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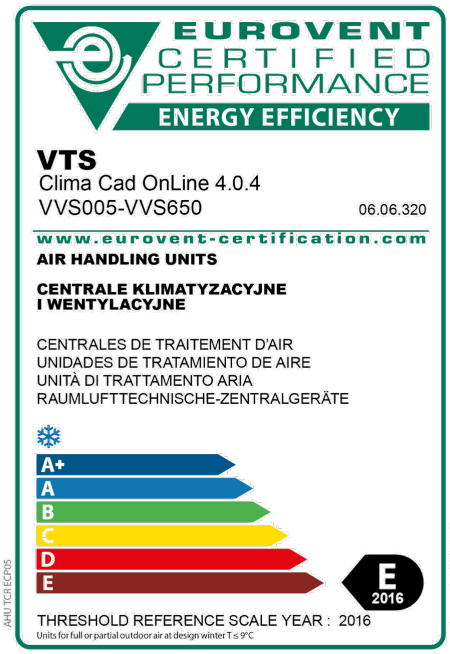
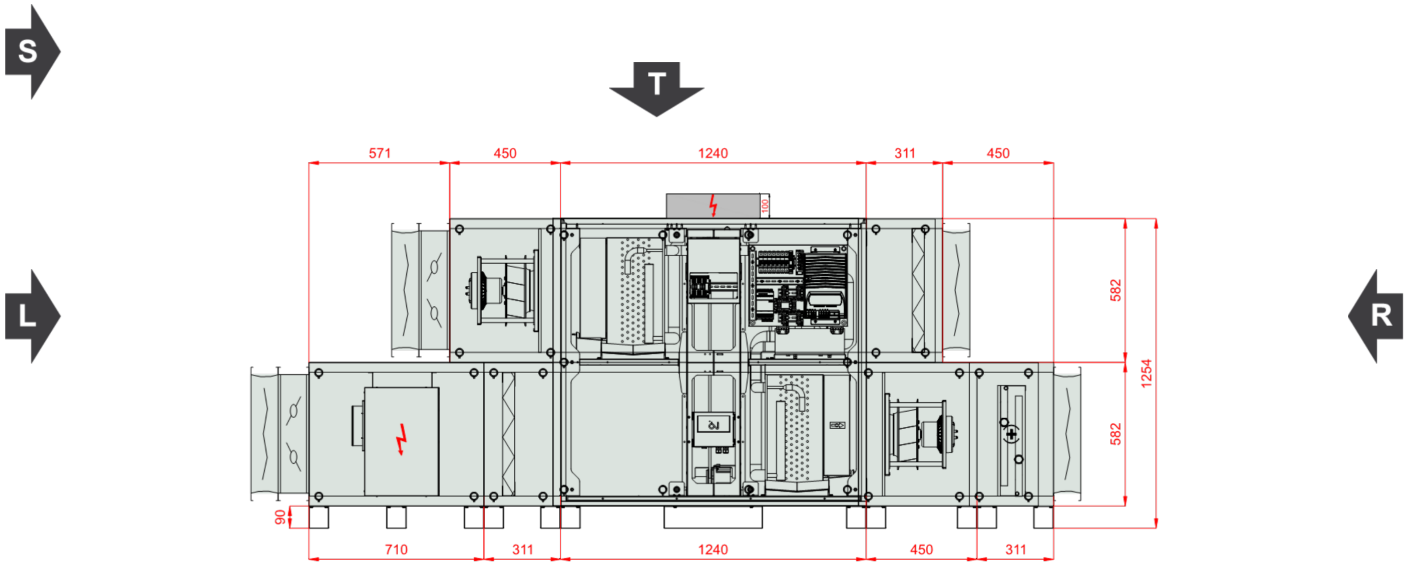
Type	RecoveryRotaryWithHeatPumpVertical
Unit Type:	Indoor
Project Tag	13577239
Size	VVS040c
Set	VVS040c-R-HFXVH/VVS040c-L-FXV_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	632 Kg
Supply airflow 2	4000.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	4000.00 m³/h
External pressure	300 Pa
SFP Winter	2.42 kW/m³/s
SFP Summer	2.44 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	E 2016



Inspection Panels



Comment 1:

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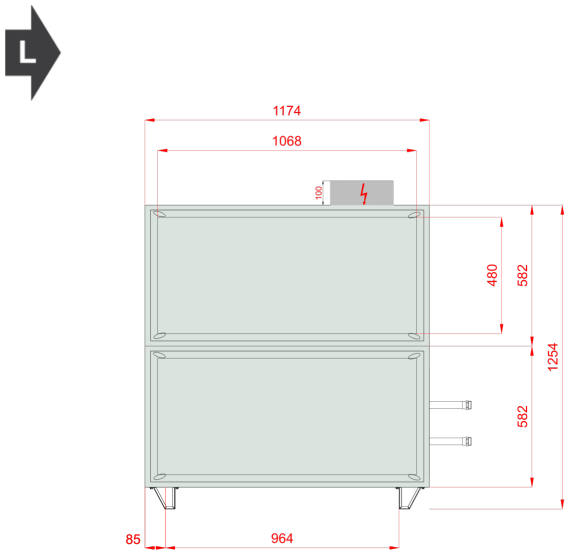
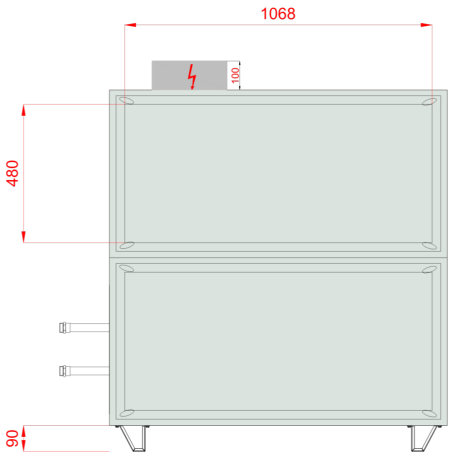
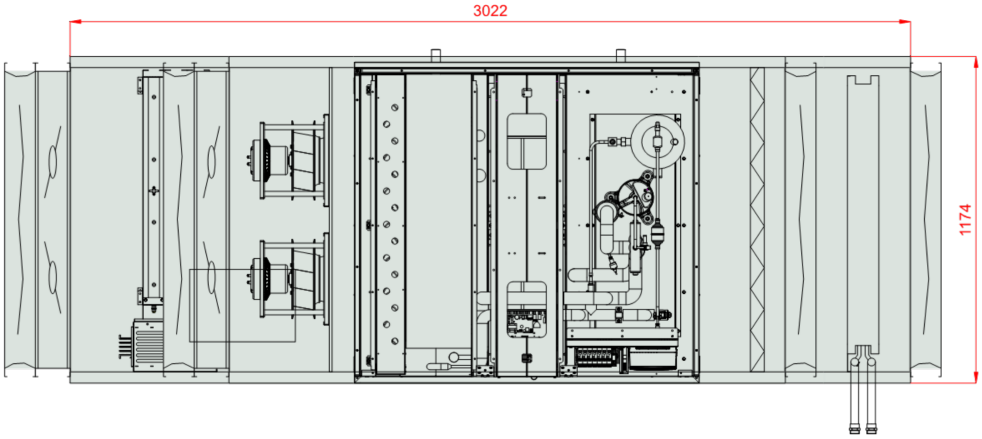
Front View (left)



Front View (right)



Top View



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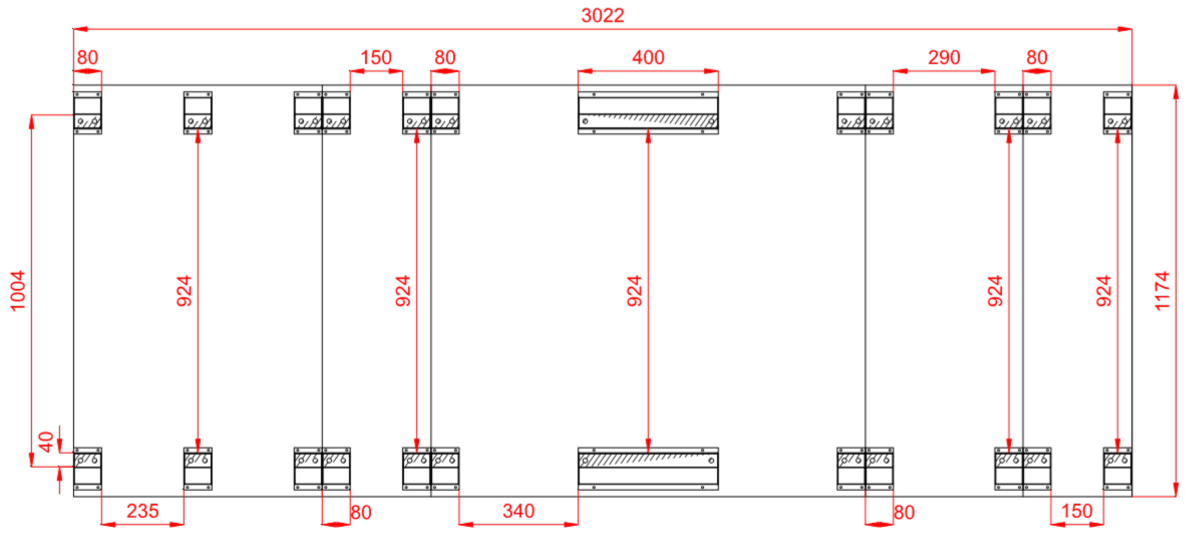
Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply	FF	1068x480	**Lt**	3022	**Hi**	502	**Wi**	1094
Air outlet Supply	FF	1068x480	**LtA**	3367	**H**	672	**W**	1174
			L1	3022	**H2**	1254		
Air inlet Exhaust	FF	1068x480	**L2**	2001	**Hf**	90		
Air outlet Exhaust	FF	1068x480	**L21**	571				
			L22	450				

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	28.0 °C	45 %	1.2000 kg/m³	25.0 °C	50 %	1.2000 kg/m³
Winter	-20.0 °C	90 %	1.2000 kg/m³	20.0 °C	20 %	1.2000 kg/m³

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Supply

Electric heater in casing

Type VVS040c-6,00kW-400/3/50-RES **Version** N4_400_3_50_FullControls_RES_NO

Rated Electric Power	24.00 kW		
Intake air DBT / RH	-20.0 °C / 90 %	Discharge air DBT / RH	-5.0 °C / 23 %
Air velocity	3.83 m/s	Pressure drop Wet / Dry Wet	59 Pa
Air Volume Flow	4000.00 m³/h		
Heating capacity	20.1 kW		

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	118 Pa	50% Dirty Air Pressure Drop	118 Pa
Initial Air Pressure Drop	87 Pa	Initial Air Pressure Drop	87 Pa
100% Dirty Air Pressure Drop	150 Pa	100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.06 m/s	Air velocity	2.06 m/s
Air Filter Sizes			
P.FLT (1-2-0301-0215)	2,000 x Pcs		

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Heat Pump & RRG

Heat Wheel Data

Type RRG VVS040c HGR

R2_SR_HGR

Rated voltage	230 V/1 ph/50 Hz		
Winter operation		**Summer operation**	
Supply		**Supply**	
Intake air DBT / RH	-5.0 °C / 23 %	Intake air DBT / RH	28.0 °C / 45 %
Discharge air DBT / RH	14.4 °C / 21 %	Discharge air DBT / RH	25.8 °C / 51 %
Pressure drop Wet / Dry Wet / Dry	189 Pa / 208 Pa	Pressure drop Wet / Dry Wet / Dry	212 Pa / 208 Pa
Recovery capacity Sensible / Total Sensible / Total	26.0 kW / 31.3 kW	Recovery capacity Sensible / Total Sensible / Total	3.0 kW / 3.4 kW
Actual efficiency / at balanced flow Real / BalancedFlow	78 % / 78 %	Actual efficiency / at balanced flow Real	75 %
Dry efficiency in winter	78 %		
		Resp_Recovery_LatentEfficiency_Name	17 %
Winter operation		**Summer operation**	
Exhaust		**Exhaust**	
Intake air DBT / RH	20.0 °C / 20 %	Intake air DBT / RH	25.0 °C / 50 %
Discharge air DBT / RH	1.2 °C / 47 %	Discharge air DBT / RH	27.3 °C / 45 %
Pressure drop Wet / Dry Wet / Dry	207 Pa / 208 Pa	Pressure drop Wet / Dry Wet / Dry	211 Pa / 208 Pa
Max Internal Leakage 3%			

Heat Pump Data

HEAT PUMP VVS040c R2SR|H|6|6 **R410A** 6 Kg

Compressor Rated Power	5.30 kW		
Compressor Power Supply	230 V/3 ph/50 Hz		
Winter operation		**Summer operation**	
Compressor Power Consumption	2.48 kW	Compressor Power Consumption	2.27 kW
Compressor Revolutions	120 1/s	Compressor Revolutions	71 1/s
Supply		**Supply**	
Intake air DBT / RH	14.4 °C / 21 %	Intake air DBT / RH	25.8 °C / 51 %
Discharge air DBT / RH	24.4 °C / 11 %	Discharge air DBT / RH	17.1 °C / 86 %
Pressure drop Wet / Dry Wet	107 Pa	Pressure drop Wet / Dry Wet	103 Pa
Capacity	13.7 kW	Capacity	11.6 kW
COP - Coefficient of Performance	6	EER - Energy Efficiency Ratio	5
Exhaust		**Exhaust**	
Pressure drop Wet / Dry Wet	112 Pa	Pressure drop Wet / Dry Wet	102 Pa

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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	823 Pa	Impeller efficiency: Static / Total	71 %/76 %
Dynamic pressure	58 Pa	Shaft power	0.64 kW x 2
External pressure	300 Pa	Working revolutions	3622 1/min
Total Pressure	881 Pa		
Winter operation		**Summer operation**	
Air Volume Flow	4000.00 m³/h	Air Volume Flow	4000.00 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	1.49 kW	EPC for mean contaminated filters	1.52 kW
EPC for clean filters	1.43 kW	EPC for clean filters	1.47 kW
SFP for clean filters	1.29 kW/m³/s	SFP for clean filters	1.32 kW/m³/s

Fan Section Power Supply Additional Info

C50/3

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 [dm^3]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	14.4 °C / 21 %	Discharge air DBT / RH	24.0 °C / 12 %
Air velocity	2.48 m/s	Pressure drop Wet / Dry Wet	49 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	4000.00 m³/h		
Total heating capacity	12.9 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.56 m³/h	Medium pressure drop	0.65 kPa

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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)]	52.3	65.6	71.6	71.0	69.3	62.1	56.5	76.2
Outlet	[dB(A)]	56.8	63.8	49.1	53.9	47.7	45.9	41.2	65.2
Environment	[dB(A)]	40.9	52.2	50.2	44.5	36.8	29.3	15.7	55.0

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)]	33.9	45.2	43.2	37.5	29.8	22.3	8.7	48.0

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	108 Pa	50% Dirty Air Pressure Drop	108 Pa
Initial Air Pressure Drop	65 Pa	Initial Air Pressure Drop	65 Pa
100% Dirty Air Pressure Drop	150 Pa	100% Dirty Air Pressure Drop	150 Pa
Air velocity	2.06 m/s	Air velocity	2.06 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.

Fan PLUG_VS_250_AF_Px 2

Total Static Pressure	728 Pa	Impeller efficiency: Static / Total	71 %/76 %
Dynamic pressure	58 Pa	Shaft power	0.57 kW x 2
External pressure	300 Pa	Working revolutions	3504 1/min
Total Pressure	787 Pa		

Winter operation		**Summer operation**	
Air Volume Flow	4000.00 m³/h	Air Volume Flow	4000.00 m³/h

Motor EC_IE4_F_71_IMB14_1.58p_0.7_50x 2

771.3.570 — EC — 50Hz

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		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	44 Hz

Winter operation		**Summer operation**	
EPC for mean contaminated filters	1.33 kW	EPC for mean contaminated filters	1.31 kW
EPC for clean filters	1.25 kW	EPC for clean filters	1.24 kW
SFP for clean filters	1.13 kW/m³/s	SFP for clean filters	1.12 kW/m³/s

Fan Section Power Supply Additional Info

C50/3

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)]	52.4	65.8	71.7	72.1	70.4	65.0	59.3	77.0
Outlet	[dB(A)]	55.1	68.5	74.4	74.8	73.1	68.6	62.9	79.8
Environment	[dB(A)]	40.1	51.5	49.4	43.8	36.1	28.6	14.9	54.3

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)]	33.1	44.5	42.4	36.8	29.1	21.6	7.9	47.3

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

Control application

Functional Code	AX|0|0|2|3|1|0|0|6|3|0|0|0|0|0|1
APP Code	uPC3
Main Temp. Sensor	Duct Exhaust

Human Machine Interface

HMI Advanced (Settings) Yes

Options

Differential Pressure Transducer CAV

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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)	2
Duct temperature sensor NTC 10k	Temp. Sensor NTC10k (Duct)	2
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	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	42.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 10,00 mm²

TDS_AHUPowerConnection_ElectricHeaters

1 HP

TDS_AHUPowerConnection_Heaters		TDS_AHUPowerConnection_Controls	
Rated Power	24.00 kW	Rated Power	24.00 kW
Power Connection	400V+PE	Power Connection	230V+N+PE
Full Load Amps	41.0 A	Full Load Amps	0.2 A
TDS_AHUPowerConnection_MCA	51.3 A	Power Cord	3 x 0,75 mm²
TDS_AHUPowerConnection_CircuitBreaker	63.0 A		
Power Cord	4 x 10,00 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-H-F-X-V-H
3	Declared type		NRVU, UVU
4	Type of drive installed		VFD(AC) or Controller(EC)
5	Type of energy recovery		None
6	Thermal efficiency of heat recovery		Not applicable
7	Nominal NRVU flow rate		1.11
8	Effective electric power input	kW	1.49

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9	Internal Specific Fan Power (SFPint)	w/m³/s	141.30
10	Face velocity	m/s	2.06
11	Nominal external pressure	Pa	300.00
12	Internal Pressure Drop of ventilation components Δps,int	Pa	86.88
13	Internal pressure drop of non-ventilation components Δps,add	Pa	436.06
14	Maximum Leakage Rate	%	0.01
15	Energy performance of filters (declared information about the calculated annual anergy consumption)		EU7MPleat / F7 / -
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	72	450	1174	582
2	69	710	1174	672
3	25	311	1174	672
4	298	1240	1174	1254
5	60	450	1174	672
6	43	311	1174	672
7	28	311	1174	582

Transport Sections Dims