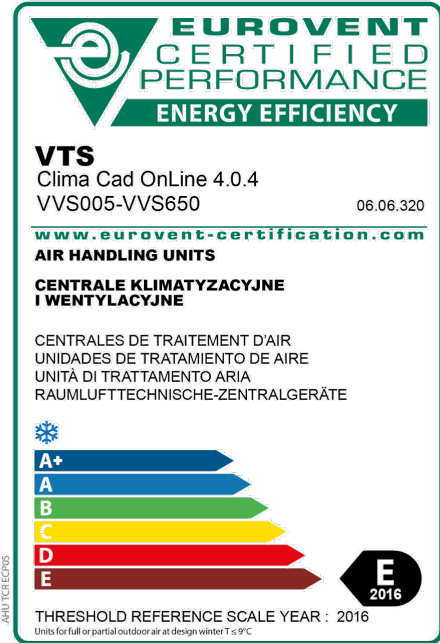
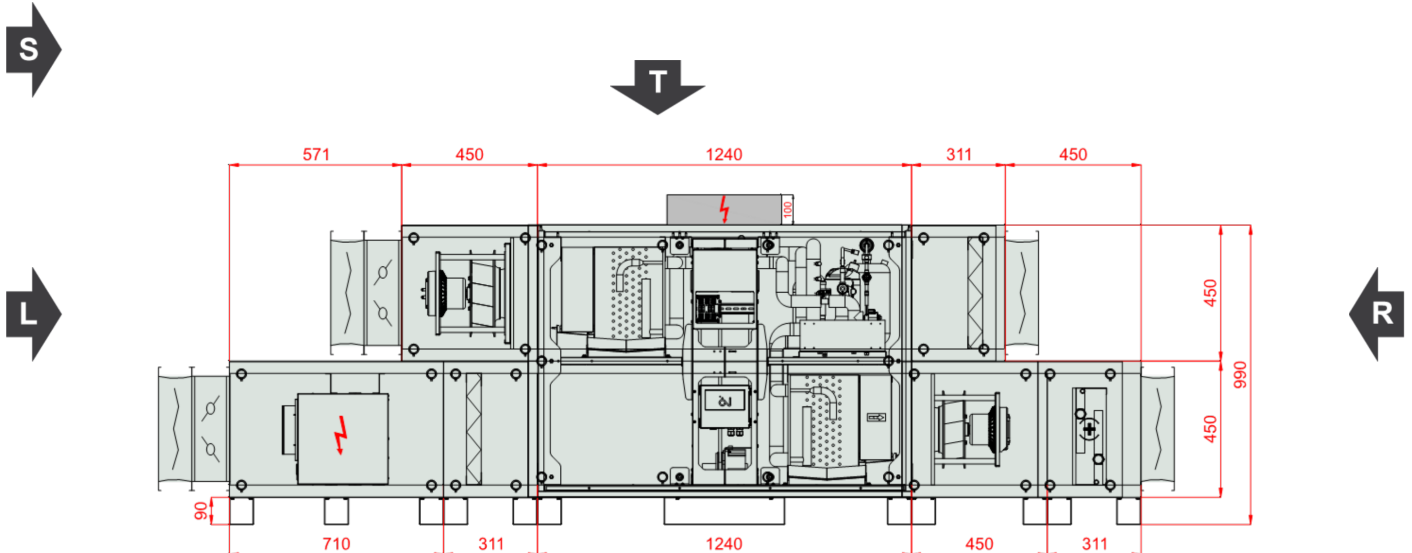


Type	RecoveryRotaryWithHeatPumpVertical
Unit Type:	Indoor
Project Tag	13577237
Size	VVS021c
Set	VVS021c-R-HFXVH/VVS021c-L-FXV_cd
Insulation thickness	40 mm
Insulation	Mineral Wool
Weight of the set (+/- 10%)*	492 Kg
Supply airflow 2	2100.00 m³/h
External pressure	300 Pa
Exhaust airflow 2	2100.00 m³/h
External pressure	300 Pa
SFP Winter	2.40 kW/m³/s
SFP Summer	2.42 kW/m³/s
Ecodesign	Yes (2018 +)
Eurovent Energy efficiency class (Winter 2016 / Summer 2020)	E 2016



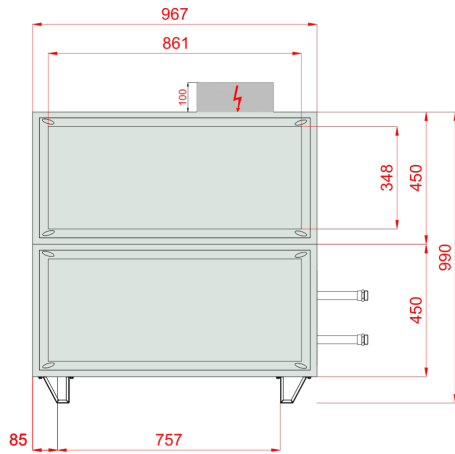
Inspection Panels



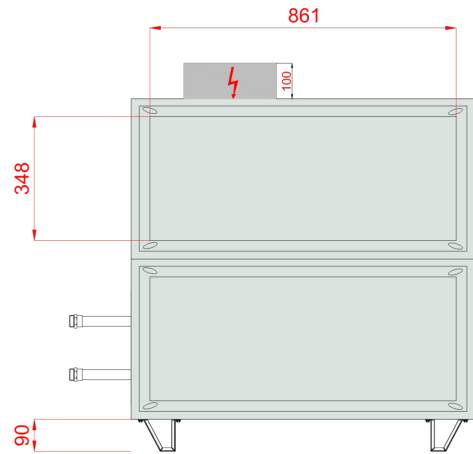
Comment 1:



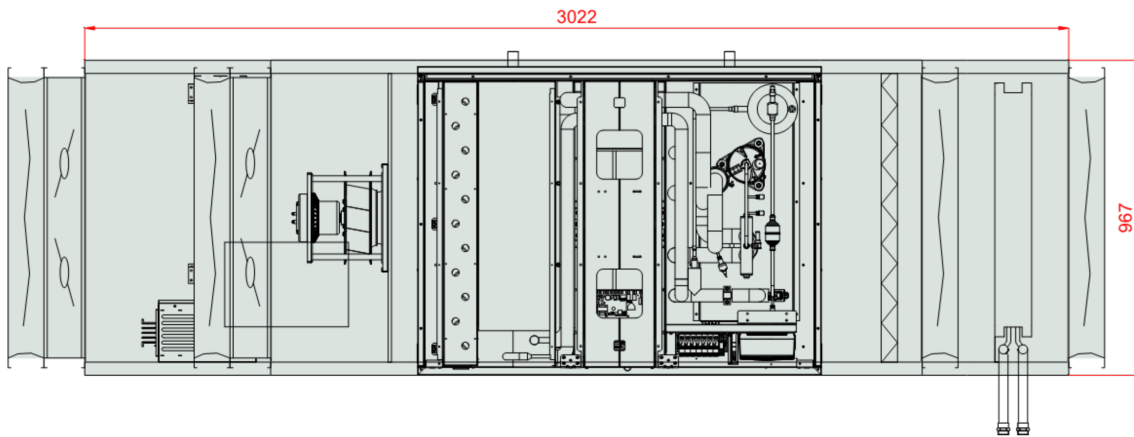
Front View (left)



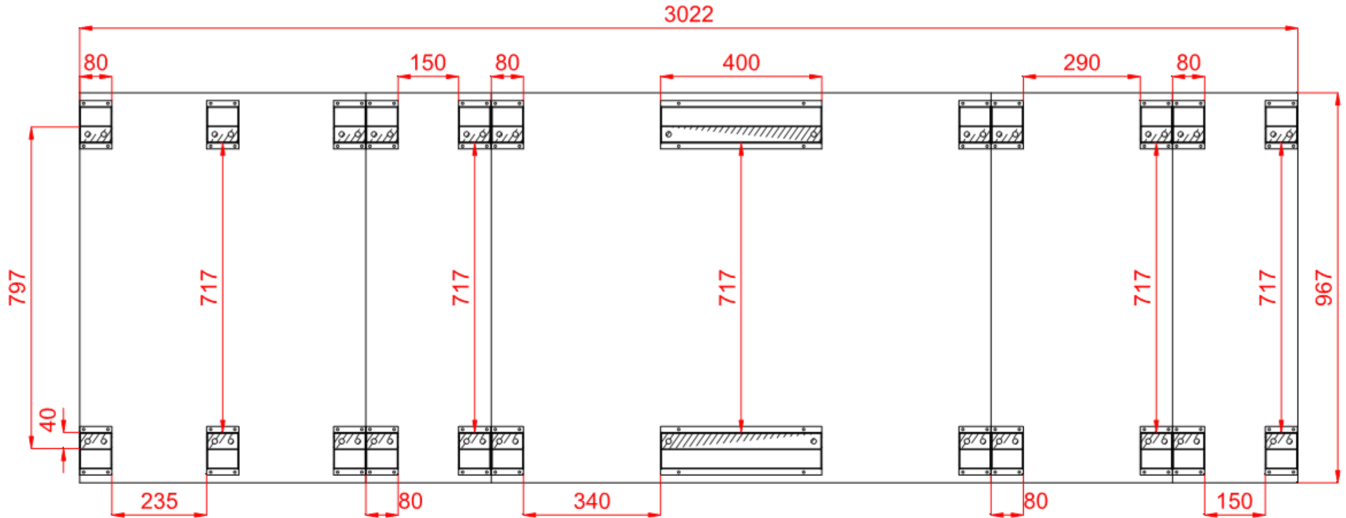
Front View (right)



Top View



Frame Top View, within the AHU outline contour



Sizes [mm]

Air intake Supply FF	861x348	Lt 3022	Hi 370	Wi 887
Air outlet Supply FF	861x348	LtA 3367	H 540	W 967
		L1 3022	H2 990	
Air inlet Exhaust FF	861x348	L2 2001	Hf 90	
Air outlet Exhaust FF	861x348	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

Supply

+ Electric heater in casing

Type VVS021c-1,80kW-400/3/50-RES

Version N5_400_3_50_FullControls_RES_YES

Rated Electric Power	9.00 kW		
Intake air DBT / RH	-20.0 °C / 90 %	Discharge air DBT / RH	-9.0 °C / 33 %
Air velocity	4.17 m/s	Pressure drop Wet / Dry Wet	69 Pa
Air Volume Flow	2100.00 m³/h		
Heating capacity	7.7 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

50% Dirty Air Pressure Drop	109 Pa
Initial Air Pressure Drop	68 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	1.82 m/s

Summer operation

50% Dirty Air Pressure Drop	109 Pa
Initial Air Pressure Drop	68 Pa
100% Dirty Air Pressure Drop	150 Pa
Air velocity	1.82 m/s

Air Filter Sizes

P.FLT (1-2-0301-0213) 2,000 x Pcs

Heat Pump & RRG

Heat Wheel Data

Type RRG VVS021c HGR

R2_SR_HGR

Rated voltage 230 V/1 ph/50 Hz

Winter operation

Supply

Intake air DBT / RH -9.0 °C / 33 %
 Discharge air DBT / RH 13.5 °C / 23 %
 Pressure drop Wet / Dry Wet / Dry 187 Pa / 209 Pa
 Recovery capacity Sensible / Total
 Sensible / Total 15.9 kW / 18.7 kW
 Actual efficiency / at balanced flow Real /
 BalancedFlow 78 % / 78 %
 Dry efficiency in winter 78 %

Winter operation

Exhaust

Intake air DBT / RH 20.0 °C / 20 %
 Discharge air DBT / RH -1.9 °C / 59 %
 Pressure drop Wet / Dry Wet / Dry 208 Pa / 209 Pa
 Max Internal Leakage 3%

Summer operation

Supply

Intake air DBT / RH 28.0 °C / 45 %
 Discharge air DBT / RH 25.8 °C / 51 %
 Pressure drop Wet / Dry Wet / Dry 213 Pa / 209 Pa
 Recovery capacity Sensible / Total
 Sensible / Total 1.6 kW / 1.8 kW
 Actual efficiency / at balanced flow Real 75 %
 Resp_Recovery_LatentEfficiency_Name 15 %

Summer operation

Exhaust

Intake air DBT / RH 25.0 °C / 50 %
 Discharge air DBT / RH 27.3 °C / 45 %
 Pressure drop Wet / Dry Wet / Dry 211 Pa / 209 Pa

Heat Pump Data

HEAT PUMP VVS021c R2SR|H|6

R410A 4 Kg

Compressor Rated Power 5.00 kW
 Compressor Power Supply 230 V/3 ph/50 Hz

Winter operation

Compressor Power Consumption 1.58 kW
 Compressor Revolutions 82 1/s

Supply

Intake air DBT / RH 13.5 °C / 23 %
 Discharge air DBT / RH 24.3 °C / 12 %
 Pressure drop Wet / Dry Wet 103 Pa
 Capacity 7.8 kW
 COP - Coefficient of Performance 5

Exhaust

Pressure drop Wet / Dry Wet 115 Pa

Summer operation

Compressor Power Consumption 0.89 kW
 Compressor Revolutions 36 1/s

Supply

Intake air DBT / RH 25.8 °C / 51 %
 Discharge air DBT / RH 17.8 °C / 82 %
 Pressure drop Wet / Dry Wet 98 Pa
 Capacity 5.6 kW
 EER - Energy Efficiency Ratio 6

Exhaust

Pressure drop Wet / Dry Wet 98 Pa

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	815 Pa	Impeller efficiency: Static / Total	70 %/72 %
Dynamic pressure	26 Pa	Shaft power	0.34 kW x 2
External pressure	300 Pa	Working revolutions	3589 1/min
Total Pressure	841 Pa		
Winter operation		Summer operation	
Air Volume Flow	2100.00 m³/h	Air Volume Flow	2100.00 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		Summer operation	
EPC for mean contaminated filters	0.79 kW	EPC for mean contaminated filters	0.81 kW
EPC for clean filters	0.74 kW	EPC for clean filters	0.77 kW
SFP for clean filters	1.28 kW/m³/s	SFP for clean filters	1.31 kW/m³/s

Fan Section Power Supply Additional Info

C40/3

Hot Water Coil

Type WCL VVS021c 2R DT SH.St.St.Std	Number of rows 2	Connection Supply/Return: 1"/1"
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Standard Circuits	1,77 [dm³]		
Medium	Water	Maximum working pressure	16 bar
Intake air DBT / RH	13.5 °C / 23 %	Discharge air DBT / RH	24.0 °C / 12 %
Air velocity	2.42 m/s	Pressure drop Wet / Dry Wet	47 Pa
Air Pressure	101325 Pa	Air Density	1.2000 kg/m³
Air Volume Flow	2100.00 m³/h		
Total heating capacity	7.4 kW	Medium temperature	70.0 °C/50.0 °C
Medium flow rate	0.32 m³/h	Medium pressure drop	0.82 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)]	50.3	63.7	69.6	69.0	67.4	60.1	54.5	74.2
Outlet	[dB(A)]	54.8	61.9	47.1	51.9	45.8	43.9	39.2	63.3
Environment	[dB(A)]	38.9	50.3	48.2	42.5	34.9	27.3	13.7	53.1

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)]	31.9	43.3	41.2	35.5	27.9	20.3	6.7	46.1

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 101 Pa
 Initial Air Pressure Drop 51 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 1.82 m/s

Summer operation

50% Dirty Air Pressure Drop 101 Pa
 Initial Air Pressure Drop 51 Pa
 100% Dirty Air Pressure Drop 150 Pa
 Air velocity 1.82 m/s

Air Filter Sizes

P.FLT (1-2-0301-0201) 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|1.58x1

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_250_AF_Px 1

Total Static Pressure	723 Pa	Impeller efficiency: Static / Total	70 %/76 %
Dynamic pressure	64 Pa	Shaft power	0.60 kW x 1
External pressure	300 Pa	Working revolutions	3585 1/min
Total Pressure	788 Pa		

Winter operation

Air Volume Flow 2100.00 m³/h

Summer operation

Air Volume Flow 2100.00 m³/h

Motor EC_IE4_F_71_IMB14_1.58p_0.7_50x 1

771.3.570 EC 50Hz





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

EC Motor Controller

EC Controller Settings	45 Hz
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Winter operation

EPC for mean contaminated filters	0.70 kW
EPC for clean filters	0.65 kW
SFP for clean filters	1.12 kW/m³/s

Summer operation

EPC for mean contaminated filters	0.69 kW
EPC for clean filters	0.64 kW
SFP for clean filters	1.10 kW/m³/s

Fan Section Power Supply Additional Info

C40/3

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)]	50.1	63.5	69.4	69.7	68.1	62.6	57.0	74.7
Outlet	[dB(A)]	52.8	66.2	72.1	72.4	70.8	66.2	60.6	77.4
Environment	[dB(A)]	37.8	49.2	47.1	41.4	33.8	26.2	12.6	52.0

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)]	30.8	42.2	40.1	34.4	26.8	19.2	5.6	45.0

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
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	Options
	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)	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-2,5	1

Transducers and Switches

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

AHU Connection Box

AHU Connection Box

Rated Power	2.18 kW	Full Load Amps	37.0 A
Power Connection	3x400V AC +N+PE	Power Cord	5 x 10,00 mm ²

TDS_AHUPowerConnection_ElectricHeaters

1 LP

TDS_AHUPowerConnection_Heaters

Rated Power	9.00 kW
Power Connection	400V+PE
Full Load Amps	16.2 A
TDS_AHUPowerConnection_MCA	20.3 A
TDS_AHUPowerConnection_CircuitBreaker	25.0 A
Power Cord	4 x 2,50 mm ²

TDS_AHUPowerConnection_Controls

Rated Power	9.00 kW
Power Connection	230V+N+PE
Full Load Amps	0.2 A
Power Cord	3 x 0,75 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-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		0.58
8	Effective electric power input	kW	0.79



9	Internal Specific Fan Power (SFPint)	w/m ³ /s	112.78
10	Face velocity	m/s	1.82
11	Nominal external pressure	Pa	300.00
12	Internal Pressure Drop of ventilation components $\Delta p_{s,int}$	Pa	68.19
13	Internal pressure drop of non-ventilation components $\Delta p_{s,add}$	Pa	447.20
14	Maximum Leakage Rate	%	0.01
15	Energy performance of filters (declared information about the calculated annual energy consumption)		EU7MPleat / F7 / -
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	48	450	967	450
2	59	710	967	540
3	21	311	967	540
4	222	1240	967	990
5	47	450	967	540
6	33	311	967	540
7	23	311	967	450

Transport Sections Dims

