VTS

ventus VVS/COMPACT

VOLCANO
WING
WING PRO
2025

www.vtsgroup.com


VTS
LOGISTIC
CENTER
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CLIMA GULF FZCO
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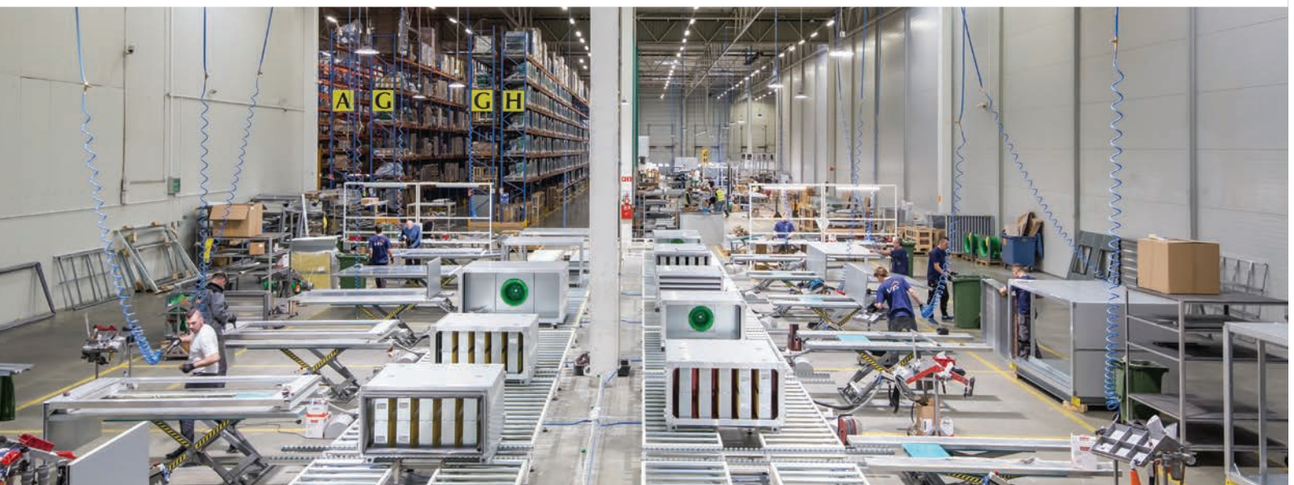
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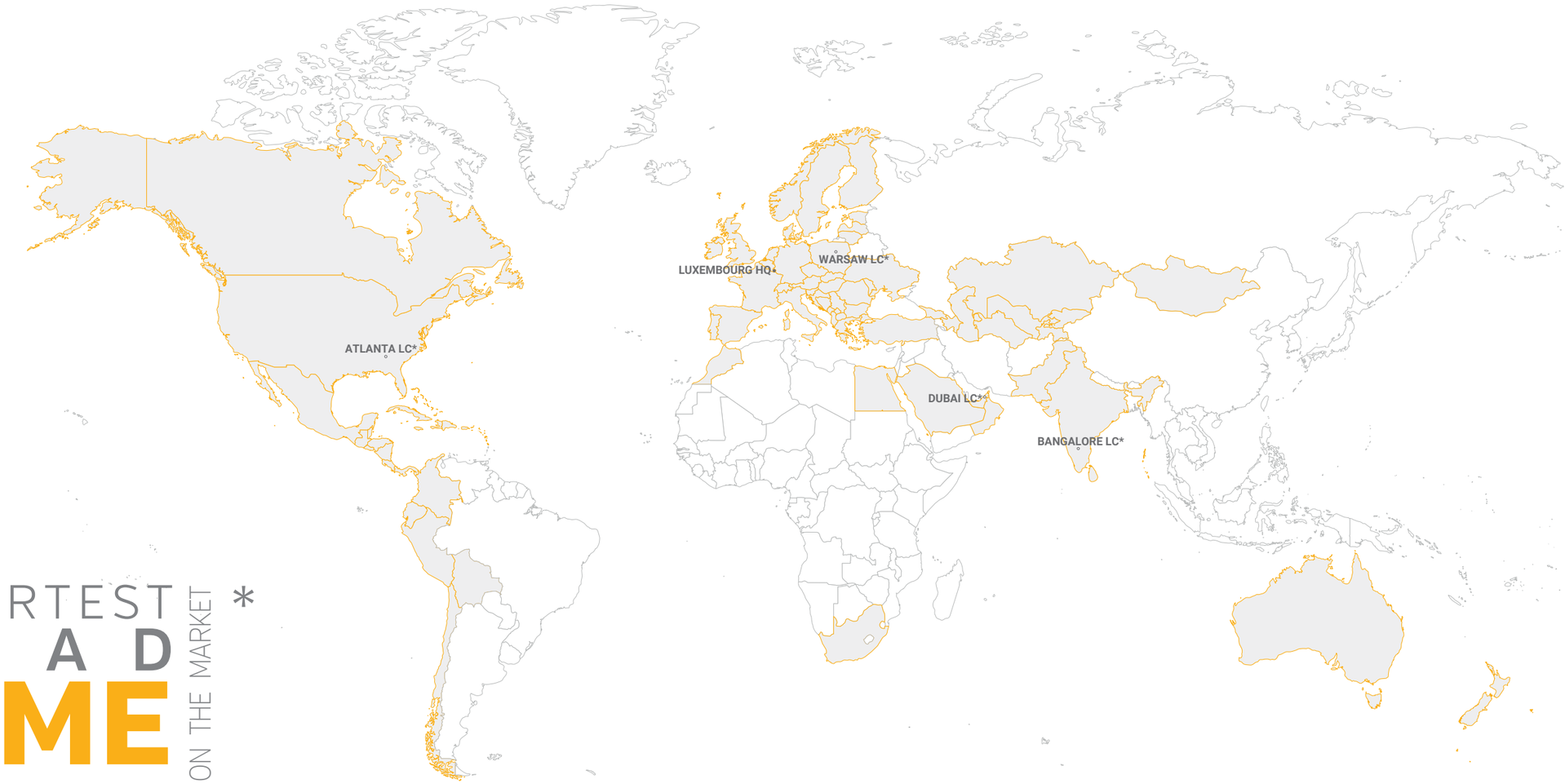
01
VTS Group

VTS Group

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

OUR MISSION

AHU#1



SHORTEST LEAD TIME ON THE MARKET *

* Logistics center

AHRI CERTIFIED Central Station Air-Handling Units AHRI Standard 430

amca MEMBER

Conforms to UL Std 1995 Certified to CSA Std C22.2 No. 236 Intertek 4009808

ISO 9001 ISO 14001 BUREAU VERITAS Certification

TÜV

CE

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 4 efficiently running production and logistic centers (**Atlanta, Dubai, Warsaw, Bangalore**), enable to ensure the shortest lead time on the market, wherever in the world.

SHORTEST LEAD TIME ON THE MARKET

4 CENTERS LOGISTIC

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

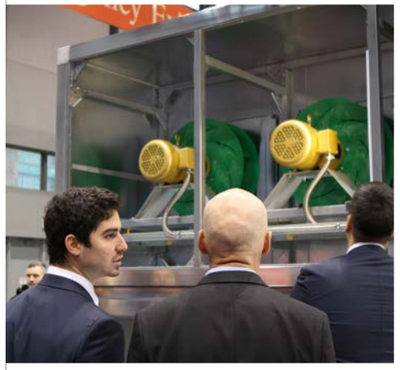
$ COMPETITIVE PRICE

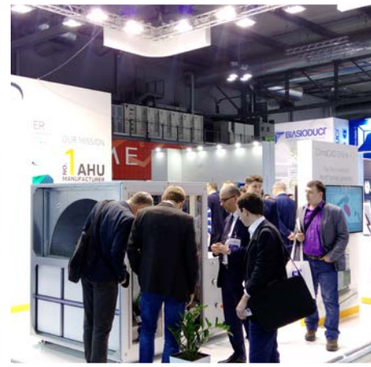
150 000 UNITS SOLD ANNUALLY

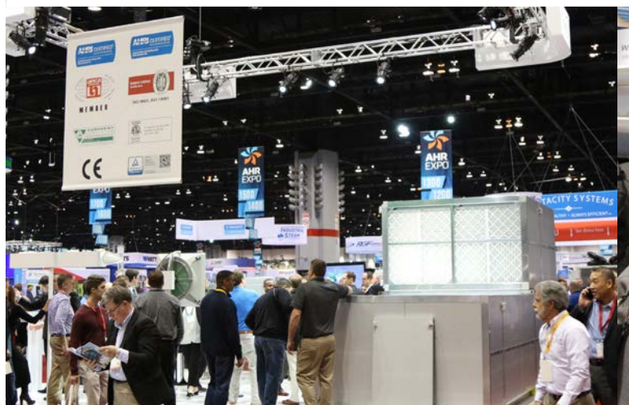
Multistage quality control system allows VTS to offer **2 years warranty, extendable even up to 5.**

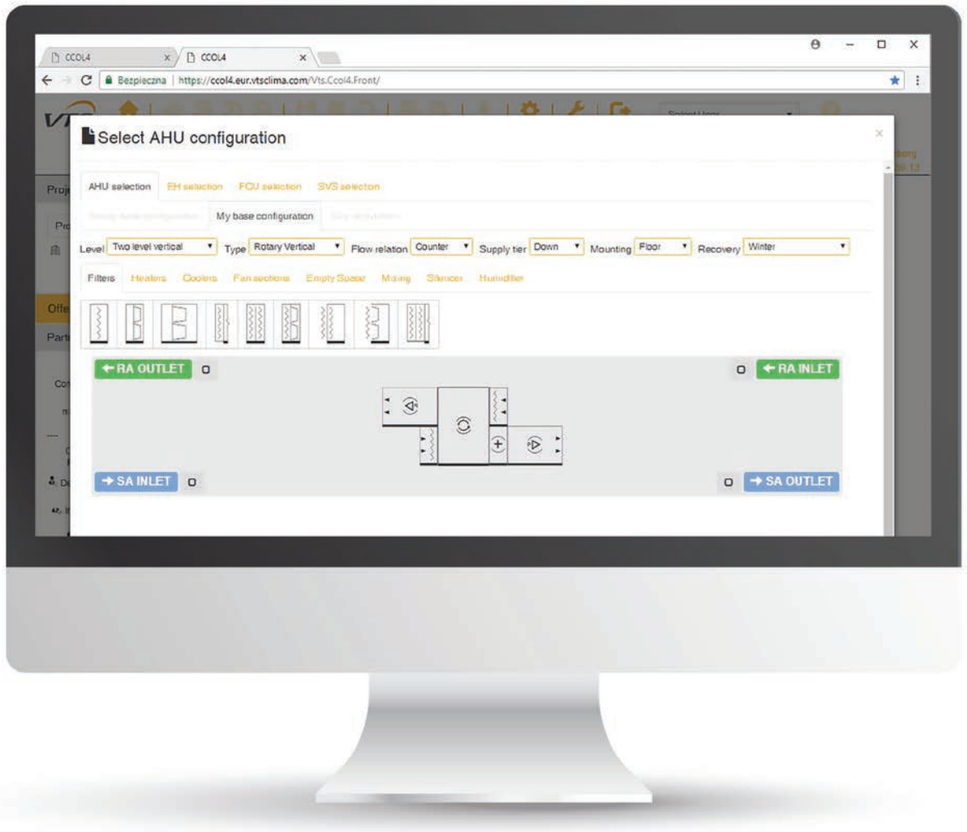
BEST QUALITY

UP TO 5 YEARS WARRANTY FOR EACH UNIT









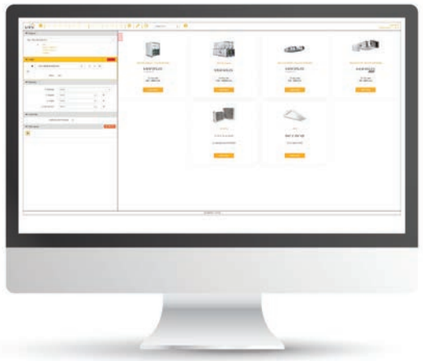
02

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

CCOL4 OPTIMIZED FOR

» any web-browser

» any operating system

» any device

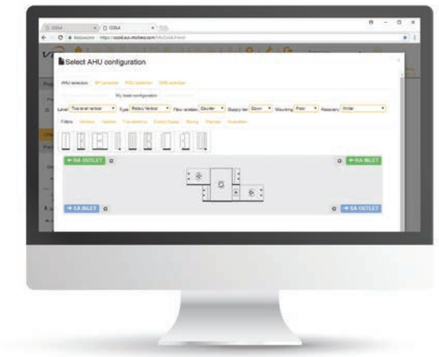
DATA EXPORT TO

PDF · CAD 2D · CAD 3D · SUBMITTAL · QUOTATION · TECHNICAL SPECIFICATION

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.

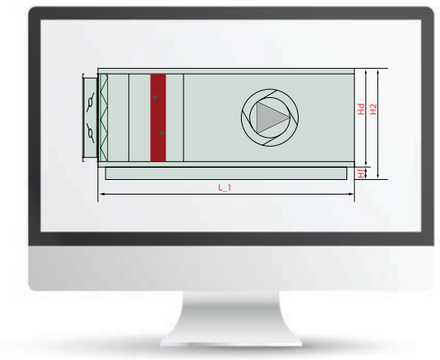
DESIGN VERSATAILTY

» Infinite units configurations.
» Detecting of configurations errors.



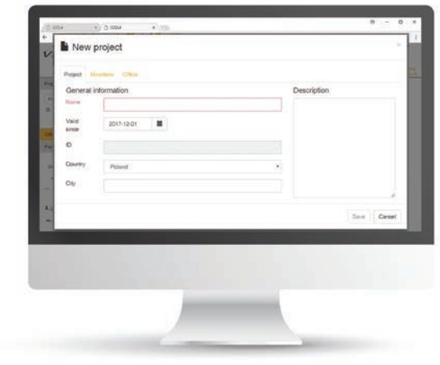
DYNAMIC AHU LENGTH DEFINITION

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



MANAGING OF YOUR DATA BASE

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



www.ccol4.com

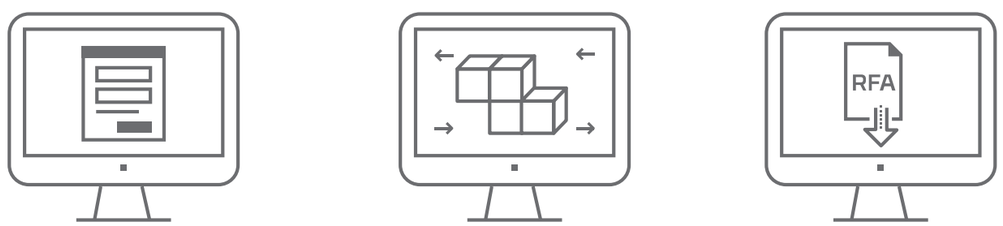
Support for designers

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.

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.

3 steps to generate the model:



1 Login to CCOL 4.0

You can login using our web-site:

www.ccol4.com

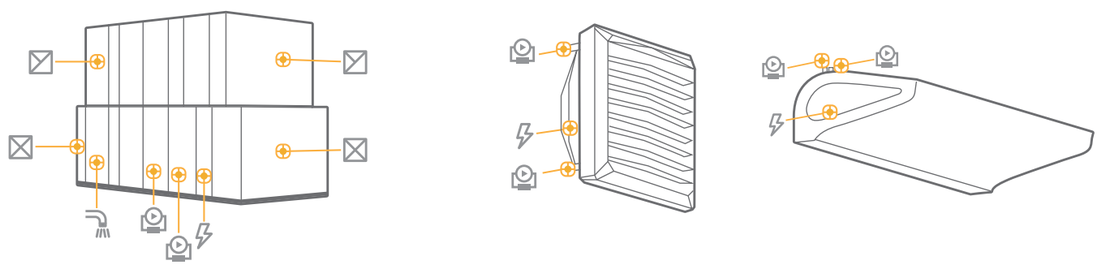
2 AHU configuration and parameters specyfing

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

3 Selection export to .fra file

In order to generate .fra 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 sent the link to the site from where model can be downloaded. Entire process take no longer than 15 minutes.

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.**

Models can be downloaded from: **https://vtsgroup.com/vtsbim.html**

Support for designers

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

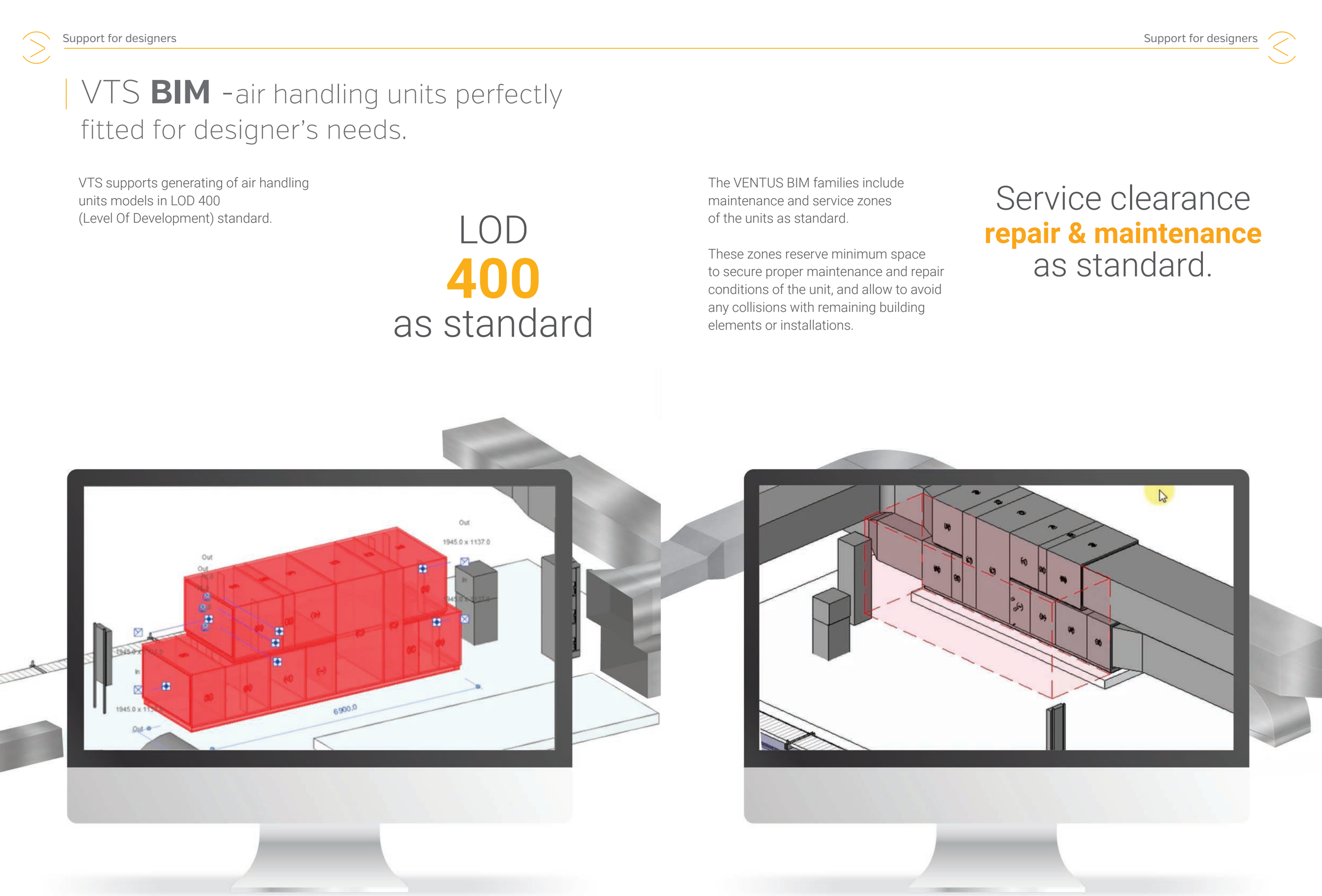
VTS supports generating of air handling units models in LOD 400 (Level Of Development) standard.

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

VENTUS VVS

VENTUS
VVS

Airflow
from **1 100** m^3/h
from **100 000** m^3/h

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

14
sizes

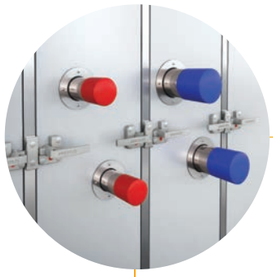
DURABLE AND TIGHT STRUCTURE

RELIABLE COMPONENTS

SMART CONTROLS

USER SAFETY

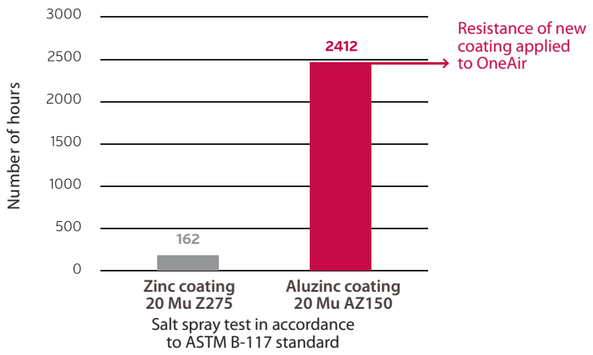
STRUCTURE



STEEL SKIN COATED WITH ALUZINC AZ 150

ALUMINUM POSTS OF SPECIAL CONSTRUCTION IN EACH AHU TYPE

CORROSION RESISTANCE



PROFIL V
VVS 021-180

PROFIL C
VVS 230-650

STEEL BASE FRAME AS STANDARD FOR ANY TYPE OF UNITS

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.

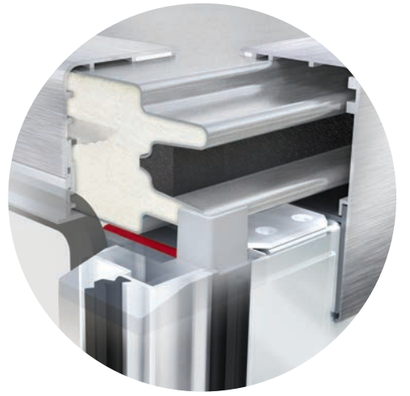
FOUNDATION

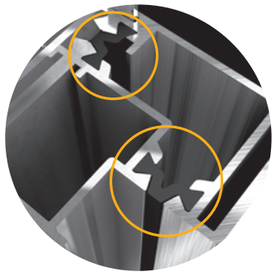
- Transport facilitation.
- High resistance of the frame to deflection.

STRUCTURAL POSTS

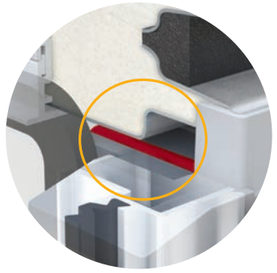
- Broken thermal bridges as standard.
- High resistance to weather conditions and UV radiation.

TIGHTNESS





THERMAL BREAK



LABIRYNTH TIGHTNENING

ADDITIONAL POST SEALING

ADDITIONAL SEALING BLADE

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

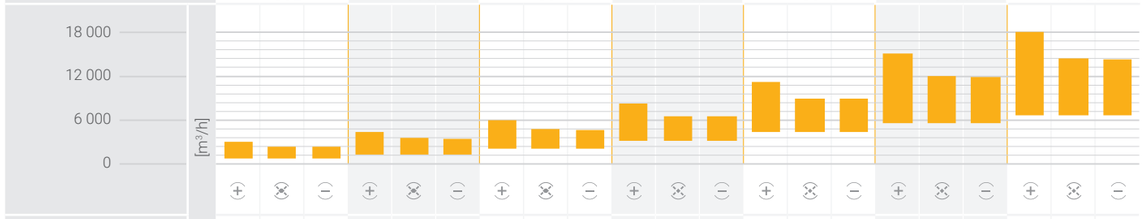
- Highly aesthetic and ergonomic handles securing perfect tightness of inspection panels.

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		
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_{fd}	[mm]	90			90			90			90			90			90			90		
H_{fu}		-			-			-			-			-			-			-		
H		538			670			670			805			925			1 025			1 062		
W		961			961			1 168			1 339			1 480			1 660			1 891		
H_i		368			500			500			635			755			855			892		
W_i		881			881			1 088			1 259			1 400			1 580			1 811		
H_2		986			1 250			1 250			1 520			1 760			1 960			2 034		
l		40			40			40			40			40			40			40		

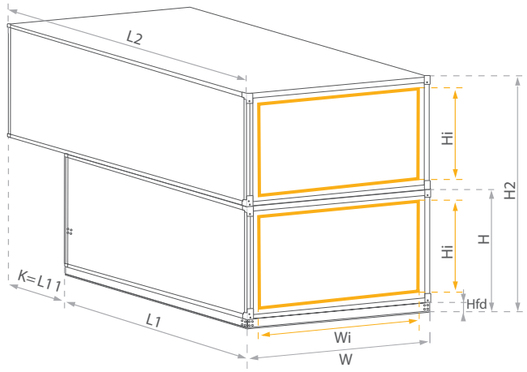
Selected configurations Dimension — Length of selected configurations

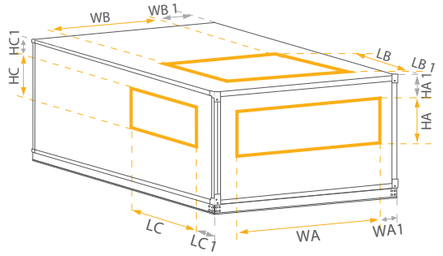
FPDV/FVPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026	[mm]
	L1	2 562	2 928	2 928	2 928	3 294	4 026	4 026	
	K	366	366	366	366	0	0	0	
	Lt	2 928	3 294	3 294	3 294	3 294	4 026	4 026	
FPDHV/FVPD_cd	L2	2 928	3 294	3 294	3 294	3 294	4 026	4 026	
	L1	2 562	2 928	2 928	2 928	3 294	4 026	4 026	
	K	366	366	366	366	0	0	0	
	Lt	2 928	3 294	3 294	3 294	3 294	4 026	4 026	
FPDHV/FVPD_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

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_{fd}	[mm]	90			120			120			120			120			120			120		
H_{fu}		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_i		993			1 197			1 197			1 496			1 729			1 729			2 206		
W_i		2 005			2 005			2 413			2 505			3 005			3 505			3 617		
H_2		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																				
FPDV/FVPD_cd	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		
FPDMV/FVMPD_cd	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		
FPDHV/FVPD_cd	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		
FPDMHV/FVMPD_cd	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		
FPDHCV/FVPD_cd	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		
FPDMHCV/FVMPD_cd	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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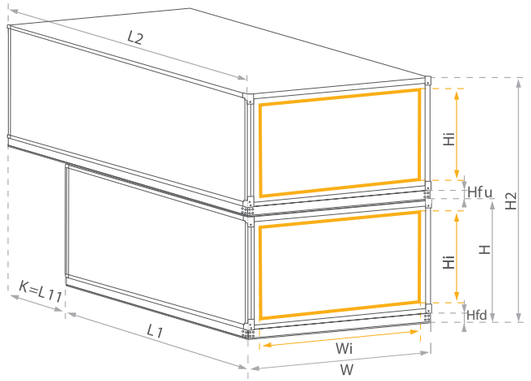
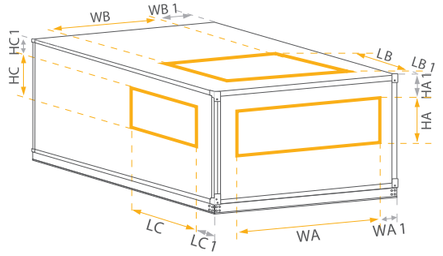
DIMENSIONS - VVS 150-650 - RECUPERATOR (PREMIUM PLUS)





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 / 12 000 / 6 000 / 0 [m³/h]		+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−
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_{fd}	[mm]	90			90			90			90			90			90			90		
H_{fu}		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_i		368			500			500			635			755			855			892		
W_i		881			881			1 088			1 259			1 400			1 580			1 811		
H_2		986			1 250			1 250			1 520			1 760			1 960			2 034		
l		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.

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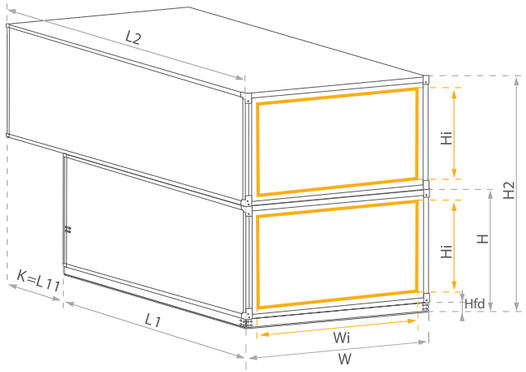
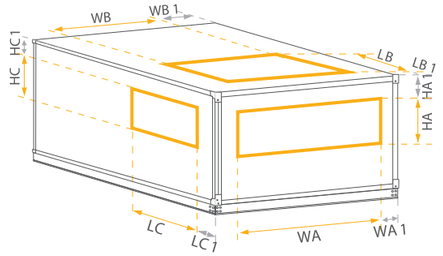
DIMENSIONS - VVS 021-120 - ROTARY HEAT WHEEL





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

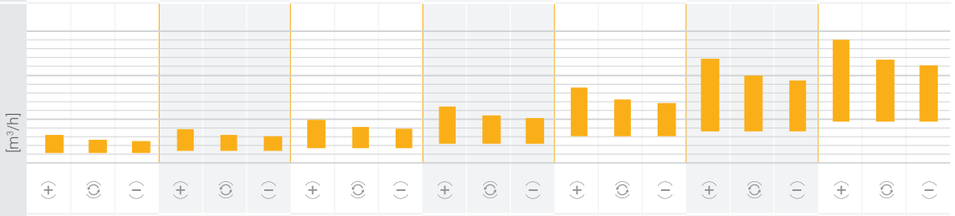
Side inlet-outlet
END (BS)

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]																		
		+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−	+	⟲	−
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_{fd}	[mm]	90			120			120			120			120			120			120		
H_{fu}		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_i		993			1 197			1 197			1 496			1 729			1 729			2 206		
W_i		2 005			2 005			2 413			2 505			3 005			3 505			3 617		
H_2		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	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	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	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	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	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	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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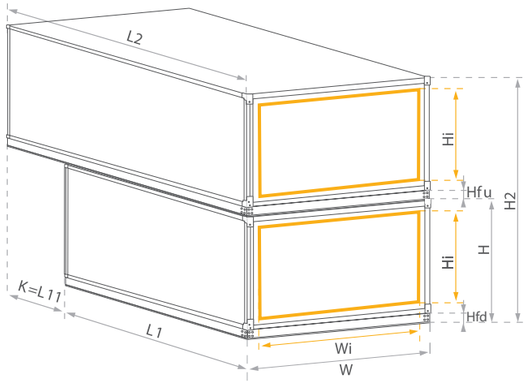
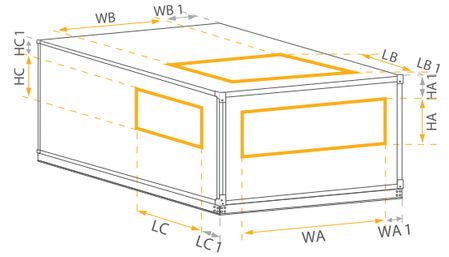
DIMENSIONS - VVS 150-650 - ROTARY HEAT WHEEL





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

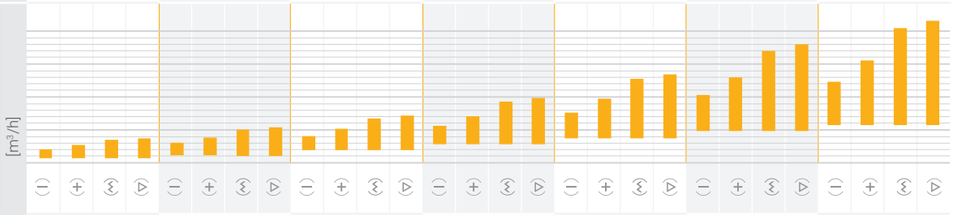
Side inlet-outlet
END (BS)

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]																									
Min airflow		806	806	806	806	1 180	1 180	1 167	1 167	1 958	1 958	1 958	1 958	2 878	2 878	2 878	2 878	3 805	3 805	3 805	3 805	4 863	4 863	4 863	4 863	5 815	5 815	5 815	5 815
Max airflow		2 163	2 730	3 570	3 780	3 090	3 900	5 100	5 400	4 120	5 200	6 800	7 200	5 665	7 150	9 350	9 900	7 725	9 750	12 750	13 500	10 300	13 000	17 000	18 000	12 360	15 600	20 400	21 600
H_{fd}	[mm]	90				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_i		368				500				500				635				755				855				892			
W_i		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						
FV	Lt	732	732	732	1 098	1 098	1 464	1 464
FHV	Lt	1 098	1 098	1 098	1 464	1 464	1 830	1 830
FCV	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
FHCV	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
FGHV	Lt	1 830	1 830	1 830	2 196	2 196	2 562	2 562
FGV	Lt	1 830	1 830	1 830	2 196	2 196	2 562	2 562
FGCVH	Lt	1 464	1 464	1 464	1 830	1 830	2 196	2 196
		2 196	2 196	2 196	2 562	2 562	2 928	2 928

[mm]

Entire range of configuration
in ClimaCAD OnLine 4 selection tool.

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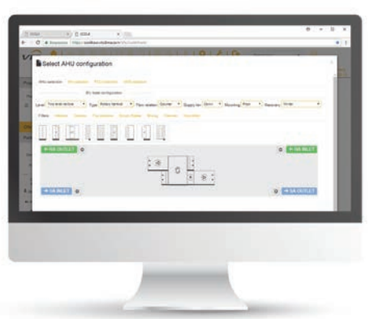
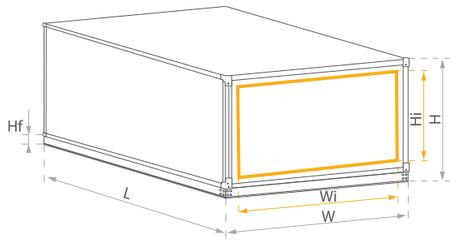
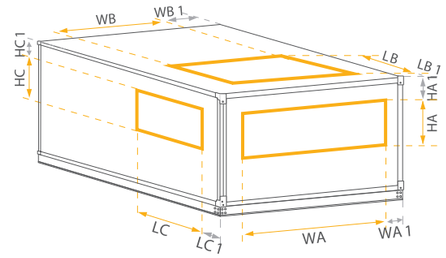


DIMENSIONS - VVS 0 21-120 - SUPPLY & EXHAUST





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

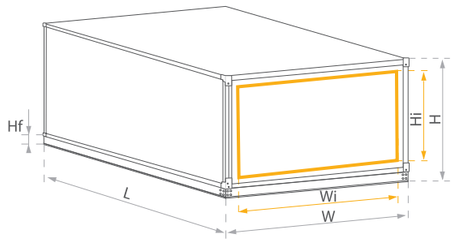
Nominal parameters		Recommended airflow range																									
Unit size		VVS150				VVS180				VVS230				VVS300				VVS400				VVS500				VVS650			
120 000 / 90 000 / 60 000 / 30 000 / 0	[m³/h]																										
Min airflow		7 167	7 167	7 167	7 167	8 640	8 640	8 640	8 640	10 398	10 398	10 398	10 398	13 491	13 491	13 491	13 491	18 704	18 704	18 704	18 704	21 817	21 817	21 817	21 817	28 725	28 725	28 725	28 725
Max airflow		15 450	19 500	25 500	27 000	18 540	23 400	30 600	32 400	23 690	29 900	39 100	41 400	30 900	39 000	51 000	54 000	41 200	52 000	58 000	62 000	56 650	71 500	77 000	79 000	66 950	84 500	87 000	100 000
H_{fd}	[mm]	90				120				120				120				120				120				120			
H_{fu}		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_i		993				1 197				1 197				1 496				1 729				1 729				2 206			
W_i		2 005				2 005				2 413				2 505				3 005				3 505				3 617			
H_2		2 236				2 754				2 754				3 352				3 818				3 818				4 772			
l		40				40				40				40				40				40				40			

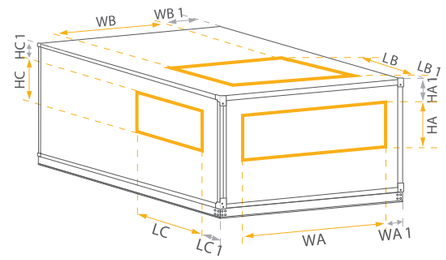
Selected configurations	Dimension	Length of selected configurations						
V	Lt	1 464	1 464	1 464	1 830	1 830	1 830	1 830
FV	Lt	1 830	1 830	1 830	2 196	2 196	2 196	2 196
FHV	Lt	2 196	2 196	2 196	2 562	2 562	2 562	2 562
FCV	Lt	2 196	2 196	2 196	2 562	2 562	2 562	2 562
FHCV	Lt	2 562	2 562	2 562	2 928	2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

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 CUNCTIONS - 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
F	L	[mm]	F7/F9	762	762	762	762	762	762	762
			EU4/F5	366	366	366	366	366	366	366
H	L		H	366	366	366	366	366	366	366
C	L		C	366	366	366	366	366	366	366
S	L		S	1098	1098	1098	1098	1098	1098	1098
E	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
M	L		M	762	762	762	762	762	762	762
W	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
F	L	[mm]	F7/F9	762	762	762	762	762	762	762
			EU4/F5	366	366	366	366	366	366	366
H	L		H	366	366	366	366	366	366	366
C	L		C	366	366	366	366	366	366	366
S	L		S	1098	1098	1098	1098	1098	1098	1098
E	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
M	L		M	1098	1098	1098	1098	1098	1098	1098
W	L		W	1098	1098	1098	1098	1098	1098	1098

COMPONENTS

DIRECT DRIVE PLUG FAN SET

Design and application

- Centrifugal fan, without casing, single inlet, PLUG type, with backward curved blades.
- Impeller made of SAN (styrene/ acrylonitryle) 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: 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_{10}= 20000h / L_{50} = 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 widing 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)°C ÷ (+90)°C.
- Panel thickness: 40mm.
- Thermal conductivity PPU λ= 0,022 W/mK.
- Casing fire resistance: non-flamable, non fire spreading (NRO).
- Moisture absorption: 0,04%.
- PPU density: ρ= 42kg/m³.
- Mechanical strength of casing: -1000 Pa ÷ 1000 Pa < 2mm (D_1 - PN EN 1886: 2008),
- Casing tightness: (MB): (-400) Pa - 0,05 l/sm², (+700) Pa - 0,13 l/sm² (L_1 -PN EN 1886: 2008); (RU): (+400) Pa - 0,93 l/sm².
- Casing heat transfer coefficient: K= 0,6 W/m²K (T2 - PN EN 1886: 2008),
- Thermal bridges coefficient: K_b =0,64 (TB_2 - 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)°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 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.

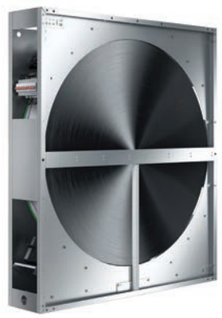
Specification

- Working temperature: max (+70)°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

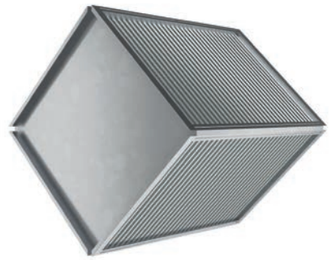
Design and application

- 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



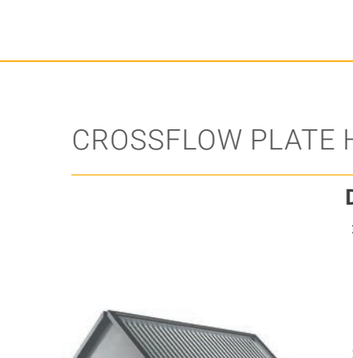
Design and application

- 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 calculaation of selected unit (CCOL).
- Medium side pressure drop – parameter resulting from individual performance calculation of selected unit (CCOL).

ELECTRIC HEATER

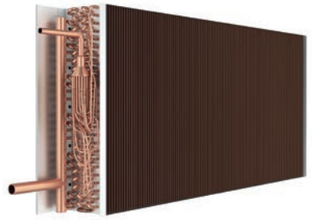
Design and application

- 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 calculaation of selected unit (CCOL).

WATER COOLER

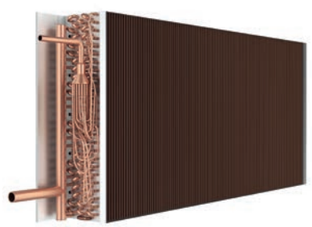
Design and application

- 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 operationg 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 execusion (so calleed Condenser).
- Cooling and dehumidifying of the air as a part of air complex dehumidifying process in summer season.
- Coil usually applied for smallerd 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^3).
- 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^2 have 2 linked pivots).

Specification

- Air leakage at closted damper: 50 m^3/h*m^2 - 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.

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_2 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.

HMI Basic

- Engaging and disengaging the AHU, change of operational modes.
- Change of temperature, airflow, humidity, max CO_2 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 CO2 level settings, etc.
- Parameters setting and reporting.
- Errors reporting.
- Time schedule setting.

USER

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

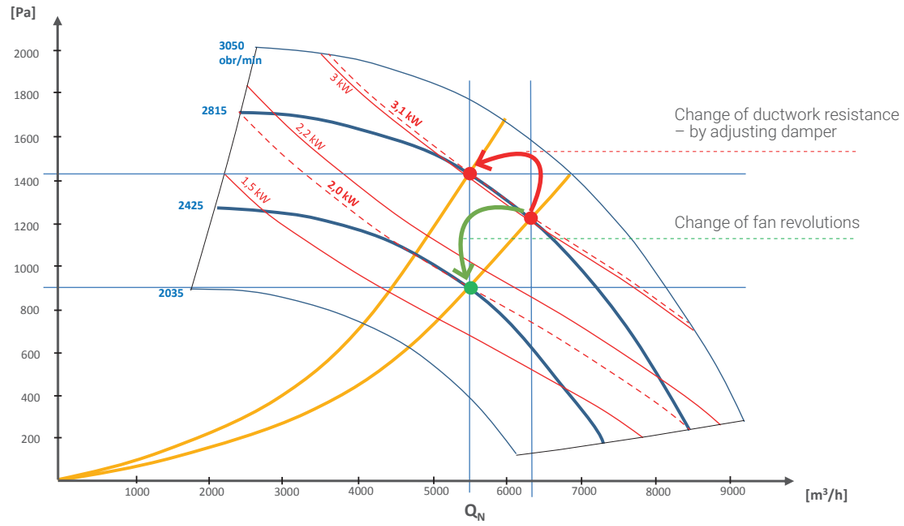
- Regulation of supply, return air temperature and humidity in handled spaces.
- Control of water coils valves (heater, cooler) and condensing unit.
- Control of rotary heat wheel revolutions, by-pass damper and mixing box, depending on AHU type and configuration.

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_2 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 engages 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

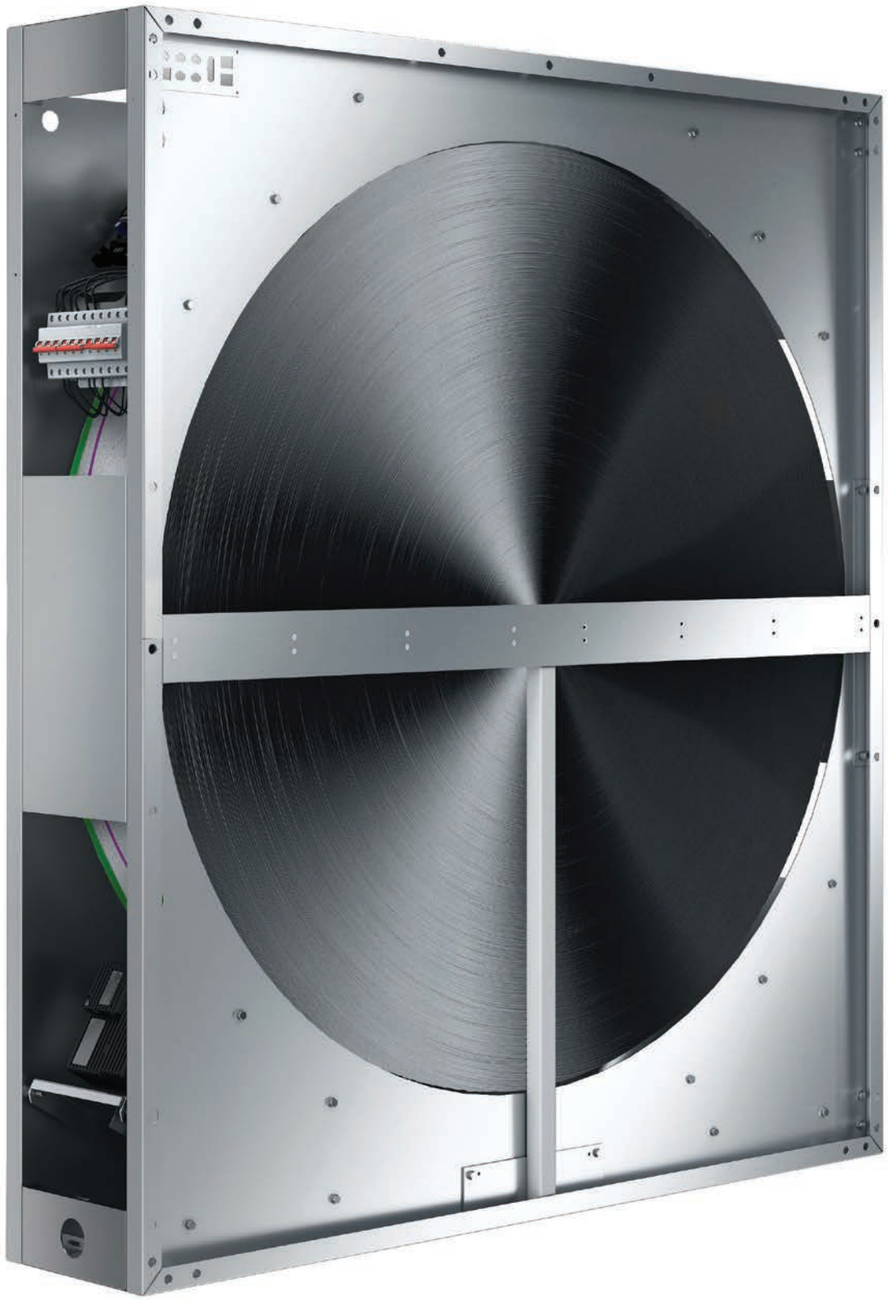
» Constant filter contamination status control:
  • Constant monitoring of filter pressure drop by means of static pressure transducers,
  • Evaluation of filter contamination status for vs actual airflow rate.
» Fans shutting-down delay – fan's run out for systems with electric heater
» Water heater 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: ±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: ±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: ±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 humidyfing and dehumidyfing).
- 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_2 TRANSDUCER

Functions and application

- Regulation of CO_2 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^2).
- 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 by-pass 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 m2).
- 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_2, 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 20.

SUPPLY AND CONTROL BOX

Functions and application

- Control of all components and processes of Air Handling Unit, especially realization of regulation (temperature, airflow, CO_2, 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.

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