

# Installation/Use/Maintenance Instructions

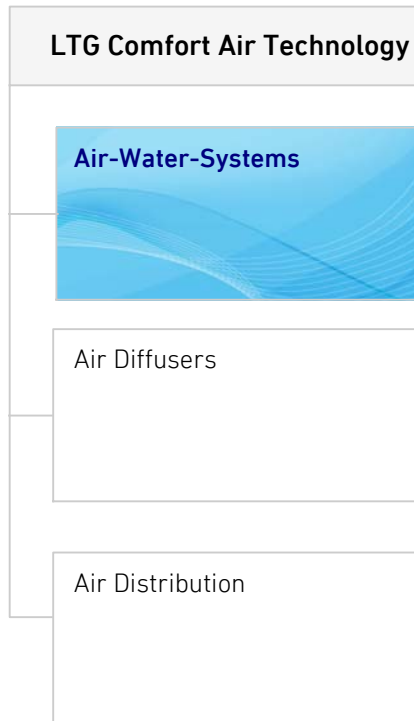
# LTG Air-Water Systems

## LTG FanPower

Fan coil unit VFC




Installation in sills




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## 1. Safety


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



Carefully read the safety instructions before using any LTG induction unit. Always follow the safety instructions!

The units meet any pertinent safety standards.


	<p>The installation and maintenance of air conditioning units may be dangerous because of high pressures and electrical components being alive. Therefore, the installation, maintenance, and repair must be performed by qualified and trained staff only.</p> <p>Safety instructions in the technical documentation and on unit labels must be followed at all times.</p> <p>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.</p>
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	<p>During continuous operation the motor may reach temperatures of up to 149 °F. If necessary, allow the motor to cool off or wear gloves.</p> <p>In the heating mode a water temperature of up to 176 °F may be achieved. Water-carrying parts may be hot so do not touch with your bare hands to avoid burns.</p>	
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	<p>Be careful when performing work on the heat exchangers. Blades and housing parts are sharp-edged. Wear gloves during work and handling.</p>	
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	<p>The standard version of the heat exchangers is designed for an operating pressure of 145 psi (test pressure 232 psi). High water pressures may be hazardous. Higher operating pressures, therefore, require LTG's express permission.</p> <p>Wear safety glasses.</p>	
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### Continuation 1.2 Operating safety instructions

 **Parts and tools.**  
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 damages (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!


## 2. Transport, storage, delivery

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

The unit is supplied in corrugated board boxes secured with straps.

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

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

 **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, 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 41 °F and 131 °F with a relative humidity of 90 % max. (non-condensing).

### 2.3 Delivery

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

- on pallets, 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.

### 3. Function

The fan coil unit is a recirculating air unit for cooling or heating (2-pipe) or for cooling and heating (4-pipe) the air.

These fan coil units have been designed for installation in sills in office and conference rooms, hotel rooms, hospitals and other closed rooms for room air treatment.

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

Uniform distribution of the air across the entire fan is ensured by a tangential fan impeller extending over the entire width. The heat exchanger is usually equipped with a filter for protection.

Thermal energy transport to the heat exchanger is performed by water; water connection on the right or left.

If the cold water temperature drops in the cooling mode below dew point of the air the condensate will be collected by a condensate tray with possible connecting socket. For reasons of hygiene, the unit should be dimensioned in a way to ensure that no condensation occurs during standard operation. For operation below dew point insulated units are available.

Output is water-side controlled by valves.

The fan speed is controlled by a 0-10 V input signal to the EC motor with low energy consumption.

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

With view to sizing, 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 control device.

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

The use of a filter results, at the same speed level, in a reduction of both the caloric output and the air flow rate while the sound power level of the units is higher when increasing the fan speed.

### 3.1 Intended Use

The LTG fan coil unit VFC is intended for use indoors.

It is designed for indoor ambient temperatures of +41...+104 °F 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 +104°F.

The maximum admissible water supply temperature is, therefore, limited to +176 °F.

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.

**4. Technical data**

**4.1 Specification, dimensions, technical data**

**4.1.1 2-pipe system (type VFC-0/2/...)**

**Specification**

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

Water-side control by valves.

Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills.

For extremely low inlet temperatures an insulated drain pan is available.

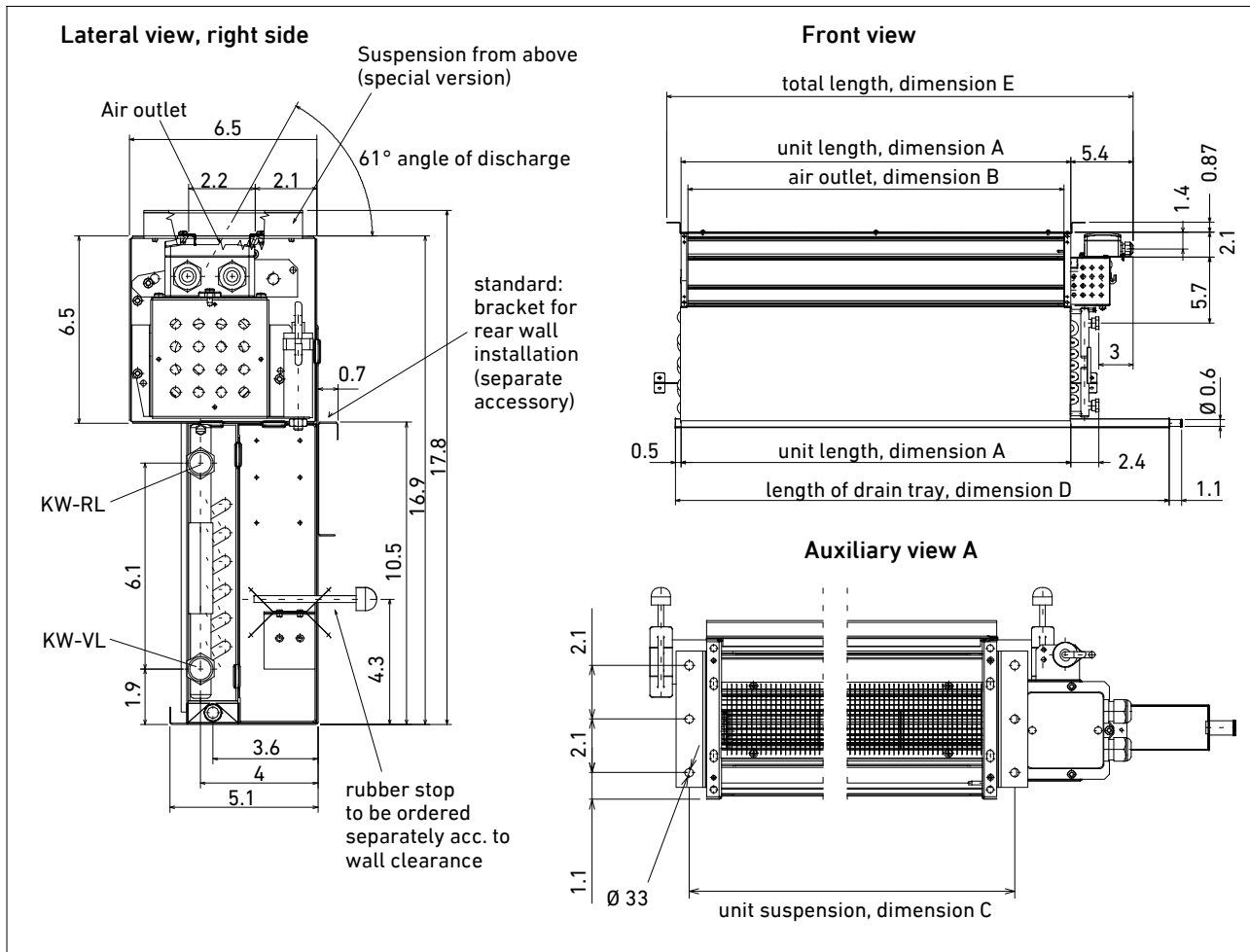
Vertical installation.

Water connection on the right or left.

**Dimensions**

Size	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	Weight* [lbs]
500	20.7	19.5	22.1	28.7	27.3	28.6
630	24.7	23.5	26.1	34.8	31.3	33
800	33.7	32.5	35.1	42.7	40.3	42
1000	41.6	40.4	43	52.6	48.2	51
1250	49.5	48.3	50.9	61.1	56.1	62

\* approx. values, depending on the exact model



**Mounting options:**

- suspension from above (attachment to the sill)
- wall mounting - rear suspension

KW-VL = cold water inlet

KW-RL = cold water return

Continuation 4.1 Specification, dimensions, technical data

**4.1.1 2-pipe system, version for extremely low inlet temperatures (type VFC-0/2/.../E/...)**

**Specification**

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

Water-side control by valves.

Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills.

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

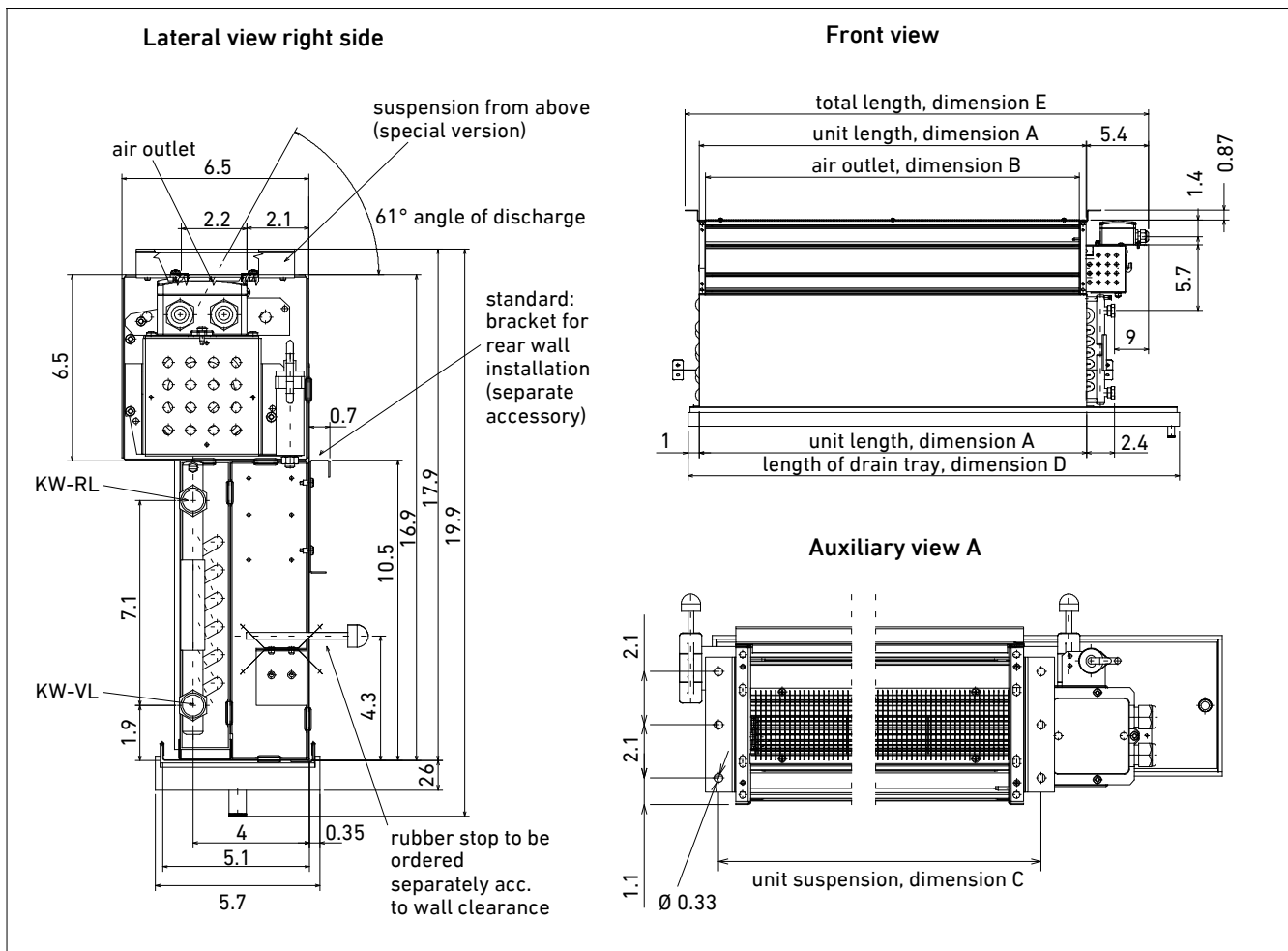
Vertical installation.

Water connection on the right or left.

Size	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	Weight* [lbs]
500	20.7	19.5	22.1	28.7	27.3	28.6
630	24.7	23.5	26.1	34.8	31.3	33
800	33.7	32.5	35.1	42.7	40.3	42
1000	41.6	40.4	43	52.6	48.2	51
1250	49.5	48.3	50.9	61.1	56.1	62

\* approx. values, depending on the exact model

**Dimensions**



**Mounting options:**

- suspension from above (attachment to the sill)
- wall mounting (rear suspension)

KW-VL = cold water inlet  
 KW-RL = cold water return

**Technical data** see standard version VFC-0/2/.../T/...

Continuation 4,1 Specification, dimensions, technical data

4.1.1 2-pipe system (VFC-0/2/..../T/....)

Technical data size 500

n	V [cfm]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>oF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>sens mF</sub> <sup>2)</sup> [BTU/h]	w <sub>o</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	94	26	32	70.1	68.2	2,948	2,456	0.88 / 6.0	16
II	141	30	36	92.9	91.0	3,930	3,275		20
III	171	36	42	108.0	106.1	4,316	3,821		23
IV	200	40	46	121.3	121.3	4,804	4,367		25
V	253	46	52	138.4	138.4	5,377	4,981		31

Technical data size 630

n	V [cfm]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>oF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>sens mF</sub> <sup>2)</sup> [BTU/h]	w <sub>o</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	100	25	31	91.0	81.5	3,521	2,934	0.88 / 6.7	16
II	153	29	35	111.8	111.8	4,831	4,026		20
III	182	35	41	128.9	128.9	5,241	4,640		23
IV	218	39	45	144.1	144.1	5,705	5,186		25
V	282	46	52	164.9	164.9	6,411	5,937		31

Technical data size 800

n	V [cfm]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>oF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>sens mF</sub> <sup>2)</sup> [BTU/h]	w <sub>o</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	129	25	31	98.6	91.0	3,930	3,275	0.88 / 7.3	16
II	188	28	34	136.5	121.3	5,241	4,367		20
III	224	34	40	157.3	147.8	6,012	5,322		23
IV	271	38	44	180.1	174.4	6,905	6,278		25
V	341	45	51	199.0	199.0	7,738	7,165		31

Technical data size 1000

n	V [cfm]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>oF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>sens mF</sub> <sup>2)</sup> [BTU/h]	w <sub>o</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	176	27	33	117.5	111.8	5,077	4,026	0.88 / 7.6	25
II	247	30	36	155.4	144.1	6,714	5,186		29
III	276	34	40	174.4	168.7	7,093	6,073		33
IV	335	38	44	197.1	193.3	7,806	6,960		36
V	424	46	52	216.1	216.1	8,400	7,779		42

Technical data size 1250

n	V [cfm]	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	Q <sub>oF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>1)</sup> /Δt [BTU/h*Δt]	Q <sub>mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>sens mF</sub> <sup>2)</sup> [BTU/h]	w <sub>o</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	212	27	33	151.6	138.4	5,977	4,981	0.88 / 8.3	25
II	276	30	36	185.8	174.4	7,533	6,278		29
III	335	35	41	202.8	197.1	8,018	7,097		33
IV	406	38	44	219.9	214.2	8,482	7,711		36
V	488	46	52	242.6	235.0	9,137	8,461		42

1) Specific cooling capacity (non condensing operation)

2) Cooling capacity with the following parameters: water inlet 43 °F, air temperature entering the heat exchanger 79 °F, 50 % rel. humidity

**Legend see page 14**



### Continuation 4.1 Specifications, dimensions, technical data

#### 4.1.2 4-pipe system (type VFC-0/4/..../T/....)

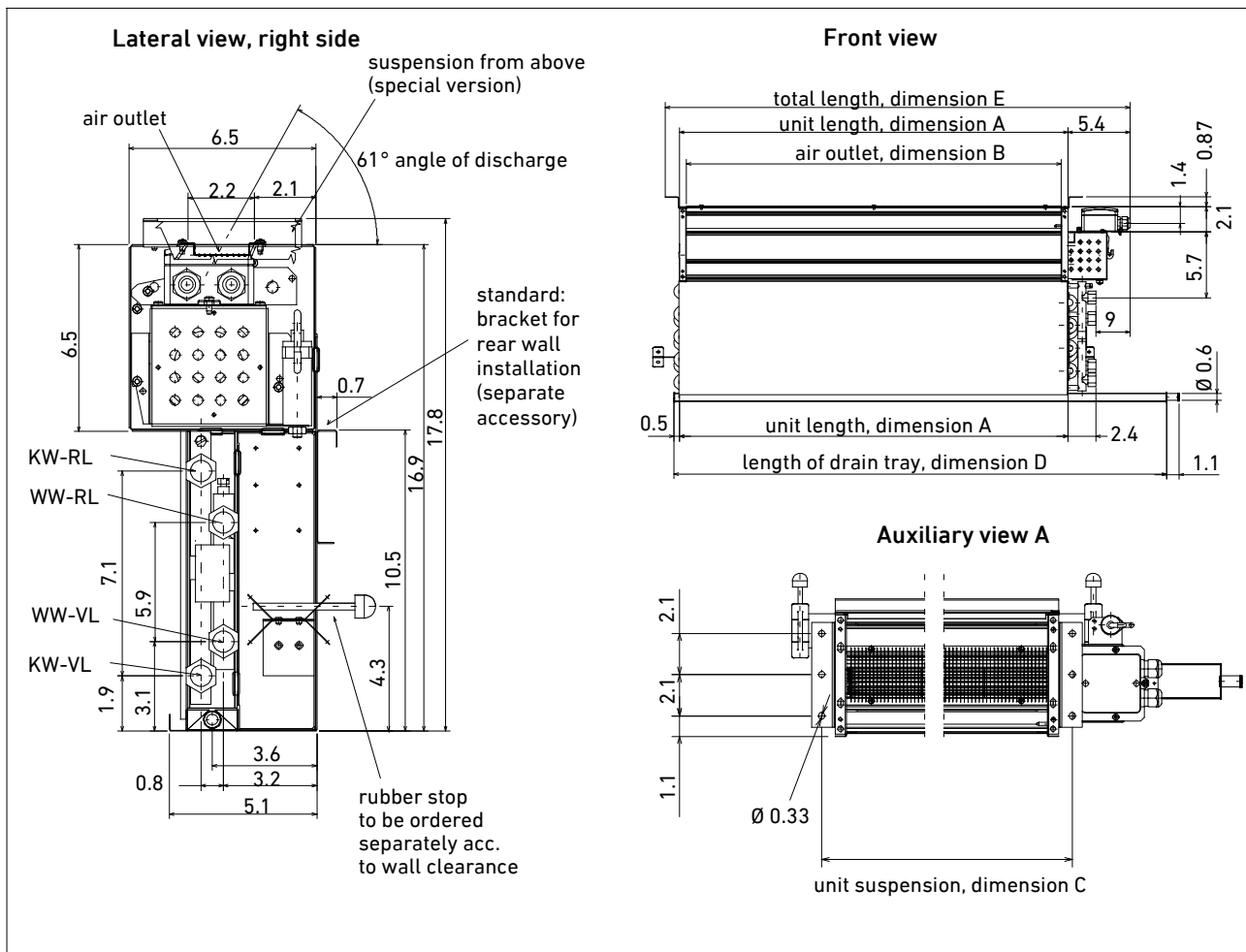
##### Specification

Fan coil unit with one heat exchanger and two separate water cycles for heating and cooling the ambient air.  
 Water-side control by valves.  
 Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills.  
 For extremely low inlet temperatures an insulated drain tray is available for insertion on site.  
 Vertical installation.  
 Water connection on the right or left.

##### Dimensions

Size	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	Weight* [lbs]
500	20.7	19.5	22.1	28.7	27.3	28.6
630	24.7	23.5	26.1	34.8	31.3	33
800	33.7	32.5	35.1	42.7	40.3	42
1000	41.6	40.4	43.0	52.6	48.2	51
1250	49.5	48.3	50.9	61.1	58.1	62

\* approx. values, depending on exact model



##### Mounting options:

- Suspension from above (attachment to the sill)
- Wall mounting - rear suspension

- KW-VL = cold water inlet
- KW-RL = cold water return
- WW-VL = warm water inlet
- WW-RL = warm water return

Continuation 4.1 Specifications, dimensions, technical data

**4.1.2 4-pipe system, for extremely low inlet temperatures (type VFC-0/4/.../E/...)**

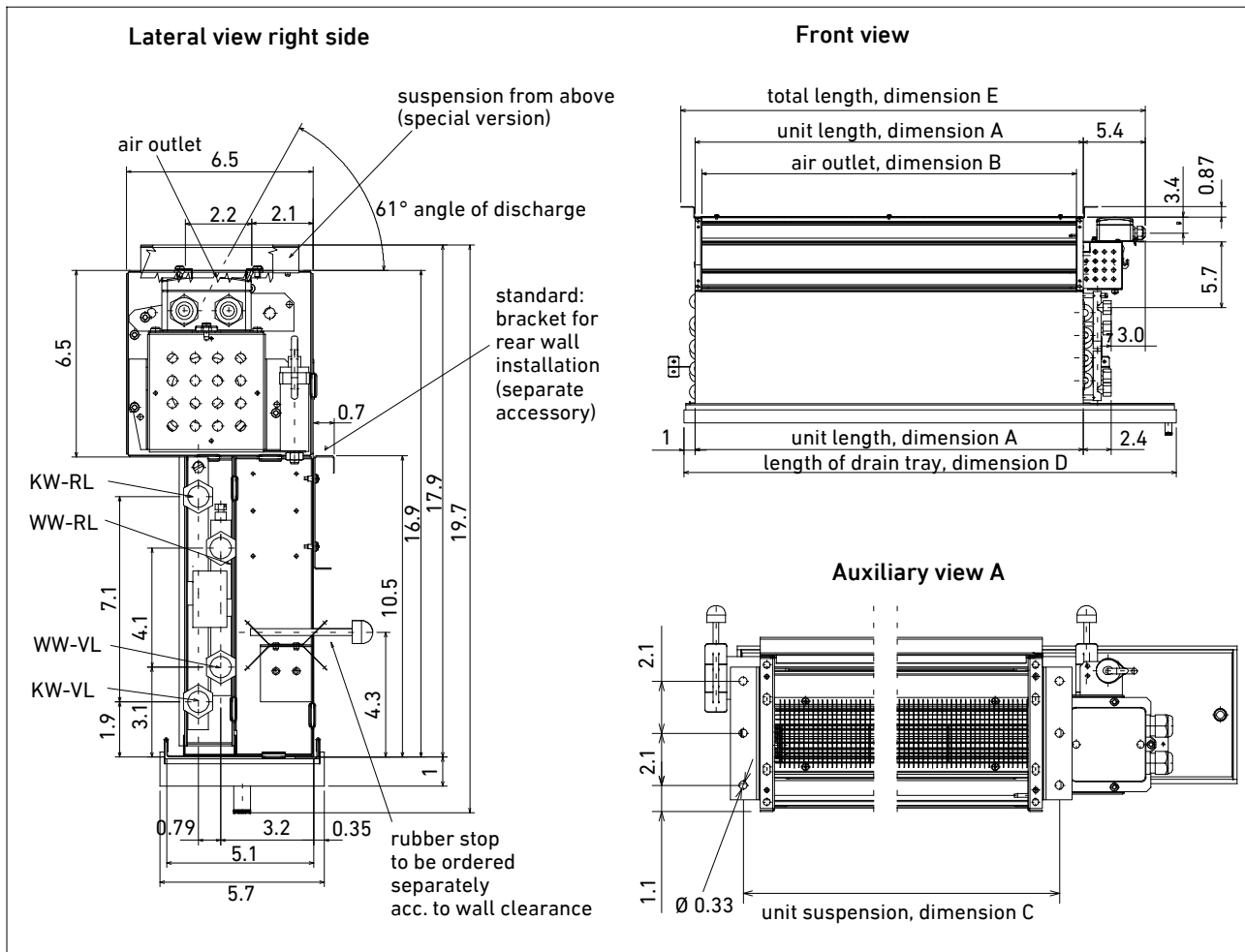
**Specification**

Fan coil unit with one heat exchanger and two separate water cycles for heating and cooling the ambient air. Water-side control by valves. Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills. For extremely low inlet temperatures an insulated drain tray is available for insertion on site. Vertical installation. Water connection on the right or left.

Size	A [inch]	B [inch]	C [inch]	D [inch]	E [inch]	Weight* [lbs]
500	20.7	19.5	22.1	29.8	27.3	35
630	24.7	23.5	26.1	33.7	31.3	42
800	33.7	32.6	35.1	42.8	40.3	53
1000	41.6	40.4	43	50.7	48.2	64
1250	49.5	48.3	51	58.5	56.1	75

\* approx. values, depending on exact model

**Dimensions**



**Mounting options:**

- Suspension from above (attachment to the sill)
- Wall mounting - rear suspension

- KW-VL = cold water inlet
- KW-RL = cold water return
- WW-VL = warm water inlet
- WW-RL = warm water return

**Technical data** see standard unit VFC-0/4/.../T/...

Continuation 4.1 Specifications, dimensions, technical data

4.1.2 4-pipe system (VFC-. /4)

Technical data size 500

n	V [cfm]	LA18 [dB(A)]	LWA [dB(A)]	Q <sub>k oF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>k sens mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>h oF</sub> /Δt [BTU/h*Δt]	Q <sub>h mF</sub> /Δt [BTU/h*Δt]	w <sub>ok</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	w <sub>oh</sub> /Δp <sub>w</sub> [Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	94	25	32	64.4	53.1	2,293	1,911	39.8	36.0			16
II	141	32	38	87.2	85.3	3,685	3,071	53.1	53.1			20
III	171	36	42	102.4	102.4	4,162	3,685	60.7	60.7	0.88 / 4.3	0.44 / 0.83	23
IV	200	41	47	113.7	113.7	4,504	4,094	66.3	66.3			25
V	253	47	53	128.9	128.9	5,009	4,640	75.8	75.8			31

Technical data size 630

n	V [cfm]	LA18 [dB(A)]	LWA [dB(A)]	Q <sub>k oF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>k sens mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>h oF</sub> /Δt [BTU/h*Δt]	Q <sub>h mF</sub> /Δt [BTU/h*Δt]	w <sub>ok</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	w <sub>oh</sub> /Δp <sub>w</sub> [Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	100	26	32	77.7	68.2	2,948	2,456	49.3	43.6			16
II	153	32	38	98.6	96.7	4,176	3,480	60.7	58.8			20
III	182	36	42	113.7	113.7	4,626	4,094	66.3	66.3	0.88 / 4.7	0.44 / 0.9	23
IV	218	41	47	127.0	127.0	5,029	4,572	73.9	73.9			25
V	282	47	53	144.1	144.1	5,599	5,186	81.5	81.5			31

Technical data size 800

n	V [cfm]	LA18 [dB(A)]	LWA [dB(A)]	Q <sub>k oF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>k sens mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>h oF</sub> /Δt [BTU/h*Δt]	Q <sub>h mF</sub> /Δt [BTU/h*Δt]	w <sub>ok</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	w <sub>oh</sub> /Δp <sub>w</sub> [Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	129	25	31	89.1	79.6	3,439	2,866	55.0	49.3			16
II	188	31	37	121.3	113.7	4,913	4,094	72.0	68.2			20
III	224	34	42	140.3	134.6	5,473	4,845	79.6	77.7	0.88 / 5.3	0.44 / 1.0	23
IV	271	40	46	155.4	153.5	6,080	5,527	89.1	89.1			25
V	341	46	52	174.4	172.5	6,704	6,209	96.7	96.7			31

Technical data size 1000

n	V [cfm]	LA18 [dB(A)]	LWA [dB(A)]	Q <sub>k oF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>k sens mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>h oF</sub> /Δt [BTU/h*Δt]	Q <sub>h mF</sub> /Δt [BTU/h*Δt]	w <sub>ok</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	w <sub>oh</sub> /Δp <sub>w</sub> [Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	176	25	31	109.9	100.5	4,340	3,617	68.2	62.5			25
II	247	32	38	144.1	134.6	5,814	4,845	89.1	83.4			29
III	276	36	42	161.1	155.4	6,322	5,595	102.4	96.7	0.88 / 6.0	0.44 / 1.1	33
IV	335	41	47	180.1	174.4	6,905	6,278	111.8	108.0			36
V	424	47	53	202.8	199.0	7,738	7,165	123.2	123.2			42

Technical data size 1250

n	V [cfm]	LA18 [dB(A)]	LWA [dB(A)]	Q <sub>k oF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>1) /Δt</sup> [BTU/h*Δt]	Q <sub>k mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>k sens mF</sub> <sup>2)</sup> [BTU/h]	Q <sub>h oF</sub> /Δt [BTU/h*Δt]	Q <sub>h mF</sub> /Δt [BTU/h*Δt]	w <sub>ok</sub> /Δp <sub>w</sub> [gpm]/[Ft H <sub>2</sub> O]	w <sub>oh</sub> /Δp <sub>w</sub> [Ft H <sub>2</sub> O]	P <sub>el</sub> [W]
I	212	25	31	140.3	128.9	5,568	4,640	87.2	81.5			25
II	276	32	38	170.6	161.1	6,960	5,800	102.4	96.7			29
III	335	36	42	185.8	182.0	7,492	6,551	115.6	109.9	0.88 / 6.7	0.44 / 1.2	33
IV	406	41	47	200.9	197.1	7,806	7,097	119.4	115.6			36
V	488	47	53	223.7	219.9	8,547	7,915	130.8	127.0			42

1) Specific cooling capacity (non condensing operation)

2) Cooling capacity with the following parameters: water inlet = 43 °F, air temperature entering the heat exchanger = 79 °F, rel. humidity = 50 % rel.

**Legend** see page 14

Continuation 4.1 Specifications, dimensions, technical data

**4.1.3 Fresh air supply by linear diffuser LDB (type VFC-././..../FL/....)**

**Specification**

Fan coil unit special version with additional fresh air supply. Via an adjustable LTG diffuser LDB, the air is blown out in parallel to the tangential fan outlet. Optimum fresh air supply is ensured even with the fan at standstill.

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

Water-side control by valves.

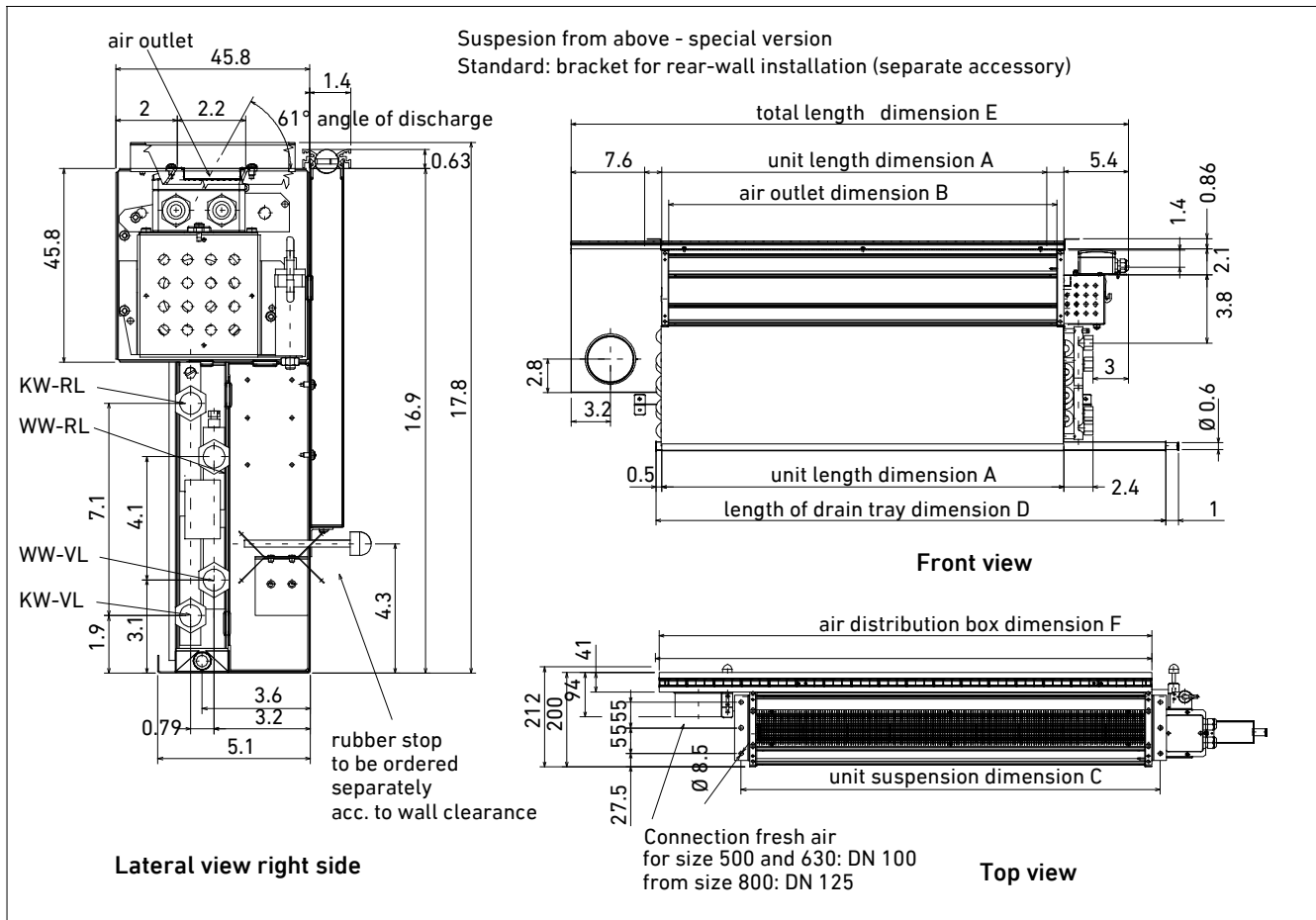
Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills. Vertical installation.

Water connection on the right or left.

**Dimensions, weights**

Size	A	B	C	D	E	F	Weight [lbs] *
500	20.7	19.5	22.1	28.7	33.8	28.3	35
630	24.7	23.5	26.1	34.8	37.8	32.3	42
800	33.7	32.5	35.1	42.7	46.9	41.3	53
1000	41.6	40.4	43	52.5	54.7	49.2	64
1250	49.5	48.3	51	61.1	62.6	57.0	77

\* approx. values, depending on exact model



Shown: 4-pipe unit

Technical data see standard units type VFC-0/4/..../T and type VFC-0/2/..../T.

Acoustic data may vary according to fresh air rate.

The total sound power level may be calculated as follows:  $L_{WA} = 10 * \log (10^{0.1 * L_{WA,P}} + 10^{0.1 * L_{WA,VKB}})$

The sound power level  $L_{WA}$  [dB(A)] for separate socket for fresh air supply must be added to the unit's sound power level:

Size	V [cfm]					
	23.5	35.3	47	59	70.6	82.3
500	15	26	34	40	46	>45
630	15	23	31	37	42	>45
800	<15	28	25	32	37	41
1000	<15	<15	19	26	31	35
1250	<15	<15	<15	22	26	31

Continuation 4.1 Specifications, dimensions, technical data

**4.1.4 Fresh air supply by fresh air box (type VFC-0/./.../FS)**

**Specification**

Fan coil unit special version with fresh air supply, with lateral (left, opposite to motor) primary air box in extension to the recirculating air outlet Optimum fresh air supply is ensured even with the fan at standstill.

Connection is realized using a dia: 4.0 " socket, with integrated damper (option).

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

Water-side control by valves.

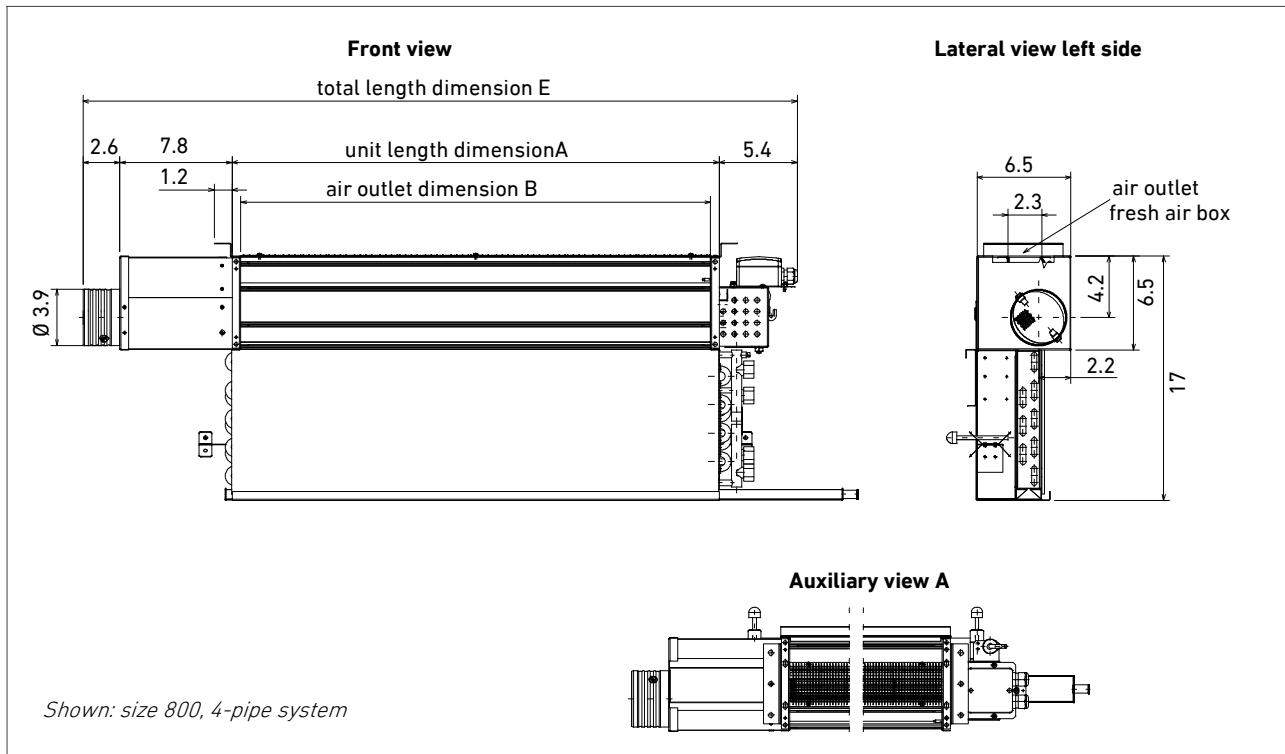
Particularly small built-in depth and height, therefore especially appropriate for a room-saving installation in sills.

Vertical installation. Water connection on the right or left.

**Dimensions, weights**

Size	A [inch]	B [inch]	E [inch]	Weight * [lbs]
500	20.7	19.5	36.5	31
630	24.7	23.5	40.4	35
800	33.7	32.5	49.5	44
1000	41.6	40.4	57.4	53
1250	49.5	48.7	65.3	64

\* approx. values, depending on exact model



Technical data see standard units VFC-0/4 and VFC-0/2. Acoustic data may increase according to fresh air rate.

The sound power level  $L_{WA}$  [dB(A)] for separate fresh air box must be added to the unit's sound power level:

1 socket (dia: 4.0 "), with grille (aluminum linear grille)					
$V_p$	[cfm/ft]	10.7	14.3	17.9	21.4
$L_{WA P}$	[dB(A)]	29	31	32	37
<b>Pressure loss</b>	[in(wg)]	0.014	0.024	0.04	0.056

The total sound power level may be calculated as follows:  $L_{WA} = 10 * \log (10^{0.1 * L_{WA P}} + 10^{0.1 * L_{WA VFC}})$

Continuation 4.1 Specifications, dimensions, technical data

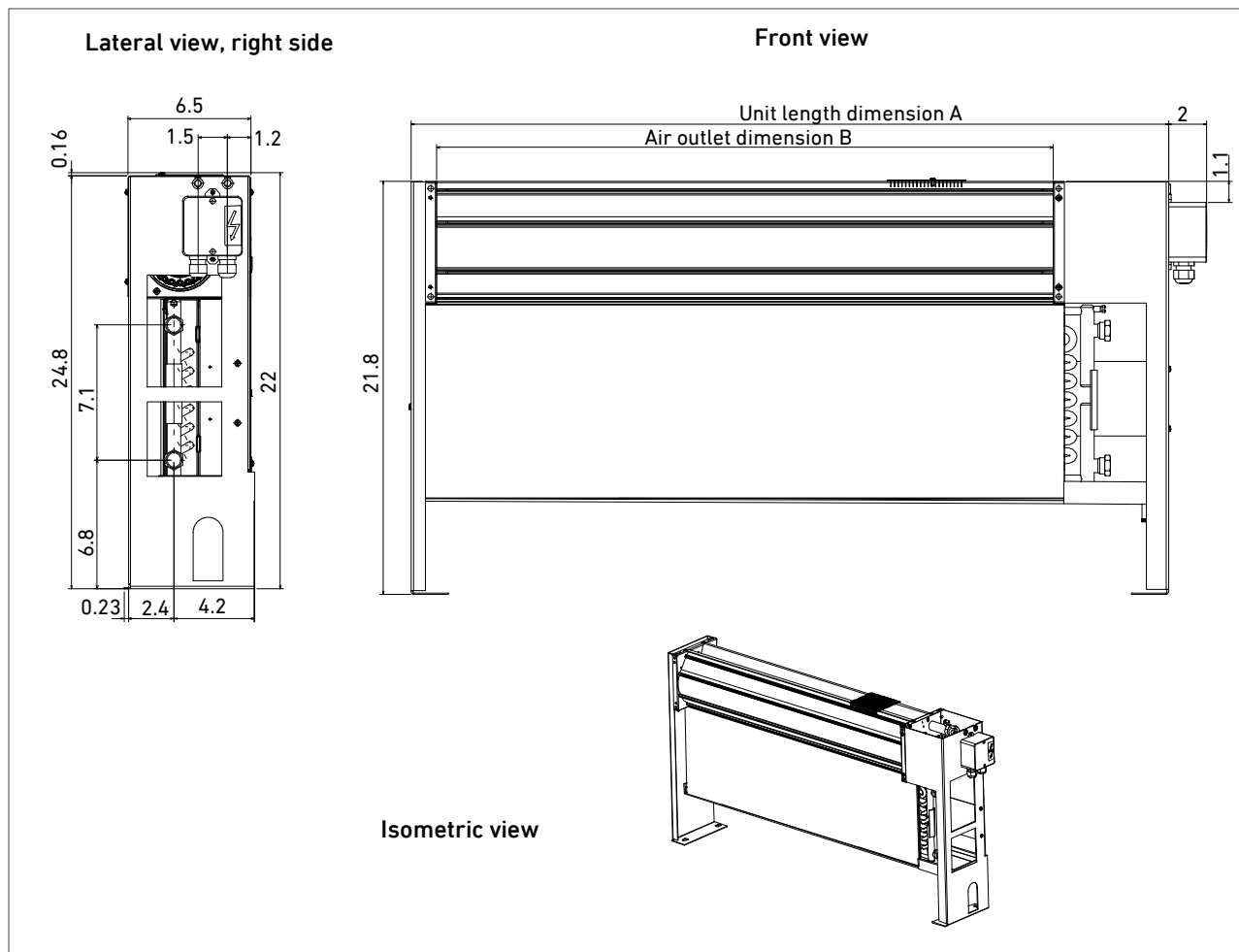
**4.1.5 Upright unit with solid floor fixation (type VFC-F/...)**

**Specification**

With base for attachment to the ground.

**Dimensions, weights**

Size	A [inch]	B [inch]	Weight [lbs]
630	31	235	42
800	40	325	51
1000	47.9	404	59
1250	55.7	48.3	70



*Shown: size 630, 2-pipe system, without casing*

**Technical data** see standard unit VFC-0/4 resp. VFC-0/2

Continuation 4.1 Specifications, dimensions, technical data

**4.1.6 Casing VK for upright units**

**Specification**

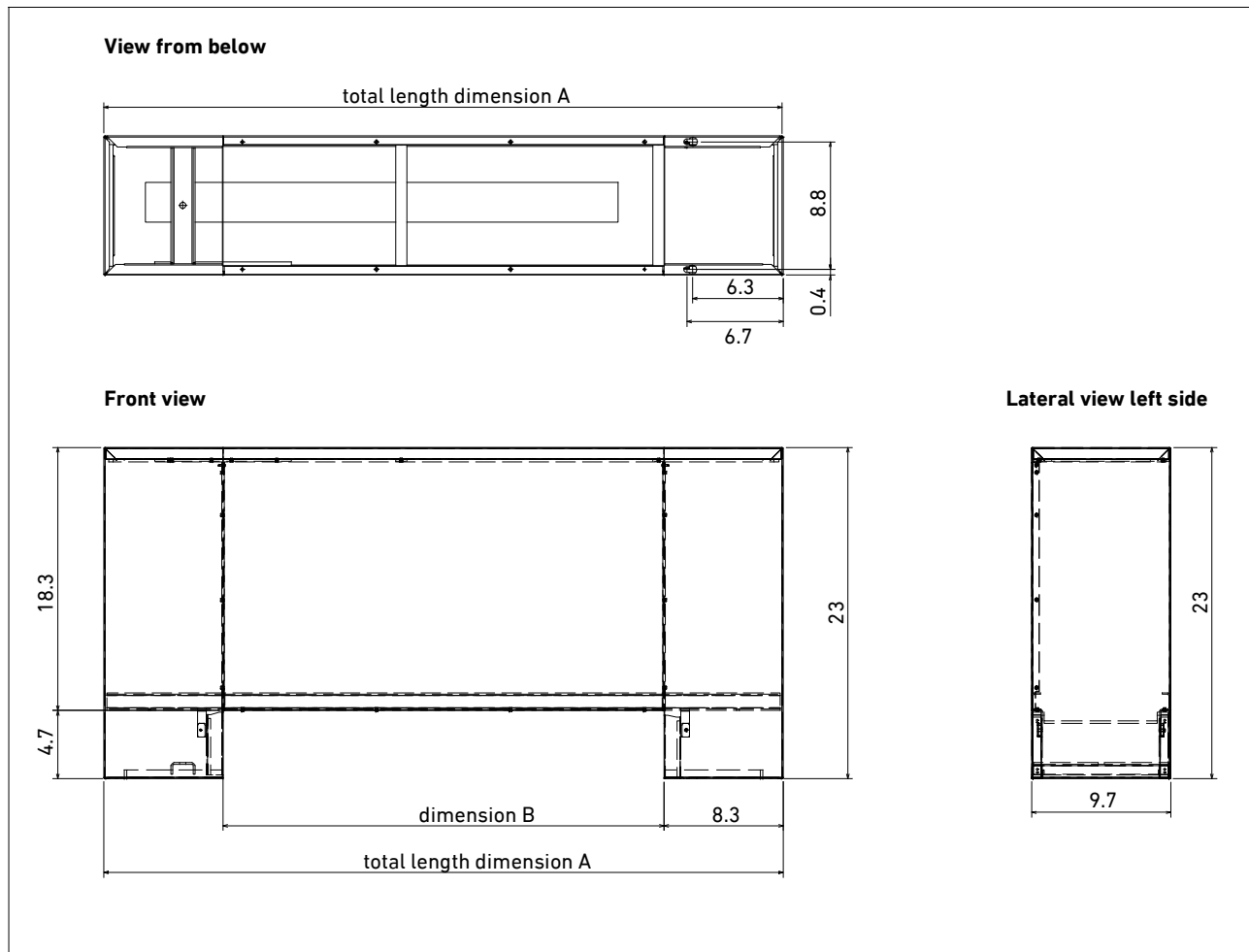
4-side casing for VF units of galvanized sheet metal. Consisting of supporting structure of channel-sections, rear cover panel, angle panel, side mullions and air outlet grille LDC (aluminum). All exposed surfaces are high-quality powder coated in colors similar to RAL, thickness of layer 60 µm.

All VF units are fixed to the casing using brackets.

Dimensions see table. Special lengths on request.

**Dimensions, weights**

Size	A [inch]	B [inch]	Weight [lbs]
630	38.2	23.8	35
800	47.2	32.9	40
1000	55.1	40.7	46
1250	63	48.6	53



Continuation 4.1 Specifications, dimensions, technical data

**4.1.7 Type VFC-0/4/.../EC**

**Specification**

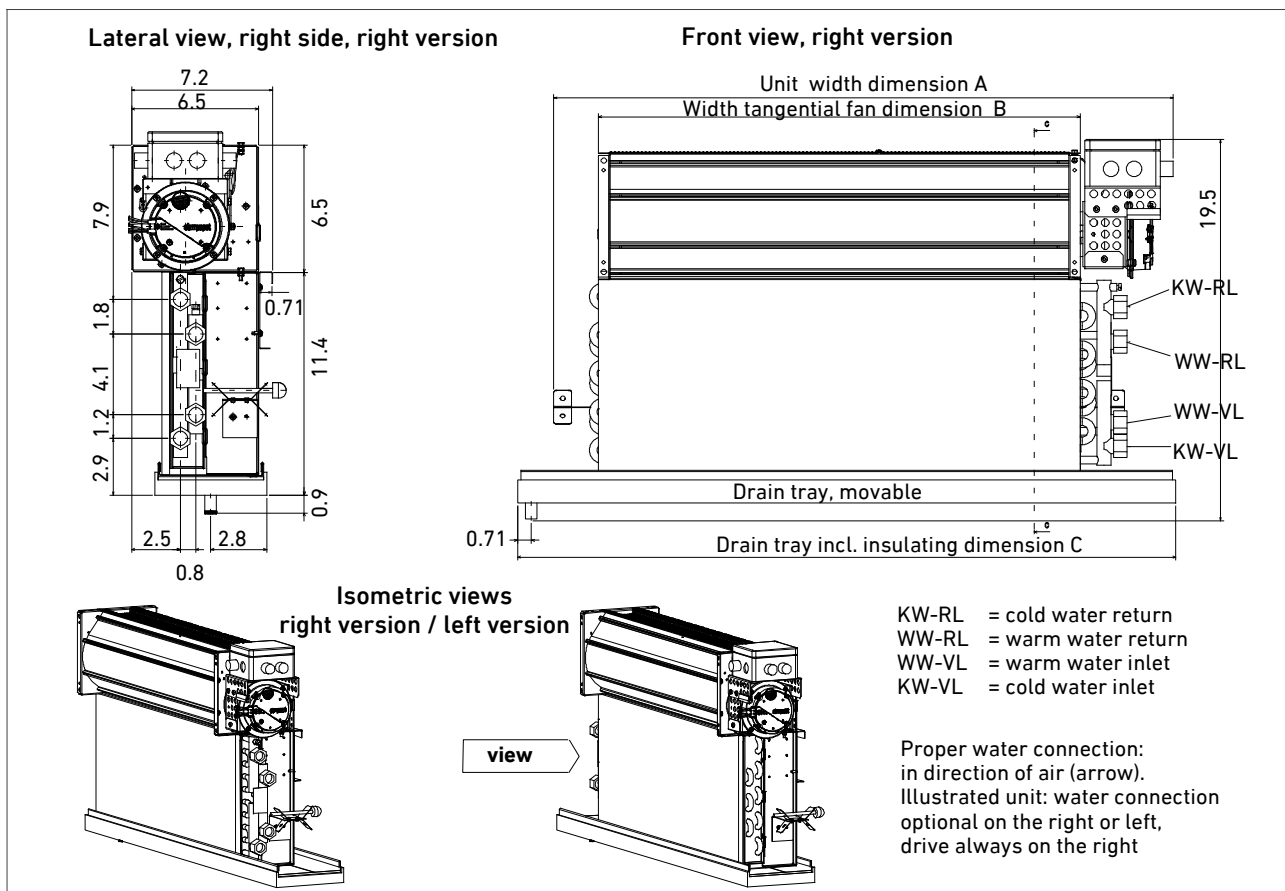
Fan coil unit with one heat exchanger with two separate water circuits for cooling and heating.  
 Water-side control by valves.  
 With EC motor for all variants.  
 Extra small built-in depth and height, therefore especially appropriate for a room-saving installation in sills.

For extremely low inlet temperatures an insulated drain tray is available.  
 Vertical installation, water connection on the right or left  
 Mounting options:  
 - Suspension from above (to hook in the sill)  
 - Wall installation, mounting on rear side

**Dimensions, weights, caloric data**

Size	A [inch]	B [inch]	C [inch]	Weight * [lbs]	Voltage	L <sub>A18</sub> [dB(A)]	L <sub>WA</sub> [dB(A)]	P <sub>el</sub> [W]
500	26.6	19.5	29.8	33	2.3	23	29	5
					3.0	29	35	6
					3.7	35	41	9
					4.3	41	46	11
					5.5	45	51	17
630	31.8	24.7	33.7	39	as size 500			
800	38.4	31.4	42.8	51	as size 500			
1000	46.3	39	50.6	62	2.3	24	30	6
					3.0	29	35	8
					3.7	35	41	11
					4.3	41	47	16
					5.5	47	53	26
1250	56.2	49.1	58.5	73	as size 1000			

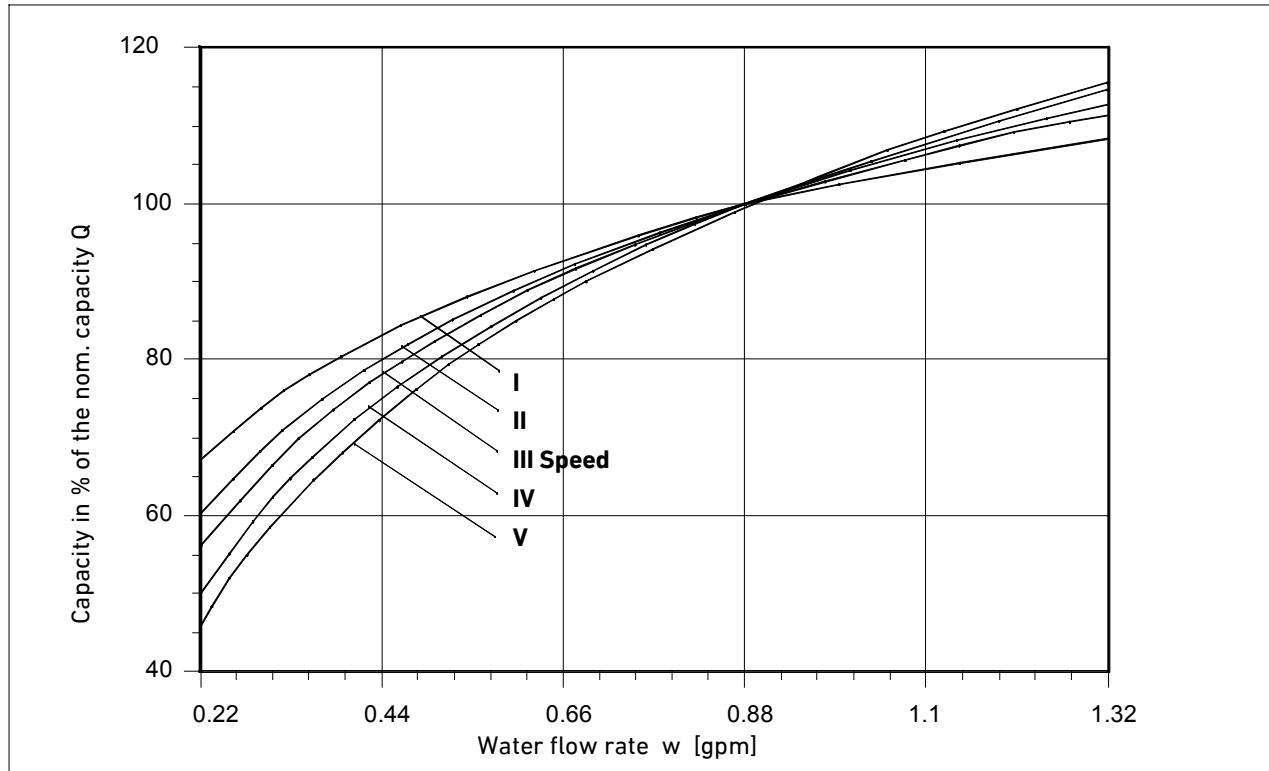
\* approx. values, depending on version



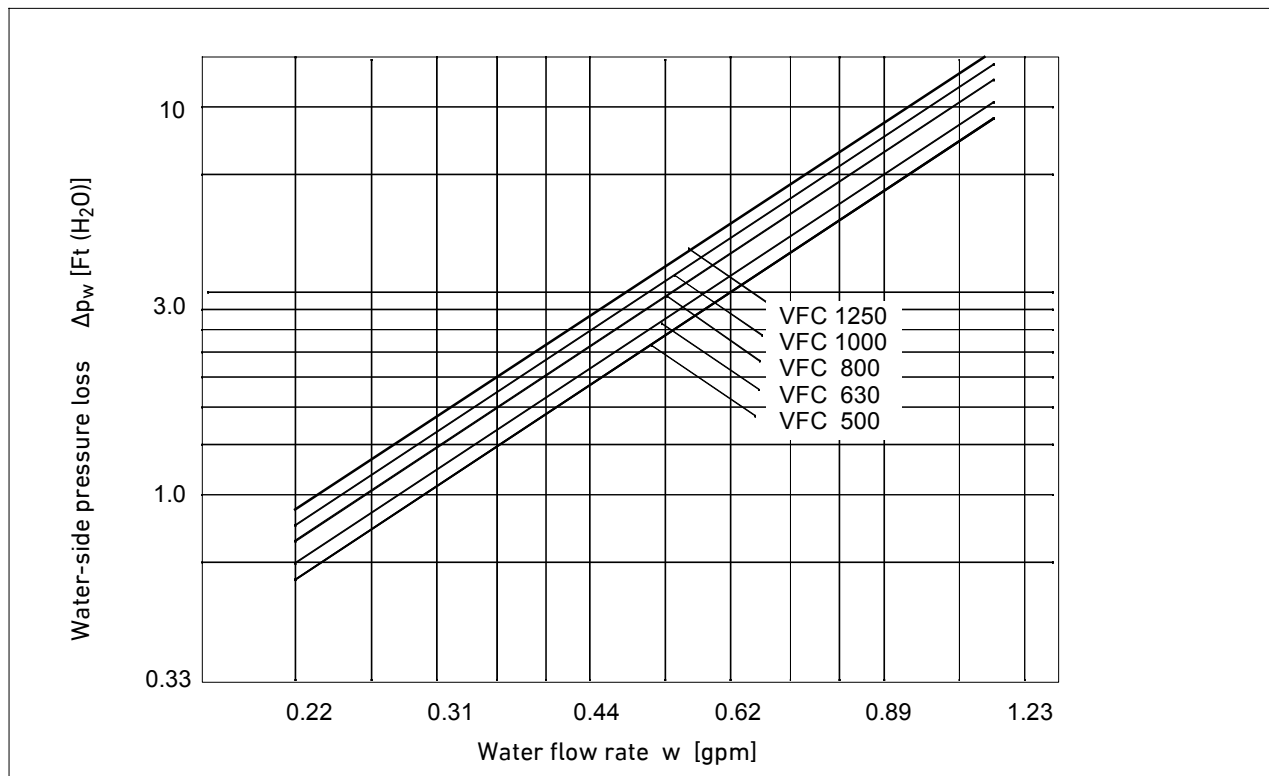


**4.1.8 Capacity charts**

**Capacity for different flow rates, 2-pipe system**

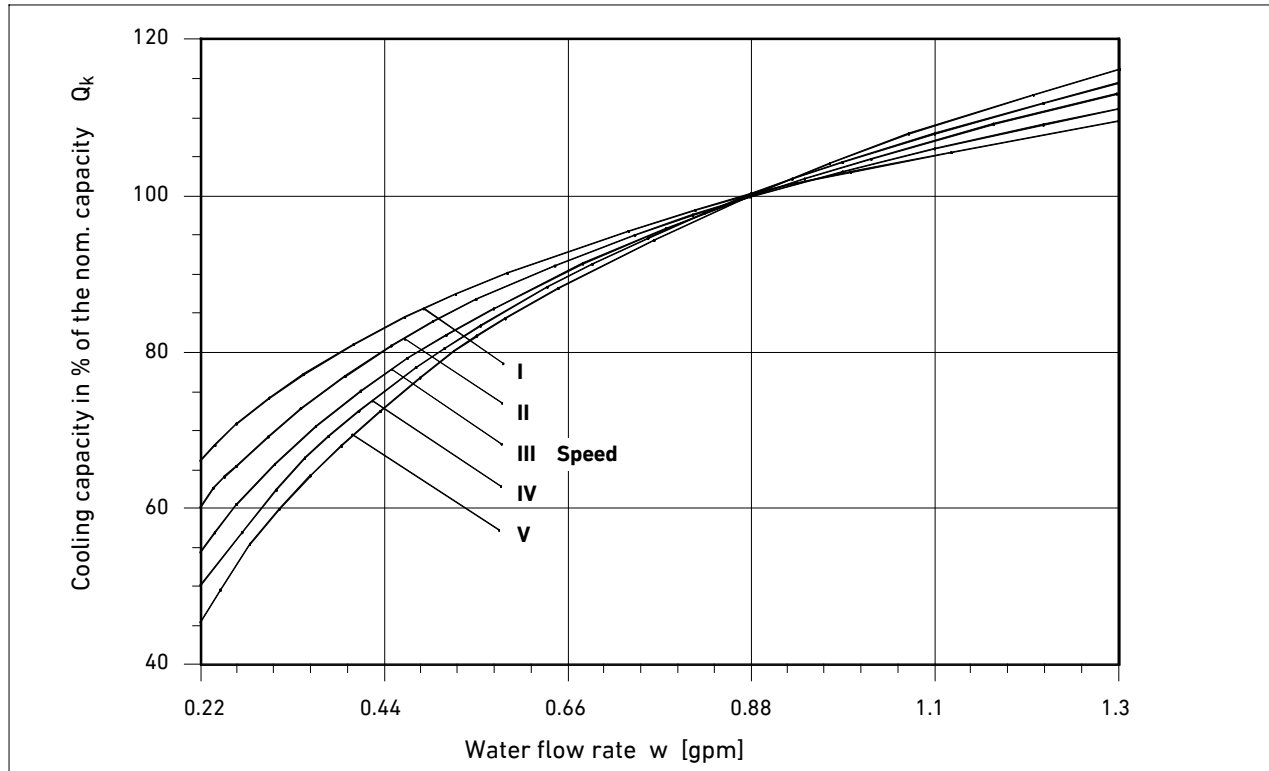


**Water-side pressure loss for different flow rates, 2-pipe system**

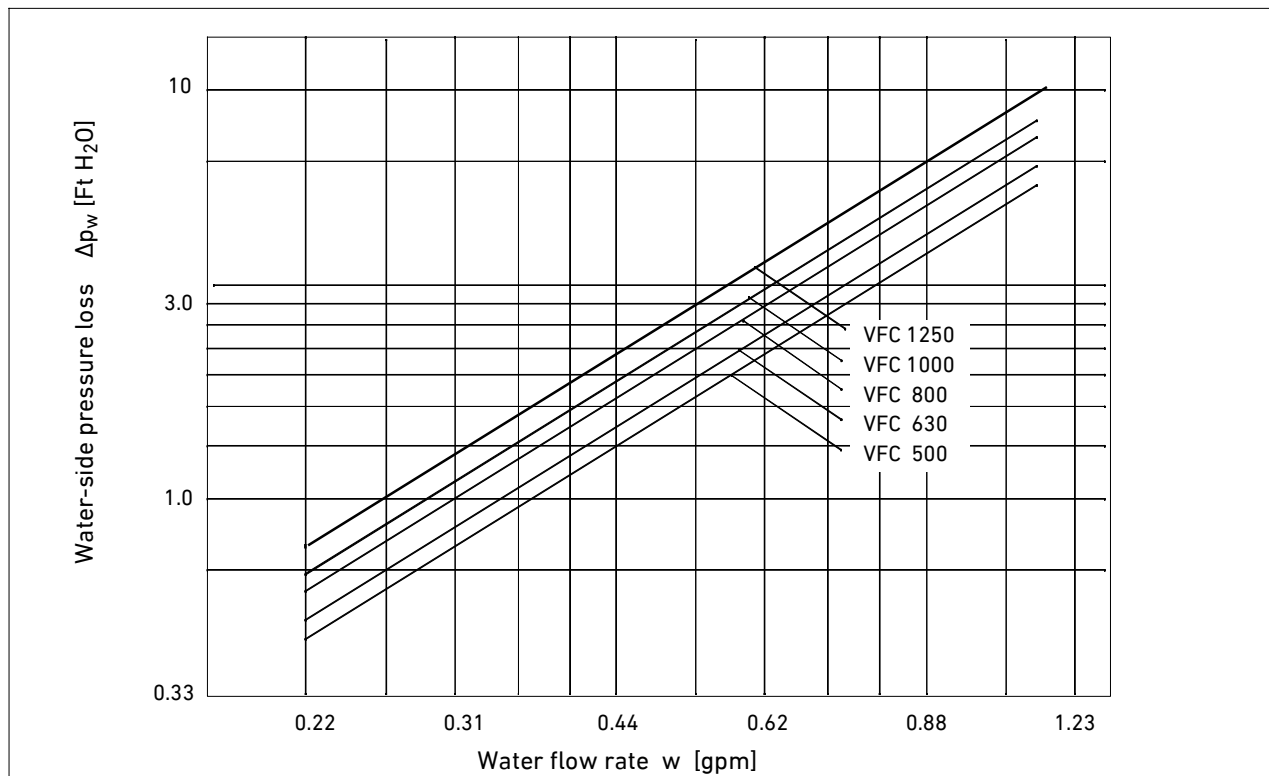


Continuation 4.1. 8 Capacity charts

**Cooling capacity for different water flow rates, 4-pipe system**

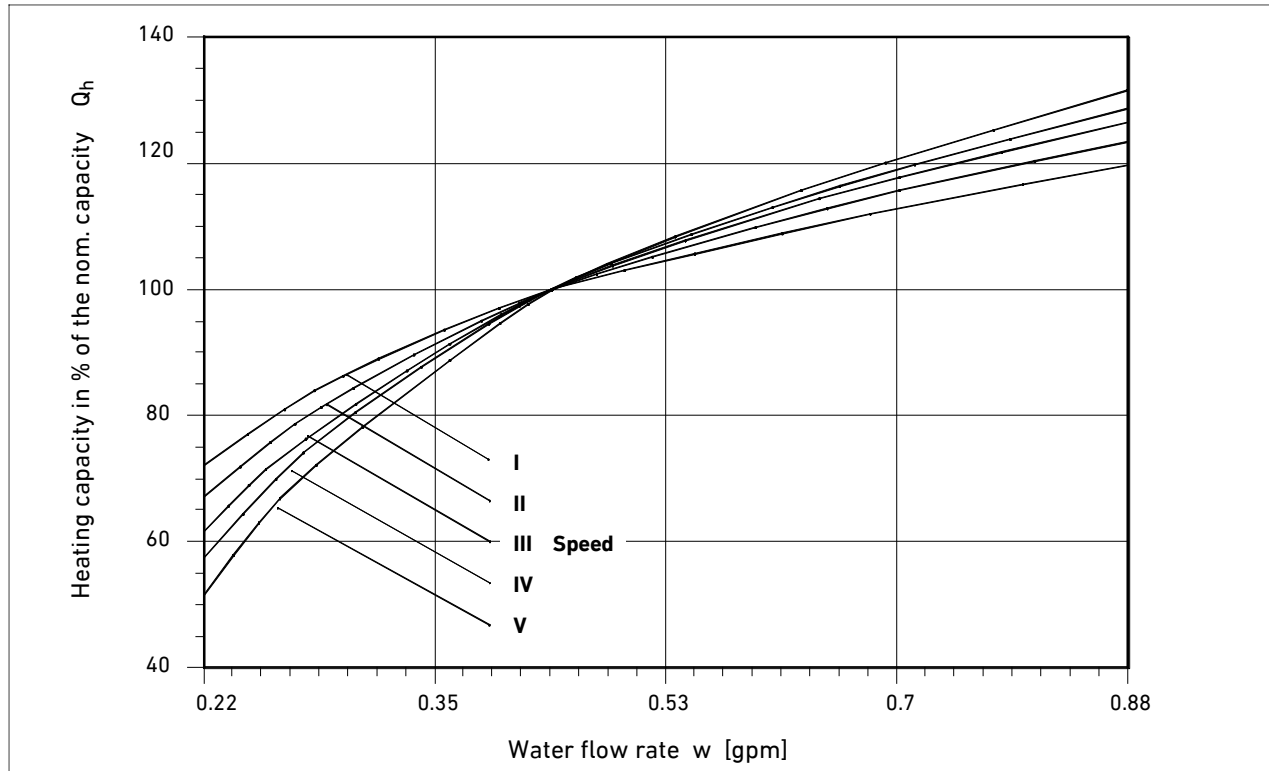


**Water-side pressure loss of the cooler for different water flow rates, 4-pipe system**

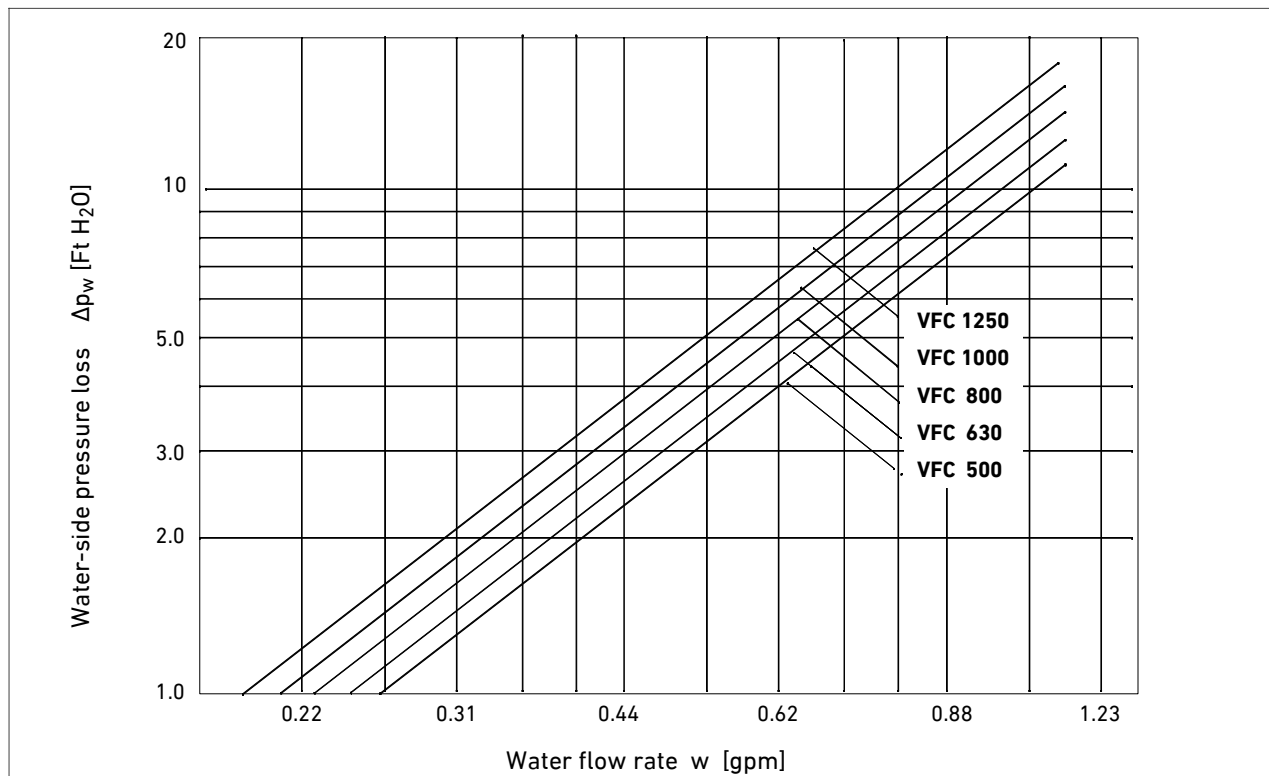


Continuation 4.1. 8 Capacity charts

**Heating capacity for different water flow rates, 4-pipe system**



**Water-side pressure loss of the heater for different water flow rates, 4-pipe system**



### 4.2 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 from 53.6...61 °F in the cooling mode and 122...140 °F in the heating mode.

Parameters used:

- specific heat capacity of the water      1 BTU/lb/°F
- specific heat capacity of the air        0.74 BTU/lb/°F
- air density                                      0.075 lb/Ft<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 air 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.

### 4.3 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  $L_{A18}$  for different fan speed.

Sound pressure levels apply to a room absorption surface of 194 ft<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%.

### 4.4 Hydraulic data

Heat exchangers are approved for an operating pressure of 145 psi max. (test pressure 232 psi).

Pressures exceeding 145 psi 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 %.

#### 4.5 Weight

Weights (without packaging)

Size	Upright unit [lb]	Upright unit with additional drain tray [lb]
<b>500</b>	29	33
<b>630</b>	33	40
<b>800</b>	42	51
<b>1000</b>	51	62
<b>1250</b>	62	73

#### 4.6 Electrical data

##### 4.6.1 Electrical Connection (on-site control)



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

All units are provided with a terminal box installed inside the unit, degree of protection IP 44.



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

Min. voltage for a safe start of the fan:  
2 V

The main power supply on site is to be performed according to the wiring diagram and by a licensed electrician.

Electrical lines on site must be realized using the openings on the terminal box and on the unit housing.

Always disconnect power before working in the unit.



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, codes and safety instructions.

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



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

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

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

It is not permitted to operate the units in a partly disassembled condition.

**Continuation 4.6.1 Electrical connection**

**Speed control wiring diagram for EC motor**

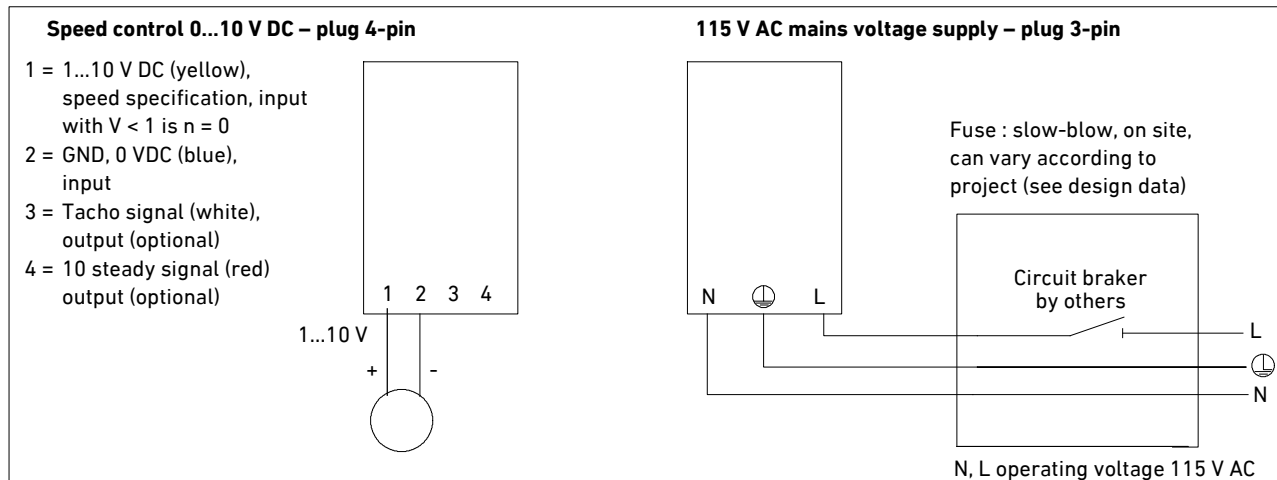
Two connections are necessary for electrically connecting the fan convector. These are provided by plug connections, protection IP 21. The plugs are preassembled on the motor side at the factory. Only the supplied mating plugs have to be assembled by others accordingly.

**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 parametrized by others.



**5. Installation**

**5.1 Installation / Suspension**

There are, in general, 2 ways to install or suspend the units:

- wall mounting - rear or lateral
- installation using floor stands


Please consider the following when installing the units:

- To ensure unit stability and rigidity, use screws of at least the stated property class when mounting the unit. Hardware required for installation are not included.
- Use only the existing holes on the unit for the mounting elements.
- Use only the hardware described on the following pages for installing the unit to ensure sufficient stability. Always observe the installation instructions!
- Do not use the air conditioning units as supporting elements for other components and avoid loading them in any other way.

There are various possibilities to install the units (see following 2 pages):

- Units are installed using the two angle brackets on the unit's top and 4 bolts.
- Using an angle bracket on the unit's backside, the unit may be attached to a wall or floor support.

Additionally, the unit may be secured against the wall using rubber stops.



Select the hardware in a way to ensure that sound transmission is avoided.

**Continuation 5.1 Installation / Suspension**

**Wall mounting - Rear Suspension**

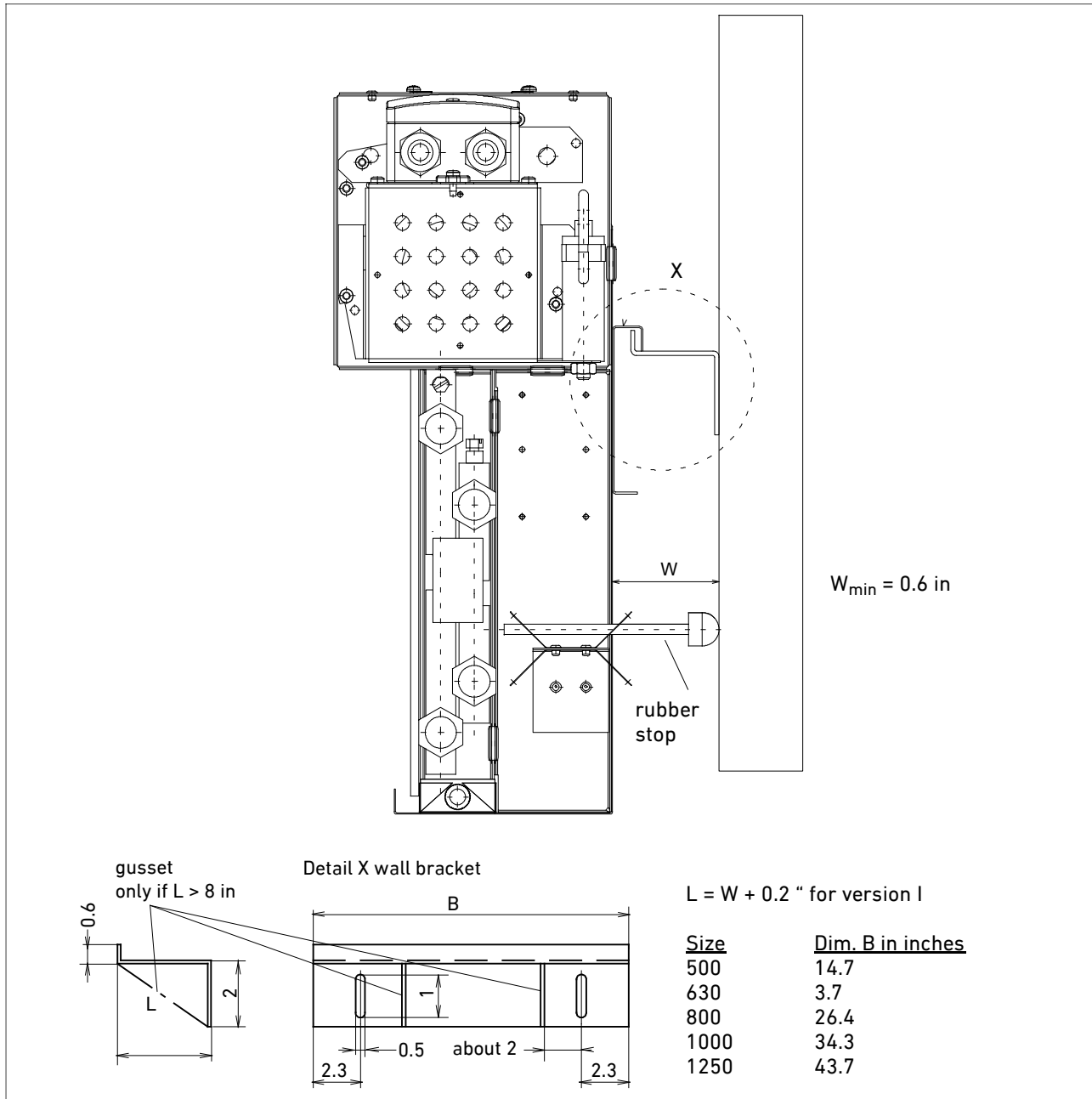
For rear suspension, a Z profile is available. It offers the possibility to subsequently adjust the unit in height by approx. 0.4 " and laterally, parallel to the wall, by approx. 2 ". However, the wall clearance cannot be adjusted. Therefore, always state the clearance W between the unit and the wall in your order.

For stability reasons, this clearance must not exceed 7.9 " when using the standard version, but for greater clearances, a reinforced version is available.

If the unit is not supported from below, use a spacer in addition to the wall bracket for safety reasons (consisting of clamping pieces or clamping brackets and rubber stops).

The unit housing can be supported in the same way on the front side.

For wall mounting, screws of at least property class M8 (8.8) are to be used to ensure sufficient stability.



Continuation 5.1 Installation / Suspension

**Wall mounting - lateral suspension**

Another possibility to install the unit is the lateral suspension, consisting of a supporting plate and a bracket. The lateral suspension enables you to adjust the **unit in all three axes**:

- $\pm 1$  inch laterally, parallel to the wall, in the slot of the bracket
- $\pm 1$  inch regarding the wall clearance *W*, in the second slot of the bracket
- $\pm 1$  inch in height, in the slot of the supporting plate.

In general, the supporting plate is not attached to the unit, but must be ordered together with the lateral bracket. When ordering state the wall clearance *W* !

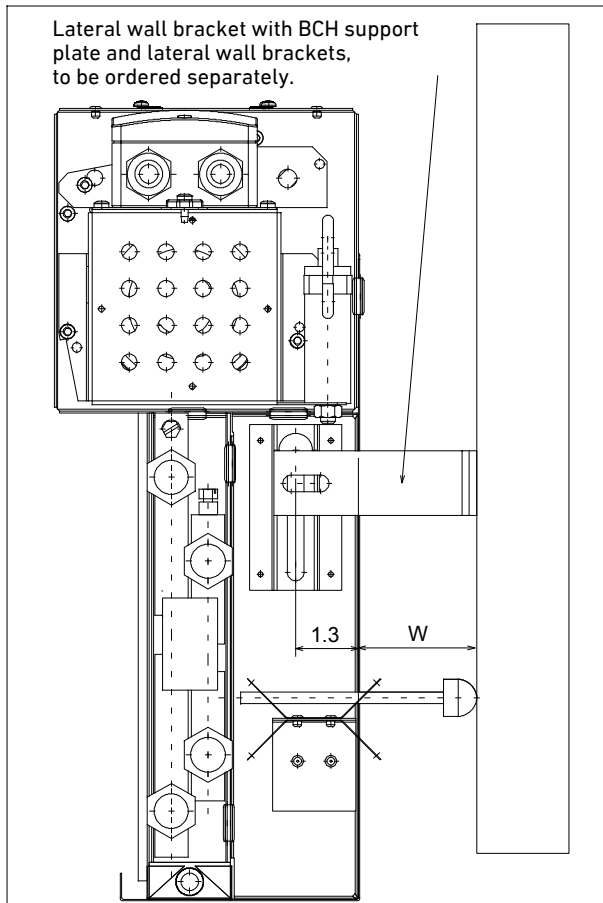
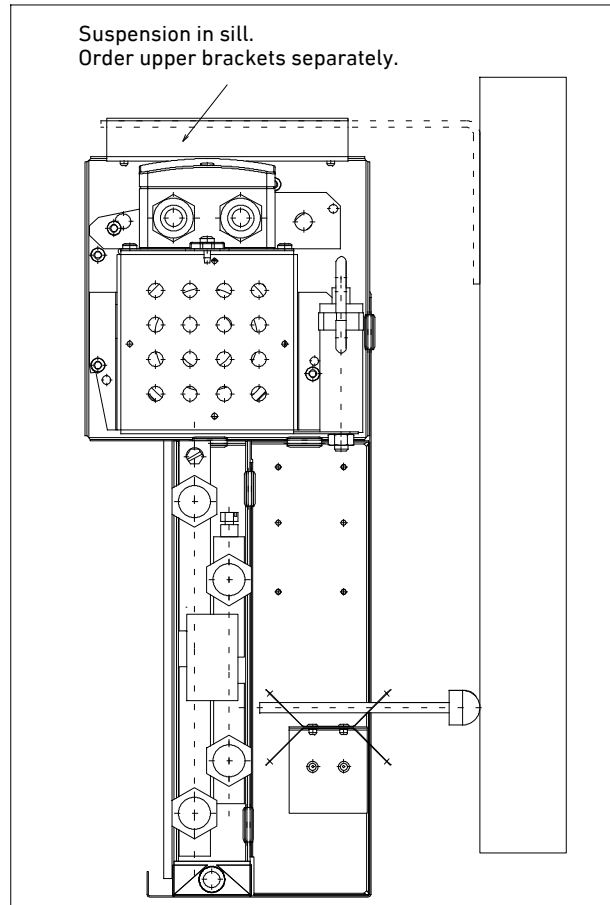
If the unit is not supported from below, use a spacer in addition to the wall bracket for safety reasons, consisting of clamping pieces (version I) or clamping brackets (version II) and rubber stops.

The unit housing can be supported in the same way on the front side (see figures - state clearance *V* !).

For wall mounting, use screws of at least property class **M8 (8.8)** in order to ensure sufficient stability.

For attaching the supporting plate, use hammer head screws M8 x 20.

**Suspension in the sill**





**Continuation 5.1 Installation / Suspension**

**Installation using floor stands**

For an installation independent of the wall, galvanized floor stands with a plastic plug are available (2 floor stands required for each unit).

The floor stand height L depends on the unit type and the installation conditions. Dimension  $H > 0.79$  " may be sufficient. Please always state the unit type and dimension 'H' when ordering.

The unit is adjustable in height, upwards by approx. 0.2 ", and downwards to 'H'.

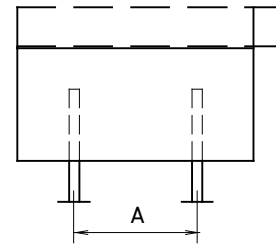
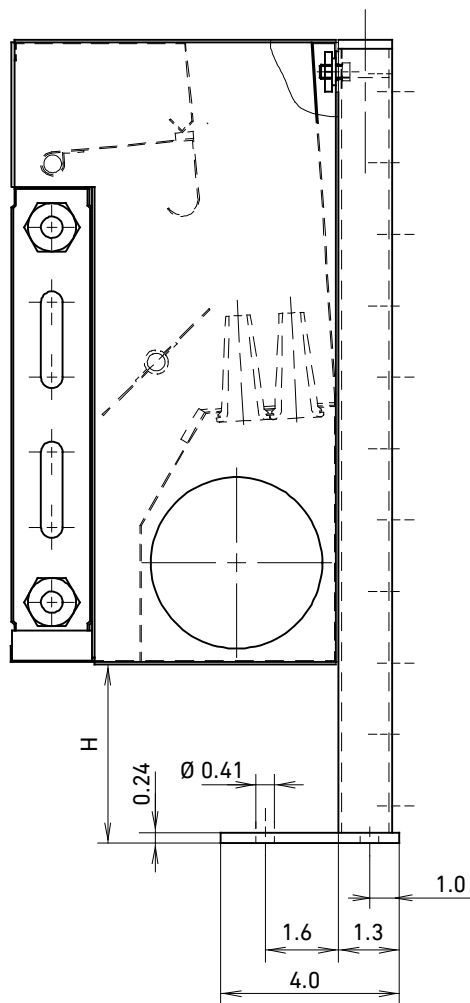
However, it should be considered that the floor stand may exceed the unit height.

The unit may also be adjusted to the rear in the slots of the stand by approx. 0.4 ".

The unit may furthermore be adjusted laterally by approx. 2.0 ", provided that the center-to-center distance between the floor stands remains the same.

Bolts (included in the delivery) are attached to the rails of the floor stands and the unit is inserted.

When securing the unit to the floor, use screws of at least property class M8 (8.8). These special screws are not included in the delivery.



<u>Size</u>	<u>Center-to-center distance A</u> <u>(inches)</u>
500	14.5
630	20.3
800	26.4
1000	34.2
1250	43.9

Please state height H when ordering !

## 5.2 Water Connections



Remove the heat exchanger plugs prior to water connection!

Units are provided with heat exchangers with copper tubes and aluminum fins 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 145 psi (other pressures on request).

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

1. copper fitting with 0.5 " outer diameter.  
This connection is only suitable for flexible connection with quick coupling.
2. 1/2" internal thread fitting, conical sealing.



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 leakproof connection. Even though hoses to the heat exchanger are pre-installed, connections 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 or twisting.  
Pipe fittings must always be flush.

In order to adjust the water flow rate specified in the selection data, a regulating device or restricting olive will be required. A regulating device for each individual unit can be provided only when the units are identical, with the same water flow quantities and the same pressure losses, in the case of the Tichelmann system (reverse return principle). 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, 2 or 4 shut-off 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.

Included in the unit price and provided with the unit (unless special fittings such as transitions, straight-way or angle valves or hose connections are ordered) is a complete compression fitting for unit-side water connection, appropriate to take copper pipes with a 0.5 " outer diameter, wall thickness of 0.03 "...0.04 ", suitable for connecting hoses. The union nut is fixed to the heat exchanger pipe's flared end, while olive and banjo bolt will be delivered in packs of 2 or 4 - according to type of unit - in a bag attached to the unit.

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

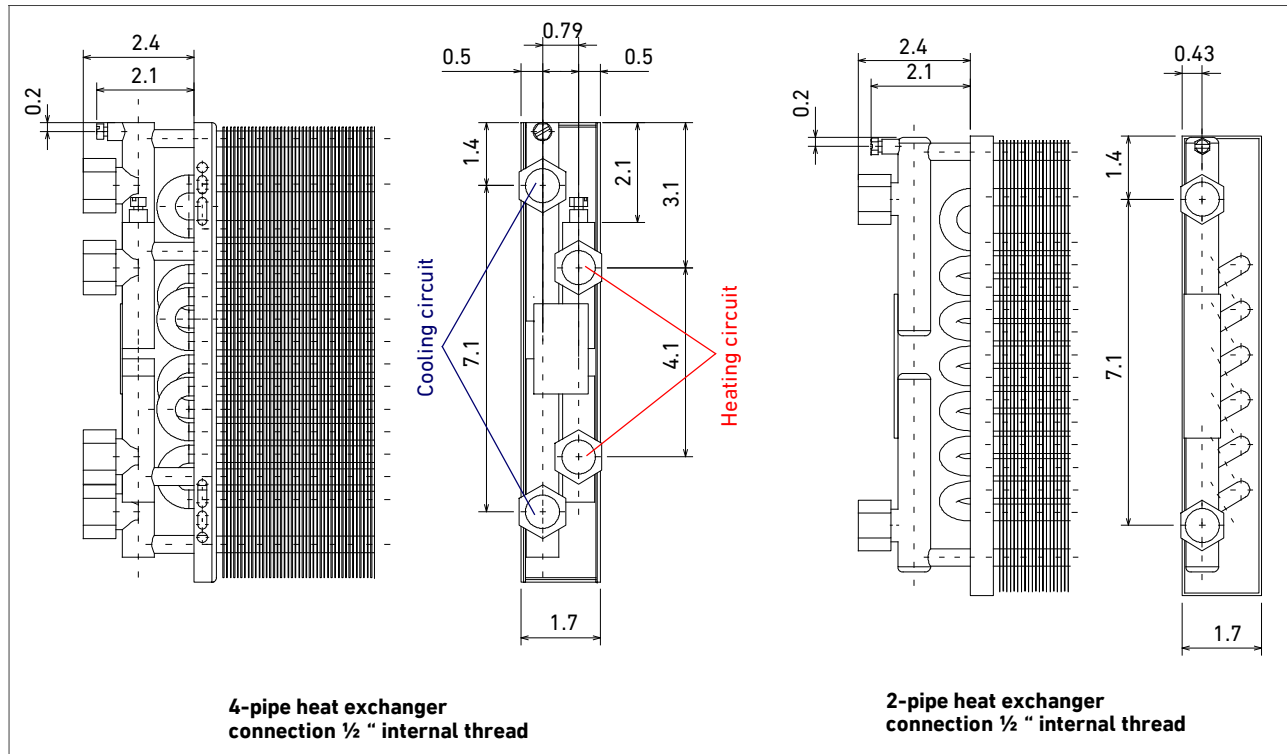
**Continuation 5.2 Water Connections**

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

The heat exchanger needs to be connected as follows:

- vertical heat exchangers: water supply below, water return above
- horizontal heat exchangers: water supply at unit's front side  
 water return at unit's back side

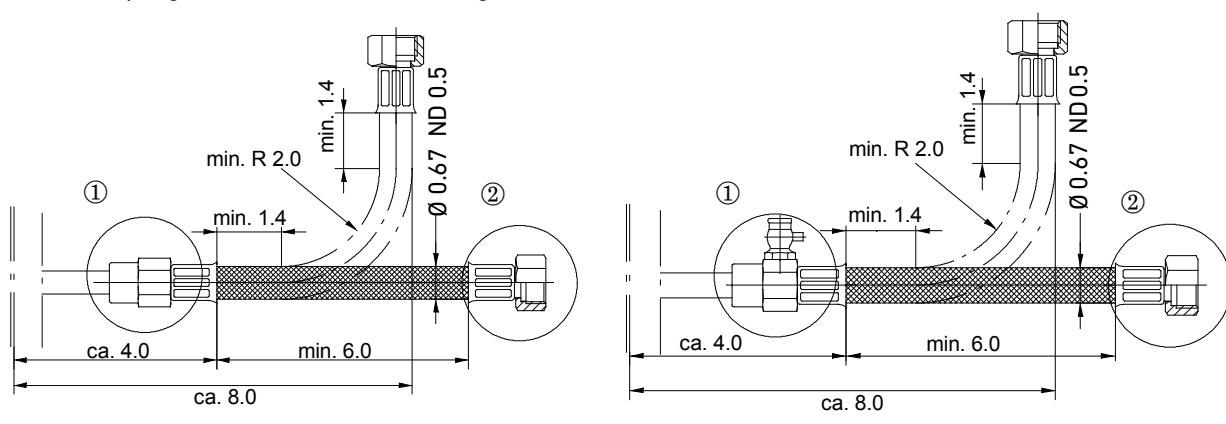
**Water connections**



Continuation 5.2 Water Connections

**Example for water connection using flexible hose (Quick coupling connect. to heat exchangers)**

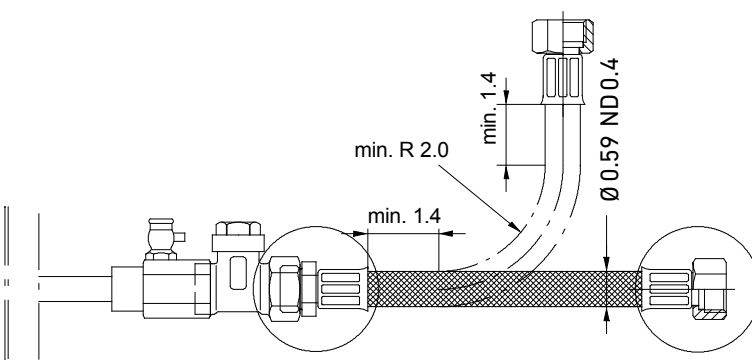
Quick coupling connection to heat exchangers



Please read the hose manufacturer's instructions !  
 Hose without insulation. For insulated hoses, dimensions will change accordingly (0.4 " Armaflex insulation).

- ① Hose for connection to LTG heat exchanger with smooth tube  
 Connection types: SK  
                           SK + Eh
- ② Different hose connections  
 thread diameter acc. to customer requirements or standard ½ "

**Example for water connection using transition - LTG description VSG 10/ 2 EH (venting) -, straight-way valve and flexible hose**

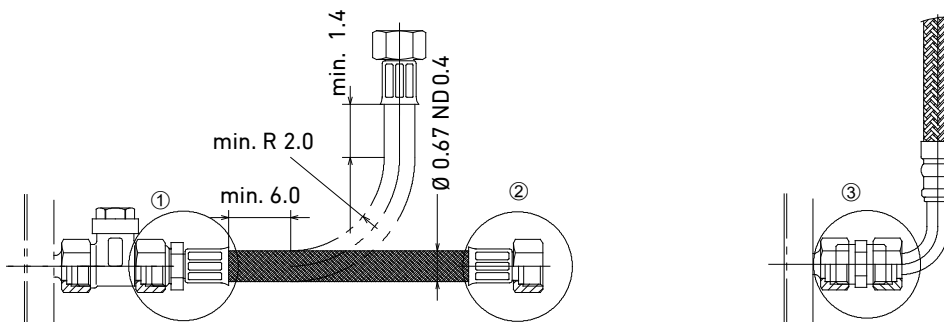


Please read the hose manufacturer's instructions !  
 Hose without insulation. For insulated hoses, dimensions will change accordingly.

- ① Hose for connection to angle or straight-way valve,  
 connection type: AGK, external thread, tapered ½ "
- ② Different hose connections (see above)  
 Different hose connections, thread diameter acc. to customer requirements or standard ½ "

Continuation 5.2 Water Connections

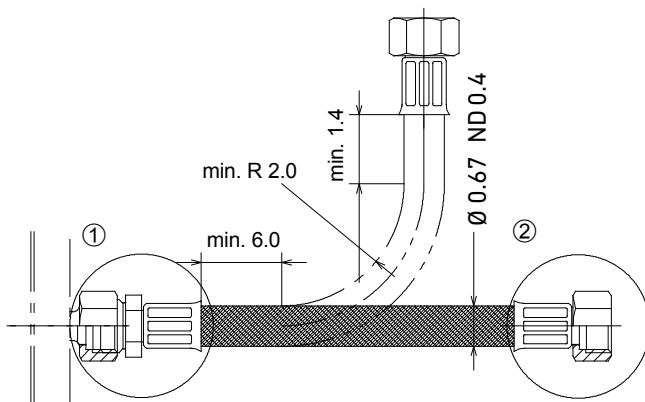
**Example for water connection using valve and flexible hose (straight and 90° variant)**



Hose without insulation. For insulated hoses, dimensions will change accordingly.  
 (0.4 " Armaflex insulation)

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

**Example for water connection 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, tapered 1/2 "
- ② Different hose connections, thread diameter acc. to customer requirements or standard 1/2 "

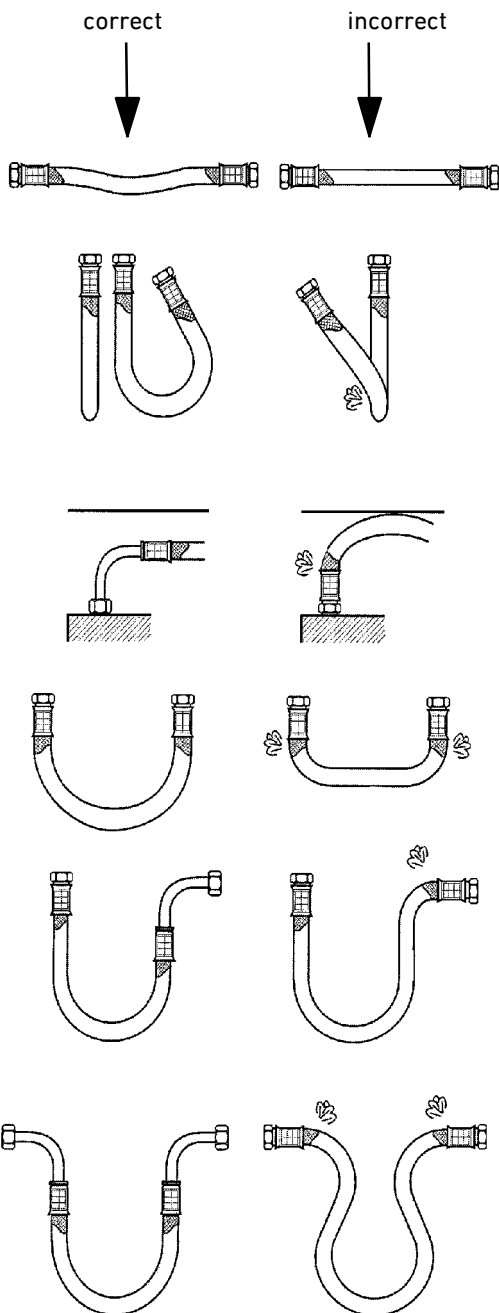
5.2.1 Instructions for Installation of Water Connections Using Flexible Hoses



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.

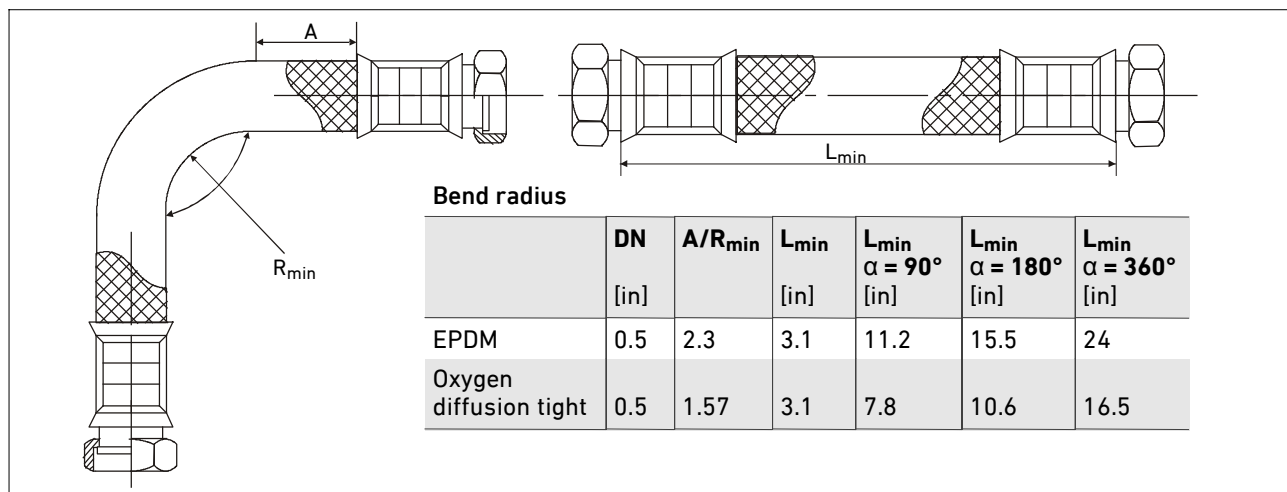
In general, tightness of the connection (hose/connector) is the responsibility of the technician performing the installation. Do not over-tighten.

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.

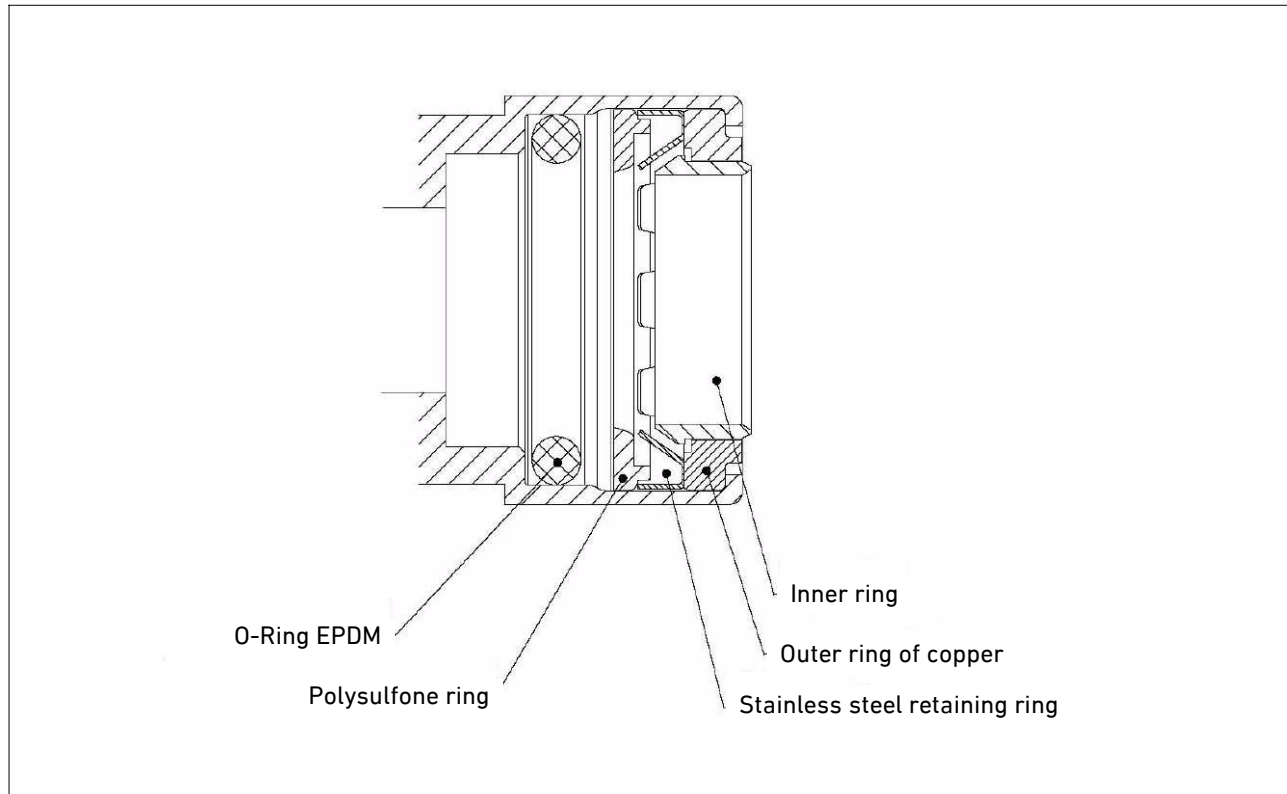
Continuation 5.2.1 Instructions for installation of water connections using flexible hoses

**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	-4...+212 °F	up to +176 °F
Max. operating pressure	217.5 psi	145 psi
Internal Ø	0.5 in	0.5 in



Continuation 5.2.1 Instructions for installation of water connections using flexible hoses  
LTG Quick-Connection



Quick connection for copper tube or suitable brass or red brass.

Components used meet KTW (Plastics in Drinking Water) recommendations.

The Cuprofit plug-in connection has been evaluated based on DVGW (German Association of the Gas and Water Industries) Worksheet W534, in connection with the use of Wieland copper tubing. This permanently tight connection is suitable for concealed installation.

Using the special quick connect tool, this connection may be detached up to three times when not under pressure. Prior to reconnection, check for loosened undamaged condition of the seal.

Check after each installation to ensure the connection is done properly.

Due to their specific design, quick 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 145 psi / 200 °F  
Test pressure 232 psi / 86 °F



### 5.3 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 for 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. As an option, LTG provides a special insulated version for condensing operation (please consider when designing and ordering).

In any case, please observe the following:

- **Air conditioning plant with centralized cooling and dehumidification** (water temperature > 55.4 °F)

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...3 °F 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 i.e. 60 grains/lb the water supply temperature may be lowered to 59 °F 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 room air humidity is probable it is recommended to provide the tray with a thermal insulation.
- All codes, rules and regulation requirements are to be met with the installation of any condensate drain connection on site.

- Ventilation without dehumidification or window opening (water temperature > 61 °F)

In case of a ventilation without dehumidification the water supply temperature must be 61 °F 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.

### 5.4 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 by codes, rules and regulations,
- proper functioning of the controls (optional),
- proper functioning of the motors (fan, actuators) without friction noises,
- the unit's mounting,
- 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 installation.

#### Check for media supply

- Check for proper availability of primary air, cold water, warm water, and electrical power or compressed air for the controls.
- 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. Control valves are often factory-mounted.

#### 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 LTG Aktiengesellschaft's skilled personnel 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 all 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 for the fan is adequate.

Having started the unit air flow should be perceivable from the outlet 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.

### 7. Operation, Maintenance and Repair

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



Any maintenance and repair work must be performed by skilled, licensed 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.



The heat exchanger blades are sharp-edged. Wear gloves for protection!

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 codes, rules and regulations.

#### 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 lints 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 initial operation. By that time, heat exchangers are usually visibly polluted from carpet lints and construction dust remainders. Exact timing is subject to local conditions.

Heat exchanges will then have to be vacuum cleaned on a regular basis, every 6 months to max. 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.

#### 7.4 Repair

If the damage is more than sheet metal damage to the housing or the outlet grille, 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 the 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 adjustments can only be performed in the factory using special equipment.

Warranty applies to complete fans only.

### 7.5 Troubleshooting and Corrective Action

Trouble	Source	Action
<b>No heating or cooling by the unit despite of fan running</b>	Cold or hot water supply not operating Heat exchanger and water supply lines have room temperature	Ensure cold or hot water supply Check and remove trouble Check fan coil unit shut-off valve
<b>No air movement at the unit's outlet grille</b>	The unit's fan is not operating	Put fan into operation. If necessary, force starting with highest speed level Check fan power supply. If necessary, replace fuses or switch on main power supply Replace drive unit.
<b>No control signal is applied to the (valve) actuator, or it is not the one according to setting</b>	Deficient control	Have unit checked by a specialized technician replacing or repairing broken parts
<b>No valve spindle movement when actuator motor signal is being changed</b>	Actuator is stuck	Try to release the stuck actuator by setting the temperature controller from "max. hot" to "max. cold" and vice versa.  If unsuccessful, remove actuator, clean or replace
<b>Unit is heating or cooling, but set temperature is not achieved</b>	Window is open	Close window
<b>Despite highest fan speed only weak air movement at the fan diffuser</b>	Filter or heat exchanger polluted Suction or diffuser opening blocked or polluted	Replace filter Clean heat exchanger Remove objects in front of the diffuser and protective grille. Observe a minimum distance of 10 cm in front of the casing.
<b>Measured cold water temperature is lower than the setting (ask technician for setting). Therefore, diffused air temperature is extremely low</b>	Cold water temperature to the units is too low	Check cold water control including valve and actuator. If necessary, restore proper settings, replace or repair broken parts
<b>Part of the condensate trays is overflowing despite of drainage system</b>	Condensate drainage system clogged	Remove clogging In the meantime, increase inlet temperature or shut off unit
<b>Unit drips</b>	Leaking or overflowing condensate tray	Replace leaking condensate tray Check condensate pump Check drainage system
<b>Increased room air humidity perceivable</b>	Considerable moisture sources in the room	Remove moisture sources If impossible, temporarily shut off unit water-side
<b>Water inlet/return temperature difference too low</b>	Fan not running or not conveying sufficient air Inlet temperature too high in the cooling mode  Water volume possibly too high	Check fan and terminals Maybe speed is too low  Check temperature and cooling circuit Heat exchanger and filter polluted Check water volume balancing

Continuation 7.5 Troubleshooting and corrective action

Trouble	Source	Action
<b>Audible impact noises</b>	Fan bearing damage Foreign bodies in the fan	Replace bearing or drive (only by LTG Aktiengesellschaft !) Remove foreign object(s) from impeller (only with the unit off)
<b>Audible grinding noises</b>	Fan imbalanced resulting in contact to the casing	Replace drive and impeller unit
<b>Audible knocking noises</b>	Suspension improperly fixed Casing vibrations	Check and fix suspension

**7.6 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 odours	3	
	Check the filter layer for tightness	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 supply and return	12	
	Vent		x
	Check for hygienic condition	6	
<b>Dirt and condensate tray</b>	Check for pollution, damage, leak 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 bearings for noises	12	
	Check vibration damper for proper functioning	12	
	Check the motor cover for damage, correct positioning and fixation	12	
	Clean chambers from the inside		x
	Check for hygienic condition	6	

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

Sanitation requirements must be observed.

## 8. Spare parts

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

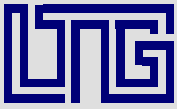
Quantity	Ident No.	Description	Minimum order quantity
1		4-pipe heat exchanger size 500 for VFC	1
1		4-pipe heat exchanger size 630 for für VFC	1
1		4-pipe heat exchanger size 800 for VFC	1
1		4-pipe heat exchanger size 1000 for VFC	1
1		4-pipe heat exchanger size 1250 for VFC	1
1		2-pipe heat exchanger size 500 for VFC	1
1		2-pipe heat exchanger size 630 for VFC	1
1		2-pipe heat exchanger size 800 for VFC	1
1		2-pipe heat exchanger size 1000 for VFC	1
1		2-pipe heat exchanger size 1250 for VFC	1
1	530065	Condensate tray size 630 for VFC	10
1	530073	Condensate tray size 800 for VFC	10
1	531170	Condensate tray size 1000 for VFC	10
1	1003369	Condensate tray size 1250 for VFC	10
1	1008313	Terminal box electrical connection	1
1		Fan size 500 with EC motor	1
1		Fan size 630 with EC motor	1
1		Fan size 800 with EC motor	1
1		Fan size 1000 with EC motor	1
1		Fan size 1250 with EC motor	1
		Filter mats in rolls of 130 Lft	1 roll
		Adhesive Velcro tape	300 ft

For heat exchangers please state connection (1/2", smooth copper tube)

## 9. Decommissioning, disposal

When the fan 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 codes, rules and regulations.
- Silencers are waste for recycling
- Heat exchangers are waste for recycling (copper, aluminum)



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