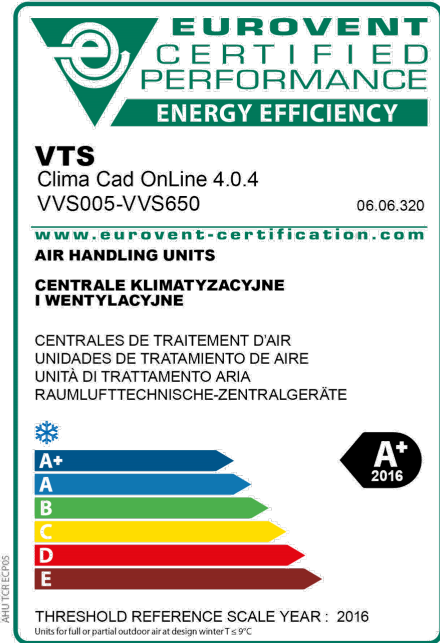
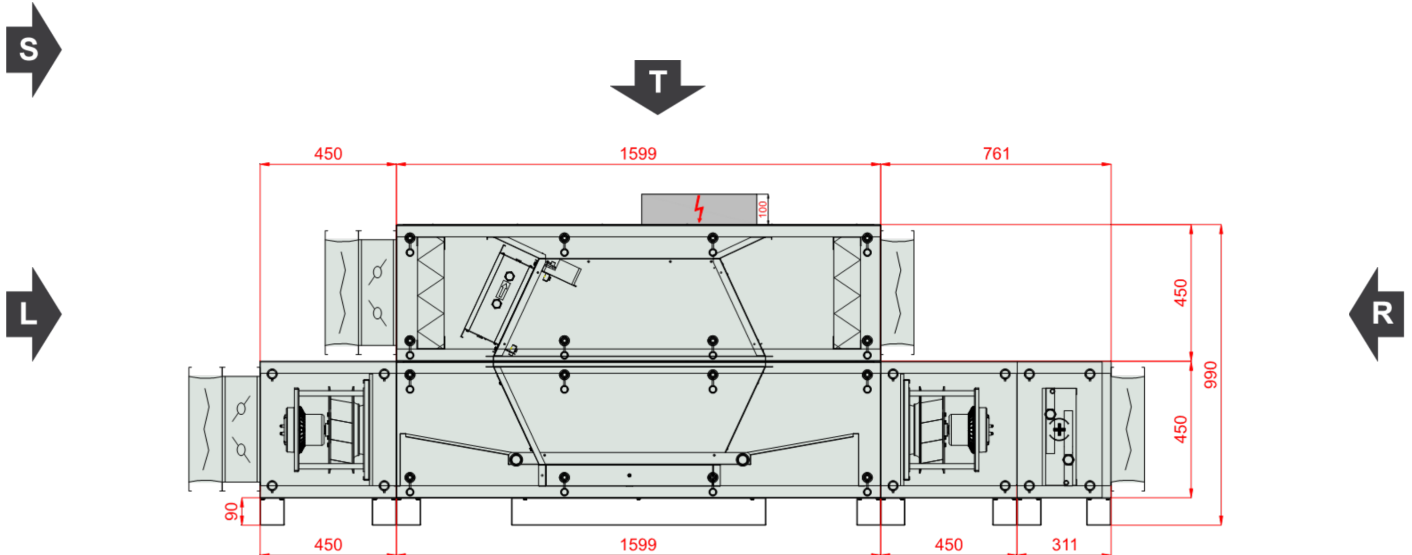


<b>Type</b>	RecoveryHexVerticalCompact
<b>Unit Type:</b>	Indoor
<b>Project Tag</b>	13577190
<b>Size</b>	VVS021c
<b>Set</b>	VVS021c-R-FPVH/VVS021c-L-FPV_cd
<b>Insulation thickness</b>	40 mm
<b>Insulation</b>	Mineral Wool
<b>Weight of the set (+/- 10%)*</b>	346 Kg
<b>Supply airflow 2</b>	2310.00 m³/h
<b>External pressure</b>	300 Pa
<b>Exhaust airflow 2</b>	2310.00 m³/h
<b>External pressure</b>	300 Pa
<b>SFP Winter</b>	2.08 kW/m³/s
<b>SFP Summer</b>	2.13 kW/m³/s
<b>Ecodesign</b>	Yes (2018 +)
<b>Eurovent Energy efficiency class (Winter 2016 / Summer 2020)</b>	A+ 2016



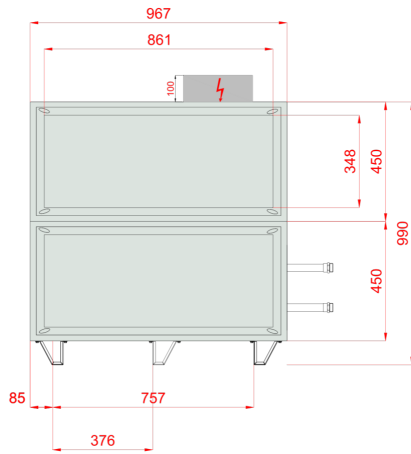
**Inspection Panels**



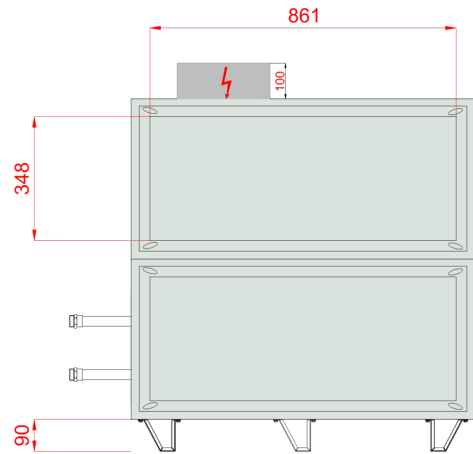
Comment 1:



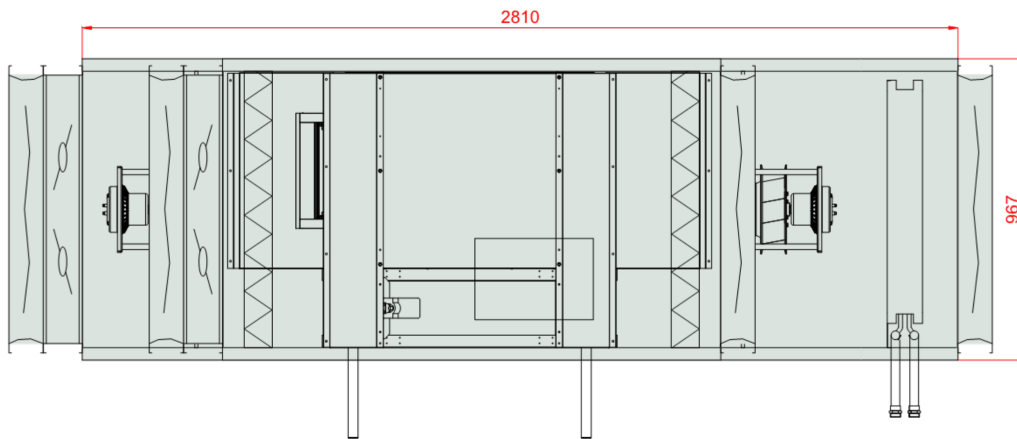
Front View (left)



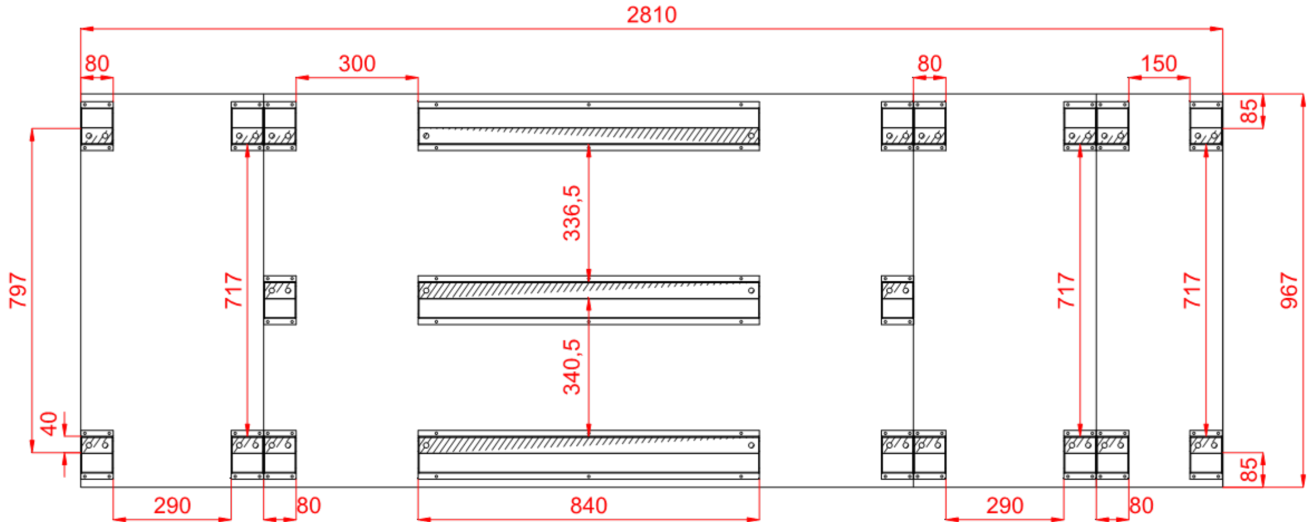
Front View (right)



Top View



**Frame Top View, within the AHU outline contour**



**Sizes [mm]**

<b>Air intake Supply</b> FF	861x348	<b>Lt</b> 2810	<b>Hi</b> 370	<b>Wi</b> 887
<b>Air outlet Supply</b> FF	861x348	<b>LtA</b> 3155	<b>H</b> 540	<b>W</b> 967
		<b>L1</b> 2810	<b>H2</b> 990	
<b>Air inlet Exhaust</b> FF	861x348	<b>L2</b> 1599	<b>Hf</b> 90	
<b>Air outlet Exhaust</b> FF	861x348	<b>L21</b> 450		
		<b>L22</b> 761		

**Unit design**

40mm insulated walls , double skin made of steel  
 Unit Power Supply 400V/3ph/50Hz  
 Casing anti-corrosion protection: Aluzinc AZ 150. Corrosion resistance (salt spary test): over 2400 hours  
 In case of delivery with controls a base unit fully wired, with pre-configured controller and EC motors drives  
 Energy recovery efficiency exceeding 86% (for EC 1253/2014 conditions)

**Temperature Conditions**

	Reference atmospheric pressure 101325 Pa			Winter outdoor reference temperature -20.0 °C		
	External air			Return air		
	DBT	RH	DA	DBT	RH	DA
Summer	32.0 °C	45 %	1.2000 kg/m³	20.0 °C	65 %	1.2000 kg/m³
Winter	-20.0 °C	100 %	1.2000 kg/m³	20.0 °C	40 %	1.2000 kg/m³

## Supply

### Panel Filter

#### Type F7/50.EU7MPleat.Int.Sld

ePM2,5 65% (ISO16890) - EFF CLASS E Flat Mini-Pleat Filter[27.0]

Filter Energy Performance Class E

#### Winter operation

50% Dirty Air Pressure Drop 116 Pa  
 Initial Air Pressure Drop 83 Pa  
 100% Dirty Air Pressure Drop 150 Pa  
 Air velocity 2.01 m/s

#### Air Filter Sizes

P.FLT (1-2-0301-0213) 2,000 x Pcs

#### Summer operation

50% Dirty Air Pressure Drop 116 Pa  
 Initial Air Pressure Drop 83 Pa  
 100% Dirty Air Pressure Drop 150 Pa  
 Air velocity 2.01 m/s

## Counter-Flow Recuperator (Hexagonal)

#### Type PCR VVS021c Hex

HIPS 2.0 (SR)

#### Winter operation

##### Supply

Intake air DBT / RH -20.0 °C / 100 %  
 Discharge air DBT / RH 15.5 °C / 6 %  
 Air velocity 2.53 m/s  
 Pressure drop Wet / Dry Wet 194 Pa  
 Air Pressure 101325 Pa  
 Air Density 1.2000 kg/m<sup>3</sup>  
 Air Volume Flow 2310.00 m<sup>3</sup>/h  
 Recovery capacity Sensible / Total Total 27.5 kW  
 Actual efficiency / at balanced flow Real / BalancedFlow 89 % / 89 %  
 Dry efficiency in winter 80 %

#### Winter operation

##### Exhaust

Intake air DBT / RH 20.0 °C / 40 %  
 Discharge air DBT / RH -6.5 °C / 97 %  
 Air velocity 2.53 m/s  
 Pressure drop Wet / Dry Wet 224 Pa  
 Air Pressure 101325 Pa  
 Air Density 1.2000 kg/m<sup>3</sup>  
 Air Volume Flow 2310.00 m<sup>3</sup>/h  
 Recovery Bypass Yes  
 Air Damper No

Counter-Flow (Hex)

Max Internal Leakage 0.25%

#### Summer operation

##### Supply

Intake air DBT / RH 32.0 °C / 45 %  
 Discharge air DBT / RH 23.7 °C / 74 %  
 Air velocity 2.53 m/s  
 Pressure drop Wet / Dry Wet 234 Pa  
 Air Pressure 101325 Pa  
 Air Density 1.2000 kg/m<sup>3</sup>  
 Air Volume Flow 2310.00 m<sup>3</sup>/h  
 Recovery capacity Sensible / Total Total -7.5 kW

#### Summer operation

##### Exhaust

Intake air DBT / RH 20.0 °C / 45 %  
 Discharge air DBT / RH 30.0 °C / 36 %  
 Air velocity 2.53 m/s  
 Pressure drop Wet / Dry Wet 224 Pa  
 Air Pressure 101325 Pa  
 Air Density 1.2000 kg/m<sup>3</sup>  
 Air Volume Flow 2310.00 m<sup>3</sup>/h  
 Eco Design Class Eco Design



## Recovery Additional Info

PlateExchangers

### Plug-Fan Set

#### Fan Section PLUG\_DD\_250\_0,70\_1.58

EC_IE4_F_IMB14_71_1.58p_T	771.3.570	250 0.7kW 1.58x1
		Qty in section x 1

Fan Set Designed for wet operating conditions

The fan system effects is taken into account in the fan performances.

#### Fan PLUG\_VS\_250\_AF\_Px 1

Total Static Pressure	638 Pa	Impeller efficiency: Static / Total	67 %/75 %
Dynamic pressure	78 Pa	Shaft power	0.61 kW x 1
External pressure	300 Pa	Working revolutions	3688 1/min
Total Pressure	716 Pa		
<b>Winter operation</b>		<b>Summer operation</b>	
Air Volume Flow	2310.00 m³/h	Air Volume Flow	2310.00 m³/h

#### Motor EC\_IE4\_F\_71\_IMB14\_1.58p\_0.7\_50x 1

771.3.570	EC	50Hz
		Rated revolutions 4000 1/min
Operational Voltage	230 V/1 ph	Rated Power 0.70 kW x 1
Name plate RPM	230 V/1 ph/50 Hz	

#### EC Motor Controller

EC Controller Settings 46 Hz

#### Winter operation

EPC for mean contaminated filters	0.70 kW
EPC for clean filters	0.67 kW
SFP for clean filters	1.05 kW/m³/s

#### Summer operation

EPC for mean contaminated filters	0.74 kW
EPC for clean filters	0.71 kW
SFP for clean filters	1.11 kW/m³/s

#### Fan Section Power Supply Additional Info

C20/3

### + Hot Water Coil

**Type** WCL VVS021c 1R DT SH.St.St.Std **Number of rows** 1 **Connection Supply/Return:** 1"/1"

Standard Circuits	1,29 [dm <sup>3</sup> ]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	15.5 °C / 6 %	Discharge air DBT / RH	20.0 °C / 4 %
Air velocity	2.61 m/s	Pressure drop Wet / Dry Wet	28 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m <sup>3</sup>
Air Volume Flow	2310.00 m <sup>3</sup> /h		
Total heating capacity	3.5 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.15 m <sup>3</sup> /h	Medium pressure drop	0.43 kPa

### Acoustic data

Acoustic power level [dB(A)]	Frequency	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Lw [dB(A)]
Inlet	[dB(A)]	55.1	61.2	59.1	54.0	50.5	54.1	51.2	65.1
Outlet	[dB(A)]	54.2	61.2	46.5	51.3	45.1	43.3	38.6	62.6
Environment	[dB(A)]	38.3	49.6	47.6	41.9	34.2	26.7	13.1	52.4

Acoustic pressure level at 1 meter distance [dB(A)]	Frequency	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Lp [dB(A)]
	[dB(A)]	31.3	42.6	40.6	34.9	27.2	19.7	6.1	45.4

### Exhaust airflow 3

### Panel Filter

**Type** M5/50.EU5MPleat.Int.Sld

ePM10 40% - ISO 16890 - EFF CLASS E Flat Mini-Pleat Filter[26.0]

Filter Energy Performance Class E

#### Winter operation

50% Dirty Air Pressure Drop	106 Pa
Initial Air Pressure Drop	62 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.01 m/s

#### Summer operation

50% Dirty Air Pressure Drop	106 Pa
Initial Air Pressure Drop	62 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.01 m/s

#### Air Filter Sizes

P.FLT (1-2-0301-0201) 2,000 x Pcs

### Plug-Fan Set

**Fan Section** PLUG\_DD\_250\_0,70\_1.58

EC\_IE4\_F\_IMB14\_71\_1.58p\_T 771.3.570 250|0.7kW|1.58x1

Qty in section x 1

Fan Set Designed for wet operating conditions

The fan system effects is taken into account in the fan performances.



### Fan PLUG\_VS\_250\_AF\_Px 1

Total Static Pressure	631 Pa	Impeller efficiency: Static / Total	67 %/75 %
Dynamic pressure	78 Pa	Shaft power	0.60 kW x 1
External pressure	300 Pa	Working revolutions	3680 1/min
Total Pressure	709 Pa		
<b>Winter operation</b>		<b>Summer operation</b>	
Air Volume Flow	2310.00 m³/h	Air Volume Flow	2310.00 m³/h

### Motor EC\_IE4\_F\_71\_IMB14\_1.58p\_0.7\_50x 1

771.3.570	EC	50Hz	
		Rated revolutions	4000 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.70 kW x 1
Name plate RPM	230 V/1 ph/50 Hz		

### EC Motor Controller

EC Controller Settings	46 Hz
------------------------	-------

<b>Winter operation</b>		<b>Summer operation</b>	
EPC for mean contaminated filters	0.70 kW	EPC for mean contaminated filters	0.70 kW
EPC for clean filters	0.66 kW	EPC for clean filters	0.66 kW
SFP for clean filters	1.03 kW/m³/s	SFP for clean filters	1.03 kW/m³/s

### Fan Section Power Supply Additional Info

C20/3

### Acoustic data

Acoustic power level [dB(A)]	Frequency	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Lw [dB(A)]
Inlet	[dB(A)]	50.6	63.9	69.8	70.2	68.5	63.1	57.5	75.1
Outlet	[dB(A)]	53.3	66.6	72.5	72.9	71.2	66.7	61.1	77.9
Environment	[dB(A)]	38.3	49.6	47.5	41.9	34.2	26.7	13.1	52.4

Acoustic pressure level at 1 meter distance [dB(A)]	Frequency	125 [Hz]	250 [Hz]	500 [Hz]	1000 [Hz]	2000 [Hz]	4000 [Hz]	8000 [Hz]	Lp [dB(A)]
	[dB(A)]	31.3	42.6	40.5	34.9	27.2	19.7	6.1	45.4

### AHU Discharge and intake Opening Sizes & Unit Accessories

#### Supply

#### Exhaust

Controls Selection Mode: Functional set

AHU Discharge and Intake Opening Sizes	Supply	Exhaust
Air Inlet	Front 861x348	Front 861x348
Air Outlet	Front 861x348	Front 861x348
AirDamper	Supply	Exhaust
Air Inlet	Provided	Not Provided
Air Outlet	Not Provided	Provided



Flexible Connection	Supply	Exhaust
Air Inlet	Provided	Provided
Air Outlet	Provided	Provided

### Control application

#### Functional Code

Functional Code: AP|1|0|0|0|0|0|0|6|3|0|0|0|0|0|1

APP Code: uPC3 (AP-161)

Main Temp. Sensor: Duct Exhaust

#### Human Machine Interface Options

BMS	Yes	Differential Pressure Transducer	CAV
HMI Advanced (Settings)	Yes		
HMI Basic (User)	Yes		
Control Box	Yes		

#### Air damper actuators

Name	Code	Set
Air Damper Actuator ON-OFF S 10Nm	ADMP.ACT.SET ON-OFF S 10Nm	1
Air Damper Actuator ON-OFF 10Nm	ADMP.ACT.SET ON-OFF 10Nm	1
Air Damper Actuator 0-10 2Nm	ADMP.ACT.SET 0-10 2Nm	1

#### Temperature sensor

Name	Code	Set
Resp_Controls_TempSensors_Temp. Sensor NTC10k (Outdoor)	Temp. Sensor NTC10k (Outdoor)	3
Duct temperature sensor NTC 10k	Temp. Sensor NTC10k (Duct)	1
Strap-on temperature sensor NTC 10k	Temp. Sensor NTC10k (Strap-on)	1

#### Hydronic Coils Controls

Name	Code	Set
3-way Valve	VLV.SET-3W-2,5	1

#### Transducers and Switches

Name	Code	Set
Frost Switch	FRST.SWITCH	1
Differential Pressure Transducer CAV	PRSS.TRDC_CAV	1

### AHU Connection Box

#### AHU Connection Box

Rated Power	1.40 kW	Full Load Amps	19.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 2,50 mm <sup>2</sup>

### DECLARATION OF PERFORMANCE - Product information - (EU) 1253/2014 annex V as referred to in art. 4(2)

No.	Parameter	Unit	Value
1	Manufacturer's name		VTS sp. z o.o.
2	Manufacturer's product code		VVS021c-F-P-V-H
3	Declared type		NRVU, BVU
4	Type of drive installed		VFD(AC) or Controller(EC)
5	Type of energy recovery		Other
6	Thermal efficiency of heat recovery	%	80.00





7	Nominal NRVU flow rate		0.64 / 0.64
8	Effective electric power input	kW	0.70 / 0.70
9	Internal Specific Fan Power (SFPint)	w/m³/s	475.39 / 493.80
10	Face velocity	m/s	2.01
11	Nominal external pressure	Pa	300.00 / 300.00
12	Internal Pressure Drop of ventilation components $\Delta p_{s,int}$	Pa	276.27 / 286.39
13	Internal pressure drop of non-ventilation components $\Delta p_{s,add}$	Pa	62.05 / 44.69
14	Maximum Leakage Rate	%	0.01 / 0.01
15	Energy performance of filters (declared information about the calculated annual energy consumption)		EU7MPleat / F7 / - / EU5MPleat / M5 / -
16	Description of visual filter warning for NRVUs		Supported by control application
17	Casing sound power level LWA	dBA	52
18	Internet address for disassembly instructions		<a href="http://www.vtsgroup.com">http://www.vtsgroup.com</a>
19	Ecodesign Compliance		Yes (2018 +)

### Section splits

Transport Sections	Mass [Kg]	LENGTH [mm]	WIDTH [mm]	HEIGHT [mm]
1	49	450	967	540
2	197	1599	967	990
3	39	450	967	540
4	32	311	967	540

Transport Sections Dims

