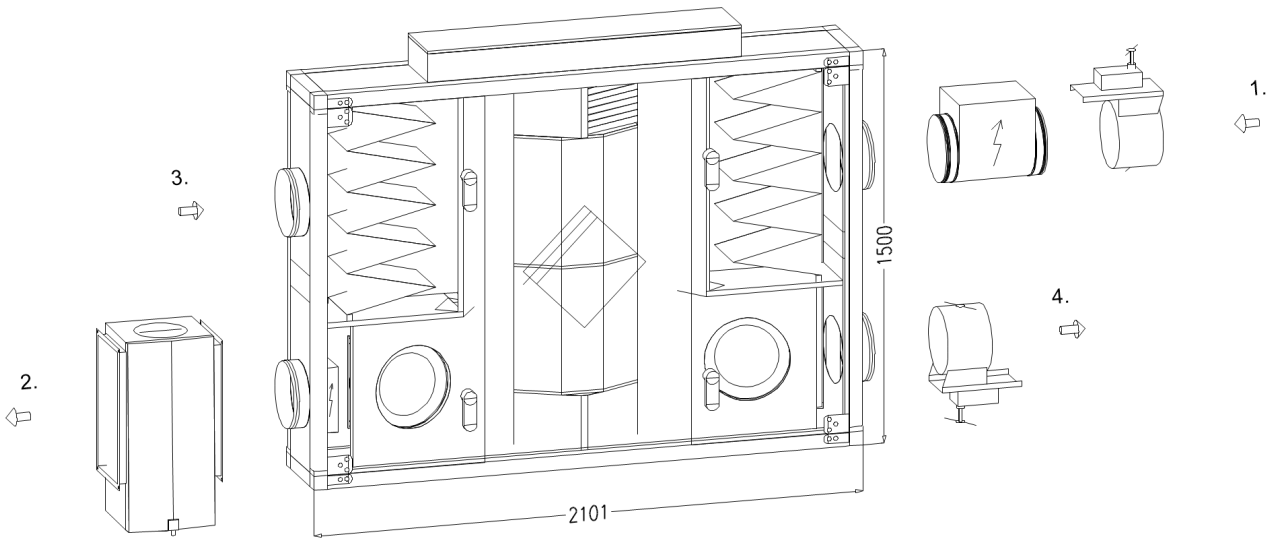
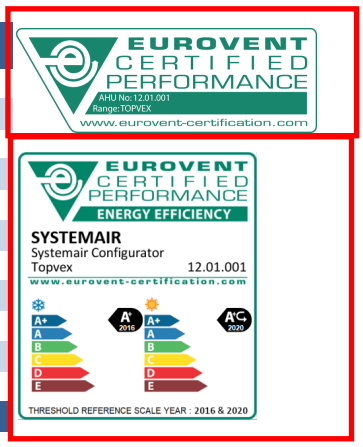
Topvex FC02 EL-L-CAV (94594)

Total weight: 270 kg
Width: 350 mm
Duct connection: Ø 250 mm



1. Outdoor
2. Supply
3. Extract
4. Exhaust

	Supply air	Extract air	Units
Airflow (1.205 kg/m³)	800	800	m³/h
Face velocity (unit)	1.1	1.1	m/s
External pressure	250	250	Pa
Fan speed	3,003	2,878	rpm
Filter	ePM1 60% (F7)	ePM10 60% (M5)	
Break out sound power	59 dB (A)		
Design outdoor temperature	-23.0 °C		
Heating, electric	5.02 kW ; -23.0/-7.0°C ; 3x400V		
Heating, electric	1.37 kW ; 16.9/22.0°C ; 3x400V		
Cooling coil, evaporation	3.69 kW ; 23.9/15.1°C		
Medium	5.0 °C ; 60.44 l/min ; 22 mm / 22 mm Pipe connections		
Energy			
Temperature efficiency (wet/EN 308)	82.5 / 80.5		%
SFPv, clean filter pressure drop	2.23		kW/(m³/s)
SFPe with dimensional filter pressure drop	2.58		kW/(m³/s)
Ecodesign 2018 approved	Yes		



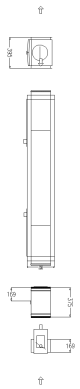
EUROVENT
CERTIFIED
PERFORMANCE
AHU No: 12.01.001
Range:TOPVEX
www.eurovent-certification.com

Unit data		
Item number	94594	
Unit name (optional)	MRT patalpos	
Notes	Reversinis DX	
Country (for EECS)	Lithuania	
Place (for EECS)	VILNIUS INTL	
Total weight	270	kg
Eurovent energy class	A+	
Eurovent Energy efficiency class summer	A+	

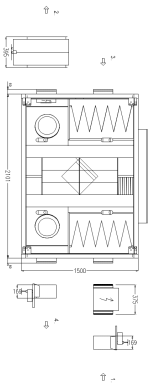
Ecodesign		
Trade name	Systemair	
Product name	Topvex FC02	
Fulfills Ecodesign 2018	Yes	
Unit category	NRVU	
Unit type	BVU	
Drive	Integrated VSD	
Heat recovery type	Recuperative	
Temperature ratio	81.3	%
Nominal airflow	720	m³/h
P nom	0	kW
SFP int	1,088	W/(m³/s)
Face velocity	0.99	m/s
Nominal pressure	200	Pa
Ps int. Supply	292	Pa
Ps int. Extract	252	Pa
Supply fan efficiency	49.7	%
Extract Fan efficiency	50.3	%
External leakage	2	%
Internal leakage	1	%
Sound power level (LwA)	56	dB (A)

1. Outdoor 2. Supply 3. Extract 4. Exhaust

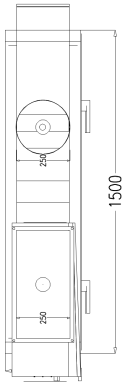
Top



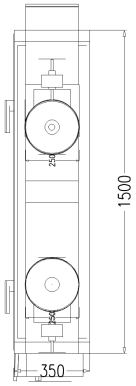
Front



Left



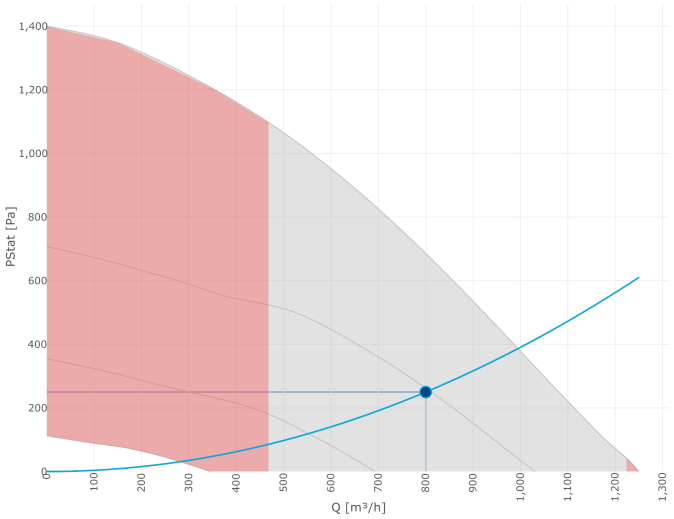
Right



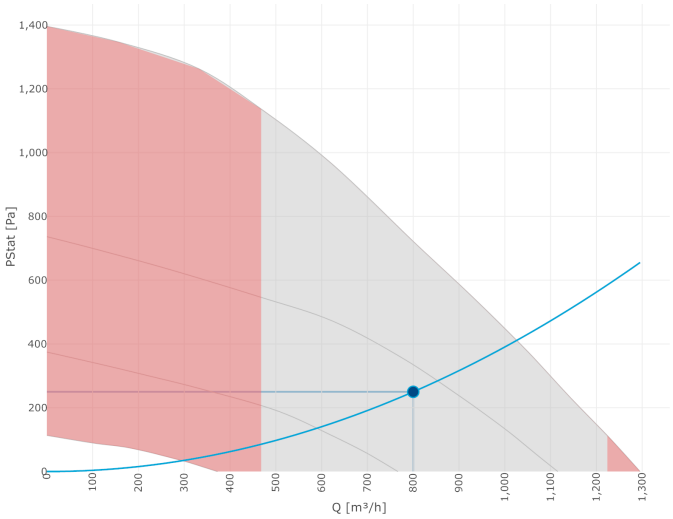
Air and sound

Winter

Supply



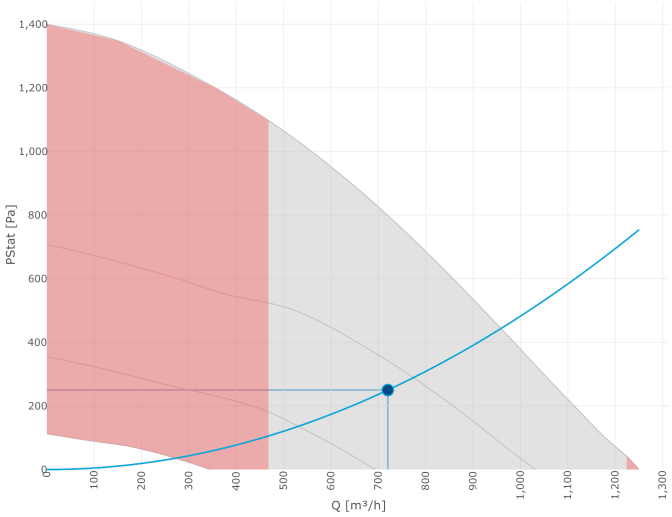
Extract



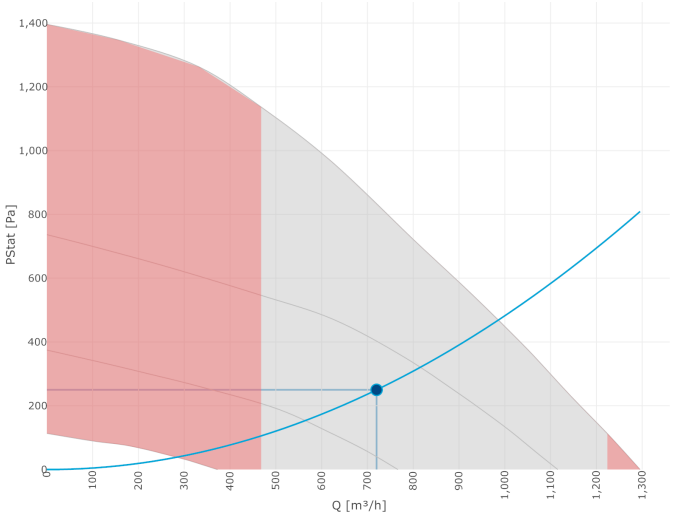
	Octave bands [Hz]								
	63	125	250	500	1k	2k	4k	8k	Total
Sound power level	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB(A)]
Supply	94	78	90	80	75	75	71	69	85
Outdoor	88	67	61	56	52	44	36	29	64
Extract	81	66	60	54	51	43	31	22	59
Exhaust	93	77	80	74	73	73	66	63	79
Surrounding	72	62	65	57	44	43	38	33	59

Summer

Supply



Extract



	Octave bands [Hz]								
	63	125	250	500	1k	2k	4k	8k	Total
Sound power level	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB(A)]
Supply	90	77	87	78	74	74	69	67	82
Outdoor	85	65	60	54	50	42	35	26	61
Extract	78	64	59	52	49	41	30	22	57
Exhaust	89	76	78	72	71	71	65	63	77
Surrounding	69	61	63	56	43	41	36	31	57

Casing

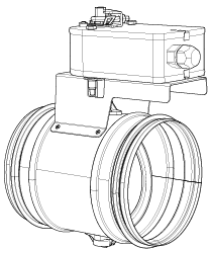
Casing name	Topvex
Thickness of panel	50 mm
Insulation material	Mineral wool
Internal and external sheet metal thickness	0.7 - 2 mm
Single or double skin	Double
CAL @ -400 Pa (EN1886)	L2 (R)
CAL @ 400 Pa (EN1886)	L2 (R)
Enclosure Class	IP23

Control cabinet

Air volume control	VAV
Main power supply unit	3x400V
External communication	Modbus / Exoline via RS485, Modbus / Exoline / Built in WEB via TCP/IP, BACnet via IP
Temperature control	Cascaded Extract Air Control
Language in controller menu	Select local language by startup
Recommended fuse unit	3 x 13 A
Pre-heater	Separat tilluft
Note	

Supply air side

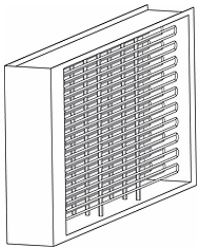
Outdoor - Damper



Model	Tune-R-250-3-LF24
Item number	79889
Note	

	Winter	Summer	
Pressure drop	0	0	Pa

Outdoor - Electric coil



Capacity	9.0	kW
Power supply electrical heater	3x400	V
Note		

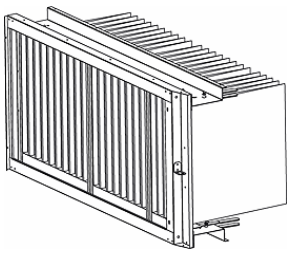
	Winter	Summer	
Airflow	800		m³/h
Inlet air temperature	-23.0		°C
Outlet air temperature	-7.0		°C
Requested outlet air temperature	-7.0		°C
Inlet relative humidity	90		%
Outlet relative humidity	21		%
Nominal capacity	9.00		kW
Power output	5.02		kW
Power output [%]	56		%

Outdoor - Duct connection

Dimension	Ø 250 mm	
Note		

	Winter	Summer	
Air temperature	-7.0	32.0	°C
Air relative humidity	21	40	%
Airflow	800	720	m³/h
External pressure drop outdoor	50	50	Pa

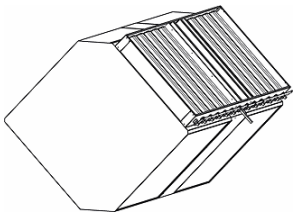
Outdoor - Filter



Model	BFT FC02 Filter ePM1 60%	
Filter type	Bag Filter	
Class	ePM1 60% (F7)	
Length	375	mm
Width	837	mm
Height	242	mm
Required number of filters	1	
Note		

	Winter	Summer	
Initial pressure drop	39	33	Pa
Design pressure drop	121	103	Pa
Terminal pressure drop	203	173	Pa
Face velocity	1.1	1.0	m/s
Energy performance	0.31	0.25	kW

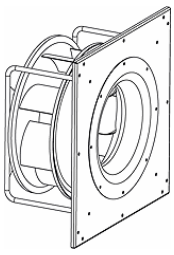
Plate heat recovery



Model	REK+23-500-22	
Defrosting	Bypass	
Note		

	Winter	Summer	
Temperature efficiency (wet)	82.5	81.2	%
Temperature efficiency (EN 308)	80.5	81.3	%
Supply pressure drop	102	87	Pa
Extract pressure drop	107	87	Pa
Total duty	6.42	2.03	kW
Condensate	1.00	0.00	kg/h
Supply temperature before/after	-7.0 / 16.9	32.0 / 23.9	°C
Supply RH before/after	21 / 4	40 / 64	%
Extract temperature before/after	22.0 / 0.9	22.0 / 30.1	°C
Extract RH before/after	30 / 96	50 / 31	%
Heat exchanger active	Yes	Yes	-

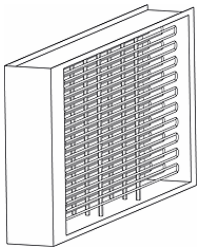
Supply - EC Fan



Type of drive	Direct drive	
Fan type	High Efficiency	
Impeller type	Plastic/Composite	
Motor protection	Thermistor	
Max. temperature of transported air	60.0	°C
Max. temperature of transported air when voltage-controlled	60.0	°C
Note		
Rated voltage	1x230V	

	Winter	Summer	
Air volume flow	800	720	m³/h
External static pressure	250	250	Pa
Internal static pressure	460	386	Pa
Total static pressure. The pressure drop of the fan is calculated as a part of the static pressure drop for the complete unit.	710	636	Pa
Power	0.31	0.26	kW
Speed	3,003	2,849	rpm
SFP	1.38	1.29	kW/(m³/s)
Total efficiency by total pressure, incl. motor and speed control	51.3	49.3	%
Spare capacity	20	24	%

Supply - Electric coil



Capacity	5.0	kW
Power supply electrical heater	3x400	V
Note		

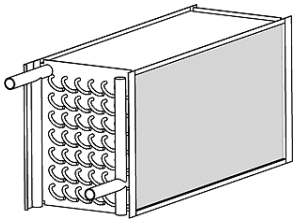
	Winter	Bypass	Summer	
Airflow	800	800		m³/h
Inlet air temperature	16.9	-7.0		°C
Outlet air temperature	22.0	10.0		°C
Requested outlet air temperature	22.0	22.0		°C
Inlet relative humidity	4	21		%
Outlet relative humidity	3	6		%
Nominal capacity	5.00	5.00		kW
Power output	1.37	5.00		kW
Power output [%]	27	100		%

Supply - Duct connection

Dimension	Ø 250 mm
Note	

	Winter	Summer	
Air temperature	22.0	23.9	°C
Air relative humidity	3	64	%
Airflow	800	720	m³/h
External pressure drop supply	200	200	Pa

Supply - Cooling coil



Coil type	Evaporator	
Refrigerant	R407C	
Droplet eliminator	No	
Note		
Inlet connection size	22 mm	
Coil volume	1.26	l
Outlet connection size	22 mm	
Tube material	Cu	
Fin material	Al(Hydrophilic)	
Fin spacing	2.5	mm
No of rows	3	
Drip tray material	Standard	
Coil code	M 25x22-3/8 C S 10T 3R 500A 2.5P 3NC	
Coil model	DXRE 50-25-3-2,5	

	Winter	Summer	
Application	Heat pump use	Cooling only	-
Fluid sub cooling temperature	3.0	3.0	°C
DX evaporating temperature	5.0	5.0	°C
Requested air outlet temperature	22.0	18.0	°C
Gas super heating temperature	10.0	10.0	°C
Gas condensation temperature	40.0	40.0	°C
Result total cooling capacity		3.69	kW
Sensible cooling		2.18 kW (59 %)	-
Result total heating capacity	4.39		kW
Sensible heating	4.39 kW (100 %)		-
Fluid pressure drop	1.40	3.41	kPa
Air inlet temperature	8.0	23.9	°C
Air outlet temperature	24.3	15.1	°C
Air volume flow	800	720	m³/h
Air pressure drop	24	24	Pa
Air pressure drop, dry		20	Pa
Air face velocity	1.7	1.7	m/s
Air inlet relative humidity	30	64	%
Air outlet relative humidity	11	88	%

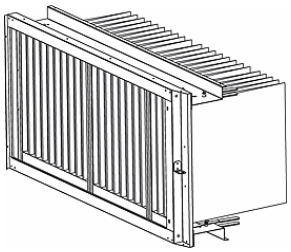
Extract air side

Extract - Duct connection

Dimension	Ø 250 mm	
Note		

	Winter	Summer	
Air temperature	22.0	22.0	°C
Air relative humidity	30	50	%
Airflow	800	720	m³/h
External pressure drop extract	200	200	Pa

Extract - Filter



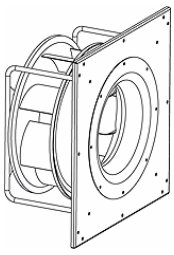
Model	BFT FC02 Filter ePM10 60%	
Filter type	Bag Filter	
Class	ePM10 60% (M5)	
Length	375	mm
Width	837	mm
Height	242	mm
Required number of filters	1	
Note		

	Winter	Summer	
Initial pressure drop	17	14	Pa
Design pressure drop	103	84	Pa
Terminal pressure drop	188	154	Pa
Face velocity	1.1	1.0	m/s
Energy performance	0.25	0.20	kW

Plate heat recovery

Data - see supply air side

Exhaust - EC Fan



Type of drive	Direct drive	
Fan type	High Efficiency	
Impeller type	Plastic/Composite	
Motor protection	Thermistor	
Max. temperature of transported air	60.0	°C
Max. temperature of transported air when voltage-controlled	60.0	°C
Note		
Rated voltage	1x230V	

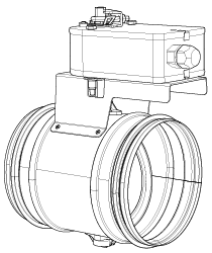
	Winter	Summer	
Air volume flow	800	720	m³/h
External static pressure	250	250	Pa
Internal static pressure	397	322	Pa
Total static pressure. The pressure drop of the fan is calculated as a part of the static pressure drop for the complete unit.	647	572	Pa
Power	0.27	0.23	kW
Speed	2,878	2,695	rpm
SFP	1.20	1.14	kW/(m³/s)
Total efficiency by total pressure, incl. motor and speed control	53.9	50.0	%
Spare capacity	23	28	%

Exhaust - Duct connection

Dimension	Ø 250 mm	
Note		

	Winter	Summer	
Air temperature	0.9	30.1	°C
Air relative humidity	96	31	%
Airflow	800	720	m³/h
External pressure drop exhaust	50	50	Pa

Exhaust - Damper



Model	Tune-R-250-3-LF24
Item number	79889
Note	

	Winter	Summer	
Pressure drop	0	0	Pa

Accessories

Rubber bushing kit 4pcs Topvex

Item number	112708
Quantity	1

DXRE 40-20-3-2,5 Duct cooler

Item number	7951
Quantity	1

Preheat. kit Topvex CB250 EL

Item number	131084
Quantity	1

TUNE-R-250-3-LF24

Item number	79889
Quantity	2

DXRE 50-30-3-2,5 Duct cooler

Item number	7953
Quantity	1

DXRE 50-25-3-2,5 Duct cooler

Item number	7952
Quantity	1

ASF 250/KB Flex. connection

Item number	2716
Quantity	1

VAV Air Volume Control

Item number	145946
Quantity	1

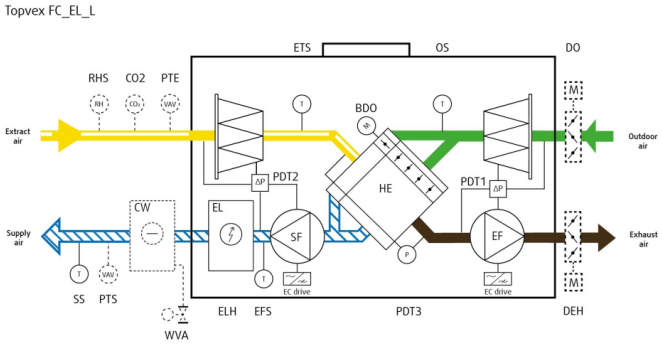
Integrated control system, Systemair Access

The air handling unit is built with a complete and fully integrated control system - based on the Access control unit mounted in the control cabinet and the NaviPad user interface. The air handling unit can either run stand alone or handled from a building management system. Before shipment the unit has been assembled and has passed a final functional test and inspection. Set-up and parameters are stored in the control unit during this process.

Flow chart

Extract

Outdoor



Supply

Exhaust

BDO	Bypass damper outdoor air	CO2	CO2 sensor	CW	Cold Water cooler
DEH	Damper Exhaust air	DO	Damper Outroor air	EF	Extract Fan
EFS	Efficiency sensor	ELH	en-GB.SysCon.CompactUnits.Flowchart.ELH	ETS	Extract air temp. Sensor
HE	Heat Exchanger	OS	Outdoor air temp. Sensor	PDT	Pressure sensor
PTE	Pressure Transmitter Extract air fan	PTS	Pressure Transmitter Supply air fan	RHS	Relative Humidity Sensor
SF	Supply Fan	SS	Supply air temp. Sensor	WVA	Water Valve Actuator

Control cabinet and mains supply

The cabinet holds necessary components including terminal blocks, fuses, 24VAC power supply and the Access control unit. On site mains power supply must be connected to the cabinet. The installer on site has full responsibility to ensure that any unit/installation which requires additional protection of the mains power supply is all carried out according to local statutory requirements. The supply disconnecting safety switch for the unit is not included.

External electrical components

Temperature sensor for the supply air duct, is delivered with the unit and must be connected to the terminals in the cabinet by the installer on site.
The control cabinet design is prepared for connection of delivered components and any extra sensors that could be needed.
Depending on the customer's choice, external components are delivered, such as:
• pressure transmitters in ducts for pressure control
• valve for heating and circulation pump for heating coil
User interface with 3 m cable is not connected to control unit.

Access Control unit and NaviPad user interface

The Access NaviPad with a 7” capacitive touch screen connected by cable (3m) to the Access CU283W-4 control unit in the cabinet. All normal handling and configuration is carried out from the graphical user interface in the NaviPad. The protection class of the NaviPad is IP 54, but not for outdoor mounting. The communication between the user interface and the control unit in the cabinet is possible with up to 100 meters of cable.
The installer must use Standard PDS LAN network cable AWG23 (path cable) for extension
If several units are connected to a local network (on the same subnet), the NaviPad will be able to connect and monitor up to nine units. Please see separate instruction for details.

Schedules

The control unit has individual schedules for start, stop and high/low airflow rate for each weekday as well as schedules for holidays.
The control unit has automatic summer-winter-time change over.
Outside normal operating hours, free cooling is available according to settings.

Access rights – passwords

There are 3 different log-on levels
• End user – (no password) – access to read values and to change end-user relevant settings displayed on homepage.
• Operator level – (password) – access to read values and to change user relevant settings concerning schedules, temperature, air flow and to acknowledge alarms.
• Service level (password) – access to change configuration values, access to activate new functions, or restore factory settings.

Alarms and safety functions

If an alarm condition occurs, a circular light appear at the bottom of the control panel.
• Fixed green — Status ok (no active alarms).
• Flashing red — Active/returned alarms in one or many control
units.
• Fixed red — Acknowledged alarms in one or many control
units, alarms not reset
Alarms are logged in an alarm list. The list shows the type of alarm, date and time for the alarm and alarm class:
Class A alarm
Needs to be acknowledged
Class B alarm
Needs to be acknowledged
Class C alarm
Returns when the cause of the alarm disappear

Flexible System

A technician will be able to adapt the regulation further to the requirements of the users;
• The air flow regulation can be changed between several methods that are constant air volume through the fans, constant pressure in the ducts, CO2 dependant control or humidity dependant control.
• The temperature control mode can be changed between room temperature control, supply air temperature control and outdoor compensation of the selected temperature etc.
• In addition to the fixed schedule, an external start signal for extended operation is available, 3 levels
• In addition or as an alternative to the fixed schedule, an external stop input signal is available.
• A large number of other alternative functions are also optional.

Communication options

The control unit includes hardware and ports that can later be programmed by a technician according to demands from the user for two alternative methods that are;
- Communication to BMS via MODBUS RTU, TCP/IP or RS485
- Communication to BMS via BACnet IP

Heat exchanger

The capacity of the heat exchanger is stepless via modulating control.

Supply fan with EC motor

The supply air fan is driven by an EC motor with the impeller mounted directly on the motor shaft. All parameters have been configured and tested from factory.

Extract fan with EC motor

The extract air fan is driven by an EC motor with the impeller mounted directly on the motor shaft. All parameters have been configured and tested from factory.

Electric heater (EL units)

Modulated control of the electric heater is placed in the cabinet next to the heater, in the same section as the heater. The control unit in the cabinet delivers a 0-10 V DC or ON/OFF signal for control signal for the heater capacity.

Prepared for control of heating coil (HW units)

The unit is delivered with heating battery, and without valve and modulating valve motor.
The control unit is prepared for control of valve motor, and signal as well as power for valve motor is available from terminals in the switchboard, a 0-10 V DC signal and power 24VAC.
Terminals for 230 V circulation pump are available in the control cabinet. The pump for the heating circuit will always run when the outdoor temperature is lower than a settable value (+10 °C). At higher outdoor temperatures the pump will run when the heating output is larger than 0 %.
The pump has a settable, shortest running time and the pump will use a pump-kick once daily at 3 p.m.
Pump is not included in the delivery.

Freeze protection of the heating coil - water temperature sensor (HW units)

For freeze protection, the water temperature in the coil is transmitted to the control unit by a temperature sensor in a water return circuit of the coil. The control unit always generates a signal to the valve motor that keeps a sufficient flow of hot water to protect the coil against frost. This freeze protection is also activated when the running mode is “off”.
If the water temperature falls below the set point temperature the fans stop, the dampers close, and an alarm is activated.

Filter monitoring

Filter monitoring over bag filters are modulated. Pressure limit is depending on the flow. Low flow = low pressure limit, high flow = high limit. Transmitters are connected to the control unit. From the display you can see actual pressure and set limits for alarm. Transmitters placed as indicated in flow chart.

Extended running – normal, low or high speed and external stop

Digital inputs – just by pressing one of two buttons – can force the unit to start at normal speed or reduced although the timer says the running mode should be “off”. The unit will run for the set time. Digital input to stop the unit if it is in operation is also available.

Cooling recovery

If the extract air temperature is lower than the outdoor air temperature, and there is a cooling demand in the rooms, the cooling recovery will be activated. The heat exchanger signal is reversed to give increasing cooling recovery on increasing cooling demand.

Constant supply air

• The control of the supply air temperature is based on the value from the sensor mounted in the supply air duct.
The supply air temperature is controlled by a PID-regulator (PID control loop). The set-point for the supply temperature can be adjusted from the control panel. The supply air temperature is kept at the set-point value by control of the heat exchanger, heating coil and cooling coil demand. The control of all capacities is fully modulating.

Outdoor compensated supply air

Control of the supply air temperature is based on the values from 2 temperature sensors:
• A sensor inside the unit at air intake, giving the outdoor temperature. Optional an outdoor wall mounted sensor can be selected.
• A sensor mounted in the supply air duct.
The supply air temperature is controlled by a PID-regulator and the set-point is outdoor air temperature compensated using a control curve with 4 node points. The 4 node points can be adjusted from the control panel. The supply air temperature is kept at the setpoint value by controlling the capacity of the heat exchanger, heating coil and cooling coil. The control of all capacities is fully modulating.

Outdoor dependent supply or room temp

When the outdoor temperature is lower than a settable value (winter) outdoor compensated supply air temperature control will be active, otherwise when the outdoor temperature is above this settable value (summer), cascaded room temperature control will be active.

Cascaded room temperature control

The control of the supply air temperature is based on the values from 2 temperature sensors:
• A sensor in the room, optional 2
• A sensor in the supply air duct.
The supply air temperature is controlled by a cascaded room temperature regulator to achieve a constant, settable room temperature. The set points for the room temperature as well as the temperature limits for the supply air temperature can be adjusted from the control panel. The output from the room temperature PID-loop controls the supply air temperature. The set-point value is achieved by controlling the capacity of the heat exchanger, heating coil and cooling coil. The control of all capacities is fully modulating.

Cascaded extract temperature control

The control of the supply air temperature is based on the values from 2 temperature sensors:
• A sensor inside the extract section giving the mixed average temperature from the rooms
• A sensor installed by the installer in the supply air duct.
The supply air temperature is controlled by a cascaded room temperature regulator to achieve a constant, settable extract temperature. The set points for the extract temperature as well as the temperature limits for the supply air temperature can be adjusted from the control panel. The output from the room temperature PID-loop controls the supply air temperature. The set-point value is achieved by controlling the capacity of the heat exchanger, heating coil and cooling coil (if installed). The control of all capacities is fully modulating.

Air flow control - m3/h (Factory setting)

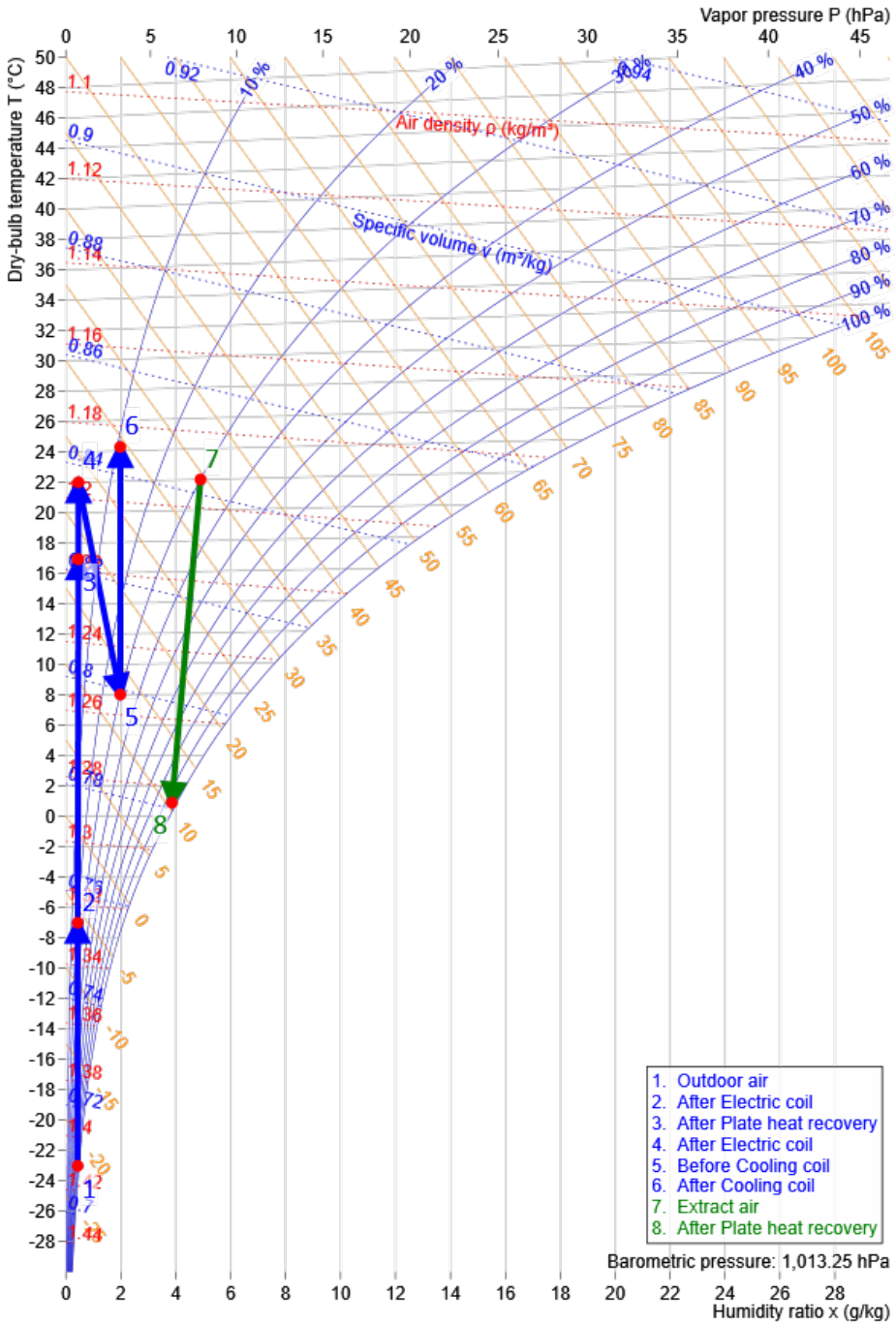
The air flow rates of supply and extract air are controlled separately. The supply and extract air at Normal, Reduced and boost airflow in m^3/h are set separately on the control panel.
On each fan a pressure transducer measures the difference between the pressure before the fan and the pressure at the measuring probe in the inlet cone. Through a formula with a factor for each fan size, the output signal from the pressure transducer is used to calculate the actual airflow in m^3/h. Optional other units can be selected as well.
A PID-regulator maintains the set point value by controlling the speed of the fans.

Constant duct pressure

The air pressure of supply and extract air are controlled separately. The supply and extract air at Normal, Reduced and Boost air pressure in Pa are set separately on the control panel. The air pressures are measured by pressure transducers in supply and exhaust air duct.
A PI-regulator maintains the set value by controlling the speed of the fans.
An actual air flow read out of supply and extract air is also available.
The actual air flow is available for read out.
External pressure transmitters are not included in the delivery.

Winter

HX diagram Winter



Summer

HX diagram Summer