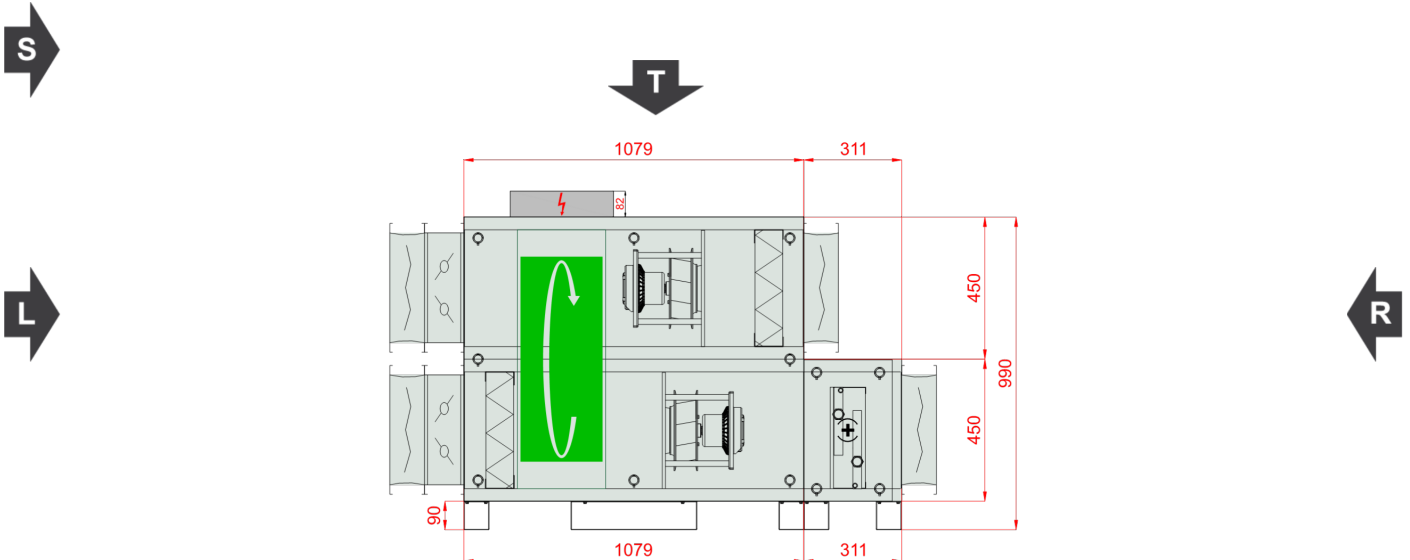


| | |
|---|---------------------------------|
| Type | RecoveryRotaryVerticalCompact |
| Unit Type: | Indoor |
| Project Tag | 13577197 |
| Size | VVS021c |
| Set | VVS021c-R-FRVH/VVS021c-L-FVR_cd |
| Insulation thickness | 40 mm |
| Insulation | Mineral Wool |
| Weight of the set (+/- 10%)* | 276 Kg |
| Supply airflow 2 | 2730.00 m³/h |
| External pressure | 300 Pa |
| Exhaust airflow 2 | 2730.00 m³/h |
| External pressure | 300 Pa |
| SFP Winter | 2.18 kW/m³/s |
| SFP Summer | 2.25 kW/m³/s |
| Ecodesign | Yes (2018 +) |
| Eurovent Energy efficiency class (Winter 2016 / Summer 2020) | B 2016 |



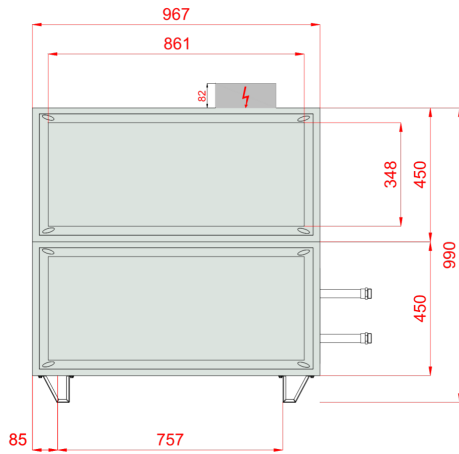
Inspection Panels



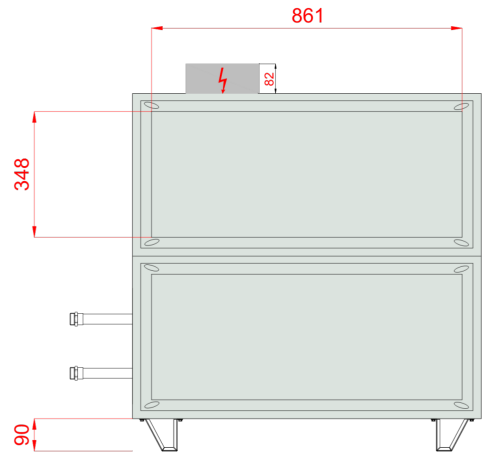
Comment 1:



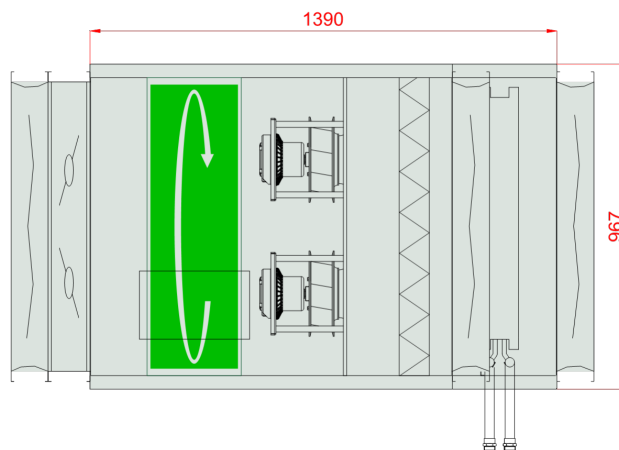
Front View (left)



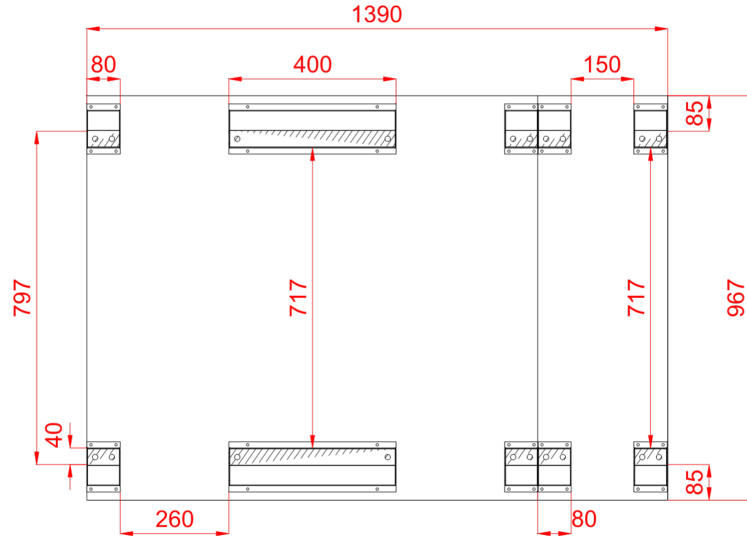
Front View (right)



Top View



Frame Top View, within the AHU outline contour



Sizes [mm]

| | | | | |
|------------------------------|---------|-----------------|---------------|---------------|
| Air intake Supply FF | 861x348 | Lt 1390 | Hi 370 | Wi 887 |
| Air outlet Supply FF | 861x348 | LtA 1735 | H 540 | W 967 |
| | | L1 1390 | H2 990 | |
| Air inlet Exhaust FF | 861x348 | L2 1079 | Hf 90 | |
| Air outlet Exhaust FF | 861x348 | L22 311 | | |

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 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 | 722 Pa | Impeller efficiency: Static / Total | 71 %/76 % |
| Dynamic pressure | 43 Pa | Shaft power | 0.38 kW x 2 |
| External pressure | 300 Pa | Working revolutions | 3701 1/min |
| Total Pressure | 765 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 | 41 Hz |
|------------------------|-------|

| | | | |
|-----------------------------------|--------------|-----------------------------------|--------------|
| Winter operation | | Summer operation | |
| EPC for mean contaminated filters | 0.89 kW | EPC for mean contaminated filters | 0.94 kW |
| EPC for clean filters | 0.87 kW | EPC for clean filters | 0.92 kW |
| SFP for clean filters | 1.14 kW/m³/s | SFP for clean filters | 1.22 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 |

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)] | 49.1 | 61.6 | 66.6 | 66.0 | 62.5 | 56.2 | 49.7 | 70.9 |
| Outlet | [dB(A)] | 54.5 | 61.6 | 46.8 | 51.6 | 45.4 | 43.6 | 38.9 | 62.9 |
| Environment | [dB(A)] | 38.6 | 50.0 | 47.9 | 42.2 | 34.5 | 27.0 | 13.4 | 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)] | 31.6 | 43.0 | 40.9 | 35.2 | 27.5 | 20.0 | 6.4 | 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 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 & 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 AR|1|0|0|0|0|0|0|6|3|0|0|0|0|1
 APP Code uPC3 (AR-129)
 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.SWITCH | 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 |
| 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 | 0.89 / 0.83 |
| 9 | Internal Specific Fan Power (SFPint) | w/m ³ /s | 537.22 / 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 | 90.63 / 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 | 216 | 1079 | 967 | 990 |
| 2 | 33 | 311 | 967 | 540 |

Transport Sections Dims

