SystemairCAD week 37 release

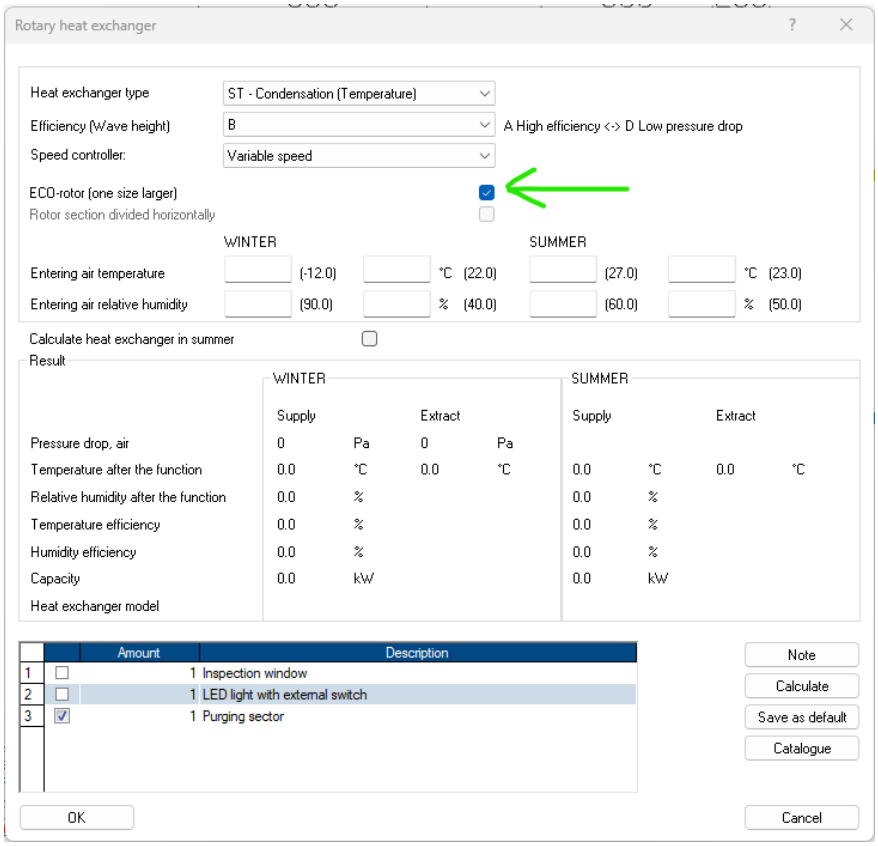
ECO version of rotary heat exchanger and cross flow heat exchanger

The ECO versions of rotary heat exchanger and cross flow heat exchanger provide the opportunity to reduce the pressure drop and increase the efficiency of the heat exchanger, without changing the unit size.

The feature is available for unit size Geniox 10 to Geniox 29.

The feature is selected with a small check box in the heat exchanger selection dialog.

Rotary heat exchanger



Rotary heat exchanger

Heat exchanger type	ST - Condensation (Temperature)							
Efficiency (Wave height)	B				A High efficiency <-> D Low pressure drop			
Speed controller:	Variable speed							
ECO-rotor (one size larger)	☑							
Rotor section divided horizontally	☐							
	WINTER				SUMMER			
Entering air temperature		(-20.0)		°C (22.0)		(27.0)		°C (22.0)
Entering air relative humidity		(90.0)		% (40.0)		(60.0)		% (40.0)

Calculate heat exchanger in summer ☐

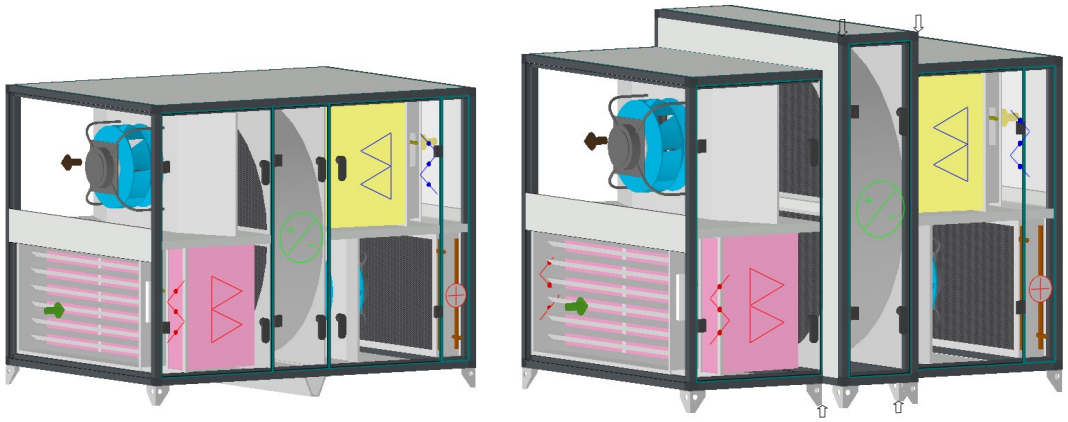
Result

	WINTER				SUMMER			
	Supply		Extract		Supply		Extract	
Pressure drop, air	70	Pa	70	Pa				
Temperature after the function	15.8	°C	-13.8	°C	0.0	°C	0.0	°C
Relative humidity after the function	52.8	%			0.0	%		
Temperature efficiency	85.3	%			0.0	%		
Humidity efficiency	87.0	%			0.0	%		
Capacity	59.6	kW			0.0	kW		
Heat exchanger model	P_140_380_2-1340/1340-1480*-WGV-VVX15							

		Amount	Description
1	☐	1	Inspection window
2	☐	1	LED light with external switch
3	☑	1	Purging sector

Note | Calculate | Save as default | Catalogue

OK | Cancel



By selecting the ECO version of the heat exchanger the system will insert the heat exchanger from one unit size larger. In the above Geniox 16 the rotary heat exchanger section from a Geniox 18 is inserted.

This will provide a larger heat exchanger area and there by better performance and lower pressure drop in the section.

Standard version

Result

WINTER

	Supply		Extract	
Pressure drop, air	188	Pa	188	Pa
Temperature after the function	14.6	°C	-4.6	°C
Relative humidity after the function	48.1	%		
Temperature efficiency	78.3	%		
Humidity efficiency	70.0	%		
Capacity	115.4	kW		
Heat exchanger model	P_140_380_2-1540/1540-1480*-WGV-WX15			

ECO design version

Result

WINTER

	Supply		Extract	
Pressure drop, air	144	Pa	144	Pa
Temperature after the function	15.4	°C	-5.4	°C
Relative humidity after the function	47.4	%		
Temperature efficiency	80.7	%		
Humidity efficiency	73.5	%		
Capacity	119.5	kW		
Heat exchanger model	P_140_380_2-1540/1540-1680*-WGV-DRHX4			

In this case we decrease the pressure drop from 188 Pa to 144Pa and we increase the efficiency from 78,3% to 80,7% by selecting the ECO version of the heat exchanger.

The improved performance in the heat exchanger section, will of cause have a positive effect on the total performance of the unit. In the above example of a Geniox 16 unit calculated with 9500 m³/h, it will even change the calculated Eurovent energy class.

Standard heat exchanger

ECO design version

The same feature is offered for cross flow heat exchangers.

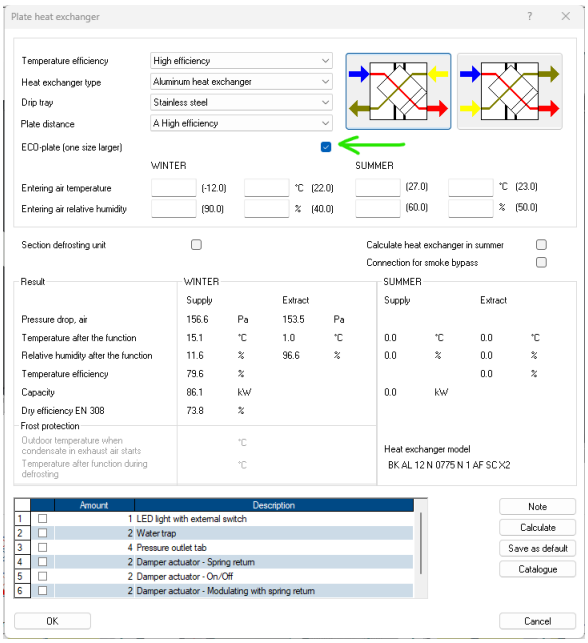
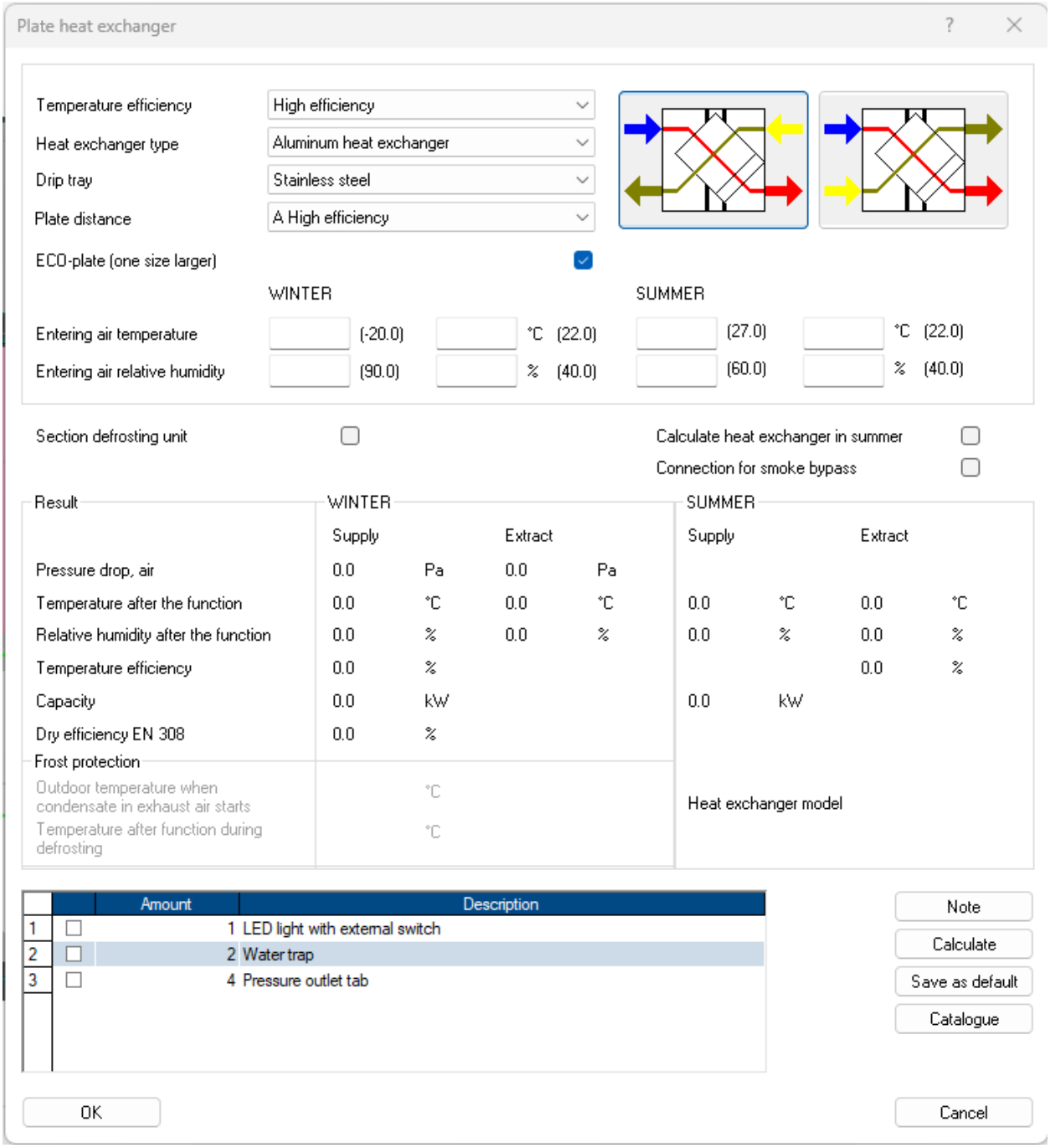
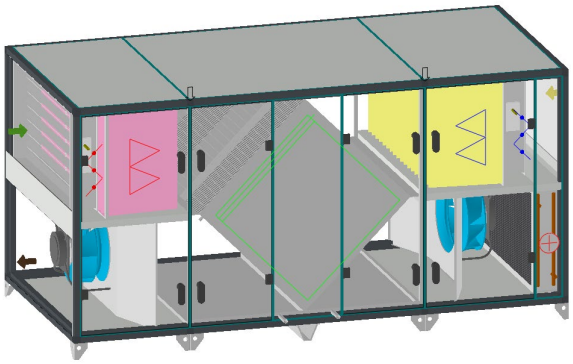


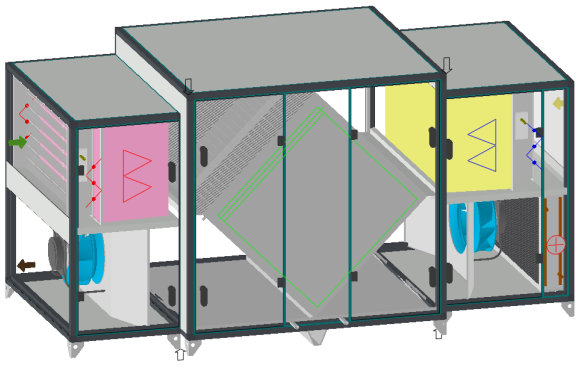
Plate heat exchanger
Temperature efficiency
High efficiency
Heat exchanger type
Aluminum heat exchanger
Drip tray
Stainless steel
Plate distance
A High efficiency
ECO-plate (one size larger)
WINTER
SUMMER
Entering air temperature
(-12.0)
(22.0)
(27.0)
(23.0)
Entering air relative humidity
(90.0)
(40.0)
(60.0)
(50.0)
Section defrosting unit
Calculate heat exchanger in summer
Connection for smoke bypass
Result
WINTER
SUMMER
Supply
Extract
Pressure drop, air
156.6 Pa
153.5 Pa
Temperature after the function
15.1 °C
1.0 °C
0.0 °C
0.0 °C
Relative humidity after the function
11.6 %
96.6 %
0.0 %
0.0 %
Temperature efficiency
79.6 %
0.0 %
Capacity
86.1 kW
0.0 kW
Dry efficiency EN 308
73.8 %
Frost protection
Outdoor temperature when condensate in exhaust air starts
Temperature after function during defrosting
Heat exchanger model
BK AL 12 N 0775 N 1 AF SC X2
Amount
Description
1 LED light with external switch
2 Water trap
4 Pressure outlet tab
2 Damper actuator - Spring return
2 Damper actuator - On/Off
2 Damper actuator - Modulating with spring return
Note
Calculate
Save as default
Catalogue
OK
Cancel



Standard cross flow heat exchangers

ECO version cross flow heat exchangers





If we focus a bit on the performance of the unit, we can see that the SfP value in decreased significantly for the unit with the ECO heat exchanger.

Standard cross flow heat exchangers

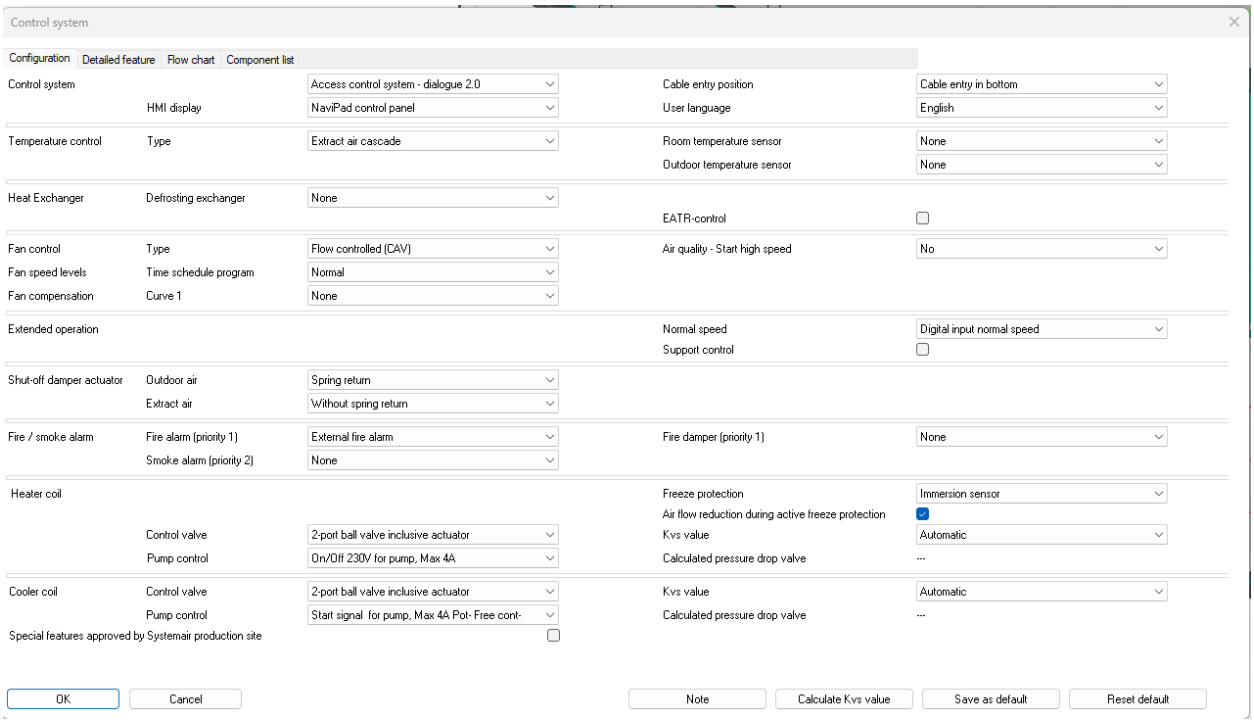
Unit		
SFPv, clean filters *)	1.94	kW/(m³/s)
Energy class Winter / Summer	B / B	
fs - Pref	0.99 / 0.99	

ECO version cross flow heat exchangers

Unit		
SFPv, clean filters *)	1.61	kW/(m³/s)
Energy class Winter / Summer	A / A	
fs - Pref	0.95 / 0.95	

Control system and printout

The Access control system selection dialog 2.0, has been available for the past couple of versions. In this release, the 2.0 version of the dialog will be the default selected. It is still possible to change back to the old dialog, but that option will be removed in week 12 - 2024.



We have been working with the printout report in the past releases. We have implemented significant changes for the control system. New overview tables and options in the print dialog are implemented in the past versions.

Component list

Component list

Project reference	Component reference	Internal components	Type	Delivered options
	BP1:A	Pressure transmitter: Supply air Fan (flow)	DPT DUAL-MOD	Factory installed and connected
	BP1:B	Pressure transmitter: Extract air filter	DPT DUAL-MOD	Factory installed and connected
	BP2:A	Pressure transmitter: Extract air Fan (flow)	DPT DUAL-MOD	Factory installed and connected
	BP2:B	Pressure transmitter: Supply air filter	DPT DUAL-MOD	Factory installed and connected
	BP8	Pressure transmitter: Exchanger extract air	DPT DUAL-MOD	Factory installed and connected
	BT1	Temperature sensor: Intake air	PT1000	Factory installed and connected
	BT2	Temperature sensor: Exhaust air	PT1000	Factory installed and connected
	BT3	Temperature sensor: Extract air	PT1000	Factory installed and connected
	BT4	Temperature sensor: Efficiency	PT 1000	Factory installed and connected
	GQ1	EC fan: Supply air		Factory installed and connected
	GQ2	EC fan: Extract air		Factory installed and connected
	QM31S	Damper actuator: Outdoor (supply) air, spring return	SF24A-MOD	Factory installed and connected
	QM32	Damper actuator: Extract air	SM24A-MOD	Factory installed and connected
	QM45	Damper actuator: Exchanger/bypass	SM24A-MOD	Factory installed and connected
	QM46	Damper actuator: Exchanger/bypass	SM24A-MOD	Factory installed and connected
	BT10	Temperature sensor: Freeze protection	ETF-1198SR	Supplied
	BT5	Temperature sensor: Supply air	TG-KH/PT1000	Supplied with cable
	GP50	Circulation pump: Heater	1~230V max 4A	Not supplied by Systemair
	HMI	HMI Control panel	PD70-C	Supplied with cable
	QN51	Valve: Heater (3-port), Kvs value 2.5 Actuator: Valve 24V, 2..10V	R3015-2P5-S1 LR24A-SR-TP	Supplied Supplied

Configuration description

Configuration		
Control system	Access control system - dialogue 2.0 HMI display: **NaviPad control panel**	Cable entry position: **Cable entry in bottom** User language: **English**
Temperature control	Type: **Extract air cascade**	Room temperature sensor: **None** Outdoor temperature sensor: **None**
Heat Exchanger	Defrosting exchanger: **Pressure monitoring**	
Fan control **Fan speed levels** **Fan compensation**	Type: **Flow controlled (CAV)** Time schedule program: **Normal** Curve 1: **None**	Air quality - Start high speed: **No**
Extended operation		Normal speed: **Digital input normal speed** Support control: **No**
Shut-off damper actuator	Outdoor air: **Spring return** Extract air: **Without spring return**	
Fire / smoke alarm	Fire alarm (priority 1): **External fire alarm** Smoke alarm (priority 2): **None**	Fire damper (priority 1): **None**
Heater coil	Control valve: **3-port ball valve inclusive actuator** Pump control: **On/Off 230V for pump, Max 4A**	Freeze protection: **Immersion sensor** Air flow reduction during active freeze protection: **Yes**

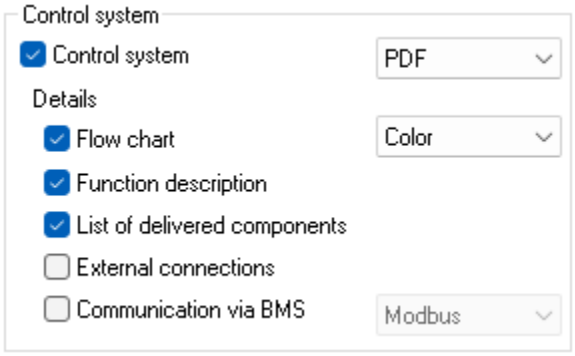
Detailed feature		
Temperature control	Actual control type: **Extract air cascade** Cooling recovery: **Yes**	Effeciency presentation: **Yes**
Fan compensation	Curve 1: **None**	
Night operation	Free cooling: **No**	
Fire/smoke alarm		Operation mode when fire alarm priority 1: **Stopped both fans**
Energy insight	Calculation of energy usage: **Yes**	
Heater	Feedback signal: **None**	
Fan setpoint compensation	Type of compensation: **None**	
Extra indications & outputs	Summery alarm: **A/B-alarm (1-DO)** Alarm acknwledge: **No**	Running indication: **No** External stop: **No**

Description of the Access controller

Access control unit CU40-C

Physical Inputs/Outputs	40 (10 AI, 12 DI, 4 UI, 6 AO, 8 DO)	
Degree of protection	IP20	
Operation temperatures	0…50	°C
Storage temperature	-20…+70	°C
Input voltage	24	V DC
External communication	Modbus RS485, Modbus TCP/IP or BACnet IP (B-AAC), Systemair connect (Cloud service)	

New printout options



Of other changes in the printout, I can mention.

Model box text is added to explain the (M) in the casing property table

Casing			
Panels	Steel sheets coated with ZM310, corrosion class C5		
Frame profiles	Steel profiles coated wiht z225 painted, corrosion class C4		
Mullion profiles	Steel profiles coated with ZM310, corrosion class C5		
Corners	PA6 fiber rienforced		
Insulation	60 mm mineral wool / Density 60 kg/m3		
Corrosion protection	Class C4 according to EN ISO 12944-2:2018		
Operating pressure	0 - 2000 Pa (Geniox10 - Geniox31)		
Operating temperatures	-40/+40 °C (Standard)		
	-40/+60 °C (Special design)		
Classifications	EN 1886, 2. edition 2008		
Mechanical Strength	Class D1(M)*		
Casing air leakage	-400 Pa: Class L1(M)*		
	+700 Pa: Class L1(M)*		
Filter by-pass leakage	-400 Pa: Class G1-F9		
	+400 Pa: Class G1-F9		
Thermal transmittance	Class T2(M)*		
Thermal bridging factor	Class TB2(M)*		
Acoustic insulation of casing	Octave band Hz	Insulation dB	
	63	10	
	125	17	
	250	24	
	500	27	
	1000	28	
	2000	28	
	4000	32	
	8000	40	

* (M) = Classification according to EN1886 Modelbox test

In some cases, we showed data for electrical coils in steps even though the coil was modulating.

Pre-heater								
Air flow							10000	m³/h
Pressure drop							16	Pa
Face velocity for the coil							2.40	m/s
Air temperature before/after							-12.0/-3.0	°C
Air relative humidity before/after							0/0	%
Capacity							30.13	kW
Number of steps							Modulating	
Connections	1	2	3	4	5	6	7	
Rated power	30.1	0.0	0.0	0.0	0.0	0.0	0.0	kW
Voltage	3x400							V
Current, Amp.	43.5	0.0	0.0	0.0	0.0	0.0	0.0	A
Connection side							Service side	
Electrical coils must have separate power supply								

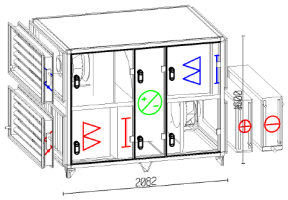
Heating coil		
Air flow	10000	m³/h
Pressure drop	54	Pa
Face velocity for the coil	4.40	m/s
Air temperature before/after	-12.0/-3.0	°C
Air relative humidity before/after	90/45	%
Capacity	30.13	kW
Number of steps	Modulating	
Voltage	3x400	V
Current, Amp.	49.1	A
Connection side	Service side	
Electrical coils must have separate power supply		

Impeller material is added to the text about the fan type

Fan section, Plug		
Air flow	3600	m³/h
External pressure	400	Pa
Pressure drop	13	Pa
Static pressure (Designed at wet conditions)	634	Pa
Total pressure	664	Pa
Fan speed	1838	RPM
Maximum fan speed	1950	RPM
Total efficiency by static pressure, incl. motor and speed control	59.1	%
Total efficiency by total pressure, incl. motor and speed control	61.9	%
K-factor (p=1.2 kg/m³)	154	
Fan type - Medium - Impeller Aluminium	GR40C-ZID.DC.1R	
ErP efficiency n(stat,A)	65.9	%
ErP efficiency class N(actual)/ N(target)	75.4 / 62	
ErP-conformity	Yes	
Direct drive		

Duct components are added in the description about shipping. Both on the front page and in the section about shipping.

Description: Geniox 14
Unit width / Weight: 1501 mm / 665 kg
Delivery: 1 sections + 4 duct components; Feet are supplied mounted on the unit casing.

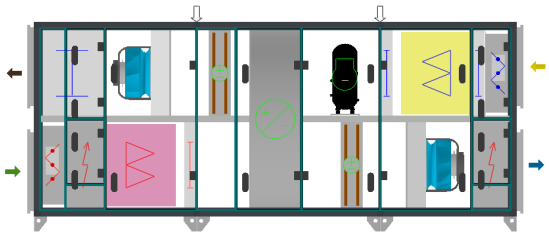


Section about shipping

Unit sections	Dimensions (width x height x length), incl. packaging	Weight, Inc. Packaging	Weight of unit
Section 1	1482 x 1600 x 2082 mm	590 kg	590 kg
	Feet are supplied mounted on the unit casing.		

Duct mounted components	Dimensions (width x height x length), incl. packaging	Weight, Inc. Packaging	Weight of component
Damper	1460 x 600 x 146 mm	18 kg	18 kg
Heating coil	1446 x 646 x 200 mm	21 kg	21 kg
Damper	1460 x 600 x 146 mm	18 kg	18 kg
Cooling coil	1446 x 663 x 255 mm	53 kg	53 kg
Combined weight		111 kg	111 kg
	Duct components are delivered on a pallet		

Power connections on the front page are updated and all connections included.



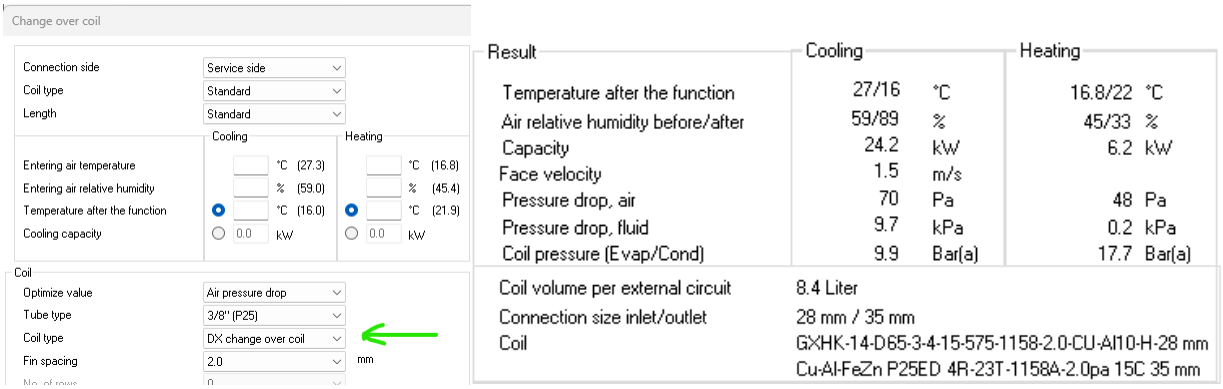
Unit	
Unit color || Insulation || Hygienic	ZincMagnesium || 60 mm mineral wool / Density 60 kg/m3 || Standard
Control system	Without control system
Power supply Unit	L1 + L2 + L3 + N + PE (3x400V) 50 Hz / 5.7 A
Power supply e-heater	L1 + L2 + L3 + N + PE (3x400) 50 Hz / 19.8 A
Power supply Reversable heat pump	L1 + L2 + L3 + N + PE (3x400) 50 Hz / 23.6 A
Power supply e-heater	L1 + L2 + L3 + N + PE (3x400) 50 Hz / 5.8 A
Sound break out || Supply air	54 dB(A) || 74 dB(A)

DX cooling coil for Heat Pump use

The option has been removed form the selection dialog of the cooling coil.

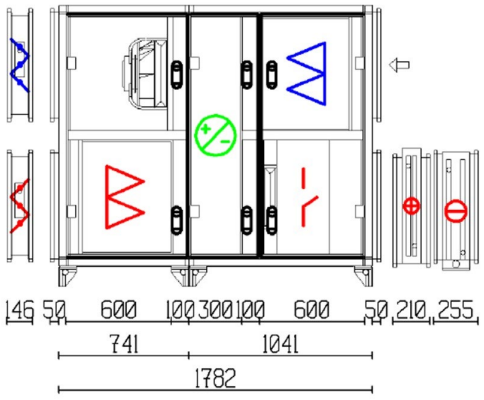
This configuration must be selected through the DX change over coil option. This option will cover the same functionality as the “Heat pump use” option, but it will include a calculation for heating as well.

Change over coil dialog and calculation example.



Bug in the specification texts

The unit length was not calculated correct when the unit included duct mounted functions. The system inserted the full length including the empty space between the duct mounted functions in the 3D model. This has been fixed.



Function	Leng
Damper	146
duct connection	50
Unit	1782
duct connection	50
Heating coil	210
Cooling coil	255
Total	2493

Specification texts

Dimensions and weight – total for the whole unit, when assembled
Width: 1680 mm
Height: 1600 mm
Length: 2613 mm
Weight: 667 kg

It is now the compressed length of the Unit (2493 mm), we state as the total unit length in the specification texts.