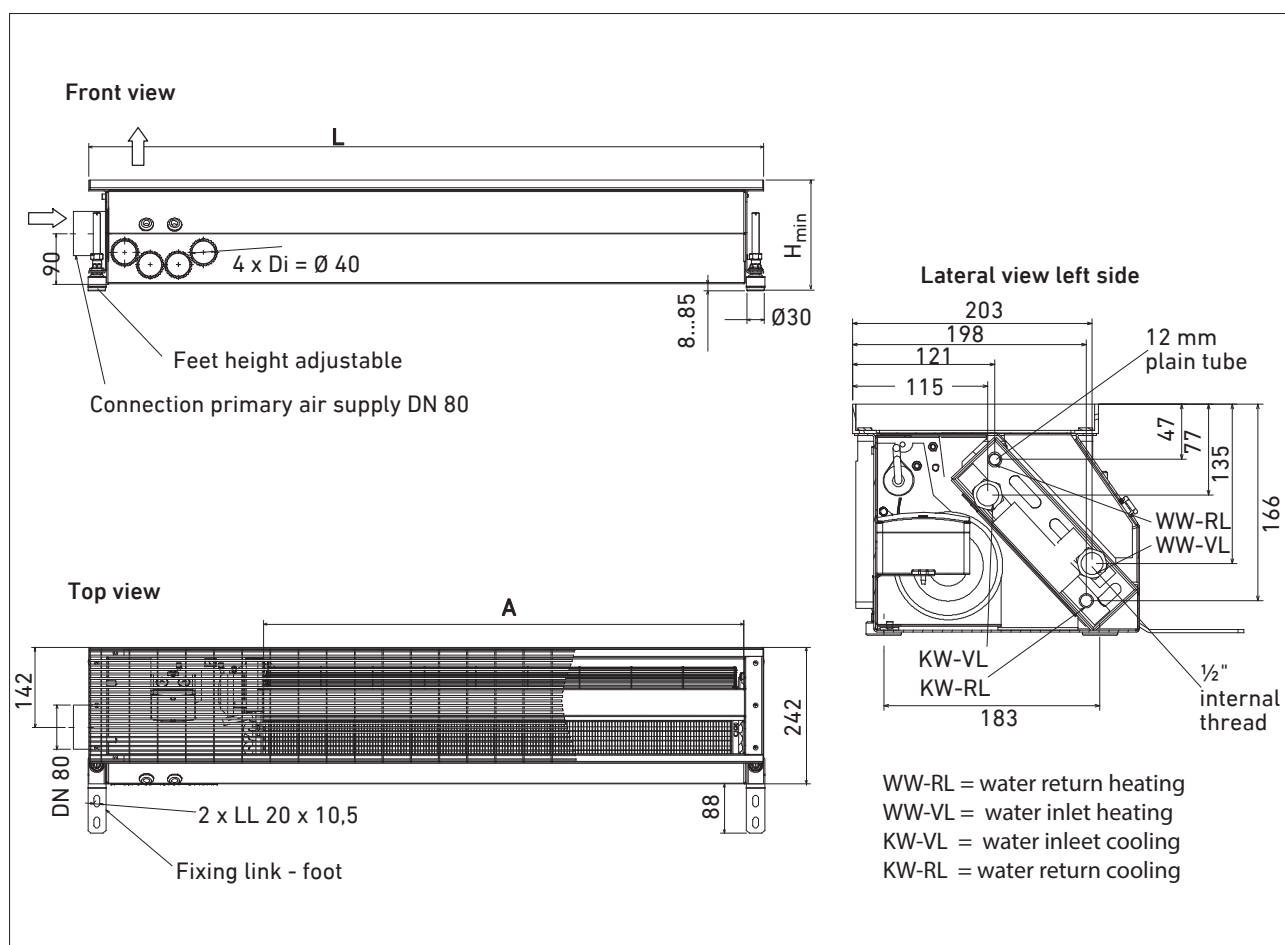


## Technical data

### Continuation 4.4.1 Dimensions, weight, acoustics, type VKB-S/4

#### With primary air supply on the left DN 80

Size	L [mm]	A [mm]	H <sub>min</sub> [mm]	B [mm]	Weight [kg]	Water content	
						Heating circuit [l]	Cooling circuit [l]
500	898	526	with stainless steel linear grille: 195   205		19	0.25	0.25
630	988	626			21	0.35	0.35
800	1198	856	with aluminium roller grille (on request): 201   208		25	0.40	0.40
1000	1398	1056			31	0.50	0.50
1250	1598	1256	with aluminium linear grille: 201   208		36	0.60	0.60



Acoustic power level for separate primary air connection socket (to be added to the unit's power level).

The total acoustic power level may be calculated as follows:

$$L_{wA} = 10 * \log (100,1 * L_{wA P} + 100,1 * L_{wA, VKB})$$

Primary air flow rate	V <sub>P</sub>	[m <sup>3</sup> /(hm)]	50	60	80	100
Acoustic power level	L <sub>WA P</sub>	[dB(A)]	27	28	29	31
Pressure loss		[Pa]	2	4	5	8

## Technical data

### 4.4.2 Technical data type VKB-S/4, 4-pipe system, grille width 200 mm

#### Size 500

n (not EC) [-]	U [V]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> /Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]	P <sub>el</sub> (EC) [W]
I	3	180	25	32	38	380	31	90	200 / 8	100 / 2.5	15	3
II	4	250	32	38	46	460	36				17	4
III	5	300	36	42	52	520	42				20	5
IV	6	340	41	47	57	570	46				22	7
V	8	400	47	53	62	620	50				27	12

#### Size 630

n (not EC) [-]	U [V]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> /Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]	P <sub>el</sub> (EC) [W]
I	3	230	26	32	46	460	38	100	200 / 10	100 / 3.5	15	3
II	4	300	32	38	57	570	45				17	4
III	5	370	36	42	64	640	51				20	5
IV	6	420	41	47	69	690	55				22	7
V	8	490	47	53	75	750	60				27	13

#### Size 800

n (not EC) [-]	U [V]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> /Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]	P <sub>el</sub> (EC) [W]
I	3	280	25	31	54	540	45	140	200 / 12	100 / 4	15	3
II	4	390	31	37	64	640	51				17	4
III	5	470	34	42	72	720	56				20	5
IV	6	520	40	46	77	770	61				22	7
V	8	600	46	52	84	840	64				27	14

#### Size 1000

n (not EC) [-]	U [V]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> /Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]	P <sub>el</sub> (EC) [W]
I	3	300	25	31	60	600	44	171	200 / 15	100 / 5	15	3
II	4	410	32	38	70	700	56				17	4
III	5	510	36	42	79	790	63				19	5
IV	6	570	41	47	84	840	67				22	7
V	8	660	47	53	92	920	74				27	14

#### Size 1250

n (not EC) [-]	U [V]	V [m³/h]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>k</sub> <sup>1)</sup> /Δt [W/K]	Q <sub>k</sub> <sup>1)</sup> [W]	Q <sub>h</sub> /Δt [W/K]	Q <sub>st</sub> <sup>3)</sup> [W]	w <sub>ok</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	w <sub>oh</sub> /Δp <sub>w</sub> [kg/h]/[kPa]	P <sub>el</sub> [W]	P <sub>el</sub> (EC) [W]
I	3	330	25	31	66	660	54	204	200 / 17	100 / 6.5	15	3
II	4	450	32	38	77	770	61				17	4
III	5	560	36	42	86	860	69				19	5
IV	6	620	41	47	92	920	73				22	8
V	8	720	47	53	101	1010	81				27	14

Values are given for the unit with air outlet grille, without filter.

1) For 16 °C water supply temp., 26 °C suction air temperature before entering the heat exchanger (may vary from room temperature), non condensing operation.

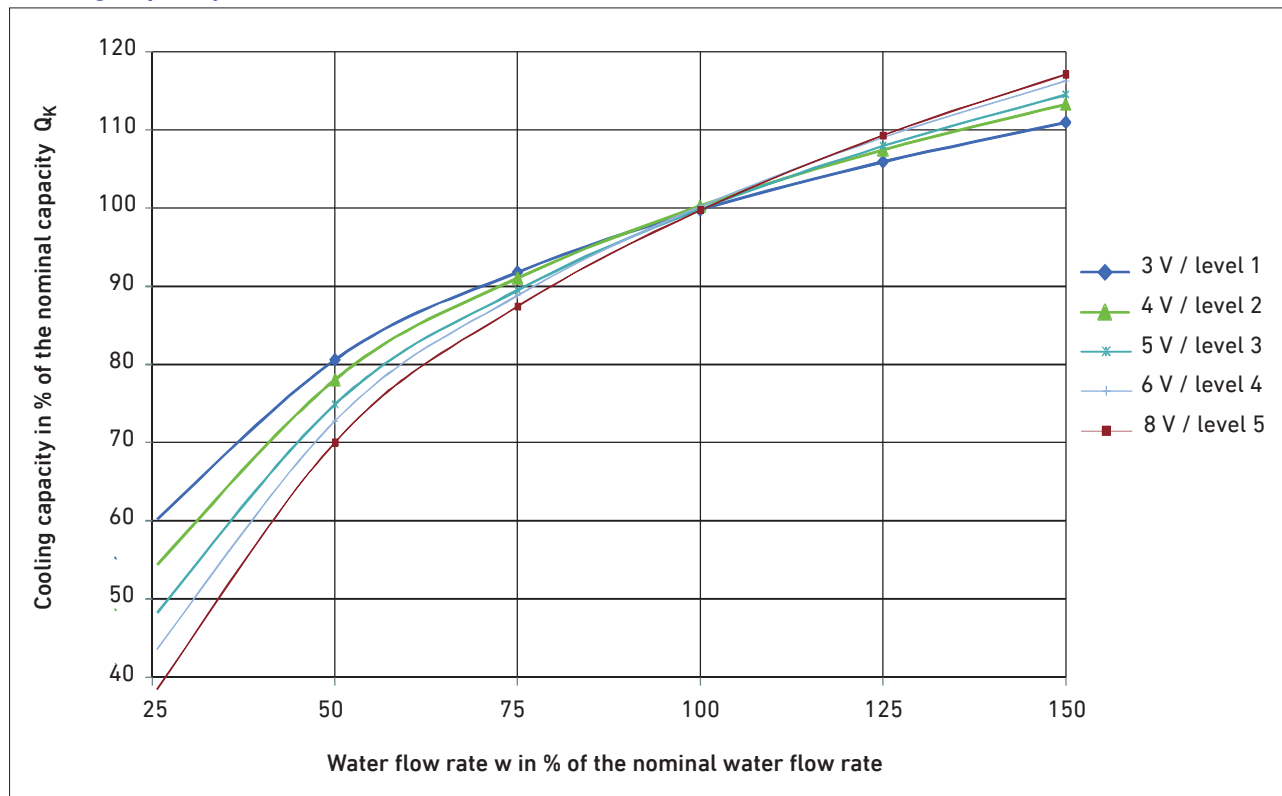
2) For 55 °C water supply temperature, 20 °C suction air temperature

Correction for other water flow rates see pages 36/37. Legend see page 28.

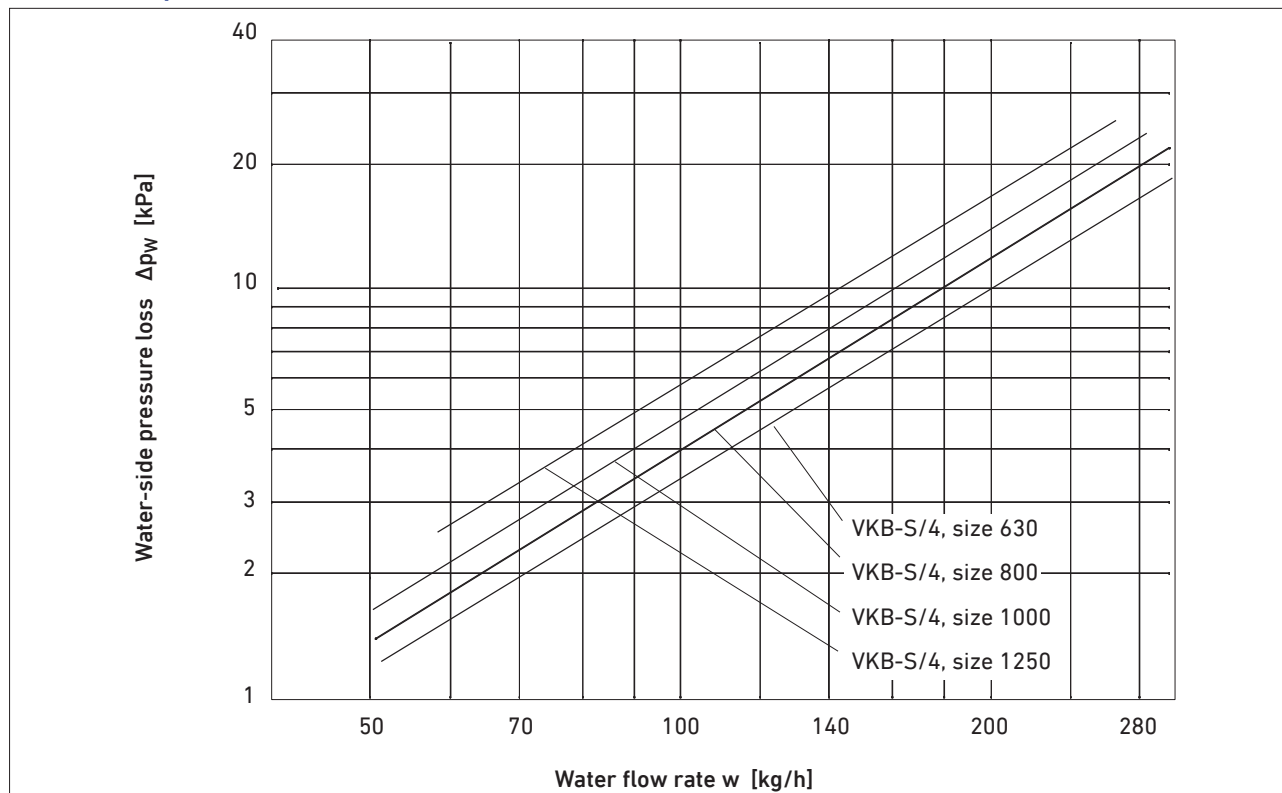
## Technical data

### 4.4.3 Correction charts type VKB-S/4, 4-pipe system

#### Cooling capacity for different water flow rates



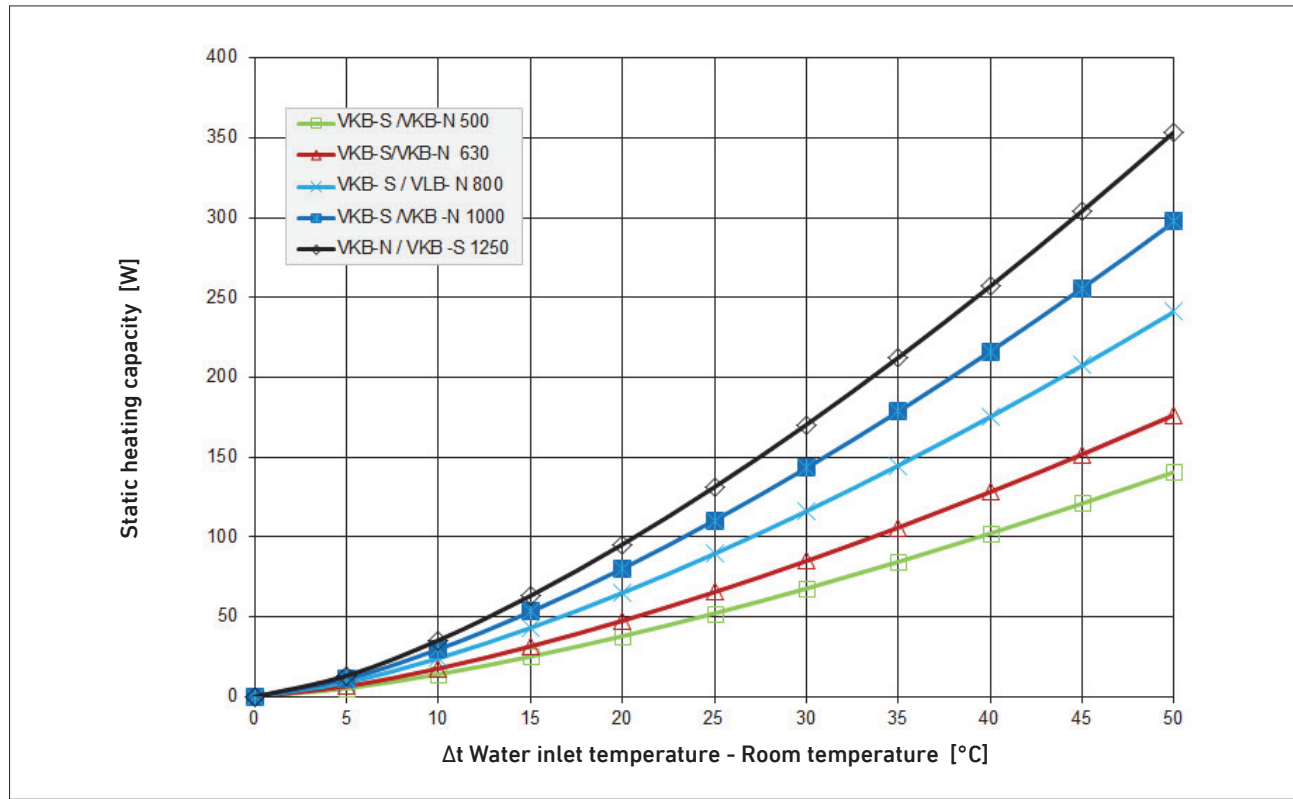
#### Water-side pressure loss of the cooler for different water flow rates



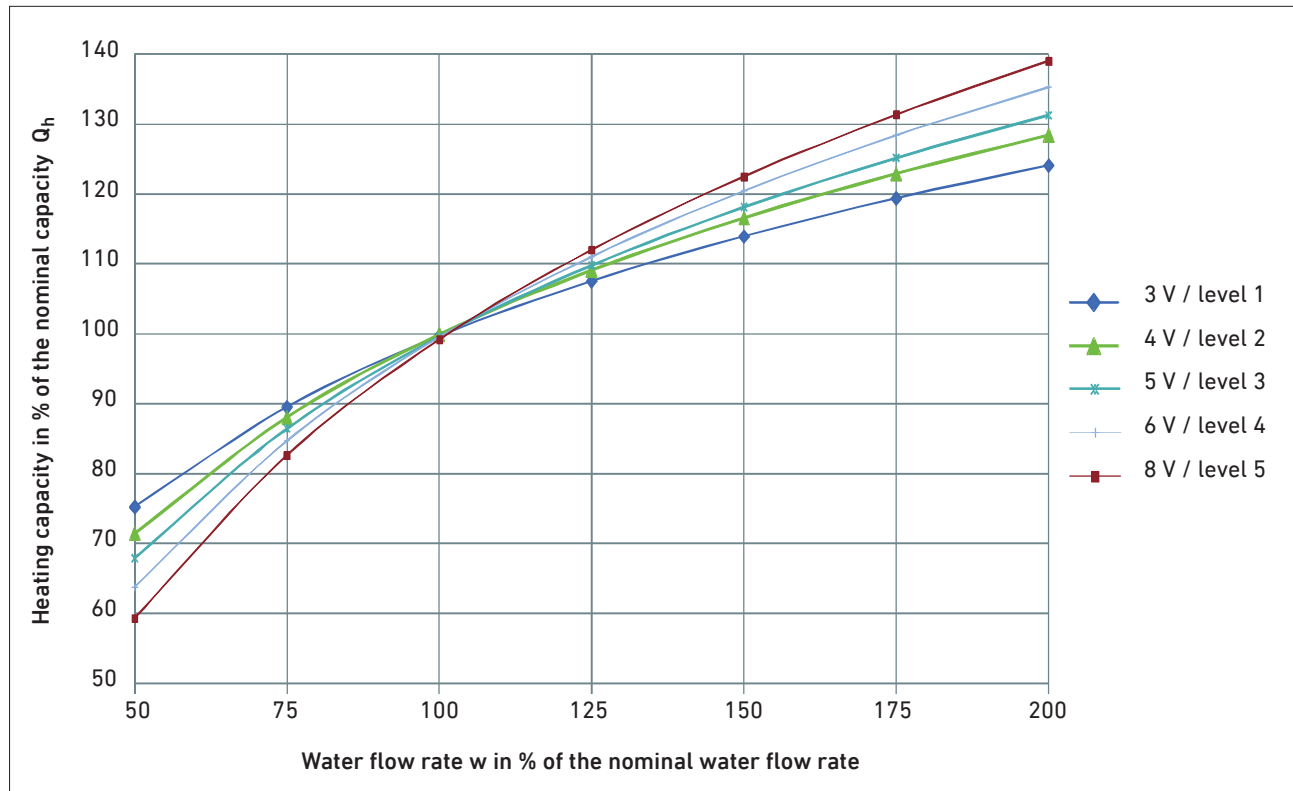
## Technical data

### Continuation 4.4.3 Correction charts type VKB-S/4, 4-pipe system

#### Static heating capacity for 100 kg/h



#### Heating capacity for different water flow rates



## Technical data

### 4.5 Caloric output data

Caloric output data were determined at a test stand in the LTG test lab.

Data are valid if the following applies:

- unit at operating temperature, steady-state condition
- steady-state condition during measurements
- no condensation at the heat exchanger in the cooling mode
- water without additives (drinking water quality) \*
- water supply temperatures 12...16 °C in the cooling mode and 50...60 °C in the heating mode

Parameters used:

- specific heat capacity of the water 4186 J/(kgK)
- specific heat capacity of the air 1004 J/(kgK)
- air density 1.2 kg/m<sup>3</sup>

To ensure easy transferability, the specific caloric outputs - i.e. the absolute caloric outputs in relation to the temperature difference between water intake and induction air before entering the heat exchanger - are given with varying fan speeds.

The outputs given in the chart do apply with specific nominal flow rates only. These are stated for each type and size.

The correction charts give a graphic illustration of how outputs change with other flow rates compared to nominal flow rate output.

Flow rates have been determined through calculation and may vary by about 10 %.

**\* Addition of ethylene glycol to lower the freezing point:**

To lower the freezing point, cooling water is often added some ethylene glycol. The lower specific thermal capacity of the mixture reduces the unit's cooling capacity.

### 4.6 Acoustic data

Acoustic data have been determined in a reverberation chamber in the LTG test lab.

The technical data sheet contain the A weighted sound pressure levels LA18 for different fan speeds.

Sound pressure levels apply to a room absorption surface of 18 m<sup>2</sup> which equals a room absorption of about 6 dB(A). Thus, sound power levels may easily be calculated.

$$L_{WA} = L_{A18} + 6 \text{ dB(A)}$$

The data given apply to one unit, i.e. one room axle. If more than one unit is installed in the same room, the sound pressure level will rise accordingly.

Increase in sound level with several sound sources of the same type:

Number of sound sources of the same type	1	2	3	4
Sound level increase [dB]		3	5	6

Measuring accuracy is ± 10 %.

### 4.7 Hydraulic data

Heat exchangers are approved for an operating pressure of 10 bar max. (test pressure 16 bar).

Pressures exceeding 10 bar require the express permission of LTG.

Water-side pressure losses have been measured directly at the heat exchanger connections. Further resistances will have to be added.

Measuring accuracy is ± 10 %.

## Installation

### 5. Installation

#### 5.1 Installation instructions

The unit is usually supplied as described in the following:

- Unit with completely retracted feet and slightly fixed counternuts and a protective board (chipboard) inserted instead of the foot traffic resistant grille.
- Required installation material and parts, if any, such as rivets, screws, bolts, junction sheets, fixing links, air duct are included in the delivery.



The following points must always be observed when installing the unit:

Do not remove the **protective board** (chipboard) unless to execute the water and electrical connections. Reinstall the protective board until the grille is inserted into the unit to avoid damages to and pollution of the unit.

**Any work in connection with the electrical equipment and the water connections** is to be performed by skilled and trained staff only.

When installing the unit **on site** an **insulating strip** is to be used between the unit and the facade and between the unit and the floor boards.

The **counternuts** of the supporting feet are to be fastened using a 3 Nm torque.

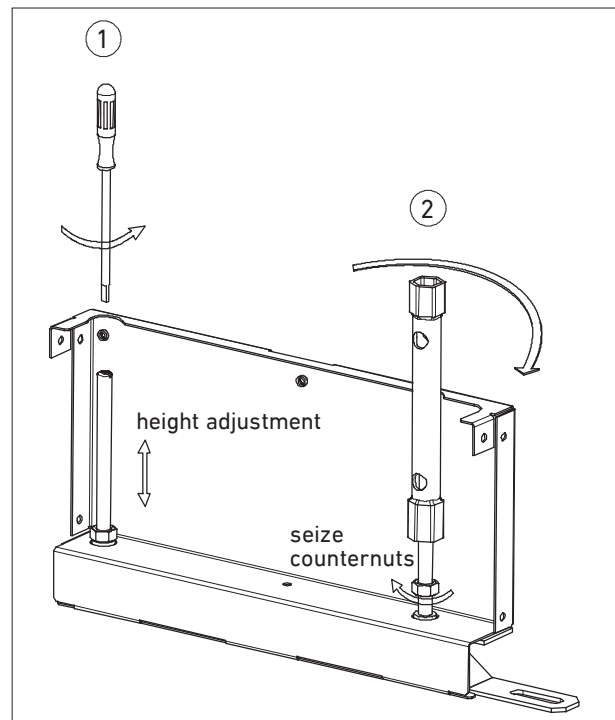
When fixing the units to the floor using the **fastening brackets** included in the delivery, a **sound insulation** is to be installed on the bottom side of the brackets to avoid sound transmission.

Before inserting the outlet grille the **protective foil** on the valve chamber's sheet steel cover is to be removed.

#### 5.2 Unit installation

Please observe the following when installing the unit:

- Supporting feet must be preadjusted to ensure that the unit's own weight is carried by the supporting feet and not by the outside air socket.
- Tighten the supporting feet's lock nuts observing a torque of 3 Nm.
- Secure the unit against horizontal shifting, e.g. by using the fixing links available as accessories.
- Do not fix other components to the unit unless with LTG Aktiengesellschaft's express permission and prior release
- Take care to avoid any direct contact between the unit and the raw floor except by the supporting feet to eliminate sound and foot traffic noise transmission.
- Take care to avoid any direct contact between the unit and the facade and suction duct to avoid sound transmission, except via seals designed for this purpose (VDE 6022, hydrophobic and closed pored).



#### Laying the floor

When laying the floor take special care to avoid any direct contact between the floor boards and the unit, i.e. do not place floor boards directly on the unit and avoid their touching laterally. Ensure the use of a sound insulation element in between or use an appropriate sealant (see above) between the unit and the false floor's boards.

## Installation

### 5.2.1 Installation in line

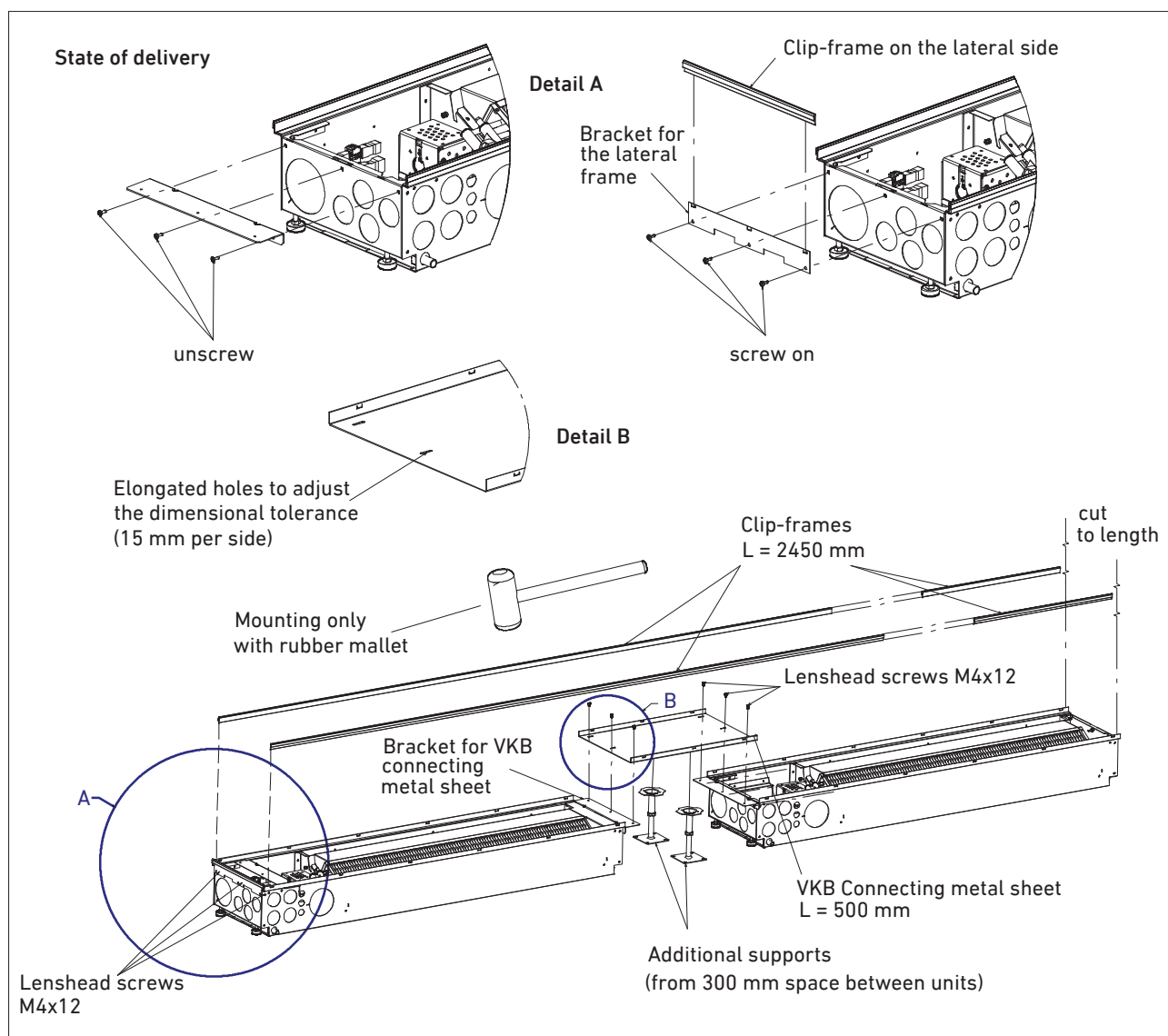
The units are delivered by the factory with fitted

- retaining plates for end-side support frame, or
- retaining plates for VKB connecting plates.

Depending on local conditions, the retaining plates must be modified by others in accordance with the following assembly drawings.

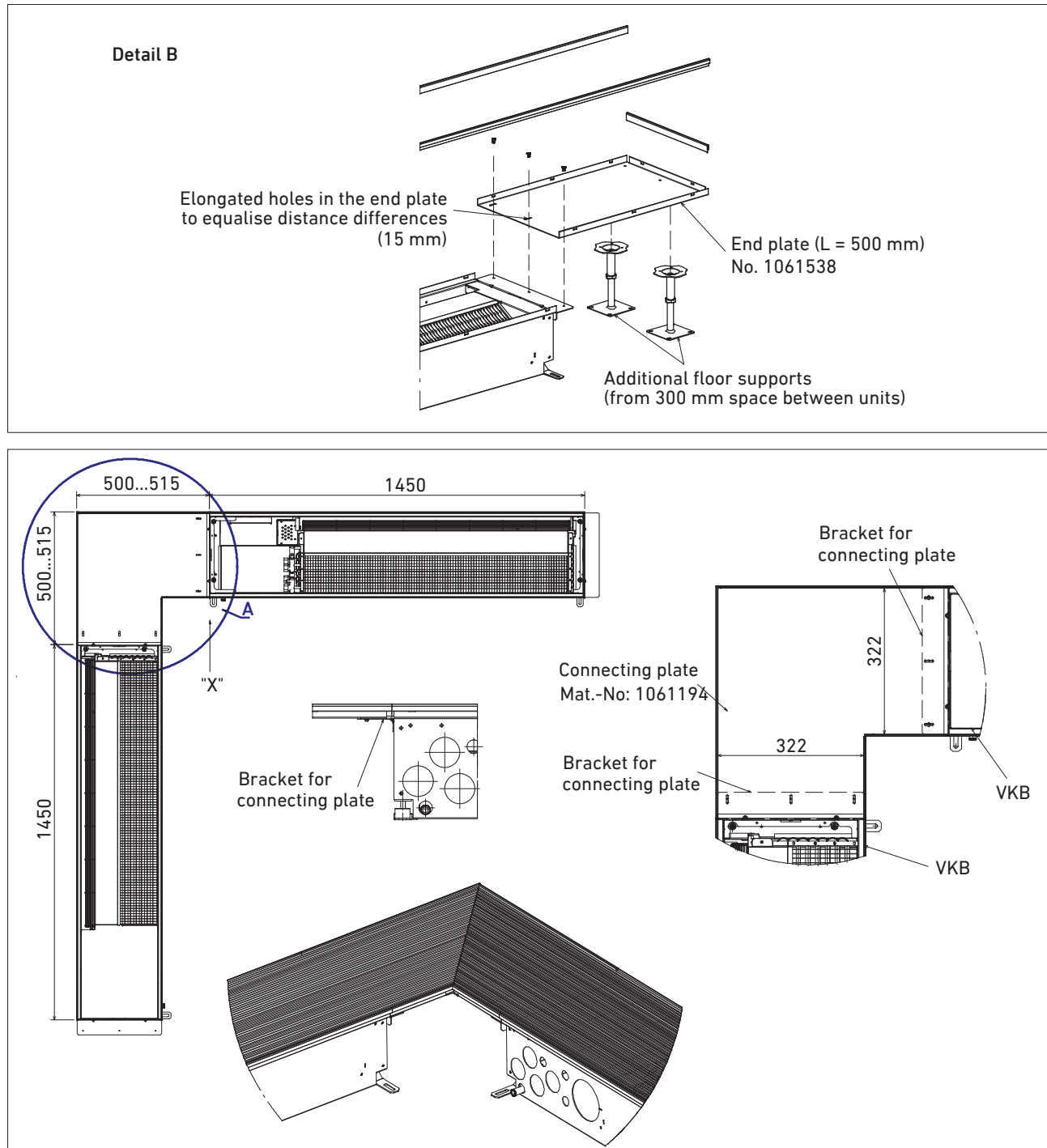
The connecting plates or support frames must be fitted by others and adapted where necessary.

In the case of a cavity of 300 mm or above, or with end sections, floor supports must be additionally provided for stabilisation.



## Installation

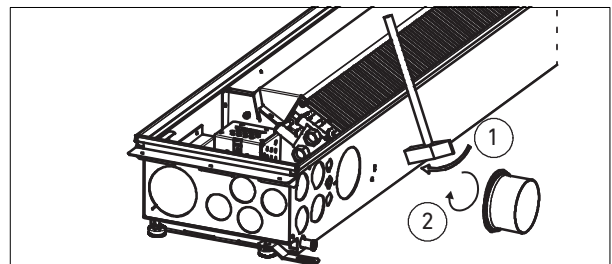
### Continuation 5.2.1 Installation in line



### 5.2.2 Primary air connection

The primary air connection can be attached as follows:

1. Pre-punched leadthrough for primary air connection is snapped out, at the room side or end side depending on requirements.
2. Screw in the primary air connection.



## Installation

### 5.3 Electrical connection

The installation of electrical systems must be carried out in accordance with the specifications of VDE0100-100:2009-06.

Electrical systems must be installed professionally by suitably qualified personnel and using suitable materials in accordance with the current state of the art.

In the case of accessory components (e.g. room control units, valve actuators, etc.) that are connected and operated with LTG units, the specifications of the respective manufacturer must be observed and implemented.

The fan coil unit is intended for permanent connection to permanently laid pipes.

The electrical connection is equipped with a plug connection, protection IP 21, in the case of motors with **EC technology**. Only the supplied mating plugs have to be assembled accordingly by others.

Ensure that shielded cables are used for actuating the EC motor.

Units with **AC motors** are provided with a terminal box, degree of protection IP 44.

The main power supply on site is to be performed according to the wiring diagram and by skilled and trained staff only.

Electrical lines on site must be realised using the outputs on the terminal box and on the unit housing.

It is not permitted to work on the electrical equipment with the unit being alive.

Operation in the disassembled state is not permissible.

All units are equipped, in the case of individual control, with a terminal box fitted on the unit.

The technical specifications contain the electrical output data for the units.



Connect the unit to a residual current device (RCD).



A total of 5 units may be connected in parallel and triggered through a single switch.

Take care to connect in parallel identical speeds only, i.e. connect speed I of unit 1 to speed I of unit 2, etc.

For a safe start of the fans it is indispensable to use speed III.



Units must be provided with a possibility to completely disconnect them from the main power supply!

Any work must be performed in compliance with national regulations and safety instructions.

Wiring, fuse and earthing of the fan coil unit have to meet the local regulations and safety instructions.

## Installation

### Continuation 5.3 Electrical connection

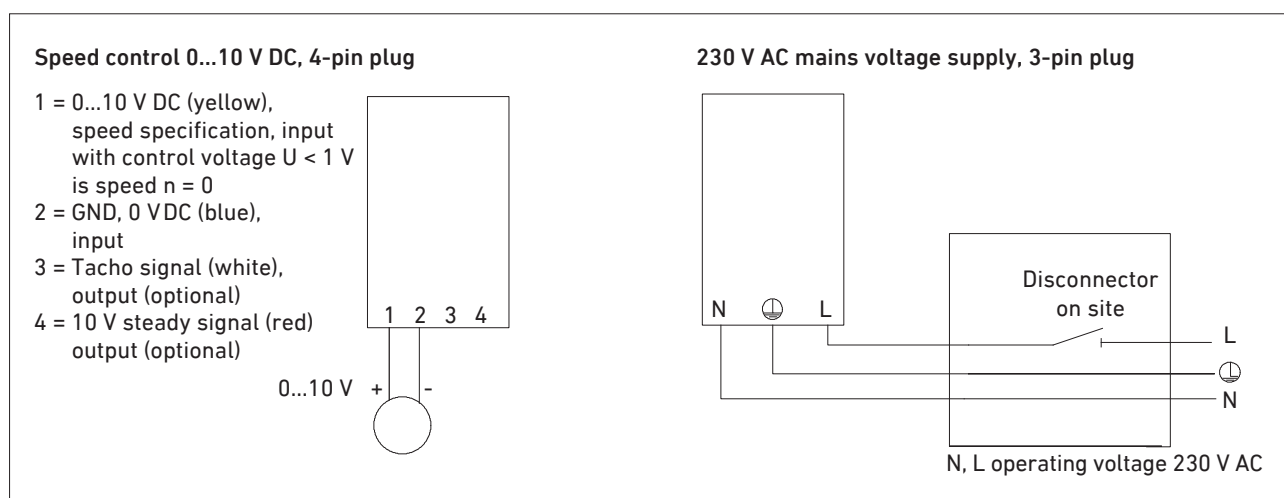
#### Speed control wiring diagram for EC motor

Two connections are necessary for electrically connecting the fan coil unit. These are provided by plug connections, protection IP 21. The plugs are pre-assembled on the motor side at the factory. Only the supplied mating plugs have to be assembled by others accordingly.

**Note:** As a rule, we are not familiar with the full scope of the ventilation, air-conditioning and control engineering systems. For this reason, the designs, drawings and circuit diagrams only show the systems that are relevant to the basic functions. Other units or components, such as those required for overall control engineering and/or design in compliance with VDE regulations, are not shown and are not explicitly mentioned.

Please also note the assembly and installation instructions in the original documentation.

The controllers for this application are parametrised by others.



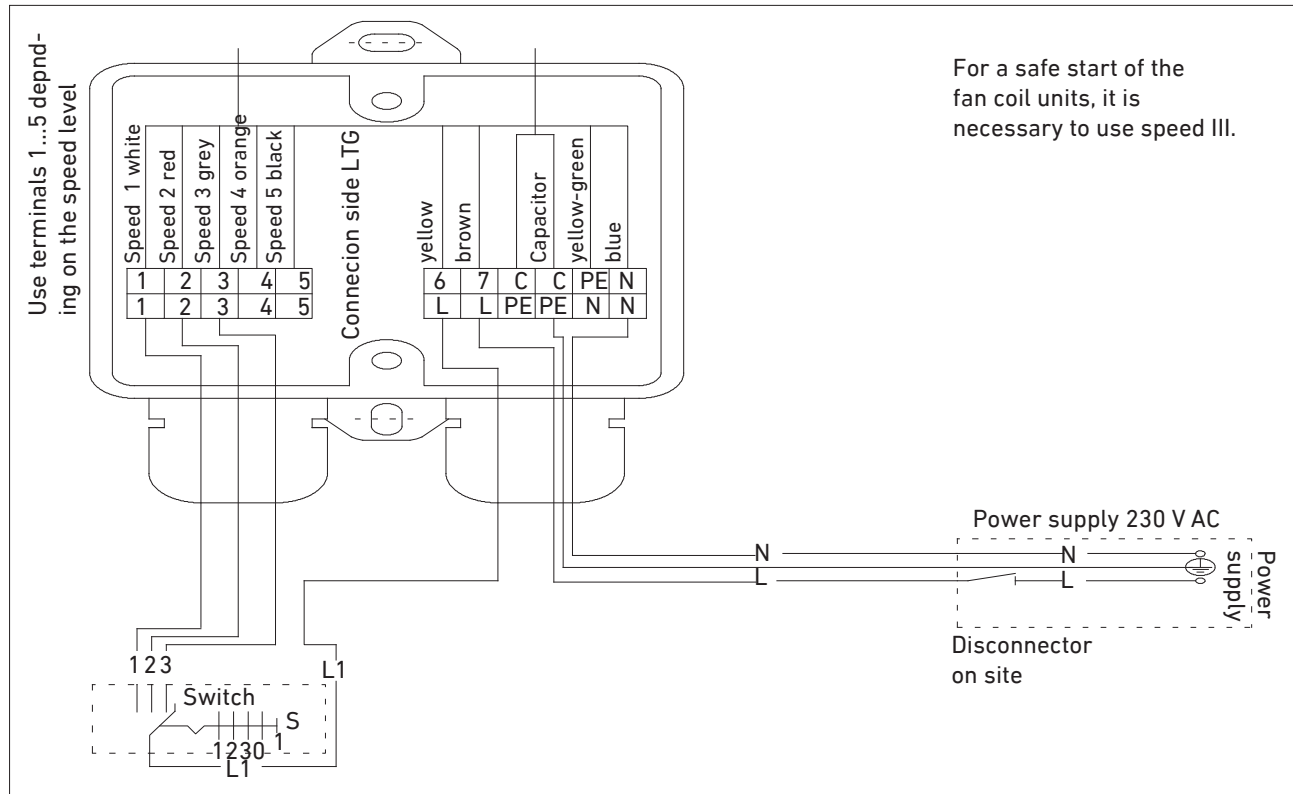
## Installation

### Continuation 5.3 Electrical connection

#### Speed control wiring diagram for 5-speed AC motor

##### Note:

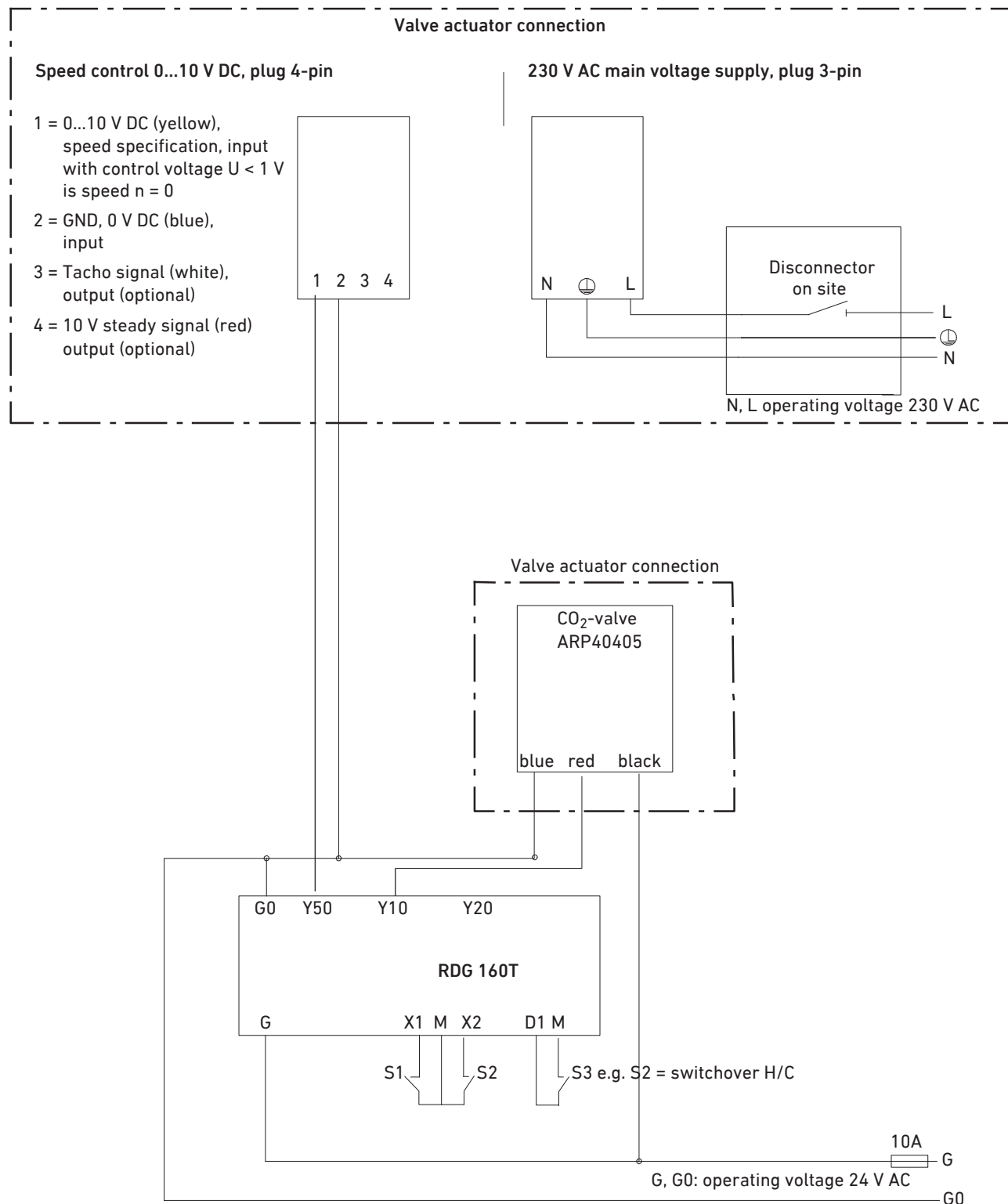
- Capacitor motor with 5 tapings
- Multiple unit triggering via on-site relays possible
- The technical data contain details about the current consumption and the corresponding electrical power



## Installation

### Continuation 5.3 Electrical connection

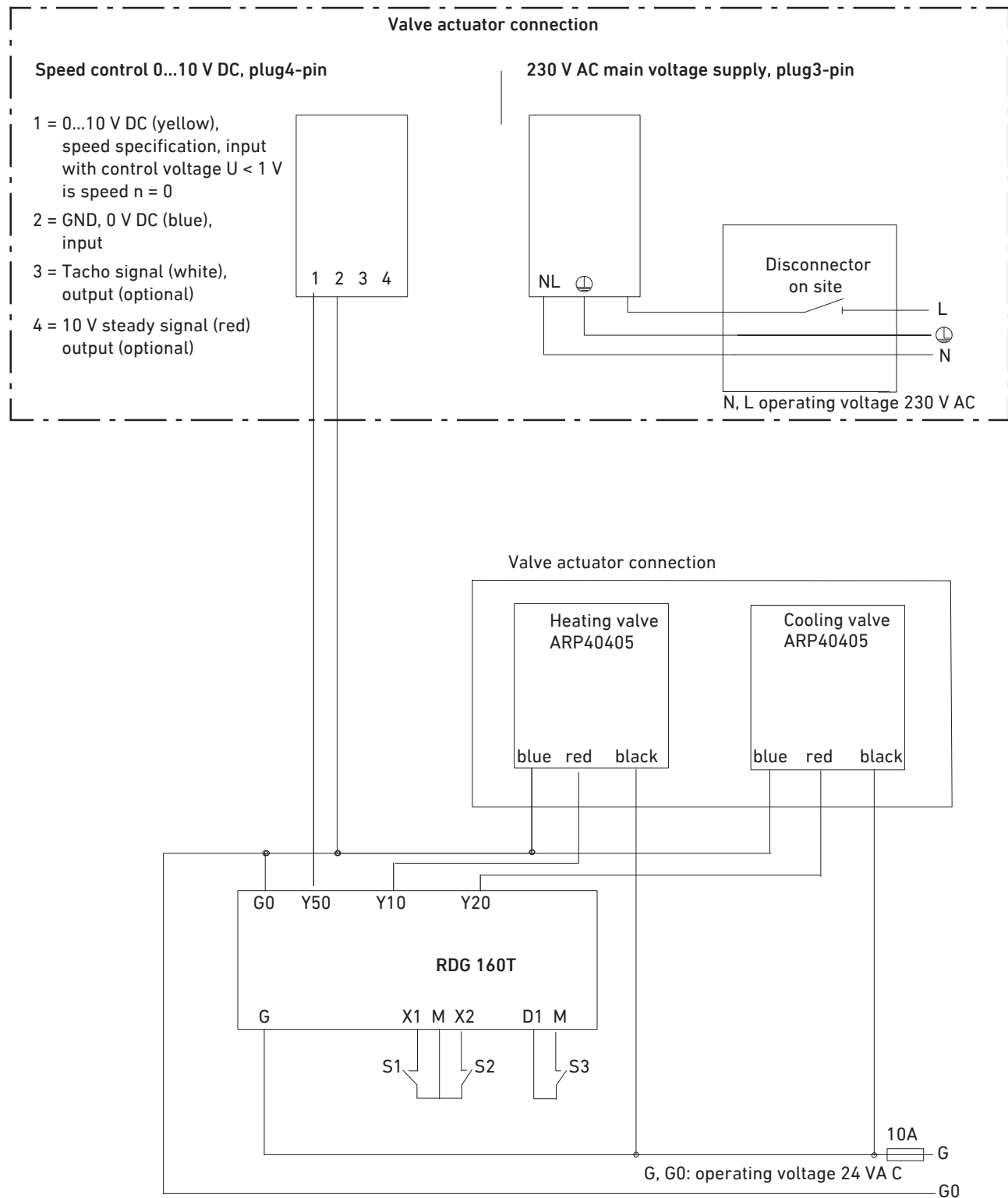
#### Application example: 2-pipe system with room temperature controller RDG 160T



# Installation

## Continuation 5.3 Electrical connection

### Application example: 4-pipe system with room temperature controller RDG 160T



## 5.4 Water connections



Remove the heat exchanger plugs prior to water connection!

Units are provided with heat exchangers with copper tubes and aluminium blades for 4-pipe operation with separate heating and cooling circuits or for 2-pipe operation.

The heat exchangers have been approved for a maximum operating pressure of 10 bar (other pressures on request).

Depending on the unit type, water connections are supplied in the following versions:

1. Copper fitting with 12 mm outer diameter.  
This connection is only suitable for flexible connection with quick coupling.
2. ½" internal thread fitting, tapered.
3. Fitting with special LTG olive and union nut to connect flexible hoses or copper tubes.



Always follow the installation instructions for the water connections:

Connections must be strainless.

Connecting lines must be able to expand.

Attention:

Prior to allowing water to enter the unit the flexible water connection hoses will have to be checked for proper and leak-proof fixation. Even though hoses to the heat exchanger are preinstalled, fixations might have loosened during transport or installation of the unit on site.

You may use off-the-shelf control valves and shut-off valves.

When tightening the fittings, avoid damaging the heat exchanger pipes through bending, twisting and so on. Pipe fittings must always be flush.

In order to adjust the water volume specified in the selection data, a regulating device or restricting olive will be required. A regulating device for each individual unit can be dispensed with only when the units are identical, with the same water quantities and the same pressure losses, in the case of the Tichelmann system. In this case, one regulating device for the entire line may be sufficient. Otherwise, a regulating device will be required for each heat exchanger.

If removal of a heat exchanger without draining the entire system or a line is a requirement, two or four isolation valves will have to be provided for each unit. You may use off-the-shelf shut-off valves.

The unit fitting will only be provided with an integrated vent if specifically asked for. The water speed inside the heat exchanger is usually sufficient to carry along air bubbles and one ventilation device per line is therefore appropriate. In a case of emergency, the line may be ventilated by slightly loosening the standard fitting of the unit.

Due to possible condensation, the connections to the heat exchanger for cooling should be insulated, e.g. using Armaflex insulation.

The water connection side is to be specified when ordering the unit. Some units offer a possibility to still change the side during installation by removing 4 bolts.

Execute the heat exchanger connection as follows:

- Vertical heat exchangers:  
water inlet below,  
water return above
- Horizontal heat exchangers:  
unit's front side: water inlet,  
unit's back side: water return

# Installation

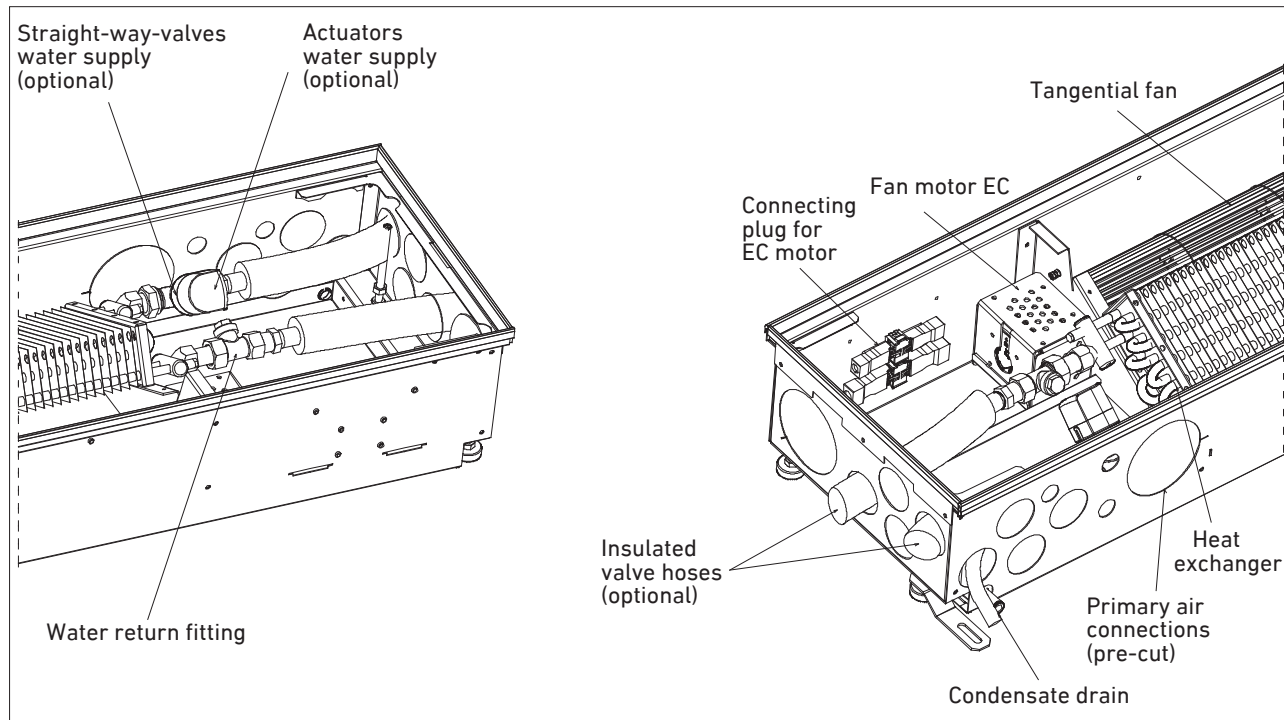
## Continuation 5.4 Water connections

The water pipes can be passed through the floor trough at the end side or room side. To do so, first the pre-punched leadthroughs must be snapped out depending on the application and version.

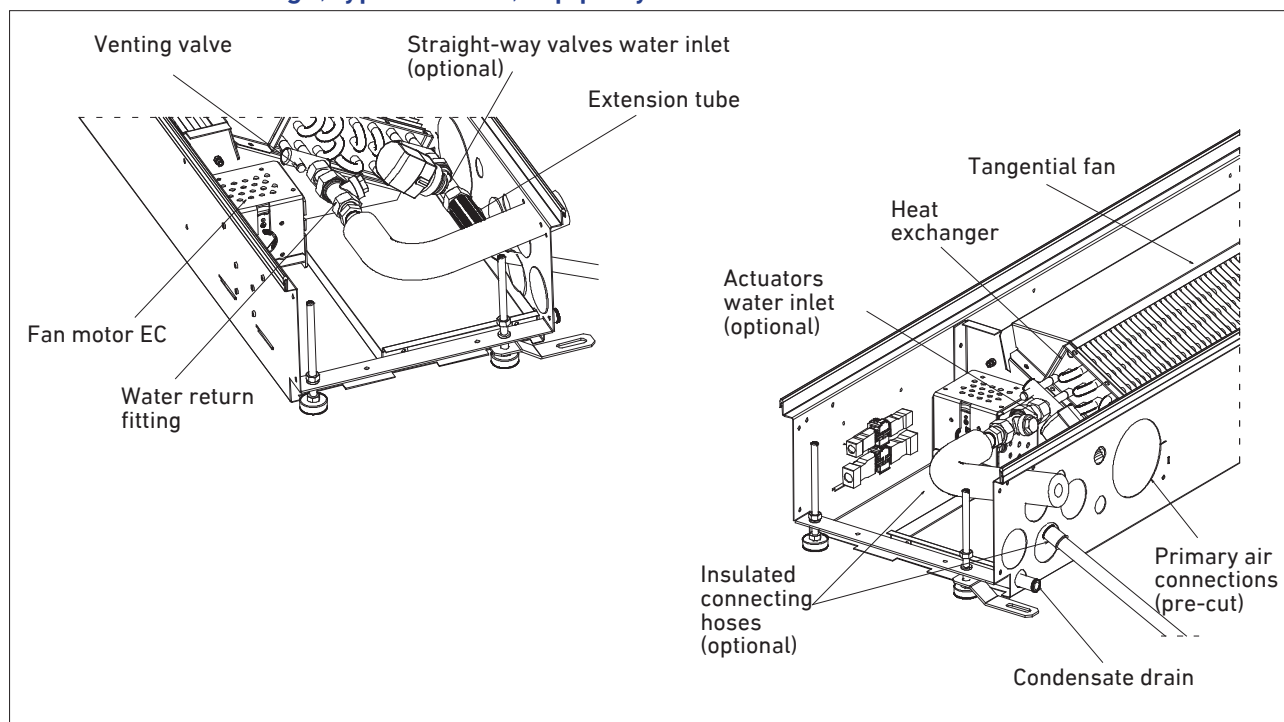


Only snap out the **needed** leadthroughs!  
Snapped out leadthroughs can not be refitted.

## Leadthrough at the end side, type VKB-0/2, 2-pipe system



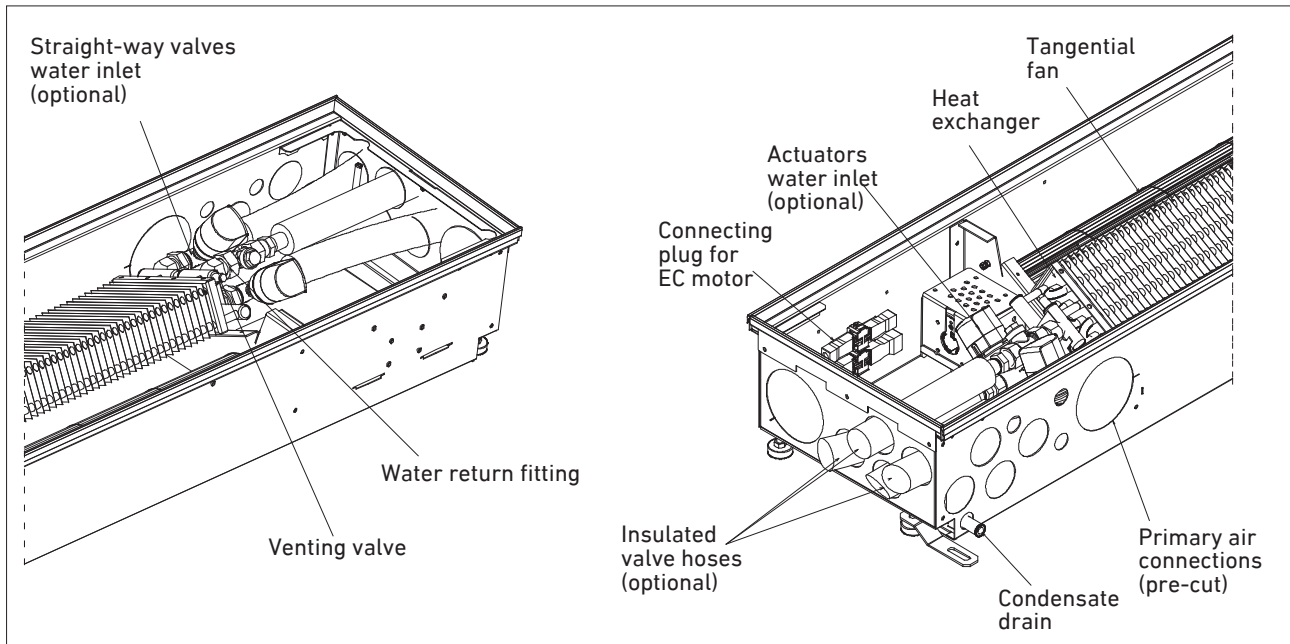
## Room side leadthrough, type VKB-0/2, 2-pipe system



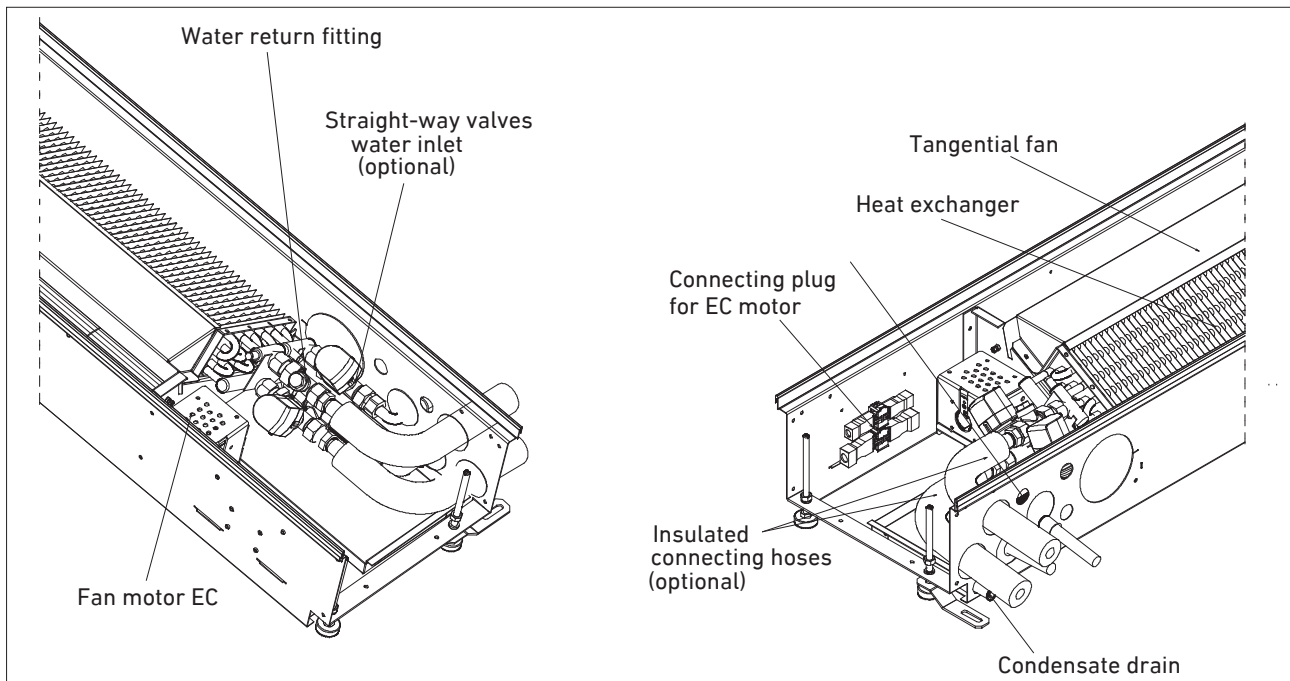
## Installation

### Continuation 5.4 Water connections

#### Leadthrough at the end side, type VKB-0/4, 4-pipe system



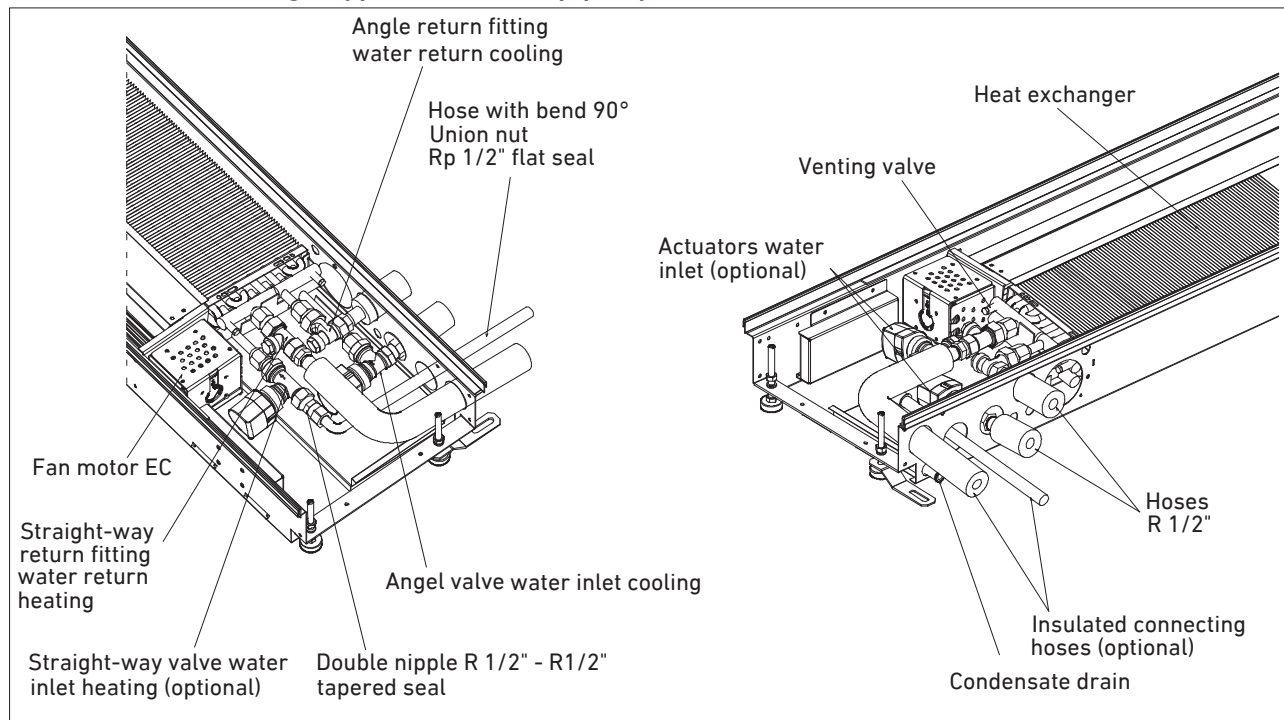
#### Room side leadthrough, type VKB-0/4, 4-pipe system



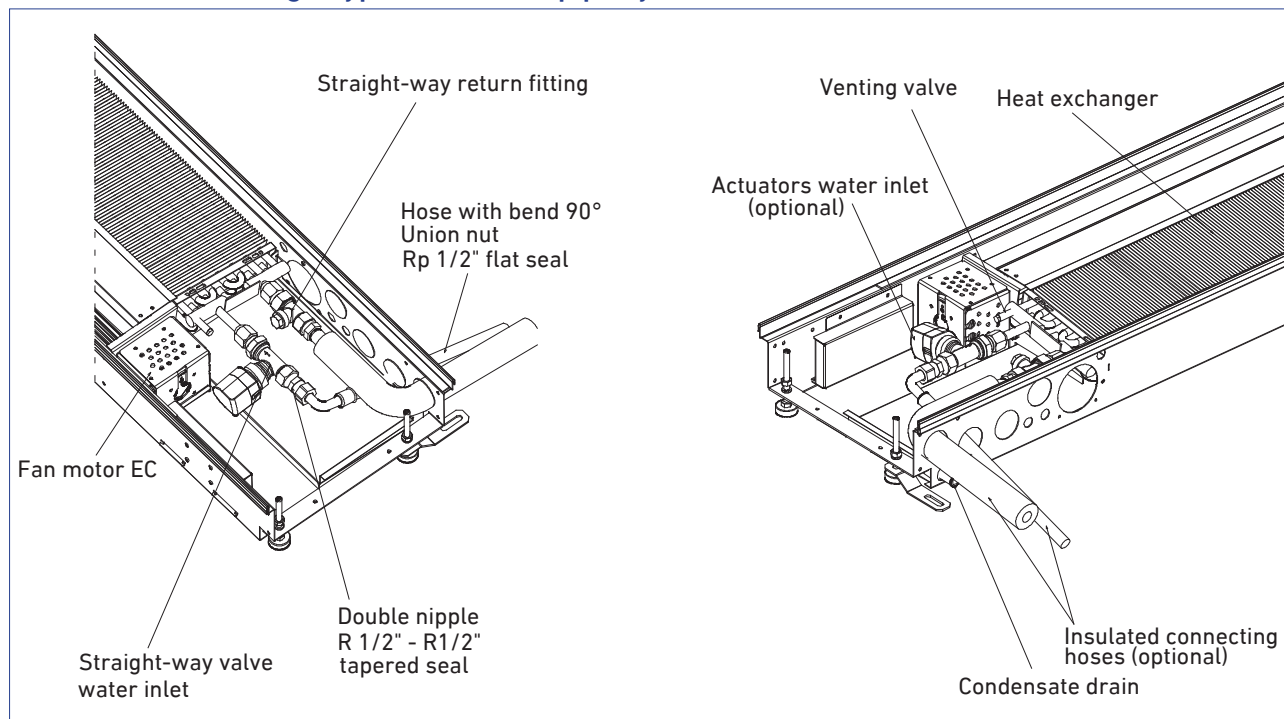
## Installation

### Continuation 5.4 Water connections

#### Room side leadthrough, type VKB-N/4, 4-pipe system



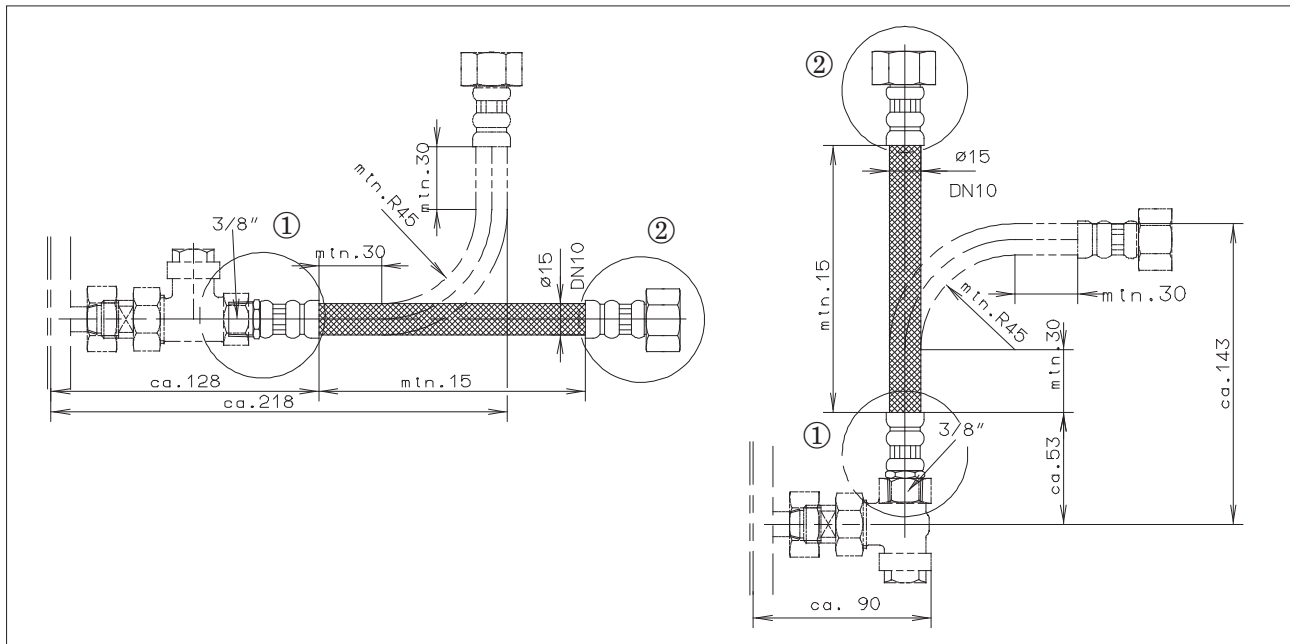
#### Room side leadthrough, type VKB-N/2, 2-pipe system



## Installation

### Continuation 5.4 Water connections

#### Examples using angle valve resp. straight-way valve and flexible hose

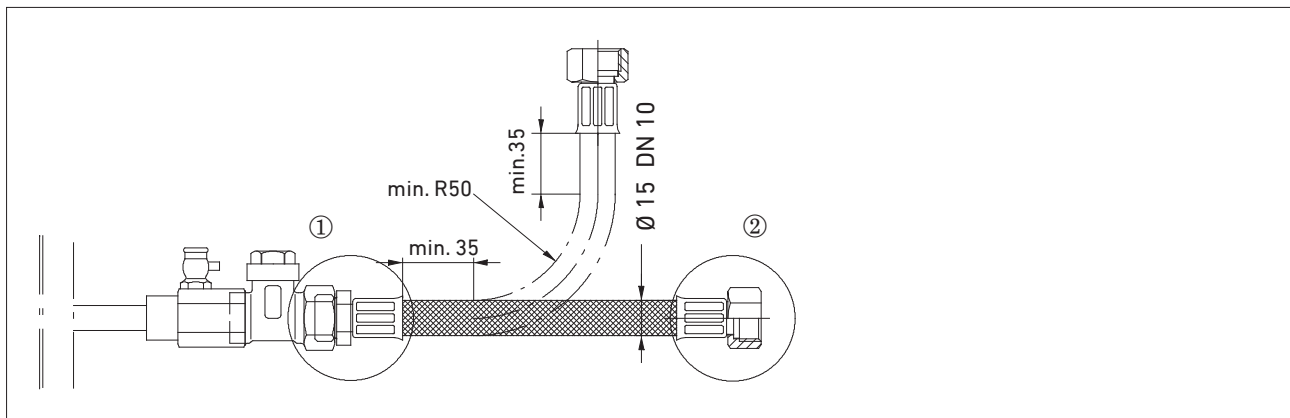


Please observe the hose manufacturer's instructions !

Hose without insulation. For insulated hoses, dimensions will change accordingly

- ① Hose for connection to angle or straight-way-valve connection type AGK, external thread, tapered,  $\frac{3}{8}$ "
- ② Different hose connections (see above), thread diameter acc. to customer requirements or standard  $\frac{3}{8}$ "

#### Example using transition, straight-way valve and flexible hose



Please observe the hose manufacturer's instructions !

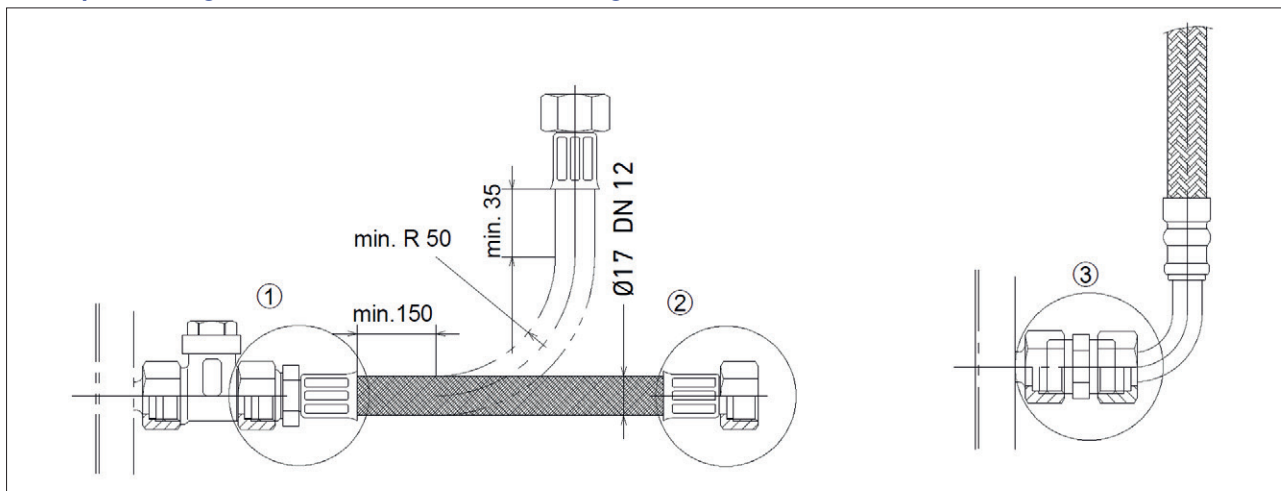
Hose without insulation. For insulated hoses, dimensions will change accordingly.

- ① Hose for connection to angle or straight-way valve, connection type: AGK, external thread, tapered  $\frac{1}{2}$ "
- ② Different hose connections (see above), thread diameter acc. to customer requirements or standard  $\frac{1}{2}$ "

## Installation

### Continuation 5.4 Water connections

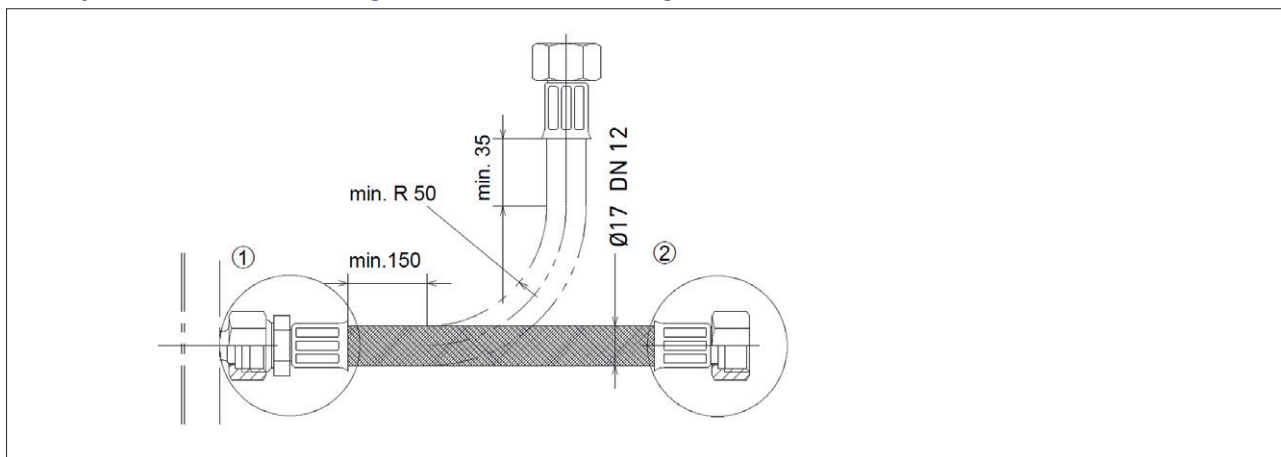
#### Examples using valve and flexible hose (straight and 90° variant)



Hose without insulation. For insulated hoses, dimensions will change accordingly.(10 mm Armaflex insulation).

- ① Hose for connection to angle or straight-way valve, connection type AGK, external thread tapered ½"
- ② Different hose connections, thread diameter acc. to customer requirements or standard ½ "
- ③ Connection for direct screwing into the heat exchanger in case of angle connection, connection type: double nipple ½" - ½"; ÜFD hose connection, ½" flat seal union nut

#### Example for direct screwing into the heat exchanger



Hose without insulation. For insulated hoses, dimensions will change accordingly.

- ① Connection for direct screwing into the heat exchanger, connection type: AGK, external thread ½", tapered seal
- ② Different hose connections, thread diameter acc. to customer requirements or standard ½"

## Installation

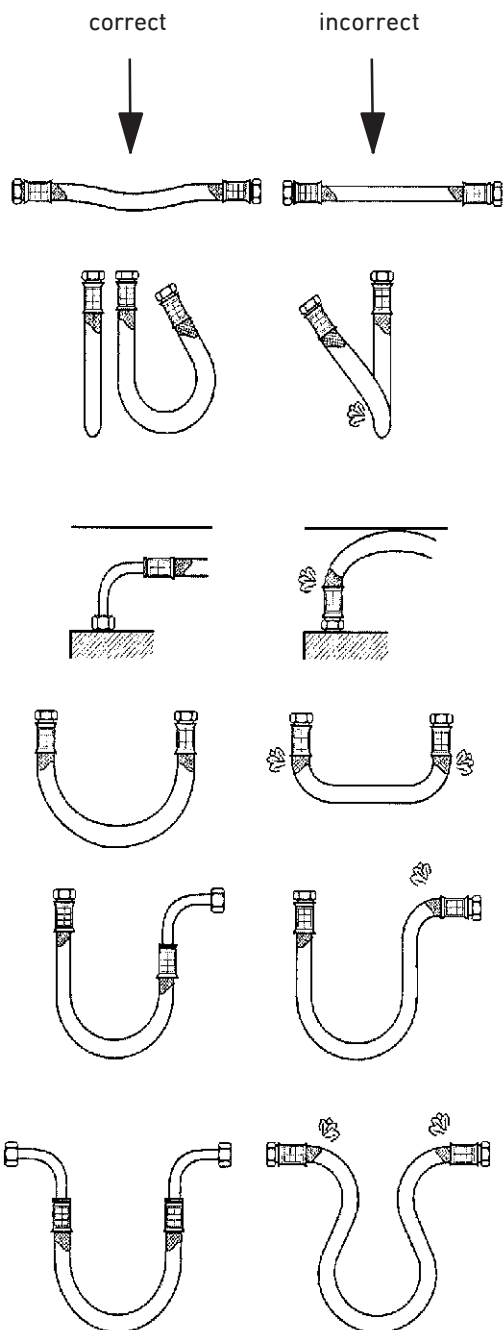
### 5.4.1 Instructions for installation of water connections using flexible hoses



Warranty will only apply if the following instructions are observed and if installation is performed in compliance with DIN-EN regulations.



In particular, corrosive, electrochemical, and bacteriological charges are to be excluded taking appropriate preventive measures.



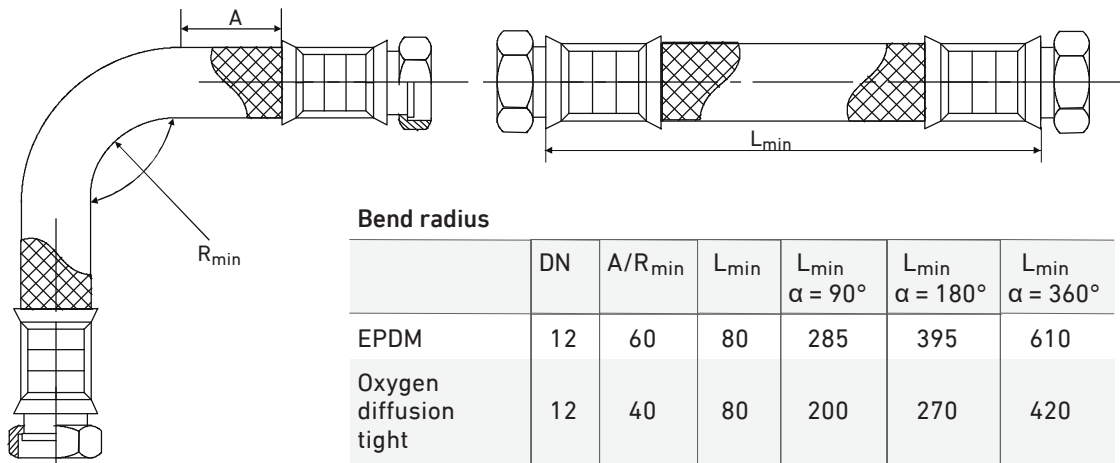
- Pressure and exposition to heat may result in slight elongation of the hose. Therefore, newly placed hoses must consider such potential elongation.
- Do not fall below the admissible bending radius  $R_{min}$  (chart), neither during transport, nor during installation or when installed.  
If it should turn out impossible to keep the admissible bending radius, choose a different installation type.
- For minimum length see chart below.  
If the hose is being placed by bending it, check whether there is sufficient hose length to allow for an open bow in order to avoid kinking and destruction of the hose at the connecting points.
- Absolutely avoid distorting or kinking the flexible connection.
- Do not subject the hose to any tensile or pressure loads applied from outside, neither during installation nor operation.
- Do not retighten rigid connections (outer thread) after fixing the second connection since this might result in distortion of or damage to the hose.
- In general, tightness of the connection (hose/connector) is the responsibility of the technician performing the installation.
- Any sealing material included in the delivery is to be verified by the technician for its suitability since the hose manufacturer has no information about the material or geometry of the connections.

## Installation

### Continuation 5.4.1 Instructions for installation of water connections using flexible hoses

#### Flexible Hoses

Type	EPDM	Oxygen diffusion tight Free of halogens, plasticisers and heavy metals. Tested acc. to DIN 4726
Braiding	Stainless steel wire acc. to AISI 304	
Ferrule	Stainless steel acc. to AISI 304	
Temperature range	up to +90 °C	up to +80 °C
Max. operating pressure	15 bar	15 bar
Internal Ø DN	12 mm	12 mm

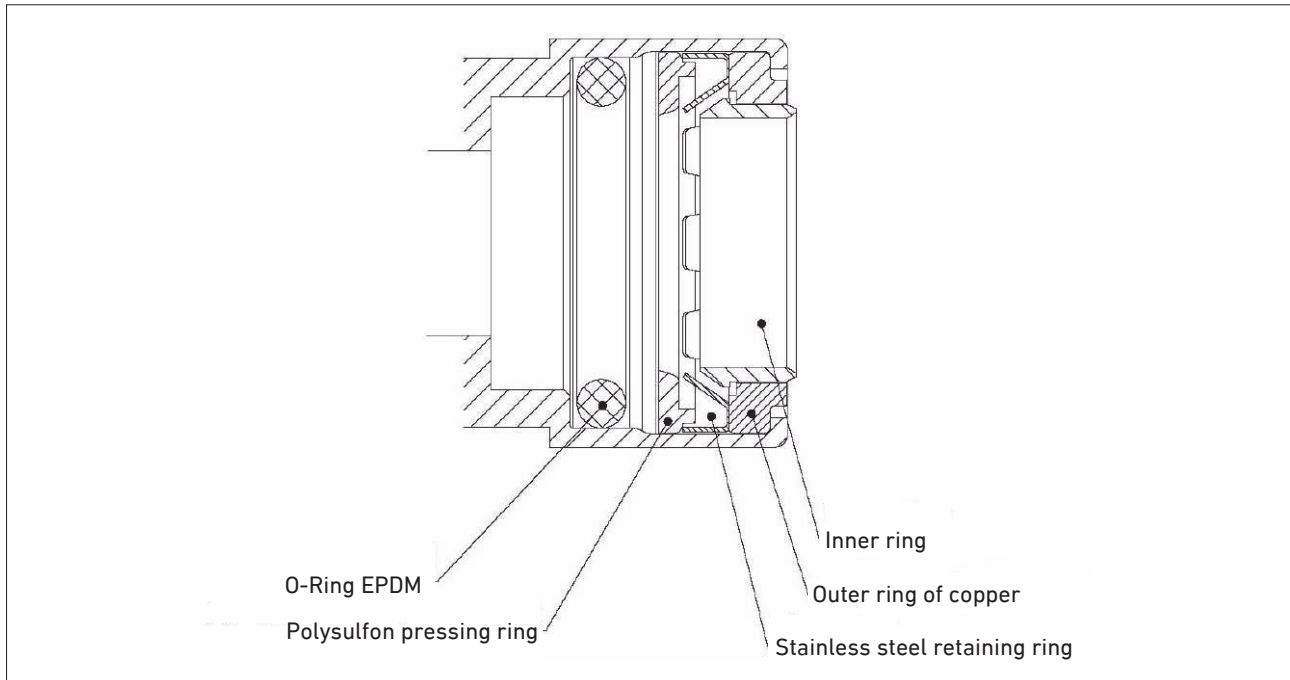


**Bend radius**

	DN	A/R <sub>min</sub>	L <sub>min</sub>	L <sub>min</sub> $\alpha = 90^\circ$	L <sub>min</sub> $\alpha = 180^\circ$	L <sub>min</sub> $\alpha = 360^\circ$
EPDM	12	60	80	285	395	610
Oxygen diffusion tight	12	40	80	200	270	420

## Continuation 5.4.1 Instructions for installation of water connections using flexible hoses

### Plug-in connection Cuprofit



Tube connection of plug-in fitting and bright copper tube according to EN 1057 and RAL 641/1 or suitable brass or red brass socket.

This permanently tight connection is suitable for concealed installation.

Using special tools, this connection may be detached up to three times when not under pressure.

Prior to reconnection, check for undamaged condition of the seal.

Check every installation for tightness when completed.

Due to their specific design, Cuprofit connectors are not suitable for use as grounding conductors for electrical installations and therefore not to be considered in the compensation of potential.

Maximum operating pressure 10 bar / 93 °C.

Test pressure 16 bar / 30 °C.

## Installation

### 5.5 Condensate connection



Remove the condensate drainage plugs before connecting the condensate lines!

Condensate formation occurs when the cold water supply temperature is below the ambient air dew point temperature. Neither LTG Induction Units nor LTG Fan Coil Units have been designed for an operation with steady condensate formation which is why special care must be taken when setting the water inlet temperature not to fall below the dew point temperature. If necessary, provide a continuous control of the water temperature based on outside air humidity.

On request, units are available in a special insulated version for condensing operation (please consider when designing and ordering). In any case, please observe the following:

- **Air conditioning with centralized cooling and dehumidification** (water temperature > 13 °C)

A certain water supply temperature will result in condensate formation since the temperature is below the ambient air dew point. This dew point, however, depends on indoor air humidity. The water supply temperature may be 1...2 K below the dew point of the air since the air temperature on the pipes is higher than the actual water temperature.

If rooms are ventilated with a maximum supply air humidity of e.g. 8.5 g/kg Ltr the water supply temperature may be lowered to 15 °C without risk of condensate formation.

In case of an increased humidity of the air, there are two solutions:

#### Case A: Condensate tray not connected (condensate socket closed by plug)

- If outside air humidity is high keep windows closed.
- Alternative:  
If windows are opened use a window contact with closing/time-delayed opening system.
- Alternative:  
A central system controls the water supply temperature based on the outside air humidity whenever windows are opened, i.e. in case of a high humidity of the air the water supply temperature is increased. This will, however, reduce the cooling capacity.

#### Case B: Condensate tray connected

- No need for a window contact or central cold water supply temperature raise in case of high outside air humidity.
- If a short-term increase of the indoor air humidity is probable (unit in the intermediate ceiling above a wet room, e.g. a hotel) it is recommended to provide the tray with a thermal insulation.
- In general, VDI 6022 requirements are to be met with the installation of any condensate drain connection on site.
- **Ventilation without dehumidification or window opening** (water temperature > 16 °C)

In case of a ventilation without dehumidification the water supply temperature must be 16 °C or up. If the supply air is not dehumidified or the ventilation is realized by opening windows, the air humidity might be very high which is why the following case will have to be considered:

#### The condensate tray must be connected.

A central cold water control and weather related cold water supply temperature raise is recommended since opening the windows might result in outside air with a high humidity entering the room and the temperature dropping below the air's dew point.



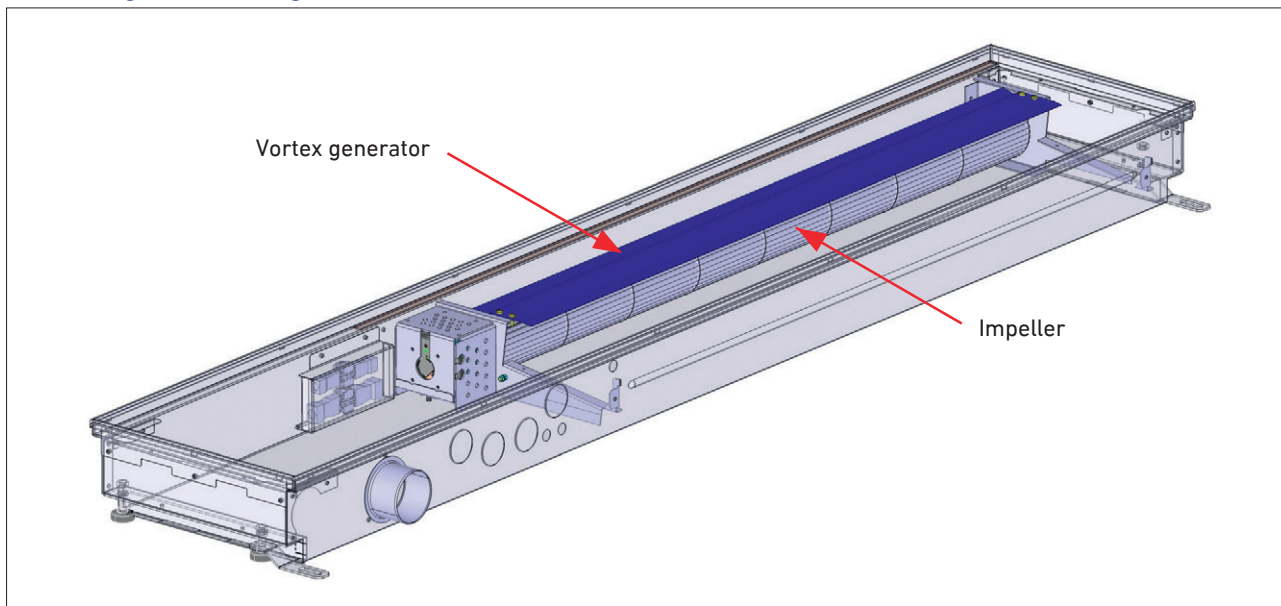
Whatever the case of application, all water carrying pipes and fittings outside the condensate tray's range must be insulated.

If a condensate drainage system is connected there must be sufficient slope and proper drainage of the condensate produced. Condensate trays and the condensate drainage system require cleaning and sanitation checks on a regular basis.

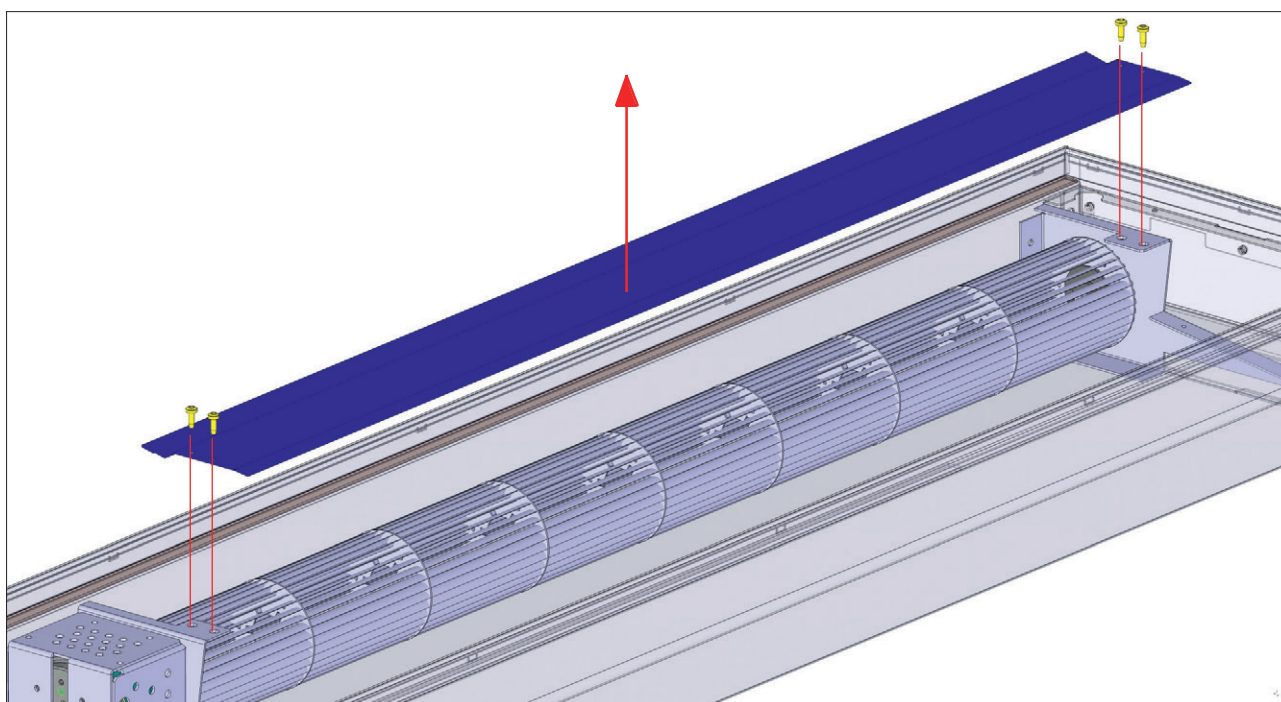
## Installation

### 5.6 Installing the heat exchanger in type VKB-N

#### Removing the vortex generator



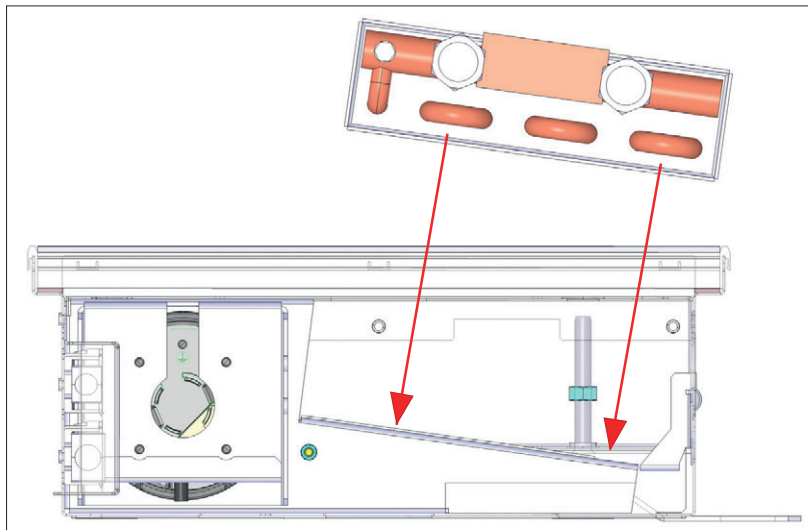
Undo the four M4x12 screws to allow removal of the vortex generator:



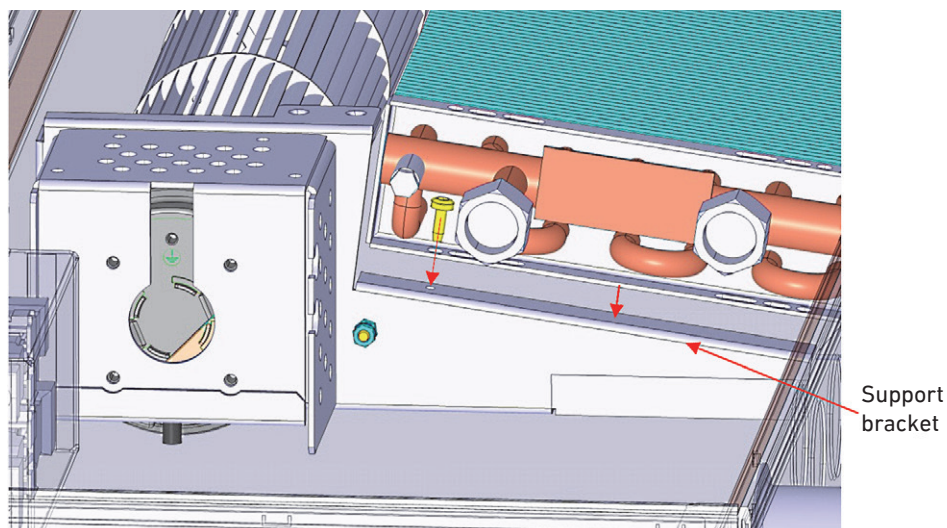
The vortex generator must not touch the impeller!  
The impeller has been balanced and is very sensitive!

Continuation 5.6 Installing the heat exchanger in type VKB-N

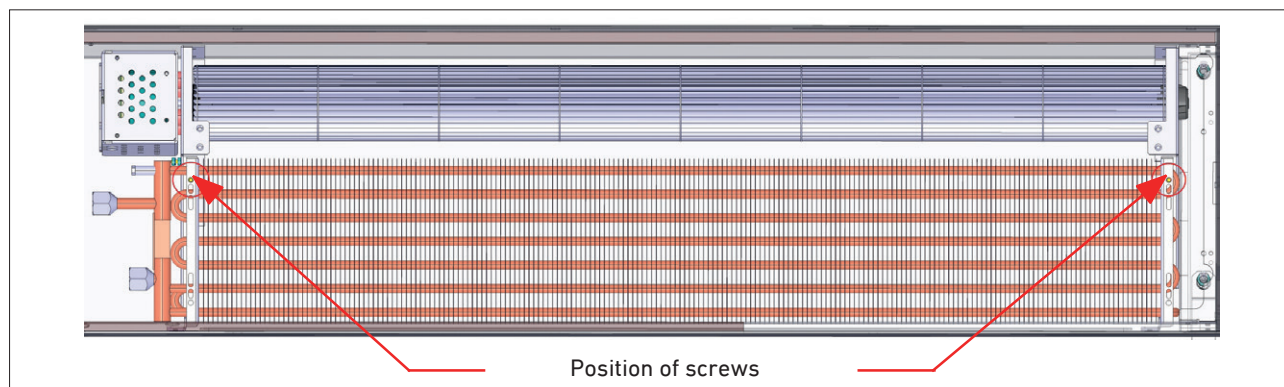
**Inserting the heat exchanger**



Place the heat exchanger on the two support brackets and screw them tight to these brackets using two self-tapping screws (M4x12).



**Please ensure that the heat exchanger is not touching the impeller and is fitted at a sufficient distance from it.**

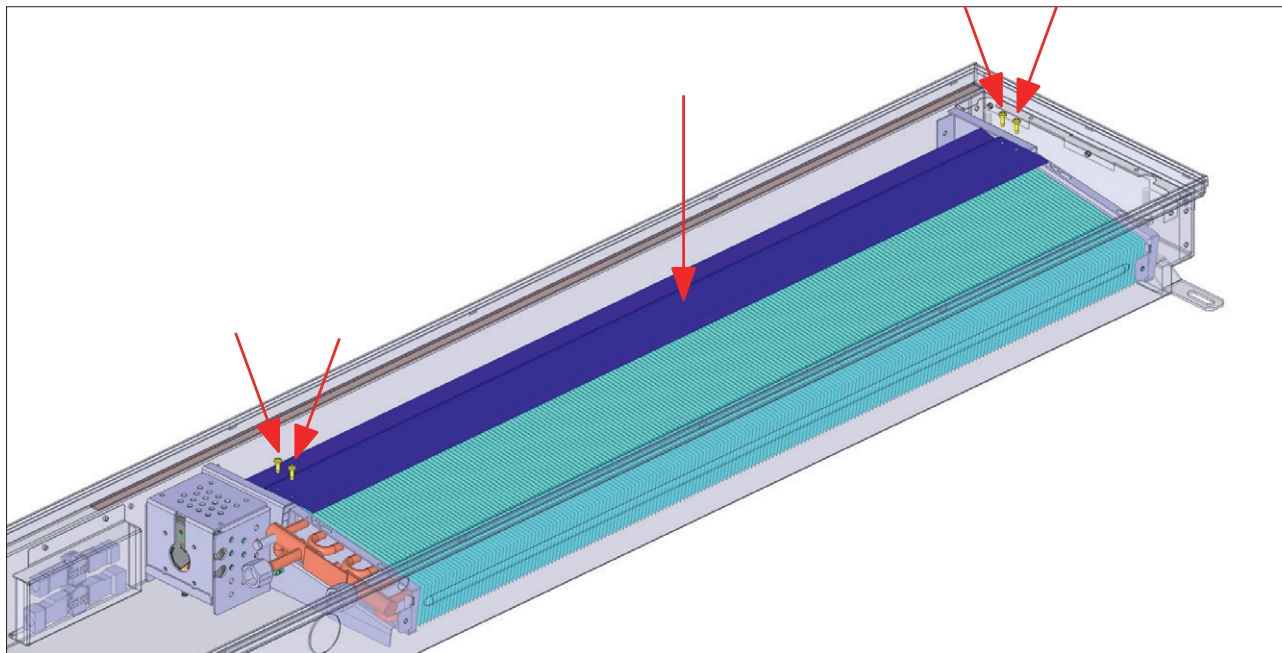


## Installation

### Continuation 5.6

#### Installing the heat exchanger in type VKB-N

#### Fitting the vortex generator



After fitting of the heat exchanger, screw the vortex generator tightly back onto the support brackets.



Ensure once again that the vortex generator is not touching the impeller!

## 5.7 Check after installation



Verify for the unit's proper connection to a residual current device (RCD).

### Mechanical Check

Having completed the installation the unit is to be checked for any mechanical damages. Reminders of the packaging material and dust in or on the unit must be removed.

Check the following:

- leakproofness of the water connections (including heat exchanger connections),
- the insulation of all cold water carrying components to the heat exchanger for damage,
- the condensate drainage (optional) for clear passage and sufficient slope,
- the fixing screws for proper fit,
- the suspension for rigidity and sufficient load-bearing capacity (ceiling units),
- the unit for not contacting the facade and the raw floor except via the seals provided and the supporting feet (floor units),
- the line voltage and frequency to match the data given on the type plate,
- the electrical connections for proper execution and conformity to pertinent regulations,
- proper functioning of the control (optional),
- proper functioning of the motors (fan, actuators) without friction noises,
- the unit's fixation,
- the diffusion area/diffusion grille of the unit to be free of any obstructions,
- proper horizontal alignment, accurate to dimension,
- sufficient water hose lengths and strainless laying.

### Check for media supply

- Check for proper availability of primary air, cold water, warm water, and electrical power or compressed air for the control.
- Check whether voltage and line frequency comply with the data given on the actuator's type plate. Never operate control devices with inappropriate voltage or frequency since this might result in destruction of the units and put people at risk.

### Control technical equipment

Supply of control devices by LTG Aktiengesellschaft is optional, however it is the rule for actuators for units with dampers.

### Check for proper functioning

Turn the temperature control's selection knob slowly from one end position to the other while keeping an eye on the control dampers and linkage or the valves. Dampers and valves must move correspondingly quite smoothly and without rattling noises from one end position to the other. No exceptional noise must be produced by the electric actuators. In case the units show damages have them properly repaired by an expert. Damper linkages have been gauge adjusted in the factory and, therefore, require skilled personnel from LTG Aktiengesellschaft for readjustment.

### Starting standard operation

Then set the temperature controller to the desired temperature. After a certain time the indoor air temperature should meet the setpoint.

## 6. First use

Prior to first use any installation work and all checks must have been completed.

Check for proper water and power supply.

Please take special care to ensure that the starting voltage is adequate.

Having started the unit an air flow should be perceivable from the floor grille. Only very minor air diffusion and motor sounds should be audible. Other sounds such as friction or impact might indicate damages resulting from transport or installation.

## Operation/maintenance/repair

### 7. Operation, maintenance, repair

All units are virtually maintenance free, however certain things should be observed.



Any maintenance and repair work must be performed by skilled and trained staff only.

Before starting any maintenance or repair work the unit is to be completely disconnected from the main power supply!

#### 7.1 Heat exchanger, water connections, condensate tray

It is recommended to vacuum clean the heat exchanger and the dry condensate tray on a regular basis.



Be careful when performing work on the heat exchangers. Blades and housing parts are sharp-edged. Wear gloves during work and handling.



Check water connections and heat exchanger for tightness and possible corrosion damages.

If corrosion occurs inside the heat exchangers skilled staff must check the water treatment.

In case of condensation and existing condensate drainage the condensate tray will have to be wet cleaned and checked for contamination on a regular basis as required by VDI 6022.

#### 7.2 Filter

##### Unit with filter

If a recirculated air filter exists it requires replacement about 2...3 months after first use of the unit. By that time, it will probably be saturated from carpet lint and construction dust residues.

Exact timing is subject to local conditions.

The filter must be replaced on a regular basis, every 6 months to 2 years depending on dust formation.

A 6-month filter change interval will be required if the unit is operated in an environment with heavy dust load, a lot of foot traffic, and only minimum primary air filter quality.

A 2-year filter change interval might be appropriate if the unit is operated under conditions without foot traffic, in a clean environment, and with a very good primary air filter quality.

##### Unit without filter

The exchanger(s) is/are to be vacuum cleaned about 2...3 months after their putting into operation. By that time, heat exchangers are usually visibly polluted from carpet lint and construction dust remainders.

Exact timing is subject to local conditions.

Heat exchangers will then have to be vacuum cleaned on a regular basis, every 6 months to 2 years depending on dust formation. This gains particular importance considering that condensate formation might result in hard-to-remove dust caking.

A 6-month cleaning interval might be required if the unit is operated in an environment with heavy dust load, a lot of foot traffic, and only minimum primary air filter quality, in case of condensate formation on the cooler even sooner.

A 2-year cleaning interval might be appropriate if the unit is operated under conditions without foot traffic, in a clean environment, with a very good primary air filter quality and without condensate formation on the cooler.

#### 7.3 Fan

The fan is virtually maintenance-free. However, after an operating time of about 20,000 hours a failure of the fan may occur. The fan must be checked for smooth and proper running, possible imbalance, and damages to the bearing. The fan must also be checked on a regular basis, every 6...12 months, for potential dust and foreign bodies on the impeller. Severe pollution and foreign bodies may result in premature wear of the bearing and fan.

## Operation/maintenance/repair

### 7.4 Repair

If the damage is not obviously a mere "damage to the bodywork", e.g. on the condensate tray or outlet, units should be completely replaced and checked by the factory (in case of defects to the fan it might be sufficient to replace the fan unit without need to disconnect the system entirely from the water supply system).

First, the unit is to be completely disconnected from the power supply by an expert.

The filter in front of the heat exchanger is easy to replace since it is fixed to the unit with a simple adhesive strip.



Replacement of the control unit should be performed by skilled staff only or by the factory.

Replacement of individual components, e.g. a fan bearing, is not recommended since the greater number of settings can only be performed in the factory using special equipment.

Warranty applies to complete fans only.

### 7.5 Component maintenance schedule

Component	Activity	To perform	
		months	as required
<b>Unit, in general</b>	Check for pollution, damage, corrosion, correct positioning and fixation	12	
<b>Filter</b>	Check for pollution, damage and smell	3	
	Check the filter layer for correct positioning	3	
	Replace filter medium (document)	12 *	x
	Check for hygienic condition	3	
<b>Heat exchanger</b>	Check for pollution, damage and corrosion	6	
	Clean to maintain function	6	x
	Check water connections	12	
	Check proper function of entry and return	12	
	Vent		x
	Check for hygienic condition	6	
<b>Dirt and condensate tray</b>	Check for pollution, damage, tightness and corrosion	3	
	Clean to maintain function		x
	Check for hygienic condition	6	
	Check heat insulation for damage (visual check)		x
	Check drain and siphon for proper functioning		x
<b>Fan</b>	Check for pollution, damage, corrosion and proper fixation	6	
	Clean to maintain function		x
	Check impeller for imbalance	12	
	Check bearing for noises	12	
	Check vibration damper for proper functioning	12	
	Check safety device for proper functioning	12	
	Clean chambers from the inside		x
		6	

\* Shorten replacement intervals if outside or recirculating air are extremely dust loaded.

VDI 6022 sanitation requirements must be observed.

## Spare parts, decommissioning/disposal

### 8. Spare parts

The following spare parts are available and may be ordered from LTG Aktiengesellschaft stating unit type and description.

Spare part	Ident No.	Minimum order quantity
Heat exchanger size _____ for VKB _____		
Motor EC technology (all sizes)	1054827	1
Motor AC technology (motor 5-speed)	1020194	1
Impeller 630	1058507	1
Impeller 800	1058508	1
Impeller 1000	1058509	1
Diaphragm for water pipes	1052117	50
Rubber support for grille NBR 12x2	1019056	10 m
Terminal box electrical connection (AC motor)	1020194	1
Capacitor 1UF (AC motor)	1004190	1
Accessory Connecting plug (EC motor)	1061955	1
Sleeve for cable leadthroughs	1061079	50

### 9. Decommissioning, disposal

When the unit is taken out of service, is no longer used and is disposed of as waste, the following must be complied with:

- all steel parts are waste for recycling
- all plastic parts are waste for recycling
- all secondary substances and lubricants must be disposed of in accordance with the provisions of the EWC (European Waste Catalogue) classification.
- Silencers are waste for recycling
- Heat exchangers are waste for recycling (copper, aluminium).



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