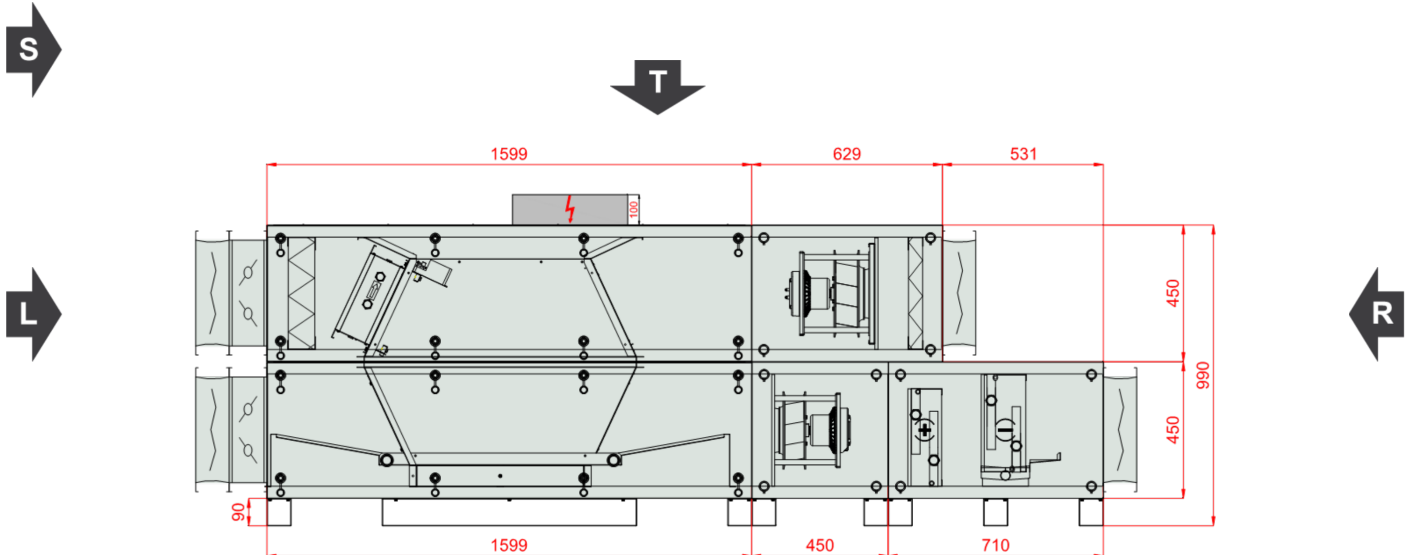


Type	RecoveryHexVerticalCompact
Unit Type:	Indoor
Project Tag	13577217
Size	VVS021c
Set	VVS021c-R-FPVHC/VVS021c-L-FVP_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	397 Kg
Supply airflow 2	2310.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	2310.00 m³/h
External pressure	300 Pa
SFP Winter	2.23 kW/m³/s
SFP Summer	2.30 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	A+ 2016



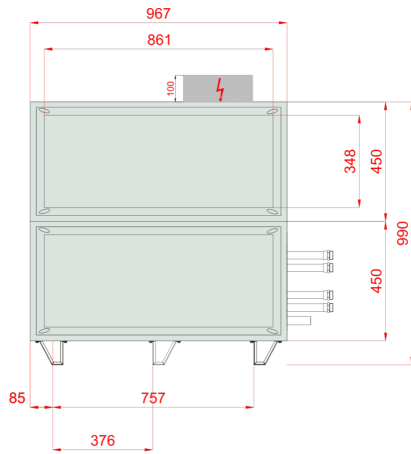
Inspection Panels



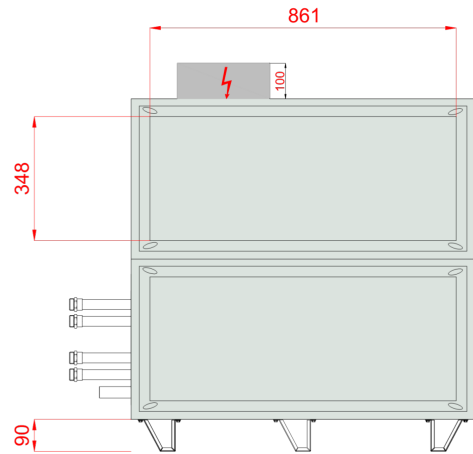
Comment 1:



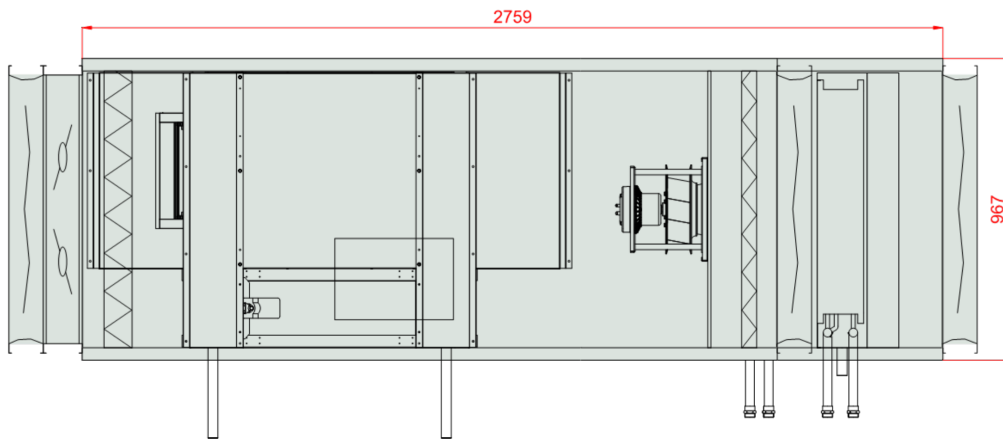
Front View (left)



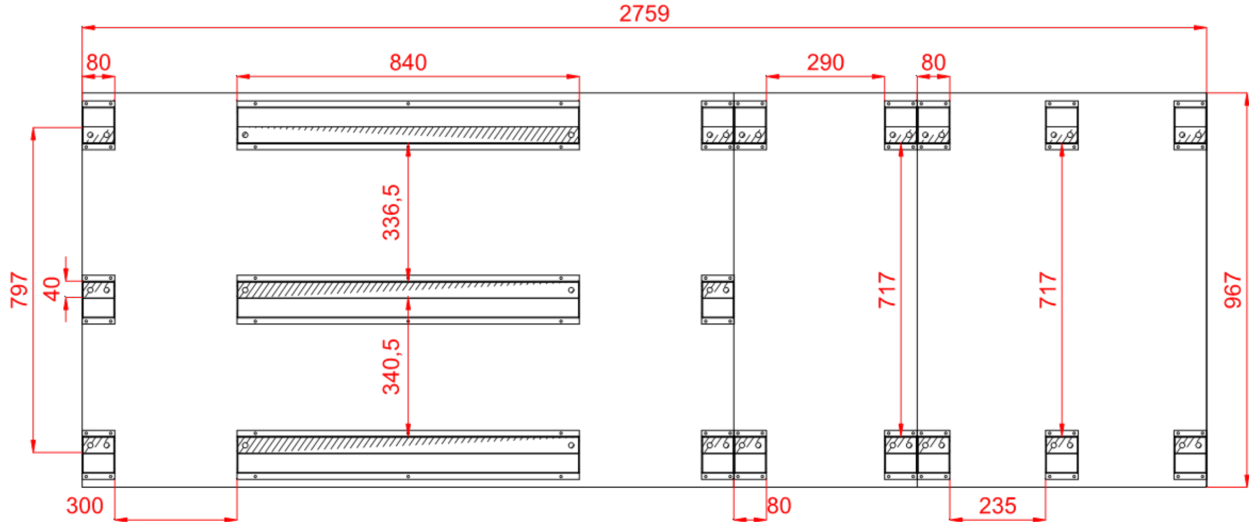
Front View (right)



Top View



Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply FF	861x348	Lt 2759	Hi 370	Wi 887
Air outlet Supply FF	861x348	LtA 3104	H 540	W 967
Air inlet Exhaust FF	861x348	L1 2759	H2 990	
Air outlet Exhaust FF	861x348	L22 531	Hf 90	

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/m ³	20.0 °C	65 %	1.2000 kg/m ³
Winter	-20.0 °C	100 %	1.2000 kg/m ³	20.0 °C	40 %	1.2000 kg/m ³

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/m³
 Air Volume Flow 2310.00 m³/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/m³
 Air Volume Flow 2310.00 m³/h
 Recovery Bypass Yes
 Air Damper Yes

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/m³
 Air Volume Flow 2310.00 m³/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/m³
 Air Volume Flow 2310.00 m³/h
 Eco Design Class Eco Design



Recovery Additional Info

PlateExchangers

Plug-Fan Set

Fan Section PLUG_DD_225_0,74_1.33

EC_IE4_F_IMB14_71_1.33p_T 771.3.570-2 225|0.74kW|1.33x2

Qty in section x 2

Fan Set Designed for wet operating conditions

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

Fan PLUG_VS_225_AF_Px 2

Total Static Pressure	774 Pa	Impeller efficiency: Static / Total	71 %/74 %
Dynamic pressure	31 Pa	Shaft power	0.35 kW x 2
External pressure	300 Pa	Working revolutions	3589 1/min
Total Pressure	804 Pa		
Winter operation		Summer operation	
Air Volume Flow	2310.00 m³/h	Air Volume Flow	2310.00 m³/h

Motor EC_IE4_F_71_IMB14_1.33p_0.74_50x 2

771.3.570-2 EC 50Hz

Rated revolutions 4500 1/min

Operational Voltage 230 V/1 ph Rated Power 0.74 kW x 2

Name plate RPM 230 V/1 ph/50 Hz

EC Motor Controller

EC Controller Settings 40 Hz

Winter operation		Summer operation	
EPC for mean contaminated filters	0.81 kW	EPC for mean contaminated filters	0.85 kW
EPC for clean filters	0.77 kW	EPC for clean filters	0.82 kW
SFP for clean filters	1.20 kW/m³/s	SFP for clean filters	1.27 kW/m³/s

Fan Section Power Supply Additional Info

C20/3

+ Hot Water Coil

Type WCL VVS021c 2R DT SH.St.St.Std **Number of rows** 2 **Connection Supply/Return:** 1"/1"

Standard Circuits	1,77 [dm ³]		
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	2.67 m/s	Pressure drop Wet / Dry Wet	55 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m ³
Air Volume Flow	2310.00 m ³ /h		
Total heating capacity	3.5 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.15 m ³ /h	Medium pressure drop	0.36 kPa

- Chilled Water Coil

Type WCL VVS021c 3R DT SH.St.St.Std **Number of rows** 3 **Connection Supply/Return:** 1"/1"

Standard Circuits	3,2 [dm ³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	23.7 °C / 73 %	Discharge air DBT / RH	20.0 °C / 84 %
Air velocity	2.67 m/s	Pressure drop Wet / Dry Wet / Dry	107 Pa / 62 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m ³
Air Volume Flow	2310.00 m ³ /h		
Cooling capacity: Sensible / Total	3.0 kW/5.1 kW	Medium temperature: Inlet / Outlet	7.0 °C/12.0 °C
Medium flow rate	0.88 m ³ /h	Medium pressure drop	3.04 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)]	55.3	61.5	59.3	54.2	50.8	54.3	51.4	65.3
Outlet	[dB(A)]	52.6	59.7	44.9	48.8	40.9	34.5	29.8	60.9
Environment	[dB(A)]	38.5	49.9	47.8	42.1	34.5	26.9	13.3	52.7

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)]	31.5	42.9	40.8	35.1	27.5	19.9	6.3	45.7

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		

Winter operation

Air Volume Flow 2310.00 m³/h

Summer operation

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 0.66 kW
 SFP for clean filters 1.03 kW/m³/s

Summer operation

EPC for mean contaminated filters 0.70 kW
 EPC for clean filters 0.66 kW
 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
Air Damper	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 AP|1|1|0|0|0|0|0|6|3|0|0|0|0|1
 APP Code uPC3 (AP-165)
 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
Air Damper Actuator 0-10 10Nm	ADMP.ACT.SET 0-10 10Nm	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
3-way Valve	VLV.SET-3W-4	1

Transducers and Switches

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

AHU Connection Box

AHU Connection Box

Rated Power	2.18 kW	Full Load Amps	19.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 2,50 mm ²

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-C
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	0.81 / 0.70
9	Internal Specific Fan Power (SFPint)	w/m ³ /s	450.69 / 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 Δps,int	Pa	276.27 / 286.39
13	Internal pressure drop of non-ventilation components Δps,add	Pa	197.33 / 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	53
18	Internet address for disassembly instructions		http://www.vtsgroup.com
19	Ecodesign Compliance		Yes (2018 +)



Section splits

Transport Sections	Mass [Kg]	LENGTH [mm]	WIDTH [mm]	HEIGHT [mm]
1	203	1599	967	990
2	47	450	967	540
3	64	710	967	540
4	50	629	967	450

Transport Sections Dims

