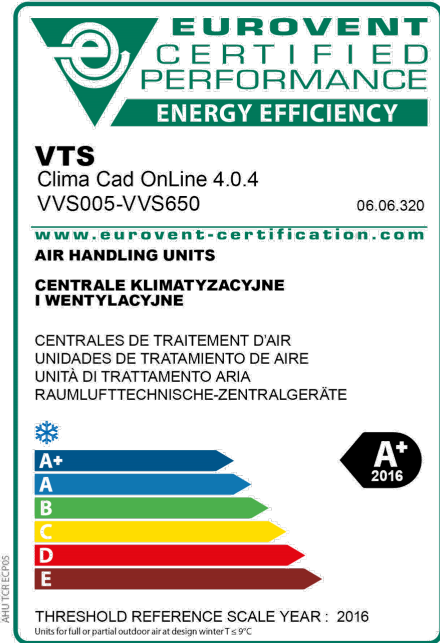
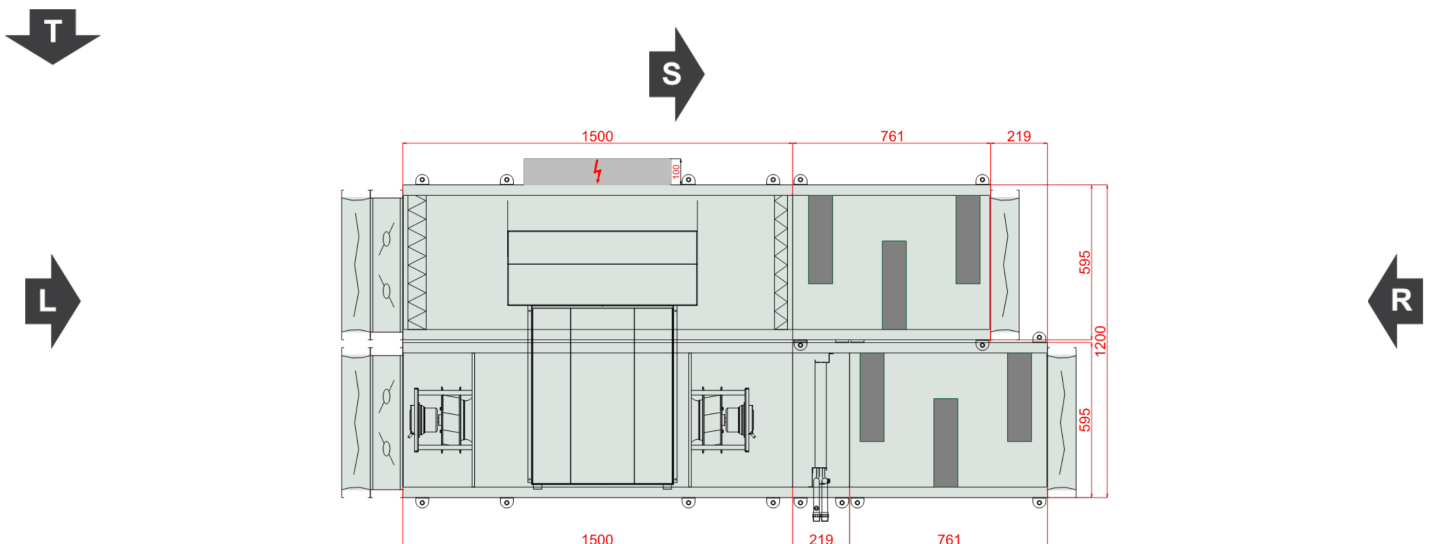


Type	RecoveryHexHorizontal
Unit Type:	Indoor
Project Tag	13577181
Size	VVS010s
Set	VVS010s-R-FPVHS/VVS010s-L-SFPV_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	290 Kg
Supply airflow 2	1100.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	1100.00 m³/h
External pressure	300 Pa
SFP Winter	1.64 kW/m³/s
SFP Summer	1.70 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	A+ 2016



Top View

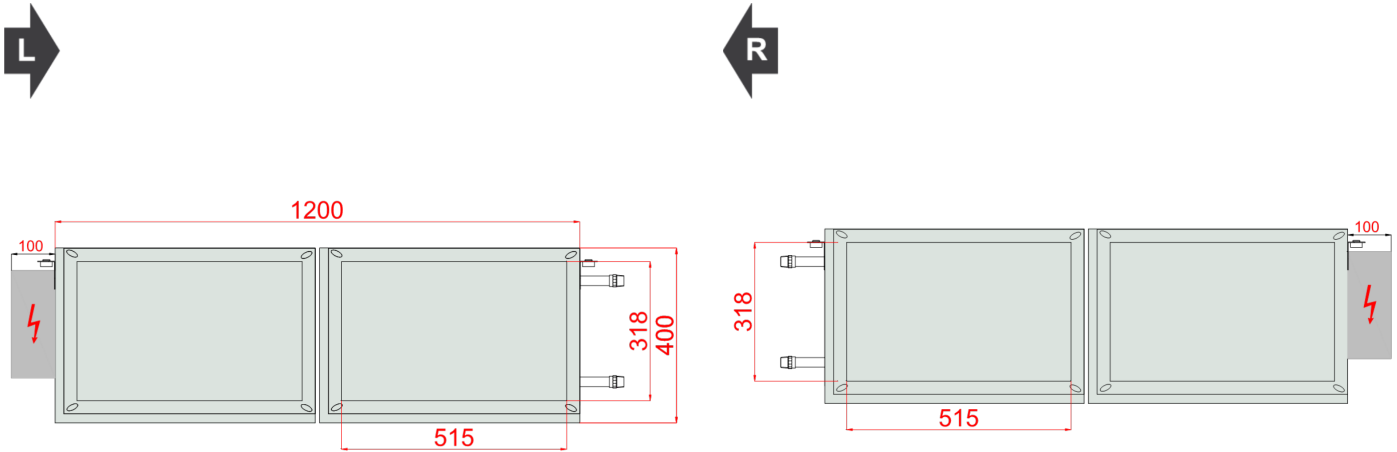


Comment 1:

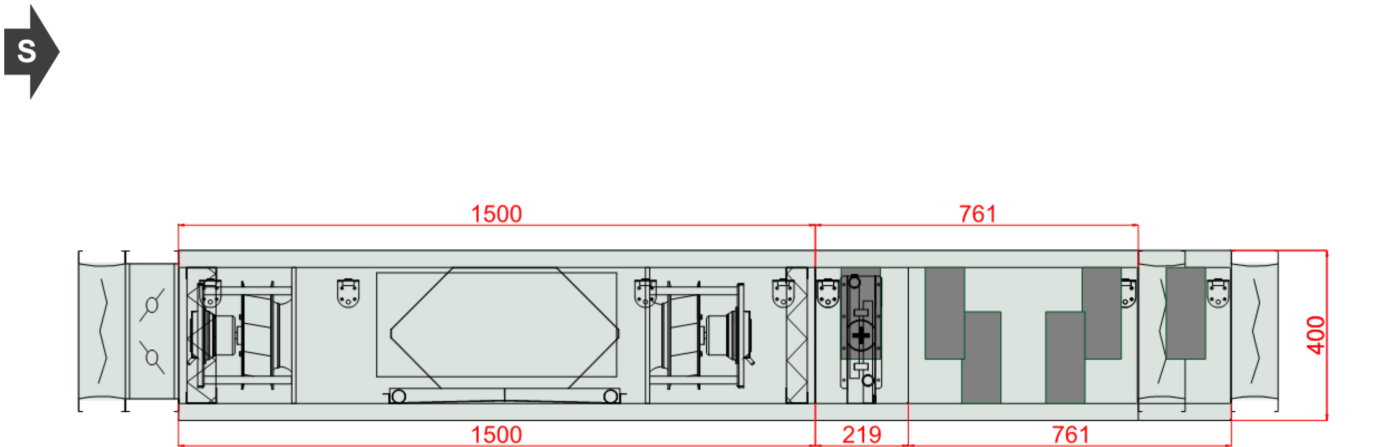


Front View (left)

Front View (right)



Inspection Panels



Sizes [mm]

Air intake Supply FF	515x318	Lt 2480	Hi 320	Wi 515
Air outlet Supply FF	515x318	LtA 2825	H 400	W 595
		L1 2480		W2 1200
Air inlet Exhaust FF	515x318	L2 2261		
Air outlet Exhaust FF	515x318	L22 219		

Unit design

Walls filled with MW 40mm, double skin made of steel, excluding silencer and electric heater sections

Down base unit inspection

Casing anti-corrosion protection: Aluzinc AZ 150.
 Base unit with pre-configured EC motors drives
 Energy recovery efficiency meet EC 1253/2014 requirements

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 118 Pa
 Initial Air Pressure Drop 85 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 1.91 m/s

Summer operation

50% Dirty Air Pressure Drop 118 Pa
 Initial Air Pressure Drop 85 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 1.91 m/s

Air Filter Sizes

P,FLT F7 513x320x48 (1-2-0301-0244) 1,000 x Pcs

Counter-Flow Recuperator (Hexagonal)

Type PCR VVS010s Hex

HIPS or AL 3.0 (SR)

Winter operation

Supply

Intake air DBT / RH	-20.0 °C / 100 %
Discharge air DBT / RH	11.2 °C / 8 %
Air velocity	2.51 m/s
Pressure drop Wet / Dry Wet	82 Pa
Air Pressure	101325 Pa
Air Density	1.2000 kg/m³
Air Volume Flow	1100.00 m³/h
Recovery capacity Sensible / Total Total	11.5 kW
Actual efficiency / at balanced flow Real / BalancedFlow	78 % / 78 %
Dry efficiency in winter	72 %

Winter operation

Exhaust

Intake air DBT / RH	20.0 °C / 40 %
Discharge air DBT / RH	-2.2 °C / 89 %
Air velocity	2.51 m/s
Pressure drop Wet / Dry Wet	108 Pa
Air Pressure	101325 Pa
Air Density	1.2000 kg/m³
Air Volume Flow	1100.00 m³/h
Recovery Bypass	Yes
Air Damper	No
Counter-Flow (Hex)	
Max Internal Leakage	0.25%

Summer operation

Supply

Intake air DBT / RH	32.0 °C / 45 %
Discharge air DBT / RH	23.4 °C / 75 %
Air velocity	2.51 m/s
Pressure drop Wet / Dry Wet	116 Pa
Air Pressure	101325 Pa
Air Density	1.2000 kg/m³
Air Volume Flow	1100.00 m³/h
Recovery capacity Sensible / Total Total	-3.2 kW
Actual efficiency / at balanced flow Real	72 %

Summer operation

Exhaust

Intake air DBT / RH	20.0 °C / 65 %
Discharge air DBT / RH	27.6 °C / 42 %
Air velocity	2.51 m/s
Pressure drop Wet / Dry Wet	108 Pa
Air Pressure	101325 Pa
Air Density	1.2000 kg/m³
Air Volume Flow	1100.00 m³/h
Eco Design Class	Eco Design

Recovery Additional Info

PlateExchangers

Plug-Fan Set

Fan Section PLUG_DD_225_0,38_1.64

EC_IE4_F_IMB14_71_1.64p_T 771.3.550-3 225|0.38kW|1.64x1

Qty in section x 1

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 1

Total Static Pressure	556 Pa	Impeller efficiency: Static / Total	71 %/75 %
Dynamic pressure	28 Pa	Shaft power	0.24 kW x 1
External pressure	300 Pa	Working revolutions	3148 1/min
Total Pressure	584 Pa		
Winter operation		Summer operation	
Air Volume Flow	1100.00 m³/h	Air Volume Flow	1100.00 m³/h

Motor EC_IE4_F_71_IMB14_1.64p_0.38_50x 1

771.3.550-3	EC	50Hz	
FLA	2.1 A	MCA	2.7 A
MCB	6.0 A		
		Rated revolutions	3650 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.38 kW x 1
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

	_EC	_EC	
Motor Drive FLA (Full-Load Amperes)	2.1 A	Motor Drive MCA (Min. Circuit Ampacity)	2.7 A
Motor Drive MCB (Max. Circuit Breaker)	6.0 A		
EC Controller Settings	43 Hz		

Winter operation		Summer operation	
EPC for mean contaminated filters	0.28 kW	EPC for mean contaminated filters	0.29 kW
EPC for clean filters	0.26 kW	EPC for clean filters	0.28 kW
SFP for clean filters	0.85 kW/m³/s	SFP for clean filters	0.90 kW/m³/s

Fan Section Power Supply Additional Info

C20/1

⊕ Hot Water Coil

Type WCL VVS010s 2R DT SH.St.St.Std	Number of rows 2	Connection Supply/Return: 3/4"/22	
Standard Circuits	0,94 [dm ³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	11.2 °C / 8 %	Discharge air DBT / RH	20.0 °C / 4 %
Air velocity	2.39 m/s	Pressure drop Wet / Dry Wet	39 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	1100.00 m³/h		
Total heating capacity	3.3 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.14 m³/h	Medium pressure drop	0.63 kPa



Silencer

Type SLNCR VVS010s Mod2

Winter operation

Air Press Drop (Wet conditions) 17 Pa

Summer operation

Air Press Drop (Wet conditions) 17 Pa

Resp_Silencer_Info_Name

Silencers

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)]	49.7	55.9	53.7	48.6	45.2	48.7	45.8	59.7
Outlet	[dB(A)]	42.9	47.0	26.3	28.1	20.8	18.8	14.4	48.5
Environment	[dB(A)]	34.9	46.3	52.2	48.5	48.9	29.3	21.7	55.6
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)]	27.9	39.3	45.2	41.5	41.9	22.3	14.7	48.6

Exhaust airflow 3

Silencer

Type SLNCR VVS010s Mod2

Winter operation

Air Press Drop (Wet conditions) 17 Pa

Summer operation

Air Press Drop (Wet conditions) 17 Pa

Resp_Silencer_Info_Name

Silencers

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 107 Pa

Initial Air Pressure Drop 64 Pa

100% Dirty Air Pressure Drop 150 Pa

Air velocity 1.91 m/s

Summer operation

50% Dirty Air Pressure Drop 107 Pa

Initial Air Pressure Drop 64 Pa

100% Dirty Air Pressure Drop 150 Pa

Air velocity 1.91 m/s

Air Filter Sizes

P,FLT M5 513x320x48 (1-2-0301-0246) 1,000 x Pcs



Plug-Fan Set

Fan Section PLUG_DD_225_0,38_1.64

EC_IE4_F_IMB14_71_1.64p_T	771.3.550-3	225 0.38kW 1.64x1
	Qty in section	x 1

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 1

Total Static Pressure	532 Pa	Impeller efficiency: Static / Total	71 %/75 %
Dynamic pressure	28 Pa	Shaft power	0.23 kW x 1
External pressure	300 Pa	Working revolutions	3103 1/min
Total Pressure	560 Pa		
Winter operation		Summer operation	
Air Volume Flow	1100.00 m³/h	Air Volume Flow	1100.00 m³/h

Motor EC_IE4_F_71_IMB14_1.64p_0.38_50x 1

771.3.550-3	EC	50Hz	
FLA	2.1 A	MCA	2.7 A
MCB	6.0 A		
		Rated revolutions	3650 1/min
Operational Voltage	230 V/1 ph	Rated Power	0.38 kW x 1
Name plate RPM	230 V/1 ph/50 Hz		

EC Motor Controller

	_EC	_EC	
Motor Drive FLA (Full-Load Amperes)	2.1 A	Motor Drive MCA (Min. Circuit Ampacity)	2.7 A
Motor Drive MCB (Max. Circuit Breaker)	6.0 A		
EC Controller Settings	43 Hz		

Winter operation		Summer operation	
EPC for mean contaminated filters	0.26 kW	EPC for mean contaminated filters	0.26 kW
EPC for clean filters	0.24 kW	EPC for clean filters	0.24 kW
SFP for clean filters	0.79 kW/m³/s	SFP for clean filters	0.79 kW/m³/s

Fan Section Power Supply Additional Info

C20/1

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)]	39.0	49.3	49.3	46.7	43.8	38.2	33.0	54.1
Outlet	[dB(A)]	47.6	60.9	66.9	67.2	65.5	61.0	55.4	72.2



Environment [dB(A)] 34.6 45.9 51.9 48.2 48.5 29.0 21.4 55.2

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)]	27.6	38.9	44.9	41.2	41.5	22.0	14.4	48.2

AHU Discharge and intake Opening Sizes & Unit Accessories

	Supply	Exhaust
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Controls Selection Mode: Functional set

AHU Discharge and Intake Opening Sizes	Supply	Exhaust
Air Inlet	Front 515x318	Front 515x318
Air Outlet	Front 515x318	Front 515x318
Air Damper	Supply	Exhaust
Air Inlet	Provided 485x288	Not Provided
Air Outlet	Not Provided	Provided 485x288
Flexible Connection	Supply	Exhaust
Air Inlet	Provided 485x288	Provided 485x288
Air Outlet	Provided 485x288	Provided 485x288

Control application

Functional Code AP|1|0|0|0|0|0|6|3|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
Strap-on temperature sensor NTC 10k	Temp. Sensor NTC10k (Strap-on)	1
Duct temperature sensor NTC 10k	Temp. Sensor NTC10k (Duct)	1
Resp_Controls_TempSensors_Temp. Sensor NTC10k (Outdoor)	Temp. Sensor NTC10k (Outdoor)	3

Hydronic Coils Controls		
Name	Code	Set
3-way Valve	VLV.SET-3W-2,5	1

Transducers and Switches		
Name	Code	Set
Frost Switch	FRST.SWITCH	1
Differential Pressure Transducer CAV	PRSS.TRDC_CAV	1

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		VVS010s-F-P-V-H-S
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	%	73.00
7	Nominal NRVU flow rate		0.31 / 0.31
8	Effective electric power input	kW	0.28 / 0.26
9	Internal Specific Fan Power (SFPint)	w/m ³ /s	271.50 / 278.14
10	Face velocity	m/s	2.04
11	Nominal external pressure	Pa	300.00 / 300.00
12	Internal Pressure Drop of ventilation components $\Delta p_{s,int}$	Pa	167.49 / 171.66
13	Internal pressure drop of non-ventilation components $\Delta p_{s,add}$	Pa	88.54 / 60.36
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	56
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	193	1500	1200	400
2	18	219	595	400
3	38	761	595	400
4	35	761	595	400

Transport Sections Dims

