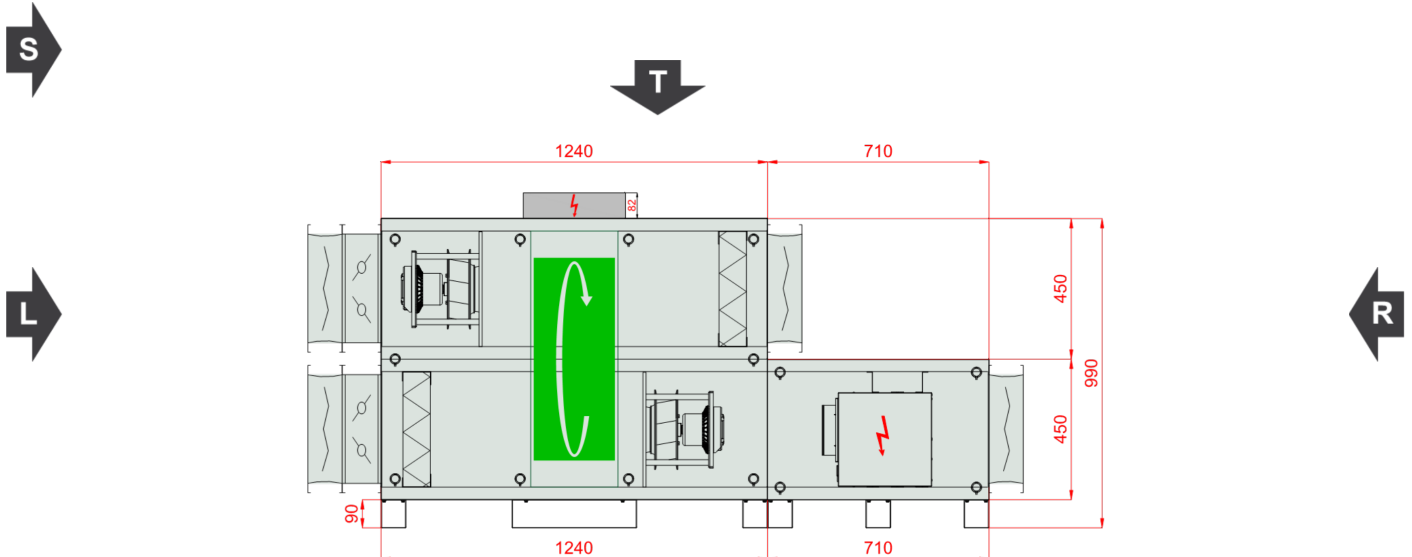


<b>Type</b>	RecoveryRotaryVerticalCompact
<b>Unit Type:</b>	Indoor
<b>Project Tag</b>	13577159
<b>Size</b>	VVS021c
<b>Set</b>	VVS021c-R-FRVH/VVS021c-L-FRV_cd
<b>Insulation thickness</b>	40 mm
<b>Insulation</b>	Mineral Wool
<b>Weight of the set (+/- 10%)*</b>	299 Kg
<b>Supply airflow 2</b>	2730.00 m³/h
<b>External pressure</b>	300 Pa
<b>Exhaust airflow 2</b>	2730.00 m³/h
<b>External pressure</b>	300 Pa
<b>SFP Winter</b>	2.25 kW/m³/s
<b>SFP Summer</b>	2.33 kW/m³/s
<b>Ecodesign</b>	Yes (2018 +)
<b>Eurovent Energy efficiency class (Winter 2016 / Summer 2020)</b>	B 2016



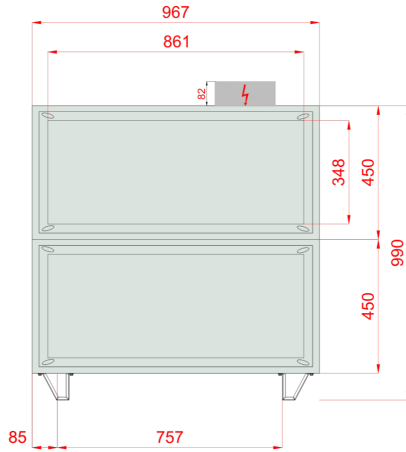
**Inspection Panels**



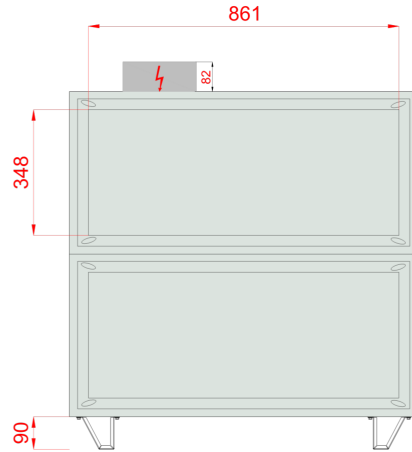
Comment 1:



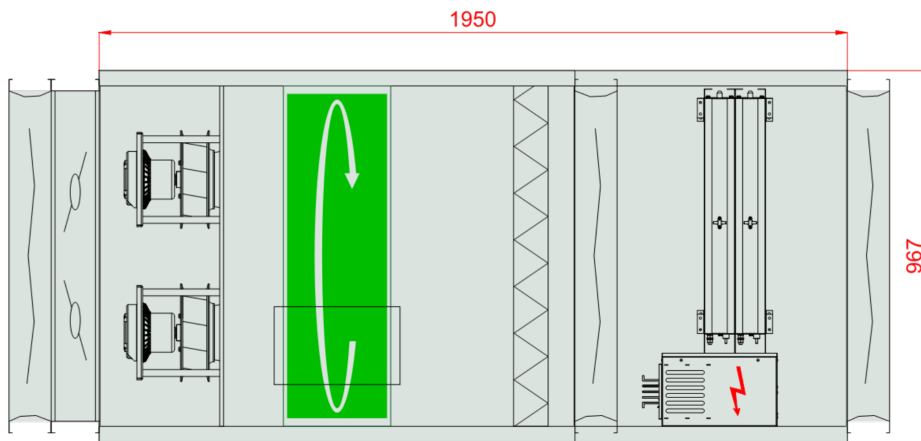
Front View (left)



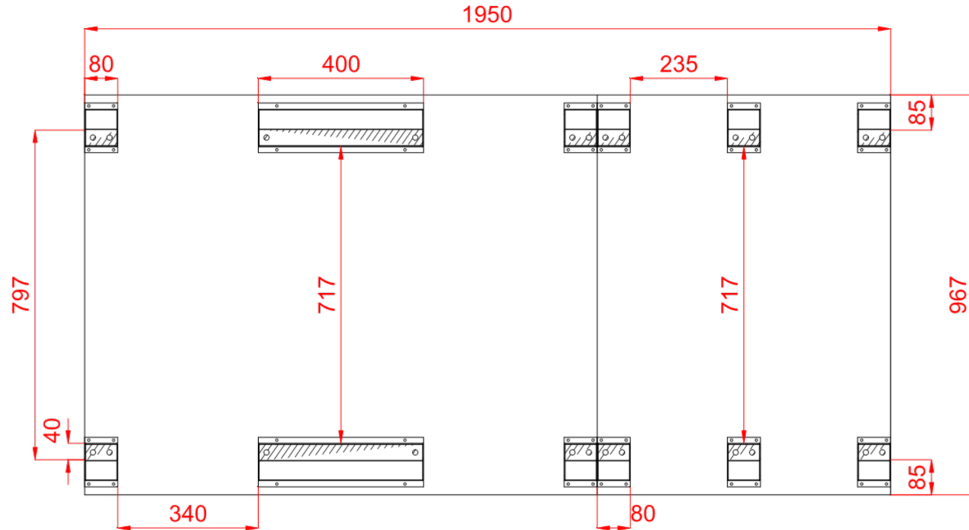
Front View (right)



Top View



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



**Sizes [mm]**

<b>Air intake Supply</b> FF	861x348	<b>Lt</b> 1950	<b>Hi</b> 370	<b>Wi</b> 887
<b>Air outlet Supply</b> FF	861x348	<b>LtA</b> 2295	<b>H</b> 540	<b>W</b> 967
		<b>L1</b> 1950	<b>H2</b> 990	
<b>Air inlet Exhaust</b> FF	861x348	<b>L2</b> 1240	<b>Hf</b> 90	
<b>Air outlet Exhaust</b> FF	861x348	<b>L22</b> 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/m <sup>3</sup>	20.0 °C	65 %	1.2000 kg/m <sup>3</sup>
Winter	-20.0 °C	100 %	1.2000 kg/m <sup>3</sup>	20.0 °C	40 %	1.2000 kg/m <sup>3</sup>



**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/m<sup>3</sup>

Air Volume Flow 2730.00 m<sup>3</sup>/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/m<sup>3</sup>

Air Volume Flow 2730.00 m<sup>3</sup>/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/m<sup>3</sup>

Air Volume Flow 2730.00 m<sup>3</sup>/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/m<sup>3</sup>

Air Volume Flow 2730.00 m<sup>3</sup>/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	767 Pa	Impeller efficiency: Static / Total	71 %/75 %
Dynamic pressure	43 Pa	Shaft power	0.41 kW x 2
External pressure	300 Pa	Working revolutions	3770 1/min
Total Pressure	810 Pa		
<b>Winter operation</b>		<b>Summer operation</b>	
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	42 Hz
------------------------	-------

<b>Winter operation</b>		<b>Summer operation</b>	
EPC for mean contaminated filters	0.94 kW	EPC for mean contaminated filters	1.00 kW
EPC for clean filters	0.92 kW	EPC for clean filters	0.98 kW
SFP for clean filters	1.21 kW/m³/s	SFP for clean filters	1.29 kW/m³/s

**Fan Section Power Supply Additional Info**

C20/3

**⊕ Electric heater in casing**

**Type VVS021c-6,00kW-400/3/50-RES**      **Version N3\_400\_3\_50\_FullControls\_RES\_NO**

Rated Electric Power	18.00 kW		
Intake air DBT / RH	9.3 °C / 52 %	Discharge air DBT / RH	20.0 °C / 26 %
Air velocity	5.42 m/s	Pressure drop Wet / Dry Wet	117 Pa
Air Volume Flow	2730.00 m³/h		
Heating capacity	9.8 kW		

**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)]	49.5	62.0	67.0	66.4	63.0	56.6	50.1	71.4
Outlet	[dB(A)]	53.1	66.5	72.4	71.8	70.2	63.8	58.2	77.1
Environment	[dB(A)]	39.0	50.4	48.3	42.6	35.0	27.4	13.8	53.2

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)]	32.0	43.4	41.3	35.6	28.0	20.4	6.8	46.2



### 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		
<b>Winter operation</b>		<b>Summer operation</b>	
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 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 & 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**

<b>Functional Code</b>	AR 3 0 0 0 0 0 0 6 3 0 0 0 0 0 1		
<b>APP Code</b>	uPC3 (AR-130)		
<b>Main Temp. Sensor</b>	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 10Nm	ADMP.ACT.SET ON-OFF 10Nm	2





#### 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

#### Transducers and Switches

Name	Code	Set
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 <sup>2</sup>

##### TDS\_AHUPowerConnection\_ElectricHeaters

1 HP

##### TDS\_AHUPowerConnection\_Heaters

Rated Power	18.00 kW
Power Connection	400V+PE
Full Load Amps	26.0 A
TDS_AHUPowerConnection_MCA	32.5 A
TDS_AHUPowerConnection_CircuitBreaker	40.0 A
Power Cord	4 x 6,00 mm <sup>2</sup>

##### TDS\_AHUPowerConnection\_Controls

Rated Power	18.00 kW
Power Connection	230V+N+PE
Full Load Amps	0.2 A
Power Cord	3 x 0,75 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-R-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	%	74.00
7	Nominal NRVU flow rate		0.76 / 0.76
8	Effective electric power input	kW	0.94 / 0.83
9	Internal Specific Fan Power (SFPint)	w/m <sup>3</sup> /s	536.90 / 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 Δps,int	Pa	331.32 / 337.80
13	Internal pressure drop of non-ventilation components Δps,add	Pa	135.41 / 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	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	226	1240	967	990
2	48	710	967	540

Transport Sections Dims

