



**ventus** VVS/COMPACT

**VOLCANO  
WING**

2019



VTS



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**01**

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VTS Group



**VTS GROUP** – is a manufacturer of technically advanced HVAC equipment, combining innovative technologies in the field of research&development, production and logistics.



SHORTEST  
LEAD  
**TIME** ON THE MARKET \*

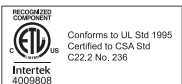
\* Logistics center





# OUR MISSION

# AHU#1





# 3 PILLARS OF SUCCESS

Constantly highest quality of products. Best prices on the market. Shortest lead time. These 3 pillars of marketing policy allows VTS to be always one step head, wherever in the world.

Following the best practices of the branch, VTS has created a network of 6 efficiently running production and logistic centers (**Atlanta, Dubai, Moscow, Shanghai, Warsaw, Bangalore**), enable to ensure the shortest lead time on the market, wherever in the world.

Large-scale production of repetitive units allow VTS to offer them at **the most competitive price, simultaneously keeping their highest possible quality**

Multistage quality control system allows VTS to offer **2 years warranty, extendable even up to 5.**

SHORTEST  
LEAD  
**TIME** ON THE MARKET



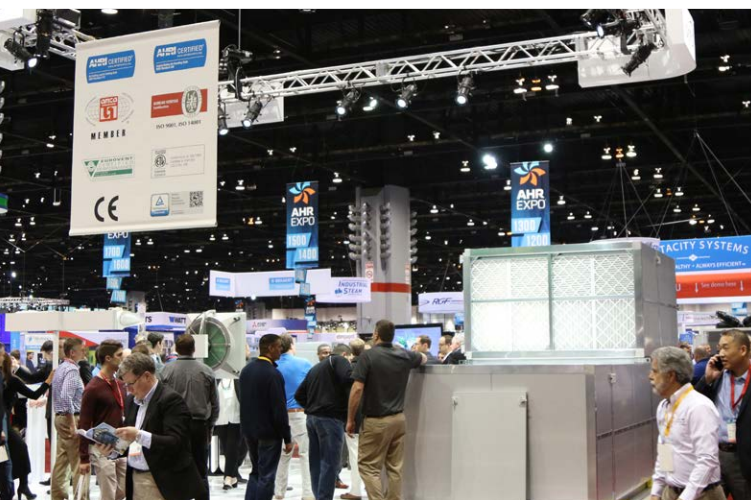
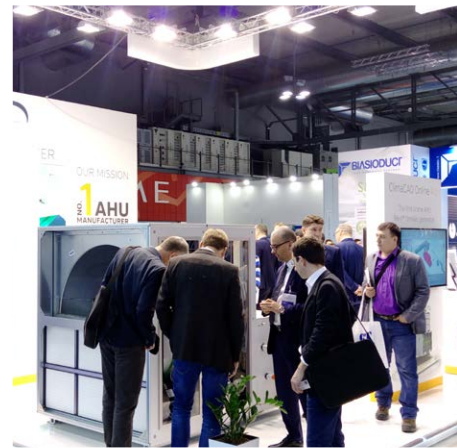
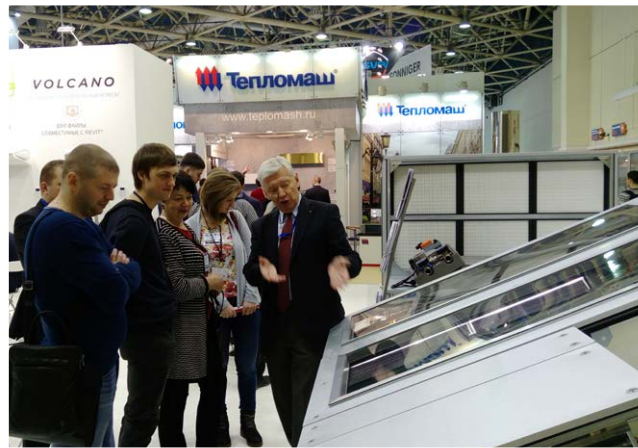
**\$** COMPETITIVE  
**PRICE**

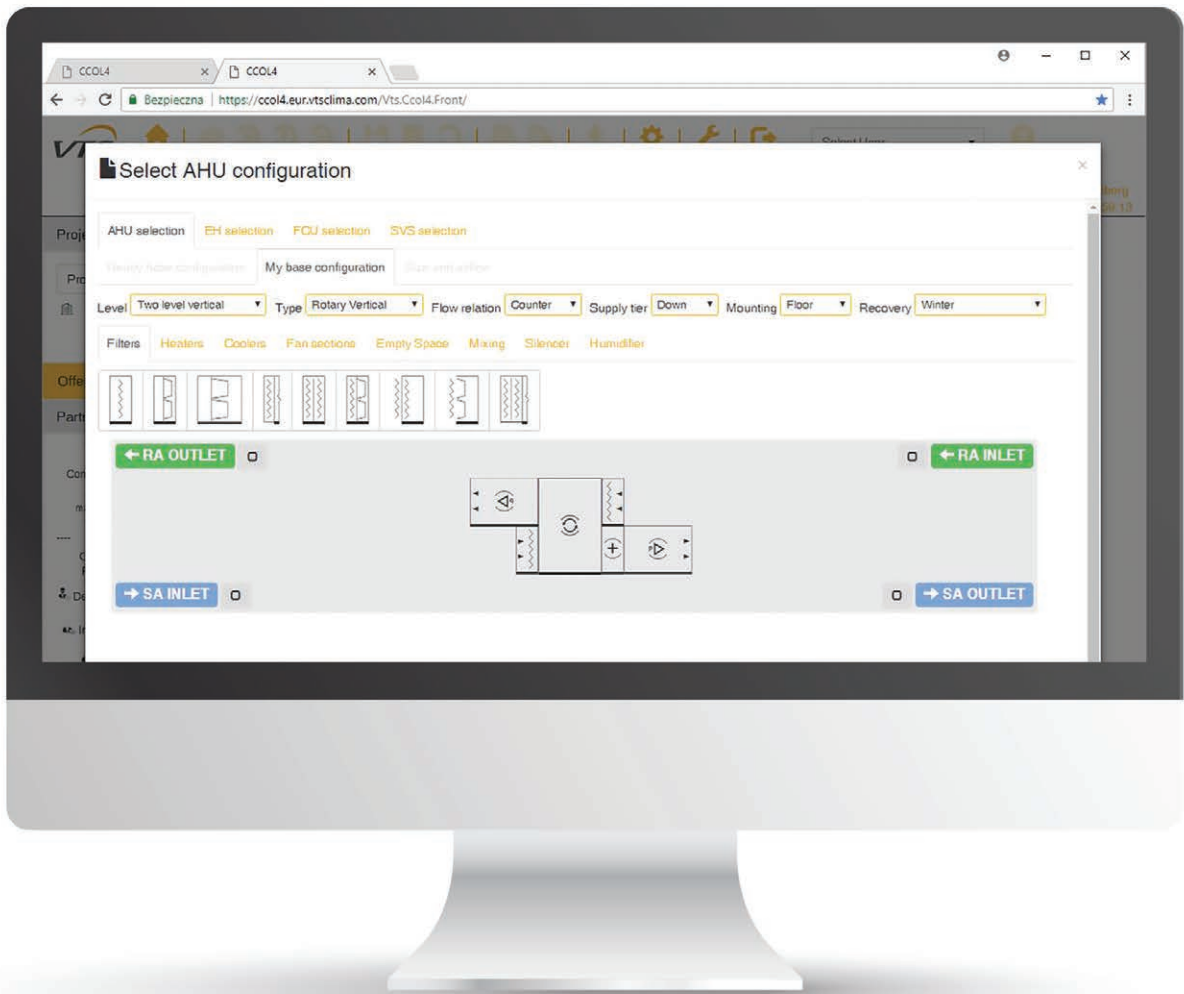
**110 000**  
**UNITS**  
SOLD ANNUALLY

**Q** BEST  
**QUALITY**

UP TO **5** YEARS **WARRANTY**  
FOR EACH  
**UNIT**









**02**

---

Support  
for designers



# CLIMACAD ONLINE 4.0 [CCOL 4]

Infinite number of configurations

Friendly user interface



Simple and easy selection

Integration with CRM, ERP & WMA systems

Certified by



## CCOL4 OPTIMIZED FOR

» any web-browser



» any operating system



» any device



## DATA EXPORT TO

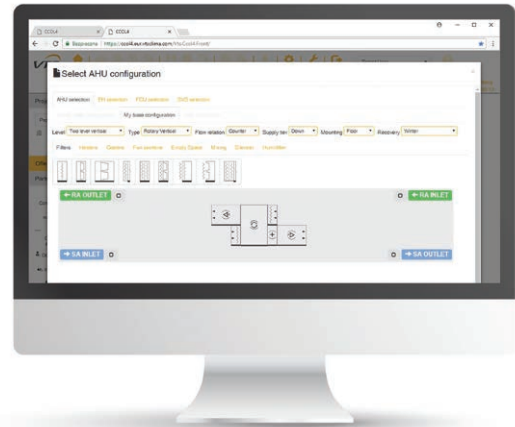




CCOL 4.0 utilises latest technologies and software platforms. The tool has been developed in SaaS model (Software as a Service). It's best advantage is, that service is accessible wherever in the world. Any device equipped with web-browser and internet access is all you need to experience the power of our CCOL 4.0.

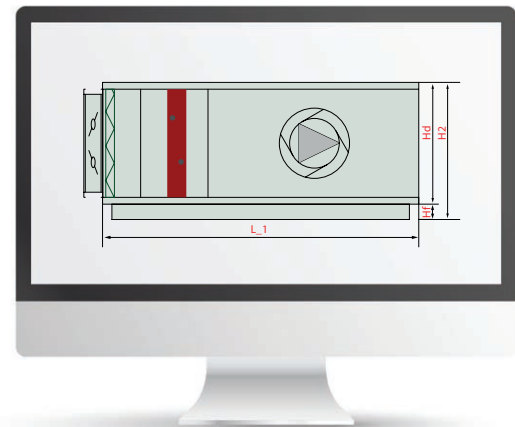
## DESIGN VERSATILITY

- » Infinite units configurations.
- » Detecting of configurations errors.



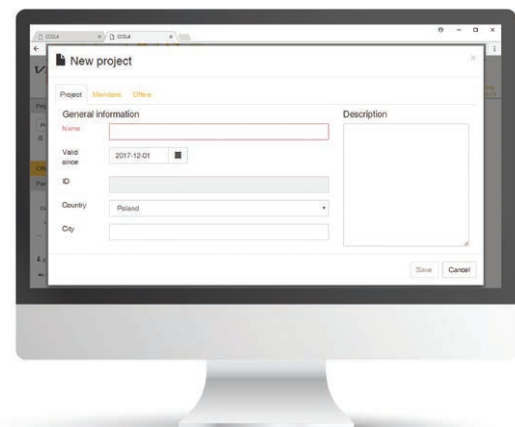
## DYNAMIC AHU LENGTH DEFINITION

- » CCOL4 applies dynamic optimizing of AHU length based on automatic air treatment functions. placements with regard to minimum gaps between them in order to secure their proper performance.



## MANAGING OF YOUR DATA BASE

- » Self-creating and development by designer of own projects and AHU selections data base.
- » Sharing of self-made AHU selections with VTS engineers for pricing.





# VTS **BIM** - new approach to digital models of Air Handling Units

VTS has enabled dynamic generating of VENTUS VVS, VENTUS Compact and American VENTUS AVS units digital models as on-line service. This became possible thanks to implementation of new AHU selection tool – the ClimaCAD OnLine 4.0 [CCOL 4.0], equipped with .rfa [Revit®] files generator.



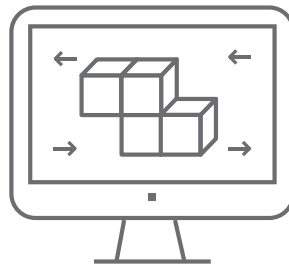
## 3 steps to generate the model:



### 1 Login to CCOL 4.0

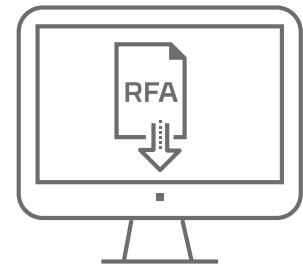
You can login using our web-site:

[www.ccol4.com](http://www.ccol4.com)



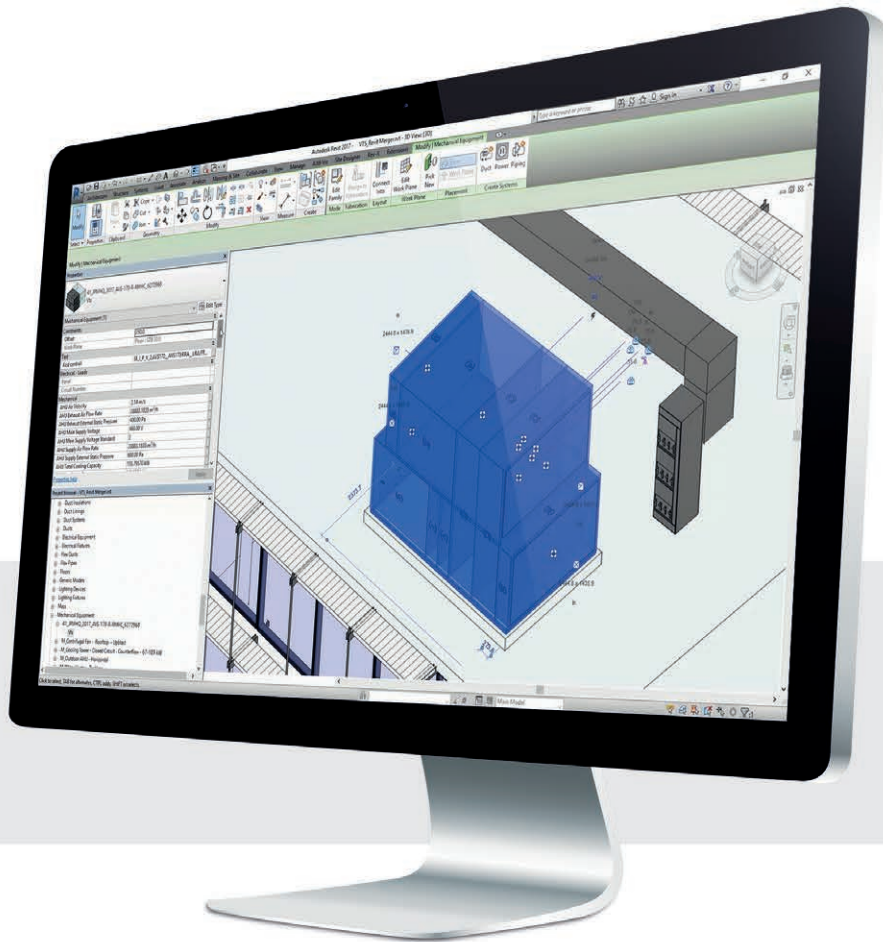
### 2 AHU configuration and parameters specifying

Intuitive unit configurator enables to select a unit, perfectly fitting to your design assumptions.



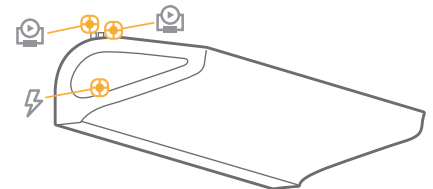
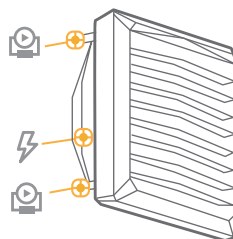
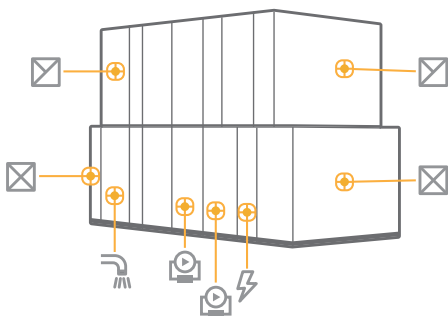
### 3 Selection export to .rfa file

In order to generate .rfa model, all you need to do is to enter personal information (including e-mail address) of a person to whom the model is to be sent. The system will automatically send the link to the site from where model can be downloaded. Entire process take no longer than 15 minutes.



The Autodesk REVIT® families shared by VTS significantly facilitate entire building modelling process done by designing bureaus. At the moment, the generator is an unique tool in entire BIM environment. It enables to generate brand new VENTUS units model on the spot, in any configuration or any parameters.

As a result the client is given:



Digital model of the air handling unit with fully parametrized connectors:

- » Air,
- » Hydraulic,
- » Sanitary,
- » Electric,

and also a set of complete technical and dimensioning information, including clearly marked **maintenance** and **service zone** of the unit.

VTS enables also a library of static families for WING air curtains and VOLCANO air heaters.

The models includes:

- » parametrized electric and hydraulic connectors,
- » both vertical and horizontal mounting options,
- » presentation of units effective air range,
- » parametrized angle of heater's to the horizontal plane.



# VTS **BIM** -air handling units perfectly fitted for designer's needs.

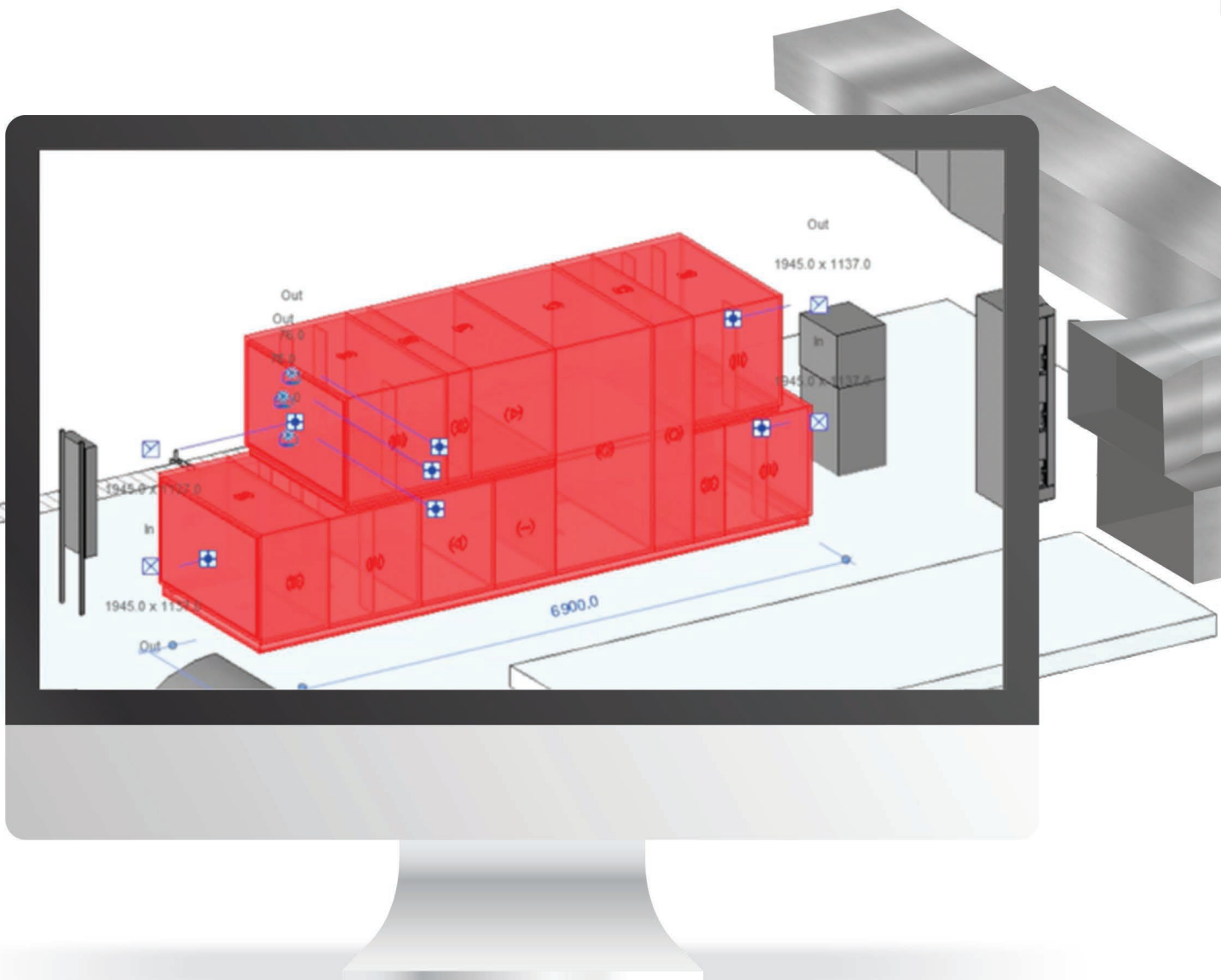
VTS supports generating of air handling units models in LOD 400

(Level Of Development) standard.

In 2019, ClimaCAD OnLine 4.0 will support customization of the model's Level of Development, at the moment of their generating.

This will make the designing process even more flexible, especially when making first approaches to general concept of the building HVAC installations.

LOD  
**400**  
as standard



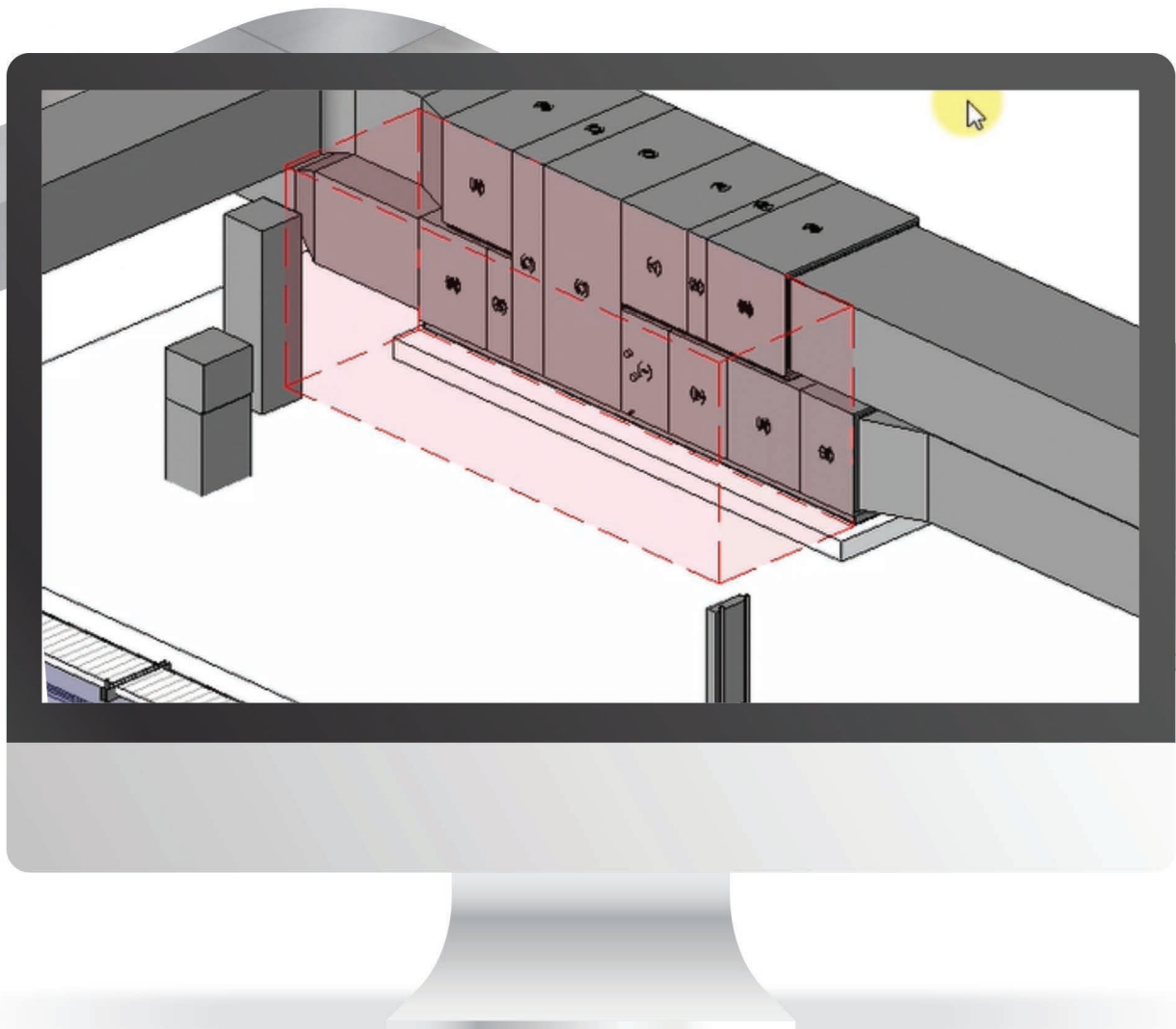




The VENTUS BIM families include maintenance and service zones of the units as standard.

These zones reserve minimum space to secure proper maintenance and repair conditions of the unit, and allow to avoid any collisions with remaining building elements or installations.

## Service clearance **repair & maintenance** as standard.







**03**

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Units  
- VENTUS VVS

*ventus*

VVS



DURABLE  
AND TIGHT  
STRUCTURE



RELIABLE  
COMPONENTS

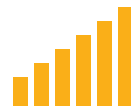


## Airflow

from **1 100** m<sup>3</sup>/h  
from **100 000** m<sup>3</sup>/h



Up to **92%**  
of energy recovery  
efficiency



**14**  
sizes



SMART  
CONTROLS



USER  
SAFETY



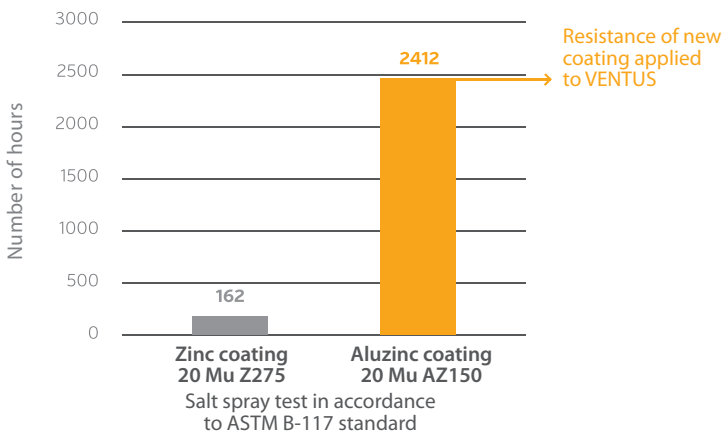
# STRUCTURE



STEEL SKIN COATED WITH ALUZINC AZ 150



## CORROSION RESISTANCE



## CASING SKIN

- » Rigid, durable structure of the casing.
- » Low absorption of heat radiation and UV.
- » High resistance to weather conditions.

## FAN SECTION CAGE

- » Improved longitudinal rigidity of the structure.
- » Facilitated sections joining.



**PROFIL Z**

VVS 021-150



**PROFIL C**

VVS 180-650

**STEEL BASE FRAME**  
AS **STANDARD** FOR ANY TYPE  
OF UNITS

**ALUMINUM  
POSTS**  
OF SPECIAL  
CONSTRUCTION  
IN EACH AHU  
TYPE

FOUNDATION

- » Transport facilitation.
- » High resistance of the frame to deflection.

STRUCTURAL POSTS

- » Broken thermal bridges as standard.
- » High resistance to weather conditions and UV radiation.



# TIGHTNESS



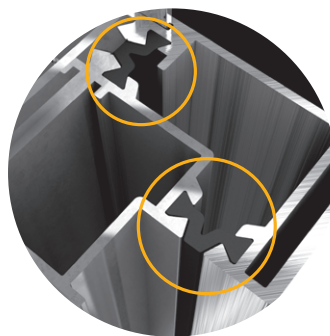
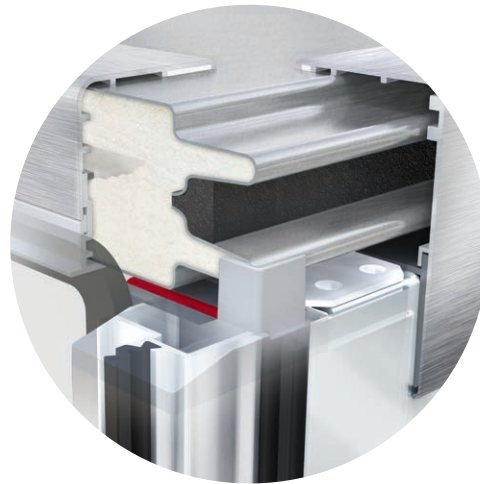
## CANOPY

- » The canopy is made of 0,5 mm steel sheet, double side coated with 185 um of zinc (DX51D AZ185).
- » Canopy is assembled of modules equipped with self-latching grooves securing perfect tightness of the joints. Modular structure of the canopy ensures its easy and safe assembly.

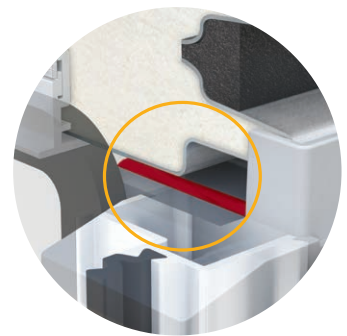
## ERGONOMIC INSPECTION PANEL LOCK

- » Highly aesthetic and ergonomic handles securing perfect tightness of inspection panels.

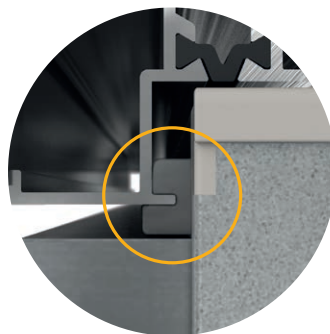




**THERMAL  
BREAK**



**LABIRYNTH  
TIGHTENING**



**ADDITIONAL  
POST SEALING**

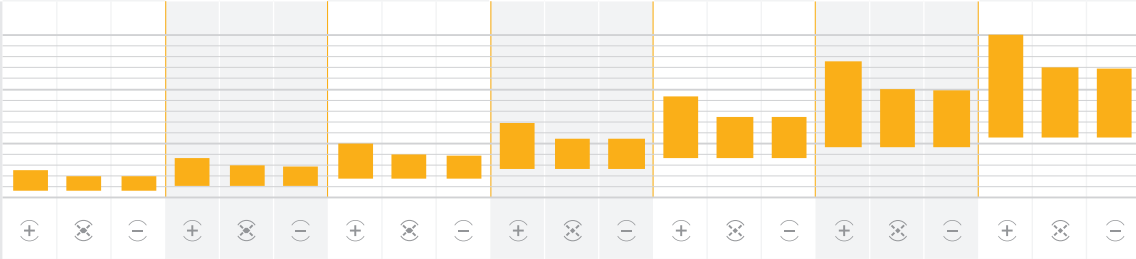









**ADDITIONAL  
SEALING BLADE**

## ALUMINUM STRUCTURAL POSTS WITH ADDITIONAL SEALING BLADE AND THERMAL BREAK

- » Broken thermal bridge as standard – eliminates humidity condensation on units structural elements.
- » Blade along the inspection window ensures labyrinth tightening between panel and AHU body – currently the most effective solution on the market, mainly applied to laboratory equipment.
- » Symmetrical groove in the vertical post's mounting feet secures its 100% tightness with the AHU casing structure.

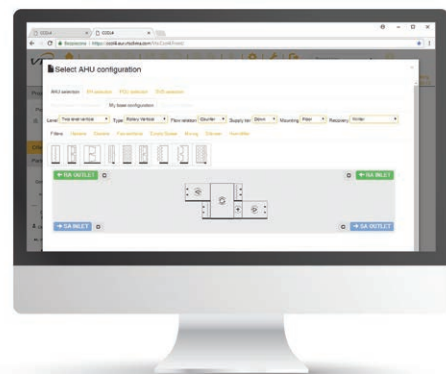
# VVS 021-120 – RECUPERATOR (HEX & PREMIUM PLUS)

Nominal parameters			Recommended airflow range																									
Unit size			VVS021			VVS030			VVS040			VVS055			VVS075			VVS100			VVS120							
18 000 12 000 6 000 0	[m³/h]																											
		+			X			-			+			X			-			+			X			-		
		Min airflow	806	806	806	1 180	1 180	1 180	1 958	1 958	1 958	2 878	2 878	2 878	3 805	3 805	3 805	4 863	4 863	4 863	5 815	5 815	5 815					
		Max airflow	2 730	2 184	2 163	3 900	3 120	3 090	5 200	4 160	4 120	7 150	5 720	5 665	9 750	7 800	7 725	13 000	10 400	10 300	15 600	12 480	12 360					
H <sub>fd</sub>			90			90			90			90			90			90			90							
H <sub>fu</sub>			-			-			-			-			-			-			-							
H			538			670			670			805			925			1 025			1 062							
W			961			961			1 168			1 339			1 480			1 660			1 891							
H <sub>i</sub>			368			500			500			635			755			855			892							
W <sub>i</sub>			881			881			1 088			1 259			1 400			1 580			1 811							
H <sub>2</sub>			986			1 250			1 250			1 520			1 760			1 960			2 034							
I			40			40			40			40			40			40			40							

Selected configurations		Dimension	Length of selected configurations						
									
	FPDV/FVPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	2 562	2 928	2 928	2 928	3 294	4 026	4 026
		K	366	366	366	366	0	0	0
		Lt	2 928	3 294	3 294	3 294	3 294	4 026	4 026
	FPDHV/FVPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	2 562	2 928	2 928	2 928	3 294	4 026	4 026
		K	366	366	366	366	0	0	0
		Lt	2 928	3 294	3 294	3 294	3 294	4 026	4 026
	FPDMHV/FVMPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	2 928	3 294	3 294	3 294	3 660	4 392	4 392
		K	0	0	0	0	0	0	0
		Lt	2 928	3 294	3 294	3 294	3 660	4 392	4 392
	FPDMHV/FVMPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	2 928	3 294	3 294	3 294	3 660	4 392	4 392
		K	0	0	0	0	0	0	0
		Lt	2 928	3 294	3 294	3 294	3 660	4 392	4 392
	FPHCV/FVPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	3 294	3 660	3 660	3 660	4 026	4 758	4 758
		K	0	0	0	0	0	0	0
		Lt	3 294	3 660	3 660	3 660	4 026	4 758	4 758
	FPDMHCV/FVMPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026
		L1	3 294	3 660	3 660	3 660	4 026	4 758	4 758
		K	0	0	0	0	0	0	0
		Lt	3 294	3 660	3 660	3 660	4 026	4 758	4 758

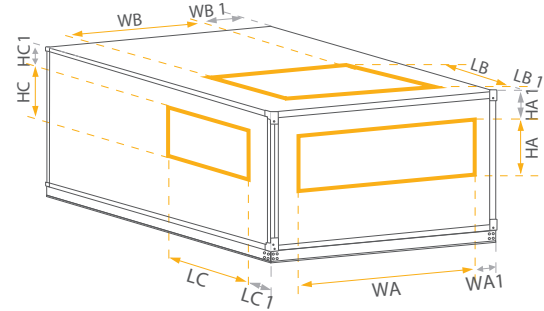
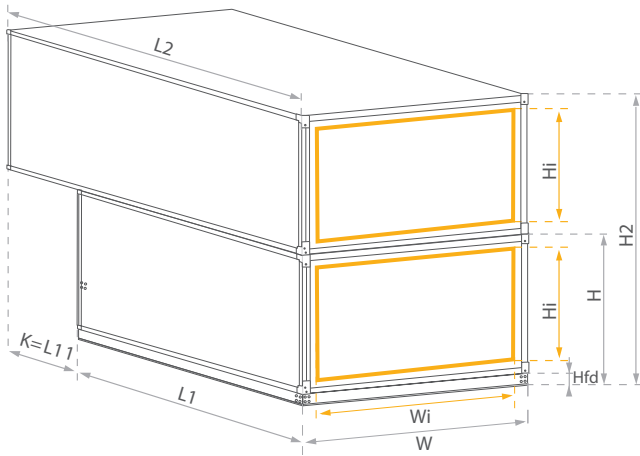
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

[www.ccol4.com](http://www.ccol4.com)





# DIMENSIONS - VVS 021-120 - RECUPERATOR (HEX & PREMIUM PLUS)



Full-face horizontal outlet END (FF)				
Size	WA	HA	WA1	HA1
VVS021	821	313	70	67,5
VVS030	821	440	70	70
VVS040	1 028	440	70	70
VVS055	1 199	575	70	70
VVS075	1 340	695	70	70
VVS100	1 520	795	70	70
VVS120	1 751	832	70	70

Small horizontal inlet-outlet END (FS)				
Size	WA	HA	WA1	HA1
VVS021	500	220	228	112
VVS030	500	220	228	178
VVS040	660	250	252	163
VVS055	821	440	257	135
VVS075	1 028	440	224	195
VVS100	1 199	575	228	200
VVS120	1 199	575	344	196

Vertical inlet-outlet END (US)				
Size	WB	LB	WB1	LB1
VVS021	500	220	228	200
VVS030	500	220	228	200
VVS040	660	250	252	200
VVS055	821	440	257	200
VVS075	1 028	440	224	200
VVS100	1 199	575	228	125
VVS120	1 199	575	344	125

Vertical outlet END (US)				
Size	WB	LB	WB1	LB1
VVS021	660	250	152	212
VVS030	613	380	173	127
VVS040	821	440	175	127
VVS055	1 028	440	157	212
VVS075	1 199	575	142	212
VVS100	1 340	695	162	212
VVS120	1 520	795	187	127

Side inlet-outlet END (BS)				
Size	HC	LC	HC1	LC1
VVS021	213	380	115	165
VVS030	313	380	131	165
VVS040	313	380	131	165
VVS055	413	380	149	165
VVS075	413	380	209	165
VVS100	613	380	159	165
VVS120	613	380	177	165

Side outlet END (BS)				
Size	HC	LC	HC1	LC1
VVS021	213	380	114	202
VVS030	313	380	180	202
VVS040	313	380	165	202
VVS055	413	380	137	202
VVS075	413	380	197	202
VVS100	613	380	158	127
VVS120	613	380	198	127



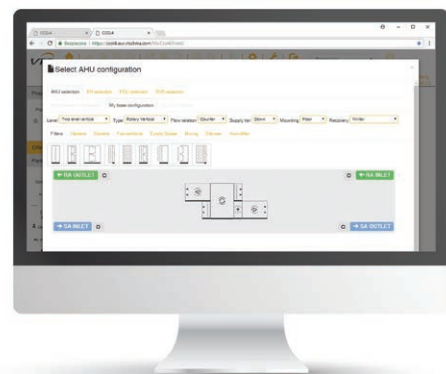
# VVS 150-650 - RECUPERATOR (PREMIUM PLUS)

Nominal parameters			Recommended airflow range																							
Unit size			VVS150			VVS180			VVS230			VVS300			VVS400			VVS500			VVS650					
90 000 60 000 30 000 0	[m³/h]																									
			Min airflow	7 167	7 167	7 167	8 640	8 640	8 640	10 398	10 398	10 398	13 491	13 491	13 491	18 704	18 704	18 704	21 817	21 817	21 817	28 725	28 725	28 725		
			Max airflow	19 500	15 600	15 450	23 400	18 720	18 540	29 900	23 920	23 690	39 000	31 200	30 900	52 000	41 600	41 200	71 500	57 200	56 650	84 500	67 600	66 950		
			H <sub>fd</sub>	90			120			120			120			120			120			120				
H <sub>fu</sub>	0			80			80			80			80			80			80							
H	1 163			1 397			1 397			1 696			1 929			1 929			2 406							
W	2 085			2 085			2 493			2 585			3 085			3 585			3 697							
H <sub>i</sub>	993			1 197			1 197			1 496			1 729			1 729			2 206							
W <sub>i</sub>	2 005			2 005			2 413			2 505			3 005			3 505			3 617							
H <sub>2</sub>	2 236			2 754			2 754			3 352			3 818			3 818			4 772							
l	40			40			40			40			40			40			40							

Selected configurations		Dimension		Length of selected configurations							
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 026	4 026	4 026	5 124	5 124	5 124	5 490	
	K			366	366	366	366	366	366	366	
	Lt			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 026	4 026	4 026	5 124	5 124	5 124	5 490	
	K			366	366	366	366	366	366	366	
	Lt			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	K			0	0	0	0	0	0	0	
	Lt			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	K			0	0	0	0	0	0	0	
	Lt			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 758	4 758	4 758	5 856	5 856	5 856	6 222	
	K			0	0	0	0	0	0	0	
	Lt			4 758	4 758	4 758	5 856	5 856	5 856	6 222	
	L2			4 392	4 392	4 392	5 490	5 490	5 490	5 856	
	L1			4 758	4 758	4 758	5 856	5 856	5 856	6 222	
	K			0	0	0	0	0	0	0	
	Lt			4 758	4 758	4 758	5 856	5 856	5 856	6 222	

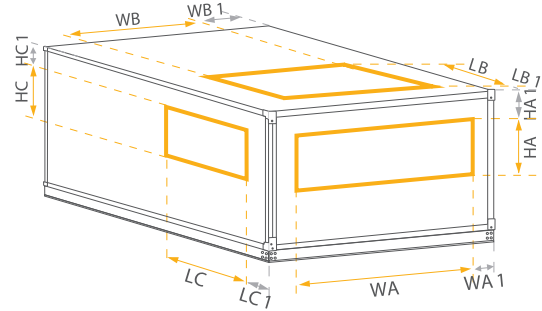
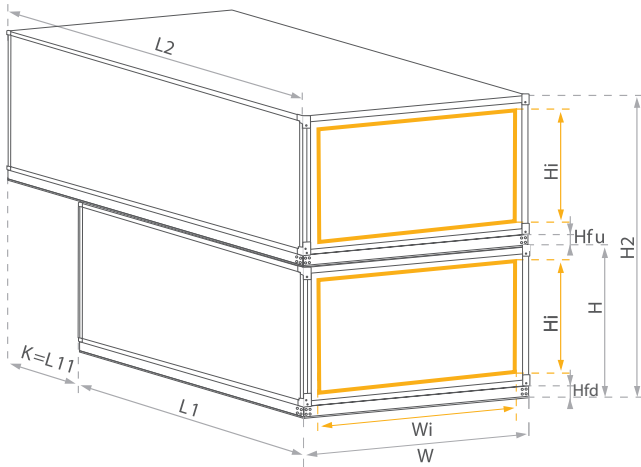
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

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# DIMENSIONS - VVS 150-650 - RECUPERATOR (PREMIUM PLUS)



Full-face horizontal outlet  
END (FF)



Size	WA	HA	WA1	HA1
VVS150	1 945	933	70	70
VVS180	1 945	1 137	70	70
VVS230	2 353	1 137	70	70
VVS300	2 445	1 436	70	70
VVS400	2 945	1 669	70	70
VVS500	3 445	1 669	70	70
VVS650	3 557	2 146	70	70

Small horizontal inlet-outlet  
END (FS)



Size	WA	HA	WA1	HA1
VVS150	1520	795	280	137
VVS180	1520	713	280	239
VVS230	1945	813	272	200
VVS300	1945	813	318	319
VVS400	2650	813	215	436
VVS500	3150	813	215	436
VVS650	3250	813	220	674

Vertical inlet-outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	200
VVS180	1520	713	280	239
VVS230	1945	813	272	151
VVS300	1945	813	318	151
VVS400	2650	813	215	151
VVS500	3150	813	215	151
VVS650	3250	813	220	151

Vertical outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	127
VVS180	1520	713	293	127
VVS230	1945	813	284	127
VVS300	1945	813	330	127
VVS400	2650	813	228	127
VVS500	3150	813	228	212
VVS650	3250	813	234	212

Side inlet-outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS150	713	740	178	165
VVS180	913	740	180	165
VVS230	913	740	180	165
VVS300	1 213	740	179	165
VVS400	1 513	740	146	165
VVS500	1 513	740	146	165
VVS650	1 913	740	184	165

Side outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS150	713	740	139	202
VVS180	913	740	241	202
VVS230	913	740	142	127
VVS300	1 213	740	321	127
VVS400	1 513	740	438	127
VVS500	1 513	740	438	127
VVS650	1 913	740	676	127



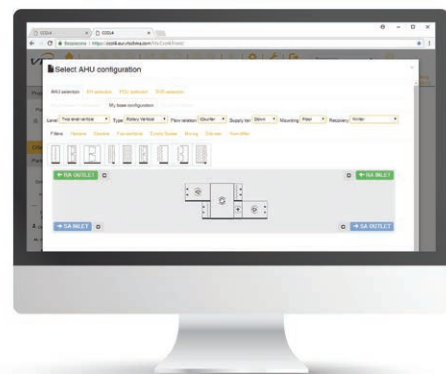
# VVS 021-120 - ROTARY HEAT WHEEL

Nominal parameters			Recommended airflow range																					
Unit size				VVS021			VVS030			VVS040			VVS055			VVS075			VVS100			VVS120		
18 000	[m³/h]																							
12 000																								
6 000																								
0																								
Min airflow		806	806	806	1 180	1 180	1 180	1 958	1 958	1 958	2 878	2 878	2 878	3 805	3 805	3 805	4 863	4 863	4 863	5 815	5 815	5 815		
Max airflow		2 730	2 415	2 163	3 900	3 450	3 090	5 200	4 600	4 120	7 150	6 325	5 665	9 750	8 625	7 725	13 000	11 500	10 300	15 600	13 800	12 360		
H <sub>fd</sub>	[mm]	90			90			90			90			90			90			90				
H <sub>fu</sub>		0			0			0			0			0			0			0				
H		538			670			670			805			925			1 025			1 062				
W		961			961			1 168			1 339			1 480			1 660			1 891				
H <sub>i</sub>		368			500			500			635			755			855			892				
W <sub>i</sub>		881			881			1 088			1 259			1 400			1 580			1 811				
H <sub>2</sub>		986			1 250			1 250			1 520			1 760			1 960			2 034				
I		40			40			40			40			40			40			40				

Selected configurations		Dimension	Length of selected configurations						
	FRV/FRV_cd	L2	1 830	1 830	1 830	2 196	2 196	2 562	2 562
		L1	1 830	1 830	1 830	2 196	2 196	2 562	2 562
		K	366	366	366	732	732	1 098	1 098
		Lt	1 830	1 830	1 830	2 196	2 196	2 562	2 562
	FRMV/FVMR_cd	L2	2 562	2 562	2 562	2 928	2 928	3 294	3 294
		L1	2 562	2 562	2 562	2 928	2 928	3 294	3 294
		K	366	366	366	366	366	366	366
		Lt	2 562	2 562	2 562	2 928	2 928	3 294	3 294
	FRHV/FRV_cd	L2	1 830	1 830	1 830	2 196	2 196	2 562	2 562
		L1	2 196	2 196	2 196	2 562	2 562	2 928	2 928
		K	366	366	366	732	732	1 098	1 098
		Lt	2 196	2 196	2 196	2 562	2 562	2 928	2 928
	FRMHV/FVMR_cd	L2	2 562	2 562	2 562	2 928	2 928	3 294	3 294
		L1	2 928	2 928	2 928	3 294	3 294	3 660	3 660
		K	0	0	0	0	0	0	0
		Lt	2 928	2 928	2 928	3 294	3 294	3 660	3 660
	FRCV/FRV_cd	L2	1 830	1 830	1 830	2 196	2 196	2 562	2 562
		L1	2 196	2 196	2 196	2 562	2 562	2 928	2 928
		K	366	366	366	732	732	1 098	1 098
		Lt	2 196	2 196	2 196	2 562	2 562	2 928	2 928
	FRMCV/FVMR_cd	L2	2 562	2 562	2 562	2 928	2 928	3 294	3 294
		L1	2 928	2 928	2 928	3 294	3 294	3 660	3 660
		K	0	0	0	0	0	0	0
		Lt	2 928	2 928	2 928	3 294	3 294	3 660	3 660

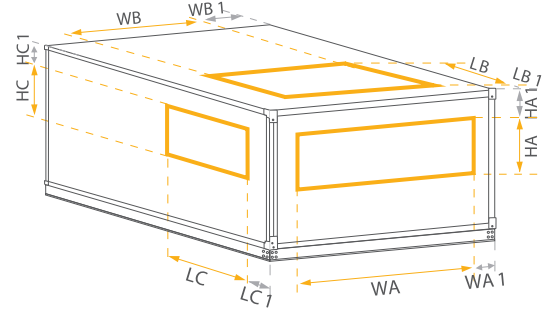
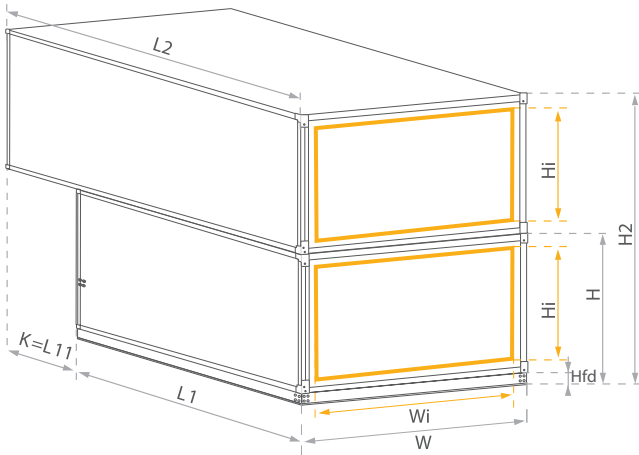
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

[www.ccol4.com](http://www.ccol4.com)





# DIMENSIONS - VVS 021-120 - ROTARY HEAT WHEEL



Full-face horizontal outlet  
END (FF)



Size	WA	HA	WA1	HA1
VVS021	821	313	70	67,5
VVS030	821	440	70	70
VVS040	1 028	440	70	70
VVS055	1 199	575	70	70
VVS075	1 340	695	70	70
VVS100	1 520	795	70	70
VVS120	1 751	832	70	70

Small horizontal inlet-outlet  
END (FS)



Size	WA	HA	WA1	HA1
VVS021	500	220	228	112
VVS030	500	220	228	178
VVS040	660	250	252	163
VVS055	821	440	257	135
VVS075	1 028	440	224	195
VVS100	1 199	575	228	200
VVS120	1 199	575	344	196

Vertical inlet-outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS021	500	220	228	200
VVS030	500	220	228	200
VVS040	660	250	252	200
VVS055	821	440	257	200
VVS075	1 028	440	224	200
VVS100	1 199	575	228	125
VVS120	1 199	575	344	125

Vertical outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS021	660	250	152	212
VVS030	613	380	173	127
VVS040	821	440	175	127
VVS055	1 028	440	157	212
VVS075	1 199	575	142	212
VVS100	1 340	695	162	212
VVS120	1 520	795	187	127

Side inlet-outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS021	213	380	115	165
VVS030	313	380	131	165
VVS040	313	380	131	165
VVS055	413	380	149	165
VVS075	413	380	209	165
VVS100	613	380	159	165
VVS120	613	380	177	165

Side outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS021	213	380	114	202
VVS030	313	380	180	202
VVS040	313	380	165	202
VVS055	413	380	137	202
VVS075	413	380	197	202
VVS100	613	380	158	127
VVS120	613	380	198	127

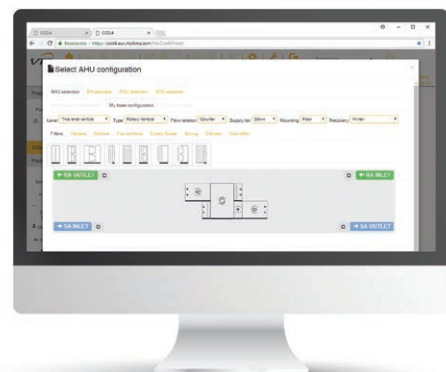
# VVS 150-650- ROTARY HEAT WHEEL

Nominal parameters			Recommended airflow range																					
Unit size			VVS150			VVS180			VVS230			VVS300			VVS400			VVS500			VVS650			
90 000 60 000 30 000 0	[m³/h]																							
			+	0	-	+	0	-	+	0	-	+	0	-	+	0	-	+	0	-	+	0	-	
			Min airflow	7 167	7 167	7 167	8 640	8 640	8 640	10 398	10 398	10 398	13 491	13 491	13 491	18 704	18 704	18 704	21 817	21 817	21 817	28 725	28 725	28 725
			Max airflow	19 500	16 350	15 450	23 400	19 620	18 540	29 900	25 070	23 690	39 000	32 700	30 900	52 000	43 600	41 200	71 500	59 950	56 650	84 500	70 850	66 950
H <sub>fd</sub>	90			120			120			120			120			120			120					
H <sub>fu</sub>	0			80			80			80			80			80			80					
H	1 163			1 397			1 397			1 696			1 929			1 929			2 406					
W	2 085			2 085			2 493			2 585			3 085			3 585			3 697					
H <sub>i</sub>	993			1 197			1 197			1 496			1 729			1 729			2 206					
W <sub>i</sub>	2 005			2 005			2 413			2 505			3 005			3 505			3 617					
H <sub>2</sub>	2 236			2 754			2 754			3 352			3 818			3 818			4 772					
l	40			40			40			40			40			40			40					

Selected configurations		Dimension		Length of selected configurations						
	FRV/FRV_cd	[mm]	L2	2 562	2 562	2 562	2 928	2 928	2 928	2 928
			L1	2 562	2 562	2 562	2 928	2 928	2 928	2 928
			K	1 098	1 098	1 098	1 464	1 464	1 464	1 464
			Lt	2 562	2 562	2 562	2 928	2 928	2 928	2 928
	FRMV/FVMR_cd	[mm]	L2	3 660	3 660	3 660	4 026	4 026	4 026	4 026
			L1	3 660	3 660	3 660	4 026	4 026	4 026	4 026
			K	0	0	0	0	0	0	0
			Lt	3 660	3 660	3 660	4 026	4 026	4 026	4 026
	FRHV/FRV_cd	[mm]	L2	2 562	2 562	2 562	2 928	2 928	2 928	2 928
			L1	2 928	2 928	2 928	3 294	3 294	3 294	3 294
			K	1 098	1 098	1 098	1 464	1 464	1 464	1 464
			Lt	2 928	2 928	2 928	3 294	3 294	3 294	3 294
	FRMHV/FVMR_cd	[mm]	L2	3 660	3 660	3 660	4 026	4 026	4 026	4 026
			L1	4 026	4 026	4 026	4 392	4 392	4 392	4 392
			K	0	0	0	0	0	0	0
			Lt	4 026	4 026	4 026	4 392	4 392	4 392	4 392
	FRMHV/FVMR_cd	[mm]	L2	2 562	2 562	2 562	2 928	2 928	2 928	2 928
			L1	2 928	2 928	2 928	3 294	3 294	3 294	3 294
			K	1 098	1 098	1 098	1 464	1 464	1 464	1 464
			Lt	2 928	2 928	2 928	3 294	3 294	3 294	3 294
	FRMCV/FVMR_cd	[mm]	L2	3 660	3 660	3 660	4 026	4 026	4 026	4 026
			L1	4 026	4 026	4 026	4 392	4 392	4 392	4 392
			K	0	0	0	0	0	0	0
			Lt	4 026	4 026	4 026	4 392	4 392	4 392	4 392

Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

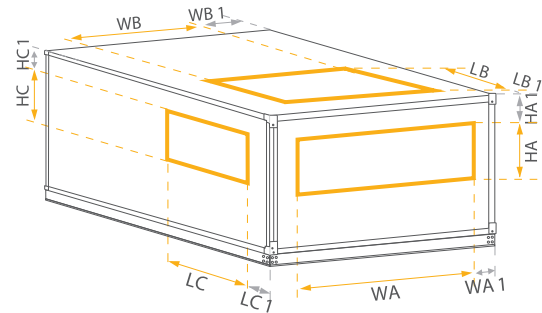
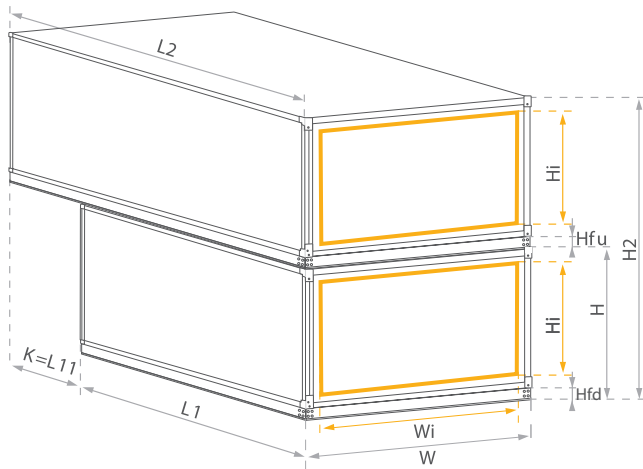
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# DIMENSIONS - VVS 150-650 - ROTARY HEAT WHEEL



Full-face horizontal outlet  
END (FF)



Size	WA	HA	WA1	HA1
VVS150	1 945	933	70	70
VVS180	1 945	1 137	70	70
VVS230	2 353	1 137	70	70
VVS300	2 445	1 436	70	70
VVS400	2 945	1 669	70	70
VVS500	3 445	1 669	70	70
VVS650	3 557	2 146	70	70

Small horizontal inlet-outlet  
END (FS)



Size	WA	HA	WA1	HA1
VVS150	1520	795	280	137
VVS180	1520	713	280	239
VVS230	1945	813	272	200
VVS300	1945	813	318	319
VVS400	2650	813	215	436
VVS500	3150	813	215	436
VVS650	3250	813	220	674

Vertical inlet-outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	200
VVS180	1520	713	280	239
VVS230	1945	813	272	151
VVS300	1945	813	318	151
VVS400	2650	813	215	151
VVS500	3150	813	215	151
VVS650	3250	813	220	151

Vertical outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	127
VVS180	1520	713	293	127
VVS230	1945	813	284	127
VVS300	1945	813	330	127
VVS400	2650	813	228	127
VVS500	3150	813	228	212
VVS650	3250	813	234	212

Side inlet-outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS150	713	740	178	165
VVS180	913	740	180	165
VVS230	913	740	180	165
VVS300	1 213	740	179	165
VVS400	1 513	740	146	165
VVS500	1 513	740	146	165
VVS650	1 913	740	184	165

Side outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS150	713	740	139	202
VVS180	913	740	241	202
VVS230	913	740	142	127
VVS300	1 213	740	321	127
VVS400	1 513	740	438	127
VVS500	1 513	740	438	127
VVS650	1 913	740	676	127



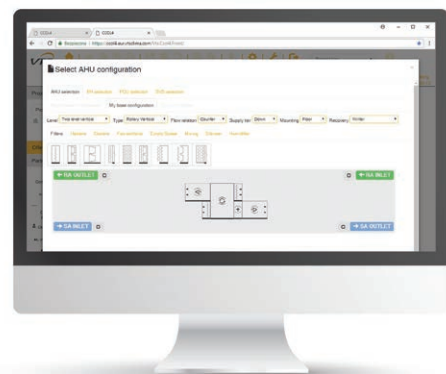
# VVS 021-120 - SUPPLY & EXHAUST

Nominal parameters		Recommended airflow range																												
Unit size		VVS021				VVS030				VVS040				VVS055				VVS075				VVS100				VVS120				
20 000 15 000 10 000 5 000 0	[m³/h]	[Bar chart showing airflow range for each unit size and model]																												
		Min airflow	806	806	806	806	1180	1180	1167	1167	1958	1958	1958	1958	2878	2878	2878	2878	3805	3805	3805	3805	4863	4863	4863	4863	5815	5815	5815	5815
		Max airflow	2163	2730	3570	3780	3090	3900	5100	5400	4120	5200	6800	7200	5665	7150	9350	9900	7725	9750	12750	13500	10300	13000	17000	18000	12360	15600	20400	21600
		H <sub>fd</sub>	90				90				90				90				90				90							
		H	538				670				670				805				925				1 025				1 062			
W	961				961				1 168				1 339				1 480				1 660				1 891					
H <sub>i</sub>	368				500				500				635				755				855				892					
W <sub>i</sub>	881				881				1 088				1 259				1 400				1 580				1 811					
l	40				40				40				40				40				40				40					

Selected configurations		Dimension	Length of selected configurations						
	V	Lt	732	732	732	1 098	1 098	1 464	1 464
	FV	Lt	1 098	1 098	1 098	1 464	1 464	1 830	1 830
	FHV	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
	FCV	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
	FHCV	Lt	1 830	1 830	1 830	2 196	2 196	2 562	2 562
	FGHV	Lt	1 830	1 830	1 830	2 196	2 196	2 562	2 562
	FGV	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
	FGCVH	Lt	2 196	2 196	2 196	2 562	2 562	2 928	2 928

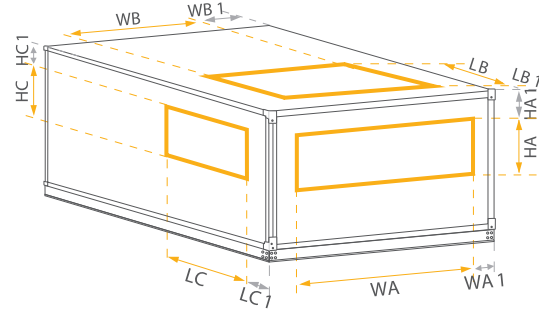
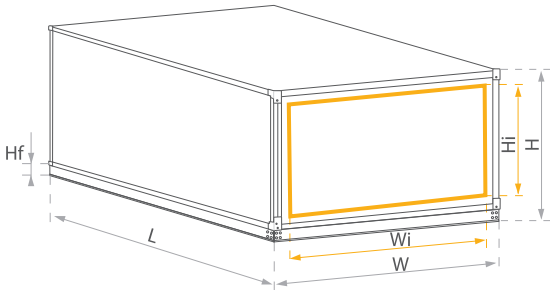
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

[www.ccol4.com](http://www.ccol4.com)





# DIMENSIONS - VVS 0 21-120 - SUPPLY & EXHAUST



Full-face horizontal outlet  
END (FF)



Size	WA	HA	WA1	HA1
VVS021	821	313	70	67,5
VVS030	821	440	70	70
VVS040	1 028	440	70	70
VVS055	1 199	575	70	70
VVS075	1 340	695	70	70
VVS100	1 520	795	70	70
VVS120	1 751	832	70	70

Small horizontal inlet-outlet  
END (FS)



Size	WA	HA	WA1	HA1
VVS021	500	220	228	112
VVS030	500	220	228	178
VVS040	660	250	252	163
VVS055	821	440	257	135
VVS075	1 028	440	224	195
VVS100	1 199	575	228	200
VVS120	1 199	575	344	196

Vertical inlet-outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS021	500	220	228	112
VVS030	500	220	228	178
VVS040	660	250	252	163
VVS055	821	440	257	135
VVS075	1 028	440	224	195
VVS100	1 199	575	228	200
VVS120	1 199	575	344	196

Vertical outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS021	660	250	152	212
VVS030	613	380	173	127
VVS040	821	440	175	127
VVS055	1 028	440	157	212
VVS075	1 199	575	142	212
VVS100	1 340	695	162	212
VVS120	1 520	795	187	127

Side inlet-outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS021	213	380	115	165
VVS030	313	380	131	165
VVS040	313	380	131	165
VVS055	413	380	149	165
VVS075	413	380	209	165
VVS100	613	380	159	165
VVS120	613	380	177	165

Side outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS021	213	380	114	202
VVS030	313	380	180	202
VVS040	313	380	165	202
VVS055	413	380	137	202
VVS075	413	380	197	202
VVS100	613	380	158	127
VVS120	613	380	198	127



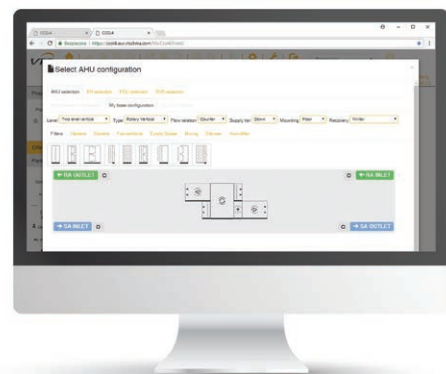
# VVS 150-650 - SUPPLY & EXHAUST

Nominal parameters		Recommended airflow range							
Unit size		VVS150	VVS180	VVS230	VVS300	VVS400	VVS500	VVS650	
120 000 90 000 60 000 30 000 0	[m³/h]								
		Min airflow	7 167	8 640	10 398	13 491	18 704	21 817	28 725
		Max airflow	15 450	18 540	23 690	30 900	41 200	56 650	79 000
		H <sub>fd</sub>	90	120	120	120	120	120	120
		H <sub>fu</sub>	0	80	80	80	80	80	80
H	1 163	1 397	1 397	1 696	1 929	1 929	2 406		
W	2 085	2 085	2 493	2 585	3 085	3 585	3 697		
H <sub>i</sub>	993	1 197	1 197	1 496	1 729	1 729	2 206		
W <sub>i</sub>	2 005	2 005	2 413	2 505	3 005	3 505	3 617		
H <sub>2</sub>	2 236	2 754	2 754	3 352	3 818	3 818	4 772		
I	40	40	40	40	40	40	40		

Selected configurations Dimension		Length of selected configurations						
	Lt	1 464	1 464	1 464	1 830	1 830	1 830	1 830
	Lt	1 830	1 830	1 830	2 196	2 196	2 196	2 196
	Lt	2 196	2 196	2 196	2 562	2 562	2 562	2 562
	Lt	2 196	2 196	2 196	2 562	2 562	2 562	2 562
	Lt	2 562	2 562	2 562	2 928	2 928	2 928	2 928
	Lt	2 562	2 562	2 562	2 928	2 928	2 928	2 928
	Lt	2 196	2 196	2 196	2 562	2 562	2 562	2 562
	Lt	2 928	2 928	2 928	3 294	3 294	3 294	3 294

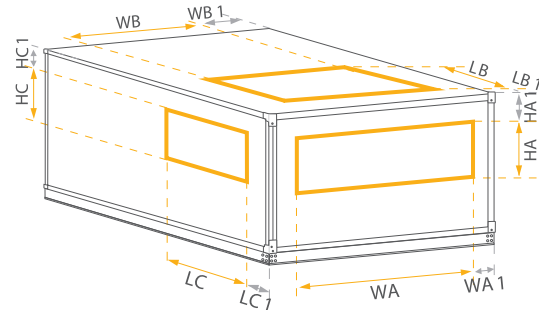
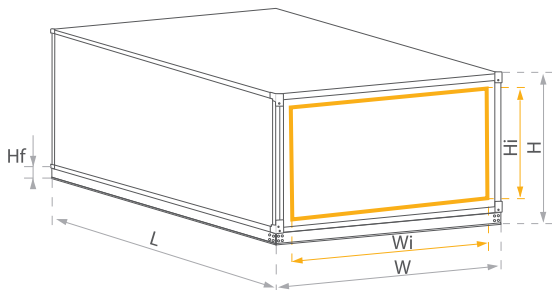
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

[www.ccol4.com](http://www.ccol4.com)





# DIMENSIONS - VVS 150-650 - SUPPLY & EXHAUST



Full-face horizontal outlet  
END (FF)



Size	WA	HA	WA1	HA1
VVS021	821	313	70	67,5
VVS030	821	440	70	70
VVS040	1 028	440	70	70
VVS055	1 199	575	70	70
VVS075	1 340	695	70	70
VVS100	1 520	795	70	70
VVS120	1 751	832	70	70

Small horizontal inlet-outlet  
END (FS)



Size	WA	HA	WA1	HA1
VVS150	1520	795	280	137
VVS180	1520	713	280	239
VVS230	1945	813	272	200
VVS300	1945	813	318	319
VVS400	2650	813	215	436
VVS500	3150	813	215	436
VVS650	3250	813	220	674

Vertical inlet-outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	200
VVS180	1520	713	280	239
VVS230	1945	813	272	151
VVS300	1945	813	318	151
VVS400	2650	813	215	151
VVS500	3150	813	215	151
VVS650	3250	813	220	151

Vertical outlet  
END (US)



Size	WB	LB	WB1	LB1
VVS150	1520	795	280	127
VVS180	1520	713	293	127
VVS230	1945	813	284	127
VVS300	1945	813	330	127
VVS400	2650	813	228	127
VVS500	3150	813	228	212
VVS650	3250	813	234	212

Side inlet-outlet  
END (BS)



Size	HC	LC	HC1	LC1
VVS021	213	380	115	165
VVS030	313	380	131	165
VVS040	313	380	131	165
VVS055	413	380	149	165
VVS075	413	380	209	165
VVS100	613	380	159	165
VVS120	613	380	177	165








Side outlet  
END (BS)










Size	HC	LC	HC1	LC1
VVS021	213	380	114	202
VVS030	313	380	180	202
VVS040	313	380	165	202
VVS055	413	380	137	202
VVS075	413	380	197	202
VVS100	613	380	158	127
VVS120	613	380	198	127



# ADDITIONAL CONFIGURATION FUNCTIONS - VVS 021-650 - RECUPERATOR (HEX & PREMIUM PLUS), REGENERATOR (HEAT WHEEL), SUPPLY & EXHAUST

Dimension		Function version	Remaining configuration functions – typical lengths of function arrangement							
			VVS021	VVS030	VVS040	VVS055	VVS075	VVS100	VVS120	
	L	F7/F9	762	762	762	762	762	762	762	
		EU4/F5	366	366	366	366	366	366	366	
	L	H	366	366	366	366	366	366	366	
	L	C	366	366	366	366	366	366	366	
	L	S	1098	1098	1098	1098	1098	1098	1098	
	L	E(e1)	366	366	366	366	366	366	366	
		E(e2)	762	762	762	762	762	762	762	
		E(e3)	1098	1098	1098	1098	1098	1098	1098	
	L	M	762	762	762	762	762	762	762	
	L	W	1098	1098	1098	1098	1098	1098	1098	

Dimension		Function version	Remaining configuration functions – typical lengths of function arrangement							
			VVS150	VVS180	VVS230	VVS300	VVS400	VVS500	VVS650	
	L	F7/F9	762	762	762	762	762	762	762	
		EU4/F5	366	366	366	366	366	366	366	
	L	H	366	366	366	366	366	366	366	
	L	C	366	366	366	366	366	366	366	
	L	S	1098	1098	1098	1098	1098	1098	1098	
	L	E(e1)	366	366	366	366	366	366	366	
		E(e2)	762	762	762	762	762	762	762	
		E(e3)	1098	1098	1098	1098	1098	1098	1098	
	L	M	1098	1098	1098	1098	1098	1098	1098	
	L	W	1098	1098	1098	1098	1098	1098	1098	



*ventus*

*ventus*



# COMPONENTS

## DIRECT DRIVE PLUG FAN SET



### Design and application

- » Single inlet, radial, backward curved, free running fan.
- » Impeller made of SAN (styrene/acrylonitrile) construction material with 20% glass fiber.
- » Direct drive – fan impeller installed directly on motor shaft.
- » Fan section consisting of single or multiple fans (fan array) in order to ensure optimum working parameters.

### Specification

- » Low and medium pressure ventilation systems with fan static pressure not exceeding 2000 Pascals.
- » Maximum fan set working temperature: 60°C.

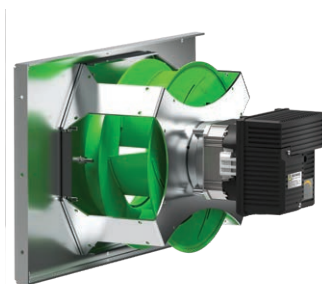
### > AC MOTORS



- » Fan and motor mounted on common housing, separated from AHU casing by set of rubber vibration absorbing mounts.
- » Motors of TEFC type (Totally Enclosed, Fan-Cooled).
- » Motors fitted for IEC standard.
- » Variable Frequency Drive (VFD) – standard equipment of the fan-set.

- » Available Energy classes: IE2, IE3
- » Rated voltage: 3x230V AC, 3x400V AC.
- » Number of poles: 2 or 4.
- » Motor winding insulation class: F (fitted for VFD operations).
- » Bearings lifetime: L<sub>10</sub>= 20000h / L<sub>50</sub> = 100000h.
- » Protection degree: IP55.
- » Maximum working ambient temperature: 60°C.

### > EC MOTORS



- » Set of fan and motor mounted on common rail, fixed to the AHU fan diaphragm.
- » EC motors are Permanent Magnet motor, characterised by much higher efficiency vs traditional inductive AC motors.
- » EC motors (Electronically Commutated) – where mechanical commutator switching the windings has been replaced with electronic one.
- » Change of revolutions is done by means of changing the frequency rate of windings switching (rate or magnetic field rotating).
- » Highly inductive permanent magnets have applied in EC motors used by VTS, which enabled to achieve high torque at relatively small dimensions, together with reaching IE4 efficiency class.

- » Available Energy classes: IE4.
- » Rated voltage: EC motors of nominal capacity exceeding 0,75kW - 3x400V AC.
- » Rated voltage: EC motors of nominal capacity equal or less 0,75kW - 1x230V AC.
- » Motor winding insulation class: F.
- » Protection degree: IP54.
- » Maximum working ambient temperature: 55°C.
- » Lifespan:
  - 70 000 hours at load not exceeding 70% of nominal capacity at ambient temperature not exceeding 35°C,
  - 30 000 hours at 100% capacity load at ambient temperature not exceeding 55°C.





## CASING



### Design and application

- » Casing structure made of 'sandwich' type panels formed in 'C' shape and reinforced by system of internal frames.
- » "Sandwich" double skin panels made of rigid polyurethane foam.
- » Indoor and outdoor application.
- » Inspection panels mounted on AHU side.
- » Casing supported on steel base rails.



### Specification

- » Working temperature:  $(-40)^{\circ}\text{C} \div (+90)^{\circ}\text{C}$ .
- » Panel thickness: 40mm.
- » Thermal conductivity PPU  $\lambda = 0,022 \text{ W/mK}$ .
- » Casing fire resistance: non-flammable, non fire spreading (NRO).
- » Moisture absorption: 0,04%.
- » PPU density:  $\rho = 42 \text{ kg/m}^3$ .
- » Eurovent certification
  - Mechanical strength of casing:  $-1000 \text{ Pa} \div 1000 \text{ Pa} < 2 \text{ mm}$  (D<sub>1</sub> - PN EN 1886: 2008),
  - Casing tightness: (MB):  $(-400) \text{ Pa} - 0,05 \text{ l/sm}^2$ ,  $(+700) \text{ Pa} - 0,13 \text{ l/sm}^2$  (L<sub>1</sub> - PN EN 1886: 2008); (RU):  $(+400) \text{ Pa} - 0,93 \text{ l/sm}^2$ ,
  - Casing heat transfer coefficient:  $K = 0,6 \text{ W/m}^2\text{K}$  (T<sub>2</sub> - PN EN 1886: 2008),
  - Thermal bridges coefficient:  $K_b = 0,52$  (TB<sub>3</sub> - PN EN 1886: 2008).

## PANEL FILTERS



### Design and application

- » Pleated filtration fabric shielded by steel net, installed in 50 mm thick frame.
- » Filtration fabric made of polyester fibres.
- » Applied as initial air filtration stage.

### Specification

- » Working temperature: max  $(+70)^{\circ}\text{C}$ , 100% RH.

### Filtration classes available

- » ISO Coarse 75% (ISO 16890) - G4 (EN779).

## BAG FILTERS



### Design and application

- » Filtration fabric made of polyester fibres.
- » Bags fixed to 25 mm thick frame.
- » Filters of class M5 - bags length: 300 mm, Filters of class F7 & F9 - bags length: 600 mm.
- » Applied as initial, secondary of final air filtration stage.

### Specification

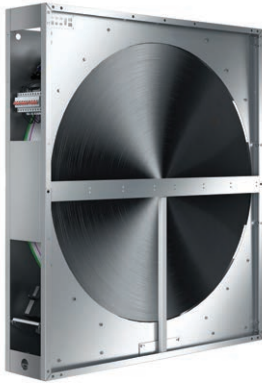
- » Working temperature: max  $(+70)^{\circ}\text{C}$ , 100% RH.

### Filtration classes available

- » ISO ePM10 50% (ISO 16890) - M5 (EN779).
- » ISO ePM2,5 65% (ISO 16890) - F7 (EN779).
- » ISO ePM1 70% (ISO 16890) - F9 (EN779).



## ROTARY HEAT WHEEL



### Design and application

- » Rotor made of aluminum with shaft suspended on bearings, installed in steel housing.
- » Rotor filling – two layers of alternately winded aluminium foil – one flat, the other – corrugated – making small ducts for the air.
- » Rotor drive system with smooth revolutions control enabling to maintain highest recovery efficiency and to adjust degree of recovery performance.
- » Purge zone reducing the cross-contamination effect of contaminated exhaust air to supply to absolute minimum.
- » Set of gaskets installed both on the wheel outer edge and bar separating supply from exhaust air being an additional protection against cross-contamination.
- » Rotary heat wheel recovers sensible heat from return air to supply, which passes the unit in opposite direction. The process enables heat recovery in winter time, same as cool recovery in summer.
- » Humidity recovery from return to supply in case the rotor pad temperature is lower than dew point of return air – typically during winter season.

### Specification

- » Up to 86% of energy recovery, depending on airflow rate and its velocity in the heat wheel window.

## COUNTERFLOW HEXAGONAL RECUPERATOR



### Design and application

- » Hexagonal heat recovery recuperator made of crosswise stamped aluminum plates, between which supply and exhaust air passes alternately in counterflow arrangement.
- » As standard, the recuperator is equipped with by-pass damper, enabling its securing against frosting and heat recovery capacity regulation.
- » Optionally, the recuperator can be equipped with integrated mixing box.
- » The recuperator provides sensible heat recovery for warmer air to the colder one. For winter season – recovery of heat from return air to supply. For summer – recovery of chill from return air to supply.

### Specification

- » Energy recovery at very high supply and exhaust air stream separation (reaching 99,9%).
- » Heat recovery reaching up to 93% depending on flow rate face velocity of the air passing the recuperator.



## CROSSFLOW PLATE HEAT RECUPERATOR



### Design and application

- » Recuperator made of crosswise stamped aluminum plates, between which supply and exhaust air passes alternately in counterflow arrangement.
- » As standard, the recuperator is equipped with by-pass damper, enabling its securing against frosting and heat recovery capacity regulation.
- » Optionally, the recuperator can be equipped with integrated mixing box.
- » The recuperator provides sensible heat recovery for warmer air to the colder one. For winter season – recovery of heat from return air to supply. For summer – recovery of chill from return air to supply.

### Specification

- » Energy recovery at very high supply and exhaust air stream separation (reaching 99,9%)
- » Heat recovery reaching up to 80% depending on flow rate face velocity of the air passing the recuperator.

## RUN-AROUND COIL



### Design and application

- » Set of two water coils – one in supply, the other one in exhaust airstream.
- » The coil in return airstream recovers the heat (cooler) and passes it to the coil in the supply air (heater) by means of heat-transfer fluid (water-glycol mixture). In case of chill recovery, entire process is reversed.
- » System applied for supply and exhaust air handling units installed remotely to each other."

### Specification

- » Indirect Energy recovery (sensible heat) at 100% supply and exhaust airstreams separation.
- » Max heat-transfer fluid operation pressure: 1,6MPa=16bar (tested 21 bar).
- » Max glycol concentration: 50%.

## MIXIN SECTION



### Design and application

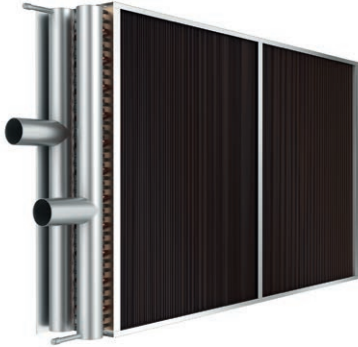
- » Section equipped with two air inlets/outlets aided with dampers, enabling regulation of fresh and recirculation air share (recirculation).

### Specification

- » Direct Energy recovery (sensible and latent heat) resulting from partial mixing of fresh air with return one.
- » Control of fresh air share in entire airflow supplied to handled spaces.
- » Working temperature range: -40 ÷ +70°C.



## WATER HEATER



### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.
- » The coil can be applied if heating medium is available (local boiler or district heating system).
- » Coil headers are equipped with medium damping valve and air vent.
- » Connecting the coil in parallel medium flow vs air, will result in its capacity reduction by over a dozen percent.

### Specification

- » Max glycol concentration: 50%.
- » Max medium temperature: 150°C.
- » Max medium working pressure: 1,6MPa = 16bar (test: 21bar).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).
- » Medium side pressure drop – parameter resulting from individual performance calculation of selected unit (CCOL).

## ELECTRIC HEATER



### Design and application

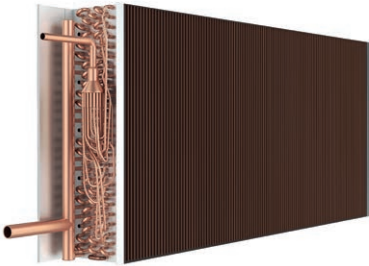
- » Set of resistive heating elements made of CR-Ni-Fe alloy, 6 kW/400V each.
- » Coils mounted on hot-dip galvanized steel frame.
- » Heater is equipped with power terminals and thermostat protecting against overheating.
- » In case of AHU with complete controls, heater is equipped with integrated capacity control module.
- » Heating capacity can be modified by means of smooth regulation module (HE module, set of Solid State Relays as optional parts of AHU controls) or by means of automatic engaging of next heating sections.

### Specification

- » Max permissible ambient temperature around heating elements: 65°C.



## DIRECT EXPANSION COIL AS CONDENSER IN HEAT PUMP CIRCUIT



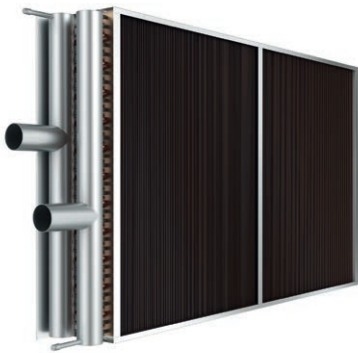
### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.

### Specification

- » Max medium temperature: 60°C.
- » Max medium working pressure: 3,84MPa = 38,4bar (test: 50bar).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).

## WATER COOLER



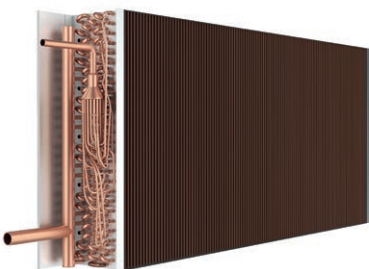
### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Cooling of the air supplied to handled spaces.
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil can be applied in complex air conditioning systems consisting of few or over a dozen of units supplied from common chilling source (chiller) or in case of single unit of relatively high cooling capacity.

### Specification

- » Max glyccol concentration: 50%.
- » Min supplying medium temperature: +2°C.
- » max medium working pressure: 1,6MPa = 16bar (test: 21bar).
- » Cooling capacity: parameter resulting from individual parameters of selected unit (CCOL).
- » Medium pressure drop / flow rate: parameter resulting from individual performance calculation of selected unit (CCOL).
- » For reversed operation mode (heating) max medium working temperature: 140°C.

## DX COOLING COIL



### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » DX cooler is also available as heater execution (so called Condenser).
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil usually applied for smaller cooling capacity systems vs water coolers or for individual air conditioning systems.

### Specification

- » Min. Refrigerant evaporation temperature: +3°C.
- » Max refrigerant working pressure: 2,2MPa=22bar (test: 29 bar).
- » Cooling capacity - parameter resulting from individual performance calculation of selected unit (CCOL).



## EVAPORATIVE HUMIDIFIER



### Design and application

- » Humidifying process based on water adiabatic evaporation from the humidifier pad.
- » Humidifying pad made of CELDEK II material.
- » Humidifier housing made of stainless steel.
- » System of direct water dropping (VVS021-VVS055).
- » System of water recirculation aided by pump (VVS075-VVS650).
- » Droplet eliminator integrated with humidifier filling (VVS075-VVS650).
- » System is equipped with water drainage system preventing against high water level in the pan and floating valve controlling its refilling (VVS075-VVS 650).

### Specification

- » Max air face velocity across the humidifier pad: 3,00 m/s (VS 21-VS 55); 4,00 m/s (VS 75-VS 650).
- » Water pressure range: 0,15 ÷ 0,75 MPa.
- » Requirements regarding water quality – standard tap water.

## SOUND ATTENUATING SECTION



### Design and application

- » Sound attenuator consists of noise attenuating bars installed in the AHU casing.
- » Attenuating bars of 140 mm width filled with sound-absorbing, inflammable mineral wool (density: 60 and 80 kg/m<sup>3</sup>).
- » Attenuating bar housing: frame made of hot-dip galvanized steel.
- » Bar outer surface: thin veil preventing against bar filling migration to the air.
- » Number of attenuating bars: 2÷13, depending on block size.

### Specification

- » Max air face velocity: v=5m/s.
- » Working conditions: -40 ÷ +70°C."

## INTERNAL LIGHT



### Design and application

- » Energy saving lamp with securing shade.
- » Facilitation of AHU inspection actions: filter, fan and humidifier compartment.

### Specification

- » Working conditions: -40 ÷ +70°C.



## AIR DAMPER



### Design and application

- » Blades made of aluminium with rubber gasket on the edges.
- » Aluminum frame.
- » Blades drive realized by means of gears made of composite material, installed on frame internal side.
- » Damper is equipped with square pivot, fitted for actuator (dampers of cross section greater than 4 m<sup>2</sup> have 2 linked pivots).

### Specification

- » Air leakage at closed damper: 50 m<sup>3</sup>/h\*m<sup>2</sup> - at 100 Pascals of pressure difference.
- » Working temperature range: -40 ÷ +70°C.

## FLEXIBLE CONNECTION



### Design and application

- » Flexible connection made of 1 mm thick and 30 mm wide hot-dip galvanized steel profiles and polyester fabric coated with PVC.
- » Flame resistance: UL94 - HB [ISO 1210].
- » Flexible connection resistant to UV radiation.
- » Working temperature range: -30°C do +70°C.
- » Max connection length (fully spread position): 110 mm.
- » Flexible connection installed on each AHU/Duct joint eliminates transfer of possible AHU vibrations to the ventilation ductwork.

### Specification

- » Max air face velocity: 5m/s.
- » Working conditions: -40 ÷ +70°C.

## AIR INTAKE AND DISCHARGE LOUVERS



### Design and application

- » Air intake louver made of aluminum profile, blades made of ABS material.
- » Air outlet louver made of aluminum profile, blades made of ABS material.
- » Protection of air handling unit installed outdoor against meteorological conditions (precipitation, sand).

### Specification

- » Max air face velocity: 5m/s.
- » Working conditions: -40 ÷ +70°C.



# CONTROLS

All controls for VENTUS air handling units is available as optional equipment.

Range of controls is always fitted to configuration of the AHU selected in the CCOL4 tool. Controls is capable to regulate all user parameters: air temperature, its humidity, maximum permissible CO<sub>2</sub> concentration and the flow rate. Also, controls support preventive and securing functions like protection of the water heater against freezing or energy recovery system against icing, protection of motors against overloading, monitoring of air filters actual status of contamination and many other. Applied algorithms can optimize performance of all air treatment components in order to minimize consumption of all energy media supplied to the unit.

The system includes control and power supply circuit.



USER



### HMI Basic

- » Engaging and disengaging the AHU, change of operational modes.
- » Change of temperature, airflow, humidity, max CO<sub>2</sub> level settings, etc.
- » Errors reporting.
- » Time schedule setting.



### HMI Advanced

- » All users and service functions except visualization
  - AHU engaging and disengaging,
  - Change of operational modes.
- » Change of temperature, airflow, humidity, max CO<sub>2</sub> level settings, etc.
- » Parameters setting and reporting.
- » Errors reporting.
- » Time schedule setting.



### BMS

- » User function like in HMI Advanced.
- » User's customized visualization (BMS).



### Remote visualization

- » All user function like in HMI Advanced:
  - VTS visualization.
- » Clear interface of schedule programming, presenting unit's operating time individually for each day of the week.
- » Energy consumption analysing module.
- » Individual parameters monitoring of each functional block.
- » Filing of all AHU's parameters recorded in few minutes intervals.





## PAREMETERS REGULATION FUNCTIONS

### Regulation of temperature and humidity

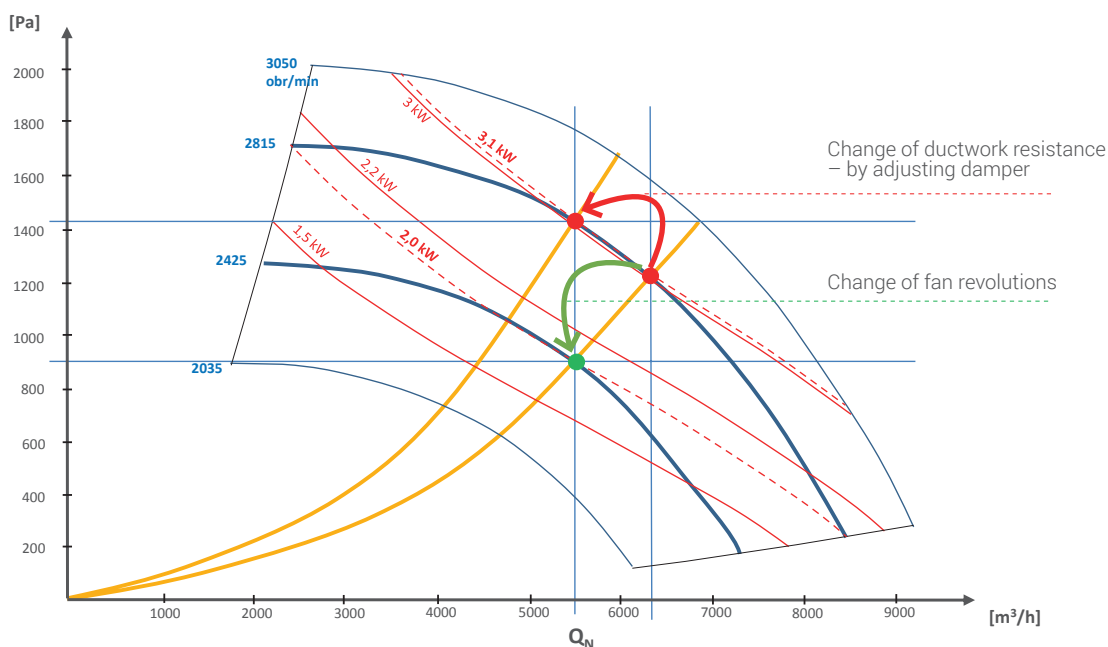
- » Regulation of supply, return air temperature and humidity in handled spaces.
- » Control of water coils valves (heater, cooler) and condensing unit.
- » Control of rotary heat wheel revolutions, by-pass damper and mixing box, depending on AHU type and configuration.

### Airflow rate regulation

- » Constant Air Volume (CAV) available as standard.
- » Constant static pressure maintenance in trunk duct (Variable Air Volume – VAV) available as option.
- » Setting of constant revolutions for each fan individually – VFD setting for AC motors or constant revolutions percentage in case of EC motors.

### CO<sub>2</sub> regulation

- » By means of mixing box – for units with air recirculation.
- » By means of airflow rate change – for all types of supply and exhaust units (function can be engaged together with mixing box control).



## PROTECTION FUNCTIONS

- » Protection against rotary heat wheel icing, by means of wheel revolutions reduction.
- » Protection against hexagonal counterflow and cross-flow recuperator icing by means of by-pass damper opening. Functions realized as optional:
  - Optimizing of icing protection function by change of minimum return air temperature threshold downstream the energy recovery unit vs return air parameters.
  - Minimizing of recovery efficiency drop during defrosting
- » Anti-freezing protection of water heater
  - Antifreeze thermostat installed downstream the heater
  - Strap-on return water temperature sensor
- » Fans overload protection (functions realized by EC motors drives)
- » Fire alarm input – AHU immediate disengaging in case of lack of external start permission from overall fire protection system.



## PREVENTIVE FUNCTIONS

- » Constant filter contamination status control:
  - Constant monitoring of filter pressure drop by means of static pressure transducers,
  - Evaluation of filter contamination status for vs actual airflow rate.
- » Fans shutting-down delay – fan's run out for systems with electric heater
- » Water heater pre-heating before fun's start up.
- » Periodical heater pump engaging in summer – to prevent against limescale accumulation
- » Opening of water heater regulation valve before engaging the fans.

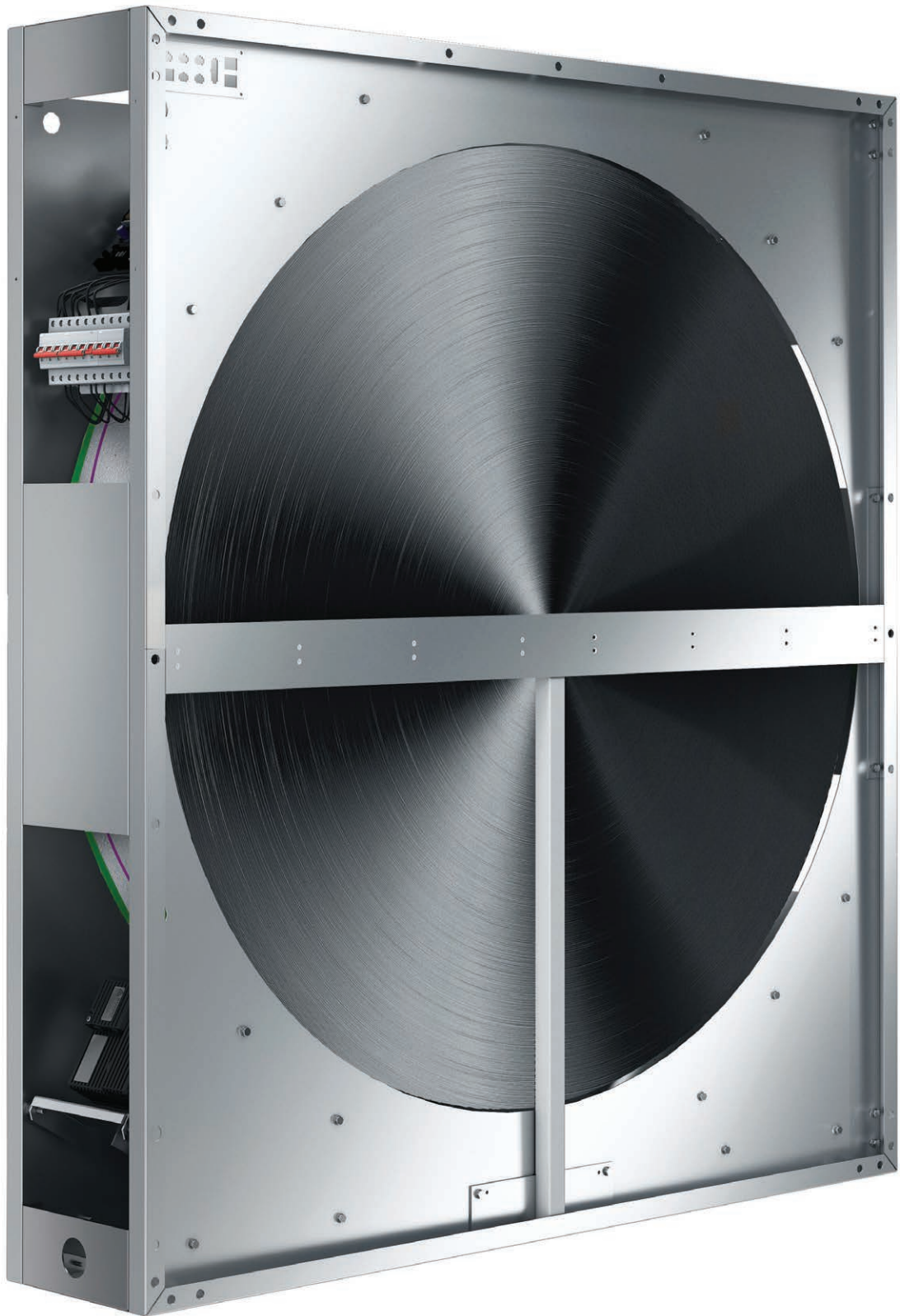
## TIME SCHEDULE FUNCTIONS

- » Weekly schedule operational modes programming (HMI Advanced i Basic).
- » Clear visualization of schedule settings by means of web-browser (computers and mobile devices).

## POWER SUPPLY AND CONTROL CIRCUITS

- » The mains component of the controls is the control box – with microprocessor controller installed inside. The control box is usually mounted on side wall of the AHU or in units direct vicinity.
- » Control box is equipped with controller, power protection circuits, terminal block enabling connecting of all control elements.
- » Electric protection of fans, rotary heat wheel drive, control elements and heater pump are installed inside the control box.
- » Control of fan-sets (variable frequency drives in case of AC motors of specialized drives for EC ones) is realized by means of digital communication based on ModBUS protocol. Fan control elements are set with individual address enabling them to be properly identified in the control system.
- » Communication with static pressure and CO2 transducers also realized by ModBUS protocol.
- » For other control elements, digital or analogue signals are used.







# CONTROL ELEMENTS

## CONTROL ELEMENTS



### Functions and application

- » Regulation of supply and exhaust air temperature.
- » Protection of the energy recovery unit against freezing.
- » Outdoor air temperature measurement in order to identify need of heat/chill recovery and engagement protecting function for water heater.

### Operational parameters

- » Measurement range: -50°C to +90°C.
- » Measurement accuracy:  $\pm 0,5K$ .
- » Sensor type: NTC 10k.
- » Air humidity range: 5 ÷ 100%.
- » Protection degree: IP67.
- » Shielded cable length: max. 100 m.

## ROOM AIR TEMPERATURE SENSOR



### Functions and application

- » Regulation o temperature in handled space.

### Operational parameters

- » Measurement range: -20°C do +70°C.
- » Measurement accuracy:  $\pm 0,5K$ .
- » Sensor type: NTC 10k.
- » Air humidity range: 5 ÷ 95% no condensation.
- » Protection degree: IP20.
- » Shielded cable length: max. 100 m.

## STRAP-ON MEDIUM TEMPERATURE SENSOR



### Functions and application

- » Protection of water heater against freezing by means of return medium temperature monitoring.

(Function supported by controller. Sensor out of VTS offer.)

### Operational parameters

- » Measurement range: -20°C do +70°C.
- » Measurement accuracy:  $\pm 0,5K$ .
- » Sensor type: NTC 10k.
- » Air humidity range: 5 ÷ 100%.
- » Protection degree: IP67.
- » Shielded cable length: max. 100 m.

## ANTI-FREEZE THERMOSTATE



### Functions and application

- » Protection of water heater against freezing by means of air off-coil temperature monitoring (recommended temperature threshold setting: +5°C).

### Operational parameters

- » Measurement range: -18 ÷ +15°C.
- » Hysteresis: 1,7 ÷ 12K.
- » Nominal voltage: 30V DC or 230V AC.
- » Output signal: potential-free contact.
- » Protection degree: IP 44.

## OVERHEAT PROTECTION THERMOSTATE FOR ELECTRIC HEATER



### Functions and application

- » Protection of electric heater against overheating.

### Operational parameters

- » Power cut-off temperature setpoint: 65°C.
- » Power re-switch on temperature setpoint : 45°C.
- » Nominal voltage: 20V DC or 230V AC.
- » Output signal: potential-free contact.

## DIFFERENTIAL PRESSURE SWITCH



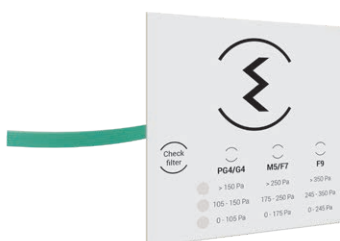
### Functions and application

- » Monitoring of filter's contamination.
- » Control of the operation of a direct driven fan unit in case of cooperation with electric heater.

### Operational parameters

- » Measurement range: 30 do 500 Pa.
- » Nominal operating voltage: 250V AC (Imax=3A).
- » Output signal: potential free contact.
- » Working temperature range: -20°C do 60°C.
- » Protection degree: IP 54.

## FILTER CONTAMINATION INDICATOR



### Functions and application

- » Measurement of air pressure drop on filters, activated manually (button).
- » Signal light (LED) informing about exceeding pressure drop thresholds.
- » Low battery warning light signal.

### Operational parameters

- » Max. Pressure difference: 800 Pa.
- » Accuracy: 2,5% of the range.
- » Protection degree (interface side): IP 65.

## DIFFERENTIAL PRESSURE TRANSDUCER



### Functions and application

- » Regulation of supply and exhaust air (CAV function).
- » Regulation of static pressure in ventilation system trunk duct (VAV function).
- » Constant monitoring of filter pressure drop (control of filter contamination level).

### Operational parameters

- » Measurement range: 6000 Pa.
- » Measurement accuracy: 0,25% of the range.
- » Communication: ModBus RTU.
- » Supply voltage: 21,5V to 30V DC or 21,5V do 26,5V AC.
- » Working temperature range: -20°C do 50°C.
- » Protection degree: IP 65.



## AIR HUMIDITY TRANSDUCER



### Functions and application

- » Regulation of supply and return air humidity in handled spaces (support for air humidifying and dehumidifying).
- » Measurement of return air humidity – automatic change of anti-freeze threshold temperature setting of cross-flow recuperator depending on return air parameters\*.

### Operational parameters

- » Measurement range: 0-100%.
- » Tolerance: +/- 3%.
- » Communication: ModBus RTU.
- » Supply voltage: 24V DC.
- » Working temperature: -40°C to 80°C.
- » Protection degree: IP 65.

\* Also available as integrated with air temperature sensor

## CO<sub>2</sub> TRANSDUCER



### Functions and application

- » Regulation of CO<sub>2</sub> concentration in handled spaces (control of mixing box or airflow rate).

### Operational parameters

- » Measurement range: 0 do 2000 ppm.
- » Tolerance:
  - between 400 and 1250 ppm: +/-3%,
  - between 1250 and 2000 ppm: +/-5%.
- » Communication: ModBus RTU.
- » Supply voltage: 24V DC.
- » Working temperature: 0 do 50°C.
- » Protection degree: IP 54.

## ON/OFF DAMPER ACTUATOR



### Functions and application

- » Airflow opening or closing in the AHU (connectors of air intake and discharge) – for units with water heater actuators with return spring are applied.

### Operational parameters

- » Regulation mode: ON/OFF (two-point).
- » Angle of rotation: 90°.
- » Torque: 16 Nm (max damper cross-section: 4 m<sup>2</sup>).
- » Full open/close time: 120 s (with spring: 10 s).
- » Supply voltage: 24V AC/DC.
- » Working temperature: -20°C do 50°C.
- » Protection degree: IP 54.

## SMOOTH CONTROL DAMPER ACTUATOR



### Functions and application

- » Smooth regulation of return and fresh air mixing (recirculation) – for units with water heater actuators with return spring are applied.
- » Protection of cross-plate or hexagonal recuperator against frosting – smooth regulation of bypass damper opening.

### Operational parameters

- » Regulation mode: 0 do 100% (smooth).
- » Control signal: 0-10V.
- » Angle de rotation: 90°.
- » Torque: 16 Nm (max damper cross-section: 4 m<sup>2</sup>).
- » Full open/close time: 90s (with spring: 10 s).
- » Supply voltage: 24V AC/DC.
- » Working temperature: -20°C do 50°C.
- » Protection degree: IP 54.

## SET FOR WATER HEATER CAPACITY REGULATION (PUMP GROUP)



### Functions and application

- » Smooth regulation of water heater capacity.

### Operational parameters

- » Regulation mode: 0 to 100% (smooth).
- » Control signal: 0-10V.
- » Full open/close time: 90 s.
- » Valve supply voltage: 24V AC/DC.
- » Pump supply voltage: 230V AC.
- » Working temperature: +5°C do 50°C.
- » Medium temperature range: -10°C to 120°C.
- » Max glycol concentration: 50%.
- » Protection degree: IP 54.

## THREE-WAY VALVE FOR WATER HEATER OR COOLER



### Functions and application

- » Smooth regulation of water heater or cooler capacity.

### Operational parameters

- » Regulation mode: 0 do 100% (smooth).
- » Control signal: 0-10V.
- » Full open/close time: 90 s.
- » Valve supply voltage: 24V AC/DC.
- » Working temperature: +5°C do 50°C.
- » Medium temperature range: -10°C do 120°C.
- » Max glycol concentration: 50%.
- » Protection degree: IP 54.

## ELECTRIC HEATER CONTROL MODULE – MHE TYPE



### Functions and application

- » Power supply, protection and smooth regulation of electric (heating) capacity of multi-stage electric heaters by means of PWM (Pulse Width Modulation).

### Operational parameters

- » Regulation mode: 0 to 100% (smooth).
- » Nominal voltage: 3\*400V/50Hz.
- » Control circuits supply voltage: 24V AC.
- » Binary input signal: 3 x 24V DC.
- » Binary output signal 6 x 24V DC.
- » PWM 1 x 24V DC.
- » Working temperature: 0°C do 50°C.

## VARIABLE FREQUENCY DRIVE



### Functions and application

- » Smooth regulation of fan-set capacity.
- » "Soft-start" of the fan without mechanical and electric shock.
- » Motor protection against overloading and stucking.

### Operational parameters

- » Frequency regulation range: 10 ÷ 100 Hz.
- » Communication: ModBus RTU RS485.
- » Supply voltage:
  - single-phase 200 ÷ 240V AC,
  - three-phase 380 ÷ 480V AC.
- » Working temperature: 0°C to 40°C.
- » Protection degree: IP 20.



## HMI BASIC USER INTERFACE



### Functions and application

- » Maintenance of Air handling unit – temperatures setting and reading, change of operating modes, independent time schedule management, alarm codes displaying.
- » Configuration of controller's universal inputs and outputs.

### Operational parameters

- » Power supply directly from the controller.
- » Communication with controller – RS485 serial port.
- » Max length of communication cable: max. 500 m.
- » Working temperature: -20°C to 60°C.
- » Humidity: <85% (no condensation).
- » Protection degree: IP 31.

## HMI ADVANCED USER INTERFACE



### Functions and application

- » Maintenance of Air handling Unit – parameters setting and reading (temperature, airflow, CO<sub>2</sub>, humidity etc), change of operational modes.
- » Weekly schedule programming.
- » Service maintenance – configuration of all advanced AHU operating parameters, configuration controllers universal inputs and outputs.
- » Remote configuring of variable frequency drives.
- » AHU alarms and errors monitoring (full text description) and cancelling.

### Operational parameters

- » Power supply directly from the controller
- » Communication with controller – RS485 serial port
- » Max length of communication cable: max. 1200 m,
- » Working temperature: -20°C to 60°C.
- » Humidity: <85% (no condensation).
- » Protection degree: IP 31.

## SUPPLY AND CONTROL BOX



### Functions and application

- » Control of all components and processes of Air Handling Unit, especially realization of regulation (temperature, airflow, CO<sub>2</sub>, humidity) and protection functions (anti-freezing of energy recovery heat exchanger or water heater, fan-sets overloading etc).
- » Alarms handling, self-diagnostics.
- » Filling of all operating parameters history.
- » Communication with user interfaces (HMI).

### Operational parameters

- » Supply voltage: 3x400 VAC or 1x230 V AC.
- » Supply frequency: 50 Hz, +/- 1 Hz.
- » Control circuits supply voltage: 24 V AC.
- » Water heater pump supply voltage: 230 V AC (max.10A).
- » Communication with internal controls circuits, VFD's or EC motors controller: ModBus RTU.
- » ModBus communication: TCP/IP.
- » Working temperature: 0 to 50°C.
- » Humidity: <85% (no condensation).
- » Protection degree: IP 54.









**04**

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Units  
- VENTUS Compact



# SUSPENDED UNITS

Unit size		AIRFLOW [m³/h]	LENGTH [mm]	WIDTH [mm]	HEIGHT [mm]
VVS030s		900 - 3 300	1 828	2 160	470
VVS020s		600 - 2 200	1 828	1 610	470
VVS015s		450 - 1 650	1 500	1 550	380
VVS010s		300 - 1 100	1 500	1 150	380
VVS005s		150 - 650	1 230	790	380



HIGHLY EFFICIENT  
HEX COUNTERFLOW  
RECOVERY



ENERGY SAVING  
AND SILENT  
EC MOTORS



WIRING  
AND CONFIGURATION  
IN PLUG&PLAY STANDARD



INTEGRATED  
MULTIFUNCTIONAL  
CONTROLS



MINI-PLEAT  
PANEL FILTERS



up to **92%**  
of energy recovery  
efficiency



# FLOOR-MOUNTED UNITS

		Unit size							
		VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c
AIRFLOW [m <sup>3</sup> /h]		840 - 2310	900 - 3300	1200 - 4400	1650 - 6050	2250 - 8250	3000 - 11000	3600 - 13200	4500 - 16500
LENGTH [mm]		1040	1120	1120	1040	1120	1040	1040	1040
		1240	1400	1400	1240	1400	1240	1240	1240
WIDTH [mm]		967	967	1174	1345	1486	1666	1897	2091
HEIGHT [mm]		991	1255	1255	1525	1765	1965	2039	2241



HIGHLY EFFICIENT  
ROTARY  
HEAT WHEELS



ENERGY SAVING  
AND SILENT  
EC MOTORS



WIRING  
AND CONFIGURATION  
IN PLUG&PLAY STANDARD



INTEGRATED  
MULTIFUNCTIONAL  
CONTROLS



MINI-PLEAT  
PANEL FILTERS



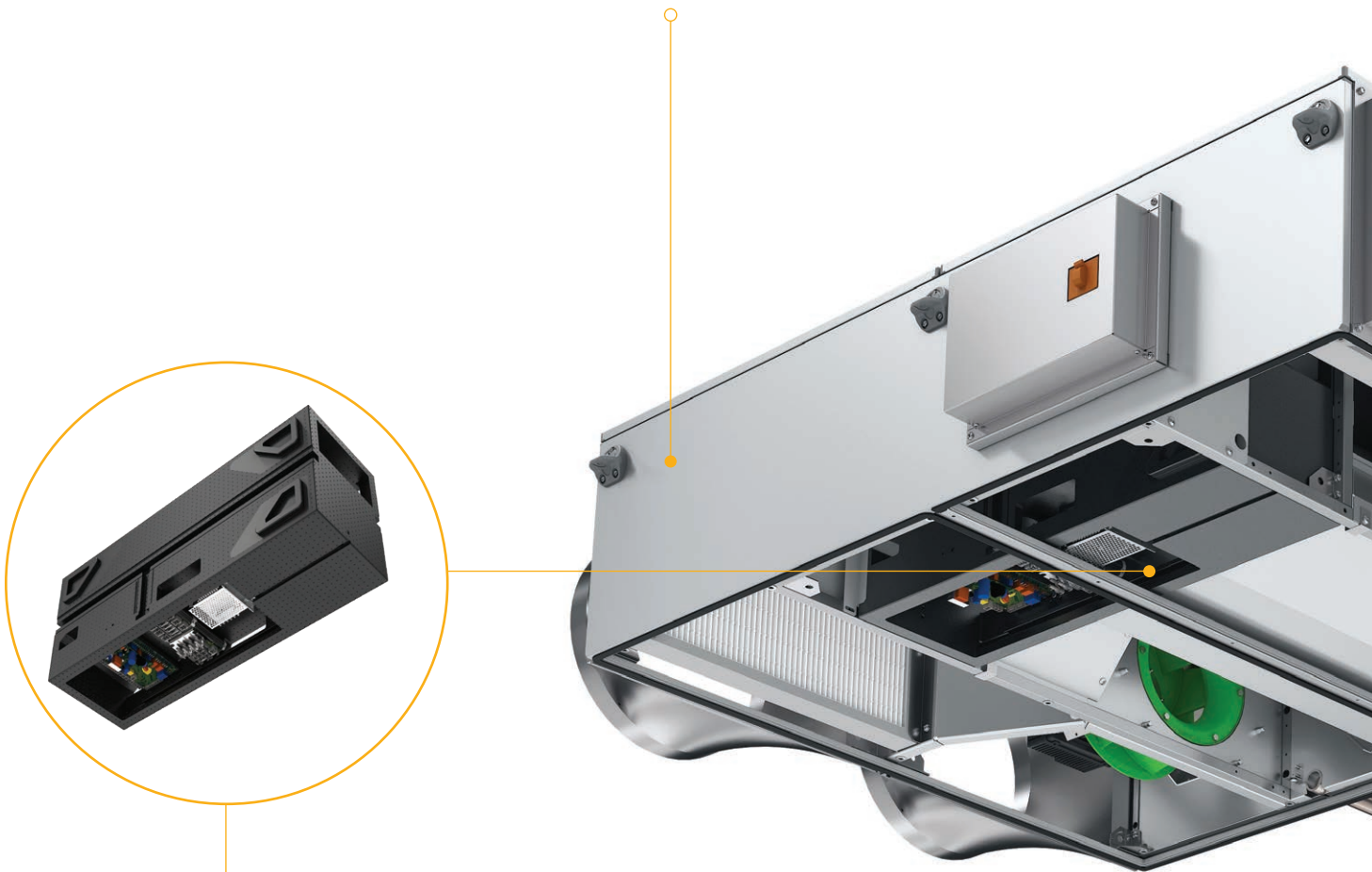
up to **86%**  
of energy recovery  
efficiency



# SUSPENDED UNITS

## CASING

- » Anticorrosive coating: Aluzinc, AZ 150.
- » Availability of spigots for round and rectangular duct.



## CONTROLS

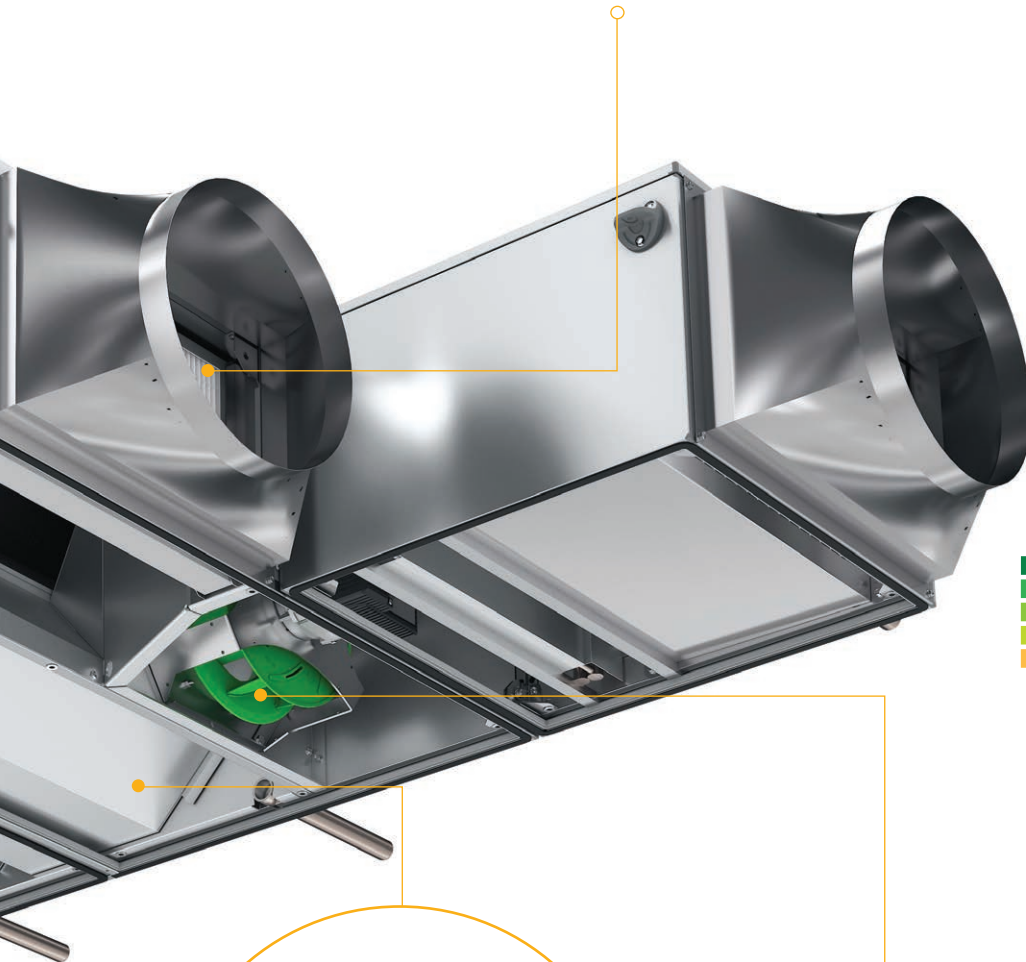
Multifunctional, factory installed controls in the unit's casing – configured and ready to run.



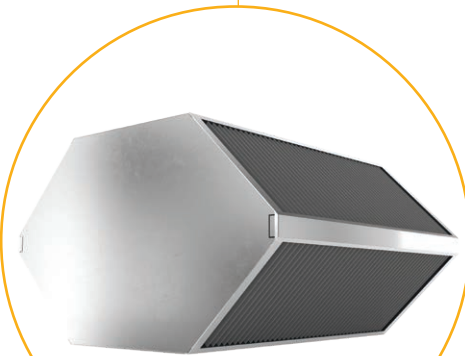
## MINI-PLEAT FILTERS

Highly absorptive filters with wide active filtration cross-section.

- » Supply - EU 7 class,
- » Exhaust - EU 5 class.

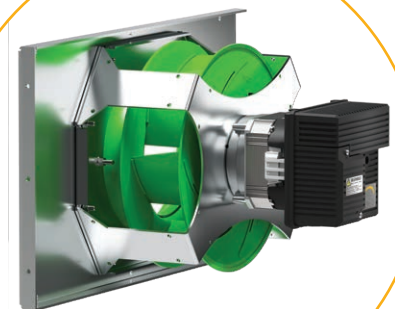


up to **93%**  
motor efficiency



## ENERGY RECOVERY

- » Highly efficient counterflow hex recovery with by-pass.
- » Sensible recovery efficiency reaching 92%.



## EC MOTORS

- » Highly effective, silent and low vibrations fan set with IE4 class EC motor.



# FLOOR-MOUNTED UNITS

## CASING

- » Anticorrosive coating: Aluzinc, AZ 150.



## ENERGY RECOVERY

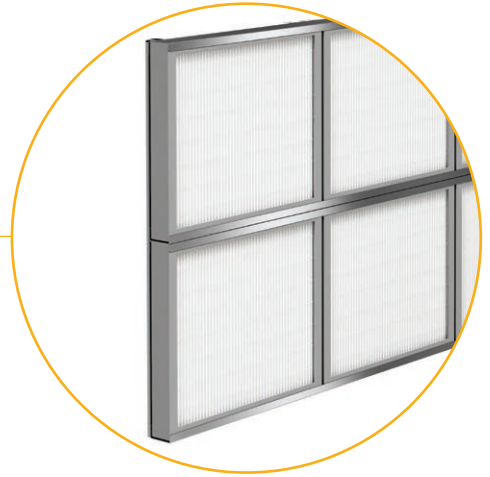
- » Highly efficiency Rotary Heat Wheel with EC motor.
- » Thermal efficiency reaching 86%.





## MINI-PLEAT FILTERS

- » Highly absorptive compact filters with expanded filtration are:
  - Supply – class EU7.
  - Return – class EU 5.



## CONTROLS

- » Multifunctional controls, factory installed in the AHU casing – configured and ready to run.

## EC MOTORS

- » Effective, silent and low vibrations fan equipped with IE4 class EC motor



# VVS 005s-030s - SUSPENDED COMPACT UNITS

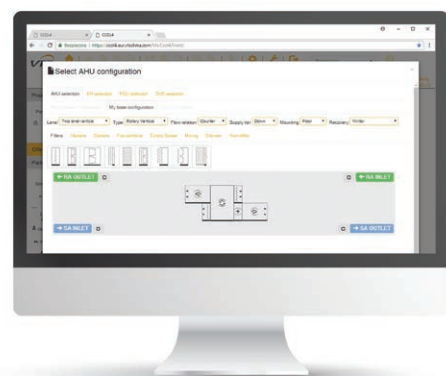
Nominal parameters		Recommended airflow range				
Unit size		VVS005s	VVS010s	VVS015s	VVS020s	VVS030s
4 000	[m³/h]					
3 000						
2 000						
1 000						
0						
	Hex 005s	Hex 010s	Hex 015s	Hex 020s	Hex 030s	
Min airflow		150	300	450	600	900
Max airflow		650	1 100	1 650	2 200	3 300
H	[mm]	380	380	380	470	470
W		395	575	775	805	1080
H <sub>i</sub>		320	320	320	410	410
W <sub>i</sub>		335	515	715	745	1020
W <sub>2</sub>		790	1150	1550	1610	2160
I		30	30	30	30	30

Dimension		Function version	Length of selected configurations				
	Lt	Counterflow hexagonal recuperator	1230	1500	1500	1828	1828
	[mm]						

Selected configurations		Dimension	Function version	Length of supply and exhaust compact units				
	V	L	V	460	460	460	460	460
	FV	L	FV	740	740	740	740	740
	FHV	L	FH(hw)V	740	740	740	740	740
		L	FH(e)V	1030	1030	1030	1030	1030
	FCV	L	FCV	860	860	860	860	860
		L	FC(de)V	1030	1030	1030	1030	1030
	FHCV	L	FH(hw)CV	1030	1030	1030	1030	1030
		L	FH(hw)C(de)V	1230	1230	1230	1230	1230
		L	FH(e)CV	1030	1230	1230	1380	1380
		L	FH(e)C(de)V	1230	1380	1380	1450	1450

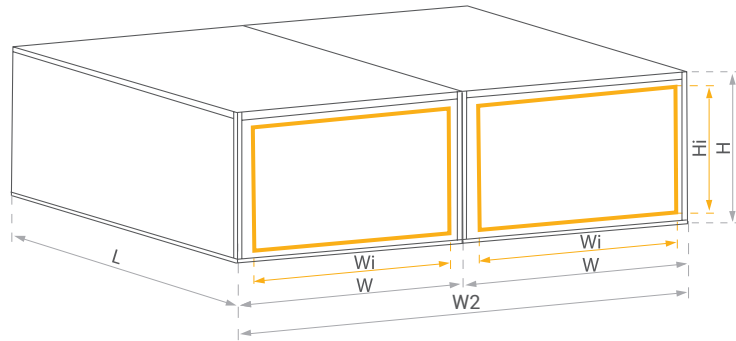
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

[www.ccol4.com](http://www.ccol4.com)





## DIMENSION - VVS 005s-030s - SUSPENDED COMPACT UNITS



### Duct fittings

Dimension [mm] Wi x Hi / Di	VVS005s	VVS010s	VVS015s	VVS020s	VVS030s
Flexible connection	305x288	485x288	685x288	730x375	1005x375
Air damper	305x288	485x288	685x288	730x375	1005x375
Rectangular spigot	330x310/300x300	510x310/400x350	710x310/400x350	740x400/500x400	1015x400/800x400
Round spigot	330x310/355	510x310/355	710x310/355	740x400/450	1015x400/450
Air intakes and outlets	335x318	515x318	715x318	743x408	1018x408

### Length of additional air treatment functions

Selected configurations	Function version	Length of selected configurations				
		VVS005s	VVS010s	VVS015s	VVS020s	VVS030s
 F	F9	180	180	180	180	180
	H(hw) (1R-2R)	180	180	180	180	180
 H	H(el)	370	370	370	370	370
	C (2R-6R)	370	370	370	370	370
 C	C(de) (2R-6R)	600	600	600	600	600
	 HC	H(hw)C	460	460	460	460
H(el)C		740	740	740	740	740
H(hw)C(de)		600	460	460	460	460
H(el)C(de)		860	740	740	740	740
 E	E(e1)	370	460	460	460	460
	E(e2)	740	740	740	740	740



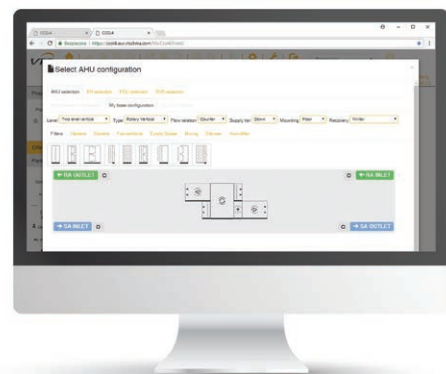
# VVS 021c-150c - FLOOR MOUNTED COMPACT UNITS

Nominal parameters		Recommended airflow range								
Unit size		VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c	
16 000 12 000 8 000 4 000 0	[m <sup>3</sup> /h]	[Bar chart showing recommended airflow ranges for each unit size]								
		Min airflow	806	1 167	1 958	2 878	3 805	4 863	5 815	5 815
		Max airflow	2 310	3 300	4 400	6 050	8 250	11 000	13 200	16 500
		H <sub>fd</sub>	90	90	90	90	90	90	90	90
		H	538	670	670	805	925	1025	1062	1163
967 368 887 986 40	[mm]	W	967	967	1174	1345	1486	1666	1897	2091
		H <sub>i</sub>	368	500	500	635	755	855	892	993
		W <sub>i</sub>	887	887	1094	1265	1406	1586	1817	2011
		H <sub>2</sub>	986	1250	1250	1520	1760	1960	2034	2236
		I	40	40	40	40	40	40	40	40

Selected configurations		Dimension of base configuration							
	Lt	1 040	1 120	1 120	1 040	1 120	1 040	1 040	1 040
	Lt	1 240	1 400	1 400	1 240	1 400	1 240	1 240	1 240

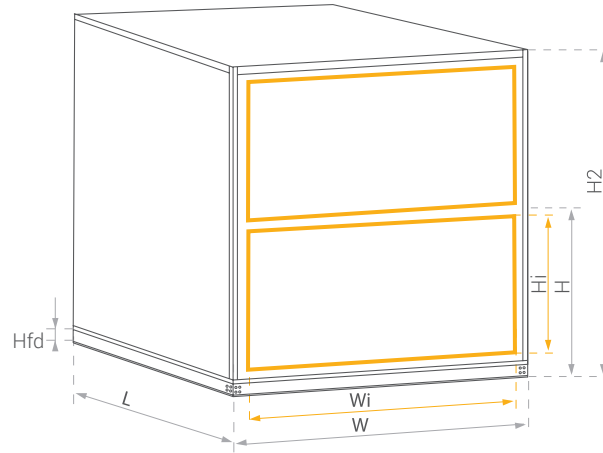
Entire range of configuration  
in ClimaCAD OnLine 4 selection tool.

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# DIMENSION - VVS 021c-150c - FLOOR MOUNTED COMPACT UNITS



Full face horizontal air inlet / outlet		END Full Front (FF) Full face air inlet / outlet		
Size	WA	HA	WA1	HA1
VVS021s	821	313	70	67,5
VVS030s	821	440	70	70
VVS040s	1028	440	70	70
VVS055s	1199	575	70	70
VVS075s	1340	695	70	70
VVS100s	1520	795	70	70
VVS120s	1751	832	70	70
VVS150	1945	933	70	70

## Lengths of additional air treatment functions

Selected configurations		Function version	Other configuration functions - typical lengths.							
			VVS021c	VVS030c	VVS040c	VVS055c	VVS075c	VVS100c	VVS120c	VVS150c
V	L	F9	240	240	240	240	240	240	240	240
		H(hw) (1R-2R)	240	240	240	240	240	240	240	240
H	L	H(el)	420	420	420	420	420	420	420	420
		C (2R-4R)	370	370	370	450	450	650	650	670
C	L	C (6R)	550	550	550	630	630	830	830	850
		H(hw) + C	550	550	550	630	630	830	830	850
HC	L	H(el) + C	700	700	700	780	780	980	980	1000
		S(s3)	1080	1080	1080	1080	1080	1080	1080	1080
E	L	E	550	550	550	630	630	650	650	670



# COMPONENTS

## DIRECT DRIVE PLUG FAN SET



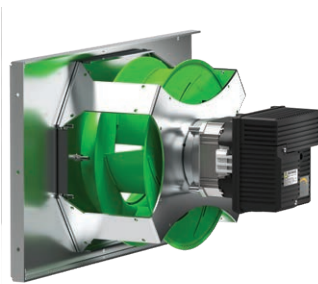
### Design and application

- » Single inlet, radial, backward curved, free running fan.
- » Impeller made of SAN (styrene/acrylonitrile) construction material with 20% glass fiber.
- » Direct drive – fan impeller installed directly on motor shaft.
- » Fan section consisting of single or multiple fans (fan array) in order to ensure optimum working parameters.

### Specification

- » Low and medium pressure ventilation systems with fan static pressure not exceeding 2000 Pascals.
- » Maximum fan set working temperature: 60°C.

### > EC MOTORS



- » Set of fan and motor mounted on common rail, fixed to the AHU fan diaphragm.
- » EC motors are Permanent Magnet motor, characterised by much higher efficiency vs traditional inductive AC motors.
- » EC motors (Electronically Commutated) – where mechanical commutator switching the windings has been replaced with electronic one.
- » Change of revolutions is done by means of changing the frequency rate of windings switching (rate or magnetic field rotating).
- » Highly inductive permanent magnets have been applied in EC motors used by VTS, which enabled to achieve high torque at relatively small dimensions, together with reaching IE4 efficiency class.
- » Available Energy classes: IE4.
- » Rated voltage: EC motors of nominal capacity exceeding 0,75kW - 3x400V AC.
- » Rated voltage: EC motors of nominal capacity equal or less 0,75kW - 1x230V AC.
- » Motor winding insulation class: F.
- » Protection degree: IP54.
- » Maximum working ambient temperature: 55°C.
- » Lifespan:
  - 70 000 hours at load not exceeding 70% of nominal capacity at ambient temperature not exceeding 35°C,
  - 30 000 hours at 100% capacity load at ambient temperature not exceeding 55°C.



## CASING > SUSPENDED COMPACT UNITS

### Design and application

- » Casing structure made of „sandwich“ panels mounted to internal supporting structure.
- » "Sandwich" double skin panels made of rigid polyurethane foam.
- » Indoor and outdoor application
- » Inspection panels mounted on top and bottom of the unit (maintenance from bottom).
- » Casing designed to be suspended above false ceilings, equipped with elements facilitating its installation.



### Specification

- » Working temperature range:  $(-40)^{\circ}\text{C} \div (+60)^{\circ}\text{C}$ .
- » Panel thickness: 30mm.
- » Thermal conductivity:  $\lambda = 0,022 \text{ W/mK}$ .
- » Casing fire resistance: Inflammable material, non-fire spreading.
- » Humidity absorption: 0,04%.
- » PPU density:  $\rho = 42\text{kg/m}^3$ .

## CASING > FLOOR MOUNTED COMPACT UNITS

### Design and application

- » Casing structure made of „sandwich“ panels mounted to internal supporting structure.
- » "Sandwich" double skin panels made of rigid polyurethane foam.
- » Indoor and outdoor application.
- » Inspection panels mounted on AHU side. For additional air treatment functions, inspection panels are on both AHU sides.
- » Casing supported on base rails or blocks.



### Specification

- » Working temperature range:  $(-40)^{\circ}\text{C} \div (+60)^{\circ}\text{C}$ .
- » Panel thickness: 30mm.
- » Thermal conductivity:  $\lambda = 0,022 \text{ W/mK}$ .
- » Casing fire resistance: Inflammable material, non-fire spreading.
- » Humidity absorption: 0,04%.
- » PPU density:  $\rho = 42\text{kg/m}^3$ .

## MINI PLEAT FILTERS

### Design and application

- » Mini-pleat filters are special type of panel filters. They are design to provide many times larger active filtration surface followed by higher dust-holding capacity than typical panel ones, at the same outer filter cartridge dimensions. Filters consist of ultra-thin microfibers, coated with special, condensed binder. Mini-pleat are characterized by much longer life span the typical, commonly used ones.
- » Applied as initial or secondary stage of air filtration.



### Specification

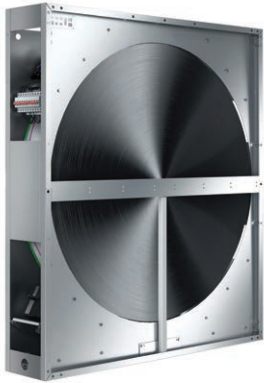
- » Max working temperature:  $(+70)^{\circ}\text{C}$ , 100% RH.i.

### Available filtration classes

- » ISO ePM10 50% (ISO 16890) - M5 (EN779),
- » ISO ePM2,5 65% (ISO 16890) - F7 (EN779),
- » ISO ePM1 70% (ISO 16890) - F9 (EN779)."



## ROTARY HEAT WHEEL



### Design and application

- » Rotor made of aluminum with shaft suspended on bearings, installed in steel housing.
- » Rotor filling – two layers of alternately winded aluminium foil – one flat, the other – corrugated – making small ducts for the air.
- » Rotor drive system with smooth revolutions control enabling to maintain highest recovery efficiency and to adjust degree of recovery performance.
- » Purge zone reducing the cross-contamination effect of contaminated exhaust air to supply to absolute minimum.
- » Set of gaskets installed both on the wheel outer edge and bar separating supply from exhaust air being an additional protection against cross-contamination.
- » Rotary heat wheel recovers sensible heat from return air to supply, which passes the unit in opposite direction. The process enables heat recovery in winter time, same as cool recovery in summer.
- » Humidity recovery from return to supply in case the rotor pad temperature is lower than dew point of return air – typically during winter season.

### Specification

- » Up to 86% of energy recovery, depending on airflow rate and its velocity in the heat wheel window.

## COUNTERFLOW HEXAGONAL RECUPERATOR



### Design and application

- » Hexagonal heat recovery recuperator made of crosswise stamped aluminum plates, between which supply and exhaust air passes alternately in counterflow arrangement.
- » As standard, the recuperator is equipped with by-pass damper, enabling its securing against frosting and heat recovery capacity regulation.
- » Optionally, the recuperator can be equipped with integrated mixing box.
- » The recuperator provides sensible heat recovery for warmer air to the colder one. For winter season – recovery of heat from return air to supply. For summer – recovery of chill from return air to supply.

### Specification

- » Energy recovery at very high supply and exhaust air stream separation (reaching 99,9%).
- » Heat recovery reaching up to 93% depending on flow rate face velocity of the air passing the recuperator.





## MIXIN SECTION



### Design and application

- » Section equipped with two air inlets/outlets aided with dampers, enabling regulation of fresh and recirculation air share (recirculation).

### Specification

- » Direct Energy recovery (sensible and latent heat) resulting from partial mixing of fresh air with return one.
- » Control of fresh air share in entire airflow supplied to handled spaces.
- » Working temperature range:  $-40 \div +70^{\circ}\text{C}$ .

## WATER HEATER



### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.
- » The coil can be applied if heating medium is available (local boiler or district heating system).
- » Coil headers are equipped with medium damping valve and air vent.
- » Connecting the coil in parallel medium flow vs air, will result in its capacity reduction by over a dozen percent.

### Specification

- » Max glycol concentration: 50%.
- » Max medium temperature:  $150^{\circ}\text{C}$ .
- » Max medium working pressure:  $1,6\text{MPa} = 16\text{bar}$  (test:  $21\text{bar}$ ).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).
- » Medium side pressure drop – parameter resulting from individual performance calculation of selected unit (CCOL).

## ELECTRIC HEATER



### Design and application

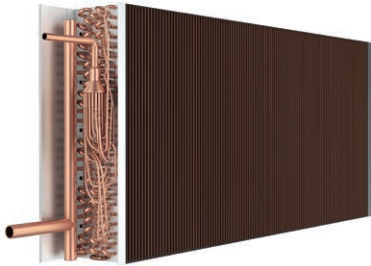
- » Set of resistive heating elements made of CR-Ni-Fe alloy,  $6\text{ kW}/400\text{V}$  each.
- » Coils mounted on hot-dip galvanized steel frame.
- » Heater is equipped with power terminals and thermostat protecting against overheating.
- » In case of AHU with complete controls, heater is equipped with integrated capacity control module.
- » Heating capacity can be modified by means of smooth regulation module (HE module, set of Solid State Relays as optional parts of AHU controls) or by means of automatic engaging of next heating sections.

### Specification

- » Max permissible ambient temperature around heating elements:  $65^{\circ}\text{C}$ .



## DIRECT EXPANSION COIL AS CONDENSER IN HEAT PUMP CIRCUIT



### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » Heating of the air supplied to the handled spaces.
- » Re-heating of the air as a part of air dehumidifying process.

### Specification

- » Max medium temperature: 60°C.
- » Max medium working pressure: 3,84MPa = 38,4bar (test: 50bar).
- » Heating capacity: parameter resulting from individual performance calculation of selected unit (CCOL).

## WATER COOLER



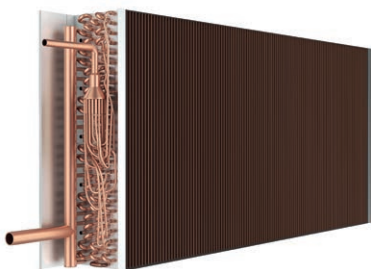
### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the medium supply system).
- » Cooling of the air supplied to handled spaces
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil can be applied in complex air conditioning systems consisting of few or over a dozen of units supplied from common chilling source (chiller) or in case of single unit of relatively high cooling capacity.

### Specification

- » Max glyccol concentration: 50%.
- » Min supplying medium temperature: +2°C.
- » max medium working pressure: 1,6MPa = 16bar (test: 21bar).
- » Cooling capacity: parameter resulting from individual parameters of selected unit (CCOL).
- » Medium pressure drop / flow rate: parameter resulting from individual performance calculation of selected unit (CCOL).
- » For reversed operation mode (heating) max medium working temperature: 140°C.

## DX COOLING COIL



### Design and application

- » Block of copper pipes integrated with another block of aluminum fins, creating expanded heat exchange surface. Pipes are bonded to the collectors, equipped with headers (for connecting entire coil to the cooling system circuit).
- » DX cooler is also available as heater execution (so called Condenser).
- » Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- » Coil usually applied for smaller cooling capacity systems vs water coolers or for individual air conditioning systems.

### Specification

- » Min. Refrigerant evaporation temperature: +3°C.
- » Max refrigerant working pressure: 2,2MPa=22bar (test: 29 bar).
- » Cooling capacity - parameter resulting from individual performance calculation of selected unit (CCOL).



## AIR DAMPER



### Design and application

- » Blades made of aluminium with rubber gasket on the edges.
- » Aluminum frame.
- » Blades drive realized by means of gears made of composite material, installed on frame internal side.
- » Damper is equipped with square pivot, fitted for actuator (dampers of cross section greater than 4 m<sup>2</sup> have 2 linked pivots).

### Specification

- » Air leakage at closed damper: 50m<sup>3</sup>/h\*m<sup>2</sup>- at 100 Pascals of pressure difference.
- » Workint temperature range: -40 ÷ +70°C.

## FLEXIBLE CONNECTION



### Design and application

- » Flexible connection made of 1 mm thick and 30 mm wide hot-dip galvanized steel profiles and polyester fabric coated with PVC.
- » Flame resistance: UL94 - HB [ISO 1210].
- » Flexible connection resistant to UV radiation
- » Working temperature range: -30°C do +70°C.
- » Max connection length (fully spread position): 110 mm.
- » Flexible connection installed on each AHU/Duct joint eliminates transfer of possible AHU vibrations to the ventilation ductwork.

### Specification

- » Max air face velocity: 5m/s.
- » Working conditions: -40 ÷ +70°C.

# CONTROLS

## VENTUS COMPACT AIR HANDLING UNITS IN PLUG&PLAY STANDARD



### Savings



### Comfort



### Safety

Ventus Compact – range of floor-mounted units with rotary heat wheel and suspended with hexagonal recuperator. Equipped with complete, factory mounted controls, pre-configured in accordance to actual selection and ready to run just after connecting to mains.

Controls is capable to regulate all user parameters: air temperature, its humidity, maximum permissible CO<sub>2</sub> concentration and the flow rate. Also, controls support preventive and securing functions like protection of the water heater against freezing or energy recovery system against icing, protection of motors against overloading, monitoring of air filters actual status of contamination and many other. Applied algorithms can optimize performance of all air treatment components in order to minimize consumption of all energy media supplied to the unit. The system includes control and power supply circuits:



USER



#### HMI Basic

- » Engaging and disengaging the AHU, change of operational modes.
- » Change of temperature, airflow, humidity, max CO<sub>2</sub> level settings, etc.
- » Errors reporting.
- » Time schedule setting.



#### HMI Advanced

- » All users and service functions except visualization
  - AHU engaging and disengaging,
  - Change of operational modes.
- » Change of temperature, airflow, humidity, max CO<sub>2</sub> level settings, etc.
- » Parameters setting and reporting.
- » Errors reporting.
- » Time schedule setting.



#### BMS

- » User function like in HMI Advanced.
- » User's customized visualization (BMS).



#### Remote visualization

- » All user function like in HMI Advanced:
  - VTS visualization.
- » Clear interface of schedule programming, presenting unit's operating time individually for each day of the week.
- » Energy consumption analysing module.
- » Individual parameters monitoring of each functional block.
- » Filing of all AHU's parameters recorded in few minutes intervals.



## PAREMETERS REGULATION FUNCTIONS

### Temperature and humidity regulation

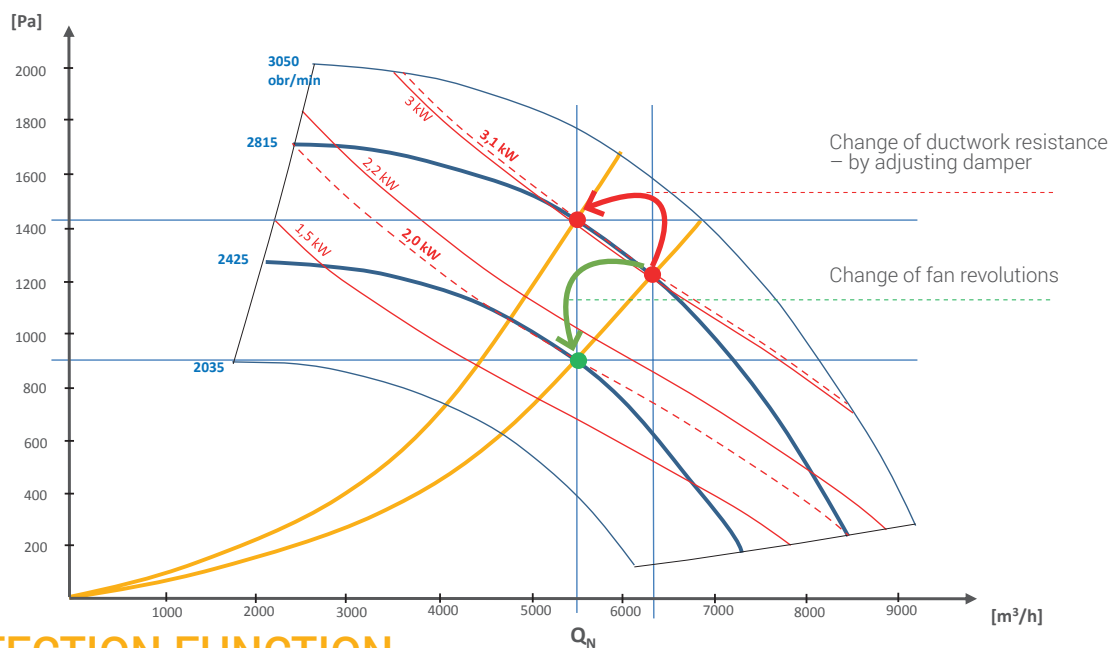
- » Regulation of supply, return air temperature and humidity in handled spaces.
- » Control of water coils valves (heater, cooler) and condensing unit.
- » Control of rotary heat wheel revolutions and mixing box (Ventus floor-mounted Compact units), bypass-damper of hexagonal counterflow energy recovery system (suspended VENTUS Compact units).

### Airflow rate regulation

- » Constant Air Volume (CAV) available as standard
- » Constant static pressure maintenance in trunk duct (Variable Air Volume – VAV) available as option.
- » Getting of constant revolutions for each fan individually – VFD setting for AC motors or constant revolutions percentage in case of EC motors.

### CO<sub>2</sub> regulation

- » By means of mixing box – for units with air recirculation.
- » By means of airflow rate change – for all types of supply and exhaust units (function can be engaged together with mixing box control).



## PROTECTION FUNCTION

- » Protection against rotary heat wheel icing (VENTUS Compact floor mounted units), by means of wheel revolutions reduction.
- » Protection against hexagonal counterflow recuperator icing (VENTUS Compact suspended units) by means of by-pass damper opening:
  - optimizing of icing protection function by change of minimum return air temperature threshold downstream the energy recovery unit vs return air parameters,
  - minimizing of recovery efficiency drop during defrosting.
- » Anti-freezing protection of water heater:
  - antifreeze thermostat installed downstream the heater,
  - strap-on return water temperature sensor
- » Fans overload protection (functions realized by EC motors drives)
- » Fire alarm input – AHU immediate disengaging in case of lack of external start permission from overall fire protection system.

## TIME SCHEDULE FUNCTIONS

- » Weekly schedule operational modes programming.
- » Clear visualization of schedule settings by means of web-browser (computers and mobile devices).

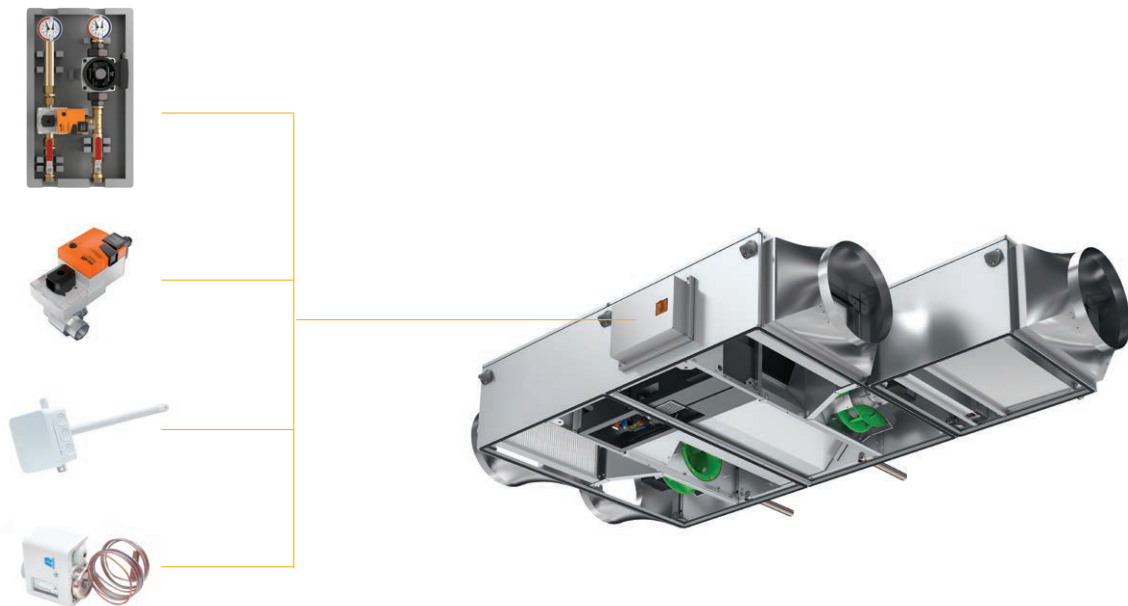


## PREVENTIVE FUNCTIONS

- » Constant filter contamination status control:
  - constant monitoring of filter pressure drop by means of static pressure transducers,
  - evaluation of filter contamination status for vs actual airflow rate.
- » Fans shutting-down delay – fan's run out for systems with electric heater.
- » Water heater pre-heating before fan's start up.
- » Periodical heater pump engaging in summer – to prevent against limescale accumulation.

## CONTROL CIRCUITS

- » All control circuits installed inside the base unit are fully wired and configured in accordance to its technical selection.
- » Control of fans operation is done by means of digital communication based using ModBUS protocol. Each of the fan is adequately programmed with individual address enabling its recognition by the control system (fans should never be swapped).
- » Control elements handling external modules (antifreeze thermostat of the water heater, valves for heater and cooler, supply air temperature sensor) should be connected to terminal block.
- » Clear and easy to ready description of terminal block facilitates correct connecting of control peripheral components.



## POWER SUPPLY AND PROTECTION CIRCUITS

- » Fan's power supply, rotary heat wheel and control circuits are fully wired.
- » All electrical protection circuits of fans, rotary heat wheel drive, control circuits and water heater pump are installed inside the AHU.
- » The only to be by the user is connecting the AHU to mains (to the main switch located in the connecting box) and optionally – crossing the power supply to the pump of the water heater.
- » Water heater power supply terminals are crossed to the terminal block located on AHU outer wall.

VTS



rg

Esc





# CONTROL ELEMENTS

## CONTROL ELEMENTS



### Functions and application

- » Regulation of supply and exhaust air temperature.
- » Protection of the energy recovery unit against freezing.
- » Outdoor air temperature measurement in order to identify need of heat/chill recovery and engagement protecting function for water heater.

### Operational parameters

- » Measurement range: -50°C to +90°C.
- » Measurement accuracy:  $\pm 0,5K$ .
- » Sensor type: NTC 10k.
- » Air humidity range: 5 ÷ 100%.
- » Protection degree: IP67.
- » Shielded cable length: max. 100 m.

## ROOM AIR TEMPERATURE SENSOR



### Functions and application

- » Regulation of temperature in handled space.

### Operational parameters

- » Measurement range: -20°C do +70°C.
- » Measurement accuracy:  $\pm 0,5K$ .
- » Sensor type: NTC 10k.
- » Air humidity range: 5 ÷ 95% no condensation.
- » Protection degree: IP20.
- » Shielded cable length: max. 100 m.

## ANTI-FREEZE THERMOSTATE



### Functions and application

- » Protection of water heater against freezing by means of air off-coil temperature monitoring (recommended temperature threshold setting: +5°C).

### Operational parameters

- » Measurement range: -18 ÷ +15°C.
- » Hysteresis: 1,7 ÷ 12K.
- » Nominal voltage: 30V DC or 230V AC.
- » Output signal: potential-free contact.
- » Protection degree: IP 44.

## OVERHEAT PROTECTION THERMOSTATE FOR ELECTRIC HEATER



### Functions and application

- » Protection of electric heater against overheating.

### Operational parameters

- » Power cut-off temperature setpoint: 65°C.
- » Power re-switch on temperature setpoint : 45°C.
- » Nominal voltage: 20V DC or 230V AC.
- » Output signal: potential-free contact.





## DIFFERENTIAL PRESSURE SWITCH



### Functions and application

- » Monitoring of filter's contamination.
- » Control of the operation of a direct driven fan unit in case of cooperation with electric heater.

### Operational parameters

- » Measurement range: 30 do 500 Pa.
- » Nominal operating voltage: 250V AC ( $I_{max}=3A$ ).
- » Output signal: potential free contact.
- » Working temperature range:  $-20^{\circ}C$  do  $60^{\circ}C$ .
- » Protection degree: IP 54.

## DIFFERENTIAL PRESSURE TRANSDUCER



### Functions and application

- » Regulation of supply and exhaust air (CAV function).
- » Regulation of static pressure in ventilation system trunk duct (VAV function).
- » Constant monitoring of filter pressure drop (control of filter contamination level).

### Operational parameters

- » Measurement range: 6000 Pa.
- » Measurement accuracy: 0,25% of the range.
- » Communication: ModBus RTU.
- » Supply voltage: 21,5V to 30V DC or 21,5V do 26,5V AC.
- » Working temperature range:  $-20^{\circ}C$  do  $50^{\circ}C$ .
- » Protection degree: IP 65.

## ON/OFF DAMPER ACTUATOR



### Functions and application

- » Airflow opening or closing in the AHU (connectors of air intake and discharge) – for units with water heater actuators with return spring are applied.

### Operational parameters

- » Regulation mode: ON/OFF (two-point).
- » Angle of rotation:  $90^{\circ}$ .
- » Torque: 16 Nm (max damper cross-section:  $4\text{ m}^2$ ).
- » Full open/close time: 120 s (with spring: 10 s).
- » Supply voltage: 24V AC/DC.
- » Working temperature:  $-20^{\circ}C$  do  $50^{\circ}C$ .
- » Protection degree: IP 54.

## SET FOR WATER HEATER CAPACITY REGULATION (PUMP GROUP)



### Functions and application

- » Smooth regulation of water heater capacity.

### Operational parameters

- » Regulation mode: 0 to 100% (smooth).
- » Control signal: 0-10V.
- » Full open/close time: 90 s.
- » Valve supply voltage: 24V AC/DC.
- » Pump supply voltage: 230V AC.
- » Working temperature:  $+5^{\circ}C$  do  $50^{\circ}C$ .
- » Medium temperature range:  $-10^{\circ}C$  to  $120^{\circ}C$ .
- » Max glycol concentration: 50%.
- » Protection degree: IP 54.



## THREE-WAY VALVE FOR WATER HEATER OR COOLER



### Functions and application

- » Smooth regulation of water heater or cooler capacity.

### Operational parameters

- » Regulation mode: 0 do 100% (smooth).
- » Control signal: 0-10V.
- » Full open/close time: 90 s.
- » Valve supply voltage: 24V AC/DC.
- » Working temperature: +5°C do 50°C.
- » Medium temperature range: -10°C do 120°C.
- » Max glycol concentration: 50%.
- » Protection degree: IP 54.

## HMI BASIC USER INTERFACE



### Functions and application

- » Maintenance of Air handling unit – temperatures setting and reading, change of operating modes, independent time schedule management, alarm codes displaying.
- » Configuration of controller's universal inputs and outputs.

### Operational parameters

- » Power supply directly from the controller.
- » Communication with controller – RS485 serial port.
- » Max length of communication cable: max. 500 m.
- » Working temperature: -20°C to 60°C.
- » Humidity: <85% (no condensation).
- » Protection degree: IP 31.

## HMI ADVANCED USER INTERFACE

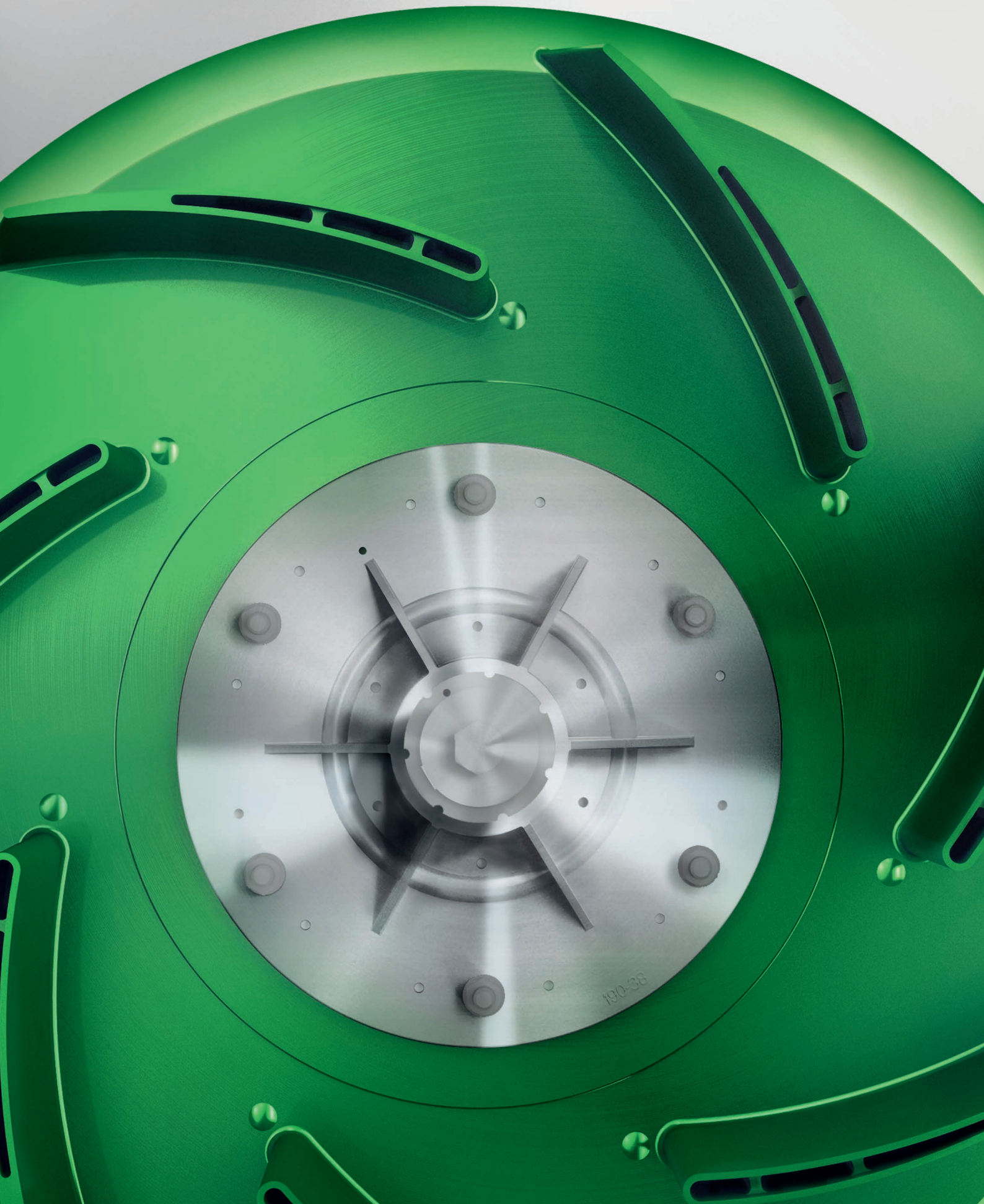


### Functions and application

- » Maintenance of Air handling Unit – parameters setting and reading (temperature, airflow, CO2, humidity etc), change of operational modes.
- » Weekly schedule programming.
- » Service maintenance – configuration of all advanced AHU operating parameters, configuration controllers universal inputs and outputs.
- » Remote configuring of variable frequency drives.
- » AHU alarms and errors monitoring (full text description) and cancelling.

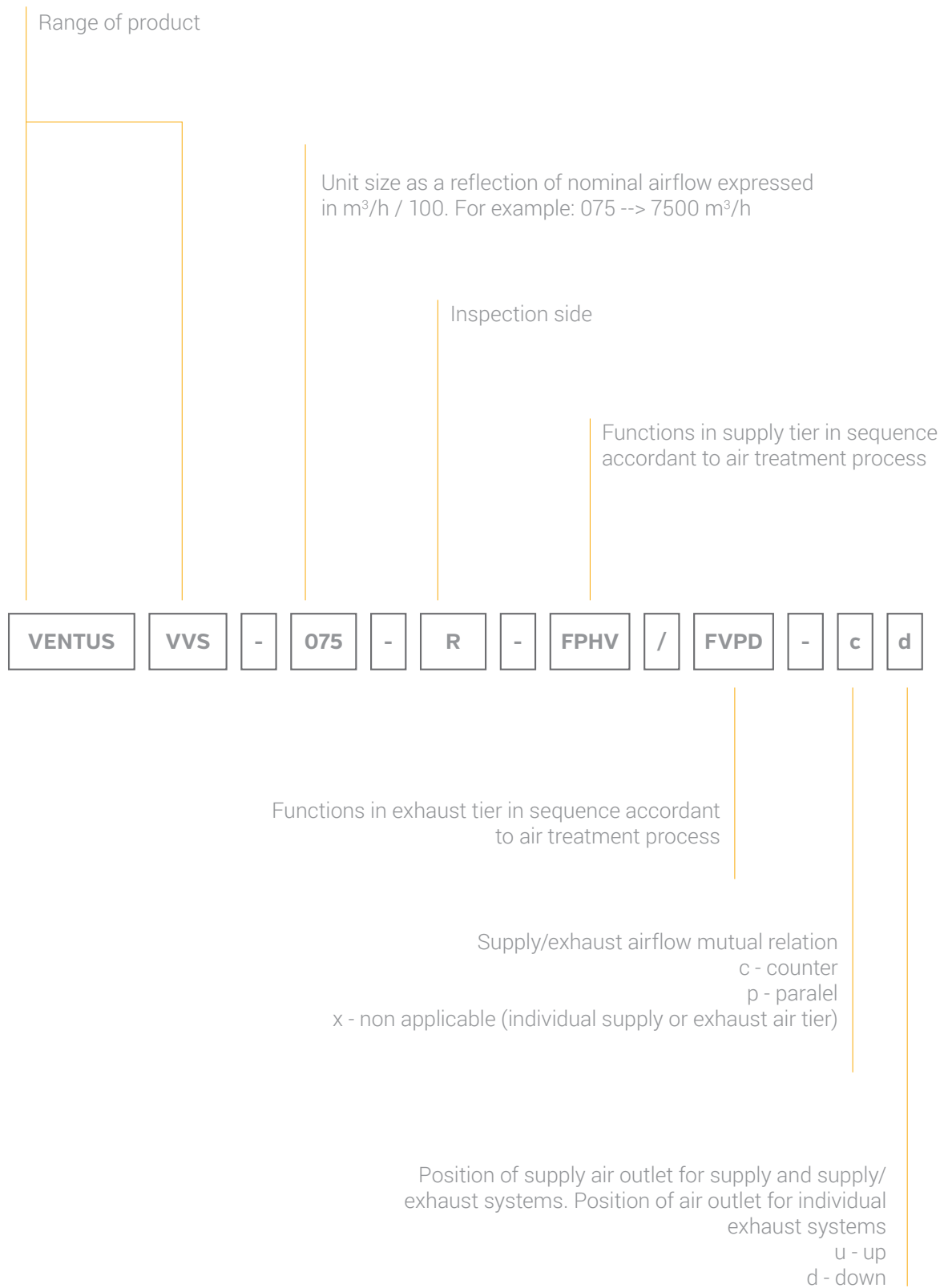
### Operational parameters

- » Power supply directly from the controller.
- » Communication with controller – RS485 serial port.
- » Max length of communication cable: max. 1200 m,
- » Working temperature: -20°C to 60°C.
- » Humidity: <85% (no condensation).
- » Protection degree: IP 31.

















# CODING



**VVS075-R-FPHV/VVS075-L-FVPD\_CD**

# CODES & SYMBOLS

CODE	SYMBOL	NAME
F		Air filter
V		Fan
C		Cooler
H		Heater
M		Mixing box
P		Plate cross-flow recuperator
R		Rotary heat wheel
G		Run-around coil
D		Droplet eliminator
W		Humidifier
E		Additional empty space
S		Sound attenuator

## Auxiliary codes

- (cw) water cooler
- (dx) direct expansion cooler
- (xR) coil number of rows
- (hw) water heater
- (el) electric heater
- (sx) sound attenuator version





**06**

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VOLCANO & WING  
units



# VOLCANO



RELIABLE  
AND ENERGY SAVING  
EC MOTORS

3 years warranty  
for the unit



## TECHNICAL SPECIFICATION

Parameter	Unit	VOLCANO VR MINI	VOLCANO VR1	VOLCANO VR2	VOLCANO VR3	VOLCANO VR-D MINI	VOLCANO VR-D
VTS item code		EC	EC	EC	EC	EC	EC
		1-4-0101-0455	1-4-0101-0442	1-4-0101-0443	1-4-0101-0444	1-4-0101-0498	1-4-0101-0450
Heater – number of rows	-	2	1	2	3	—	—
Max. Airflow	m <sup>3</sup> /h	2100	5300	4850	5700	2330	6500
Heating capacity range	kW	3-20	5-30	8-50	13-75	—	—
Max supply medium temperature	°C	130			—	—	—
Max medium pressure	MPa	1,6			—	—	—
Max horizontal air range	m	14	23	22	25	16	28
Max vertical air range	m	8	12	11	12	10	15
Coil volume	dm <sup>3</sup>	1,12	1,25	2,16	3,1	—	—
Headers diameter	"	3/4			—	—	—
Unit mass (empty coil) – EC	kg	14	21	21,5	24,5	8	15,5
Supply voltage	V/Hz	1 ~ 230/50					
EC motor capacity	kW	0,095	0,25	0,37	0,095	0,37	0,37
EC motor nominal power	A	0,51	1,3	1,7	0,51	1,7	1,7
EC motor revolutions	rpm	1200	1430	1400	1200	1400	1400
EC motor protection degree	IP	44					
Casing colors		front: RAL 9016 Traffic White, rear + mounting brackets: RAL 7036 Platinum Grey, impeller: RAL 6038 Green					

## CONTROLS

Parameters						
Model	-	Potentiometer VR EC (0-10 V)	Potentiometer with thermostat VR EC (0-10V)	Volcano EC controller	Valve with actuator (VA-VEH202TA)	NTC room temperature sensor (for VOLCANO EC controller)
VTS item code	-	1-4-0101-0453	1-4-0101-0473	1-4-0101-0457	1-2-1204-2019	1-2-1205-1007

**Selection tool:** <http://ehcad.vtsgroup.com/>

**Revit® files library:** <http://vtsgroup.com/vtsebim-Documentation-centre.html>

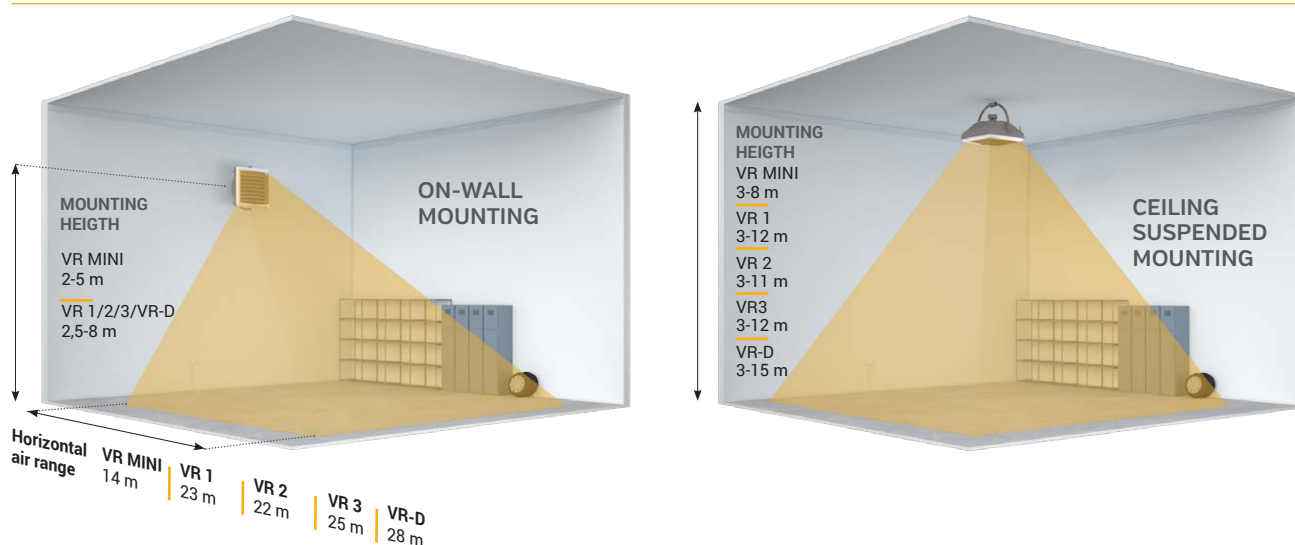
All heaters equipped with EC motors are easy and simply to connect.  
One controller can handle up to 8 heaters regardless of type.



## DIMENSIONS



## AIR RANGES



## PIPES DIAMETERS

Number of heaters supplied from common heating water trunk line**	VR Mini		VR1		VR2		VR3	
	Max water flow rate [m³/h]	Pipe diameter ["]	Max water flow rate [m³/h]	Pipe diameter ["]	Max water flow rate [m³/h]	Pipe diameter ["]	Max water flow rate [m³/h]	Pipe diameter ["]
1	0,9	3/4	1,3	3/4	2,2	3/4	3,3	3/4
2	1,8	3/4	2,6	3/4	4,4	1	6,6	1 1/4
3	2,7	1	3,9	1	6,6	1 1/4	9,9	1 1/2
4	3,6	1	5,2	1	8,8	1 1/4	13,2	1 1/2
5	4,5	1	6,5	1 1/4	11	1 1/2	16,5	2
6	5,4	1 1/4	7,8	1 1/4	13,2	1 1/2	19,8	2
7	6,3	1 1/4	9,1	1 1/4	15,4	2	23,1	2 1/2
8	7,2	1 1/4	10,4	1 1/2	17,6	2	26,4	2 1/2
9	8,1	1 1/4	11,7	1 1/2	19,8	2	29,7	2 1/2
10	9,0	1 1/4	13	1 1/2	22	2 1/2	33	3

\* - Pipe diameters are specified for max water face velocity of 25 m/s  
 \*\* - Units supplied from common heating water trunk line



# WING Air curtain



RELIABLE  
AND ENERGY SAVING  
EC MOTORS

3 years warranty  
for the unit



## TECHNICAL SPECIFICATION

Parameter	Unit	WATER HEATER			WATER HEATER			NO HEATER		
		WING W100	WING W150	WING W200	WING E100	WING E150	WING E200	WING C100	WING C150	WING C200
		EC	EC	EC	EC	EC	EC	EC	EC	EC
VTS item code		1-4-2801-0055	1-4-2801-0056	1-4-2801-0057	1-4-2801-0058	1-4-2801-0059	1-4-2801-0060	1-4-2801-0061	1-4-2801-0062	1-4-2801-0063
Max. door width	m	1	1,5	2	1	1,5	2	1	1,5	2
Max. door height (vertical air stream range)**	m	3,7			3,7			4		
Maximum airflow***	m <sup>3</sup> /h	1850	3100	4400	1850	3150	4500	1950	3200	4600
Heating capacity range*	kW	4-17	10-32	17-47	2/6 or 4/6	4/12 or 8/12	6/15 or 9/15	-		
Max supply medium temperature	°C	95			-			-		
Max medium pressure	MPa	1,6			-			-		
Coil volume	dm <sup>3</sup>	1,6	2,6	3,6	-			-		
Number of rows	szt.	2			-			-		
Supply voltage	V/ph/Hz	~ 230/1/50			~230/1/50 for 2kW ~400/3/50 for 2/4/6kW	~400/3/50		~230/1/50		
Capacity of heating elements	kW	-			2 and 4	4 and 8	6 and 9	-		
Heating elements rated current	A	-			3/6/max.9	6/11,3/ max.17,3	8,5/12,9/ max.21,4	-		
Motor capacity (EC)	kW	0,15	0,18	0,26	0,15	0,18	0,26	0,15	0,18	0,26
Motor rated current (EC)	A	1,1	1,3	1,9	1,1	1,3	1,9	1,1	1,3	1,9
Unit mass (empty coil) - EC	kg	21,5	29	37,5	22	30,5	39	19	25,5	32,5
Protection degree	IP	20								

## CONTROLS

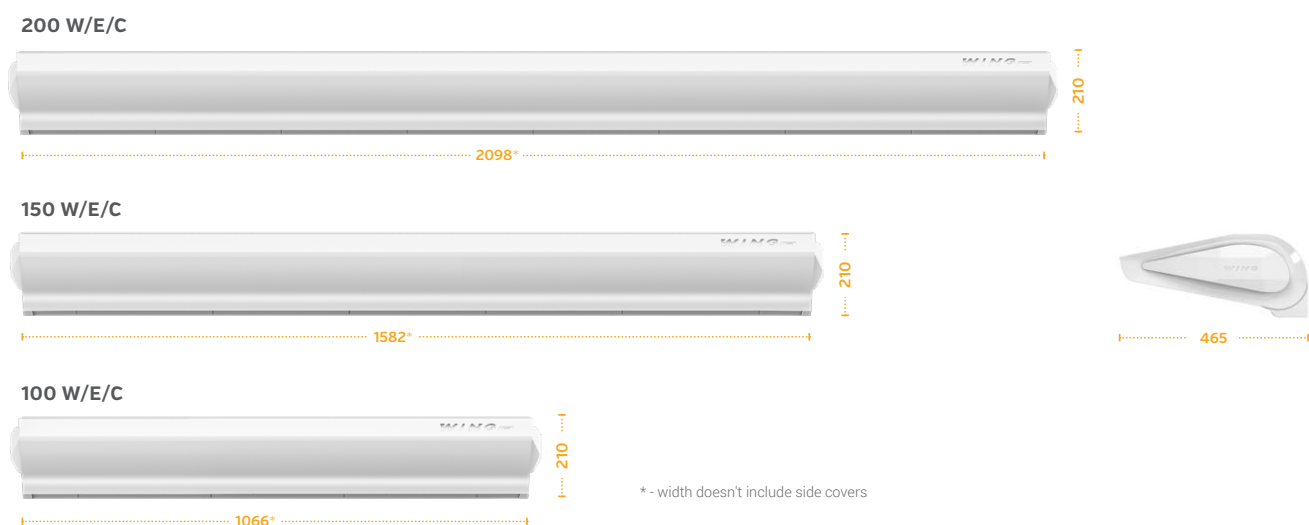
<b>WING EC controller</b>	<b>Valve with actuator</b>	<b>Door sensor (reed switch)*</b>
VTS item code	VTS item code	VTS item code
1-4-0101-0451	1-2-1204-2019	1-4-0101-0454

"WING air curtains are fitted for horizontal and vertical\* mounting, also for group configuration \* - WING W, WING C"

Revit® files library: <http://vtsgroup.com/vtsbim-Documentation-centre.html>

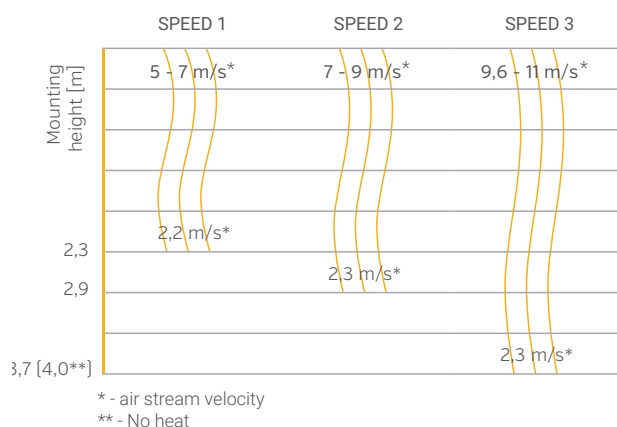
All curtains equipped with EC motors are easy and simply to connect. One controller can handle up to 8 curtains regardless of type.

## DIMENSIONS

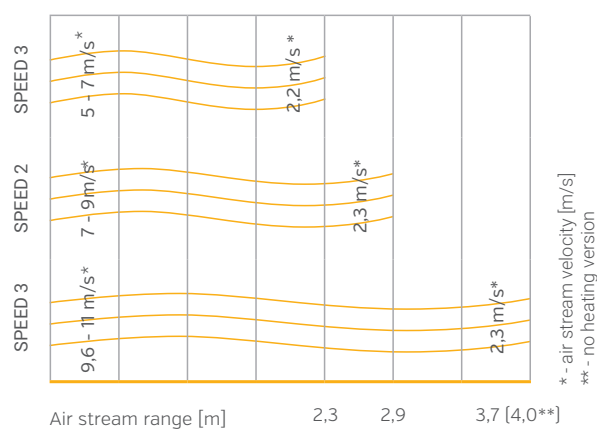


## AIR RANGES

### Vertical air stream range (Max mounting height)



### Horizontal air stream range (For vertical mounting)



Curtain with electric heater **must not** be installed vertically

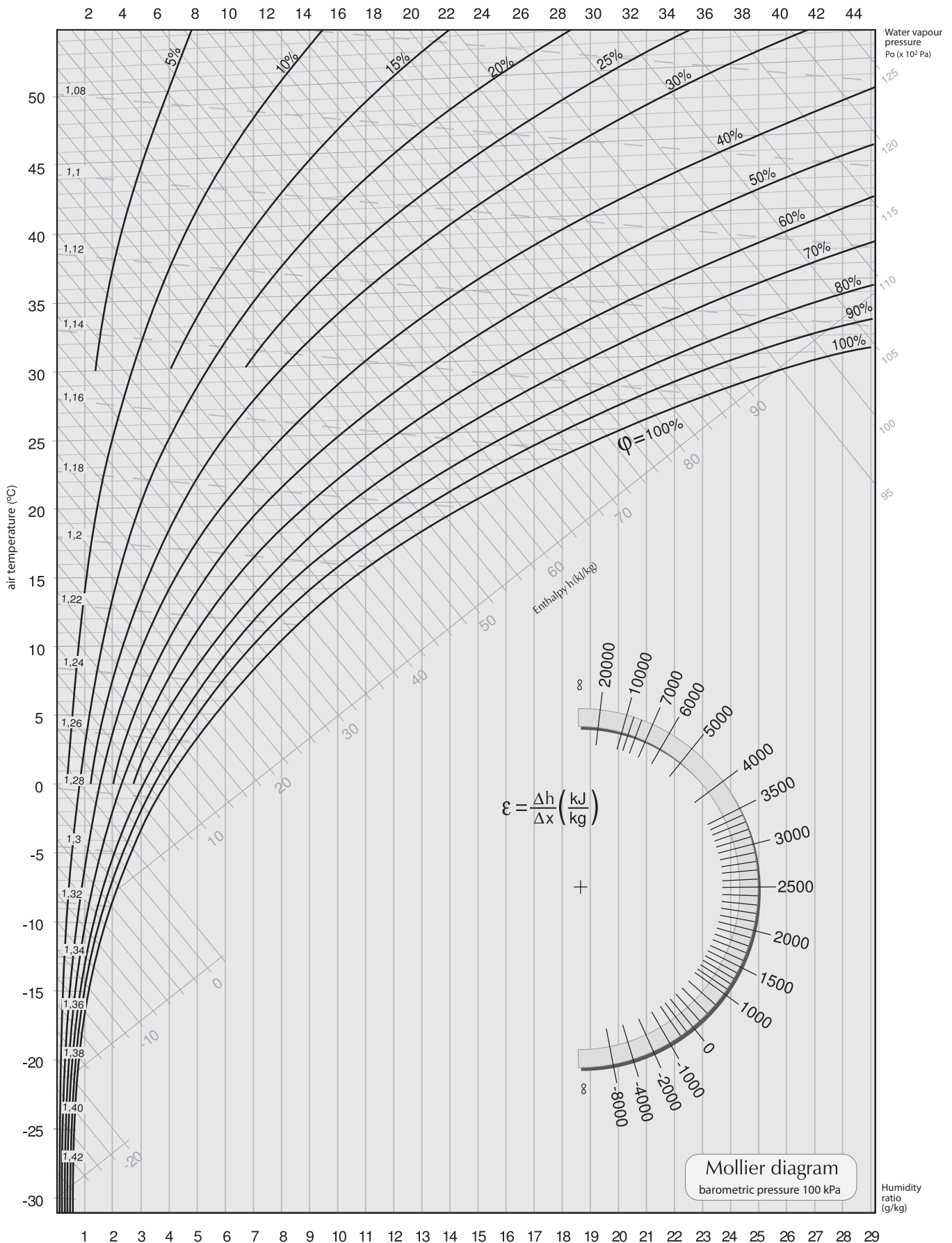
## MOUNTING

Dedicated holders set and mounting points enable easy mounting





# PSYCHROMETRIC CHART





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