

**Project's number** 1 **Project's name** Daneil Niesner

Customer	Author
Company	
Street, City, ZIP, State	, , , Czech Republic
Phone No, Fax No	,
Contact, E-Mail	,

### List of devices in the project

Number	Device name	Weight (+-10%)	GROSS PRICE		
			Air handling systems	Control	Totally
01	air rec. and vent. unit	672 kg			
<b>Total weight (+-10%)</b>		<b>672 kg</b>			
Total price for air handling systems			Price quotation is not complete !		
Total price for control				Price quotation is not complete !	
<b>Total price for project</b>					<b>Cannot calculate total price</b>

### Commercial and technical documentation \*

Modular units AeroMaster XP (manual) 05/2012  
NS 120  
NS 130 10/2008  
Mixing Sets SUMX - Update of Installation and service instructions Duct units Vento 01/2009  
Vacon 100 HVAC - Application manual  
Vacon 10 - Quick guide  
Vacon 100 HVAC - Installation manual  
Vacon 10 - User manual  
Rotary heat exchanger XPXR (Installation and operating instructions) 09/2010

### Project's errors

One of devices hasn't been priced. Cannot calculate total price for the project

Device error : 01 - air rec. and vent. unit

**Device number** 01 **Device name** air rec. and vent. unit

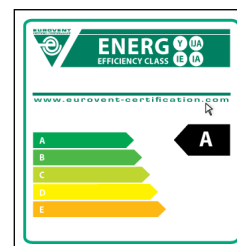
### Device MODULAR AIR-HANDLING UNIT

- as standard, the variants for indoor and outdoor applications in C2 or C3 environments in accordance with EN ISO 14713-1 are delivered
- approved for use in hygienic and clean applications (SZÚ - 111130, S 294/01)
- standard range of operating temperatures is from -40°C to +40°C
- solid frameless structure with totally smooth inner casing
- sandwich panels with 50 mm fireproof isolation
- parameters in accordance with EN 1886:2008 (M): D2, L2 respectively L1, T3, TB3
- soundproof casing  $R_w=43$  dB
- CE declaration of conformity issued in cooperation with TUV SÜD Czech
- certificat of conformity according to GOST R
- developed and manufactured in accordance with certified quality control systém ISO 9001:2001

\* For detailed information on the device and accessories application refer to the respective Commerce and Technical Documentation

**Type, size**  
**Model box**  
**Device weight**

AeroMaster XP 04  
AMXP3  
672 kg



### Climatic and entry conditions (winter/summer)

External air temperature [°C]	-15 / 30	Room temperature [°C]	20 / 25
Relative humidity (outside) [%]	84 / 40	Relative humidity in room [%]	45 / 60
Air pressure [kPa]	99 / 99		

### Device parameters of air (Supply/Exhaust)

Real air-flow [m³/h]	1240 / 1240	Pressure drop of components in the set [Pa]	106 / 95
Velocity in cross-section [m/s]	1.26 / 1.26	Outlet temperature from Supply (winter/summer) [°C]	21 / 26
Real external pressure drop [Pa]	202 / 213	Outlet relative humidity from Supply (winter/summer) [%]	23 / 50
Difference (for adjusting) [Pa]	+37 / +25		

### Device parameters of output (Supply/Exhaust)\*

Dimensioned according to fan output step	2 / 2	Total outputs for heating [kW]	3 / 0
Total fan outputs [kW]	0.19 / 0.19	Total outputs for cooling [kW]	0 / 0
Specific fan power $SFP_{E, [W/m^3.s]}$	1128	Output of heat recovery [kW]	13

\*Designed for wet conditions

### Noise parameters of device

Supply	Levels of sound power in octave ranges $L_{WA_{okt}}$ [dB(A)] and total level $L_{WA}$ [dB(A)]								
Octave range	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{WA}$
Inlet	31.9	46.3	56.2	61.0	56.5	50.6	44.0	36.5	63.6
Outlet	33.9	47.3	56.2	55.0	39.5	36.6	42.0	41.5	59.2
Surroundings	29.9	35.2	44.1	42.0	38.8	35.4	31.7	21.3	47.7

Exhaust	Levels of sound power in octave ranges $L_{WA_{okt}}$ [dB(A)] and total level $L_{WA}$ [dB(A)]								
Octave range	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	$L_{WA}$
Inlet	31.9	45.3	52.2	50.0	32.5	29.6	35.0	33.5	54.9
Outlet	34.9	49.3	60.2	66.0	64.5	60.6	56.0	48.5	69.8
Surroundings	29.9	35.2	44.1	42.0	38.8	35.4	31.7	21.3	47.7

## List of components in the device

Item	Component's name	Short name	PCs	Weight	Information*		
					A	B	C
01.06	Flexible connection	DV 500-450	1	3.1			
01.19	Blending damper	LK 500-450	1	8.4			
	Actuator	LM 230A	1				●
01.18	Filter section	XPHO 04/D	1	56.8			
	End panel - inlet	XPK 04/P	1				●
	Panel installation kit	XPK 04/P (MSP)	1				
	Filter insert	XPNH 04/5	1				●
01.15	Rotary heat-exchanger section	XPXR 04/0	1	150.0			
01.22	Service section	XPJS 04/K	1	16.2			
01.25	Heater section	XPTV 04	1	29.6			
	Water heater	XPNC 04/1R	1				●
	Mixing set	SUMX 1 (1)	1				
	Anti-freeze sensor	NS 130 R	1				●
01.02	Fan section	XPAP 04/S	1	67.2			
	Fan	XPVP 250-0,75/64-J2 (IE1)	1				●
	Speed controller	XPFM 0.75 (1x230V) V	1				
01.26	Attenuator section	XPPO 04/N	1	58.0			
01.13	Flexible connection	DV 500-450	1	3.1			
01.09	Flexible connection	DV 500-450	1	3.1			
01.08	Blending damper	LK 500-450	1	8.4			
	Actuator	LM 230A	1				●
01.07	Filter section	XPHO 04/K	1	24.5			
	End panel - inlet	XPK 04/P	1				●
	Panel installation kit	XPK 04/P (MSP)	1				
	Filter insert	XPNV 04/3	1				●
01.27	Attenuator section	XPPO 04/N	1	58.0			
01.23	Fan section	XPAP 04/S	1	67.2			
	Fan	XPVP 250-0,75/64-J2 (IE1)	1				●
	Speed controller	XPFM 0.75 (1x230V) V	1				
01.24	Empty section	XPJP 04/K	1	20.5			
	End panel - outlet	XPK 04/P	1				●
	Panel installation kit	XPK 04/P (MSP)	1				
01.11	Flexible connection	DV 500-450	1	3.1			
01.XX	Mounting kit	XPSS 04/M	5	20.0			
01.XX	Base frame	XPR 04/750-3	1	17.1			
01.XX	Base frame	XPR 04/750-3	1	16.4			
01.XX	Base frame	XPR 04/750-3	1	16.4			
01.XX	Base frame	XPR 04/250-3	1	12.4			
01.XX	Base frame	XPR 04/250-3	1	12.4			

Total weight of device

671.9 kg

Comment\* :

**A** – covered in sum of air handling systems prices

**B** – covered in sum of prices of control

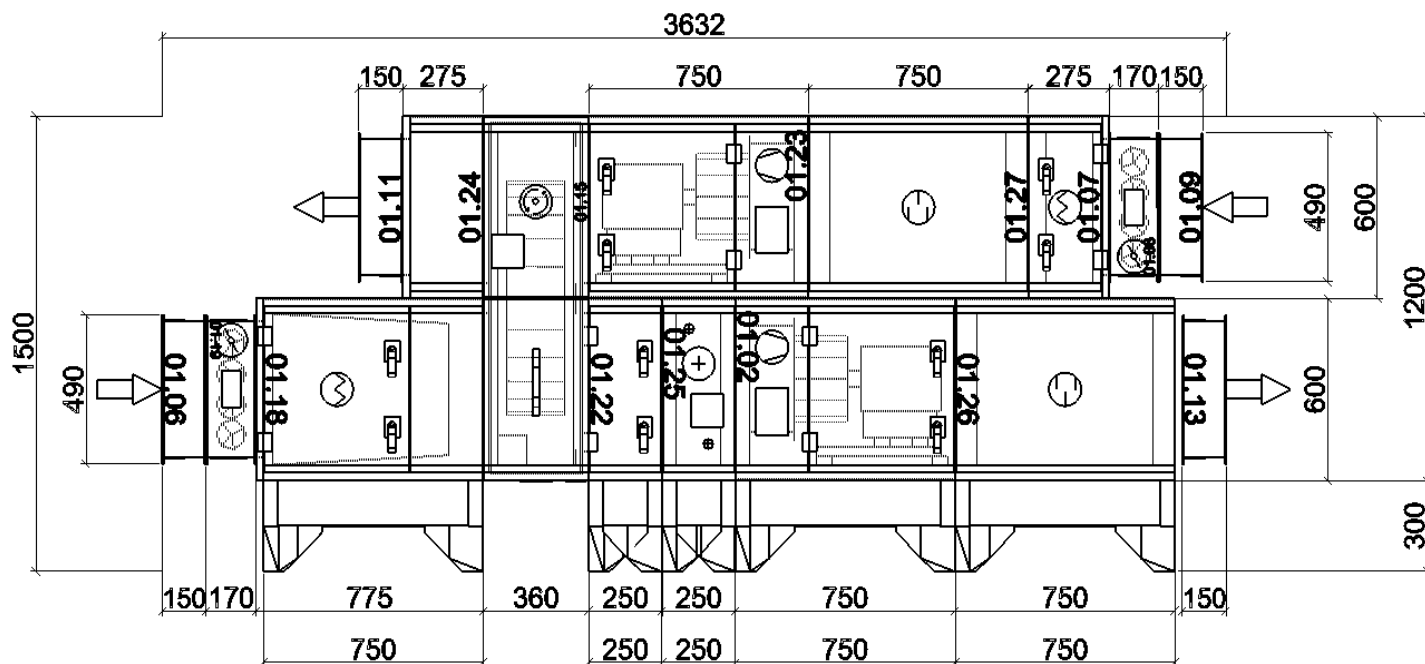
**C** – built-in accessories (inside or on the component)

**Graphic view**

Device  
Device dimensions

**From front XZ**

01 - air rec. and vent. unit  
X = 3631 mm, Y = 1500 mm

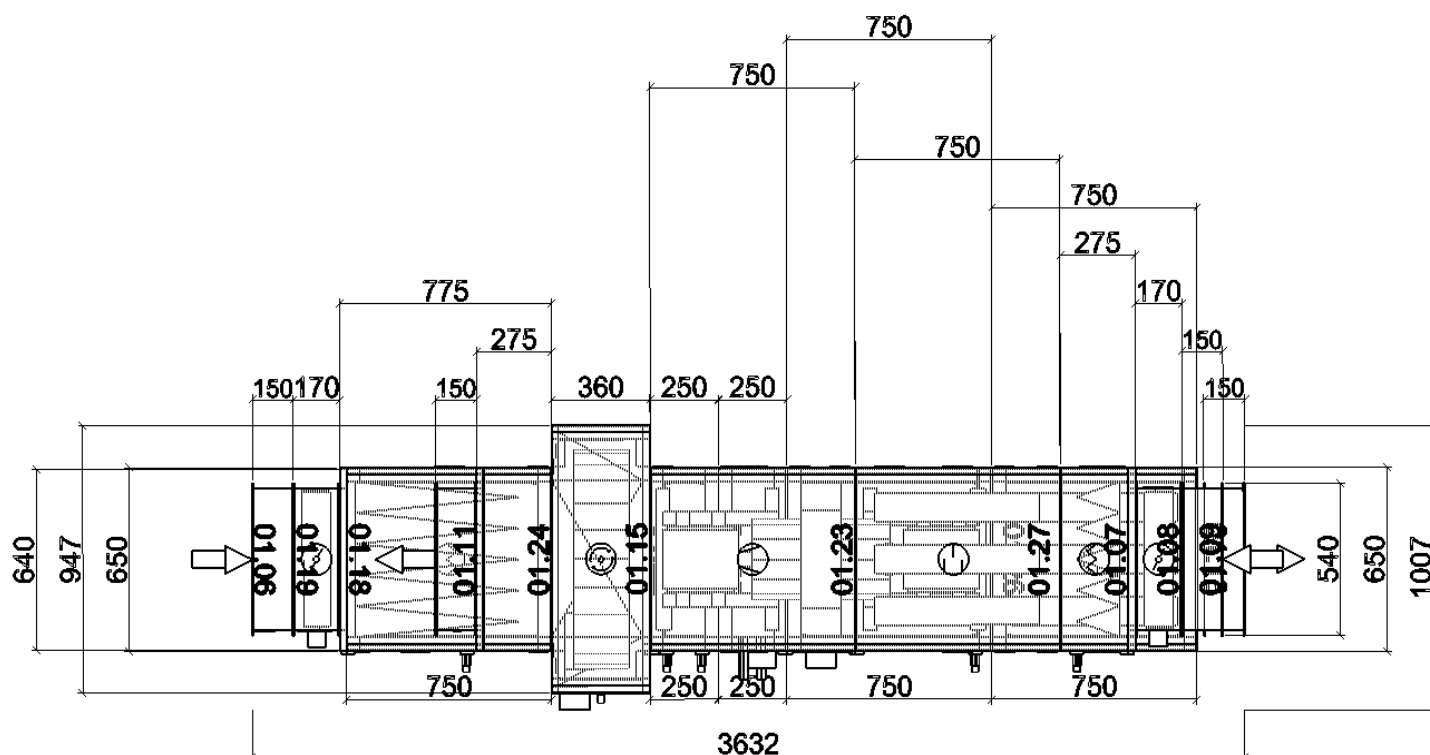


**Graphic view**

Device  
Device dimensions

**From above XY**

01 - air rec. and vent. unit  
X = 3631 mm, Y = 1009 mm



**Graphic view**

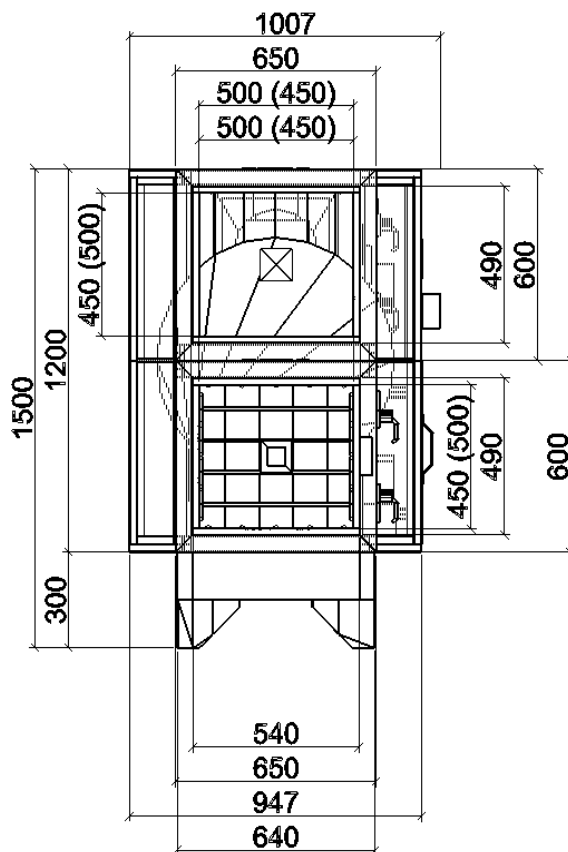
Device

Device dimensions

**From left YZ**

01 - air rec. and vent. unit

X = 1009 mm, Y = 1500 mm



**Graphic view**

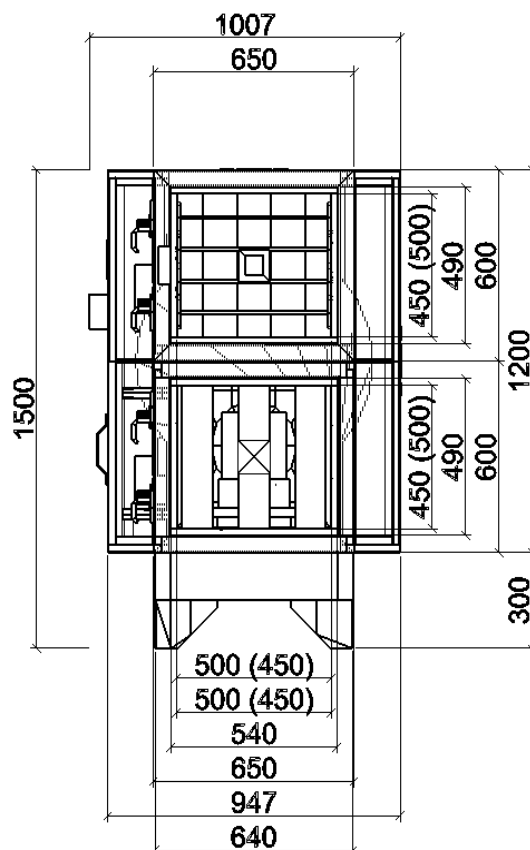
Device

Device dimensions

**From right YZ**

01 - air rec. and vent. unit

X = 1009 mm, Y = 1500 mm



# Graphic view

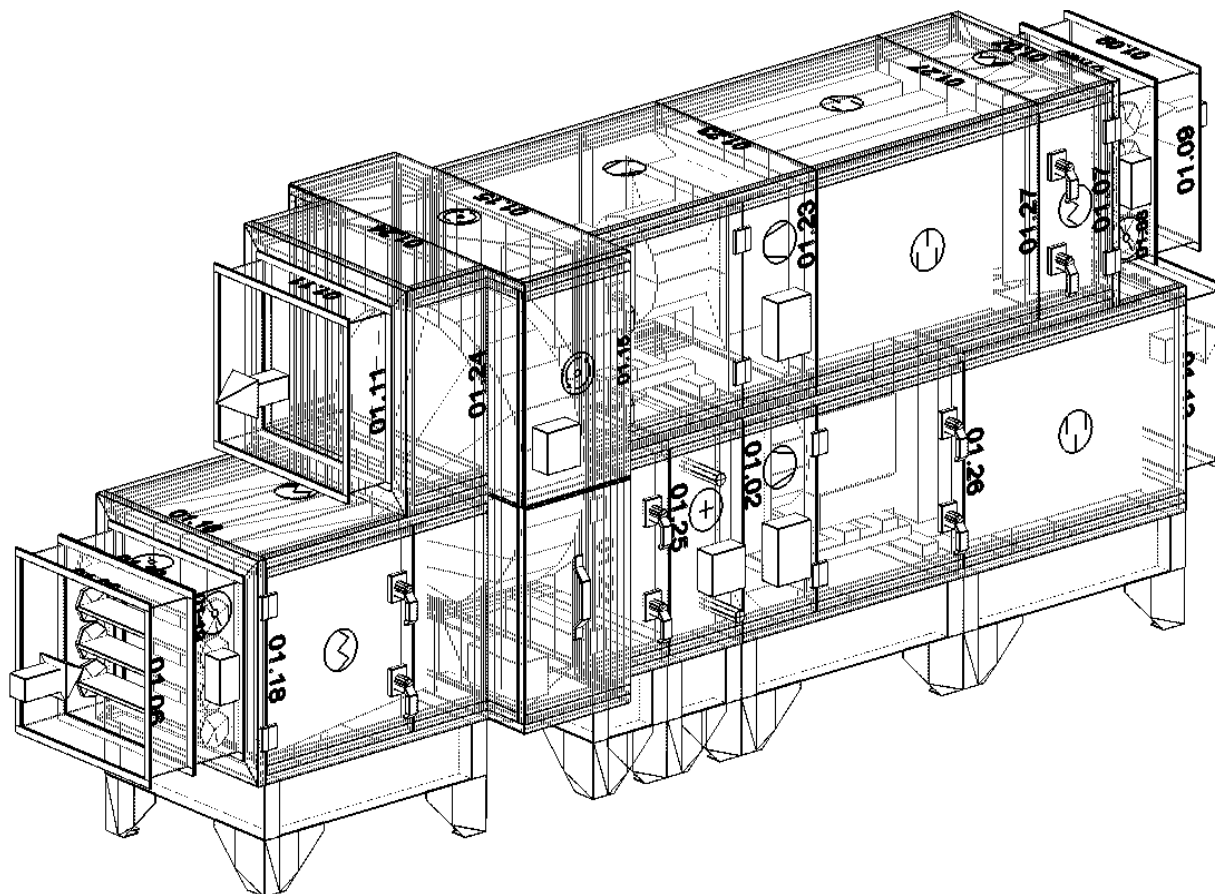
Device

Device dimensions

## Axonometry XYZ from front

01 - air rec. and vent. unit

X = 3631 mm, Y = 1009 mm, Z = 1500 mm



# Graphic view

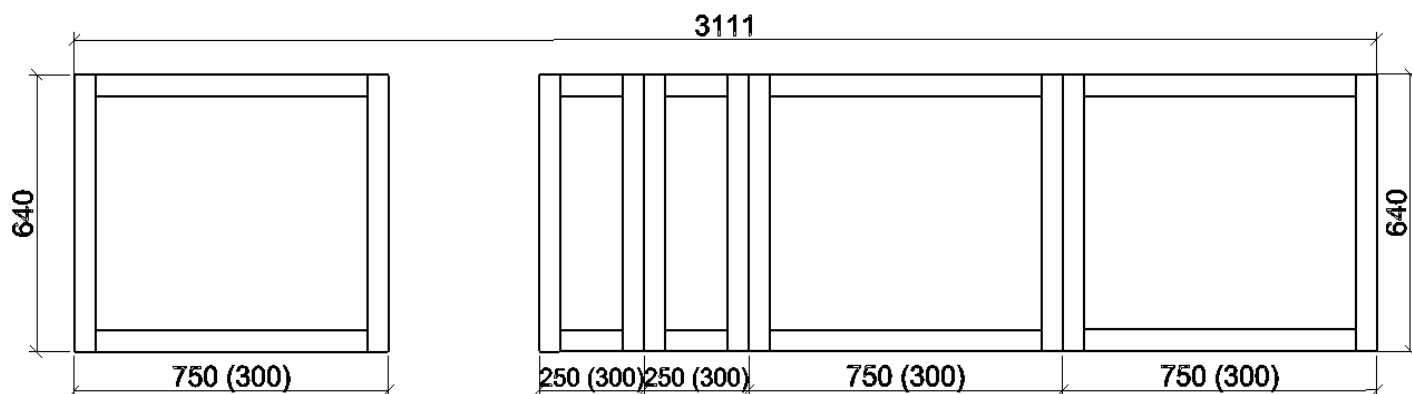
Device

Device dimensions

## Subframes

01 - air rec. and vent. unit

X = 640 mm, Y = 3111 mm, Socle width of frame profile = 40 mm

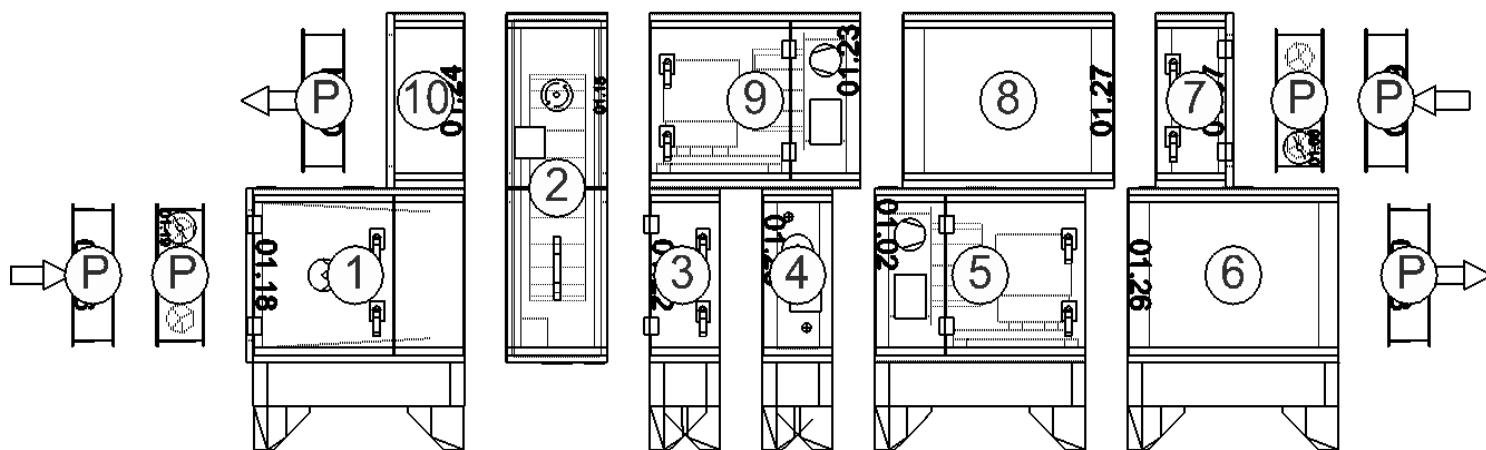


**Graphic view**

Device  
Device dimensions

**Blocks**

01 - air rec. and vent. unit  
X = 3631 mm, Y = 1500 mm

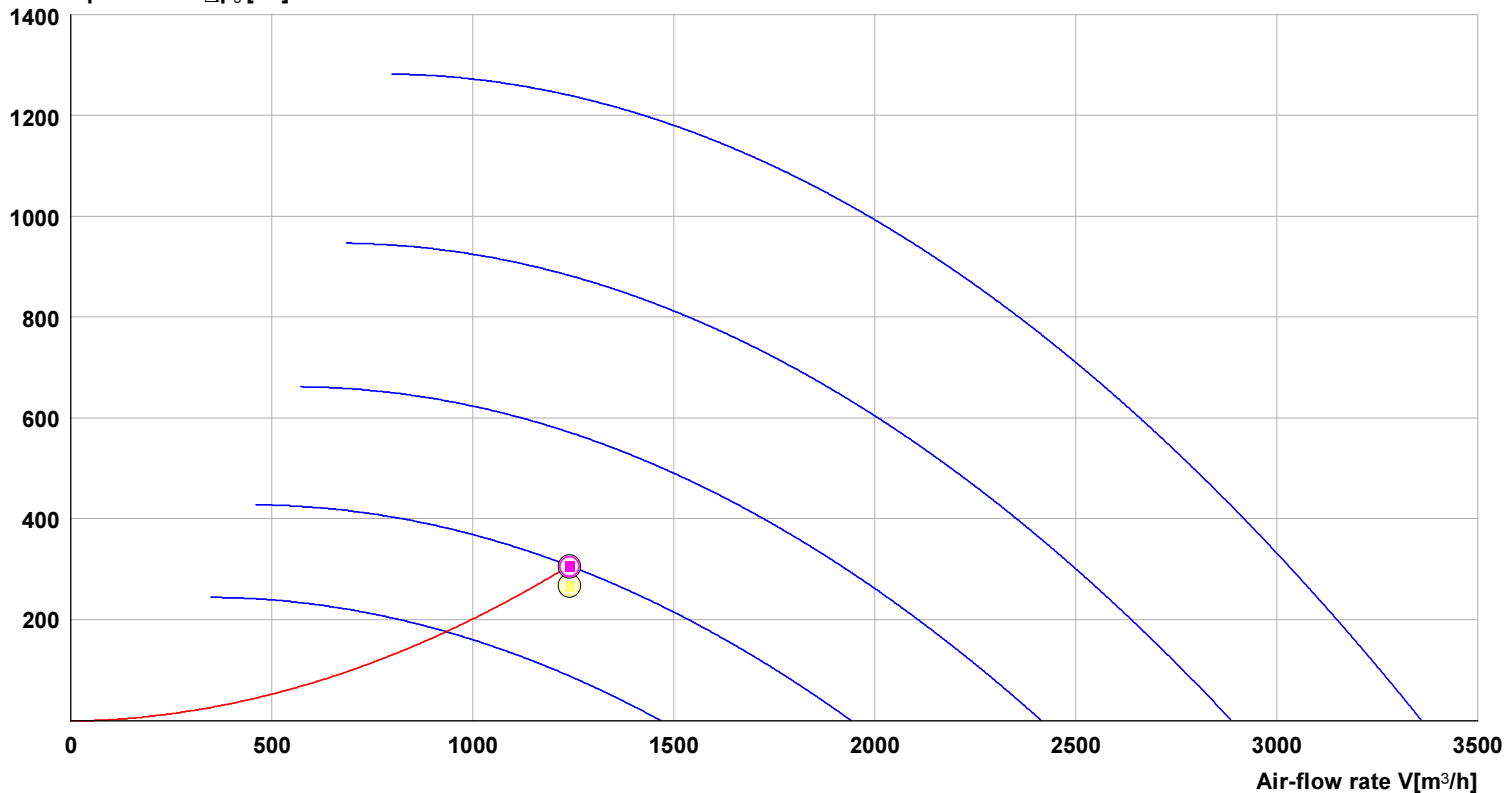


**Fans' profiles: Air flow - static pressure**

Inlet section

Type	$V_n$ [m³/h]	$\Sigma \Delta p_s$ [Pa]	$\Sigma \Delta p_t$ [Pa]	$n$ [1/min]	U [V]	P [kW]	$\eta$ [%]
XPVP 250-0,75/64-J2 (IE1)	1240	308	326	3700	3NPE 400 V, 50 Hz	0.14	78

**Static pressure -  $\Delta p_s$  [Pa]**



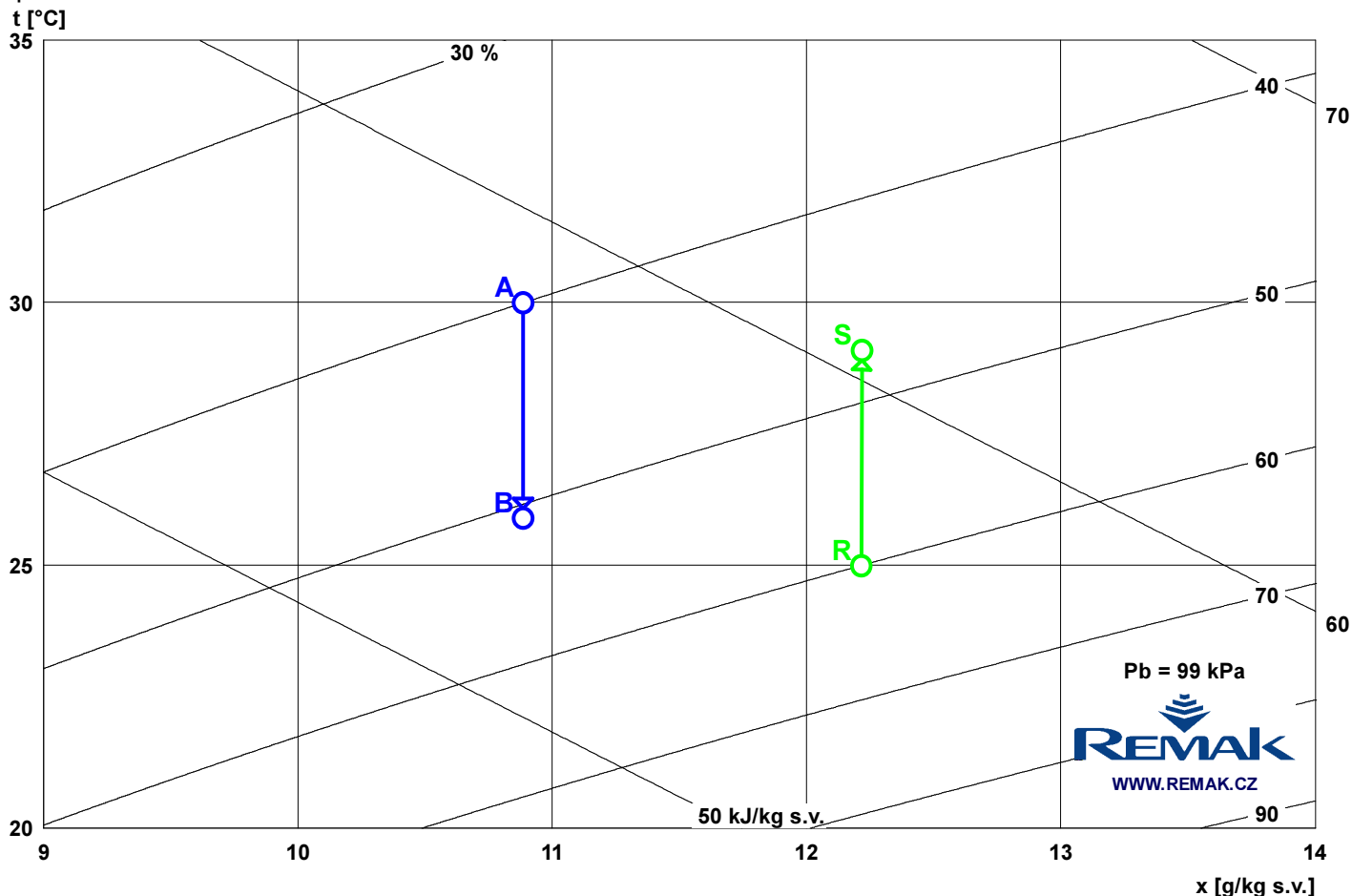
Type	V <sub>n</sub> [m³/h]	Σ Δp <sub>s</sub> [Pa]	Σ Δp <sub>t</sub> [Pa]	n [1/min]	U [V]	P [kW]	η [%]
XPVP 250-0,75/64-J2 (IE1)	1240	308	326	3700	3NPE 400 V, 50 Hz	0.14	78

The graph shows the relationship between pressure drop  $\Delta p_s$  [Pa] and air-flow rate  $V$  [m³/h] for a duct with a circular obstacle. The x-axis ranges from 0 to 3500 m³/h, and the y-axis ranges from 0 to 1400 Pa. Six blue curves represent different obstacle diameters  $d_{ob}$  (100, 150, 200, 250, 300, 350 mm). A red curve represents the pressure drop for a duct without an obstacle. A pink square and a yellow circle mark the intersection of the red curve and the blue curves at  $V \approx 1250$  m³/h and  $\Delta p_s \approx 300$  Pa.

Point	Item	Air temperature	Relative humidity	Specific humidity	Enthalpy	Density
		t [°C]	φ [%]	x [g/kg]	h [kJ/kg]	ρ [kg/m³]
A	01.15	-15.0	84.0	0.9	-13.0	1.33
B		13.7	37.1	3.7	23.2	1.20
C	01.25	21.0	23.5	3.7	30.6	1.17
R	01.15	20.0	45.0	6.7	37.2	1.17
S		-5.3	100.0	2.5	0.8	1.28

### Psychrometric diagram

Operation mode - Summer



Point	Item	Air temperature	Relative humidity	Specific humidity	Enthalpy	Density
		t [°C]	φ [%]	x [g/kg]	h [kJ/kg]	ρ [kg/m³]
A	01.15	30.0	40.0	10.9	58.1	1.13
B		25.9	49.9	10.9	53.4	1.14
R	01.15	25.0	60.0	12.2	56.4	1.14
S		29.1	46.1	12.2	59.9	1.13

### List of device errors

- Please check objectivity of service door hinge placing! Some components seem to have hinges at inadmissible places!

### Details to components of device

#### 01.06 Flexible connection

#### DV 500-450

Volume [m³]	0.03	Pressure drop for calculation [Pa]	0
Mass [kg]	3		



### 01.19 Blending damper

### LK 500-450

Volume [m <sup>3</sup> ]	0.04	Pressure drop for calculation [Pa]	0
Mass [kg]	8	Area of dampers [m <sup>2</sup> ]	0.23
Real air-flow [m <sup>3</sup> /h]	1240		

- **Actuator LM 230A**

### 01.18 Filter section

### XPHO 04/D

Volume [m <sup>3</sup> ]	0.29	Inner casing material	Galvanized steel / L2
Mass [kg]	57	Inspection access	From the right
Outer casing material	Galvanized steel	Real air-flow [m <sup>3</sup> /h]	1240

- **End panel - inlet XPK 04/P**

Pressure drop for calculation [Pa]	4
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- **Panel installation kit XPK 04/P (MSP)**
- **Filter insert XPNH 04/5**

Design pressure drop [Pa]	19	Filtration area [m <sup>2</sup> ]	3.14
Clean pressure drop [Pa]	19	Final pressure drop [Pa]	200
Cross sectional velocity [m/s]	1.52	Capacity [g]	510
Filter	Bag type	Temperature resistivity (max) [°C]	80
Filtration class	M5	Combustibility class	F1
Average synthetic dust separating efficiency [%]	88.00	Possibility to be regenerated	Cannot be regenerated
Average dust separating efficiency [%]	44.00		

### 01.15 Rotary heat-exchanger section

### XPXR 04/0

Volume [m <sup>3</sup> ]	0.41	<u>Extract air conditions in</u>	<u>Winter</u>	<u>Summer</u>
Mass [kg]	150	Temperature [°C]	20.0	25.0
Outer casing material	Galvanized steel	Relative air humidity [%]	45	60
Inner casing material	Galvanized steel / L2	Specific humidity [g/kg]	6.70	12.22
Inspection access	From the right	Enthalpy [kJ/kg]	37.20	56.35
Heat exchanger type	Thermal	<u>Exhaust air conditions out</u>	<u>Winter</u>	<u>Summer</u>
Wave height / rotor width	1,4 / 200 mm	Temperature [°C]	-5.3	29.1
Real air-flow [m <sup>3</sup> /h]	1240 / 1240	Relative air humidity [%]	100	46
Pressure drop for calculation [Pa]	69 / 67	Specific humidity [g/kg]	2.49	12.22
Operate in season	Winter and Summer	Enthalpy [kJ/kg]	0.83	59.94
<u>Supply air conditions in</u>	<u>Winter</u>	<u>Output parameters</u>	<u>Winter</u>	<u>Summer</u>
Temperature [°C]	-15.0	Temperature efficiency [%]	82	82
Relative air humidity [%]	84	Humidity efficiency [%]	49	0
Specific humidity [g/kg]	0.88	Sensible output [kW]	12.7	1.6
Enthalpy [kJ/kg]	-12.99	Bound output [kW]	3.2	0.0
<u>Supply air conditions out</u>	<u>Winter</u>	Total output [kW]	15.8	1.6
Temperature [°C]	13.7	Speed [U/min]	12	
Relative air humidity [%]	37	Motor output [W]	90	
Specific humidity [g/kg]	3.73	Current max. [A]	0.42	
Enthalpy [kJ/kg]	23.18	Motor supply voltage	3NPE 400 V, 50 Hz	

### 01.22 Service section

### XPJS 04/K

Volume [m <sup>3</sup> ]	0.10	Inner casing material	Galvanized steel / L2
Mass [kg]	16	Inspection access	From the right
Outer casing material	Galvanized steel	Real air-flow [m <sup>3</sup> /h]	1240

### 01.25 Heater section

### XPTV 04

Volume [m <sup>3</sup> ]	0.14	Inner casing material	Galvanized steel / L2
Mass [kg]	30	Media connection	From the right
Outer casing material	Galvanized steel	Real air-flow [m <sup>3</sup> /h]	1240
• <b>Water heater XPNC 04/1R</b>			
Pressure drop for calculation [Pa]	11	Relative air humidity [%]	23
Design according to conditions	Winter	Specific humidity [g/kg]	3.70
Heat transmission substance	Water	Enthalpy [kJ/kg]	30.60
Activate atypical function design	No	Outlet temperature of medium (actual) [°C]	70
Inlet medium temperature [°C]	90	Heating output (actual) [kW]	3.0
Outlet temperature of medium (specified) [°C]	70	Flow rate of heat transmission substance [m <sup>3</sup> /h]	0.13
<u>Air conditions in</u>	<u>Winter</u>	Pressure drop of substance [kPa]	0.9
Temperature [°C]	13.7	Number of rows	1
Relative air humidity [%]	37	Number of circuits	1
Specific humidity [g/kg]	3.73	Fins spacing	2.1
Enthalpy [kJ/kg]	23.18	Diameter of connection	1
<u>Air conditions out</u>	<u>Winter</u>	Water content [l] 0.95	
Temperature [°C]	21.0		

- **Mixing set SUMX 1 (1)**
- **Anti-freeze sensor NS 130 R**

### 01.02 Fan section

### XPAP 04/S

Volume [m <sup>3</sup> ]	0.29	Inner casing material	Galvanized steel / L2
Mass [kg]	67	Inspection access	From the right
Outer casing material	Galvanized steel	Real air-flow [m <sup>3</sup> /h]	1240

- **Fan XPVP 250-0,75/64-J2 (IE1)**

Pressure gain for calculation [Pa]	308	Static pressure [Pa]	308
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Total pressure [Pa]	326	Total pressure max. [Pa]	1290
Fan output [kW]	0.14	Motor supply voltage	3NPE 400 V, 50 Hz
Efficiency [%]	78	Regulator supply voltage	1NPE 230 V, 50 Hz
Electric input [kW]	0.19	Motor output nom. [W]	750
Cross sectional velocity [m/s]	1.25	Current max. [A]	8.30
Design to output level	2	Working temperature max. [°C]	40
Operating frequency [Hz]	37	Number of poles	2
Impeller diameter [mm]	250	Thermocontacts	Yes
Blade geometry	Backward	Electric protection	IP 55
Transmission	Direct	Insulation class	F
Fan speed [1/min]	3700	Type of control	frequency
Air flow max. [m³/h]	3361	Motor efficiency class	IE1

• **Speed controller** XPFM 0.75 (1x230V) V

#### 01.26 Attenuator section

#### XPPO 04/N

Volume [m³]	0.29	Inner casing material	Galvanized steel / L2
Mass [kg]	58	Real air-flow [m³/h]	1240
Outer casing material	Galvanized steel	Pressure drop for calculation [Pa]	2

#### 01.13 Flexible connection

#### DV 500-450

Volume [m³]	0.03	Pressure drop for calculation [Pa]	0
Mass [kg]	3		

#### 01.09 Flexible connection

#### DV 500-450

Volume [m³]	0.03	Pressure drop for calculation [Pa]	0
Mass [kg]	3		

#### 01.08 Blending damper

#### LK 500-450

Volume [m³]	0.04	Pressure drop for calculation [Pa]	0
Mass [kg]	8	Area of dampers [m²]	0.23
Real air-flow [m³/h]	1240		

• **Actuator** LM 230A

#### 01.07 Filter section

#### XPFO 04/K

Volume [m³]	0.10	Inner casing material	Galvanized steel / L2
Mass [kg]	25	Inspection access	From the left
Outer casing material	Galvanized steel	Real air-flow [m³/h]	1240

• **End panel - inlet** XPK 04/P

Pressure drop for calculation [Pa]	4
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• **Panel installation kit** XPK 04/P (MSP)  
• **Filter insert** XPNV 04/3

Design pressure drop [Pa]	17	Final pressure drop [Pa]	150
Clean pressure drop [Pa]	17	Capacity [g]	340
Filter	Insert type	Temperature resistivity (max) [°C]	100
Filtration class	G3	Combustibility class	F1
Average synthetic dust separating efficiency [%]	85.00	Possibility to be regenerated	Cannot be regenerated
Filtration area [m²]	0.61		

#### 01.27 Attenuator section

#### XPPO 04/N

Volume [m³]	0.29	Inner casing material	Galvanized steel / L2
Mass [kg]	58	Real air-flow [m³/h]	1240
Outer casing material	Galvanized steel	Pressure drop for calculation [Pa]	2

#### 01.23 Fan section

#### XPAP 04/S

Volume [m³]	0.29	Inner casing material	Galvanized steel / L2
Mass [kg]	67	Inspection access	From the left
Outer casing material	Galvanized steel	Real air-flow [m³/h]	1240

• **Fan** XPVP 250-0,75/64-J2 (IE1)

Pressure gain for calculation [Pa]	308	Total pressure max. [Pa]	1290
Static pressure [Pa]	308	Motor supply voltage	3NPE 400 V, 50 Hz
Total pressure [Pa]	326	Regulator supply voltage	1NPE 230 V, 50 Hz
Fan output [kW]	0.14	Motor output nom. [W]	750
Efficiency [%]	78	Current max. [A]	8.30
Electric input [kW]	0.19	Working temperature max. [°C]	40
Design to output level	2	Number of poles	2
Operating frequency [Hz]	37	Thermocontacts	Yes
Impeller diameter [mm]	250	Electric protection	IP 55
Blade geometry	Backward	Insulation class	F
Transmission	Direct	Type of control	frequency
Fan speed [1/min]	3700	Motor efficiency class	IE1
Air flow max. [m³/h]	3361		

• **Speed controller** XPFM 0.75 (1x230V) V

#### 01.24 Empty section

#### XPJP 04/K

Volume [m³]	0.10	Outer casing material	Galvanized steel
Mass [kg]	21	Inner casing material	Galvanized steel / L2

Real air-flow [m<sup>3</sup>/h] 1240

• End panel - outlet XPK 04/P

Pressure drop for calculation [Pa] 4

• Panel installation kit XPK 04/P (MSP)

## 01.11 Flexible connection

## DV 500-450

Volume [m<sup>3</sup>] 0.03

Mass [kg] 3

Pressure drop for calculation [Pa]

0

### Accessories

### Number Code

01.XX	Connection set	XPSS 04/M	5 PCs	XPSSS04MR
01.XX	Base frame	XPR 04/750-3	1 PCs	XPROS0407503P
	for section	01.18 XPHO 04/D		
01.XX	Base frame	XPR 04/750-3	1 PCs	XPROS0407503P
	for section	01.26 XPPO 04/N		
01.XX	Base frame	XPR 04/750-3	1 PCs	XPROS0407503P
	for section	01.02 XPAP 04/S		
01.XX	Base frame	XPR 04/250-3	1 PCs	XPROS0402503P
	for section	01.25 XPTV 04		
01.XX	Base frame	XPR 04/250-3	1 PCs	XPROS0402503P
	for section	01.22 XPJS 04/K		