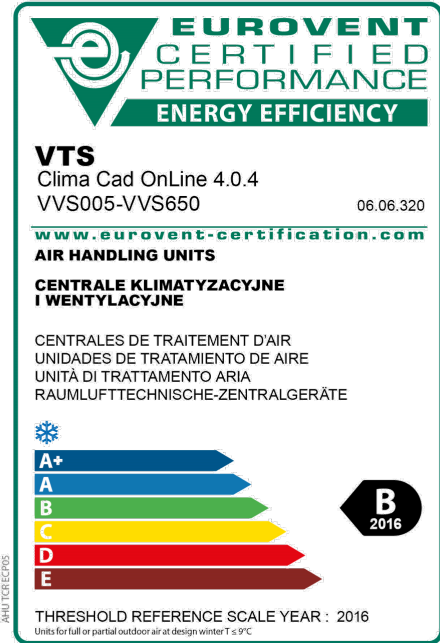
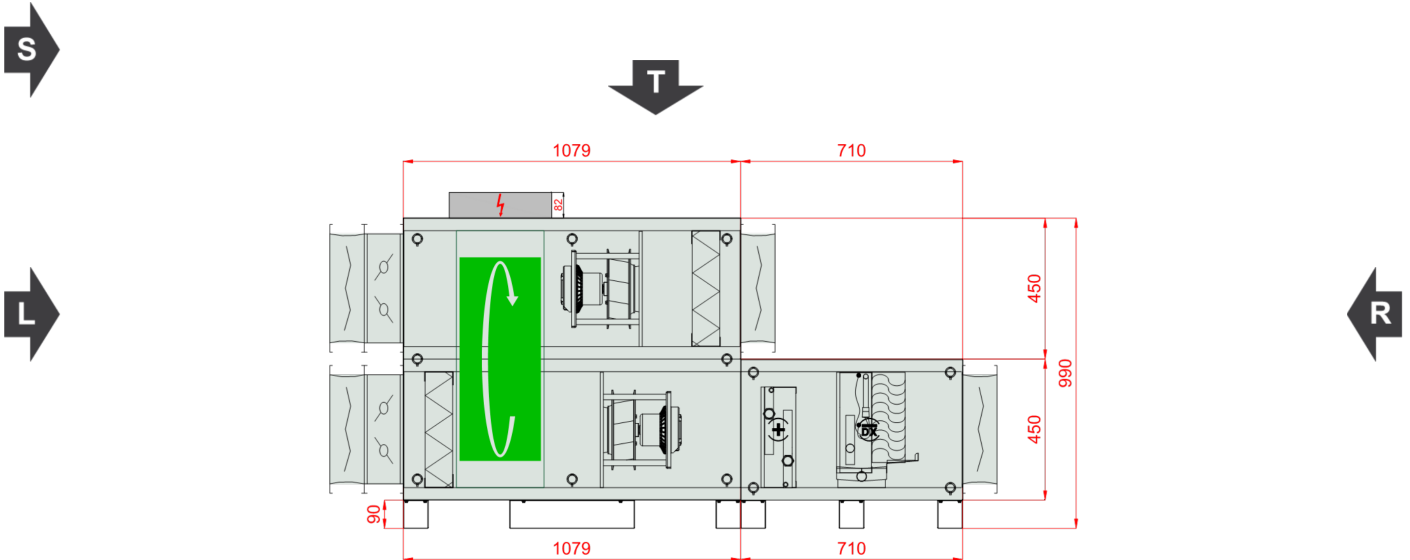


Type	RecoveryRotaryVerticalCompact
Unit Type:	Indoor
Project Tag	13577233
Size	VVS021c
Set	VVS021c-R-FRVHC/VVS021c-L-FVR_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	309 Kg
Supply airflow 2	2730.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	2730.00 m³/h
External pressure	300 Pa
SFP Winter	2.32 kW/m³/s
SFP Summer	2.39 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	B 2016



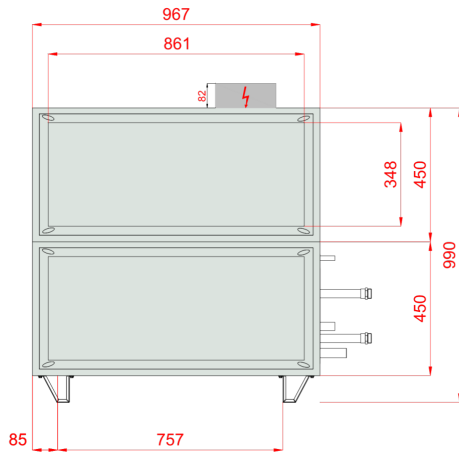
Inspection Panels



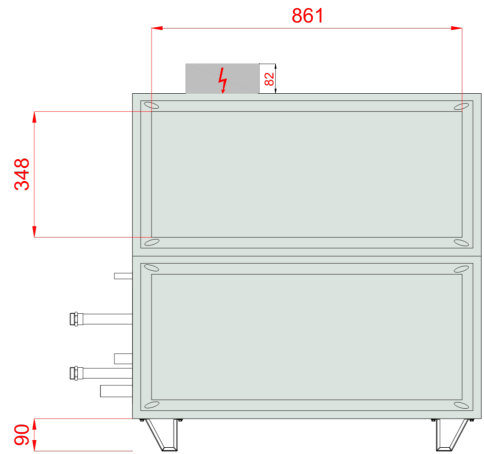
Comment 1:



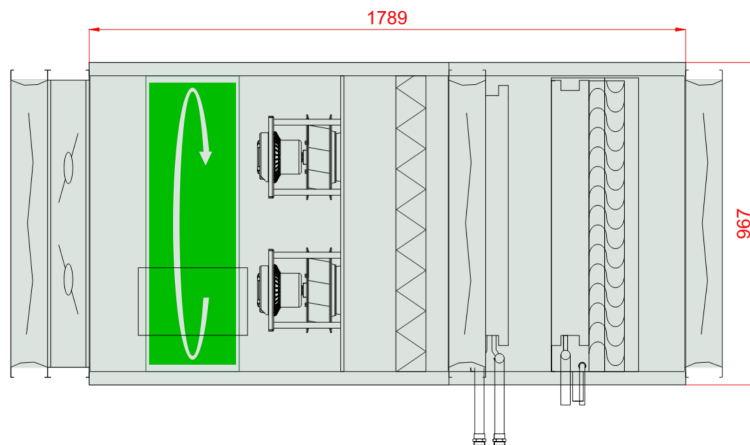
Front View (left)



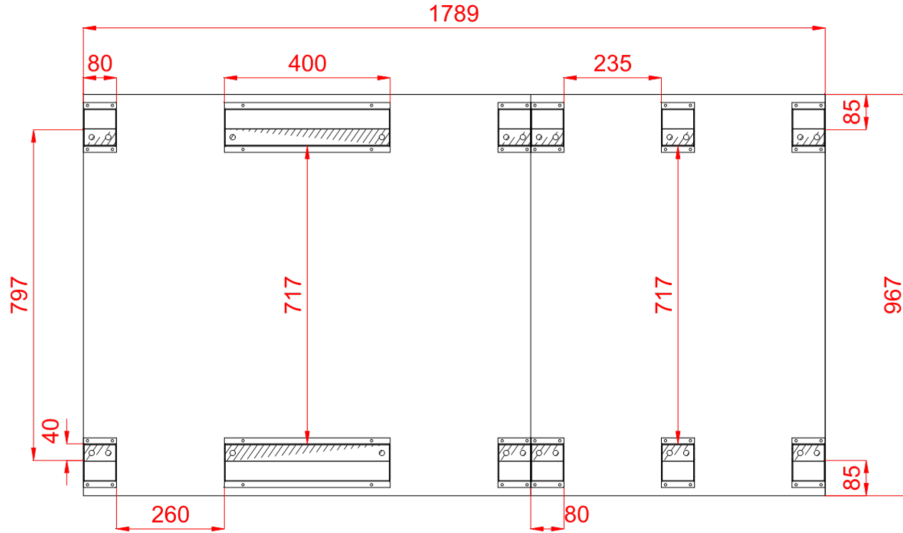
Front View (right)



Top View



Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply FF	861x348	Lt 1789	Hi 370	Wi 887
Air outlet Supply FF	861x348	LtA 2134	H 540	W 967
		L1 1789	H2 990	
Air inlet Exhaust FF	861x348	L2 1079	Hf 90	
Air outlet Exhaust FF	861x348	L22 710		

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 133 Pa
 Initial Air Pressure Drop 115 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.37 m/s

Summer operation

50% Dirty Air Pressure Drop 133 Pa
 Initial Air Pressure Drop 115 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.37 m/s

Air Filter Sizes

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



Rotary Wheel

Type RRG VVS021c NHG

R2_SR_NHG

Rated voltage 230 V/1 ph/50 Hz

Winter operation

Supply

Intake air DBT / RH -20.0 °C / 100 %

Discharge air DBT / RH 9.3 °C / 52 %

Air velocity 4.01 m/s

Pressure drop Wet / Dry Wet / Dry 216 Pa / 252 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 2730.00 m³/h

Recovery capacity Sensible / Total
Sensible / Total 26.8 kW / 34.2 kW

Actual efficiency / at balanced flow Real /
BalancedFlow 73 % / 73 %

Dry efficiency in winter 74 %

Winter operation

Exhaust

Intake air DBT / RH 20.0 °C / 40 %

Discharge air DBT / RH -7.6 °C / 95 %

Air velocity 4.01 m/s

Pressure drop Wet / Dry Wet / Dry 251 Pa / 252 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 2730.00 m³/h

Recovery Bypass No

Rotary Regenerator

Max Internal Leakage 3%

Summer operation

Supply

Intake air DBT / RH 32.0 °C / 45 %

Discharge air DBT / RH 23.2 °C / 75 %

Air velocity 4.01 m/s

Pressure drop Wet / Dry Wet / Dry 262 Pa / 252 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 2730.00 m³/h

Recovery capacity Sensible / Total
Sensible / Total 8.1 kW / 8.1 kW

Actual efficiency / at balanced flow Real 74 %

Summer operation

Exhaust

Intake air DBT / RH 20.0 °C / 65 %

Discharge air DBT / RH 29.0 °C / 38 %

Air velocity 4.01 m/s

Pressure drop Wet / Dry Wet / Dry 251 Pa / 252 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 2730.00 m³/h

Eco Design Class

Eco Design

Recovery Additional Info

RotaryExchangers

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	805 Pa	Impeller efficiency: Static / Total	71 %/75 %
Dynamic pressure	43 Pa	Shaft power	0.43 kW x 2
External pressure	300 Pa	Working revolutions	3830 1/min
Total Pressure	849 Pa		
Winter operation		Summer operation	
Air Volume Flow	2730.00 m³/h	Air Volume Flow	2730.00 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	43 Hz
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Winter operation		Summer operation	
EPC for mean contaminated filters	0.99 kW	EPC for mean contaminated filters	1.05 kW
EPC for clean filters	0.97 kW	EPC for clean filters	1.02 kW
SFP for clean filters	1.28 kW/m³/s	SFP for clean filters	1.35 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 [dm³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	9.3 °C / 52 %	Discharge air DBT / RH	20.0 °C / 26 %
Air velocity	3.11 m/s	Pressure drop Wet / Dry Wet	72 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	2730.00 m³/h		
Total heating capacity	9.8 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.42 m³/h	Medium pressure drop	1.24 kPa



DX Cooling Coil w/ Droplet Eliminator

Type DXC VVS021c 2R-1 TD SH.Cu.St.Std	Number of rows 2	Sections 1	Connection Supply/Return: 5/8"/Ø28
	1,02 [dm ³]		DX VVS021c 2R-1 SH.Cu.St.Std 516
Medium	R410A	Maximum working pressure	38 bar
Intake air DBT / RH	23.2 °C / 75 %	Discharge air DBT / RH	20.0 °C / 83 %
Air velocity	3.45 m/s	Pressure drop Wet / Dry Wet / Dry	83 Pa / 43 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m ³
Air Volume Flow	2730.00 m ³ /h		
Cooling capacity: Sensible / Total	3.0 kW/5.8 kW	Evaporation temperature	6.0 °C
Medium flow rate	0.10 m ³ /h		

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)]	49.9	62.3	67.4	66.8	63.3	57.0	50.5	71.7
Outlet	[dB(A)]	51.7	58.7	43.1	47.0	36.3	24.6	18.1	59.9
Environment	[dB(A)]	39.4	50.7	48.7	43.0	35.3	27.8	14.2	53.5

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)]	32.4	43.7	41.7	36.0	28.3	20.8	7.2	46.5

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 118 Pa
 Initial Air Pressure Drop 87 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.37 m/s

Summer operation

50% Dirty Air Pressure Drop 118 Pa
 Initial Air Pressure Drop 87 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.37 m/s

Air Filter Sizes

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

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	670 Pa	Impeller efficiency: Static / Total	71 %/76 %
Dynamic pressure	43 Pa	Shaft power	0.36 kW x 2
External pressure	300 Pa	Working revolutions	3621 1/min
Total Pressure	714 Pa		

Winter operation

Air Volume Flow 2730.00 m³/h

Summer operation

Air Volume Flow 2730.00 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

EPC for mean contaminated filters 0.83 kW
 EPC for clean filters 0.79 kW
 SFP for clean filters 1.04 kW/m³/s

Summer operation

EPC for mean contaminated filters 0.83 kW
 EPC for clean filters 0.79 kW
 SFP for clean filters 1.04 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)]	50.4	63.8	69.7	70.0	68.3	62.9	57.3	74.9
Outlet	[dB(A)]	53.1	66.5	72.4	72.7	71.0	66.5	60.9	77.7
Environment	[dB(A)]	38.1	49.5	47.4	41.7	34.0	26.5	12.9	52.2

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)]	31.1	42.5	40.4	34.7	27.0	19.5	5.9	45.2



AHU Discharge and Intake Opening Sizes & Accessories	Supply	Exhaust
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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 AR|1|2|0|0|0|0|0|6|3|0|0|0|0|0|1
APP Code uPC3 (AR-137)
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

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-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	2.96 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-R-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	%	74.00
7	Nominal NRVU flow rate		0.76 / 0.76
8	Effective electric power input	kW	0.99 / 0.83
9	Internal Specific Fan Power (SFPint)	w/m³/s	536.88 / 548.59
10	Face velocity	m/s	2.37
11	Nominal external pressure	Pa	300.00 / 300.00
12	Internal Pressure Drop of ventilation components $\Delta ps, int$	Pa	331.32 / 337.80
13	Internal pressure drop of non-ventilation components $\Delta ps, add$	Pa	174.08 / 32.66
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	54
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	216	1079	967	990
2	65	710	967	540

Transport Sections Dims

