MICRONAIRE

MAC Modular Heat Recovery Air Handling Unit

We Deliver Air For Your Ideal Enviroment

ISO 9001
ISO 14001
BUREAU VERITAS
Certification

UKAS
ENVIRONMENTAL
MANAGEMENT
0008

AHRI CERTIFIED®
www.ahridirectory.org
Central Station Air-Handling Unit Casings
AHRI Standard 1350

Company Intro

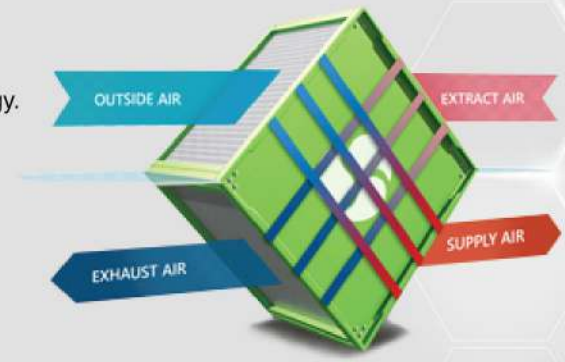
MAC MICRONAIRE is an ISO 9001 certified company who is specialized in industrial AHU manufacturing.

MAC produces high quality air handling unit conforming to ASHRAE AHRI 1350 standard that fit for industrial application especially in cleanroom application. MAC committed to produce world class cleanroom double skin modular AHU and HVAC equipment with utmost quality, efficiency and competitiveness.

With MAC utilizes finest anti corrosion material such as stainless steel and aluminum alloy to ensure our client has trouble free maintenance and long lasting equipment in the most extreme

MAU Heat Recovery AHU is the air handling unit integrated with **Heat Plate Core** to provide heat recovery in Summer or Winter.

- Uses the exhaust air which already been cooled or heated up to recover the fresh air intake.
- Reduces the capacity needed to cool or heat up the fresh air and saves energy.
- Very efficient in recovery yet it is very minimal of leakages makes it more suitable for hygienic applications.
- Comes without moving parts and makes it easier to maintain.
- The material of the heat plate is selectable from Al to SUS.
- The heat recovery plate is certified with Eurovent standard as well as VDI 6022 hygienic standard.
- Heat plate is capable to deliver massive recovery.
- Less maintenance and breakdown risk.



Frame

MAC MC6 series AHU uses 65mm thick panel for optimum heat isolation, highest in the market. Comes with highest rating in AHRI 1350, CB1 thermal bridge aluminium alloy frame & CT1 grade thermal isolation.

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Damper

MAC heat recovery AHU come with full aluminium opposed blade damper for air volume adjustment or isolation.

Damper is complied with class 2 leakage rate in accordance to EN1751. It is a simple assemble design with gear moving mechanism which can be driven by manual handle or motorised actuator.

Filters

Filters can be inserted into the heat recovery AHU depends on the application.

- Filtration level is selectable from G4 all the way to H13.
- Carbon filter, chemical filter, electrostatic filter are also available upon request.
- All the selected filters are standard in sizes and available in after sales market.

Coils

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MAC heat recovery AHU comes with cooling and heating coils. All the coil's performance are certified with AHRI 410 standard. Can be selected in direct expansion type or water type coils.

Fan

MAC heat recovery AHU uses direct driven **EC plug fan.**

- It comes with IE4 efficiency rating which is highest in the market.
- Fan array design is available for better air distribution and redundancy purpose.

Standard Model
General Data

MICRONAIRE

Heat Recovery Plate Ahu

MODEL		MHA-1000	MHA-2000	MHA-3000	MHA-4000	MHA-5000
Nominal Supply Air Flow	L/s m3/h	1000	2000	3000	4000	5000
Nominal Exhaust Air Flow	L/s m3/h	3600	7200	10800	14400	18000
Nominal Cooling Capacity	kW	22.9	46.57	68.45	90.17	117.7
Nominal Heating Capacity	kW	13.76	27.26	40.49	52.36	67.94
Supply Fan						
Total Input Power (Nominal)	kW	1.94	3.68	2.63 X 2	3.48 X 2	4.31 X 2
Running Current @ 400V (Nominal)	A	2.8	5.31	3.79 X 2	5.03 X 2	6.21 X 2
Exhaust Fan						
Total Input Power (Nominal)	kW	1.52	2.79	2.01 X 2	2.71 X 2	3.44 X 2
Running Current @ 400V (Nominal)	A	2.2	4.03	2.9 X 2	3.91 X 2	4.97 X 2
Electrical Characteristic Range		380-480 V / 3 phase / 50hz & 60 hz				
Heat Recovery (Winter)						
Inlet Condition		Winter Condition 3°C / 90% RH				
Outlet Condition		18.9°C / 31.1% RH	18.8°C / 31.3% RH	18.9°C / 31.1% RH	18.8°C / 31.3% RH	18.8°C / 31.4% RH
Heat Recovery (Wet)	kW	19.31	38.34	57.92	76.77	95.5
Heat Recovery (Dry)	kW	18.72	37.16	56.15	74.41	92.55
Efficiency	%	81.5	81	81.5	81	80.7
Heat Recovery (Summer)						
Inlet Condition		Summer Condition 34.6°C / 28% RH				
Outlet Condition		24.3°C / 50.6% RH	24.4°C / 50.4% RH	24.3°C / 50.6% RH	24.4°C / 50.4% RH	24.4°C / 50.3% RH
Heat Recovery (Wet)	kW	12.4	24.64	37.24	49.28	61.38
Heat Recovery (Dry)	kW	12.4	24.64	37.24	49.28	61.38
Efficiency	%	81.5	81	81.6	81	80.7
Chilled Water Cooling Coil		Performance based on HEX summer outlet condition				
Total Capacity	kW	22.9	46.57	68.45	90.17	117.7
Sensible Capacity	kW	17.51	35.56	52.38	69.32	89.84
Row/FPI		6/12	6/12	6/12	6/12	6/12
Velocity	m/s			~2.25		
Chilled Water Pipe Connection						
Inlet/Outlet		DN32	DN40	DN50	DN65	DN65
Heated Water Cooling Coil		Performance based on HEX winter outlet condition				
Total Capacity	kW	13.76	27.26	40.49	52.36	67.94
Sensible Capacity	kW	13.76	27.26	40.49	52.36	67.94
Row/FPI		2/8	2/8	2/8	2/8	2/8
Velocity	m/s			~2.25		
Heated Water Pipe Connection						
Inlet/Outlet		DN15	DN20	DN25	DN25	DN32
Supply Fan						
Type				IE4 EC Plug Fan		
Brand				EBM PAPST		
Model		K3G310PV6903	K3G450PA3103	K3G400PW0301	K3G450PA3103	K3G450PA3103
Quantity	Nos	1	1	2	2	2
Exhaust Fan						
Type				IE4 EC Plug Fan		
Brand				EBM PAPST		
Model		K3G310PV6903	K3G450PA3103	K3G400PW0301	K3G450PA3103	K3G450PA3103
Quantity	Nos	1	1	2	2	2
Unit Dimension						
Height	mm	1905	1905	1905	2210	2210
Width	mm	990	1600	2210	2515	3125
Length		Refer page 4&5				
Casing						
Insulation Thickness	mm	65				
Insulation Type		PU				
Frame Type		Pentapost				
Frame Material		Al Alloy				
External Sheet Material		0.6mm GI Powder Coated Grey				
Base Height	mm	100				
Base Material		Al Alloy/ Stainless Steel				
Supply Air Filtration		G4 48mm Panel Type + F8 380mm Pocket Type				
Exhaust Air Filtration		G4 48mm Panel Type				
Cooling Medium		Chilled Water (Inlet 7°C / 12°C)				
Heating Medium		Hot Water (Inlet 50°C / Outlet 35°C)				

Notes:

* Nominal info are based on winter fresh air condition 3°C / 90% RH and summer fresh air condition 34.6°C / 28% RH
* The rated load ampere (RLA) are rated at 400 volt * Cooling capacity is based on pre-cooled/pre-heated supply air temperature
* External static pressure for Supply & Exhaust Air sections are rated at 500Pa
* HEX module section length only accounts for HEX dimensions, including \HEX bypass damper(s) will require an increase in length
* The manufacturer reserves the right to make changes to specifcations without prior notice

Standard Model
General Data

MICRONAIRE
Heat Recovery Plate Ahu

MODEL		MHA-6000	MHA-7000	MHA-8000	MHA-9000	MHA-10000
Nominal Supply Air Flow	L/s m3/h	6000	7000	8000	9000	10000
Nominal Exhaust Air Flow	L/s m3/h	21600	25200	28800	32400	36000
Nominal Cooling Capacity	kW	138.3	162.4	193	214.9	235.6
Nominal Heating Capacity	kW	77.8	90.26	110.4	123.4	135.5
Supply Fan						
Total Input Power (Nominal)	kW	5.54 X 2	4.33 X 3	4.65 X 3	5.36 X 3	5.0 X 3
Running Current @ 400V (Nominal)	A	8.0 X2	6.25 X 3	6.71 X 3	7.74 X 3	7.22 X 3
Exhaust Fan						
Total Input Power (Nominal)	kW	4.36 X 2	3.36 X 3	3.77 X 3	4.35 X 3	6.01 X 3
Running Current @ 400V (Nominal)	A	6.30 X 2	4.85 X 3	5.44 X 3	6.28 X 3	8.68 X 3
Electrical Characteristic Range		380-480 V / 3 phase / 50hz & 60 hz				
Heat Recovery (Winter)						
Inlet Condition		Winter Condition 3°C / 90% RH				
Outlet Condition		19.3°C / 30.4% RH	19.2°C / 30.5% RH	19.2°C / 30.5% RH	19.2°C / 30.5% RH	19.2°C / 30.5% RH
Heat Recovery (Wet)	kW	118.61	137.73	157.41	176.88	196.53
Heat Recovery (Dry)	kW	112.3	130.37	149	167.42	186.02
Efficiency	%	81.6	81.1	81.1	81.1	81.1
Heat Recovery (Summer)						
Inlet Condition		Summer Condition 34.6°C / 28% RH				
Outlet Condition		24.3°C / 50.6% RH	24.4°C / 50.5% RH	24.4°C / 50.4% RH	24.4°C / 50.4% RH	24.4°C / 50.4% RH
Heat Recovery (Wet)	kW	74.47	86.46	98.69	111.02	123.36
Heat Recovery (Dry)	kW	74.47	86.46	98.69	111.02	123.36
Efficiency	%	81.6	81.2	81.1	81.1	81.1
Chilled Water Cooling Coil		Performance based on HEX summer outlet condition				
Total Capacity	kW	138.3	162.4	193	214.9	235.6
Sensible Capacity	kW	105.6	123.9	146.4	163.3	179.5
Row/FPI		6/12	6/12	6/12	6/12	6/12
Velocity	m/s			~2.25		
Chilled Water Pipe Connection						
Inlet/Outlet		DN65	DN65	DN80	DN80	DN80
Heated Water Cooling Coil		Performance based on HEX winter outlet condition				
Total Capacity	kW	77.8	90.26	110.4	123.4	135.5
Sensible Capacity	kW	77.8	90.26	110.4	123.4	135.5
Row/FPI		2/8	2/8	2/8	2/8	2/8
Velocity	m/s			~2.25		
Heated Water Pipe Connection						
Inlet/Outlet		DN32	DN32	DN40	DN40	DN50
Supply Fan						
Type		IE4 EC Plug Fan				
Brand		EBM PAPST				
Model		K3G450PB29L1	K3G450PA3103	K3G450PB29L1	K3G450PB29L1	K3G450PB29L1
Quantity	Nos	2	3	3	3	3
Exhaust Fan						
Type		IE4 EC Plug Fan				
Brand		EBM PAPST				
Model		K3G450PB29L1	K3G450PA3103	K3G450PB29L1	K3G450PB29L1	K3G450PB29L1
Quantity	Nos	2	3	3	3	3
Unit Dimension						
Height	mm	2690	2690	2996	2996	2996
Width	mm	3125	3430	3735	4040	4650
Length		Refer page 4&5				
Casing						
Insulation Thickness	mm	65				
Insulation Type		PU				
Frame Type		Pentapost				
Frame Material		Al Alloy				
External Sheet Material		0.6mm GI Powder Coated Grey				
Base Height	mm	100				
Base Material		Al Alloy/ Stainless Steel				
Supply Air Filtration		G4 48mm Panel Type + F8 380mm Pocket Type				
Exhaust Air Filtration		G4 48mm Panel Type				
Cooling Medium		Chilled Water (Inlet 7°C / 12°C)				
Heating Medium		Hot Water (Inlet 50°C / Outlet 35°C)				

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* HEX module section length only accounts for HEX dimensions, including \HEX bypass damper(s) will require an increase in length
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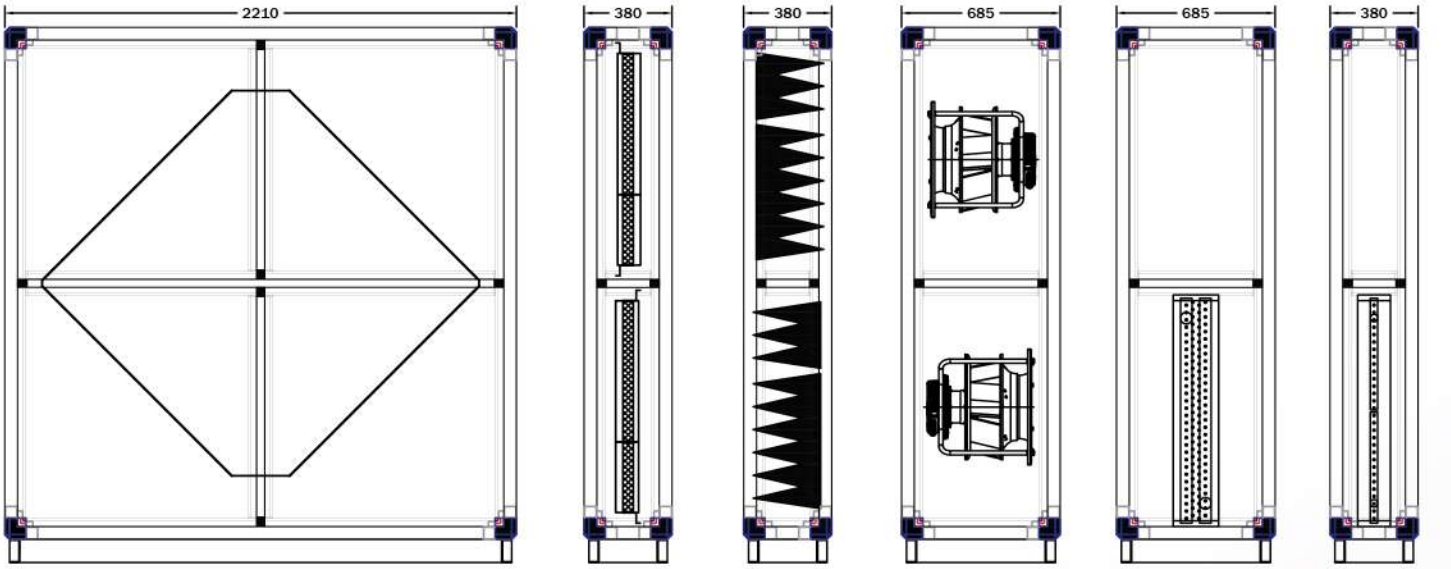
Module Diagram

HEX	Pre	Secondary	Supply/Exhaust	Cooling	Heating
-	Filter	Filter	Fan	Coil	Coil
Section	Section	Section	Section	Section	Section
2210	380	380	685	380	380
mm	mm	mm	mm	mm	mm



HEX | PRE-FILTER | BAG-FILTER | FAN | COOLING | HEATING COIL

Notes: Multiple sections is able to combine to form a Module • The maximum length of each Module is 2210mm • All the Module height must be equal

More feature section is available upon request

UV Light | Humidifier | Control System

Sample Module Length Calculation

Example of Length Calculation		
Module 1	2210	mm
Module 2	S1 + S2 + S3 - [(Total Section Number -1) x 75] 685 + 380 + 380 - [(3-1) x 75] 1295	mm mm mm
Module 3	S1 + S2 + S3 + S4 - [(Total Section Number -1) x 75] 380 + 685 + 380 + 685 - [(4-1) x 75] 1905	mm mm mm
Total Length	Module 1 + Module 2 + Module 3 2210 + 1905 + 1295 5410	mm mm mm

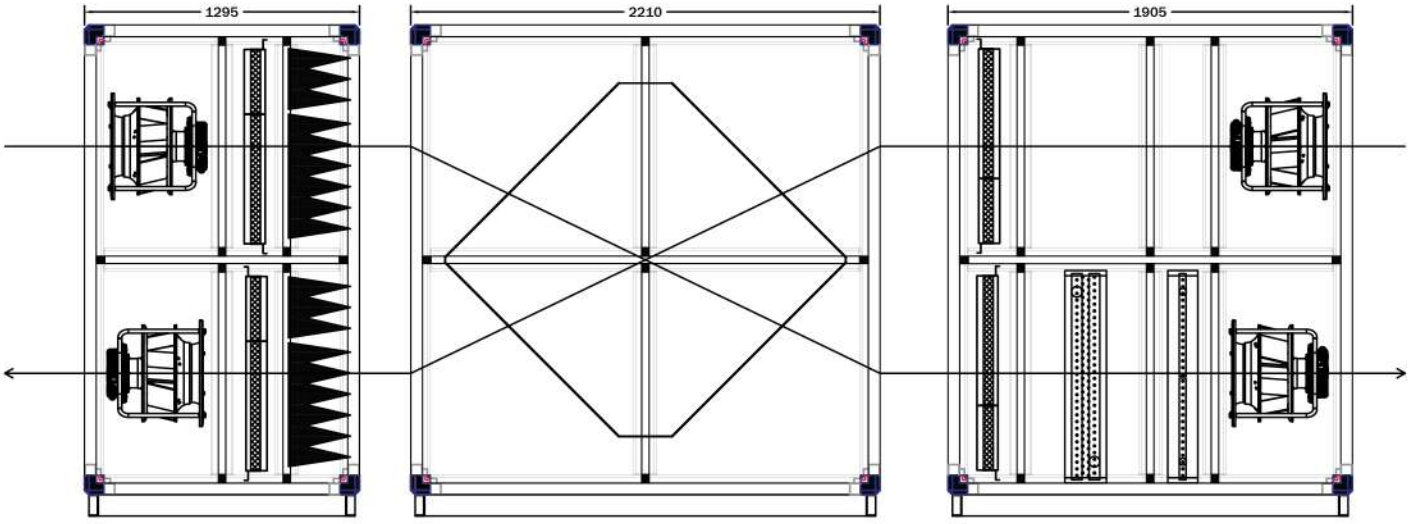
Note: Additional 130mm needed for damper for each side

Sample Modular Form of the HEX AHU

Module 2		
S1	S2	S3
Fan	Pre Filter	Bag Filter
990	380	380
1295mm		

Module 1
S1
Hex
2100mm
2100mm

Module 3			
S1	S2	S3	S4
Pre Filter	Cooling	Heating	Fan
380	685	380	990
1905mm			



SIDE VIEW

Notes

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As a result of our commitment to continuos improvement, MAC reserves the right to change the specification and description in this catalogue without prior notice.