



TECHNICAL SUBMITTAL

Project:	MCFC Women's First Team	T.S No:	TS-M-005
A&B Contract No:	4070	Date:	30/07/2025
Engineer:	Stephen Hoy	Rev: P04	

F.T.A.O.	Name: Paul Buck Organisation: John Turner Construction Group
Copies To:	Name: Andrea Elliott / Sophie Kendall Organisation: CASE Building Services / A&B Engineering Ltd

Plant Item:	Air Handling Unit(s).
Specified Manufacturer:	Exhausto (Complete Vent Solutions).
Proposed Manufacturer:	Not Applicable.
Model Type:	Please refer to the AHU and Fan Schedule.
Attachments:	<ul style="list-style-type: none"> AHU and Fan Schedule. Exhausto Product Selection Data Sheets. Helios Kitchen Extract Technical Data Sheet.

Approval Required By: A.S.A.P

<u>Response:</u>	
Date:	Signed:

Ref	Location	Service	Manufacturer	Model	Height (mm)	Width (mm)	Length (mm)	Approx Wt (kg)	Design Duty		
									Airflow (l/s)	Airflow Resistance (Pa)	Pressure Drop Calculation
AHU-01	Lower Flat Roof	Hydrotherapy	Complete Vent / Exhausto	VEX4010	1456	1135	3505	807	620	175	H2X =195 + 15% = 225
AHU-02	Upper Flat Roof	Offices	Complete Vent / Exhausto	VEX4040	1760	1710	2963	1058	1804	200	H2X = 294 + 15% =338.1
AHU-03/04	Lower Flat Roof	Gym / Changing	Complete Vent / Exhausto	VEX4050	1909	1835	2963	1201	2227	300	H2X = 250 + 15% = 288
AHU-05	Upper Flat Roof	Kitchen Supply	Complete Vent / Exhausto	VEX5050	1042	1417	4162	676	1760	250	H2X= 230 + 15% = 264.2
AHU-05	Upper Flat Roof	Kitchen Extract	Helios	HRFD 500/2/2	565 Dia		330	30	2080	285	H2X= 248 + 15% = 285.2

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Base frame	50

Project data

Project:	MCFC Womens Football Academy	Project number:	Q10860 Rev Q
Date:	25/06/2025	Our ref:	Mark Hadfield

Info

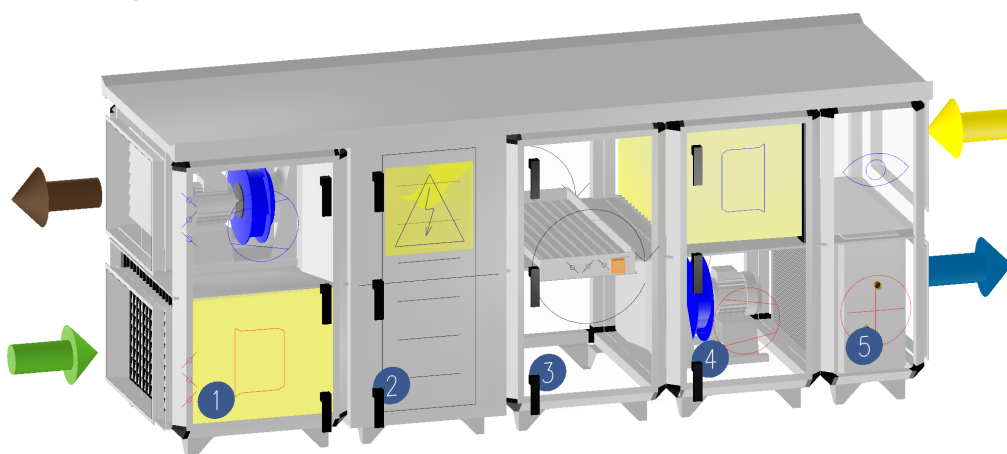
Units

Unit type	Unit number:	Unit name
VEX4010		AHU01 (Hydrotherapy) - with LPHW & MB
VEX4040		AHU02 (Offices)
VEX4050		AHU03/04 (Gym & Changing Rooms)
VEX5050		AHU05 (Kitchen Supply)

Unit data

Unit type:	VEX4010	Unit name:	AHU01 (Hydrotherapy) - with LPHW & MB
Unit number:	VEX4000		
	Airflow	Static external pressure	
Supply air	0.620 m³/s	225 Pa	SFPv 1320 W/(m³/s)
Extract air	0.620 m³/s	225 Pa	
Dimension (l x d x h)	3505 x 1135 x 1456 mm		
Total weight incl. accessories	807 kg		
Installation	Outdoor		
Inspection side	Right		
Supply voltage	3x400V		
Supply power	3.03 kW	Main control board	IKMin 0.300 kA
Supply current	9.1 A	Main control board	IKMax 10.000 kA
ETA	90.2 %	Design outdoor temperature, winter/summer	-5.0/30.0 °C
Flange system	LS/PG	700 x 55 x 500 mm	Flexible connection: No
Air density	1.2 kg/m³	Country	UK
Calculated in version	1.1.68.6	Destination	London City

Master Drawing



Winter



-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

Technical details

VEX4000

Unit

Automatic Sizing	Yes
Size	4010
Automatic control	With EXcon
Base frame	With legs
Frame material	Aluminium (Modelbox 7)
Hygiene level	Standard

Mechanical performance according EN1886

Strength at unit housing	D2 (M)
Air tightness at -400 Pa	L1 (M)
Air tightness at +700 Pa	L1 (M)
Filter bypass leakage	F9
Thermal transfer	T2 (M)
Thermal bridge factor	TB3 (M)

Control box

User input

Control system	Constant flow
Mixing control system	None
Network connection	BACnet TCP/IP
Control Interface	Touch Terminal

Supply air

Inlet

Damper

Input

Position	Inside casing
Damper motor	Damper motor modulating spring return

Results

Pressure drop	117 Pa
Face velocity	1.2 m/s
Damper motor type	SF24A-MOD

Filter

Input

Filter type	(F7) ePM1 65% - Bag
Prefilter type	None

Results

Filter configuration	1 pc. (592x490x535) + 1 pc. (287x490x535)- ePM1 65%
Pressure drop final	72 Pa
Pressure drop clean	24 Pa

Heat exchanger rotary

Input

Rotary type	Condensations rotor coated
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Wave height	1.5 mm (XL)
Cooling recovery	No
Purge section	With
Automatic Leakage Control	Off

Winter condition

Outdoor temp	-5.0 °C
Outdoor RH	100 %
Extract temp	30.0 °C
Extract RH	55 %

Results

Supply pressure loss (std. density)	116 Pa
Supply face velocity	1.6 m/s
Exhaust pressure loss (std. density)	116 Pa
Exhaust face velocity	1.6 m/s
Carry over	0.018 m³/s
Internal leakage rate EATR	0.5 %
Purge air	0.017 m³/s
Pressure balance supply extract	10 Pa
Pressure balance extract	11 Pa
OACF	1.12

Results, winter

Supply air temperature in	-5.0 °C
Supply air temperature out	24.3 °C
Extract air temperature in	30.0 °C
Extract air temperature out	0.7 °C
Supply air relative humidity in	100 %
Supply air relative humidity out	65 %
Extract air relative humidity in	55 %
Extract air relative humidity out	99 %
Heating recovery	24.50 kW
Supply air temperature efficiency	83.7 %

EN308

Temperature efficiency dry	83.7 %
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Rotor controller

Type	EX-DRHX-1055-MNN5 / MRHX-3P02N-03C5 (2Nm)
Power supply	230 V, 0.6 A
Power consumption max	0.06 kW

Mixing

Input

Damper position	Outside mixer
Mixing rate	40.0 %

Winter condition

Temperature supply	35.0 °C
Relative humidity supply	55 %
Temperature extract	30.0 °C
Relative humidity extract	60 %

Summer condition

Temperature supply	35.0 °C
Relative humidity supply	55 %
Temperature extract	30.0 °C
Relative humidity extract	60 %

Results

Supply pressure drop	1 Pa
Supply air temperature efficiency	108.6 %
Mixing damper pressure drop	1 Pa
Number of dampers	3 pcs
Damper motor type mixing	NM24A-MOD
Extract pressure drop	0 Pa

Winter results

Supply air mixing temperature in	35.0 °C
Supply air mixing temperature out	33.0 °C
Supply air mixing humidity in	55 %
Supply air mixing humidity out	57 %
Supply humidity recovery efficiency	40 %

Summer results

Supply air mixing temperature in	35.0 °C
Supply air mixing temperature out	33.0 °C
Supply air mixing humidity in	55 %
Supply air mixing humidity out	57 %
Supply humidity recovery efficiency	40 %

Plug fan

Results

Type	RH31C.CR/SM12
Pressure loss fan mounting	18 Pa
Fan static pressure	552 Pa
Fan total pressure	577 Pa
Fan speed operational	2181 rpm
Fan speed max	2500 rpm
Operational frequency	50.00 Hz
Required fan axis power	0.47 kW
K-factor per fan	0.026 m³/s
Electrical power input inverter(Psys)	0.55 kW
Electrical power input motor (P1)	0.53 kW
PmRef	0.84

Results, motor

Motor	AZ84-50
Rated power	0.80 kW
Motor current	1.0 A
Motor efficiency	90.1 %
Controller	EX-DV-3015-NGN5
Controller efficiency	95.2 %

Heating coil water

Input

Medium	Water
Coil width	Small
Coil profile	EC (1/2")
Fin spacing	2.5 mm
Fin material	Alup 0.12
No of rows	Automatic
Coil material	Cu 0.35
Max pressure loss on fluid side	20.00 kPa

Heating

Air inlet temperature	24.0 °C
Air outlet temperature	35.0 °C
Fluid inlet temperature	50.0 °C
Fluid outlet temperature	40.0 °C

Accessories

Return water temp. sensor	Yes
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Results

Number of tube rows	3 pcs
Dimension of inlet connection	1/2 "
Dimension of outlet connection	1/2 "
Fluid Flow in Secondary circle (coil)	0.20 l/s
Fluid side pressure loss	12.67 kPa
Supply air temperature in	24.0 °C
Supply air temperature out	35.0 °C
Supply air relative humidity in	57 %
Heating capacity	8.26 kW

Outlet

Extract air

Inlet

Space section single-high

Results

Face velocity	1.1 m/s
Pressure drop	1 Pa

Filter

Input

Filter type	(M5) ePM10 50% - Bag
Prefilter type	None

Results

Filter configuration	1 pc. (592x490x535) + 1 pc. (287x490x535)- ePM10 65%
Pressure drop final	63 Pa
Pressure drop clean	21 Pa

Plug fan

Results

Type	RH31C.CR/SM12
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Pressure loss fan mounting	8 Pa
Fan static pressure	407 Pa
Fan total pressure	418 Pa
Fan speed operational	1774 rpm
Fan speed max	2500 rpm
Operational frequency	50.00 Hz
Required fan axis power	0.25 kW
K-factor per fan	0.026 m³/s
Electrical power input inverter(Psys)	0.31 kW
Electrical power input motor (P1)	0.28 kW
PmRef	0.46

Results, motor

Motor	AZ84-50
Rated power	0.80 kW
Motor current	0.7 A
Motor efficiency	88.6 %
Controller	EX-DV-3015-NGN5
Controller efficiency	92.9 %

Damper

Input

Position	Inside casing
Damper motor	Damper motor modulating spring return

Results

Pressure drop	1 Pa
Face velocity	1.2 m/s
Damper motor type	SF24A-MOD

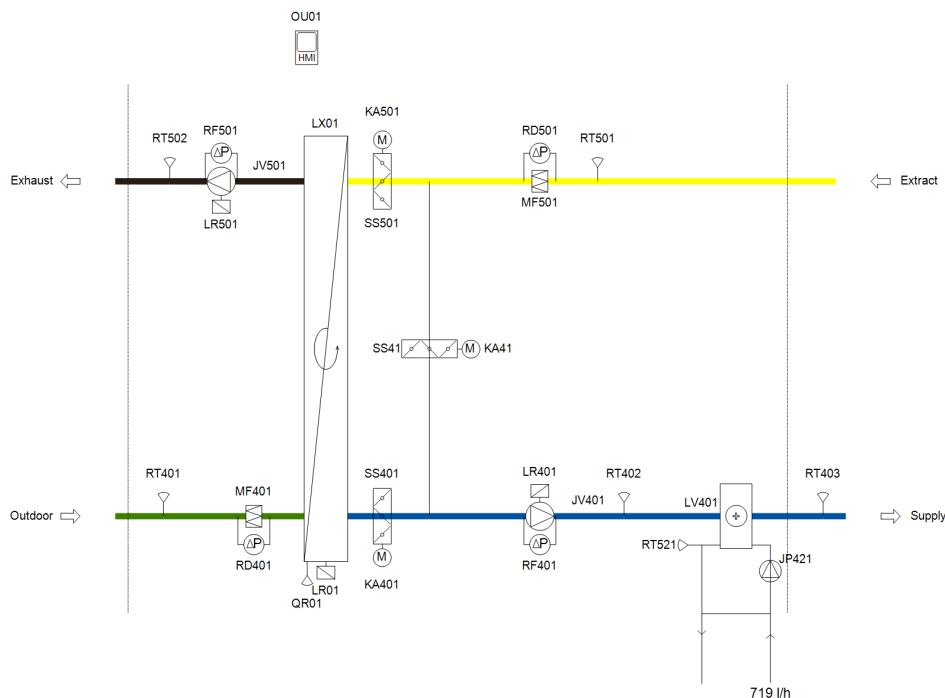
Outlet

Sound data

Sound power level

Octave band	63	125	250	500	1k	2k	4k	8k		Total	
To outdoor duct	50	60	63	57	50	47	43	35	dB	59	dB(A)
To supply duct	52	56	69	68	72	67	63	54	dB	75	dB(A)
To extract duct	52	66	59	52	45	44	39	30	dB	56	dB(A)
To exhaust duct	55	59	66	66	68	65	62	55	dB	72	dB(A)
To surroundings	61	59	54	44	47	40	35	28	dB	52	dB(A)

Flow chart

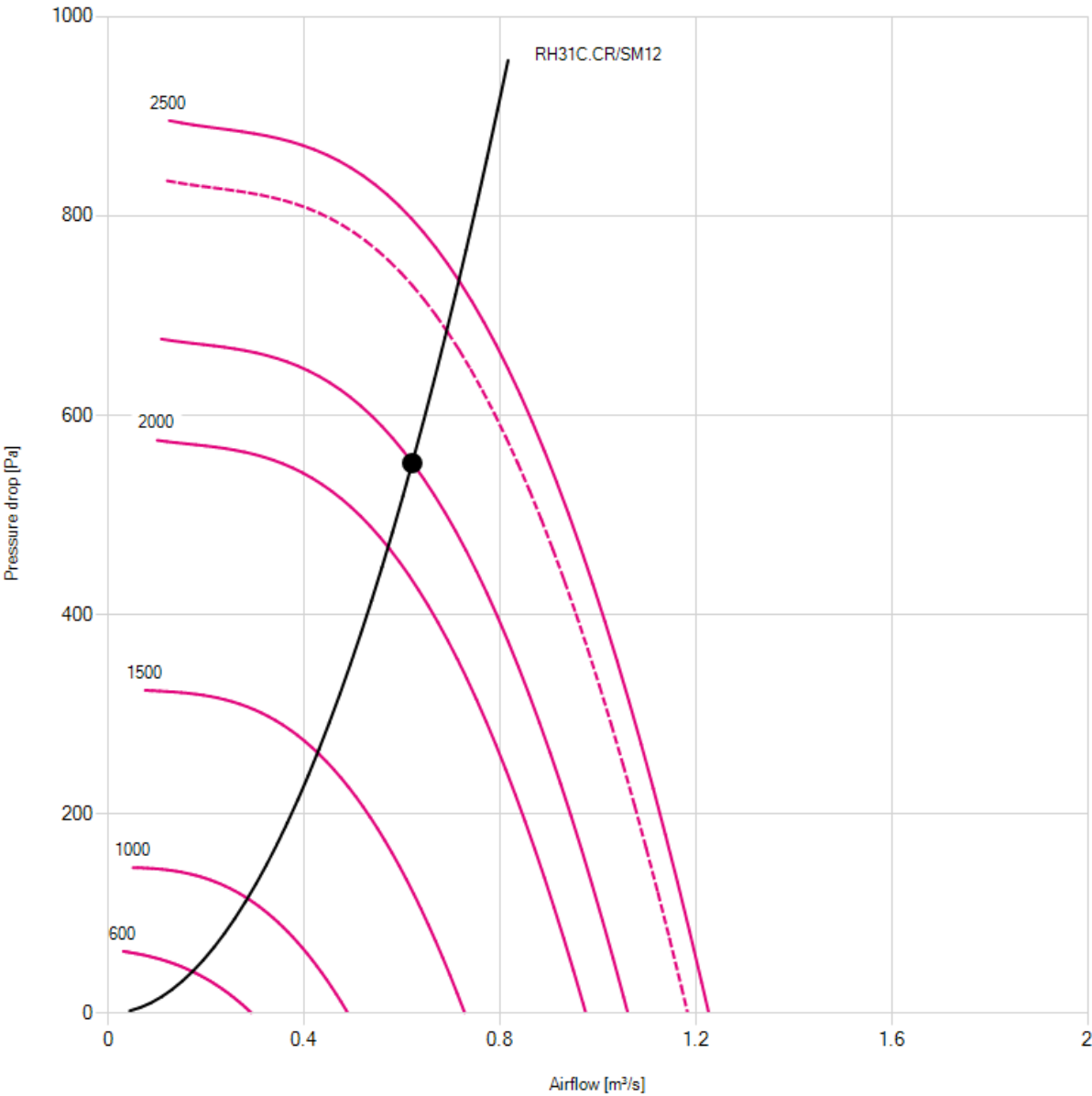


Flow chart symbols

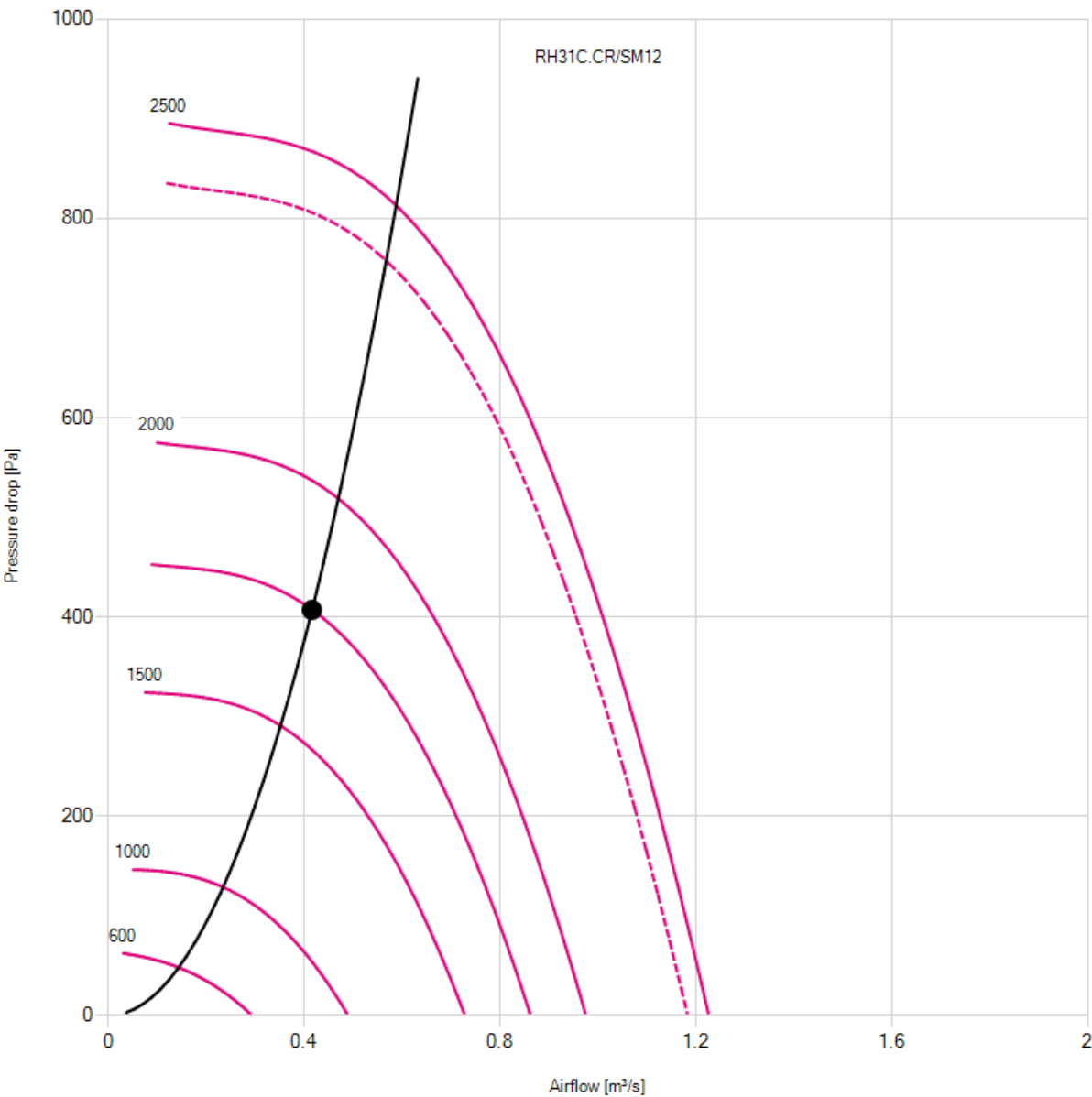
TFM No.	Key diagram No.	Description
JP421	-M27.5/-M27.7	LV circulation pump
JV401	-M7.4	Supply air fan
JV501	-M7.1	Exhaust air fan
KA401	-M124.7	Damper motor modulating spring return
KA41	-M124.1	Damper motor
KA501	-M124.4	Damper motor modulating spring return
LR01	-M60.6	Rotor drive
LR401	-T7.1	EC inverter supply air fan
LR501	-T7.4	EC inverter exhaust air fan
LV401		Water heating coil
LX01		Rotor heat recovery wheel
MF401		Outdoor air filter
MF501		Extract air filter
OU01	HMI	Touch Terminal
QR01	-B60.3	Rotor drive guard
RD401	-P36.2 / P2	Difference pressure sensor
RD501	-P33.2 / P2	Difference pressure sensor
RF401	-P33.2 / P1	Air flow rate supply air fan
RF501	-P36.2 / P1	Air flow rate exhaust air fan
RT401	-Temp.2.1	Outdoor air temp. sensor
RT402	-Temp.2.2	Supply air temp. sensor
RT403	-B28.5	Supply air temp. sensor placed after the last supply coil
RT501	-Temp.1.1	Extract air temp. sensor
RT502	-Temp.1.2	Exhaust air temp. sensor
RT521	-B28.3	Return water temperature sensor

SS401		Outdoor air damper
SS41		Mixing air damper
SS501		Extract air damper

Fan diagram
Supply fan



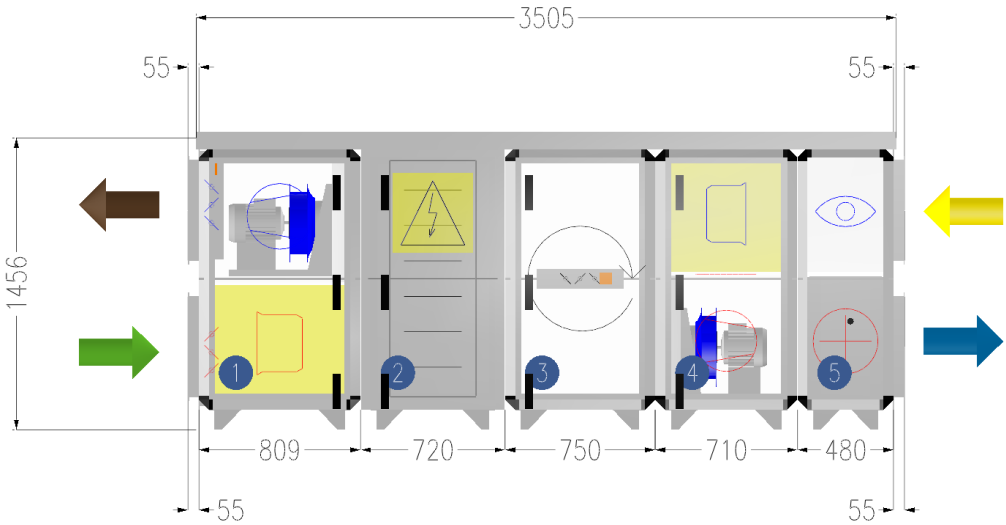
Extract fan



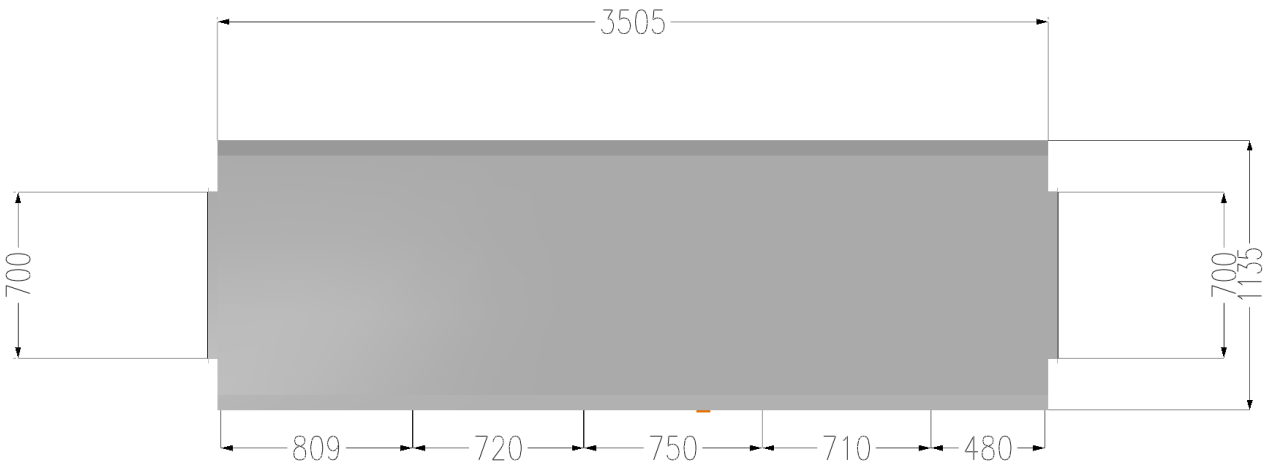
Drawings

-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

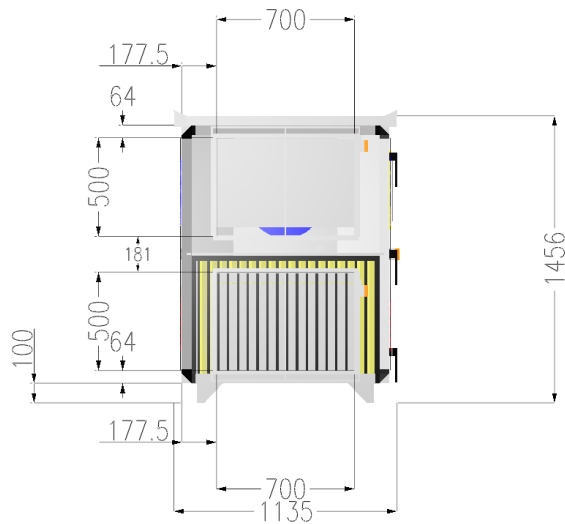
Front



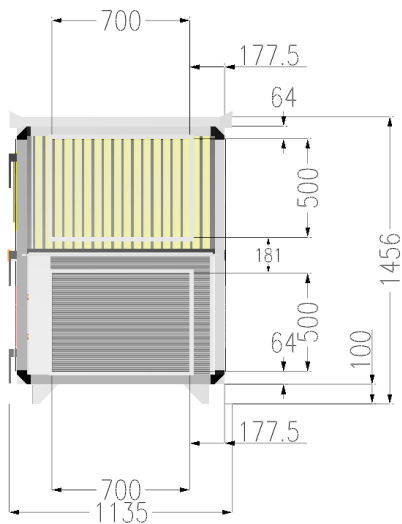
Top



Left



Right



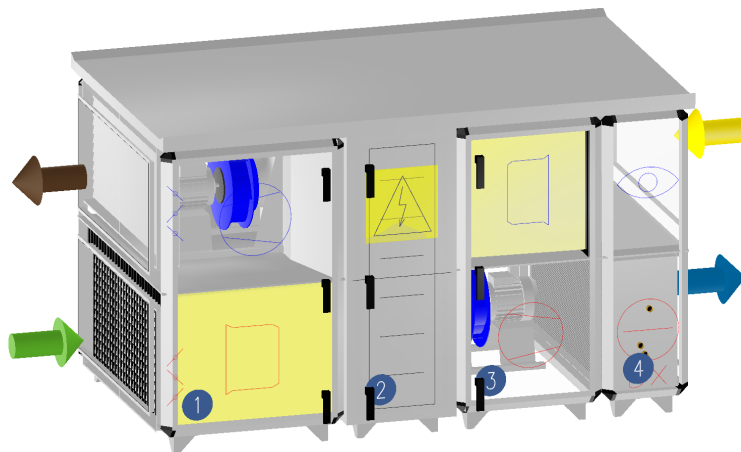
Transport details unit excl. packaging and accessories

Casings	Length [mm]	Depth [mm]	Height [mm]	Volume [m³]	Weight [kg]
Fan and filter section	809	1055	1456	1.1	189
Filter					
Plug fan					
Damper					
Heat exchanger section	720	1065	1456	1.0	207
Heat exchanger rotary					
Control box					
Mixer section	750	1055	1456	1.0	136
Mixing					
Fan and filter section	710	1055	1456	1.0	169
Filter					
Plug fan					
Heater section	480	1055	1456	0.7	97
Space section single-high					
Heating coil water					

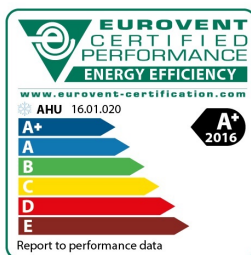
Unit data

Unit type:	VEX4040	Unit name:	AHU02 (Offices)
Unit number:			
VEX4000			
	Airflow	Static external pressure	
Supply air	1.804 m³/s	338 Pa	SFPv 1.89 W/(m³/s)
Extract air	1.804 m³/s	338 Pa	
Dimension (l x d x h)	2963 x 1710 x 1760 mm		
Total weight incl. accessories	1058 kg		
Installation	Outdoor		
Inspection side	Right		
Supply voltage	3x400V		
Supply power	6.08 kW	Main control board	IKMin 0.300 kA
Supply current	12.2 A	Main control board	IKMax 10.000 kA
ETA	76.4 %	Design outdoor temperature, winter/summer	-5.0/30.0 °C
Flange system	LS/PG	1300 x 30 x 600 mm	Flexible connection: No
Air density	1.2 kg/m³	Country	UK
Calculated in version	1.1.68.6	Destination	London City

Master Drawing



Winter



-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

Technical details

VEX4000

Unit

Automatic Sizing	Yes
Size	4040
Automatic control	With EXcon
Base frame	With legs
Frame material	Aluminium (Modelbox 7)
Hygiene level	Standard

Mechanical performance according EN1886

Strength at unit housing	D2 (M)
Air tightness at -400 Pa	L1 (M)
Air tightness at +700 Pa	L1 (M)
Filter bypass leakage	F9
Thermal transfer	T2 (M)
Thermal bridge factor	TB3 (M)

Control box

User input

Control system	Constant flow
Network connection	Modbus TCP/IP
Control Interface	Touch Terminal

Supply air

Inlet

Damper

Input

Position	Inside casing
Damper motor	Damper motor modulating spring return

Results

Pressure drop	9 Pa
Face velocity	2.9 m/s
Damper motor type	SF24A-MOD

Filter

Input

Filter type	(F7) ePM1 65% - Bag
Prefilter type	None

Results

Filter configuration	3 pc (490x592x535)-ePM1 65%
Pressure drop final	171 Pa
Pressure drop clean	71 Pa

Heat exchanger rotary

Input

Rotary type	Condensations rotor
Wave height	1.75 mm
Cooling recovery	Yes

Purge section	With
Automatic Leakage Control	Off
Results	
Supply pressure loss (std. density)	138 Pa
Supply face velocity	2.6 m/s
Exhaust pressure loss (std. density)	138 Pa
Exhaust face velocity	2.6 m/s
Carry over	0.057 m³/s
Internal leakage rate EATR	0.0 %
Purge air	0.077 m³/s
Pressure balance supply extract	10 Pa
Pressure balance supply	140 Pa
OACF	1.07
Results, winter	
Supply air temperature in	-5.0 °C
Supply air temperature out	12.6 °C
Extract air temperature in	18.0 °C
Extract air temperature out	0.4 °C
Supply air relative humidity in	100 %
Supply air relative humidity out	52 %
Extract air relative humidity in	50 %
Extract air relative humidity out	99 %
Heating recovery	50.70 kW
Supply air temperature efficiency	76.4 %
Results, summer	
Supply air temperature in	30.0 °C
Supply air temperature out	25.4 °C
Extract air temperature in	24.0 °C
Extract air temperature out	28.6 °C
Supply air relative humidity in	50 %
Supply air relative humidity out	66 %
Extract air relative humidity in	50 %
Extract air relative humidity out	38 %
Cooling recovery	0.00 kW
Supply air temperature efficiency	76.4 %
Supply air humidity efficiency	0.0 %
EN308	
Temperature efficiency dry	76.4 %
Rotor controller	
Type	EX-DRHX-1055-MNN5 / MRHX-3P02N-03C5 (2Nm)
Power supply	230 V, 0.6 A
Power consumption max	0.06 kW

Plug fan

Results	
Type	RH50C.CR/SM20
Pressure loss fan mounting	23 Pa

Fan static pressure	810 Pa
Fan total pressure	843 Pa
Fan speed operational	1604 rpm
Fan speed max	1700 rpm
Operational frequency	50.00 Hz
Required fan axis power	1.69 kW
K-factor per fan	0.070 m³/s
Electrical power input inverter(Psys)	2.25 kW
Electrical power input motor (P1)	1.78 kW
PmRef	3.06

Results, motor

Motor	AZ150-70
Rated power	2.45 kW
Motor current	5.8 A
Motor efficiency	95.1 %
Controller	EXA-DV-3030-NGN5
Controller efficiency	96.7 %

Cooling/Heating coil DX

User input

Medium	R32
Coil connection side	Front side
Drip tray material	Aluminium AlMg3

Cooling

Evaporation temperature	5.0 °C
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Accessories

Droplet eliminator	None
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Results

Air quantity	1.804 m³/s
Face velocity	2.48 m/s
Pressure drop (wet)	39 Pa
Type	4B-0230-D671
Fin distance	3.2 mm
Number of tube rows	2 pcs
Fin material	Al
Tube material	Cu
Dimension of inlet connection	1/2"/7/8"
Dimension of outlet connection	7/8"/1/2"
Weight coil	74.1 kg
Evaporation temp	5.0 °C
Superheat	5.0 °C
Condensing temp.	49.0 °C
Subcooling	3.0 °C

Summer/Winter results

Pressure drop (dry)	28 Pa
Fluid velocity	9.9 m/s
Fluid content	5.49 l

Condensate	0.01 l/s
Cooling/Heating capacity	9.57/20.45 kW
Supply air temperature out Supply	21/22 °C

Outlet

Extract air

Inlet

Space section single-high

Results

Face velocity	1.6 m/s
Pressure drop	1 Pa

Filter

Input

Filter type	(M5) ePM10 50% - Bag
Prefilter type	None

Results

Filter configuration	3 pc (490x592x535)-ePM10 65%
Pressure drop final	108 Pa
Pressure drop clean	36 Pa

Plug fan

Results

Type	RH50C.CR/SM20
Pressure loss fan mounting	27 Pa
Fan static pressure	587 Pa
Fan total pressure	625 Pa
Fan speed operational	1461 rpm
Fan speed max	1700 rpm
Operational frequency	50.00 Hz
Required fan axis power	1.32 kW
K-factor per fan	0.070 m³/s
Electrical power input inverter(Psys)	1.54 kW
Electrical power input motor (P1)	1.49 kW
PmRef	2.38

Results, motor

Motor	AZ150-70
Rated power	2.45 kW
Motor current	4.4 A
Motor efficiency	94.9 %
Controller	EXA-DV-3030-NGN5
Controller efficiency	96.5 %

Damper

Input

Position Inside casing
Damper motor Damper motor modulating spring return

Results

Pressure drop 9 Pa
Face velocity 2.9 m/s
Damper motor type SF24A-MOD

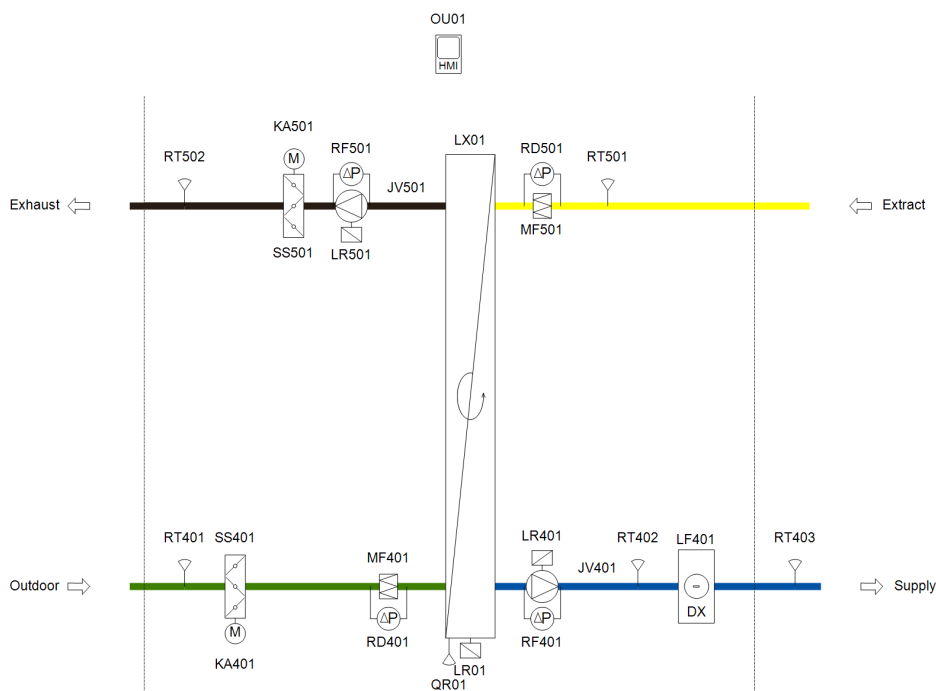
Outlet

Sound data

Sound power level

Octave band	63	125	250	500	1k	2k	4k	8k	Total	
To outdoor duct	56	79	71	61	53	53	48	41	dB	67 dB(A)
To supply duct	59	71	78	77	76	70	65	59	dB	79 dB(A)
To extract duct	53	79	70	60	51	49	46	41	dB	66 dB(A)
To exhaust duct	59	73	78	77	75	71	68	64	dB	80 dB(A)
To surroundings	66	73	64	53	52	46	41	36	dB	61 dB(A)

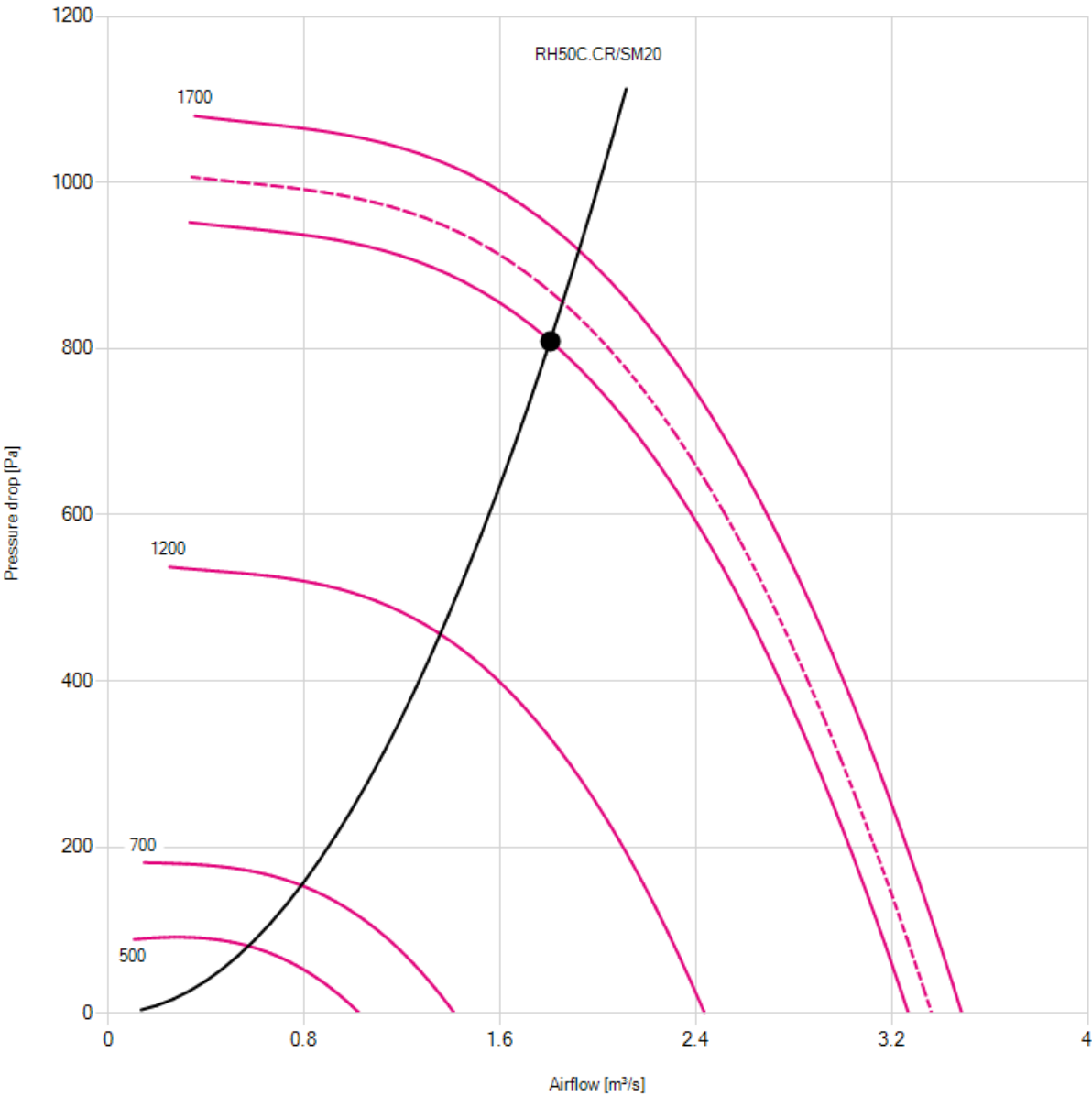
Flow chart



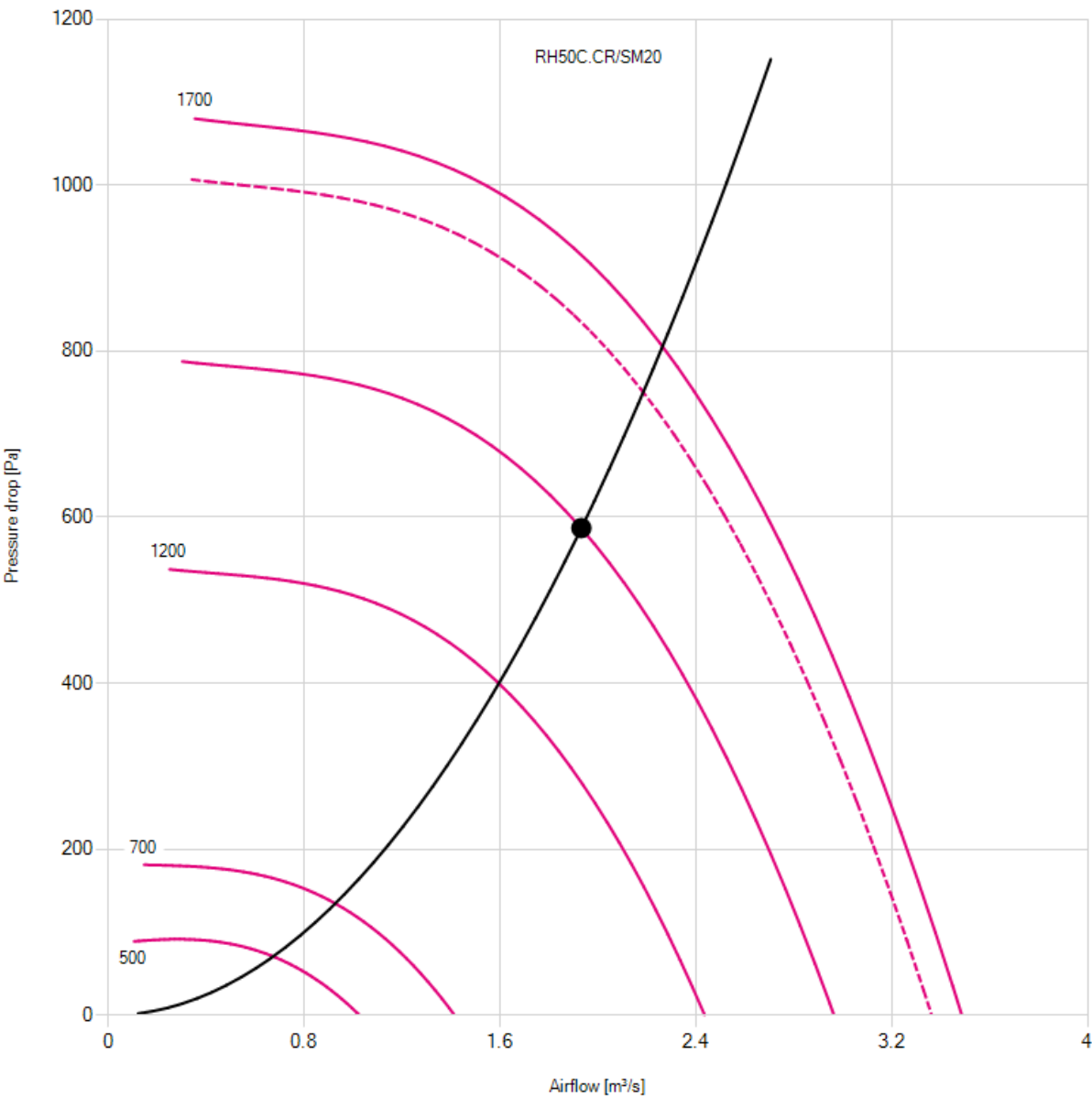
Flow chart symbols

TFM No.	Key diagram No.	Description
JV401	-M7.4	Supply air fan
JV501	-M7.1	Exhaust air fan
KA401	-M36.1	Damper motor modulating spring return
KA501	-M36.0	Damper motor modulating spring return
LF401		Cooling coil DX
LR01	-M60.6	Rotor drive
LR401	-T7.1	EC inverter supply air fan
LR501	-T7.4	EC inverter exhaust air fan
LX01		Rotor heat recovery wheel
MF401		Outdoor air filter
MF501		Extract air filter
OU01	HMI	Touch Terminal
QR01	-B60.3	Rotor drive guard
RD401	-P36.2 / P2	Difference pressure sensor
RD501	-P33.2 / P2	Difference pressure sensor
RF401	-P33.2 / P1	Air flow rate supply air fan
RF501	-P36.2 / P1	Air flow rate exhaust air fan
RT401	-Temp.2.1	Outdoor air temp. sensor
RT402	-Temp.2.2	Supply air temp. sensor
RT403	-B88.0	Supply air temp. sensor placed after the last supply coil
RT501	-Temp.1.1	Extract air temp. sensor
RT502	-Temp.1.2	Exhaust air temp. sensor
SS401		Outdoor air damper
SS501		Exhaust air damper

Fan diagram
Supply fan



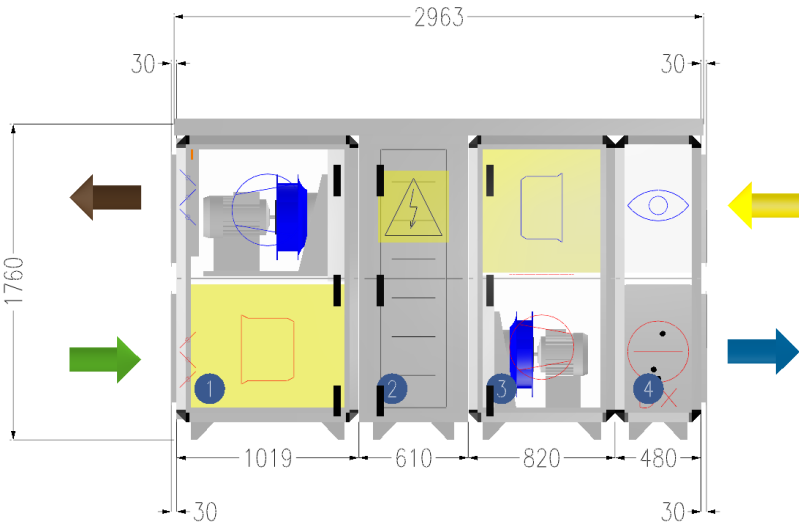
Extract fan



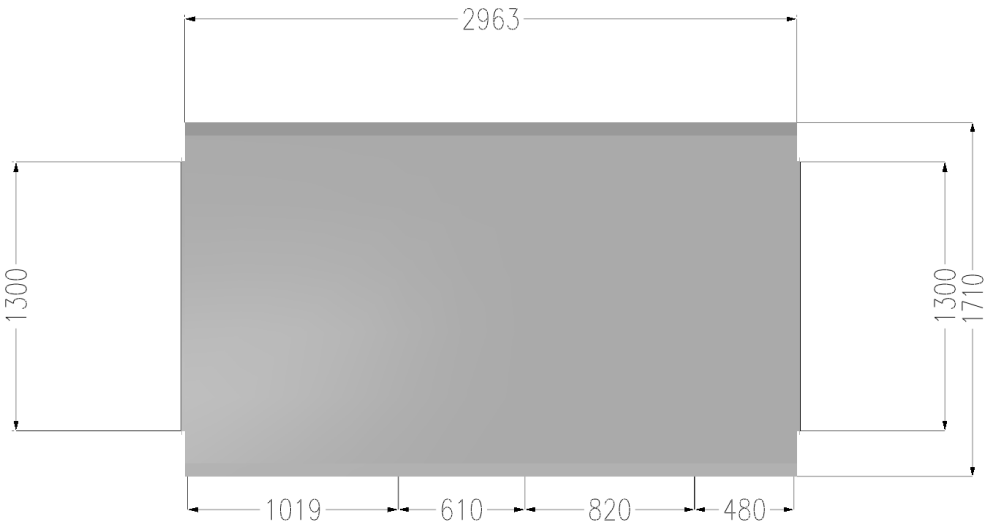
Drawings

-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

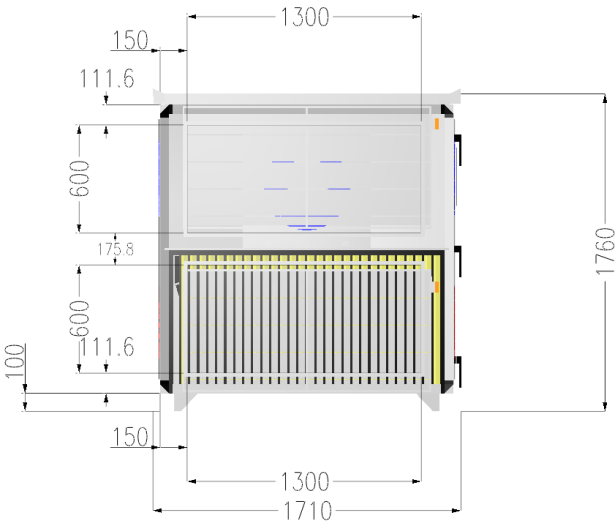
Front



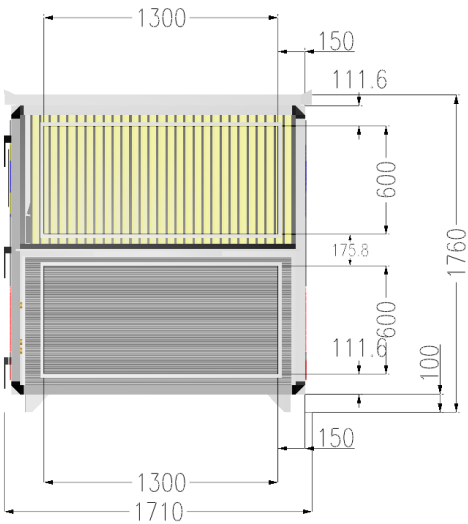
Top



Left



Right



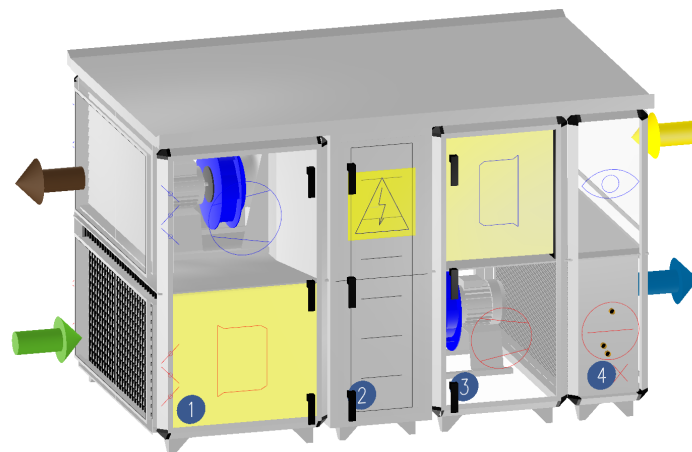
Transport details unit excl. packaging and accessories

Casings	Length [mm]	Depth [mm]	Height [mm]	Volume [m³]	Weight [kg]
Fan and filter section	1019	1630	1760	2.7	322
Filter					
Plug fan					
Damper					
Heat exchanger section	610	1640	1760	1.6	289
Heat exchanger rotary					
Control box					
Fan and filter section	820	1630	1760	2.1	282
Filter					
Plug fan					
Cooler section	480	1630	1760	1.3	148
Space section single-high					
Cooling coil DX					

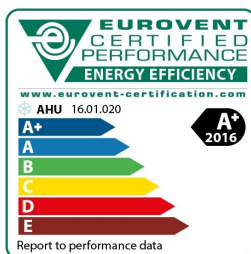
Unit data

Unit type:	VEX4050	Unit name:	AHU03/04 (Gym & Changing Rooms)
Unit number:			
VEX4000			
	Airflow	Static external pressure	
Supply air	2.227 m³/s	288 Pa	SFPv 1861 W/(m³/s)
Extract air	2.227 m³/s	288 Pa	
Dimension (l x d x h)	2963 x 1835 x 1909 mm		
Total weight incl. accessories	1201 kg		
Installation	Outdoor		
Inspection side	Right		
Supply voltage	3x400V		
Supply power	6.08 kW	Main control board	IKMin 0.300 kA
Supply current	12.2 A	Main control board	IKMax 10.000 kA
ETA	75.9 %	Design outdoor temperature, winter/summer	-5.0/30.0 °C
Flange system	LS/PG	1400 x 30 x 700 mm	Flexible connection: No
Air density	1.2 kg/m³	Country	UK
Calculated in version	1.1.68.6	Destination	London City

Master Drawing



Winter



-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

Technical details

VEX4000

Unit

Automatic Sizing	Yes
Size	4050
Automatic control	With EXcon
Base frame	With legs
Frame material	Aluminium (Modelbox 7)
Hygiene level	Standard

Mechanical performance according EN1886

Strength at unit housing	D2 (M)
Air tightness at -400 Pa	L1 (M)
Air tightness at +700 Pa	L1 (M)
Filter bypass leakage	F9
Thermal transfer	T2 (M)
Thermal bridge factor	TB3 (M)

Control box

User input

Control system	Constant flow
Network connection	Modbus TCP/IP
Control Interface	Touch Terminal

Supply air

Inlet

Damper

Input

Position	Inside casing
Damper motor	Damper motor modulating spring return

Results

Pressure drop	9 Pa
Face velocity	2.8 m/s
Damper motor type	SF24A-MOD

Filter

Input

Filter type	(F7) ePM1 65% - Bag
Prefilter type	None

Results

Filter configuration	2 pc (490x742x535) + 1 pc (592x742x535)- ePM1 65%
Pressure drop final	165 Pa
Pressure drop clean	65 Pa

Heat exchanger rotary

Input

Rotary type	Condensations rotor
Wave height	1.75 mm

Cooling recovery	Yes
Purge section	With
Automatic Leakage Control	Off

Results

Supply pressure loss (std. density)	142 Pa
Supply face velocity	2.7 m/s
Exhaust pressure loss (std. density)	142 Pa
Exhaust face velocity	2.7 m/s
Carry over	0.068 m³/s
Internal leakage rate EATR	0.0 %
Purge air	0.095 m³/s
Pressure balance supply extract	10 Pa
Pressure balance supply	85 Pa
OACF	1.07

Results, winter

Supply air temperature in	-5.0 °C
Supply air temperature out	12.5 °C
Extract air temperature in	18.0 °C
Extract air temperature out	0.5 °C
Supply air relative humidity in	100 %
Supply air relative humidity out	52 %
Extract air relative humidity in	50 %
Extract air relative humidity out	99 %
Heating recovery	62.00 kW
Supply air temperature efficiency	75.9 %

Results, summer

Supply air temperature in	30.0 °C
Supply air temperature out	25.4 °C
Extract air temperature in	24.0 °C
Extract air temperature out	28.6 °C
Supply air relative humidity in	50 %
Supply air relative humidity out	65 %
Extract air relative humidity in	50 %
Extract air relative humidity out	38 %
Cooling recovery	0.00 kW
Supply air temperature efficiency	75.9 %
Supply air humidity efficiency	0.0 %

EN308

Temperature efficiency dry	75.9 %
----------------------------	--------

Rotor controller

Type	EX-DRHX-1055-MNN5 / MRHX-3P02N-03C5 (2Nm)
Power supply	230 V, 0.6 A
Power consumption max	0.06 kW

Plug fan

Results

Type	RH50C.CR/SM20
------	---------------

Pressure loss fan mounting	36 Pa
Fan static pressure	719 Pa
Fan total pressure	770 Pa
Fan speed operational	1640 rpm
Fan speed max	1700 rpm
Operational frequency	50.00 Hz
Required fan axis power	2.14 kW
K-factor per fan	0.070 m³/s
Electrical power input inverter(Psys)	2.43 kW
Electrical power input motor (P1)	2.35 kW
PmRef	3.26

Results, motor

Motor	AZ150-70
Rated power	2.45 kW
Motor current	6.4 A
Motor efficiency	90.8 %
Controller	EX-DV-3030-NGN5
Controller efficiency	96.8 %

Cooling/Heating coil DX

User input

Medium	R32
Coil connection side	Front side
Drip tray material	Aluminium AlMg3

Cooling

Evaporation temperature	5.0 °C
-------------------------	--------

Accessories

Droplet eliminator	None
--------------------	------

Results

Air quantity	2.227 m³/s
Face velocity	2.35 m/s
Pressure drop (wet)	41 Pa
Type	4B-0230-SP709
Fin distance	3.2 mm
Number of tube rows	2 pcs
Fin material	Al
Tube material	Cu
Dimension of inlet connection	2 x 1/2"/7/8"
Dimension of outlet connection	2 x 7/8"/1/2"
Weight coil	85.8 kg
Evaporation temp	5.0 °C
Superheat	5.0 °C
Condensing temp.	49.0 °C
Subcooling	3.0 °C

Summer/Winter results

Pressure drop (dry)	25 Pa
Fluid velocity	11.0 m/s

Condensate	0.01 l/s
Cooling/Heating capacity	11.82/22.83 kW
Supply air temperature out Supply	21/22°C

Outlet

Extract air

Inlet

Space section single-high

Results

Face velocity	1.6 m/s
Pressure drop	1 Pa

Filter

Input

Filter type	(M5) ePM10 50% - Bag
Prefilter type	None

Results

Filter configuration	2 pc (490x742x535) + 1 pc (592x742x535)- ePM10 65%
Pressure drop final	99 Pa
Pressure drop clean	33 Pa

Plug fan

Results

Type	RH50C.CR/SM20
Pressure loss fan mounting	41 Pa
Fan static pressure	549 Pa
Fan total pressure	607 Pa
Fan speed operational	1564 rpm
Fan speed max	1700 rpm
Operational frequency	50.00 Hz
Required fan axis power	1.78 kW
K-factor per fan	0.070 m³/s
Electrical power input inverter(Psys)	2.02 kW
Electrical power input motor (P1)	1.95 kW
PmRef	2.63

Results, motor

Motor	AZ150-70
Rated power	2.45 kW
Motor current	5.1 A
Motor efficiency	91.2 %
Controller	EX-DV-3030-NGN5

Controller efficiency 96.7 %

Damper

Input

Position Inside casing
Damper motor Damper motor modulating spring return

Results

Pressure drop 9 Pa
Face velocity 2.8 m/s
Damper motor type SF24A-MOD

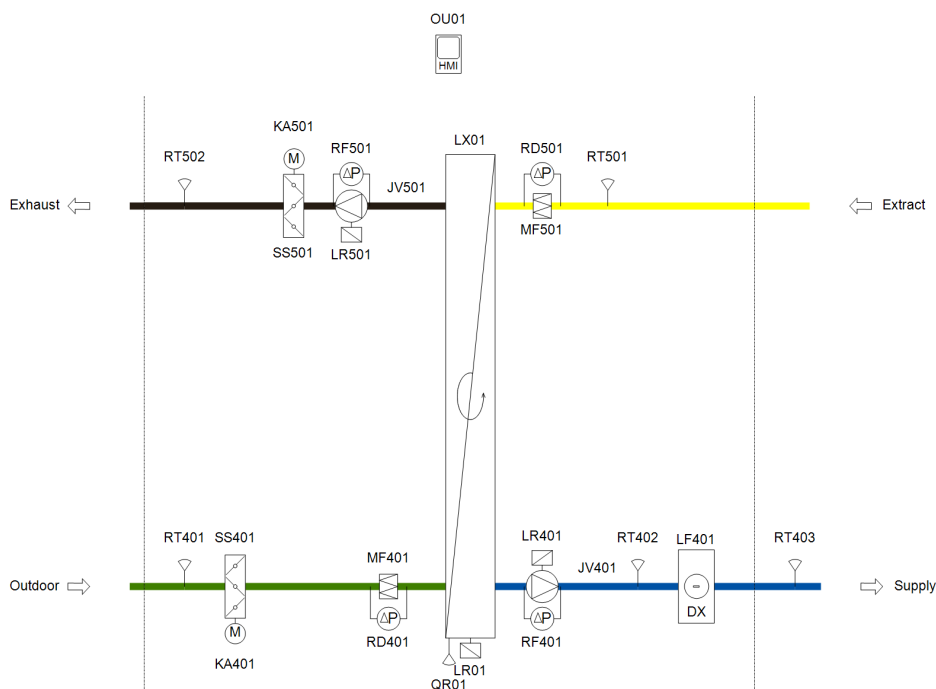
Outlet

Sound data

Sound power level

Octave band	63	125	250	500	1k	2k	4k	8k	Total	
To outdoor duct	54	75	71	63	56	52	53	54	dB	67 dB(A)
To supply duct	62	76	84	80	78	72	66	62	dB	82 dB(A)
To extract duct	55	78	71	63	55	51	53	56	dB	67 dB(A)
To exhaust duct	65	80	84	81	79	75	71	70	dB	84 dB(A)
To surroundings	66	73	66	55	53	46	43	41	dB	62 dB(A)

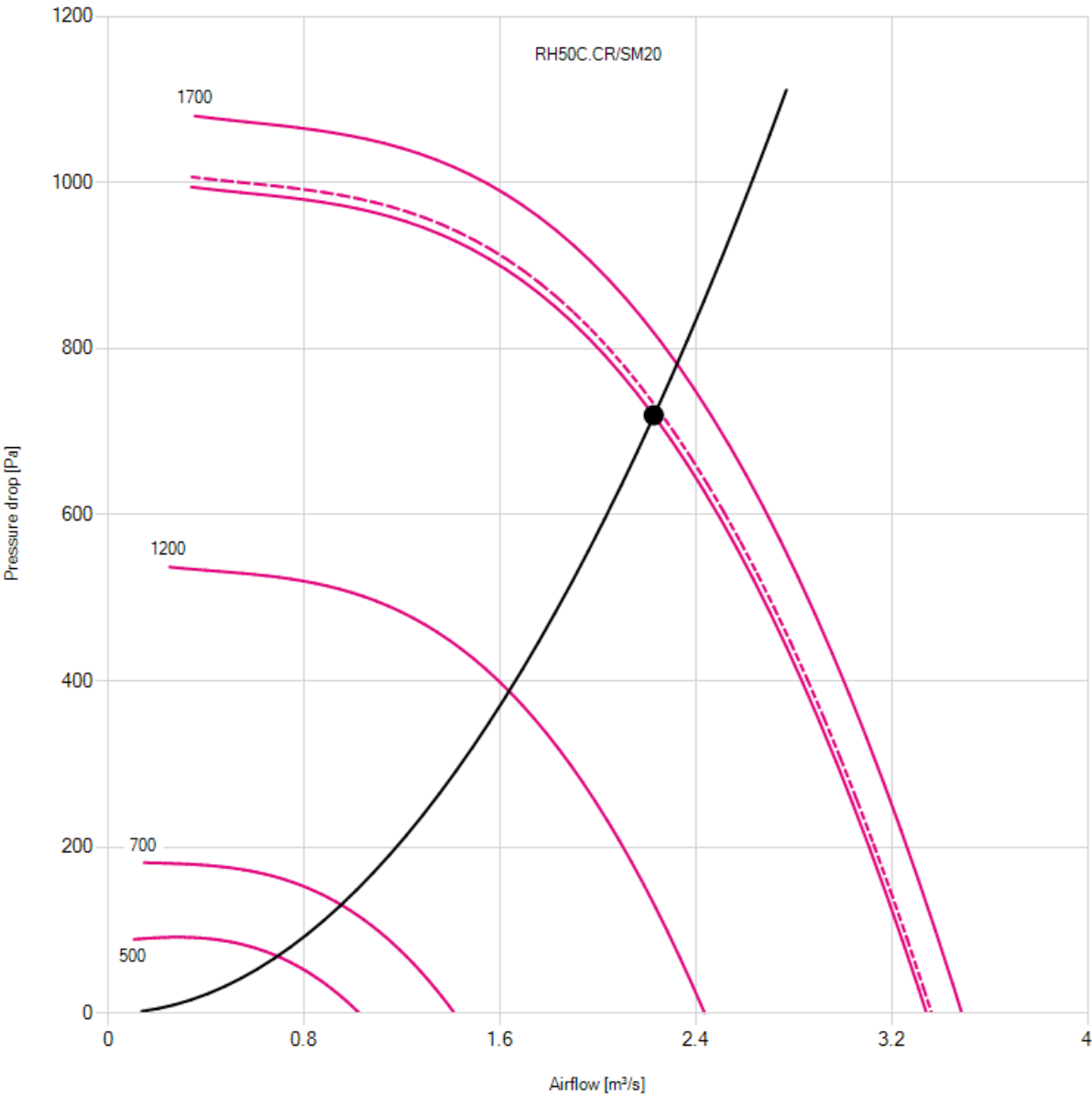
Flow chart



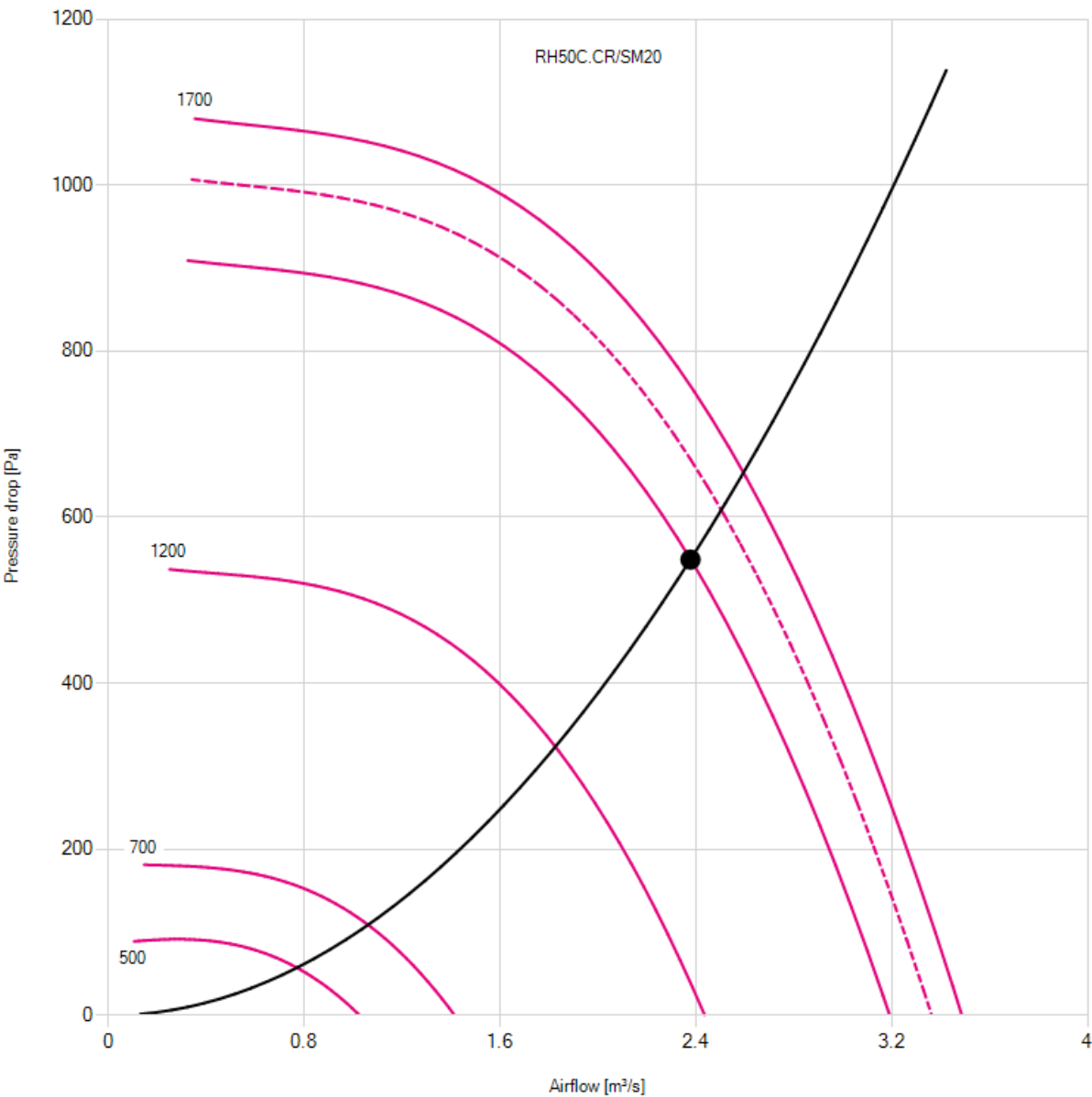
Flow chart symbols

TFM No.	Key diagram No.	Description
JV401	-M7.4	Supply air fan
JV501	-M7.1	Exhaust air fan
KA401	-M36.1	Damper motor modulating spring return
KA501	-M36.0	Damper motor modulating spring return
LF401		Cooling coil DX
LR01	-M60.6	Rotor drive
LR401	-T7.1	EC inverter supply air fan
LR501	-T7.4	EC inverter exhaust air fan
LX01		Rotor heat recovery wheel
MF401		Outdoor air filter
MF501		Extract air filter
OU01	HMI	Touch Terminal
QR01	-B60.3	Rotor drive guard
RD401	-P36.2 / P2	Difference pressure sensor
RD501	-P33.2 / P2	Difference pressure sensor
RF401	-P33.2 / P1	Air flow rate supply air fan
RF501	-P36.2 / P1	Air flow rate exhaust air fan
RT401	-Temp.2.1	Outdoor air temp. sensor
RT402	-Temp.2.2	Supply air temp. sensor
RT403	-B88.0	Supply air temp. sensor placed after the last supply coil
RT501	-Temp.1.1	Extract air temp. sensor
RT502	-Temp.1.2	Exhaust air temp. sensor
SS401		Outdoor air damper
SS501		Exhaust air damper

Fan diagram
Supply fan



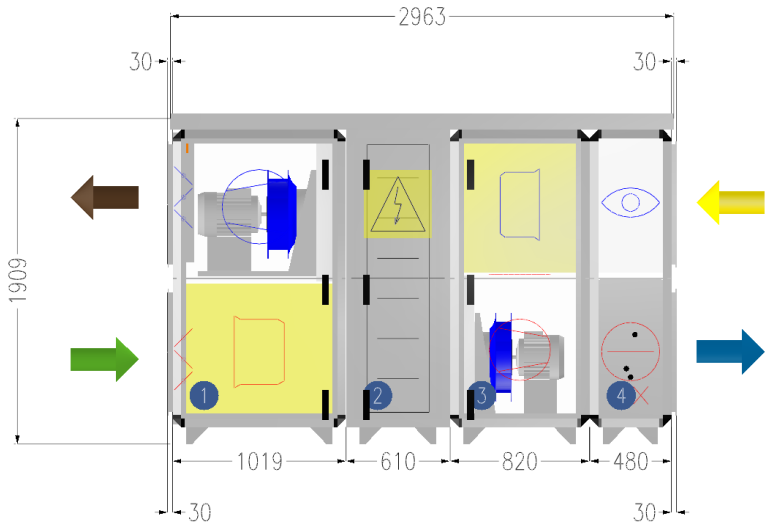
Extract fan



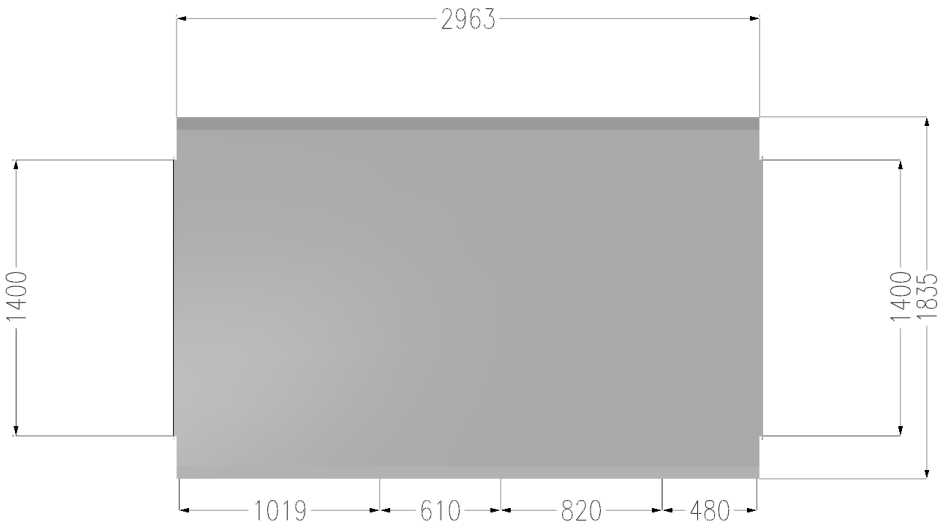
Drawings

-  Extract air inlet 1.1
-  Exhaust air outlet 1.2
-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

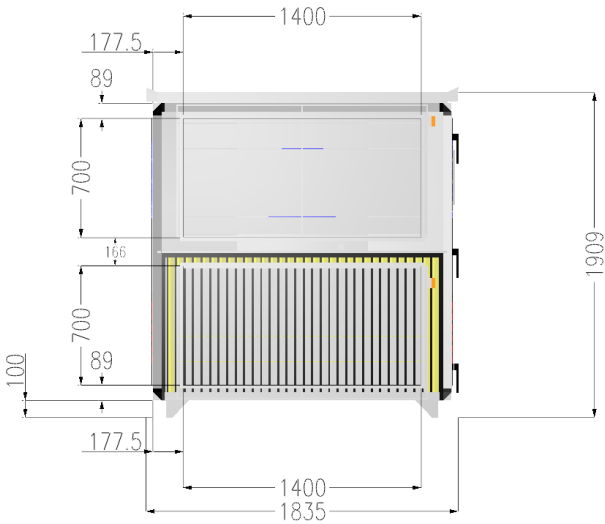
Front



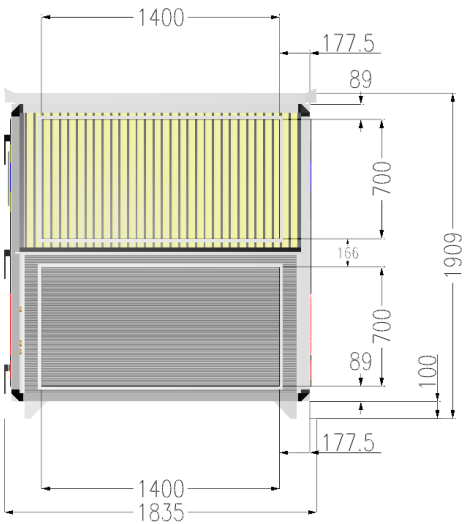
Top



Left



Right



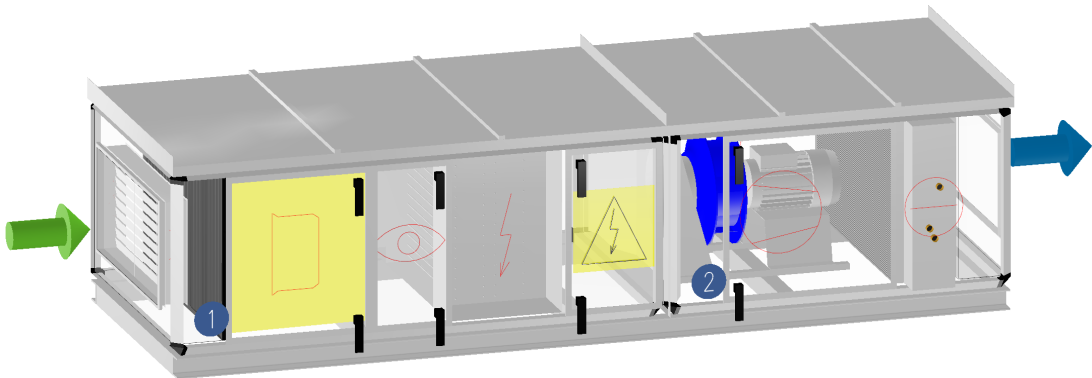
Transport details unit excl. packaging and accessories

Casings	Length [mm]	Depth [mm]	Height [mm]	Volume [m³]	Weight [kg]
Fan and filter section	1019	1755	1909	3.1	355
Filter					
Plug fan					
Damper					
Heat exchanger section	610	1765	1909	1.9	328
Heat exchanger rotary					
Control box					
Fan and filter section	820	1755	1909	2.5	303
Filter					
Plug fan					
Cooler section	480	1755	1909	1.5	196
Space section single-high					
Cooling coil DX					

Unit data

Unit type:	VEX5050	Unit name:	AHU05 (Kitchen Supply)
Unit number:			
VEX5000			
	Airflow	Static external pressure	
Supply air	1.760 m³/s	265 Pa	SFPv 906 W/(m³/s)
Dimension (l x d x h)	4162 x 1417 x 1042 mm		
Total weight incl. accessories	676 kg		
Installation			
Inspection side	Right		
Supply voltage	3x400V		
Supply power	3.08 kW	Main control board	
Supply current	7.3 A	Main control board	
ETA	%	Design outdoor temperature, winter/summer	-5.0/30.0 °C
Air density	1.2 kg/m³	Country	UK
Calculated in version	1.1.68.6	Destination	London City

Master Drawing



-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

Technical details

VEX5000

Unit

Automatic Sizing	Yes
Automatic control	With EXcon
Base frame	AHU is delivered in sections with base frame separately

Control box

User input

Control system	Constant flow
Network connection	Modbus TCP/IP
Control Interface	Touch Terminal

Supply air

Inlet

User input

Position	Inlet end
Duct connection design	Panel for duct connection
Duct accessories	No accessories
Damper SF	Inside damper SF
Regulation to damper	Damper incl. motor

Inlet results

Air quantity	1.760 m³/s
Pressure drop	4 Pa
Face velocity	3.5 m/s
Length of function	240 mm
Total weight incl. accessories	12 kg

Damper results

Damper torques requirement	14 Nm
Damper measure	1000x500 mm

Filter

Unit arrangement

Manual casing break after this part	No
-------------------------------------	----

User input

Filter type	F7- Bag (long)
Filter guard	None

Accessories

Drip pan	No
Water siphon	No
Inspection window	No
Light with switch	No
Spare filter set	0 pcs

Results

Filter configuration	2 pc. (592x592x635)
Air quantity	1.760 m³/s

Pressure drop dim.	143 Pa
Air velocity in function	1.6 m/s
V-class (EN13053)	V2
Face velocity	2.5 m/s
Pressure drop clean	93 Pa
Pressure drop final	193 Pa
Length of function	720 mm
Total weight incl. accessories	10 kg

Space section

Unit arrangement

Manual casing break after this part	No
-------------------------------------	----

User input

Length of section	400 mm
-------------------	--------

Accessories

Inspection door	Yes
Inspection window	No
Light with switch	No

Results

Air quantity	1.760 m³/s
Pressure drop	2 Pa
Face velocity	1.6 m/s
Total weight incl. accessories	0 kg

Heating coil electrical

Unit arrangement

Manual casing break after this part	No
-------------------------------------	----

User input

Coil size	Automatic
Air inlet temperature	-5.0 °C
Air outlet temperature	6.0 °C

Results

Air quantity	1.760 m³/s
Pressure drop	3 Pa
Face velocity	1.7 m/s
Coil size	HE2
Type	VRA-ZCN-13/8-02-MTXL 47kW
Voltage supply	3 x 400 V
Current rating	68.0 A
Heating requirement	23.45 kW
Heating capacity	47.00 kW
Supply air temperature in	-5.0 °C
Supply air temperature out	6.0 °C
Supply air relative humidity in	100 %
Supply air relative humidity out	45 %
Length of function	560 mm
Total weight incl. accessories	64 kg

Space section

Unit arrangement

Manual casing break after this part Yes

User input

Length of section 480 mm

Accessories

Inspection door Yes

Inspection window No

Light with switch No

Results

Air quantity 1.760 m³/s

Pressure drop 2 Pa

Face velocity 1.6 m/s

Total weight incl. accessories 0 kg

Control box

User input

Control system Constant flow

Network connection Modbus TCP/IP

Control Interface Touch Terminal

Plug fan

Unit arrangement

Manual casing break after this part No

User input

Discharge Pos. A (straight through)

Motor class IE3

Fan / Motor size Automatic

Accessories

Inspection window No

Light swith incl. 230 V No

Flexible connection No

Frequency converter Yes

Results

Type ER40C-4DN.E7.1R

Air quantity 1.760 m³/s

Pressure loss fan mounting 58 Pa

Fan static pressure 517 Pa

Fan total pressure 610 Pa

Fan speed 2211 rpm

Fan speed max 2430 rpm

Max frequency 84.00 Hz

Frequency efficiency 97.0 %

Required fan axis power 1.40 kW

Fan efficiency static 65.0 %

Fan efficiency total 76.8 %

K-factor 0.043 m³/s

Electrical power input inverter (P sys)	1.72 kW
Electrical power input motor (P1)	1.62 kW
Voltage	3 x 400 V
Fan section static ETA sys	47.0 %
ErP efficiency grade	64.9 %
ErP static fan efficiency	64.9 %
ErP-conformity	2015
P-class (EN13053)	P3
PmRef	1.82
Length of function	1120 mm
Total weight incl. accessories	57 kg
SFPv	906 W/(m³/s)
SFP class	SFP 3
Electrical power (Psys) Clean filter	1.59 kW
Fan / Motor size	PF1
Fan motor size	100
Results, motor	
Rated power	2.20 kW
Rated current	4.1 A
Motor efficiency	86.7 %

Cooling/Heating DX coil

Unit arrangement

Manual casing break after this part	No
-------------------------------------	----

User input

Medium	R32
Number of sections	3
Coil width	Large
Coil connection side	Front side
Coil profile	EC (1/2")
Fin spacing	2.5 mm
Fin material	Al 0.12
No of rows	Automatic
Coil material	Cu 0.35
Calculate with	Fluid outlet temperature

Summer condition

Max pressure loss on fluid side	9.18/2.12 kPa
Air outlet temperature	16.0/16.0 °C
Evaporation temperature	5.0 °C

Winter/Summer condition

Heating option	Yes, temperature based on condensing temperature
Air inlet temperature	6.0 °C
Air inlet relative humidity	100 %
Air outlet temperature	16.0 °C
Condensing temperature	50.0 °C

Accessories

Frost pocket	No
--------------	----

Water siphon	Yes
Droplet eliminator	No
Results	
Air quantity	1.760 m³/s
Pressure drop (dry)	28 Pa
Face velocity	2.0 m/s
Type	4B-0340-14SP979
Dimension of inlet connection	3 x 5/8 & 7/8"
Dimension of outlet connection	3 x 7/8 & 5/8" "
Supply air temperature in	30.0 °C
Supply air temperature out	16.0 °C
Cooling/Heating capacity total	48.67/21.22 kW
Condensate	0.01 l/s
Length of function	320 mm
Total weight incl. accessories Coil	102.1 kg
Fin length	78
Coil length	240
Number of tube rows	3 pcs
Number of circuits	6 pcs
Finned length	1250 mm
Finned height	720 mm
Results, winter	
Pressure drop (dry)	33 Pa
Supply air temperature out	-5.0/30 °C
	16/16°C

Outlet

User input

Position	Outlet end
Duct connection design	Panel for duct connection
Duct accessories	No accessories
Damper SF	Without

Outlet results

Air quantity	1.760 m³/s
--------------	------------

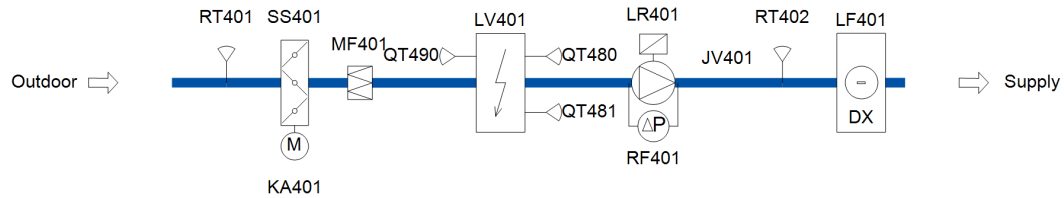
Pressure drop	1 Pa
Face velocity	3.5 m/s
Length of function	240 mm
Total weight incl. accessories	12 kg

Sound data

Sound power level

Octave band	63	125	250	500	1k	2k	4k	8k	Total	
To outdoor duct	67	57	69	59	60	59	50	46	dB	65 dB(A)
To supply duct	74	61	79	72	77	75	73	66	dB	81 dB(A)
To surroundings	59	59	66	54	57	48	42	42	dB	61 dB(A)

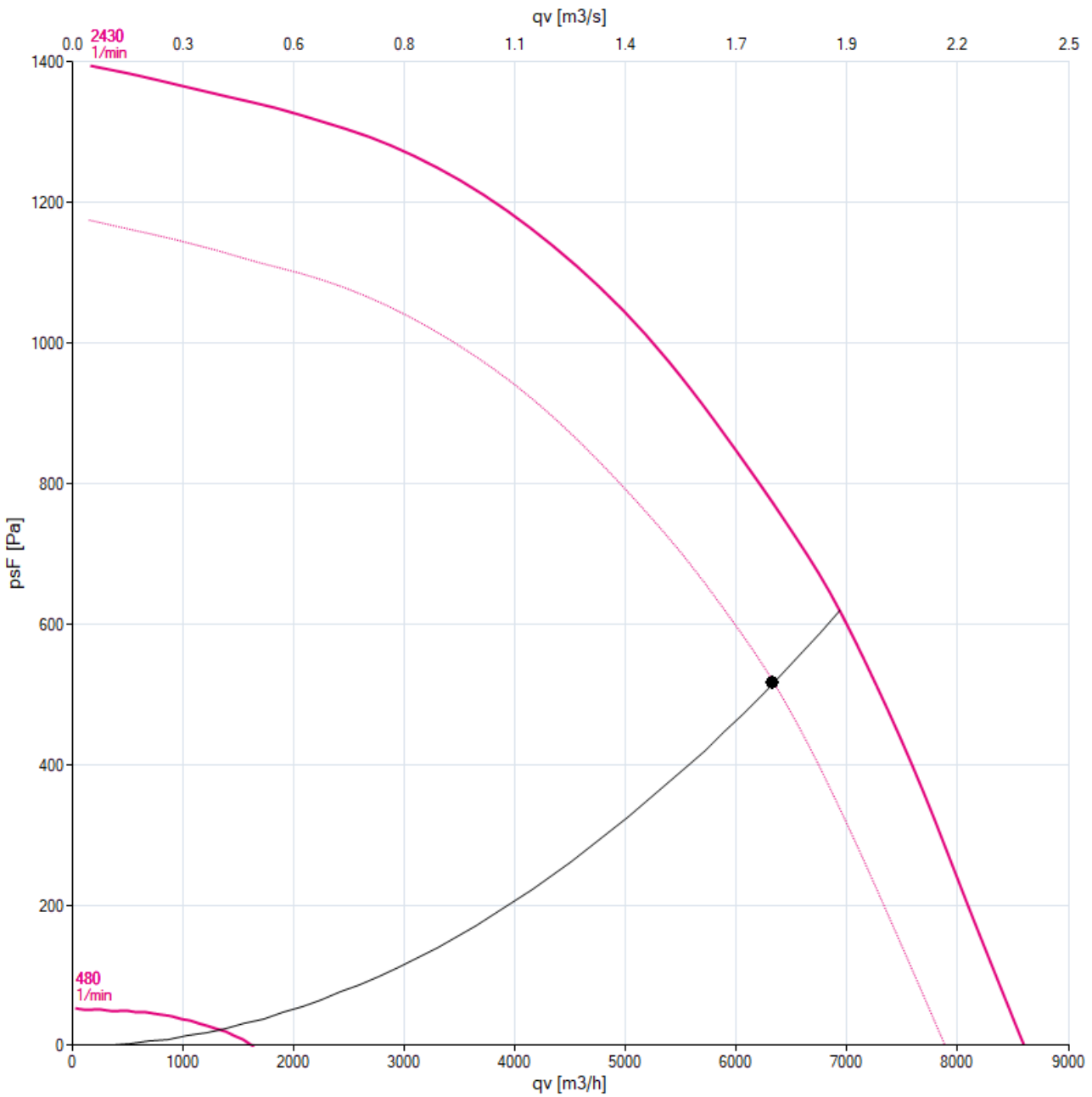
Flow chart



Flow chart symbols

TFM No.	Key diagram No.	Description
JV401	-M7.4	Supply air fan
KA401	-M36.5	Damper motor
LF401		Cooling coil DX
LR401	-T7.1	EC inverter supply air fan
LV401	-B88.0	Electrical heating coil
MF401		Outdoor air filter
QT480	-T11	Overheat thermostat with automatic reset
QT481	-T12	Overheat thermostat with automatic reset
QT490	-T1	Fire thermostat with manual reset
RF401	-P31.2 / P1	Air flow rate supply air fan
RT401	-Temp.2.1	Outdoor air temp. sensor
RT402	-Temp.2.2	Supply air temp. sensor
SS401		Outdoor air damper

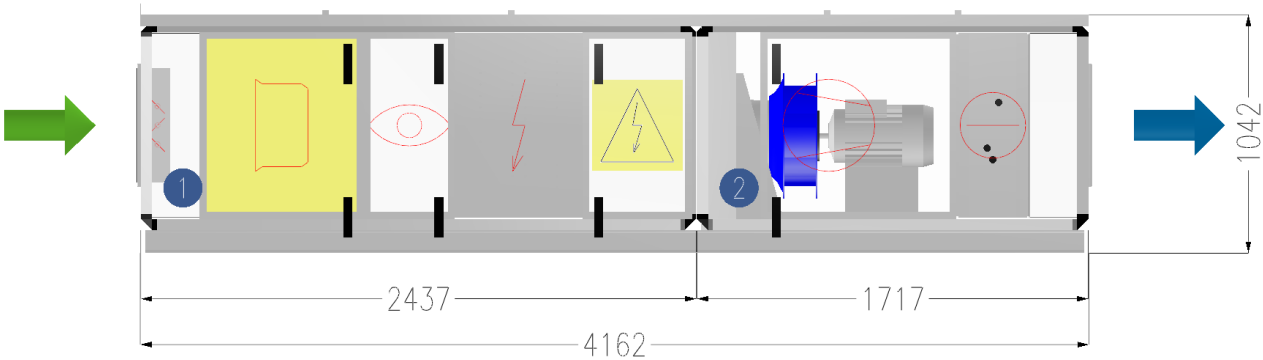
Fan diagram
Supply fan



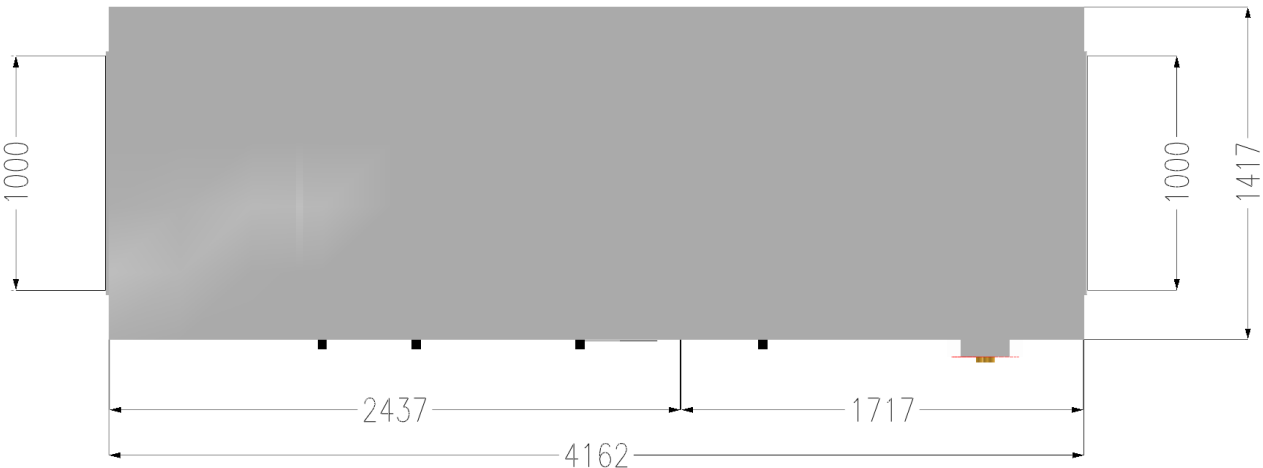
Drawings

-  Outdoor air inlet 2.1
-  Supply air outlet 2.2

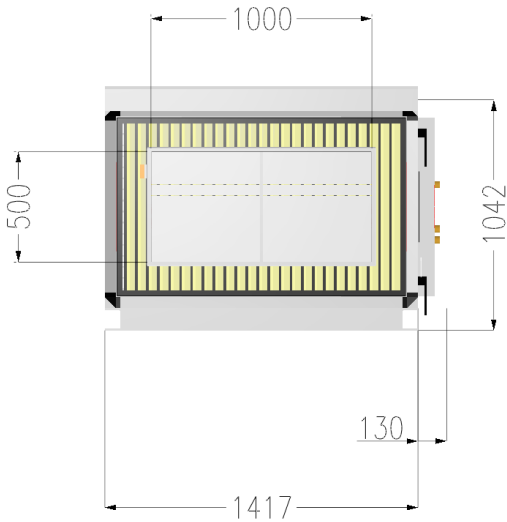
Front



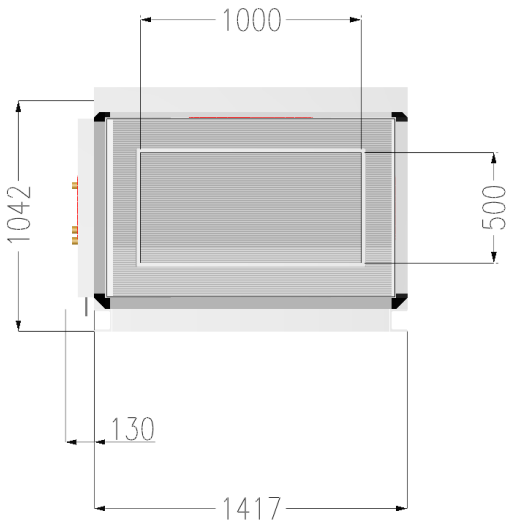
Top



Left



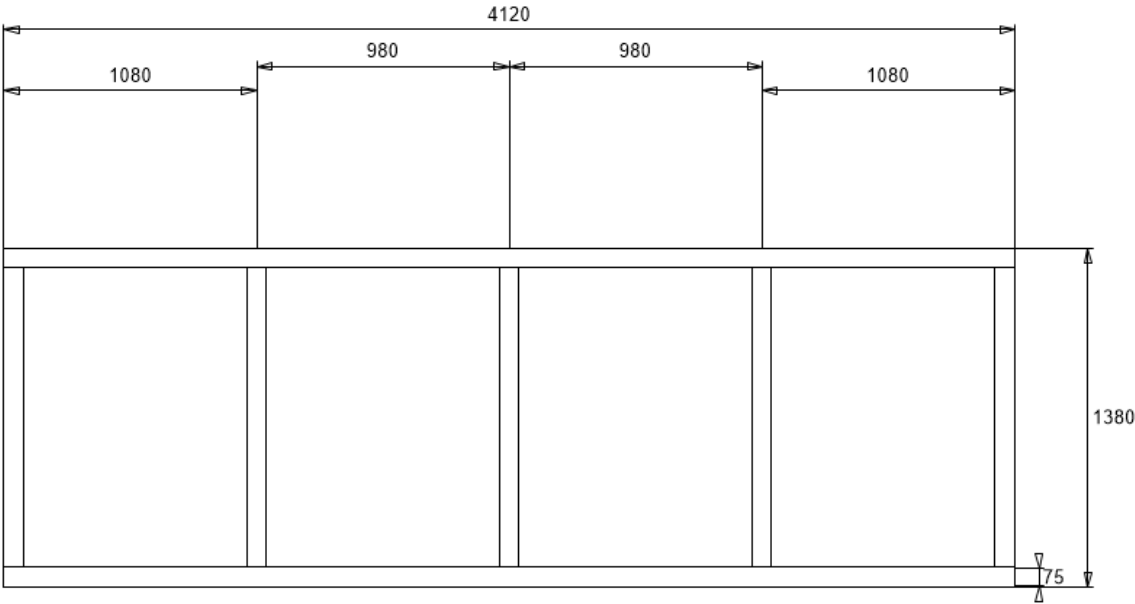
Right



Transport details unit excl. packaging and accessories

Casings	Length [mm]	Depth [mm]	Height [mm]	Volume [m³]	Weight [kg]
Section 1	2437	1417	1017	3.2	325
Inlet					
Filter					
Space section					
Heating coil electrical					
Space section					
Control box					
Roof					
Section 2	1717	1547	1017	2.4	281
Plug fan					
Cooling coil					
Outlet					
Roof					
Supply baseframe					70
Extract baseframe					0

Base frame





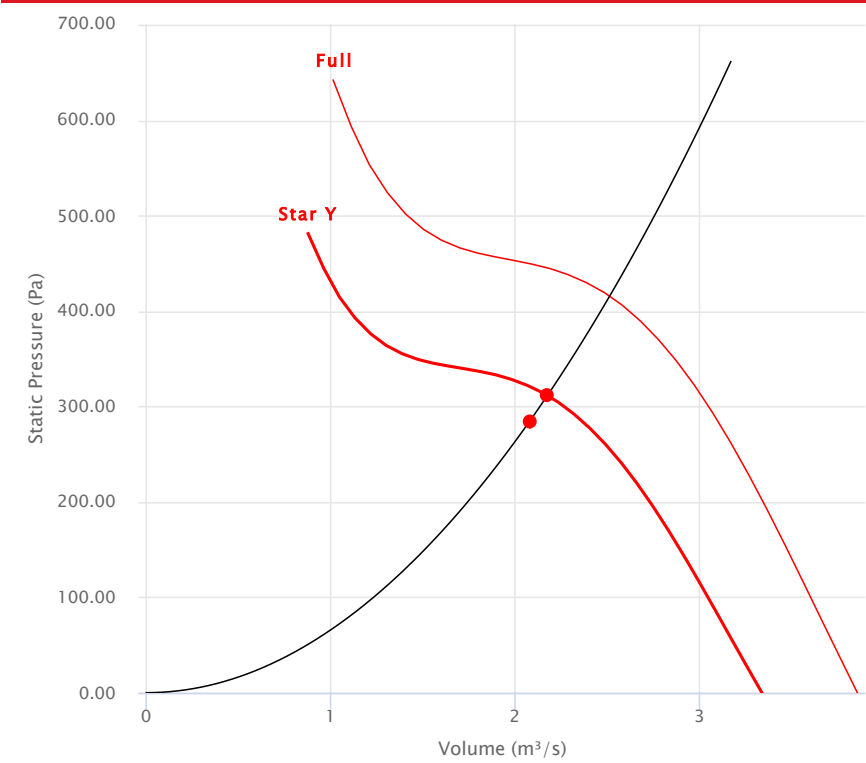
Project Name:	MCFC WOMENS ACADEMY		
Client:	COMPLETE VENT	Engineer:	MARK
Quote Number:	Q46171	Date:	10/07/2025
Item Reference:	AXIAL	Item Quantity:	1

HRFD 500/2/2 TK Long Cased Axial Fan , Pole Switching Dahlander



High efficiency long cased axial fan with cylindrical duct case with spigot ends. Cylindrical duct in galvanised sheet steel covering impeller with two flanges on both ends. Dimensions and flange fixing holes to DIN 24155. Terminal box on outer casing. Highly efficient, profiled blade impeller from polymers, aerodynamically optimised to the application, dynamically balanced. Suitable for -30 °C to +60 °C. Totally enclosed, three phase AC motor, with built-in thermal contacts. Speed controllable by voltage reduction. Maintenance free with low-noise sealed for life ball bearings. Reversible. Totally enclosed, maintenance free 3-phase motor, sealed for life ball bearings, Pole Switching Dahlander.

Performance Chart



Product

Ref.No.	485
Model Code	HRFD 500/2/2 TK
Fan Size	500 mm
Maximum airflow temp.	40 °C
Weight	30.0 kg

Performance

Requested Duty	2.08 m³/s @ 285 Pa (Static)
Actual Duty	2.17 m³/s @ 311 Pa (Static)
Fan Nominal Speed	2825 rpm
Specific Fan Power	0.24 W/l/s
Output Power	0.618 kW

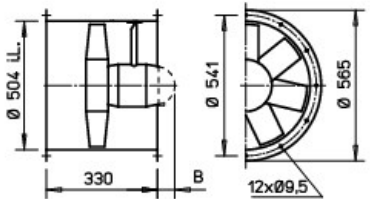
Motor

Rating	2.47 / 1.96 kW
Poles	2 / 2
Electrical Supply	400v/3Ph/50Hz
Full Load Current	3.14 / 4.73 A
Starting Current	12.56 / 18.92 A

Sound

Sound Pressure Level			45 dB(A) at 3m							
Spectrum	Hz	Total	125	250	500	1k	2k	4k	8k	
LwA	Intake	dB(A)	66	60	77	79	84	78	75	67

Dimension and Drawing



*This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.



Project Name:	MCFC WOMENS ACADEMY		
Client:	COMPLETE VENT	Engineer:	MARK
Quote Number:	Q46171	Date:	10/07/2025
Item Reference:	AXIAL	Item Quantity:	1

HRFD 500/2/2 TK - Selected Accessories

	Ref.No.	Model	Description
	674	MK 500	
	1208	FR 500	COUPLING FLANGE 500 MM
	1452	SDD 1	ANTI-VIBRATION MOUNTS FOR COMPRESSION, 1 SET = 4 PCS
	1678	FM 500	FLEXIBLE SLEEVE DIA. 500 MM WITH 2 CLAMPS

