VTS Polska Sp. z o.o.
Olivia Tower, Al. Grunwaldzka 472 A; 80-309 Gdansk;
Poland
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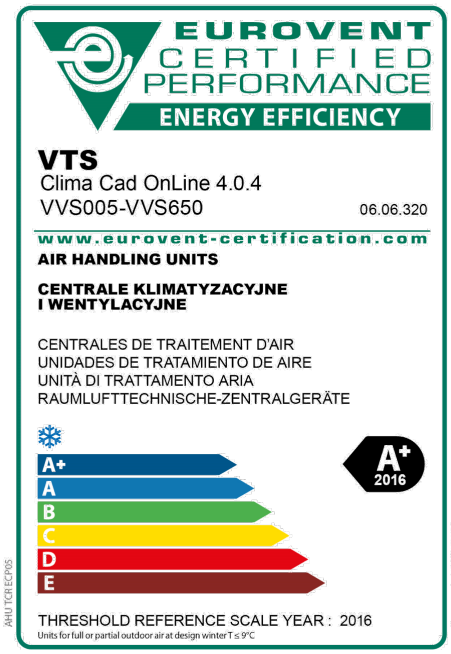
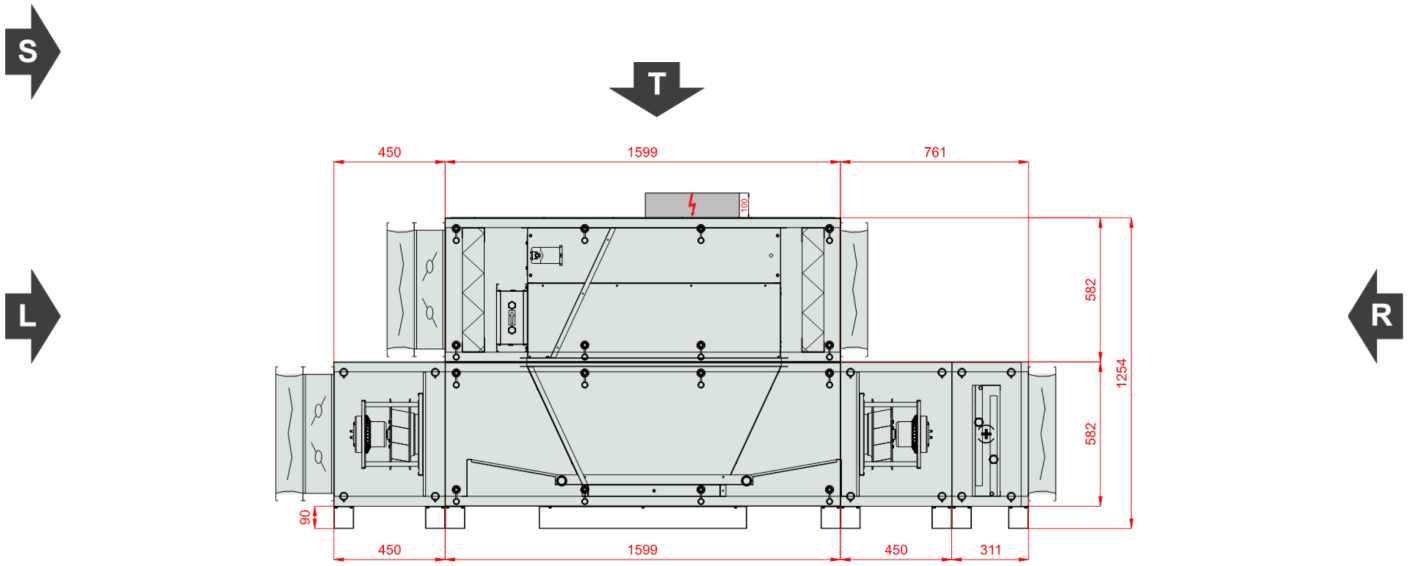
www.eshop@vtsgroup.com

Type	RecoveryHexVerticalCompact
Unit Type:	Indoor
Project Tag	13577192
Size	VVS040c
Set	VVS040c-R-FPVH/VVS040c-L-FPV_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	468 Kg
Supply airflow 2	4400.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	4400.00 m³/h
External pressure	300 Pa
SFP Winter	2.15 kW/m³/s
SFP Summer	2.21 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	A+ 2016



Inspection Panels



Comment 1:

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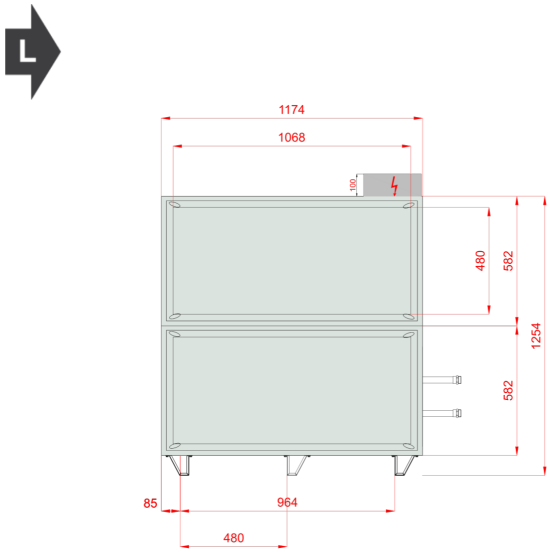
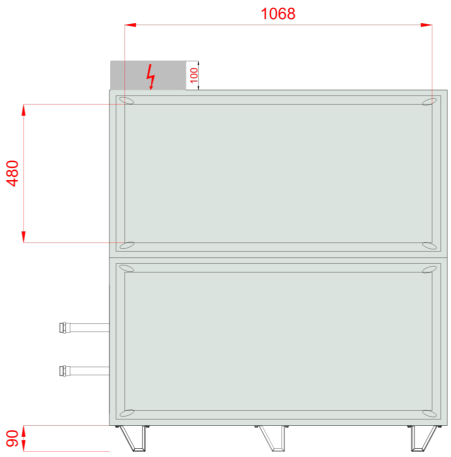
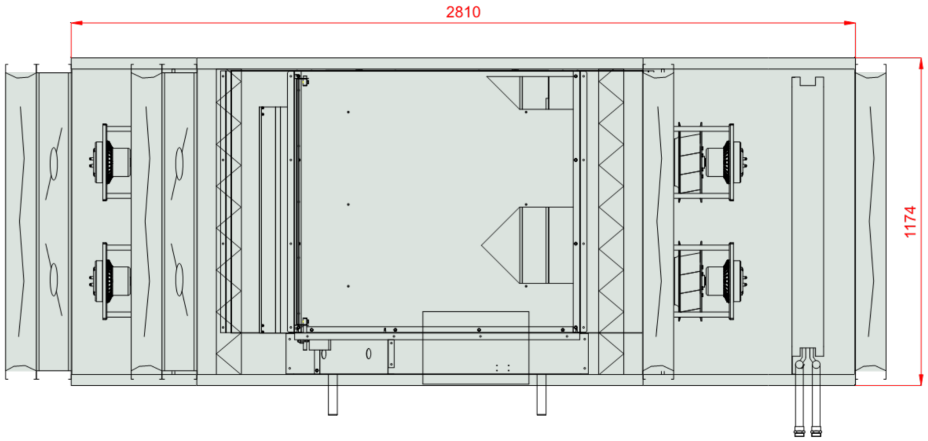
Front View (left)



Front View (right)



Top View



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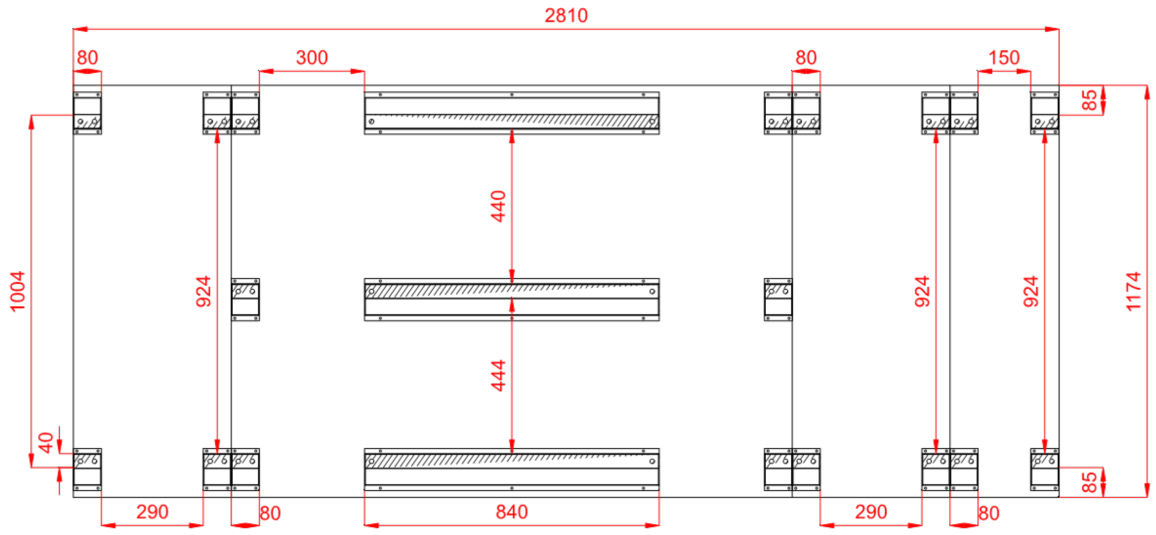
Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply	FF	1068x480	**Lt**	2810	**Hi**	502	**Wi**	1094
Air outlet Supply	FF	1068x480	**LtA**	3155	**H**	672	**W**	1174
			L1	2810	**H2**	1254		
Air inlet Exhaust	FF	1068x480	**L2**	1599	**Hf**	90		
Air outlet Exhaust	FF	1068x480	**L21**	450				
			L22	761				

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

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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		**Summer operation**	
50% Dirty Air Pressure Drop	128 Pa	50% Dirty Air Pressure Drop	128 Pa
Initial Air Pressure Drop	105 Pa	Initial Air Pressure Drop	105 Pa
100% Dirty Air Pressure Drop	150 Pa	100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.26 m/s	Air velocity	2.26 m/s

Air Filter Sizes

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

Counter-Flow Recuperator (Hexagonal)

Type PCR VVS040c Hex

HIPS 2.0 (SR)

Winter operation		**Summer operation**	
Supply		**Supply**	
Intake air DBT / RH	-20.0 °C / 100 %	Intake air DBT / RH	32.0 °C / 45 %
Discharge air DBT / RH	15.4 °C / 6 %	Discharge air DBT / RH	23.8 °C / 74 %
Air velocity	2.66 m/s	Air velocity	2.66 m/s
Pressure drop Wet / Dry Wet	210 Pa	Pressure drop Wet / Dry Wet	253 Pa
Air Pressure	101325 Pa	Air Pressure	101325 Pa
Air Density	1.2000 kg/m³	Air Density	1.2000 kg/m³
Air Volume Flow	4400.00 m³/h	Air Volume Flow	4400.00 m³/h
Recovery capacity Sensible / Total Total	52.2 kW	Recovery capacity Sensible / Total Total	-14.2 kW
Actual efficiency / at balanced flow Real / BalancedFlow	88 % / 88 %		
Dry efficiency in winter	80 %		

Winter operation		**Summer operation**	
Exhaust		**Exhaust**	
Intake air DBT / RH	20.0 °C / 40 %	Intake air DBT / RH	20.0 °C / 45 %
Discharge air DBT / RH	-6.4 °C / 97 %	Discharge air DBT / RH	29.9 °C / 36 %
Air velocity	2.66 m/s	Air velocity	2.66 m/s
Pressure drop Wet / Dry Wet	243 Pa	Pressure drop Wet / Dry Wet	243 Pa
Air Pressure	101325 Pa	Air Pressure	101325 Pa
Air Density	1.2000 kg/m³	Air Density	1.2000 kg/m³
Air Volume Flow	4400.00 m³/h	Air Volume Flow	4400.00 m³/h
Recovery Bypass	Yes	Eco Design Class	Eco Design
Air Damper	No		

Counter-Flow (Hex)

Max Internal Leakage 0.25%

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Recovery Additional Info

PlateExchangers

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|1.58x2	
		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_250_AF_Px 2

Total Static Pressure	667 Pa	Impeller efficiency: Static / Total	69 %/76 %
Dynamic pressure	71 Pa	Shaft power	0.59 kW x 2
External pressure	300 Pa	Working revolutions	3612 1/min
Total Pressure	738 Pa		
Winter operation		**Summer operation**	
Air Volume Flow	4400.00 m³/h	Air Volume Flow	4400.00 m³/h

Motor EC_IE4_F_71_IMB14_1.58p_0.7_50x 2

771.3.570	EC	50Hz	
		Rated revolutions	4000 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.70 kW x 2
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

EC Controller Settings	45 Hz

Winter operation		**Summer operation**	
EPC for mean contaminated filters	1.37 kW	EPC for mean contaminated filters	1.45 kW
EPC for clean filters	1.33 kW	EPC for clean filters	1.41 kW
SFP for clean filters	1.09 kW/m³/s	SFP for clean filters	1.15 kW/m³/s

Fan Section Power Supply Additional Info

C20/3

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Hot Water Coil

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

Standard Circuits 2,18 [dm^3]

Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	15.4 °C / 6 %	Discharge air DBT / RH	20.0 °C / 4 %
Air velocity	2.68 m/s	Pressure drop Wet / Dry Wet	29 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	4400.00 m³/h		
Total heating capacity	6.8 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.30 m³/h	Medium pressure drop	3.02 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)]	57.4	63.6	61.4	56.3	52.9	56.4	53.5	67.4
Outlet	[dB(A)]	56.5	63.6	48.8	53.6	47.5	45.6	40.9	65.0
Environment	[dB(A)]	40.6	52.0	49.9	44.2	36.6	29.0	15.4	54.8

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)]	33.6	45.0	42.9	37.2	29.6	22.0	8.4	47.8

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		**Summer operation**	
50% Dirty Air Pressure Drop	114 Pa	50% Dirty Air Pressure Drop	114 Pa
Initial Air Pressure Drop	79 Pa	Initial Air Pressure Drop	79 Pa
100% Dirty Air Pressure Drop	150 Pa	100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.26 m/s	Air velocity	2.26 m/s

Air Filter Sizes

P.FLT (1-2-0301-0203) 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|1.58x2

Qty in section x 2

Fan Set Designed for wet operating conditions

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

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Fan PLUG_VS_250_AF_Px 2

Total Static Pressure	658 Pa	Impeller efficiency: Static / Total	69 %/76 %
Dynamic pressure	71 Pa	Shaft power	0.59 kW x 2
External pressure	300 Pa	Working revolutions	3602 1/min
Total Pressure	729 Pa		
Winter operation		**Summer operation**	
Air Volume Flow	4400.00 m³/h	Air Volume Flow	4400.00 m³/h

Motor EC_IE4_F_71_IMB14_1.58p_0.7_50x 2

771.3.570	EC	50Hz	
		Rated revolutions	4000 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.70 kW x 2
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

EC Controller Settings	45 Hz		
Winter operation		**Summer operation**	
EPC for mean contaminated filters	1.36 kW	EPC for mean contaminated filters	1.36 kW
EPC for clean filters	1.29 kW	EPC for clean filters	1.29 kW
SFP for clean filters	1.06 kW/m³/s	SFP for clean filters	1.06 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)]	52.9	66.2	72.2	72.5	70.8	65.4	59.8	77.4
Outlet	[dB(A)]	55.6	68.9	74.9	75.2	73.5	69.0	63.4	80.2
Environment	[dB(A)]	40.6	51.9	49.9	44.2	36.5	29.0	15.4	54.7

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)]	33.6	44.9	42.9	37.2	29.5	22.0	8.4	47.7

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
AirDamper	Supply	Exhaust
Air Inlet	Provided	Not Provided
Air Outlet	Not Provided	Provided

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Flexible Connection	Supply	Exhaust
Air Inlet	Provided	Provided
Air Outlet	Provided	Provided

Control application

Functional Code	AP|1|0|0|0|0|0|0|6|3|0|0|0|0|0|1
APP Code	uPC3 (AP-161)
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

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

Transducers and Switches

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

AHU Connection Box

AHU Connection Box

Rated Power	2.80 kW	Full Load Amps	19.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 2,50 mm²

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-P-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	%	80.00

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7	Nominal NRVU flow rate		1.22 / 1.22
8	Effective electric power input	kW	1.37 / 1.36
9	Internal Specific Fan Power (SFPint)	w/m³/s	530.21 / 543.03
10	Face velocity	m/s	2.26
11	Nominal external pressure	Pa	300.00 / 300.00
12	Internal Pressure Drop of ventilation components Δps,int	Pa	314.91 / 321.95
13	Internal pressure drop of non-ventilation components Δps,add	Pa	52.09 / 36.36
14	Maximum Leakage Rate	%	0.01 / 0.01
15	Energy performance of filters (declared information about the calculated annual anergy consumption)		EU7MPleat / F7 / - / EU5MPleat / M5 / -
16	Description of visual filter warning for NRVUs		Supported by control application
17	Casing sound power level LWA	dBA	55
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	74	450	1174	672
2	265	1599	1174	1254
3	60	450	1174	672
4	40	311	1174	672

Transport Sections Dims