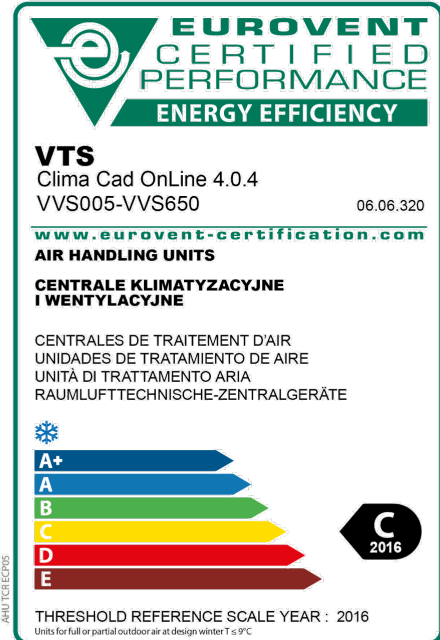
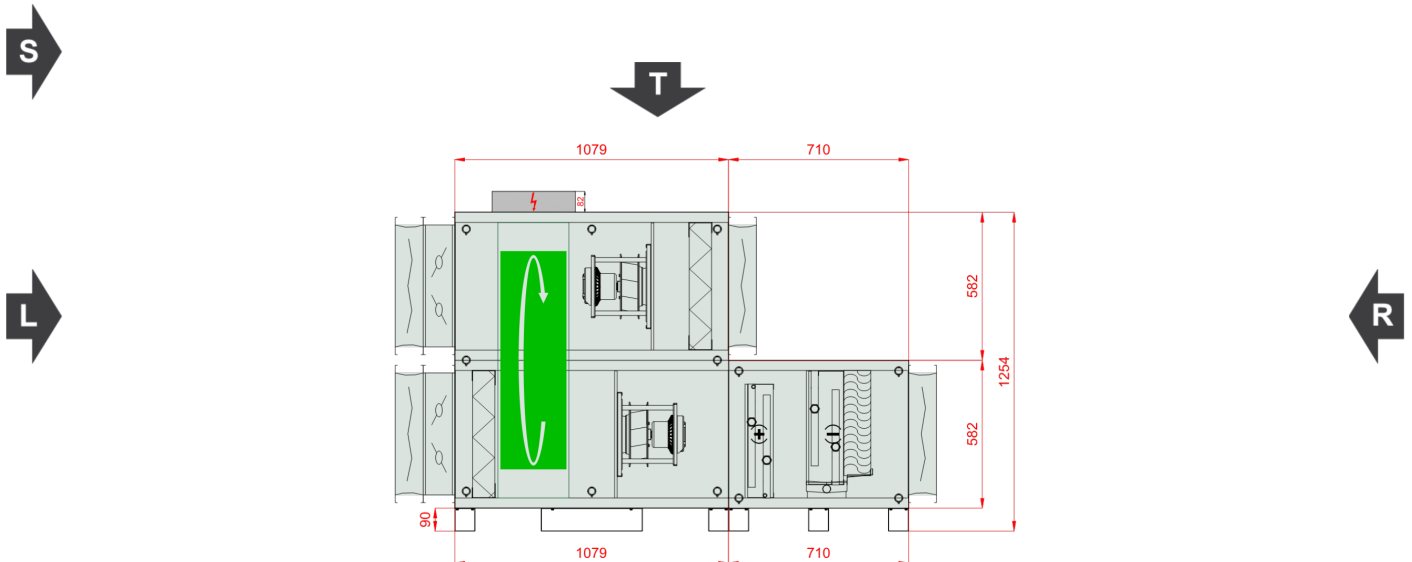


Type	RecoveryRotaryVerticalCompact
Unit Type:	Indoor
Project Tag	13577231
Size	VVS040c
Set	VVS040c-R-FRVHC/VVS040c-L-FVR_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	422 Kg
Supply airflow 2	5150.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	5150.00 m³/h
External pressure	300 Pa
SFP Winter	2.54 kW/m³/s
SFP Summer	2.61 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	C 2016



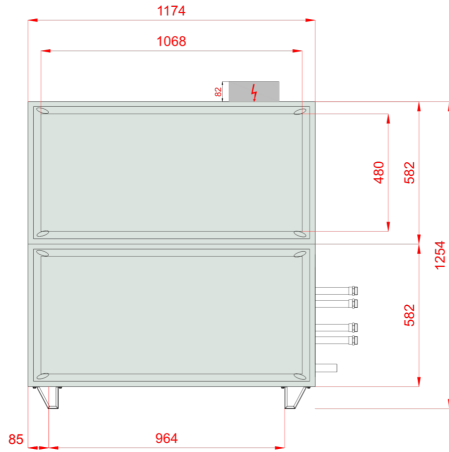
Inspection Panels



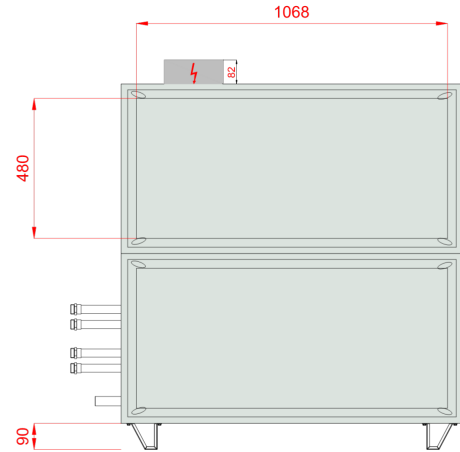
Comment 1:



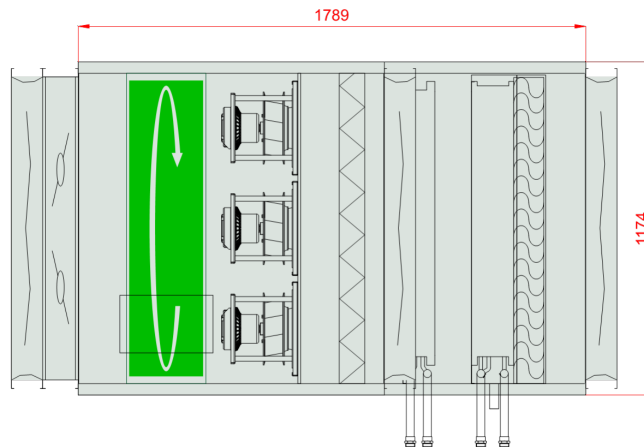
Front View (left)



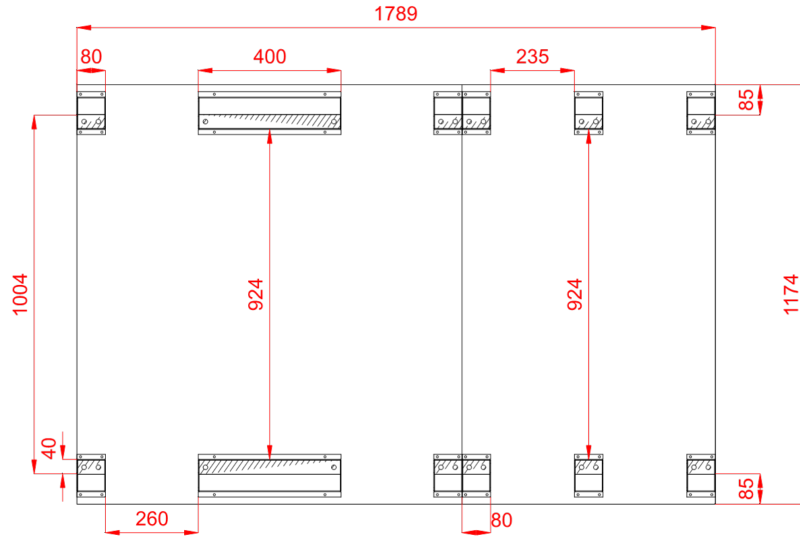
Front View (right)



Top View



Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply FF	1068x480	Lt 1789	Hi 502	Wi 1094
Air outlet Supply FF	1068x480	LtA 2134	H 672	W 1174
		L1 1789	H2 1254	
Air inlet Exhaust FF	1068x480	L2 1079	Hf 90	
Air outlet Exhaust FF	1068x480	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/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 147 Pa
 Initial Air Pressure Drop 144 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.65 m/s

Summer operation

50% Dirty Air Pressure Drop 147 Pa
 Initial Air Pressure Drop 144 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 2.65 m/s

Air Filter Sizes

P.FLT (1-2-0301-0215) 2,000 x Pcs



Rotary Wheel

Type RRG VVS040c 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 9.4 °C / 52 %

Air velocity 3.97 m/s

Pressure drop Wet / Dry Wet / Dry 214 Pa / 249 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 5150.00 m³/h

Recovery capacity Sensible / Total
Sensible / Total 50.7 kW / 64.5 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 3.97 m/s

Pressure drop Wet / Dry Wet / Dry 248 Pa / 249 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 5150.00 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 23.1 °C / 76 %

Air velocity 3.97 m/s

Pressure drop Wet / Dry Wet / Dry 259 Pa / 249 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 5150.00 m³/h

Recovery capacity Sensible / Total
Sensible / Total 15.3 kW / 15.3 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 3.97 m/s

Pressure drop Wet / Dry Wet / Dry 248 Pa / 249 Pa

Air Pressure 101325 Pa

Air Density 1.2000 kg/m³

Air Volume Flow 5150.00 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|1.33x3

Qty in section

x 3

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 3





Total Static Pressure	881 Pa	Impeller efficiency: Static / Total	71 %/76 %
Dynamic pressure	68 Pa	Shaft power	0.59 kW x 3
External pressure	300 Pa	Working revolutions	4330 1/min
Total Pressure	949 Pa		
Winter operation		Summer operation	
Air Volume Flow	5150.00 m³/h	Air Volume Flow	5150.00 m³/h

Motor EC_IE4_F_71_IMB14_1.33p_0.74_50x 3

771.3.570-2	EC	50Hz	
		Rated revolutions	4500 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.74 kW x 3
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

EC Controller Settings	48 Hz
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Winter operation		Summer operation	
EPC for mean contaminated filters	2.06 kW	EPC for mean contaminated filters	2.16 kW
EPC for clean filters	2.06 kW	EPC for clean filters	2.16 kW
SFP for clean filters	1.44 kW/m³/s	SFP for clean filters	1.51 kW/m³/s

Fan Section Power Supply Additional Info

C25/3

Hot Water Coil

Type WCL VVS040c 2R DT SH.St.St.Std		Number of rows 2	Connection Supply/Return: 1"/1"
Standard Circuits	3,25 [dm³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	9.4 °C / 52 %	Discharge air DBT / RH	20.0 °C / 26 %
Air velocity	3.15 m/s	Pressure drop Wet / Dry Wet	74 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	5150.00 m³/h		
Total heating capacity	18.5 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.80 m³/h	Medium pressure drop	1.08 kPa



Chilled Water Coil with Droplet Eliminator

Type WCL VVS040c 3R DT SH.St.St.Std Number of rows 3 Connection Supply/Return: 1"/1"

Standard Circuits	5,61 [dm ³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	23.1 °C / 76 %	Discharge air DBT / RH	20.0 °C / 84 %
Air velocity	3.19 m/s	Pressure drop Wet / Dry Wet / Dry	145 Pa / 79 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m ³
Air Volume Flow	5150.00 m ³ /h		
Cooling capacity: Sensible / Total	5.5 kW/10.1 kW	Medium temperature: Inlet / Outlet	7.0 °C/12.0 °C
Medium flow rate	1.74 m ³ /h	Medium pressure drop	6.00 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)]	53.5	66.0	71.0	70.5	67.0	60.7	54.1	75.4
Outlet	[dB(A)]	55.3	62.4	46.7	50.7	40.0	28.3	21.7	63.5
Environment	[dB(A)]	43.0	54.4	52.3	46.7	39.0	31.5	17.8	57.2

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)]	36.0	47.4	45.3	39.7	32.0	24.5	10.8	50.2

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	129 Pa
Initial Air Pressure Drop	108 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.65 m/s

Summer operation

50% Dirty Air Pressure Drop	129 Pa
Initial Air Pressure Drop	108 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.65 m/s

Air Filter Sizes

P.FLT (1-2-0301-0203) 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|1.33x3

Qty in section x 3

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 3

Total Static Pressure	679 Pa	Impeller efficiency: Static / Total	69 %/76 %
Dynamic pressure	68 Pa	Shaft power	0.47 kW x 3
External pressure	300 Pa	Working revolutions	4075 1/min
Total Pressure	747 Pa		
Winter operation		Summer operation	
Air Volume Flow	5150.00 m³/h	Air Volume Flow	5150.00 m³/h

Motor EC_IE4_F_71_IMB14_1.33p_0.74_50x 3

771.3.570-2	EC	50Hz	
		Rated revolutions	4500 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.74 kW x 3
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

EC Controller Settings	45 Hz
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Winter operation		Summer operation	
EPC for mean contaminated filters	1.63 kW	EPC for mean contaminated filters	1.63 kW
EPC for clean filters	1.58 kW	EPC for clean filters	1.58 kW
SFP for clean filters	1.11 kW/m³/s	SFP for clean filters	1.11 kW/m³/s

Fan Section Power Supply Additional Info

C25/3

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)]	54.0	67.4	73.3	73.6	72.0	66.5	60.9	78.6
Outlet	[dB(A)]	56.7	70.1	76.0	76.3	74.7	70.1	64.5	81.3
Environment	[dB(A)]	41.7	53.1	51.0	45.3	37.7	30.1	16.5	55.9

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)]	34.7	46.1	44.0	38.3	30.7	23.1	9.5	48.9

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 1068x480	Front 1068x480
Air Outlet	Front 1068x480	Front 1068x480
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 1 0 0 0 0 0 6 3 0 0 0 0 1
APP Code	uPC3 (AR-133)
Main Temp. Sensor	Duct Exhaust

Human Machine Interface

BMS	Yes
HMI Advanced (Settings)	Yes
HMI Basic (User)	Yes
Control Box	Yes

Options

Differential Pressure Transducer	CAV
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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-6,3	2

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	4.44 kW	Full Load Amps	22.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 4,00 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		VVS040c-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		1.43 / 1.43
8	Effective electric power input	kW	2.06 / 1.63
9	Internal Specific Fan Power (SFPint)	w/m³/s	585.69 / 598.05
10	Face velocity	m/s	2.65
11	Nominal external pressure	Pa	300.00 / 300.00
12	Internal Pressure Drop of ventilation components $\Delta ps, int$	Pa	357.71 / 356.65
13	Internal pressure drop of non-ventilation components $\Delta ps, add$	Pa	222.97 / 22.06
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	57
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	298	1079	1174	1254
2	95	710	1174	672

Transport Sections Dims

