McQuay® Air Conditioning

Product Catalogue

DOUBLE SKIN MODULAR AIR HANDLING UNIT

Models

DM1 - 0404 - 2233
DM2 - 0404 - 2233

TM: DM-2007

Engineered for flexibility and performance.™

CONTENTS

1.0 INTRODUCTION

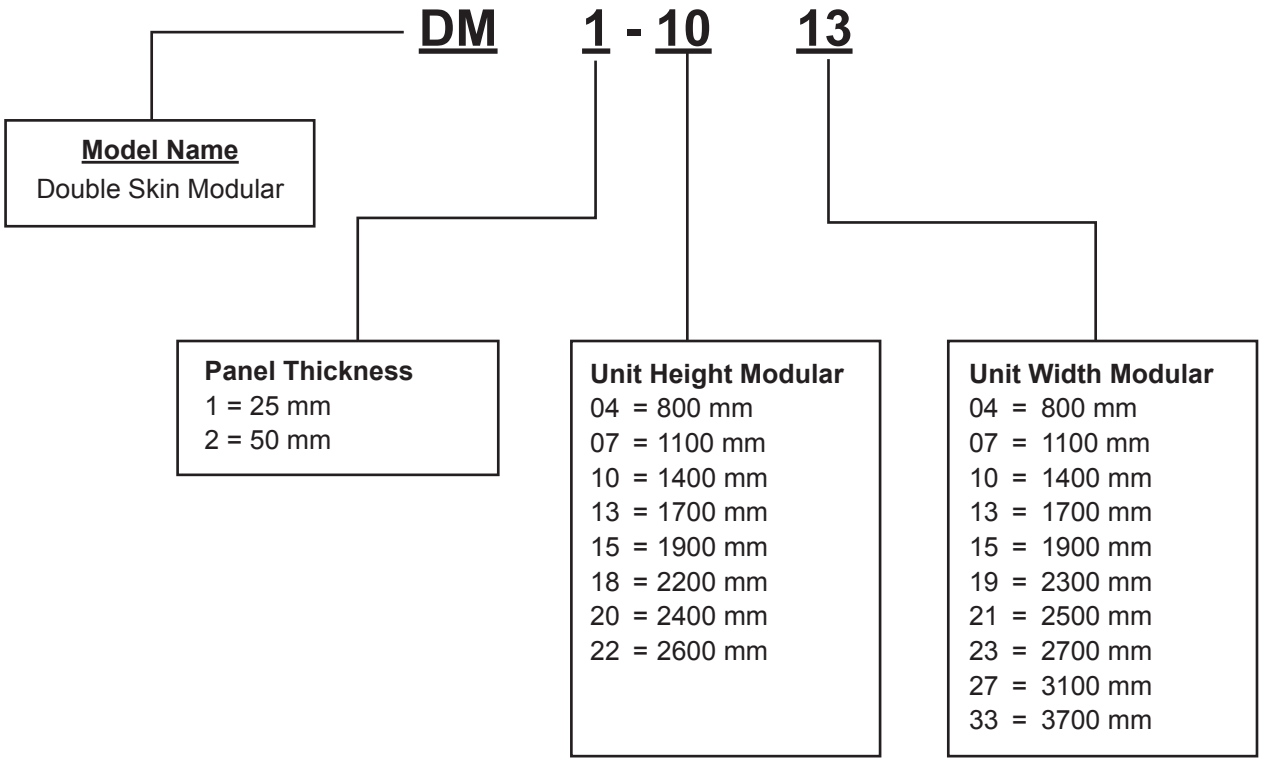
The Double Skin Modular Air Handling Unit is designed based on modular paneling concept to fulfill the indoor air quality requirement. The air flow of DM AHU is within range of 330 to 20,000 lps (700 to 42379 CFM) and up to a total static pressure of 1991 pa (8" W.G). For special design, the air flow can be reached 25,000 lps (52974 CFM).

The AHU is constructed of high strength extruded Aluminium to form rigid frame. Beside, it is with thermal barrier feature which using three leg-fiber plastic corner pieces, 25 or 50 mm Polyurethane (PU) insulation panel and all frames are insulated with 3.0 mm PE foam to minimize energy heat loss and prevent condensation occurring. The external clip method to hold the double skin PU insulation panel is easily accessible for maintenance while being air tight. The new thermal- break profile can perform better than the original profile in terms of providing better insulation and energy saving.

There is selection software programme available: DM AHU, to optimize the best arrangement and performance for either chilled water system or DX system. Standard components can be selected and be placed according to customer requirement. Once the unit is defined, optional item and accessories are identified. The programme gives immediate feedback if there is no suitable choice for the units. The programme provides us with fan curves data, coil performance data, dimension, and shipment weight.

McQuay can produce high quality, flexibility air handling unit which can provide excellent thermal efficiencies and to be airtight. Besides, air handling unit produced is with flexibility features to meet the indoor air quality, operating efficiency, sound level and installation requirement for today's extensive commercial and custom markets. A comfortable environment can enhance human's life quality.

2.0 NONMENCLATURE



NOTE :

* There is special customized design for non standard AHU upon customer request especially low height unit.
* Width and height are based on the 25mm PU insulation panel.
* Additional 50mm (Height & Width) for AHU with 50mm PU insulation.

3.0 AHU DESIGN FEATURES

3.1 MCQUAY STANDARD FEATURES

- Variable dimensioning features for flexible cabinet sizing (increment 100mm in height and width)
- External Galvanized and internal painted cabinet
- Multiple section depth
- Variable coil casing and drain pan material
- Mixing boxes
- Low leakage damper
- Face and by pass dampers
- Double sloped drain pan
- Different filter grade
- Variable fan selection include forward-curved, backward curved and airfoil
- Frequency inverter (VFD) and thermistor
- Electrical heater
- Sound Attenuator/ silencer
- Energy Recovery Section (heat recovery wheel and heat pipe)
- Accessible and maintenance
- Flexibility section for shipment

3.2 CASING / CABINET CONSTRUCTION

McQuay Air Handling Unit is designed in accordance BS EN 1886. It is constructed of maximum 2.0 mm high strength extruded aluminium pentapost and internal post with double modular skin insulation material. The patented frame channel design allows three identical pieces to be bolted together to form a composite corner piece. Both of this features form the rigid frame of the AHU. The unit wall is made up by Double Skin Polyurethane foam (PU) insulation panel with 0.5 mm high strength pre-painted steel as external skin and 0.5 mm galvanized steel (GI) as internal skin. Besides, there is special thickness: 0.8mm, 1.0mm and 1.2mm of skin material upon customer request. The PU foam insulation thickness can be 25mm or 50mm with density 40 kg/m^3, which provides an overall thermal conductivity, k = 0.017 W/ M˚K.

This cabinet construction reduces significantly the sound level from the fan of an AHU. The cabinet construction is maintenance friendly through easy access to all components. The panels may be removed from all units sections without compromising the unit rigidity which is ensured by the aluminium frame. The AHU Unit is designed to low energy consumption and little condensation due to high thermal insulation and airtight casings to EN 1886.

Access door or service panel can be supplied with a hinged access door with latch or with removable panel with handles and panel block. Gasket around the full perimeter of the access doors frame shall be used to prevent air leakage. Door shall swing outward for unit sections under negative pressure. Module to module assembly shall be accomplished with an overlapping splice joint that is sealed with gasket on both mating modules to minimize on-site labor along with meeting indoor air quality standards. The unit is mounted on galvanized steel base frame for easy handling and positioning.

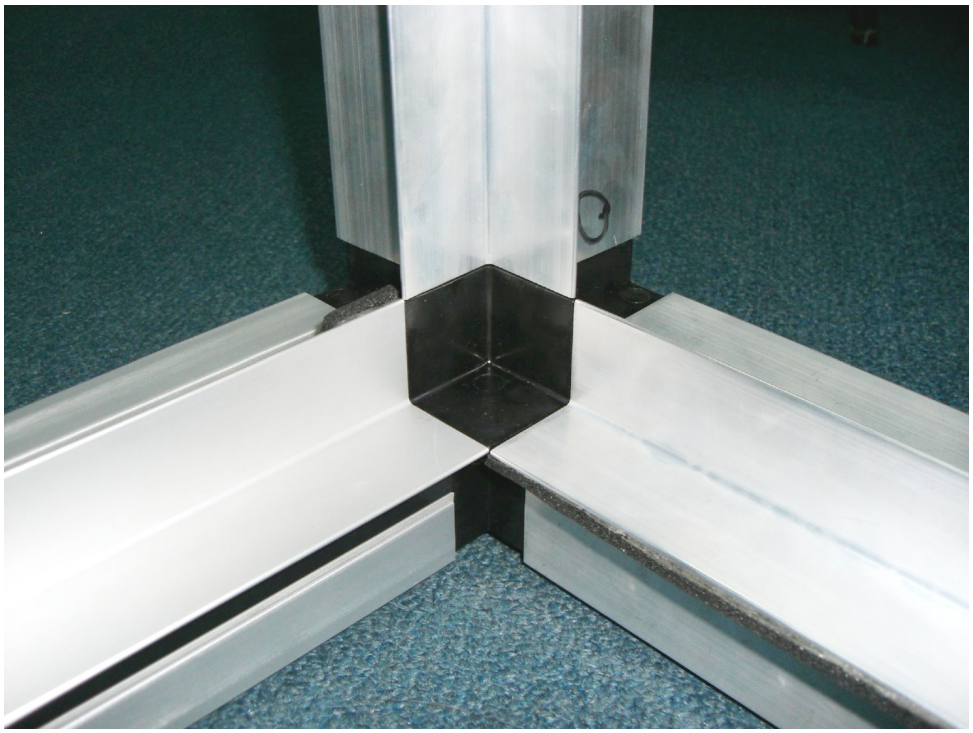


Figure 1: Aluminium pentapost attached to 3-legged injection Nylon corner piece.

Figure 2: Cabinet Appearance

3.3 THERMAL BREAK PROFILE

This is a new and high quality thermal break aluminium profile which can enhance performance of an AHU. It is constructed of two parts of extruded aluminium joint together with thermal barrier made out of nylon. The nylon is sandwiching the inner and outer layers of extruded aluminum. This design could render the formation of an effectively isolated thermal layer between the inner and outer side of the profiles so that the release of thermal energy via AHU could be ultimately minimized.

The thermal bridging factor of the assembled DM Air Handling Unit is designed to meet BS EN 1886, Class TB1. The thermal break profile only available for thickness 50mm. The thermal bridging for Standard DM AHU are TB2 (50mm) and TB3 (25mm). How to define a good AHU? It can be determined by: no air leakage and minimum heat loss through the AHU. The benefit of thermal break property showed as below increase the life of AHU and also save their operation cost for using long term. In addition, it is an ideal design for high end performance.

Benefit of Thermal Break Profile

i) Increased Energy Efficiency – System energy efficiency is improved by lowering the heat loss.
ii) Unit condensation minimized – Exterior condensation is potentially damaging or creating hazardous conditions.
iii) Probability of moisture migration into panel interior, which can degrade the insulation, is eliminated in this thermal break profile.
iv) Cut-off in an attempt to achieve energy conservation.
v) Improve sound insulation.

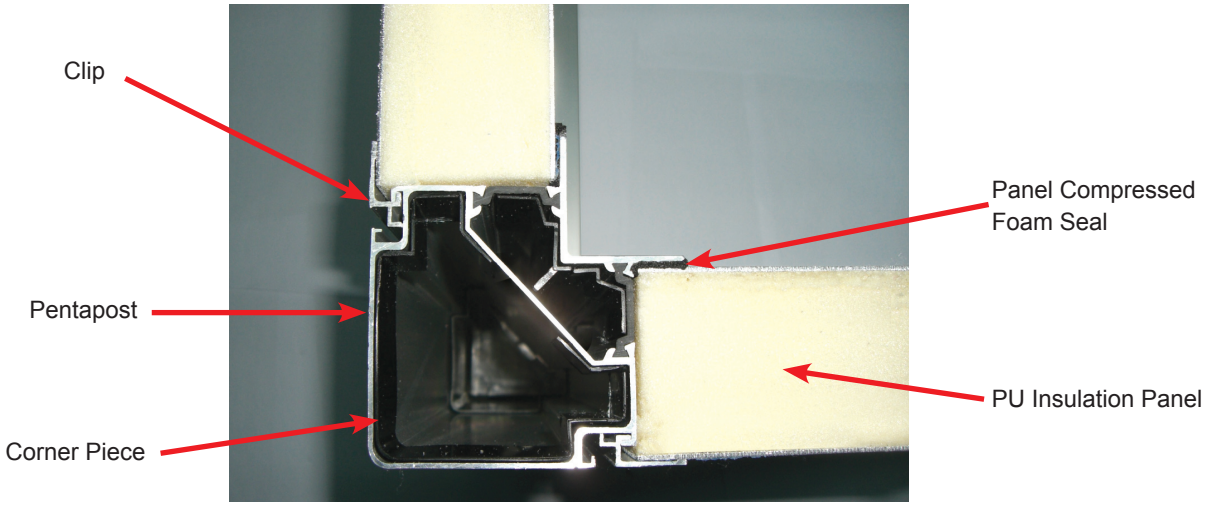


Figure 3: Thermal Break Profile Cross Section

3.4 COIL SECTION

Coil is installed such that unit casing enclose headers and return bends. Coil is designed based on the maximum utilization of available cross section area to achieve the most efficient heat transfer. Coil connections should be factory sealed with grommets on interior and exterior and gasket sleeve between outer wall and liner where each pipe extends through the unit casing to minimize air leakage and condensation inside panel assembly. Coils shall be removable through side and/ or top panels of unit without the need to remove and disassemble the entire section from the unit.

Coil constructed with aluminium corrugated fins and seamless copper tubes. Copper fins and hydrophilic fins are anti-corrosive materials which are optional. The fins are designed purposely for better heat transfer efficiency and moisture carry-over limit performance. Capacity, water pressure drop and selection procedure is designed in accordance with ARI Standard 410.

Cooling coils can be used when the face velocity does not exceed 2.5 m/s. For higher face velocity, a moisture eliminator is required to prevent condensate water carry over. For stacked coil in the coil section, drip pan is installed at back between coils to drain condensate to the main drain pans without flooding the lower coil section. The optional intermediate drain pan can be supplied for those needs to access for cleaning between the coils. McQuay Air Handling Units can handle both chilled water and direct expansion system.

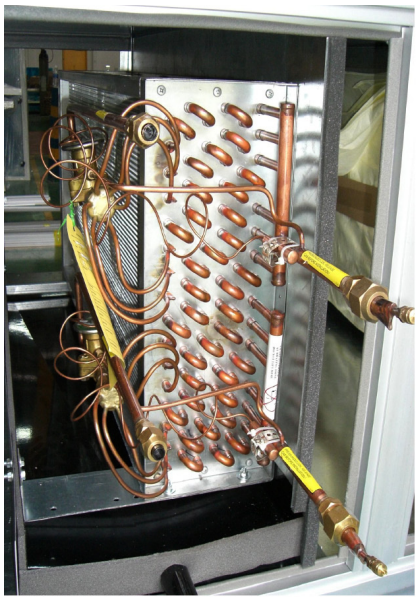


Figure 4: Direct Expansion System Coil

Figure 5: Stacked Coil

3.5 DRAIN PAN

The deep and sloped drain pan is designed to discharge the condensate water quickly. It is fabricated by galvanized steel sheet protected with powder coating paint or stainless steel as option. Beneath the drain pan, it is covered with 10mm PE insulation to prevent any occurrence of condensation. For stacked coil, additional drip pan or intermediate drain pan fabricated from same material as main drain pan will be installed at back between two coils.

3.6 FACE AND BY PASS DAMPER

It consists of opposed blades meter varying air volume through the coil and by pass to attain the desired temperature. It provides very low leakage in the face and bypass sections. Face and bypass damper can be provided for temperature modulation by bypassing air around the coil. The damper blades are fabricated of aluminium and continuous Thermoplastic Elastomer (TPE) seals are inserted onto every damper blade. The rotated rod of handle is made of brass and handle is fabricated of aluminium casting. The size of damper is decided by the air flow volume (m^3/s) and air speed (m/s). The air speed go through the damper shall not exceed 7.5 m/s.

3.7 FAN

Fans are used extensively in air-conditioning for circulating air over coils. The fan type includes forward curved, backward curved, twin fans and airfoil fans with double width double inlet (DWDI) centrifugal fan. The first low cost option will be forward curved fans which are generally used for low static pressure applications. The blade of fan is constructed of galvanized steel. It consists of blade which has tips curving forward that is in the direction of rotation of fan wheel. In addition, it generates low noise level which is preferred for installation in AHU.

Meanwhile, for backward curve fans, it requires higher speed and therefore has to be more sturdy in construction. The blade of backward curved is made of heavy gauge steel or mild steel, painted after manufacturing. It can handle high static pressure system and able to show higher efficiency over a broader range of higher system resistance.

For aerofoil fans, normally it will be the last option due to the costly components. It is constructed of mild steel. However, it shows higher efficiency, generate low noise level and can handle higher static pressures. McQuay housed air foil fans can operate up to 2240pa of static pressure.

Fan performance of all these fans have been tested and measured in accordance to AMCA Standard 210. The sound level is measure and rated in accordance with AMCA Standard 300. The fan bearing provided will have a minimum L50 life of 200,000 hours, and are available as high as 1,000,000 hours. Bearings are selected for minimum noise level and minimal device. The bearing is lubricated for life and maintenance free. Relubrication is optional. Fan is dynamically and statically balanced to Standard ISO 1940. The fan shaft is manufactured from C45 carbon steel. It is coated with a layer of anti-corrosion varnish.

There are two discharges direction: vertical and horizontal discharge. The fan discharge should be square (for both forward or backward curved fans) in area and flanged and isolated from the casing by the fire retardant grade flexible connection. Only one fan discharge is provided.

Fan selection requires accurate calculation of the air flow resistance through the whole system consisting of the total of two parts; external and internal static pressure. External static pressure is found in the distribution system, external to the air handler. Internal static pressure is the sum of the resistance of the coils and others component and accessories. Use the DM AHU selection Software to determine internal component pressure drops of the system. The software identifies fans available to properly handle the air flow and static pressure for the system.

Figure 6: Blower

3.8 MOTOR

Motor is internally mounted integral to an isolated fan assembly. Standard motor shall be horizontal foot mounting, induction motor, squirrel, totally enclosed fan-cooled (TEFV or TEFC) with IP 55 protection with class F. Motor capacity cannot be undersized but oversized for desired running capacity. For the desired operation speed between fan and motor, there are a few types of motor poles: 4 and 6 poles.

Motor Option

- 380-415 Volt / 3 phase/ 50 Hz (standard)
- 440 Volt/ 3 phase/ 60Hz
- Standard efficiency motor (Eff2)
- Premium efficiency motor (Eff1)
- Dual speed motor
- Motor with space heater

There are a few components which are able to provide safety, efficiency and flexibility for the operation of AHU. It includes thermistor, variable frequency drive (VFD), disconnect switch and others.

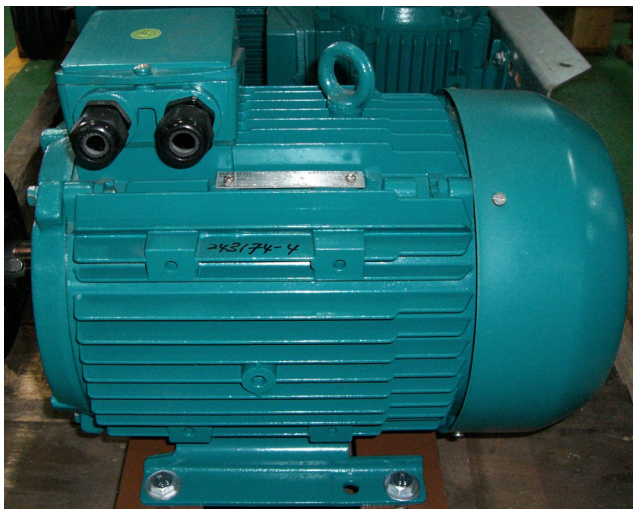


Figure 7: Motor

3.9 FAN / MOTOR ASSEMBLIES

Fan assemblies are easy to service provided with –

- The adjustable motor bases allow for proper tensioning of the belts at all times.
- Two-piece split belt guards
- The belt guard is fastened by bolt and nut via three clamps.

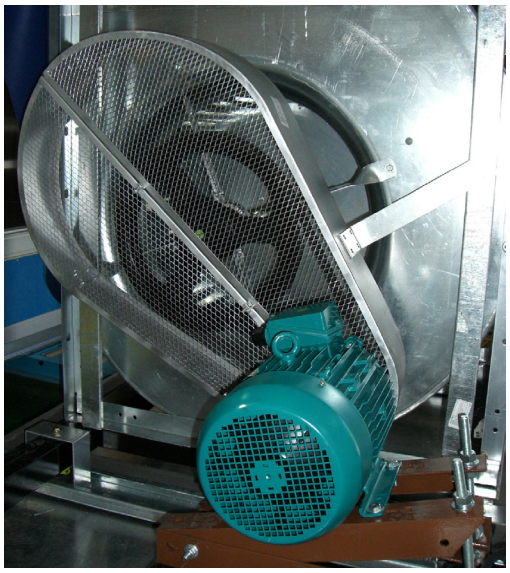


Figure 8: Fan / Motor Assemblies

3.10 SPRING ISOLATOR

The fan in a AHU can create substantial vibration that will transform to panels / casing and consequent widespread generation of sound waves. To avoid this, the spring or rubber isolator is mounted between the fan compartment and the rest of the AHU to prevent the transmission of noise and vibration into panels.
There are two types of isolators are used:

- Rubber mounting (for blower <= model 355)
- 25mm deflection spring (for blower > model 355)

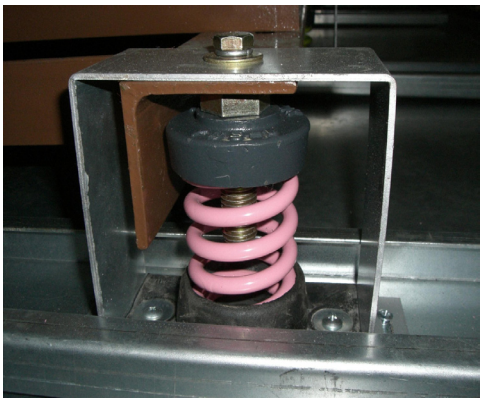


Figure 9. Spring Isolator

3.11 THERMISTOR

A thermistor is a type of resistor used to measure temperature changes in protection of windings in electric motors.

3.12 VFD/ FREQUENCY INVERTER

A VFD provides adjustable speed control of a single fan motor. Normally, an AHU which has been installed by VFD can vary the frequency within 30 to 60 Hz in order to control the motor rotation speed. It also provides protection for the motor operation.

3.13 ENERGY RECOVERY

Introducing ventilation from outdoors is essential in maintaining desired indoor air quality. Heat wheel is available as the option to match this requirement. These energy components can recover 50% or more of the energy normally exhausted from a building. They are working based on this concept – capture heat from exhaust air as it passes through the air handling unit and transfer it to the supply air stream. Hence, it is able to reduce the cost of heating or cooling the outside air. During the winter, energy recovery components do this by transferring energy from a warm air stream to a colder air stream. On the other hand, during the summer, it is used to cool the air hot air.

3.13.1 HEAT RECOVERY WHEEL

It is constructed of aluminium coated with heat transfer material (silica gel or others) which is rotated by an electric motor at constant or variable speed. It is currently known as the most efficient technology.

There are two sections of fan required: exhaust fan and supply fan. The heat wheel rotates at a constant low speeds, capturing and transferring both sensible (heat) energy and latent (moisture) energy. The ability to transfer both sensible and latent energy gives the heat wheel several advantages. First, it can reduce the capacity of ventilation equipment. Furthermore, heat wheels can work at lower temperature without frosting occurs. The supply air from the heat wheel is not near saturation level, and moisture in the ductwork is not an issue. The benefit includes recover both latent and sensible heat by allowing reduction in system capacity about 30 to 65%. The most significant benefit is to prevent sick building syndrome.

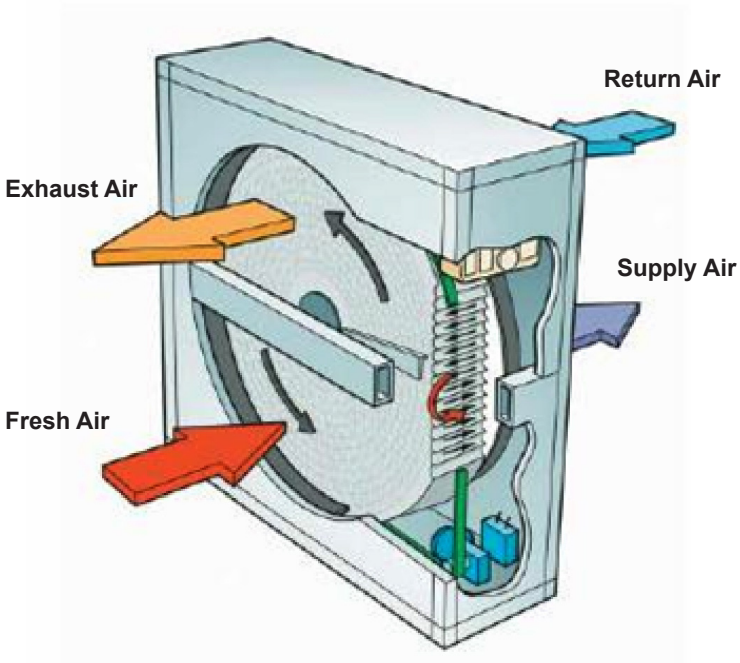


Figure 10: Heat Recover Wheel

3.13.2 HEAT PIPE

Heat pipe technology was founded by president and inventor Khanh Dinh in year 1982.
It is a simple device that can transfer heat quickly from one point to another without requisite of energy input. The basic make up of heat pipe is just a metal tube (usually copper) scaled at both ends, evacuated to a vacuum and charged with refrigerant.

When one end of the pipe is exposed to warm air stream, the inside refrigerant absorbs heat and evaporates (as shown in A) and the vapor moves to the cooler end (as shown in B). As the vapor reaches to the condensing area of the cylinder (shown as C), the heat is given off to the environment and the vapor condenses. The liquid returns by gravity or capillary action. This will be a continuous cycle inside the heat pipe.

For conventional air conditioner, it uses up most cooling capacity to cool the air to dew point but less capacity for dehumidification. Meanwhile, air conditioner which is installed with heat pipe enhance air conditioner usage by allowing more cooling capacity to go towards latent cooling by pre-cooling air before it gets to cooling coil session. Only periodical cleaning is required.

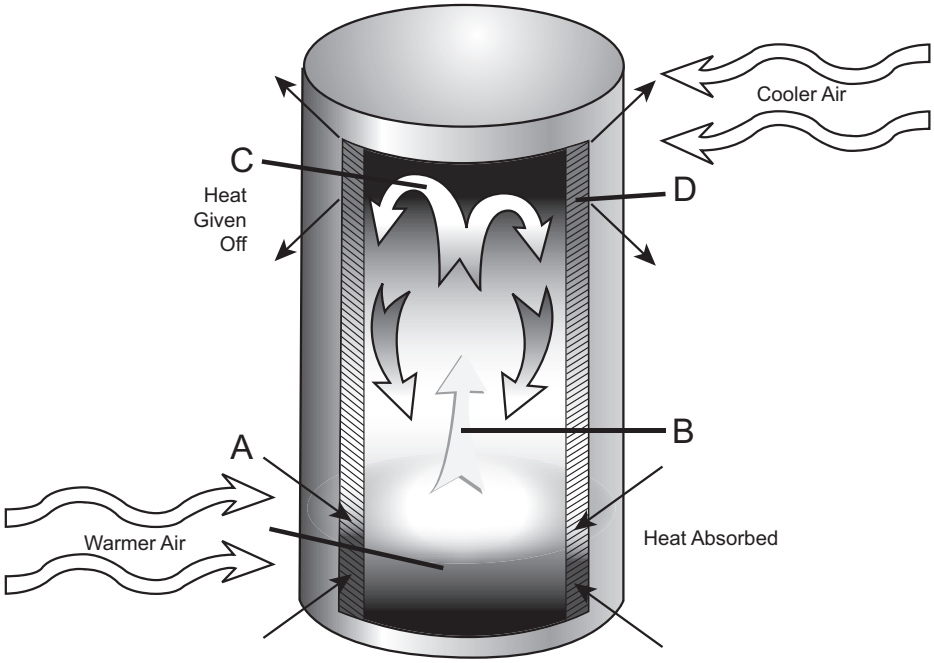


Figure 11: Heat Pipe

3.14 HUMIDIFIER

There are a few humidifiers are used commercially in AHU. We install electrode steam humidifier, which is categorized as BFDT series, the second generation, high precision, intellectualized electrode humidifier. It requires an empty section to be installed. It is a device which is used to increase the air relative humidity in atmosphere without steam source. It is a constant temperature humidifier. Its principle is the common electrode humidifier regulates the generated steam by the way of controlling water level and electrical current. Electrical loop will be built up through salt minerals in the water. Therefore, water will be heated up and boiled until vapor is generated continuously. Quality of water in the region must be considered because it reduces the steam capacity. (Softened water cannot be used)

3.15 ELECTRICAL HEATER

It is used to achieve desired room condition at certain desired relative humidity. With negligible air pressure drop, accurate controllability, light weight, easy serviceability and inherent freeze protection, electrical heater is valuable alternatives to conventional steam and hot water heating coils.

Electrical heaters are optional with either single step or multi step of heating process. It depends much on the heating capacity. Heaters are available in 240V and the installation is completed with the contactor without any thyristor control. It may require an empty section to install in the air handling unit.

3.16 FILTER SECTION

It plays a major role in maintaining good indoor air quality by filtration. There are a wide range of filter options which are provided by AAF International.

The DM AHU has been designed to handle primary and secondary filtration.

(A) Primary Filter:-

i) AmAir 300E –flat filter (Arrestance 30%) - Disposable

AmAir 300E is an economical solution to many odor problems. It is easy to install and directly interchangeable with standard air filters.

Figure 12: AmAir 300E

ii) AmerTex® R series - flat filter- Washable

AmerTex® R series media is made of exclusive bonding technology provides cleaner air, yet low resistance to airflow. It is available in synthetic and natural executions.

AmerTex® R series
- R- 15 Economy - (% Average Arrestance 75-80 %)
- R- 29 Standard - (% Average Arrestance 80-85 %)
- R- 50 Super - (% Average Arrestance 87-92 %)

They are rated at different efficiency in terms of % ARR (Arrestance) showed in **Table 1**.

(B) Secondary Filter:-

i) DriPak® 2000 – bag filter

The DriPak® 2000 filter has a unique features patented pocketed configuration, which has been aerodynamically balanced to ensure complete pocket inflation to remove crowding or leakage thus decreasing resistance and maximizing dust holding capacity. This filter is perfect as pre-filter or final filter for particulate removal in humid, high airflow and heavy dust loading conditions.

Available in three efficiencies:
- 80-85% efficiency
- 90-95 % efficiency

Figure 13: DriPak® 2000

Figure 14: BioCel® I

ii) BioCel® I

The BioCel® I filter was designed primarily to eliminate airborne biological contaminants in hospital critical areas, food and pharmaceutical processing plants, precision manufacturing operations area and laboratories where very high efficiency filtration of fine particulate matter is necessary.

The air cleaning efficiency of the BioCel® I is significantly higher than that of 90-95% ASHRAE efficiency filters and exceeds the maximum efficiency of 98% which can be measured by ASHRAE 52.1 test method.

iii) VariCel® II- Cartridge

The VariCel® II provides a unique combination of features and performance includes high efficiency filtration, broad application flexibility, easy handling, installation and removal which unmatched by any other product. This slim line mini-pleat design (inches) offer high performance and long service life in a thinner, lighter, totally rigid filter. Using this filter will be save more than 400mm depth in filter section by comparing using of bag filter.

Available in three efficiencies:
- 80-85% efficiency
- 90-95 % efficiency

(C) HEPA Filter – AstroCel® I

AstroCel® I filter has broad application in Clean-rooms and other areas requiring the very highest levels of contamination control. Air filters are designed to trap and concentrate particulate air contaminants including viable fungal and bacterial spores.This type of air filter are available in a variety of efficiencies - from 99.97% tested on 0.3 µm particles to 99.99%, and higher, tested on 0.1 to 0.2 µm particles.

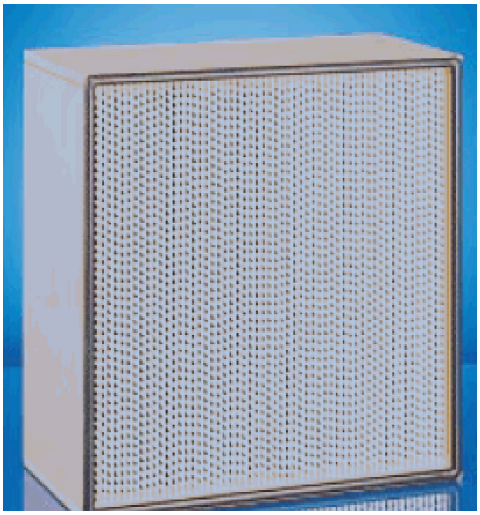


Figure 15: AstroCel® I

For the range of filter efficiency, there are a few different rating methods which in terms of:

- Dust sport
- Average efficiency
- Eurovent
- % Arrestance

3.17 Quick Air Filter Selection Guide

Classification as per EN 779

EN 779 Class	G1	G2	G3	G4
Average Arrestance, Am%	Am < 65	65 ≤ Am ≤ 80	80 ≤ Am ≤90	90 ≤ Am
Recommended Filter	-	AmerTex R15	AmerTex R29	AmAir 300 AmerTex R50

Table 1: Filter Arrestance for Coarse filters in Class G1-G2

EN 779 Class	F5	F6	F7	F8	F9
Average Arrestance, Em%	40≤ Em ≤ 60	60 ≤ Em ≤ 80	80 ≤ Am ≤90	90 ≤ Em ≤ 95	95 ≤ Em
Recommended Filter	-	-	DriPak® 2000	DriPak® 2000	BioCel® I
			Varicel® II	Varicel® II	

Table 2: Filter Arrestance for Coarse filters in Class F5-F9

Classification as per EN 1822

EN 1822 Class	H 10	H 11	H 12	H 13	H 14
Efficiency (% at 0.3µm)	> 95	> 98	> 99.99	> 99.997	> 99.999
Efficiency (% at MPPS)	> 85	> 95	> 99.5	> 99.95	> 99.995
Recommended Filter	BioCel® I	BioCel® I	AstroCel® I	-	-

Table 3: Filter Efficiency for HEPA Filters Class H10-H14

In addition, filter section can be enhanced by an optional item – filter pressure gauge to ensure regular filter servicing and prevent clogging. Normally, the filter life span can be indicated by pressure gauge value for dirty filter should not exceed 300 Pa.

3.18 MIXING BOX

It is an air inlet section to mix fresh and return air according to the system designer's requirement. It can regulate the amount of outside and return air supplied to the conditioned space. It consists of damper in parallel blades with opposed rotating blade with driving shaft. The damper blades are fabricated of aluminium and continuous Thermoplastic Elastomer (TPE) seals are inserted onto every damper blade. The rotated rod of handle is made of brass and handle is fabricated of aluminium casting. There are a few type of arrangement: top, rear and combination of top and rear. The mixing box can make use of free cooling by opening outside air dampers when the ambient air will help to condition the supply air stream. In addition, dampers maybe individually sized to provide better mixing effect.

Figure 16. Mixing Box

3.19 SOUND ATTENUATOR

It has a perimeteral galvanized steel frame. Standard pods is supplied 100mm thick in standard lengths of 900 and 1200mm according to the attenuation required. The modular widths available are 275mm or 300mm.

Nowadays, sound level will be an essential factor to be considered as one of the performance of units. McQuay product has been designing to provide the quietest sound level. Different attenuator length can be selected to meet the most stringent sound attenuation requirements. A comfortable surrounding enhances human's working and living life.

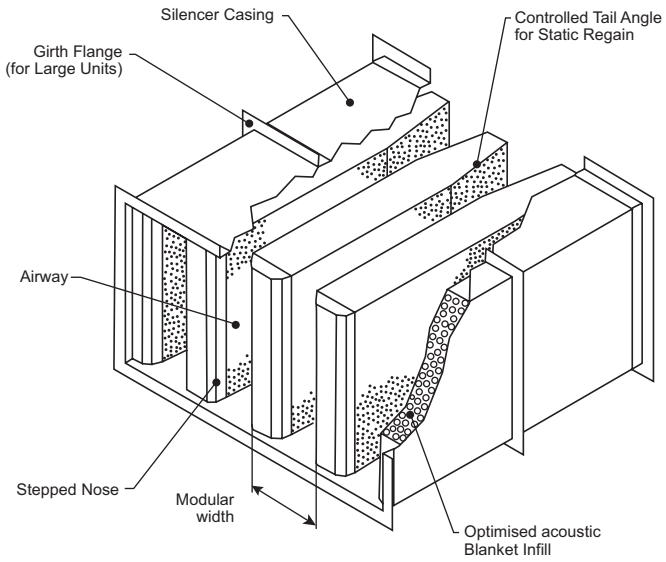


Figure 17. A Typical Cut Away View of sound attenuator

4.0 STANDARD UNITS QUICK SELECTION TABLE

Table 4. Return Air

UNIT SIZE.	Air Flow	ESP	4-ROWS COOLING COIL					1-ROW HEATING COIL			MOTOR kW
			S.C	T.C.C	Water flow	WPD	Circuit	T,C	Water flow	WPD	
	LPS	Pa	kW	kW	lps	kPa		kW	lps	kPa	
0404	646	300	7.3	7.7	0.37	0.27	F	4.7	0.11	0.04	0.75
0407	1027	300	12.6	15	0.71	1.16	F	8.8	0.21	0.19	1.1
0410	1408	300	18	22.7	1.08	3.04	F	13.1	0.32	0.48	1.5
0413	1789	300	22.7	30.8	1.47	6.25	F	17.3	0.42	0.95	2.2
0707	1670	300	20.4	24.4	1.16	1.16	F	14.3	0.35	0.19	2.2
0710	2289	300	32.1	42.9	2.04	4.82	F	24.8	0.6	0.76	2.2
0713	2908	300	38.4	50	2.38	6.26	F	28.1	0.69	0.95	3
0715	3321	300	44.5	26	2.79	9.21	F	32.8	0.8	1.39	3.7
1010	3169	350	41.9	54.5	2.6	6.98	M	29.5	0.72	0.48	4
1013	4026	350	54.7	72.9	3.47	14.01	M	39	0.95	0.95	5.5
1015	4598	350	68.4	96	4.57	30.53	M	52.2	1.27	2.16	4
1019	5741	350	80	109.3	5.21	38.05	M	58.8	1.43	0.65	7.5
1021	6312	350	88.7	122.1	5.82	50.05	M	65.8	1.6	3.5	7.5
1315	5619	350	75.3	99.2	4.72	9.2	F	55.4	1.35	1.39	7.5
1319	7016	350	95.3	127.1	6.05	17.09	F	71.8	1.75	2.64	7.5
1321	7715	350	106.1	143.3	6.83	22.83	F	81.4	1.96	3.5	11
1519	7654	450	103.9	138.6	6.6	17.09	F	78.3	1.91	2.65	11
1521	8416	450	115.8	156.3	7.45	22.83	F	87.7	2.14	3.5	11
1819	9568	500	129.9	178.8	8.26	17.09	F	97.9	2.39	2.65	15
1821	10520	500	144.7	195.4	9.31	22.83	F	109.6	2.67	3.5	15
1823	11473	500	167.1	232.5	11.07	38.25	F	130.2	3.17	5.88	15
1827	13378	500	187.2	256.7	12.23	45.29	F	141.9	3.46	6.81	18.5
2027	14270	750	188.6	245.3	11.69	5.69	D	151.4	3.69	6.8	22
2233	19482	750	262.1	346.9	16.52	10.08	D	210.3	5.12	11.71	37

For Cooling Coil: EDB = 27deg. C, EWB = 19.5 deg. C, EWT = 7 deg. C, LWT = 12deg. C
For Heating Coil: EDB =21 deg. C, EWT = 60 deg. C, LWT = 50 deg. C

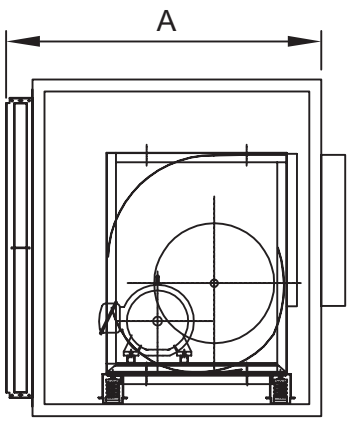
Table 5: Fresh Air

UNIT SIZE.	Air Flow	ESP	6-ROWS COOLING COIL					1-ROW HEATING COIL			MOTOR kW
			S.C	T.C.C	Water flow	WPD	Circuit	T,C	Water flow	WPD	
	LPS	Pa	kW	kW	lps	kPa		kW	lps	kPa	
0404	646	300	11.6	27.8	1.32	1.17	M	9.1	0.22	0.13	1.1
0407	1027	300	20.6	50.6	2.41	4.6	M	15.9	0.39	0.51	1.5
0410	1408	300	29.5	73	3.48	11.07	M	23	0.56	1.24	2.2
0413	1789	300	38.7	96.1	4.58	21.7	M	30.2	0.74	2.45	2.2
0707	1670	300	33.5	82.3	3.92	4.6	M	25.8	0.63	0.51	2.2
0710	2289	300	48	118.6	5.65	11.08	M	37.4	0.91	1.24	3
0713	2908	300	63	156.2	7.44	21.71	M	49.1	1.2	2.45	3
0715	3321	300	72.7	180.5	8.6	31.17	M	57.1	1.39	3.56	3.7
1010	3169	350	69.4	172.2	8.2	36.4	M	51.7	1.26	1.24	4
1013	4026	350	87.2	216.2	10.2	21.7	M	68	1.66	2.45	5.5
1015	4598	350	109.6	273.1	13.01	44.22	M	88.2	2.15	5.27	5.5
1019	5741	350	132	330.1	15.72	66.52	M	105.2	2.56	7.77	5.5
1021	6312	350	142.6	355	16.91	75.25	M	110.2	2.69	8.41	7.5
1315	5619	350	123	305.4	14.54	31.16	M	96.5	2.35	3.56	7.5
1319	7016	350	156.8	390.1	18.58	57.63	M	122.5	2.99	6.56	11
1321	7715	350	174.3	433.9	20.67	75.25	M	134.7	3.28	8.42	11
1519	7654	450	171.7	425.6	20.27	57.63	M	133.7	3.26	6.56	11
1521	8416	450	190.1	473.3	22.54	75.25	M	147	3.58	8.41	11
1819	9568	500	213.9	532	25.34	57.64	M	167.1	4.07	6.56	15
1821	10520	500	237.6	591.6	28.18	75.25	M	183.7	4.48	8.41	15
1823	11473	500	259.1	645.1	30.73	94.35	M	203.6	4.96	10.87	15
1827	13378	500	305.5	769.9	36.25	144	M	237.5	5.79	16.32	18.5
2027	14270	750	325.9	811.5	38.66	144	M	253.3	6.17	16.32	30
2233	19482	750	449.4	1120	53.36	244.2	M	351.4	8.56	28	37

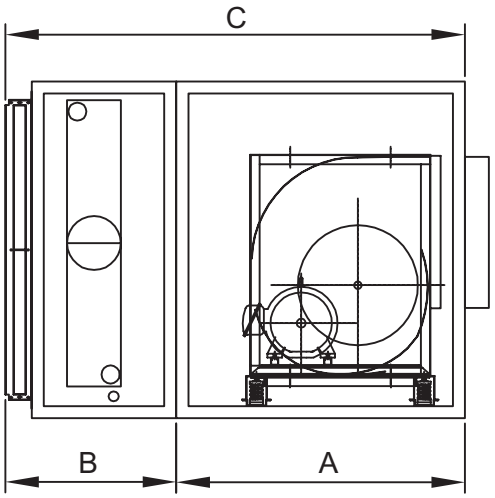
For Cooling Coil: EDB = 34deg. C, EWB = 28 deg. C, EWT = 7 deg. C, LWT = 12deg. C
For Heating Coil: EDB =21 deg. C, EWT = 60 deg. C, LWT = 50 deg. C

5.0 OUTLINE AND DIMENSION

5.1a HORIZONTAL TYPICAL CONFIGURATION



Type 1



Type 2

Model	0404	0407	0410	0413	0707	0710	0713	0715	1010	1013	1015	1019
CMH	2326	3697	5069	6440	6012	8240	10469	11956	11408	14494	16553	20668
LPS	646	1027	1408	1789	1670	2289	2908	3321	3169	4026	4598	5741
Height	800	800	800	800	1100	1100	1100	1100	1400	1400	1400	1400
Width	800	1100	1400	1700	1100	1400	1700	1900	1400	1700	1900	2300

Length

1	A	1000	1000	1100	1100	1100	1100	1300	1300	1300	1300	1500	1500
2	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	1600	1600	1700	1700	1700	1700	1900	1900	1900	1900	2100	2100

Model	1021	1315	1319	1321	1519	1521	1819	1821	1823	1827	2027	2233
CMH	22723	20228	25258	27774	27554	30298	34445	37872	41303	48161	51372	70135
LPS	6312	5619	7016	7715	7654	8416	9568	10520	11473	13378	14270	19482
Height	1400	1700	1700	1700	1900	1900	2200	2200	2200	2200	2400	2600
Width	2500	1900	2300	2500	2300	2500	2300	2500	2700	3100	3100	3700

Length

1	A	1500	1500	1500	1700	1700	1700	1700	1900	1900	2100	2100	N/A
2	A	-	-	-	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	-	-	-	700	700	700	700	700	700	700	700	700
	C	2100	2100	2100	2300	2300	2300	2300	2500	2500	2700	2700	2900

Table 6: Horizontal Typical Configuration Type 1 & 2

Note:

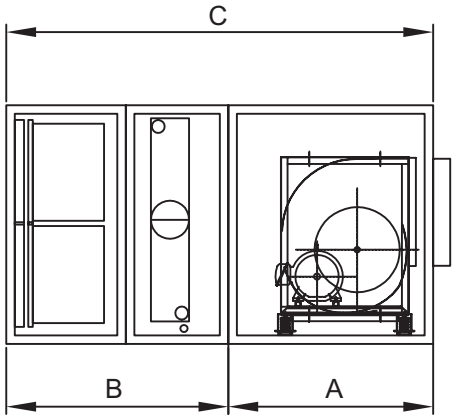
1) Please add 100mm for model using coil (8 Row & above)

2) The dimensions are subject to change without any notice for future improvement.

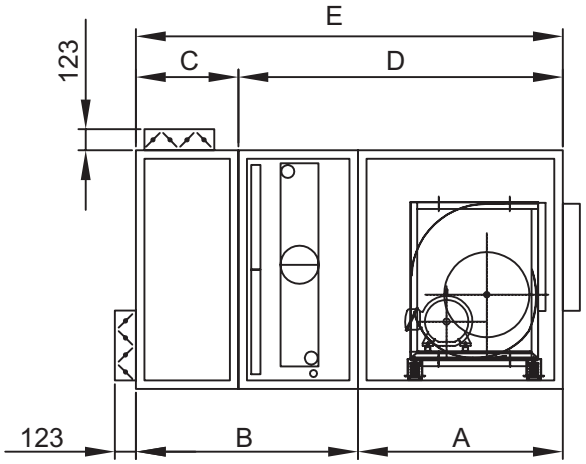
3) Dimensions in mm.

4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

5.1b HORIZONTAL TYPICAL CONFIGURATION



Type 3



Type 4

Model	0404	0407	0410	0413	0707	0710	0713	0715	1010	1013	1015	1019
CMH	2326	3697	5069	6440	6012	8240	10469	11956	11408	14494	16553	20668
LPS	646	1027	1408	1789	1670	2289	2908	3321	3169	4026	4598	5741
Height	800	800	800	800	1100	1100	1100	1100	1400	1400	1400	1400
Width	800	1100	1400	1700	1100	1400	1700	1900	1400	1700	1900	2300

Length

3	A	900	900	1000	1000	1000	1000	1200	1200	1200	1200	1400	1400
	B	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	2200	2200	2300	2300	2300	2300	2500	2500	2500	2500	2700	2700
4	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	-	-	-	-	500	500	500	500	600	600	600	600
	D	-	-	-	-	1700	1700	1900	1900	1900	1900	2100	2100
	E	2000	2000	2100	2100	2200	2200	2400	2400	2500	2500	2700	2700

Model	1021	1315	1319	1321	1519	1521	1819	1821	1823	1827	2027	2233
CMH	22723	20228	25258	27774	27554	30298	34445	37872	41303	48161	51372	70135
LPS	6312	5619	7016	7715	7654	8416	9568	10520	11473	13378	14270	19482
Height	1400	1700	1700	1700	1900	1900	2200	2200	2200	2200	2400	2600
Width	2500	1900	2300	2500	2300	2500	2300	2500	2700	3100	3100	3700

Length

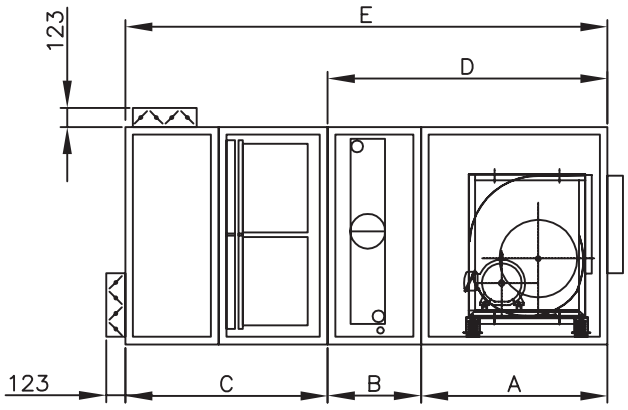
3	A	1400	1400	1400	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	2700	2700	2700	2900	2900	2900	2900	3100	3100	3300	3300	3500
4	A	-	-	-	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	-	-	-	1300	1400	1400	1400	1500	1500	1500	1500	1700
	C	600	600	600	-	-	-	-	-	-	-	-	-
	D	2100	2100	2100	-	-	-	-	-	-	-	-	-
	E	2700	2700	2700	2900	3000	3000	3000	3300	3300	3500	3500	3900

Table 7: Horizontal Typical Configuration Type 3 & 4

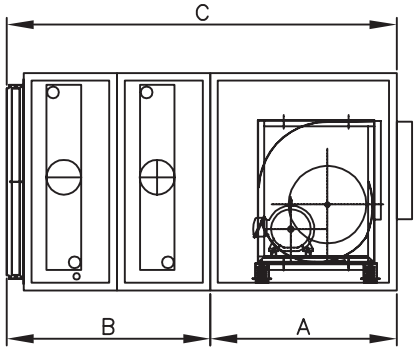
Note:

1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.

5.1c HORIZONTAL TYPICAL CONFIGURATION



Type 5



Type 6

Model	0404	0407	0410	0413	0707	0710	0713	0715	1010	1013	1015	1019
CMH	2326	3697	5069	6440	6012	8240	10469	11956	11408	14494	16553	20668
LPS	646	1027	1408	1789	1670	2289	2908	3321	3169	4026	4598	5741
Height	800	800	800	800	1100	1100	1100	1100	1400	1400	1400	1400
Width	800	1100	1400	1700	1100	1400	1700	1900	1400	1700	1900	2300

Length

5	A	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-
	C	1100	1100	1100	1100	1200	1200	1200	1200	1300	1300	1300	1300
	D	1500	1500	1600	1600	1600	1600	1800	1800	1800	1800	2000	2000
	E	2600	2600	2700	2700	2800	2800	3000	3000	3100	3100	3300	3300
6	A	-	-	1000	1000	1000	1000	1200	1200	1200	1200	1400	1400
	B	-	-	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	2100	2100	2300	2300	2300	2300	2500	2500	2500	2500	2700	2700

Model	1021	1315	1319	1321	1519	1521	1819	1821	1823	1827	2027	2233
CMH	22723	20228	25258	27774	27554	30298	34445	37872	41303	48161	51372	70135
LPS	6312	5619	7016	7715	7654	8416	9568	10520	11473	13378	14270	19482
Height	1400	1700	1700	1700	1900	1900	2200	2200	2200	2200	2400	2600
Width	2500	1900	2300	2500	2300	2500	2300	2500	2700	3100	3100	3700

Length

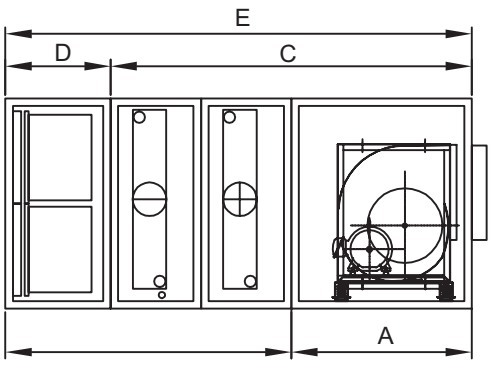
5	A	-	-	-	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	-	-	-	600	600	600	600	600	600	600	600	600
	C	1300	1300	1300	1300	1400	1400	1400	1500	1500	1500	1500	1700
	D	2000	2000	2000	-	-	-	-	-	-	-	-	-
	E	3300	3300	3300	3500	3600	3600	3600	3900	3900	4100	4100	4500
6	A	1400	1400	1400	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	2700	2700	2700	2900	2900	2900	2900	3100	3100	3300	3300	3500

Table 8: Horizontal Typical Configuration Type 5 & 6

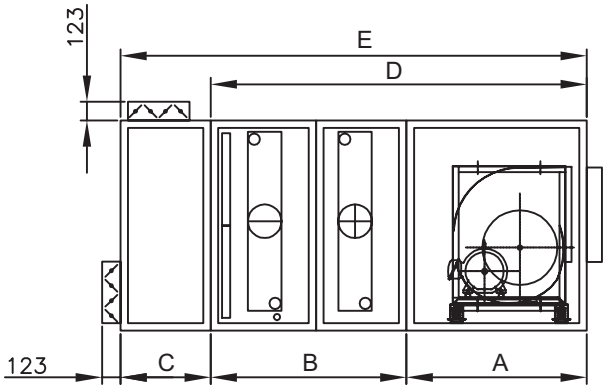
Note:

1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.
4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

5.1d HORIZONTAL TYPICAL CONFIGURATION



Type 7



Type 8

Model	0404	0407	0410	0413	0707	0710	0713	0715	1010	1013	1015	1019
CMH	2326	3697	5069	6440	6012	8240	10469	11956	11408	14494	16553	20668
LPS	646	1027	1408	1789	1670	2289	2908	3321	3169	4026	4598	5741
Height	800	800	800	800	1100	1100	1100	1100	1400	1400	1400	1400
Width	800	1100	1400	1700	1100	1400	1700	1900	1400	1700	1900	2300

Length

7	A	-	-	-	-	-	-	1200	1200	1200	1200	1400	1400
	B	-	-	-	-	-	-	1900	1900	1900	1900	1900	1900
	C	2100	2100	2200	2200	2200	2200	-	-	-	-	-	-
	D	700	700	700	700	700	700	-	-	-	-	-	-
	E	2800	2800	2900	2900	2900	2900	3100	3100	3100	3100	3300	3300
8	A	-	-	1000	1000	1000	1000	1200	1200	1200	1200	1400	1400
	B	-	-	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	400	400	400	400	500	500	500	500	600	600	600	600
	D	2200	2200	-	-	-	-	-	-	-	-	-	-
	E	2600	2600	2700	2700	2800	2800	3000	3000	3100	3100	3300	3300

Model	1021	1315	1319	1321	1519	1521	1819	1821	1823	1827	2027	2233
CMH	22723	20228	25258	27774	27554	30298	34445	37872	41303	48161	51372	70135
LPS	6312	5619	7016	7715	7654	8416	9568	10520	11473	13378	14270	19482
Height	1400	1700	1700	1700	1900	1900	2200	2200	2200	2200	2400	2600
Width	2500	1900	2300	2500	2300	2500	2300	2500	2700	3100	3100	3700

Length

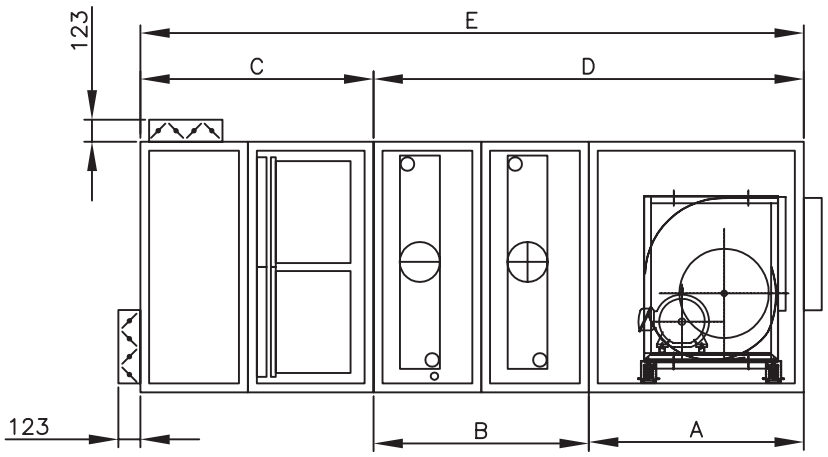
7	A	1400	1400	1400	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
	C	-	-	-	-	-	-	-	-	-	-	-	-
	D	-	-	-	-	-	-	-	-	-	-	-	-
	E	3300	3300	3300	3500	3500	3500	3500	3700	3700	3900	3900	4100
8	A	1400	1400	1400	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	1300	1300	1200	1300	1300	1300	1300	1300	1300	1300	1300	1300
	C	600	600	600	600	700	700	700	800	800	800	800	1000
	D	-	-	-	-	-	-	-	-	-	-	-	-
	E	3300	3300	3300	3500	3600	3600	3600	3900	3900	4100	4100	4500

Table 9: Horizontal Typical Configuration Type 7 & 8

Note:

1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.
4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

5.1e HORIZONTAL TYPICAL CONFIGURATION



Type 9

Model	0404	0407	0410	0413	0707	0710	0713	0715	1010	1013	1015	1019
CMH	2326	3697	5069	6440	6012	8240	10469	11956	11408	14494	16553	20668
LPS	646	1027	1408	1789	1670	2289	2908	3321	3169	4026	4598	5741
Height	800	800	800	800	1100	1100	1100	1100	1400	1400	1400	1400
Width	800	1100	1400	1700	1100	1400	1700	1900	1400	1700	1900	2300

Length

9	A	-	-	-	-	-	-	1200	1200	1200	1200	1400	1400
	B	-	-	-	-	-	-	1200	1200	1200	1200	1200	1200
	C	1100	1100	1100	1100	1200	1200	1200	1200	1300	1300	1300	1300
	D	2100	2100	2200	2200	2200	2200	-	-	-	-	-	-
	E	3200	3200	3300	3300	3400	3400	3600	3600	3700	3700	3900	3900

Model	1021	1315	1319	1321	1519	1521	1819	1821	1823	1827	2027	2233
CMH	22723	20228	25258	27774	27554	30298	34445	37872	41303	48161	51372	70135
LPS	6312	5619	7016	7715	7654	8416	9568	10520	11473	13378	14270	19482
Height	1400	1700	1700	1700	1900	1900	2200	2200	2200	2200	2400	2600
Width	2500	1900	2300	2500	2300	2500	2300	2500	2700	3100	3100	3700

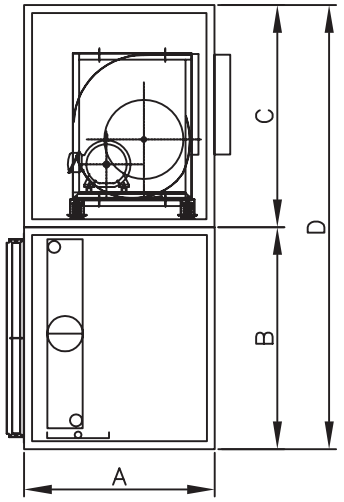
Length

9	A	1400	1400	1400	1600	1600	1600	1600	1800	1800	2000	2000	2200
	B	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	C	1300	1300	1300	1300	1400	1400	1400	1500	1500	1500	1500	1700
	D	-	-	-	-	-	-	-	-	-	-	-	-
	E	3900	3900	3900	4100	4200	4200	4200	4500	4500	4700	4700	5100

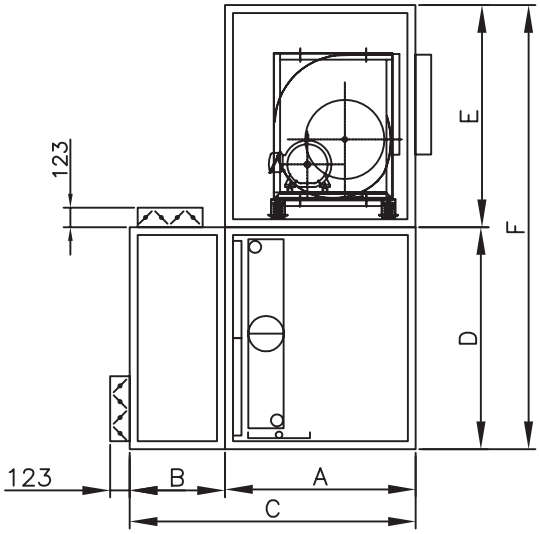
Table 10: Horizontal Typical Configuration Type 9

Note:
1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.
4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

5.2a VERTICAL TYPICAL CONFIGURATION



Type 1



Type 2

Model		0404	0407	0410	0413	0707	0710	0713	0715
CMH		2326	3697	5069	6440	6012	8240	10469	11956
LPS		646	1027	1408	1789	1670	2288	2908	3321
Width		800	1100	1400	1700	1100	1400	1700	1900
Length									
1	A	900	900	1000	1000	1000	1000	1200	1200
	B	-	-	-	-	-	1100	1100	1100
	C	-	-	-	-	-	1100	1100	1100
	D	1600	1600	1600	1600	1900	2200	2200	2200
2	A	900	900	1000	1000	1000	1000	1200	1200
	B	400	400	400	400	500	500	500	500
	C	1300	1300	1400	1400	1500	1500	1700	1700
	D	800	800	800	800	1100	1100	1100	1100
	E	-	-	-	-	-	1100	1100	1100
	F	1600	1600	1600	1600	1900	2200	2200	2200

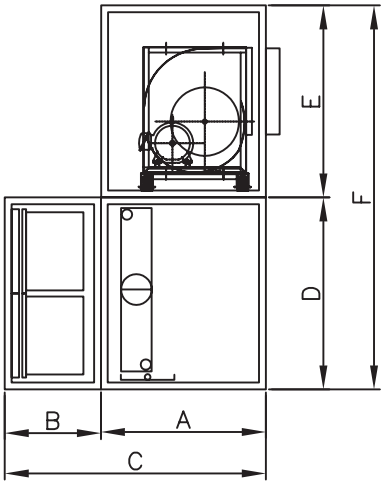
Model		1010	1013	1015	1019	1021	1315	1319	1321
CMH		11408	14494	16553	20668	22723	20228	25258	27774
LPS		3169	4026	4598	5741	6312	5619	7016	7715
Width		1400	1700	1900	2300	2500	1900	2300	2500
Length									
1	A	1200	1200	1400	1400	1400	1400	1400	1600
	B	1400	1400	1400	1400	1400	1700	1700	1700
	C	1100	1200	1400	1400	1400	1400	1600	1600
	D	2500	2600	2800	2800	2800	3100	3300	3300
2	A	1200	1200	1400	1400	1400	1400	1400	1600
	B	600	600	600	600	600	600	600	600
	C	1800	1800	2000	2000	2000	2000	2000	2200
	D	1400	1400	1400	1400	1400	1700	1700	1700
	E	1100	1200	1400	1400	1400	1400	1600	1600
	F	2500	2600	2800	2800	2800	3100	3300	3300

Table 11: Vertical Typical Configuration Type 1 & 2

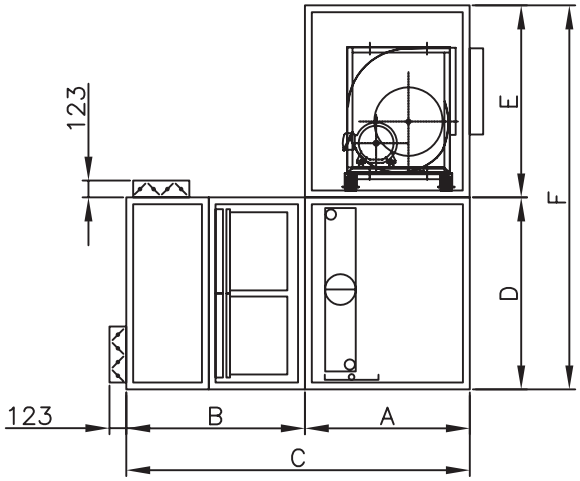
Note:

1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.
4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

5.2b VERTICAL TYPICAL CONFIGURATION



Type 3



Type 4

Model		0404	0407	0410	0413	0707	0710	0713	0715
CMH		2326	3697	5069	6440	6012	8240	10469	11956
LPS		646	1027	1408	1789	1670	2289	2908	3321
Width		800	1100	1400	1700	1100	1400	1700	1900
Length									
3	A	900	900	1000	1000	1000	1000	1200	1200
	B	700	700	700	700	700	700	700	700
	C	1600	1600	1700	1700	1700	1700	1900	1900
	D	800	800	800	800	1100	1100	1100	1100
	E	-	-	-	-	-	1100	1100	1100
	F	1600	1600	1600	1600	1900	2200	2200	2200
4	A	900	900	1000	1000	1000	1000	1200	1200
	B	1100	1100	1100	1100	1200	1200	1200	1200
	C	2000	2000	2100	2100	2200	2200	2400	2400
	D	800	800	800	800	1100	1100	1100	1100
	E	-	-	-	-	-	1100	1100	1100
	F	1600	1600	1600	1600	1900	2200	2200	2200

Model		1010	1013	1015	1019	1021	1315	1319	1321
CMH		11408	14494	16553	20668	22723	20228	25258	27774
LPS		3169	4026	4598	5741	6312	5619	7016	7715
Width		1400	1700	1900	2300	2500	1900	2300	2500
Length									
3	A	1200	1200	1400	1400	1400	1400	1400	1600
	B	700	700	700	700	700	700	700	700
	C	1900	1900	2100	2100	2100	2100	2100	2300
	D	1400	1400	1400	1400	1400	1700	1700	1700
	E	1100	1200	1400	1400	1400	1400	1600	1600
	F	2500	2600	2800	2800	2800	3100	3300	3300
4	A	1200	1200	1400	1400	1400	1400	1400	1600
	B	1300	1300	1300	1300	1400	1400	1400	1500
	C	2500	2500	2700	2700	2800	2800	2800	3100
	D	1400	1400	1400	1400	1400	1700	1700	1700
	E	1100	1200	1400	1400	1400	1400	1600	1600
	F	2500	2600	2800	2800	2800	3100	3300	3300

Table 12: Vertical Typical Configuration Type 3 & 4

Note:
1) Please add 100mm for model using coil (8 Row & above)
2) The dimensions are subject to change without any notice for future improvement.
3) Dimensions in mm.
4) Please add 50mm length on the individual section width, depth and height if using the 50mm insulation panel.

6.0 APPLICATION CONSIDERATIONS

6.1 Installation Flexibility

McQuay AHU feature sectionalized design to provide maximum installation flexibility. Mixing box, filter, coil, fan and access components permit the design flexibility of built-up systems with the cost-effective of factory fabricated units. Every section is fabricated of heavy-gauge continuous galvanized steel or extruded aluminium with exacting assembly procedures and rigid quality control standards.

6.2 Mounting and Access

Whether units are floor or ceiling mounted, care should be taken to insure that the supporting structure is level and rigid enough for satisfactory unit operation. Ideally, a heavy concrete slab should be used for bottom mounted units, and main support beams for top hung units. Long floor or ceiling spans should be avoided.

Unit should be located so as to provide proper access for routine service. Clearance for filter removal on both sides of the filter section is usually necessary. Clearance should be provided as required for access panels. Room should be allowed for coil removal. Cooling units require clearance for a trap in the drain pan line.

Access to the interior of McQuay air handlers is provided by hinged access doors or removable panels wherever possible. For access between components, a versatile access section features hinged access doors at both ends.

6.3 Ductwork

Good ductwork layout will minimize system resistance and sound generation. Duct connections to and from units should allow straight, smooth airflow. Sharp turns in the fan discharge should be avoided, particularly turns opposed to wheel rotation. Turning vanes should be used. Discharge plenums or any abrupt change in duct should be avoided.

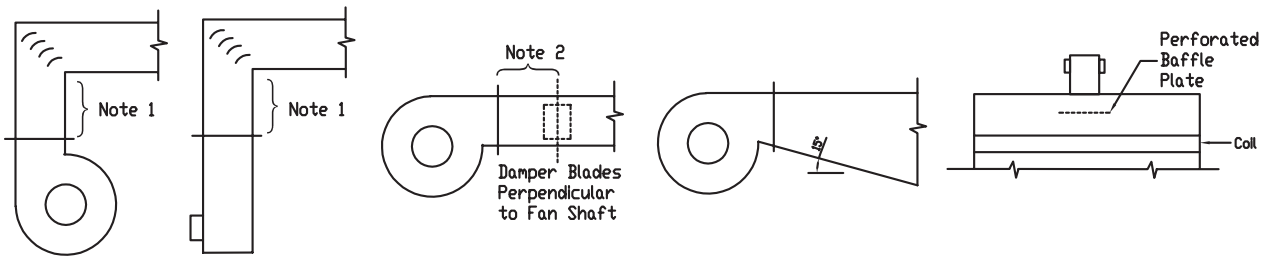


Figure 18: Discharge duct layout

Notes: 1. Elbows should not be closer than 1 1/2 to 21/2 times the largest dimension of fan discharge opening.
2. Dampers should be placed at least fan diameters downstream of the fan discharge.

FIGURES REPRINTED WITH PERMISSION FROM THE 1979 ASHRAE GUIDE AND DATA BOOK (EQUIPMENT).

6.4 Piping and Drain Fan Traps

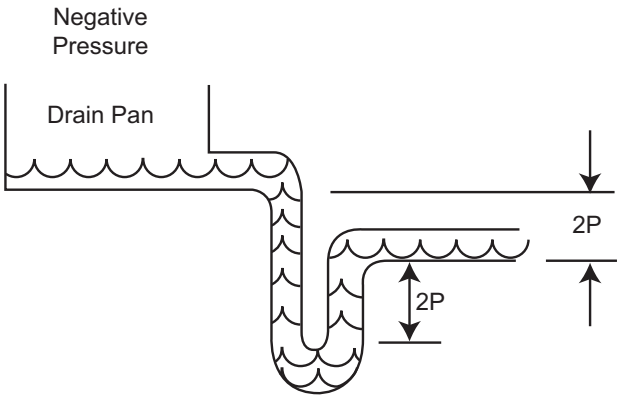


Figure 19: Drain pan traps

Piping should be in accordance with accepted industry standards. Undue stress should not be applied at the connection to coil headers. Pipe work should be supported independently of the coils with adequate piping flexibility for thermal expansion. Drain lines and traps should be run full size from the drain pan connection. Drain pans should have traps to permit the condensate from the coils to drain freely. On a draw-through unit, the trap depth and the distance between the trap outlet and the drain pan outlet should be twice the negative static pressure under normal unit operation.

6.5 Air Supply Systems and Fan Laws

An air supply system consists of an AHU cabinet, heat exchanger, filters, ductwork, grilles and register used to distribute air throughout the building. The system is independent of the fan used to supply the system. The resistance of the system, referred to as static pressure (SP), is dependent upon the quantity of air (CFM) that is moved through it. The air quantity is determined by the cooling, heating and ventilating requirements.
For any system, the static pressure will vary directly as the square of the air quantity. This relationship between CFM and SP establishes the system curve for that system and may be expressed as follows:

$$\left(\frac{CFM_1}{CFM_2}\right)^2 = \frac{SP_1}{SP_2} \quad or \quad SP_2 = SP_1\left(\frac{CFM_2}{CFM_1}\right)^2$$

The system curve is unique for a particular system configuration. Any change to the system caused by dirty filters, damper change, etc., will result in new system curve.
For fans operating at low pressures (less than 10” W.G.), the effects of air compression allows fan operation in a fixed system to be expressed by simple relationships. These relationships are known as fan laws and may be used to calculate the effects of fan speed and air density changes on this system.

1. The flow rate varies directly with the change in fan speed:

$$\frac{CFM_1}{CFM_2} = \frac{RPM_1}{RPM_2} \quad or \quad CFM_2 = CFM_1\left(\frac{RPM_2}{RPM_1}\right)$$

A 10% increase in fan speed will give a 10% increase in air quantity.

2. The static pressure varies as the square of the change in fan speed:

$$\frac{SP_1}{SP_2} = \left(\frac{RPM_1}{RPM_2}\right)^2 \quad or \quad SP_2 = SP_1 \left(\frac{RPM_2}{RPM_1}\right)^2$$

A 10% increase in fan speed will give a 21% increase in air static pressure.

3. The fan brake horsepower varies as the cube of the change in fan speed:

$$\frac{HP_1}{HP_2} = \left(\frac{RPM_1}{RPM_2}\right)^3 \quad or \quad HP_2 = HP_1 \left(\frac{RPM_2}{RPM_1}\right)^3$$

A 10% increase in fan speed will give a 33% increase in fan horsepower.

4. System static pressure and brake horsepower are directly proportional to the air density:

$$SP_2 = SP_1 \left(\frac{Density_2}{Density_1}\right) \left(\frac{RPM_2}{RPM_1}\right)^2$$

$$HP_2 = HP_1 \left(\frac{Density_2}{Density_1}\right) \left(\frac{RPM_2}{RPM_1}\right)^3$$

Consequently, the static pressure and brake horsepower decrease with an increase in air temperature or higher altitude, and increase with a decrease in air temperature or lower altitude.
To determine fan performance for temperatures and altitudes other than standard (70˚F, 0 ft. altitude), the static pressure must be adjusted by the density ratio before the fan RPM and BHP requirement can be determined. Density ratios are expressed as temperature and altitude conversion factors in Table 13.

AIR TEMP (˚F)	ALTITUDE (FEET)								
	0	1000	2000	3000	4000	5000	6000	7000	8000
-20	1.20	1.16	1.12	1.08	1.04	1.00	0.97	0.93	0.89
0	1.15	1.10	1.08	1.02	0.99	0.95	0.92	0.88	0.85
20	1.11	1.06	1.02	0.98	0.95	0.92	0.88	0.85	0.82
40	1.06	1.02	0.98	0.94	0.91	0.88	0.84	0.81	0.78
60	1.02	0.98	0.94	0.91	0.88	0.85	0.81	0.79	0.76
70	1.00	0.96	0.93	0.89	0.86	0.83	0.80	0.77	0.74
80	0.98	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72
100	0.94	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.70
120	0.92	0.88	0.85	0.81	0.78	0.76	0.72	0.70	0.67
140	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.68	0.65
160	0.85	0.82	0.79	0.76	0.74	0.70	0.68	0.65	0.63
200	0.80	0.77	0.75	0.72	0.69	0.67	0.64	0.62	0.60
250	0.75	0.72	0.69	0.67	0.65	0.62	0.60	0.58	0.56

Table 13: Temperature and altitude conversion

7.0 FAN SPECIFICATION

Model	Fan Section				Arrangement Units
	Available Fan Size	Discharge Size (mm)	Maximum Motor Size (kW)	Motor Mounting Position	R/RI/T/TI Discharge Depth (mm)
0404	200 225	260x260 295x295	3 4	Rear Rear	904 904
0407	225 250	295x295 330x330	4 4	Rear Side	904 904
0410	250 280	330x330 370x370	4 5.5	Side Side	1004 1004
0413	315 355	410x410 460x460	5.5 7.5	Side Side	1004 1004
0707	280 315	370x370 410x410	5.5 5.5	Side Side	1004 1004
0710	315 355	410x410 460x460	5.5 7.5	Side Side	1004 1004
0713	400 450	515x515 575x575	7.5 15	Side Side	1204 1204
0715	400 450	515x515 575x575	7.5 15	Side Side	1204 1204
1010	355 400	460x460 515x515	7.5 7.5	Side Side	1204 1204
1013	450 500	575x575 645x645	15 15	Side Side	1204 1204
1015	450 500	575x575 645x645	15 15	Side Side	1404 1404
1019	500 560	645x645 720x720	15 18.5	Side Side	1404 1404
1021	560 630	720x720 810x810	18.5 18.5	Side Side	1404 1404
1315	500 560	645x645 720x720	15 18.5	Side Side	1404 1404
1319	560 630	720x720 810x810	18.5 18.5	Side Side	1404 1404
1321	560 630	720x720 810x810	18.5 18.5	Side Side	1604 1604
1519	560 630	720x720 810x810	18.5 18.5	Side Side	1604 1604
1521	630 710	810x810 910x910	18.5 22	Side Side	1604 1604
1819	630 710	810x810 910x910	18.5 22	Side Side	1604 1604
1821	710 800	910x910 1010x1010	22 22	Side Side	1804 1804
1823	710 800	910x910 1010x1010	22 22	Side Side	1804 1804
1827	800 900	1010x1010 1200x1200	22 30	Side Side	2004 2004
2027	800 900	1010x1010 1200x1200	22 30	Side Side	2004 2004
2233	900 1000	1200x1200 1300x1300	30 37	Side Side	2204 2204

Table 14.

7.1 FAN DISCHARGE ARRANGEMENT

Horizontal Arrangement Unit.

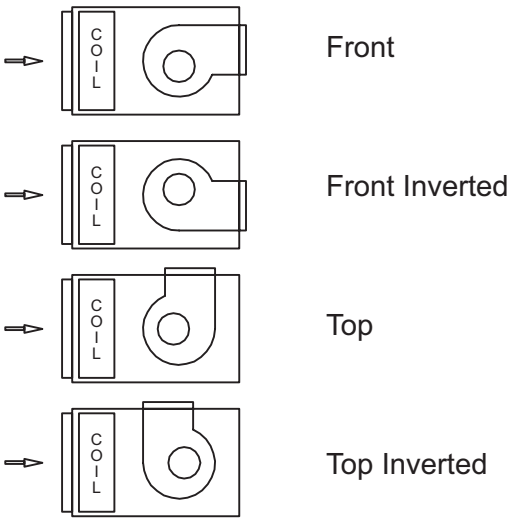


Figure 20.

Vertical Arrangement Unit.

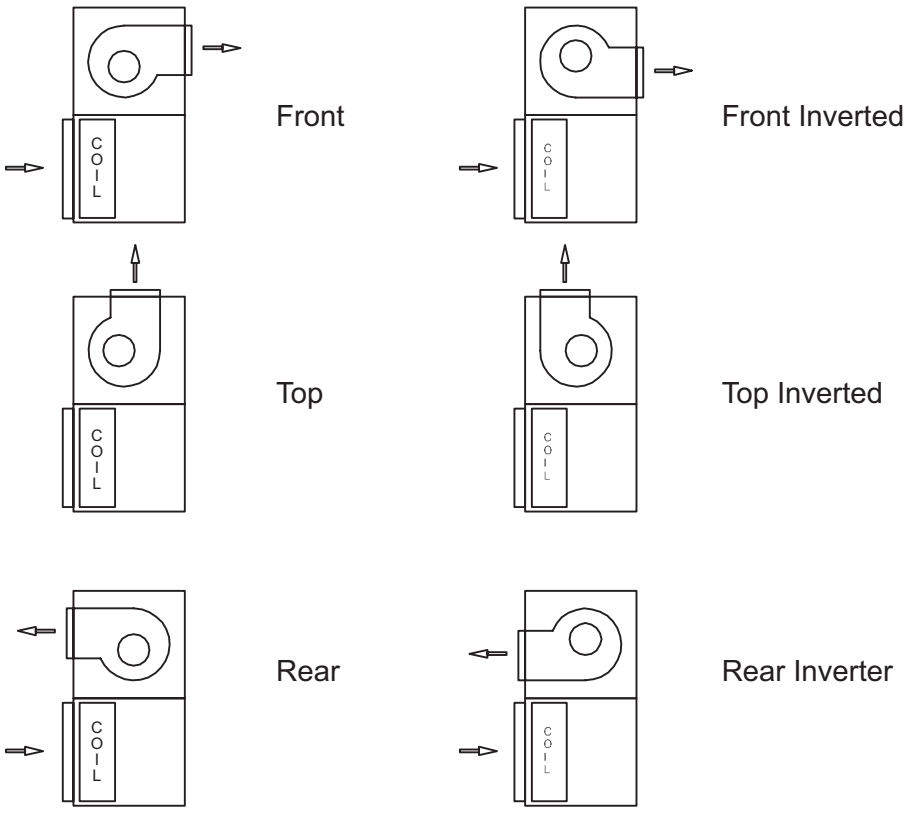
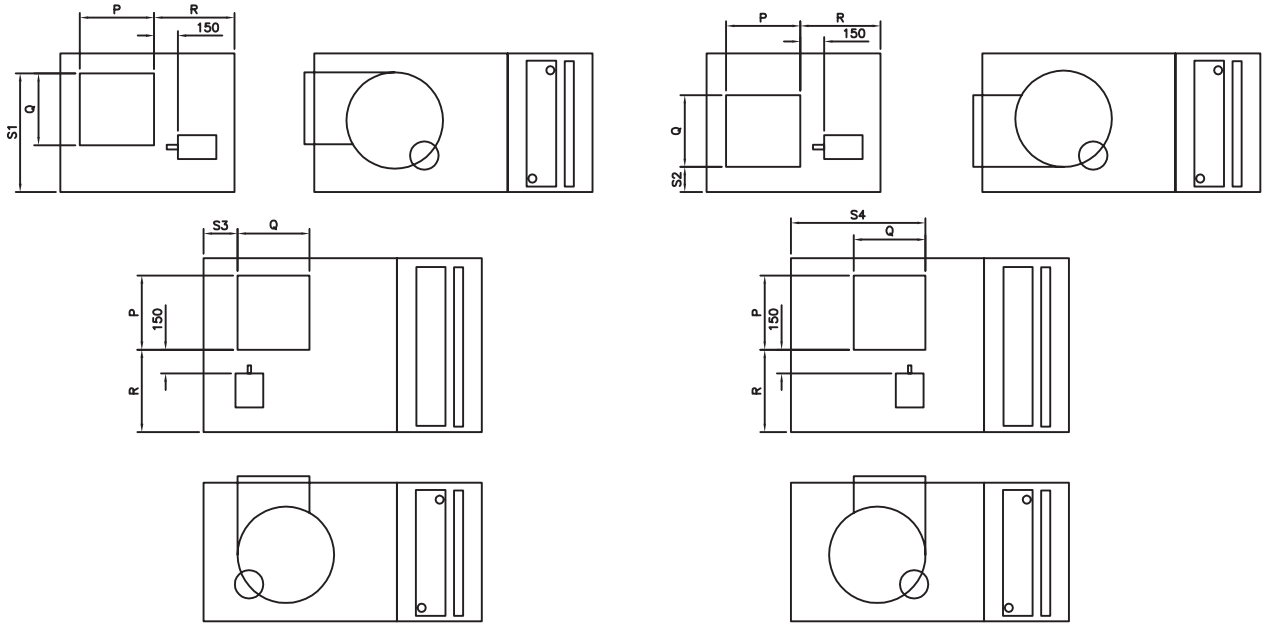


Figure 21.



	0404		0407		0410		0413		0707		0710		0713		0715		1010		1013		1015		1019	
	200	225	225	250	250	280	315	355	280	315	315	355	400	450	400	450	355	400	450	500	450	500	500	560
P	260	295	295	330	330	370	410	460	370	410	410	460	515	575	515	575	460	515	575	645	575	645	645	720
Q	260	295	295	330	330	370	410	460	370	410	410	460	515	575	515	575	460	515	575	645	575	645	645	720
R	272	255	408	585	589	560	646	621	555	513	626	590	794	780	794	785	590	647	780	780	785	777	830	792
S1	505	551	551	573	573	630	670	710	630	690	690	770	870	960	870	960	745	870	960	1083	960	1083	1083	1195
S2	136	137	137	90	90	90	90	90	90	90	90	90	140	140	140	140	90	140	140	170	140	170	170	170
S3	100	90	90	109	159	160	136	175	160	211	213	174	234	190	234	190	275	234	190	145	290	245	245	185
S4	800	815	815	796	845	843	863	825	844	789	789	825	969	1014	969	1014	925	969	1014	1060	1114	1160	1160	1219

	1021		1315		1319		1321		1519		1521		1819		1821		1823		1827		2027		2233	
	560	630	500	560	560	630	560	630	560	630	630	710	630	710	710	800	710	800	800	900	800	900	900	1000
P	720	810	645	720	720	810	720	810	720	810	810	910	810	910	910	1010	910	1010	1010	1200	1010	1200	1200	1300
Q	720	810	645	720	720	810	720	810	720	810	810	910	810	910	910	1010	910	1010	1010	1200	1010	1200	1200	1300
R	892	860	780	859	997	997	997	997	997	1047	997	997	997	997	1100	1035	1100	1146	1146	1152	1146	1152	1251	1200
S1	1195	1319	1083	1195	1195	1319	1195	1319	1195	1319	1319	1469	1319	1469	1469	1623	1469	1623	1623	1789	1623	1789	1789	1965
S2	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	160	170	160	160	160	160	160	160	160
S3	186	123	245	185	185	123	285	225	285	225	225	150	225	150	250	170	250	171	274	150	274	150	250	187
S4	1217	1280	1160	1219	1219	1280	1319	1380	1319	1380	1380	1453	1380	1453	1553	1627	1553	1627	1731	1854	1731	1854	1954	2017

Table 15.

8.0 Fan Motor Specification

- Squirrel case induction motor is used for the DM Air Handling Unit. Motor is horizontal fool mounted, single speed and has a die case steel body.
- The motor shaft material is C-40 steel and the motor has Class F insulation with temperature limit of 145˚C
- For motor below 3 kW, direct on line starting with 3 wire terminals only.
  For motor above 3 kW, star-delta starting with 6 wire terminals.
- Terminal box location is illustrated in Figure 22.

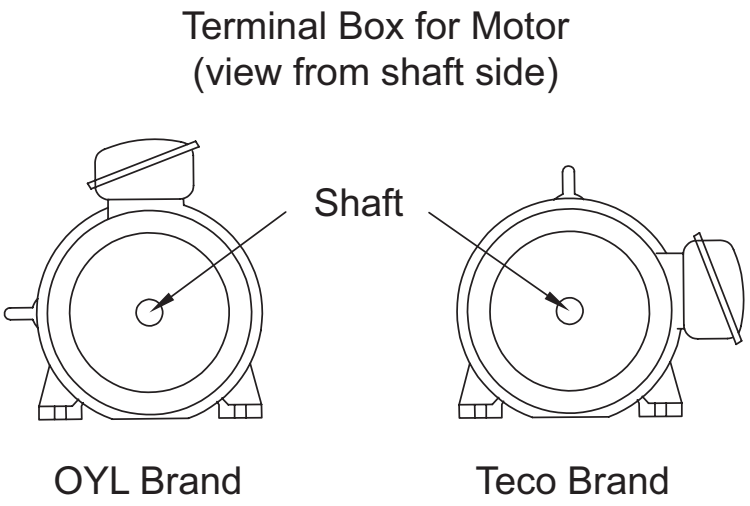


Figure 22.

4 POLES

Rated Power		Full Load Speed	Full Load Current at Rated	
kW	hp	rev/min	415V	380V
0.37	0.5	1340	1.01	1.1
0.55	0.75	1390	1.37	1.5
0.75	1	1380	1.83	2
1.1	1.5	1390	2.75	3
1.5	2	1390	3.57	3.9
2.2	3	1410	4.76	5.2
3	4	1410	6.23	6.8
4	5.5	1440	7.97	8.7
5.5	7.5	1445	10.99	12
7.5	10	1445	14.65	16
11	15	1460	21.06	23
15	20	1460	27.47	30
18.5	25	1470	32.96	36
22	30	1470	38.46	42
30	40	1470	53.11	58
37	50	1475	64.10	70
45	60	1475	77.83	85
55	75	1475	94.31	103
75	100	1485	128.20	140

Table 16.

6 POLES

Rated Power		Full Load Speed	Full Load Current at Rated	
kW	hp	rev/min	415V	380V
0.37	0.5	1340	1.10	1.2
0.55	0.75	1390	1.57	1.7
0.75	1	1380	2.20	2.4
1.1	1.5	1390	3.02	3.3
1.5	2	1390	3.66	4
2.2	3	1410	5.04	5.5
3	4	1410	6.87	7.5
4	5.5	1440	9.16	10
5.5	7.5	1445	11.90	13
7.5	10	1445	15.57	17
11	15	1460	21.98	24
15	20	1460	28.39	31
18.5	25	1470	34.80	38
22	30	1470	41.20	45
30	40	1470	53.11	58
37	50	1475	65.01	71
45	60	1475	78.75	86
55	75	1475	96.14	105
75	100	1485	130.00	142

Table 17.

9.0 BELT AND PULLEY SPECIFICATION

- DM Air Handling Unit comes standard with taper lock pulley and wedge belt with optional adjustable pulley and belt.
- Standard service factor of 1.5 suitable for 24 hours operation.

9.1 PULLEY ALIGNMENT

- Adjust the motor pulley to align with the fan pulley with the use of a straight edge.
- Do not force belts on the pulleys groove.
- Firstly, loosen the bolts at motor base until belt can slide smoothly over pulleys edge.
- When all the belts are in place, proceed to adjust belt tension using the adjusting nuts on the motor mount.
- Use a recognized belt tension gauge to check the tension as shown in Table 18.
- Figure 23 illustrates the pulleys alignment.

Deflection Force, K (Newton)								
Diameter of smaller pulleys	SPZ		SPA		SPB		SPC	
	Min	Max	Min	Max	Min	Max	Min	Max
71- 80	12	19	-	-	-	-	-	-
90 -112	16	24	19	29	-	-	-	-
125 -160	19	28	26	40	33	50	-	-
180 - 224	19	29	30	46	43	64	58	87
250 - 355	-	-	32	48	51	77	79	119
400 - 630	-	-	-	-	55	82	103	154

Table 18.

1
Shafts are not parallel to one another.

2
Shafts are not in correct alignment they appear parallel when seen from above.

3
Shafts are parallel and in alignment but pulleys are not in alignment

4
Correct installation both shafts and pulleys are parallel and in alignment

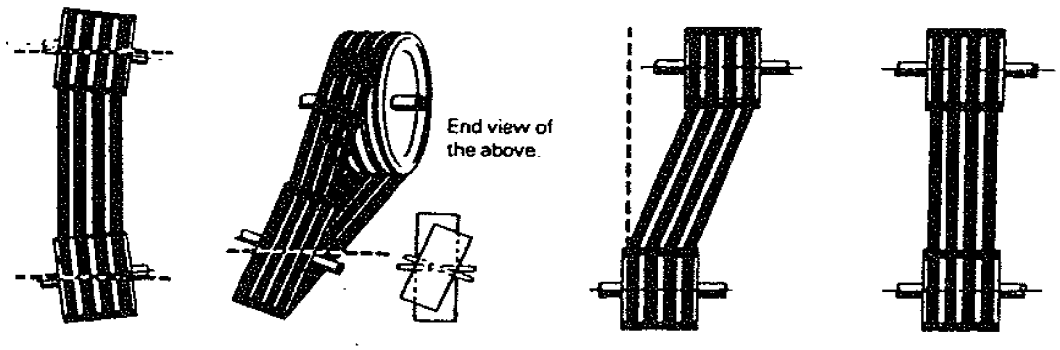


Figure 23

- To check the belt tension, apply a force K large enough at the centre of the belt to deflect the belt 15mm per meter. The deflection force for any belt should be within the minimum and maximum force shown in Table 18.
- When the tension drops to the minimum value, readjust to the maximum value.
- During normal operation a belt seat itself in pulleys grooves and require periodical checks to maintain tension.

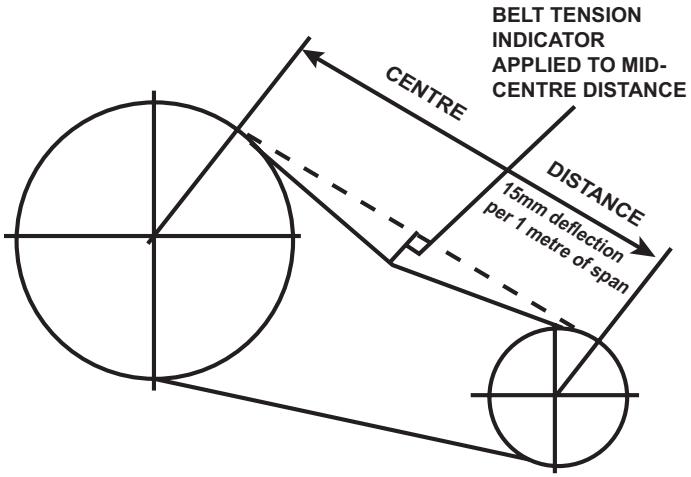


Figure 24

WARNING: Improper pulleys alignment and belt tension are the most frequent causes of excessive vibration as well as shortened belt and bearing life. It is important to install the pulleys as close as practical to the bearing.

CAUTION: Do not over tighten the belts or the bearings may become damaged.

10.0 COIL SPECIFICATION

The DM Air Handling Units can be used for both chilled water system and direct expansion system application. Coils are designed based on application to best meet the requirements.

- Standard Aluminium fins are maximum 12 FPI (fin per inch). Copper fins are also available as option. Fin thickness is 0.127mm and fin hardness is H0 and H22 for standard aluminium fin and others fins respectively. Fins can be coated by Heresite or Hydrophilic fin material as a corrosion protective layer.

- Standard coil frame is in 1.5mm thick galvanized steel (GI) while stainless steel (SSTL) is available as an option when copper fin is used to avoid galvanization effect. Coil casing is designed to have drain holes at the bottom channels to insure condensate drainage.

- For water system, the coil is available in 1, 2, 3, 4, 5, 6, 8, 10 and 12 rows. Header and collar is constructed of steel with copper material as the option. Its size is either 42 or 76 mm. Piping connection is only one sided, either “left” or “right”, viewing from return air side. The connection for steel header is by Male Pitch Threaded (MPT) joint. Copper header connection will be brazed joint but there is option with MPT by braze connector.

TOP VIEW

Right coil connection and Right Motor Location

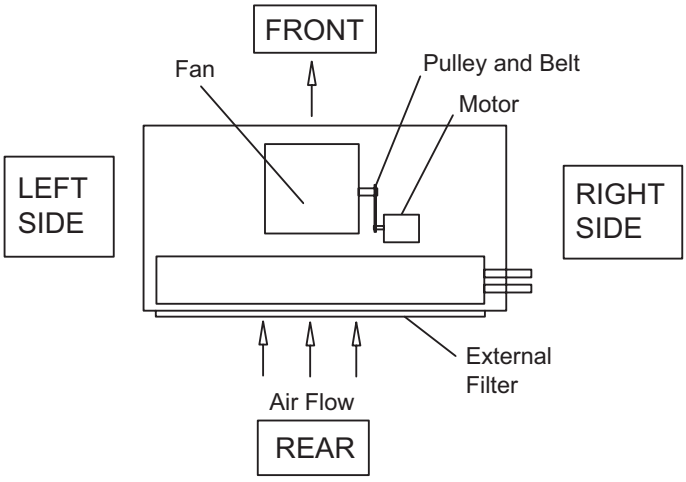


Figure 25

- For a direct expansion system, the coil is available in 2, 3, 4, 5, and 6 rows. TXV valve is optional item. Header is only available in copper materials. Pipe connection is by brazing joint.

- The standard working pressure of the coil is 250 psig (17 bar). Higher working pressure of 300 psig (20 bar).

- Coil surface area is standard size for each model and it is common for chilled water and direct expansion coil type. (Please refer Table 19.)

10.1 COIL SIZE AND FACE AREA

Model	Actual Coil Size				Face Area		No. of Coil
	Height		Length				
	in	mm	in	mm	ft^2	m^2	
0404	20	508	20.04	509	2.78	0.259	1
0407	20	508	31.85	809	4.42	0.411	1
0410	20	508	43.66	1109	6.06	0.563	1
0413	20	508	55.47	1409	7.70	0.716	1
0707	32.5	825.5	31.85	809	7.19	0.668	1
0710	32.5	825.5	43.66	1109	9.85	0.915	1
0713	32.5	825.5	55.47	1409	12.52	1.163	1
0715	32.5	825.5	63.35	1609	14.30	1.328	1
1010	45	1143	43.66	1109	13.64	1.268	1
1013	45	1143	55.47	1409	17.34	1.610	1
1015	45	1143	63.35	1609	19.80	1.839	1
1019	45	1143	79.09	2009	24.72	2.296	1
1021	45	1143	86.97	2209	27.18	2.525	1
1315	55	1397	63.35	1609	24.19	2.248	2
1319	55	1397	79.09	2009	30.21	2.807	2
1321	55	1397	86.97	2209	33.22	3.086	2
1519	60	1524	79.09	2009	32.96	3.062	2
1521	60	1524	86.97	2209	36.24	3.367	2
1819	75	1905	79.09	2009	41.20	3.827	2
1821	75	1905	86.97	2209	45.30	4.208	2
1823	75	1905	94.84	2409	49.40	4.589	2
1827	75	1905	110.59	2809	57.60	5.351	2
2027	80	2032	110.59	2809	61.44	5.708	2
2233	90	2286	134.21	3409	83.88	7.793	2

Table 19

10.2 HEADER SIZE

Model	0404	0407	0410	0413	0707	0710	0713	0715
Row								
1	42	42	42	42	42	42	42	42
2	42	42	42	42	42	42	42	42
3	42	42	42	42	42	42	42	42
4	42	42	42	42	42	42	42	42
5	42	42	42	42	42	42	42	42
6	42	42	42	42	42	42	42	42
8	42	42	42	42	42	42	42	42
10	76	76	76	76	76	76	76	76
12	76	76	76	76	76	76	76	76

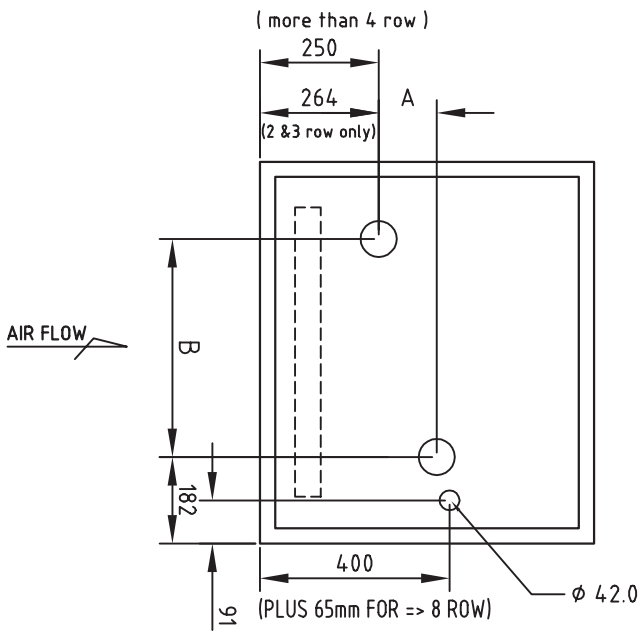
Table 20a: Dimension in mm

Model	1010	1013	1015	1019	1021	1315	1319	1321
Row								
1	42	42	42	42	42	42	42	42
2	42	42	42	42	42	42	42	42
3	42	42	42	42	42	42	42	42
4	42	42	76	76	76	42	42	76
5	42	42	76	76	76	42	42	76
6	76	76	76	76	76	76	76	76
8	76	76	76	76	76	76	76	76
10	76	76	76	76	76	76	76	76
12	76	76	76	76	76	76	76	76

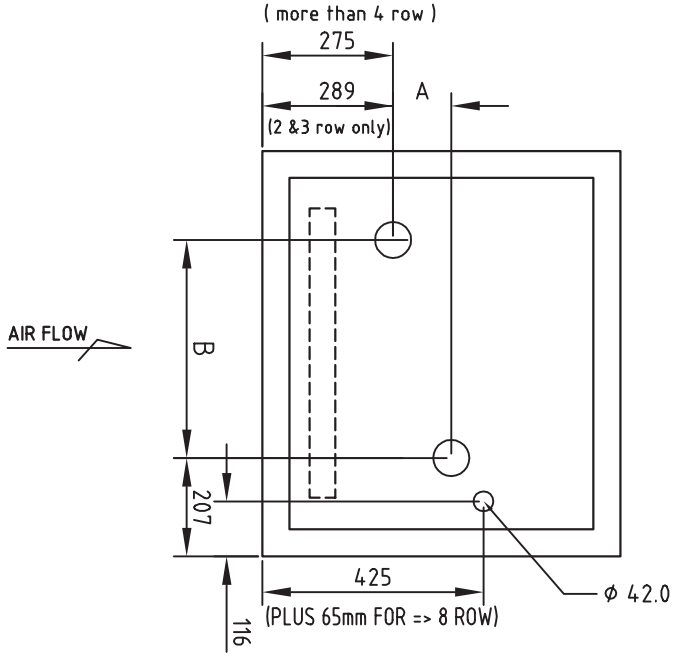
Table 20b: Dimension in mm

Model	1519	1521	1819	1821	1823	1827	2027	2233
Row								
1	42	42	42	42	42	42	42	42
2	42	42	42	42	42	42	42	42
3	42	42	42	42	42	42	42	42
4	76	76	76	76	76	76	76	76
5	76	76	76	76	76	76	76	76
6	76	76	76	76	76	76	76	76
8	76	76	76	76	76	76	76	76
10	76	76	76	76	76	76	76	76
12	76	76	76	76	76	76	76	76

Table 20c: Dimension in mm



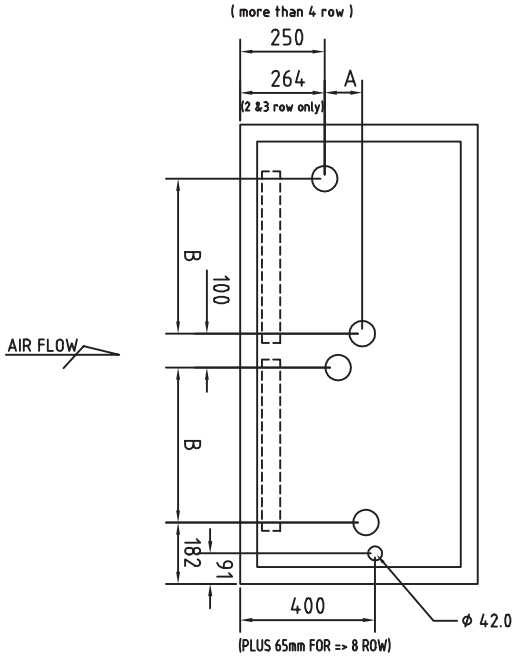
× NOTE: FOR 25MM PU INSULATION PANEL



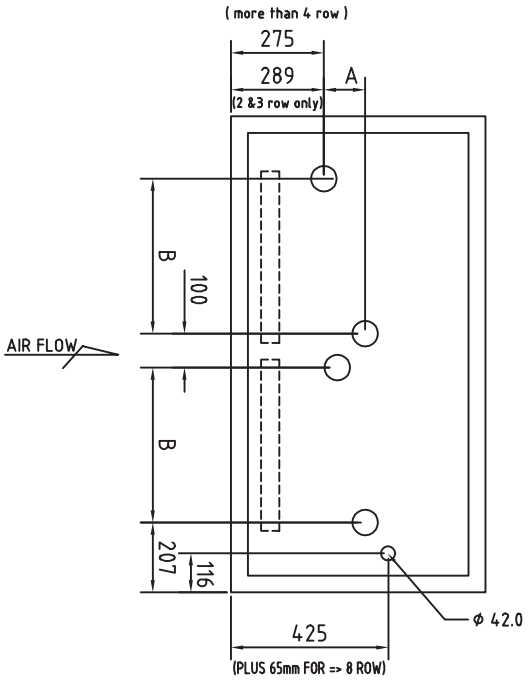
× NOTE: FOR 50MM PU INSULATION PANEL

Model	2 row		3 row		4 row		5 row		6 row		8 row		10 row		12 row	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
0404	55	460	55	460	83	460	110	460	138	460	198	460	248	460	303	460
0407	55	460	55	460	83	460	110	460	138	460	198	460	248	460	303	460
0410	55	460	55	460	83	460	110	460	138	460	198	460	248	460	303	460
0413	55	460	55	460	83	460	110	460	138	460	198	460	248	460	303	460
0707	55	777	55	777	83	777	110	777	138	777	198	777	248	777	303	777
0710	55	777	55	777	83	777	110	777	138	777	198	777	248	777	303	777
0713	55	777	55	777	83	777	110	777	138	777	198	777	248	777	303	777
0715	55	777	55	777	83	777	110	777	138	777	198	777	248	777	303	777
1010	55	1095	55	1095	83	1095	110	1095	138	1095	198	1095	248	1095	303	1095
1013	55	1095	55	1095	83	1095	110	1095	138	1095	198	1095	248	1095	303	1095
1015	55	1095	55	1095	83	1095	110	1095	138	1095	198	1095	248	1095	303	1095
1019	55	1095	55	1095	83	1095	110	1095	138	1095	198	1095	248	1095	303	1095
1021	55	1095	55	1095	83	1095	110	1095	138	1095	198	1095	248	1095	303	1095

Table 21a: Dimension in mm



× NOTE: FOR 25MM INSULATION PU PANEL



× NOTE: FOR 50MM INSULATION PU PANEL

Model	2 row		3 row		4 row		5 row		6 row		8 row		10 row		12 row	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
1315	55	650	55	650	83	650	110	650	138	650	193	650	248	650	303	650
1319	55	650	55	650	83	650	110	650	138	650	193	650	248	650	303	650
1321	55	650	55	650	83	650	110	650	138	650	193	650	248	650	303	650
1519	55	714	55	714	83	714	110	714	138	714	193	714	248	714	303	714
1521	55	714	55	714	83	714	110	714	138	714	193	714	248	714	303	714
1819	55	904	55	904	83	904	110	904	138	904	193	904	248	904	303	904
1821	55	904	55	904	83	904	110	904	138	904	193	904	248	904	303	904
1823	55	904	55	904	83	904	110	904	138	904	193	904	248	904	303	904
1827	55	904	55	904	83	904	110	904	138	904	193	904	248	904	303	904
2027	55	968	55	968	83	968	110	968	138	968	193	968	248	968	303	968
2233	55	1095	55	1095	83	1095	110	1095	138	1095	193	1095	248	1095	303	1095

Table 21b: Dimension in mm

11.0 HEAT RECOVERY WHEEL SPECIFICATION

AHU with heat wheel cannot be selected by DM AHU selection software as other standard unit because it is categorized as special customized unit. It consists of two sections: return air side and supply air side. The arrangement is as below. To install the heat wheel in air handling unit, an empty section is required. The size of heat wheel has to be considered for the specification drawing. Besides, spaces between heat wheel section and the coil section must be considered to ensure the most efficient heat transfer between air flow and coil medium at the coil section.

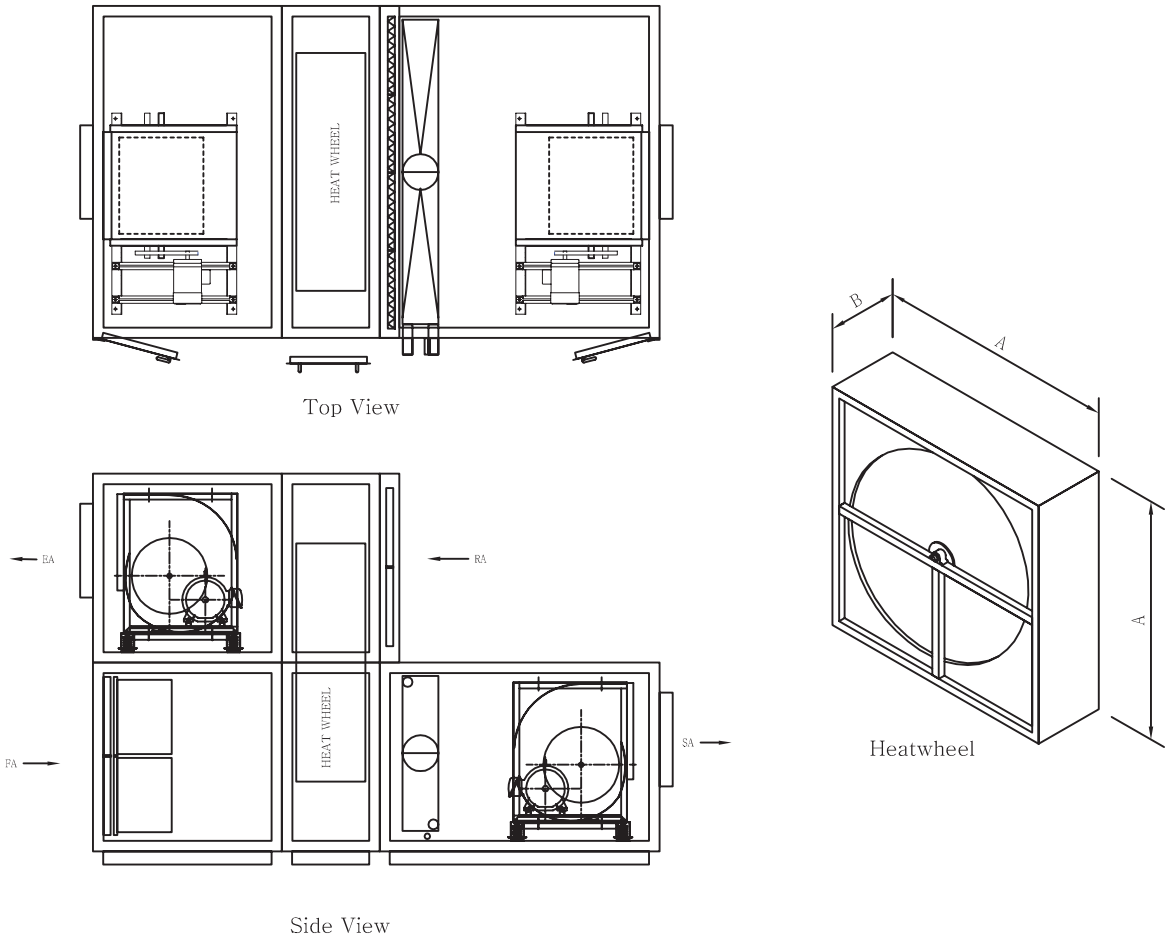


Figure 26

11.1 HEAT WHEEL SPECIFICATION

Velocity		M/S	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5		Height and Widt h "A" mm (Inch)	Depth "B" mm (Inch)	Net Weight kg. Pounds
		FPM	300.0	400.0	500.0	600.0	700.0	800.0	900.0	1000.0	1100.0				
Total (Winter Heating) Effectiveness %			87.0	84.0	81.0	79.0	78.0	76.0	74.0	72.0	70.0				
Total (Winter Heating) Effectiveness %			87.0	84.0	81.0	79.0	77.0	75.0	73.0	71.0	69.0				
Pressure Drop		Pa	74.0	94.0	114.0	142.0	170.0	201.0	231.0	263.0	300.0				
		in. w.c	0.29	0.37	0.46	0.56	0.67	0.79	0.91	1.03	1.18				
Minimum AHU Model	Heat Wheel Model	Air Volume													
0407	HRW 500	CMH	409	546	682	765	955	1092	1228	1365	1501		700	365	63
		LPS	114	152	189	213	265	303	341	379	417		27.6	14.4	139
0407	HRW 600	CMH	623	831	1039	1189	1454	1662	1870	2078	2286		800	365	71
		LPS	173	231	289	330	404	462	519	577	635		31.5	14.4	157
0407	HRW 700	CMH	879	1172	1465	1699	2051	2345	2638	2931	3224		850	365	79
		LPS	244	326	407	472	570	651	733	814	896		33.5	14.4	174
0407	HRW 800	CMH	1177	1569	1962	2379	2746	3139	3531	3932	4316		950	365	90
		LPS	693	924	1154	1400	1616	1847	2078	2314	2540		37.4	14.4	199
0410	HRW 900	CMH	1517	2022	2528	3059	3539	4044	4550	5055	5561		1030	365	103
		LPS	421	562	702	850	983	1123	1264	1404	1545		40.6	14.4	227
0410	HRW 1000	CMH	1898	2531	3164	3738	4429	5062	5695	6327	6960		1130	365	113
		LPS	527	703	879	1038	1230	1406	1582	1758	1933		44.5	14.4	250
0410	HRW 1100	CMH	2322	3096	3869	4588	5417	6191	6965	7739	8513		1230	365	153
		LPS	645	860	1075	1274	1505	1720	1935	2150	2365		48.4	14.4	338
0713	HRW 1200	CMH	2730	3640	4550	5438	6371	7281	8191	9101	10011		1330	365	169
		LPS	758	1011	1264	1511	1770	2023	2275	2528	2781		52.4	14.4	373
0713	HRW 1300	CMH	3157	4210	5262	6287	736 7	8419	9472	10524	11576		1430	365	199
		LPS	877	1169	1462	1746	2046	2339	2631	2923	3216		56.3	14.4	439

0715	**HRW 1400**	**CMH**	3701	4934	6168	7307	8635	9869	11103	12336	13570		1530	365	221
		LPS	2178	2906	3629	4299	5081	5807	6533	7259	7985		60.2	14. 4	488
0715	**HRW 1500**	**CMH**	4286	5715	7144	8666	10002	11430	12859	14288	15717		1630	365	239
		LPS	1191	1588	1984	2407	2778	3175	3572	3969	4366		64.2	14.4	528
0715	**HRW 1600**	**CMH**	4859	6479	8099	9686	11338	12958	14577	16197	17817		1730	395.0	276
		LPS	1350	1800	2250	2691	3149	3599	4049	4499	4949		68.1	15.6	609
1019	**HRW 1700**	**CMH**	5524	7366	9207	11045	12890	14732	16573	18415	20256		1830	395.0	318
		LPS	1534	2046	2558	3068	3581	4092	4604	5115	5627		72.0	15.6	702
1019	**HRW 1800**	**CMH**	6232	8309	10386	12574	14540	16617	18695	20772	22849		1930	395.0	342
		LPS	1731	2308	2885	3493	4039	4616	5193	5770	6347		76.0	15.6	755
1019	**HRW 1900**	**CMH**	6981	9307	11634	13934	16288	18615	20942	23269	25595		2030	395.0	365
		LPS	1939	2585	3232	3871	4524	5171	5817	6464	7110		79.9	15.6	806
1019	**HRW 2000**	**CMH**	7771	10362	12952	15633	18133	20724	23314	25905	28495		2130	395.0	392
		LPS	2159	2878	3598	4343	5037	5757	6476	7196	7915		83.9	15.6	866
1021	**HRW 2200**	**CMH**	9532	12709	15887	19301	22241	25419	28596	31773	34 951		2400	530.0	772
		LPS	2648	3530	4413	5361	6178	7061	7943	8826	9709		94.5	20.9	1705
1823	**HRW 2400**	**CMH**	11413	15217	19021	22940	26630	30434	34238	38042	41846		2600	530.0	851
		LPS	3170	4227	5284	6372	7397	8454	9511	10567	11624		102.4	20.9	1879
1827	**HRW 2600**	**CMH**	13461	17948	22435	27018	31409	35896	40383	44870	49357		2800	530.0	932
		LPS	3739	4986	6232	7505	8725	9971	11218	12464	13710		110.2	20.9	2058
2027	**HRW 2600**	**CMH**	13461	17948	22435	27018	31409	35896	40383	44870	49357		2800	530	932
		LPS	3739	4986	6232	7505	8725	9971	11218	12464	13710		110.2	20.9	2058
2233	**HRW 2600**	**CMH**	13461	17948	22435	27018	31409	35896	40383	44870	49357		2800	530	932
		LPS	3739	4986	6232	7505	8725	9971	11218	12464	13710		110 .2	20.9	2058

Table 22.
Note: Above specification is referred to Performance Data of EcoFresh Heat Recovery Wheel (Desiccant Rotors International).

12.0 FILTER SPECIFICATION

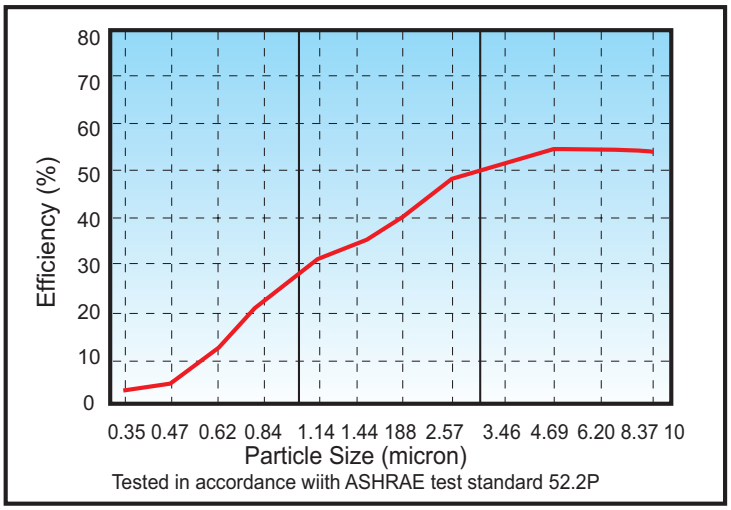
There are several types of filter are being used to achieve desired filtration efficiency.

12.1 AmAir 300E (Disposable)

Nominal Sizes (Inches)	Rated Air Flow Air Flow Capacity (SCFM)			Pleats Per Filter	Gross Media Area (Sq. Ft.)
(W X H X D)	300 FPM	500 FPM	625 FPM		
24 X 24 X 2	1200	2000	2500	28	17.6
12 X 24 X 2	600	1000	1250	14	9.2

Pleats Per Lineal Foot	Rated initial Resistance (In. WG)			Recommended dead Final Resistance (In WG)	Rated Average Efficiency (%)	Rated Average Arrestance (%)	Continuous Operating Temperature Limits	
	300 FPM	500 FPM	625 FPM				˚F	˚C
14.5	0.13	0.30	0.45	1.0	25-30	90-92	200	93

Table 23.

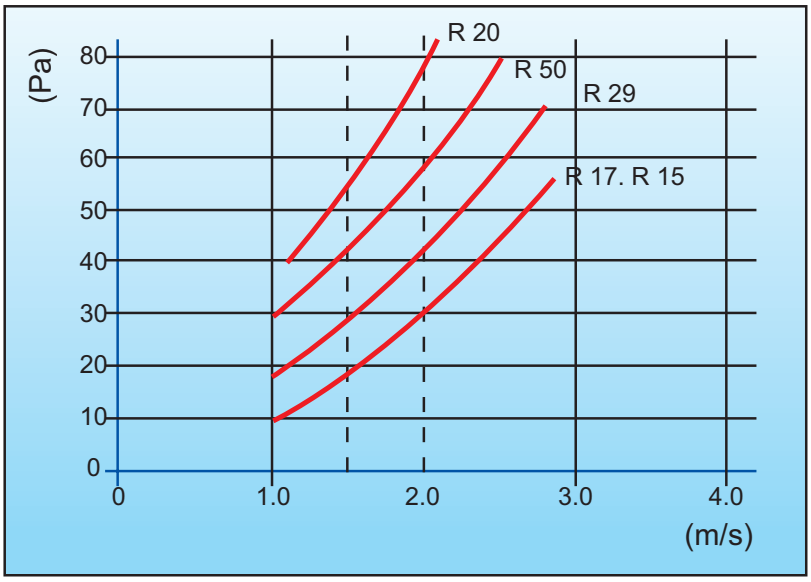


Graph 1. Effciency vs Particle Size

12.2 AmerTex® R Series

Type	R 15 Economy	R 29 Durable	R 50 Super
Recommended Face Velocity (m/s)	1.5	1.5	1.5
Rated Capacity (m3/h/m2)	5400	5400	5400
Rated Initial Resistance (Pa)	17	26	42
Recommended Final Resistance (Pa)	130	200	200
Average Resistance (%)	75-80	80-85	87-92
EN 779 Classification	G2	G3	G4
Media Colour	White	White	White
Maximum Operating Temperature (ºC)	100	100	100

Table 24.

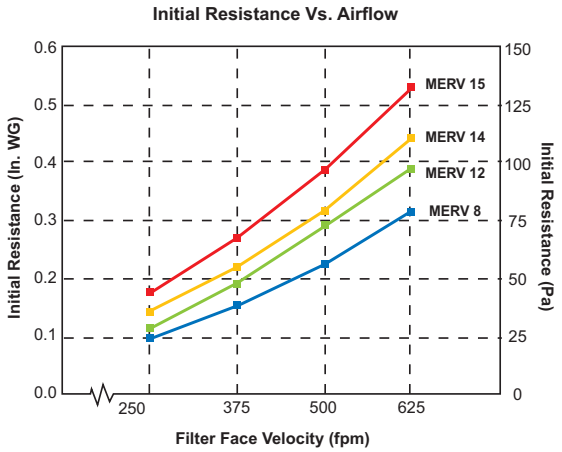


Graph 2. Initial Resistance vs. Face Velocity

12.3 DriPak® 2000

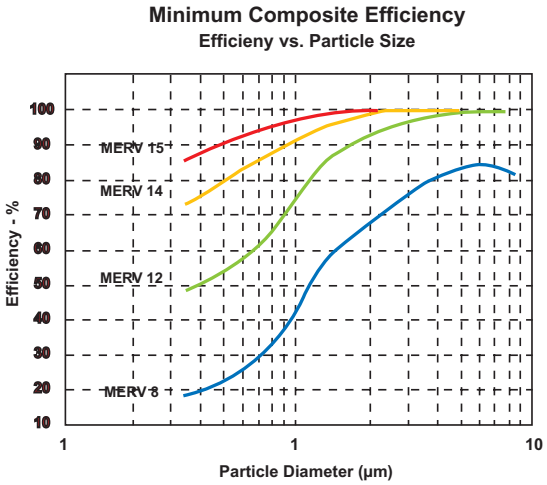
Nominal Sizes (Inches) (W X H X D)	Pockets Per Filter	Rated Air Flow Capacity	Rated Initial Resistance (In. WG)		Recommended Final Resistance (In. WG)	Gross Media Area (Sq. ft.)
		375 FPM	80-85%	90-95%		
24 X 24 X 21	6	1500	0.31	0.40	1.0	45
12 X 24 X 21	3	750	0.31	0.40	1.0	22

Table 25



Graph 3. Initial Resistance vs. Airflow

Note: MERV 14- 80-85% Average Efficiency, MERV 15- 90-95% Average Efficiency



Graph 4. Efficiency vs. Particle Size

Tested in accordance with ASHRAE Test Standard 52.2. This chart shows the minimum efficiency the filter will provide throughout its service life.

12.4 BioCel® I

Rated Filter Face Velocity (FPM)	Nominal Sizes (W X H X D) (Inches)	Rated Air Flow Capacity (SCFM)			Rated initial Resistance (In. WG)			Gross Media Area (Sq ft)
		125FPM	250FPM	500FPM	125FPM	250FPM	500FPM	
95% Initial Efficiency (0.3 µm Particles)								
250	24 X 24 X 12	500	1000	2000	0.19	0.4	0.95	156
	12 X 24 X 12	250	500	1000	0.19	0.4	0.95	72
Recommended Final Resistance 2.0 In. WG								

Table 26.

Note:

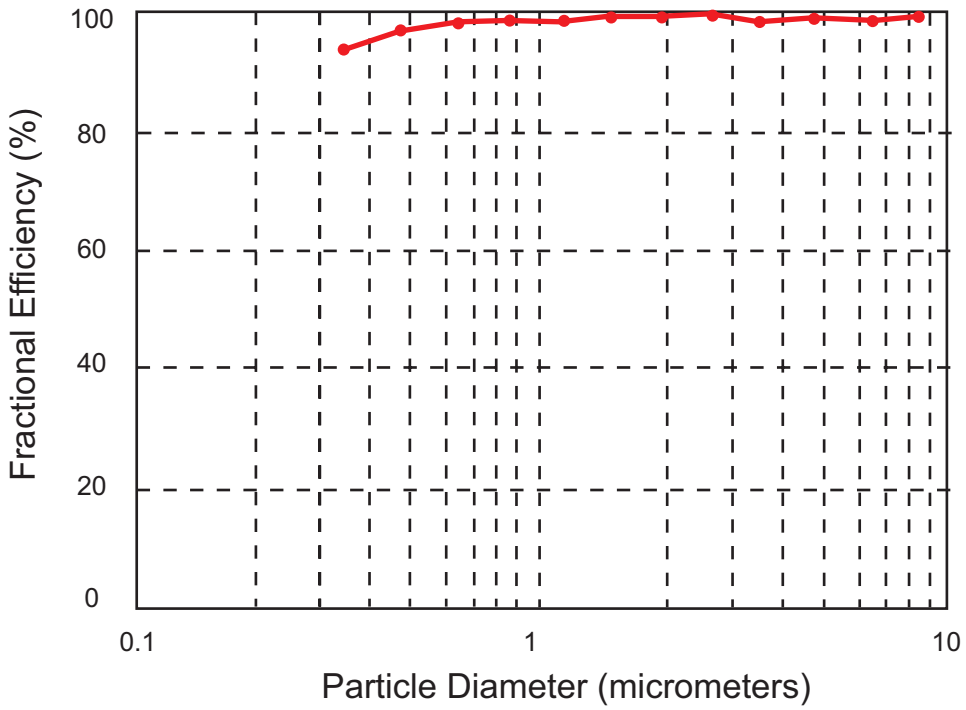
a) The “H” (height) dimension indicates the separators. BioCel I filters should always be installed with separators vertical.

b) SCFM(Standard cubic feet per minute)- rated airlow capacity at “standard” condition- 68 ºF at sea level.

c) BioCel I are classified as class2. Testing was performed according to U.L Standard 900.

Initial Efficiency Vs Particle Diameter

At rated airflow the BioCel® I has the efficiency of 95% by the DOP test method on 0.30 micron particles.



Graph 5. Efficiency vs. Particle Size

12.5 VariCel® II

Rated Filter Face Velocity (FPM)	Nominal Sizes (W X H X D) (Inches)	Rated Air Flow Capacity (CFM)	Rated initial Resistance (In. WG)	Recommended Final Resistance (In. WG)	Gross Media Area (Sq ft)
		90-95% Average Efficiency			
500	24 X 24 X 4	2000	0.68	1.5	127
	12 X 24 X 4	1000	0.68	1.5	63
		80-85% Average Efficiency			
500	24 X 24 X 4	2000	0.59	1.5	127
	12 X 24 X 4	1000	0.59	1.5	63

Table 27.

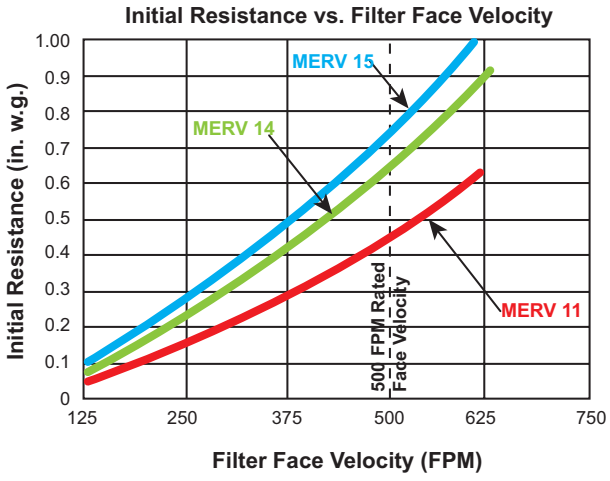
Note:

a) Width and height dimensions are interchangeable. VariCel® II filter maybe installed with the pleat either horizontal or vertical.

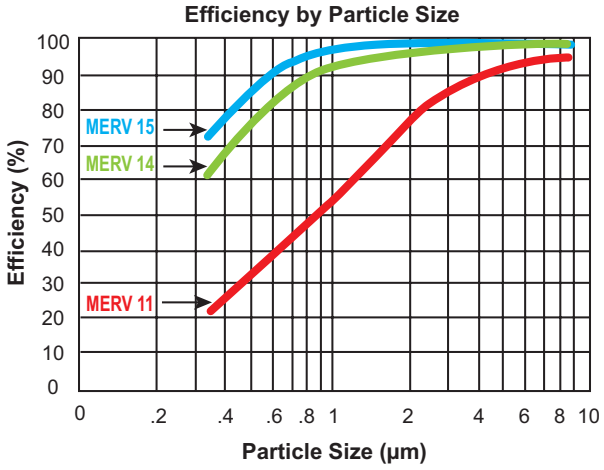
b) Filter can be operated up to 125% of rated face velocity.

c) All performance data based on ASHRAE 82.1-1992 test method. Performance tolerances conform to section 7.4 of Standard 850-84. For maximum service life, VariCel® II filter should be always be operated with a prefilter.

d) Available for side access installation designed with a 13/16" or 1-1/8" wide stationary track-Model VariCel® II- SA.



Graph 6. Initial Resistance vs. Filter Face Velocity



Graph 7.Efficiency vs. Particle Size

Note: MERV 14- 80-85% Average Efficiency
MERV 15- 90-95% Average Efficiency

Test in Accordance with ASHRAE Test Standard 52.2/1999

12.6 STANDARD FILTER SPECIFICATION

Model	Filter Media Size and Quantity					
	Size: 24" x 24"		Size: 24" x 12"		Total	
	Qty	Area (m^2)	Qty	Area (m^2)	Qty	Area (m^2)
0404	1	0.37	0	0.00	1	0.37
0407	1	0.37	1	0.19	2	0.56
0410	2	0.74	0	0.00	2	0.74
0413	2	0.74	1	0.19	3	0.93
0707	1	0.37	2	0.00	3	0.74
0710	2	0.74	2	0.19	4	1.11
0713	2	0.74	3	0.37	5	1.3
0715	3	1.11	3	0.37	6	1.67
1010	4	1.49	0	0.56	4	1.49
1013	4	1.49	2	0.56	6	1.86
1015	6	2.23	0	0.00	6	2.23
1019	6	2.23	2	0.37	8	2.6
1021	8	2.97	0	0.00	8	2.97
1315	6	2.23	3	0.37	9	2.79
1319	6	2.23	5	0.00	11	3.16
1321	8	2.97	4	0.56	12	3.71
1519	6	2.23	5	0.93	11	3.16
1521	8	2.97	4	0.74	12	3.71
1819	9	3.34	3	0.56	12	3.9
1821	12	4.46	0	0	12	4.46
1823	12	4.46	0	0	12	4.46
1827	15	5.58	0	0	15	5.58
2027	15	5.58	5	0.93	20	6.51
2233	24	8.93	0	0	24	8.93

Table 28.

12.7 AstroCel® I

HEPA Efficiencies – 99.97% and 99.99% minimum efficiency on 0.3 micrometer particles.

Nominal Sizes (W X H X D) (Inches)	Rated air Flow Capacity (SCFM) (@ 1.0" W.G)
	260 FPM
24 X 24 X 11-1/2	1050
12 X 24 X 11-1/2	500

Table 29.

12.8 HEPA FILTER SPECIFICATION

Model	HEPA Filter Size c/w Frame and Quantity/unit					
	Size: 24" x 24"		Size: 24" x 12"		Total	
	Qty	Area (m^2)	Qty	Area (m^2)	Qty	Area (m^2)
0404	1	0.37	0	0	1	0.37
0407	1	0.37	1	0.19	2	0.56
0410	2	0.74	0	0	2	0.74
0413	2	0.74	0	0	2	0.74
0707	1	0.37	2	0.38	3	0.75
0710	2	0.74	2	0.38	4	1.12
0713	2	0.74	2	0.38	4	1.12
0715	2	1.11	3	0.57	5	1.68
1010	4	1.49	0	0	4	1.49
1013	4	1.49	0	0	4	1.49
1015	4	2.23	2	0.38	6	2.61
1019	6	2.23	0	0	6	2.23
1021	6	2.97	2	0.38	8	3.35
1315	4	2.23	2	0.38	6	2.61
1319	6	2.23	0	0	6	2.23
1321	6	2.97	2	0.38	8	3.35
1519	6	2.23	3	0.57	9	2.80
1521	6	2.97	5	0.95	11	3.92
1819	9	3.34	0	0	9	3.34
1821	9	4.46	3	0.57	12	5.03
1823	12	4.46	0	0	12	4.46
1827	12	5.58	3	0.57	15	6.15
2027	12	5.58	7	1.33	19	6.91
2233	15	7.44	8	1.52	23	8.96

Table 30.

*NOTE: CABINET DEPTH 1200mm DISTANCE FILTER TO DISCHARGE OPENING 200MM

13.0 GUIDE SPECIFICATION

13.1 CASING / CABINET CONSTRUCTION

A. The frame work shall be made from natural anodized extruded aluminium channel together by 3D injection moulded Nylon corner pieces.
B. The casing panel shall be attached to the frame through a self-locking mechanism represented by a wedge and frame, exerting pressure evenly onto the panel and seal/ gasket attached to the frame and hence a better air tight cabinet construction.
C. The unit wall is shall be Double Skin Polyurethane foam (PU) insulation panel (25mm or 50mm with density 40 kg/m3) with 0.5 mm high strength pre-painted steel as external skin and 0.5 mm galvanized steel (GI) as internal skin.
D. Access door or service panel shall be supplied with a hinged access door with latch or with removable panel with handles and panel block. Door shall swing outward for unit sections under negative pressure.
E. For the best minimization of heat lost through AHU, thermal break aluminium profile shall be used.
F. The complete unit shall be mounted on a fabricated GI base frame, height of 100 mm for ease of shipment and handling.

13.2 FAN AND MOTOR

A. The fan shall be of the forward curved, backward curved or aerofoil fans with double width double inlet (DWDI) centrifugal fan. Fan assemblies including fan, motor and sheaves shall be dynamically balanced by the manufacturer.
B. Fan performance shall be measured and rated according to AMCA 210 and AMCA 300 Fan is dynamically and statically balanced to Standard ISO 1940.
C. Motors shall be on an adjustable base to aid in belt tightening.
D. Motors shall be capable of staring under all service conditions and shall be continuously rated with a minimum of 20% power margin over the driven load requirements.
E. Bearings shall be L-50 life of 200,000 hours.
F. Provide access door to motor and drive. Fan and motor assembly shall be mounted on rubber mounting or 1” deflection spring vibration type isolators inside cabinetry. Seismic and wind restraints design is upon request by customer.

13.3 COOLING AND HEATING COIL SECTIONS

A. Coil shall be installed such that unit encloses headers and return bend. Drain and vent connections shall be provided exterior to unit casing. Coil connections should be sealed with rubber grommets to minimize air leakage and condensation inside panel assembly. Coils shall be removable through side and/ or top panels of unit without the need to remove and disassemble the entire section from the unit.
B. Capacity, water pressure drop and selection procedure shall be designed in accordance with ARI Standard 410.
C. Standard Aluminium fins are maximum 12 FPI (fin per inch). Fins can be coated by Heresite or Hydrophilic fin material as a corrosion protective layer.
D. Standard coil frame shall be 1.5mm thick galvanized steel (GI) or stainless steel (SSTL) is optional.
E. Standard working pressure of the coil is 250 psig (17 bar). Higher working pressure of 300 psig (20 bar).
F. Water coils:
    a. Cooling coils can be used when the face velocity does not exceed 2.5 m/s. For higher face velocity, a moisture eliminator is required to prevent condensate water carry over.
    b. The coil is available in 1, 2, 3, 4, 5, 6, 8, 10 and 12 rows.
    c. Header and collar is constructed of steel with copper material as the option. Its size is either 42 or 76 mm. Piping connection is only one sided, either “left” or “right”, viewing from return air side.
G. The connection for steel header is by Male Pitch Threaded (MPT) joint. Copper header connection will be braze joint but there is an option with MPT by braze connector.
H. Refrigerant coils:
    a. For a direct expansion system, the coil is available in 2, 3, 4, 5 and 6 rows. TXV valve is optional item. Header is only available in copper materials. Pipe connection is by brazing joint.

13.4 FILTERS

A. Disposable and washable panel filters shall be installed in 2” holding frames.
B. DriPak® 2000- bag filter shall be installed in 1” holding frames, filter media is 21” deep with 80- 85% and 90-95% dust spot efficiency.
C. VariCel® II- Cartridge shall be installed in 4” holding frames where filter media is 4” deep.
D. BioCel® I- Cartridge type arrangement with holding frames 1”.
E. All primary and secondary filters shall be installed in Aluminium sliding rails. The arrangement designed to minimize air bypass.
F. AstroCel® I- shall be installed in 24” x 24” holding frames.
G. Flat filter only shall be installed at external side of unit for easy access.
H. Manometer or pressure gauge shall be provided upon request of customer over filter bank to give a visual indication of filter clean and dirty status.

DOP: 1107

Engineered for flexibility and performance.™

Models : e1400 to e9600

e-AHU Basic Double Skin Air Handling Unit

Air Flow : 994 to 9600 l/s

McQuay®
Air Conditioning

e-AHU: ECONOMICAL AHU BASIC DOUBLE SKIN AIR HANDLING UNIT

- Available in 8 models, with air flow from 994 l/s to 9600 l/s and the capacity between 28.1 kW and 254.9 kW use for chilled water system.

- The high strength extruded aluminum construction and incorporating with injection fiber plastic corner pieces to form a rigid frame for the air handling unit to provide maximum strength to stand the high pressure. The external clip methods to hold the double skin PU insulation panel is easy for access during maintenance and prevent air leakage.

- Excellent Thermal Barrier: all the framework are insulated with 25mm thick double skin PU insulation panel to create a thermal barrier between the internal and external surfaces. The 40kg/m3 of polyurethane foam (PU) create the optimum insulation performance and rigidity.

- Designed by J & E Hall Refrigeration Malaysia in accordance to the Eurovent Standard.

- Fan Section with Top or Front Inverted Fan Discharge Option which directly mounted to the panel (fig. 01)

(fig. 01)

- Adjustable motor bracket with rubber pad under the motor to absorb the vibration

- Drive package are select to meet the application

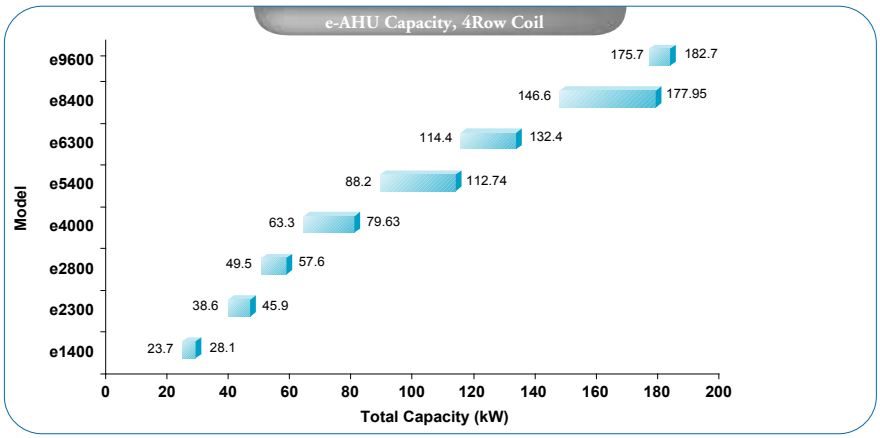
- Available in 4 and 6 rows Coil using 3/8" cupper tube with option right or left hand pipe connection, all the coil comes with aluminum fins and steel header. (fig. 02)

(fig. 02)

- No internal isolator, need to add isolator externally at site.

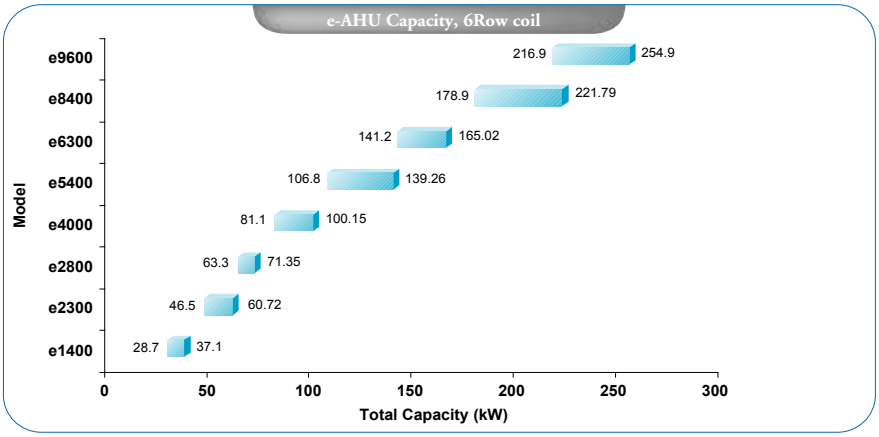
- Available with washable Synthetic Flat Filter R29 (80-85% average Arrestance) in an aluminum frame supported by wire rod. Exclusive bonding technology and high dust holding capacity with low resistance to airflow provided by AAF INTERNATIONAL. (fig. 03)

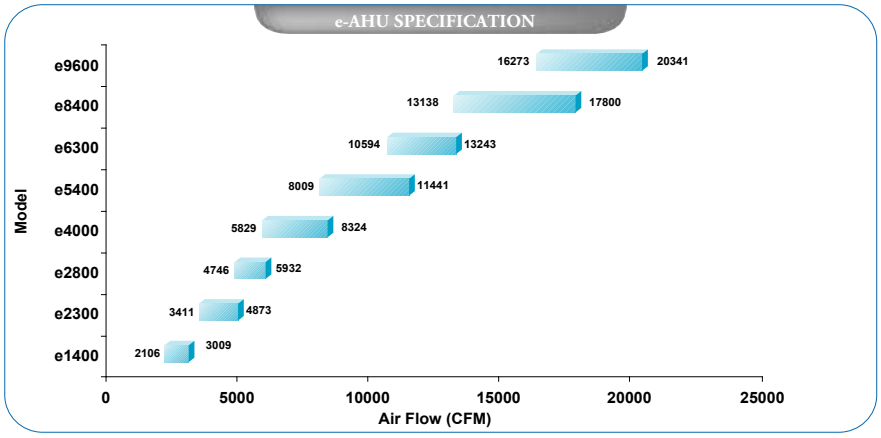
(fig. 03)



Model	Total Capacity, 4R (kW) Range		
e1400	23.7	→	28.1
e2300	38.6	→	45.9
e2800	49.5	→	57.6
e4000	63.3	→	79.63
e5400	88.2	→	112.74
e6300	114.4	→	132.4
e8400	146.6	→	177.95
e9600	175.7	→	182.7

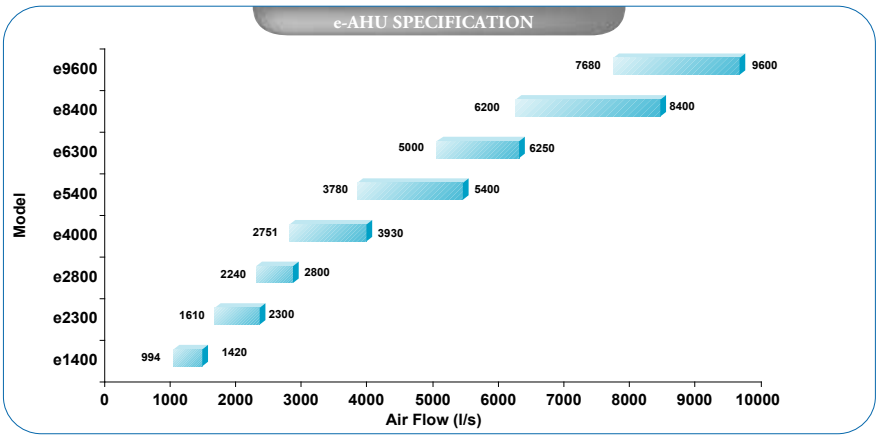
Model	Total Capacity, 6R (kW) Range		
e1400	28.7	→	37.1
e2300	46.5	→	60.73
e2800	63.3	→	71.35
e4000	81.1	→	100.15
e5400	106.8	→	139.26
e6300	141.2	→	165.02
e8400	178.9	→	221.79
e9600	216.9	→	254.9





Model	Air Flow (CFM) Range		
e1400	2106	→	3009
e2300	3411	→	4873
e2800	4746	→	5932
e4000	5829	→	8327
e5400	8009	→	11441
e6300	10594	→	13243
e8400	13138	→	17800
e9600	16273	→	20341

Model	Air Flow (l/s)) Range		
e1400	994	→	1420
e2300	1610	→	2300
e2800	2240	→	2800
e4000	2751	→	3930
e5400	3780	→	5400
e6300	5000	→	6250
e8400	6200	→	8400
e9600	7680	→	9600



e-AHU SPECIFICATION

INDOOR UNIT

MODEL				e1400		e2300		e2800		e4000	
				4R	6R	4R	6R	4R	6R	4R	6R
FAN SIZE				AT10/10 S		AT15/15 S		AT15/15 S		AT18/18 S	
CASING	Material			DOUBLE SKIN PU FOAM INSULATION PANEL, WALLS THICKNESS INT 0.5mm PRE-PAINTED STELL - EXT 0.5mm GI							
	Insulation			PU FOAM, 25mm, 40kg/m^3							
DIMENSION (Cabinet)	Height (H)	mm (in)		612		932		932		1283	
	Width (W)	mm (in)		1538		1538		1770		1770	
	Depth (D)	mm (in)		873		973		973		1180	
DIMENSION (Packing)	Height (H)	mm (in)		877		1206		1206		1500	
	Width (W)	mm (in)		1850		1850		2060		2060	
	Depth (D)	mm (in)		1196		1250		1250		1482	
COIL											
CONSTRUCTION	COIL TYPE			3/8" PLAIN TUBE							
	COIL DUTY			COOLING							
	HEAT TRANSFER FLUID			WATER							
	TUBE MATERIAL			COPPER							
	FIN MATERIAL			ALUMINIUM							
	FIN HEIGHT	mm		457		762		762		1067	
	FIN LENGTH	mm		1243		1243		1475		1475	
	TUBES HIGH			18		30		30		42	
CONFIGURATION	ROWS DEEP			4	6	4	6	4	6	4	6
	FINS PER METER	FPM		472	472	472	472	472	472	472	472
	FINS PER INCH	FPI		12	12	12	12	12	12	12	12
	NUMBER OF CIRCUIT			18	18	30	30	30	45	42	63
AIR SIDE	AIR FLOW	l/s total		1420	1420	2300	2300	2800	2800	3930	3930
	ENTERING AIR	° C DB/WB		26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4
	LEAVING AIR	° C DB/WB		14.76/13.83	12.12/11.8	14.69/13.79	12.01/11.7	14.51/13.59	12.32/12.01	14.61/13.69	12.32/12.01
	TOTAL CAPACITY	kW		28.1	37.1	45.9	60.73	57.6	71.35	79.63	100.15
	SENSIBLE CAPACITY	kW		20.7	25.3	33.73	41.28	41.71	49.18	58.03	69.02
	FACE VELOCITY	m/s		2.5	2.5	2.43	2.43	2.49	2.49	2.5	2.5
	AIR PRESSURE DROP	Pa		129	194	123	185	129	193	129	194
WATER SIDE	WATER FLOW	l/s total		1.34	1.77	2.186	2.893	2.743	3.399	3.793	4.77
	ENTERING WATER	° C		7	7	7	7	7	7	7	7
	LEAVING WATER	° C		12	12	12	12	12	12	12	12
	TUBE VELCITY	m/s		1.2	1.58	1.18	1.56	1.48	1.22	1.46	1.22
	WATER PRESSURE DROP	kPa		15.2	38.2	14.6	37	25.4	18	24.9	18.1
BLOWER											
TYPE/DRIVE				DIDW / BELT DRIVEN							
BLOWER MATERIAL				ZINC COATED STEEL							
BLOWER DIAMETER			mm (in)	254 (10)		381 (15)		381 (15)		457.2 (18)	
BLOWER LENGTH			mm (in)	254 (10)		381 (15)		381 (15)		457.2 (18)	
AIR FLOW			l/s (CFM)	1420 (3009)		2300 (4873)		2800 (5932)		3930 (8327)	
BLOWER MOTOR											
TYPE				SQUIRREL CAGE INDUCTION							
POWER SUPPLY			V / Ph / Hz	415 / 3 / 50							
RATED RUNNING CURRENT (AT 415V)			A	4.761		7.966		7.966		14.65	
RATED OUTPUT POWER (Max.)			kW	2.2		4		4		7.5	
MOTOR POLES				4 POLES							
Filter Quantity											
Type	Washable R29		24*24*2	-		2		2		4	
			20*24*2	2		-		1		2	
			12*24*2	-		1		-		-	

INDOOR UNIT

MODEL				e5400		e6300		e8400		e9600	
				4R	6R	4R	6R	4R	6R	4R	6R
FAN SIZE				ADH500R		ADH560R		ADH710R		ADH710R	
CASING	Material			DOUBLE SKIN PU FOAM INSULATION PANEL, WALLS THICKNESS INT 0.5mm PRE-PAINTED STELL - EXT 0.5mm GI							
	Insulation			PU FOAM, 25mm, 40kg/m^3							
DIMENSION (Cabinet)	Height (H)	mm (in)		1550		1550		1983		2080	
	Width (W)	mm (in)		1935		2199		2199		2395	
	Depth (D)	mm (in)		1400		1498		1930		1930	
DIMENSION (Packing)	Height (H)	mm (in)		1800		1800		2150		2250	
	Width (W)	mm (in)		2225		2490		2150		2500	
	Depth (D)	mm (in)		1680		1780		2140		2140	
COIL											
CONSTRUCTION	COIL TYPE			3/8" PLAIN TUBE							
	COIL DUTY			COOLING							
	HEAT TRANSFER FLUID			WATER							
	TUBE MATERIAL			COPPER							
	FIN MATERIAL			ALUMINIUM							
	FIN HEIGHT	mm		1321		1321		1778		1829	
	FIN LENGTH	mm		1640		1904		1904		2100	
	TUBES HIGH			52		52		70		72	
CONFIGURATION	ROWS DEEP			4	6	4	6	4	6	4	6
	FINS PER METER	FPM		472	472	472	472	472	472	472	472
	FINS PER INCH	FPI		12	12	12	12	12	12	12	12
	NUMBER OF CIRCUIT			52	78	52	78	70	105	144	108
AIR SIDE	AIR FLOW	l/s total		5400	5400	6250	6250	8400	8400	9600	9600
	ENTERING AIR	° C DB/WB		26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4	26.7/19.4
	LEAVING AIR	° C DB/WB		14.4/13.5	12.22/11.91	14.3/13.4	12.01/11.7	14.3/13.4	12.01/11.7	15.00/14.07	11.97/11.65
	TOTAL CAPACITY	kW		112.74	139.26	132.4	165.02	177.95	221.79	182.7	254.9
	SENSIBLE CAPACITY	kW		81.11	95.53	94.64	112.18	127.22	150.69	137.2	172.8
	FACE VELOCITY	m/s		2.49	2.49	2.49	2.49	2.48	2.48	2.5	2.5
	AIR PRESSURE DROP	Pa		129	193	128	192	128	192	129	194
WATER SIDE	WATER FLOW	l/s total		5.37	6.633	6.307	7.86	8.476	10.6	8.7	12.14
	ENTERING WATER	° C		7	7	7	7	7	7	7	7
	LEAVING WATER	° C		12	12	12	12	12	12	12	12
	TUBE VELCITY	m/s		1.67	1.37	1.96	1.63	1.96	1.63	0.98	1.82
	WATER PRESSURE DROP	kPa		34.7	24.4	52.8	37.8	52.6	37.7	7.9	50.2
BLOWER											
TYPE/DRIVE				DIDW / BELT DRIVEN							
BLOWER MATERIAL				ZINC COATED STEEL							
BLOWER DIAMETER			mm (in)	500 (19.68)		560 (22.05)		710 (27.95)		710 (27.95)	
BLOWER LENGTH			mm (in)	500 (19.68)		560 (22.05)		710 (27.95)		710 (27.95)	
AIR FLOW			l/s (CFM)	5400(11441)		6250 (13243)		8400 (17800)		9600 (20341)	
BLOWER MOTOR											
TYPE				SQUIRREL CAGE INDUCTION							
POWER SUPPLY			V / Ph / Hz	415 / 3 / 50							
RATED RUNNING CURRENT (AT 415V)			A	21.06		21.06		21.06		27.47	
RATED OUTPUT POWER (Max.)			kW	11		11		11		15	
MOTOR POLES				4 POLES							
Filter Quantity											
Type	Washable R29		24*24*2	-		6		9		9	
			20*24*2	-		-		-		3	
			12*24*2	-		2		3		-	
			20*25*2	6		-		-		-	
			16*25*2	2		-		-		-	

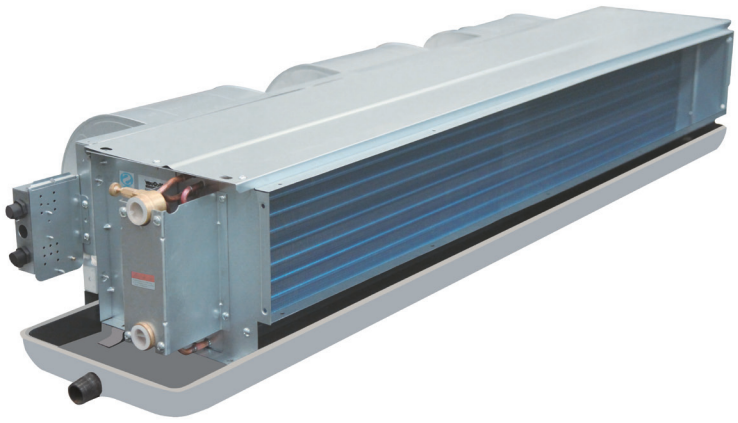
Note:
1. The specifications above are subject to change without any notice for future improvement.
2. Specification are calculated based on 0m altitude condition, altitude change will affect the unit performance.

J&E Hall Refrigeration Sdn. Bhd. (34543-W))
(Formerly Known As O.Y.L. Appliances Sdn. Bhd.)
A Member of the Hong Leong Group Malaysia
Lot 10, Jalan Perusahaan 8, Kawasan Perusahaan Pekan Banting, 42700 Banting, Selangor Darul Ehsan, Malaysia.
Tel : 603-3187 2911 Fax : 603-3187 8597

Ceiling Concealed Chilled Water Fan Coil Unit

Models: MCW200 MCW300 MCW400 MCW500
MCW600 MCW700 MCW800 MCW1000
MCW1200 MCW1400

Air Flow: 340-2380m^3/h



McQuay® Air Conditioning

Engineered for flexibility and performance.™

Literature No.: TM-MCW-V-1310A
Supersedes:
Part No.: M08039130028

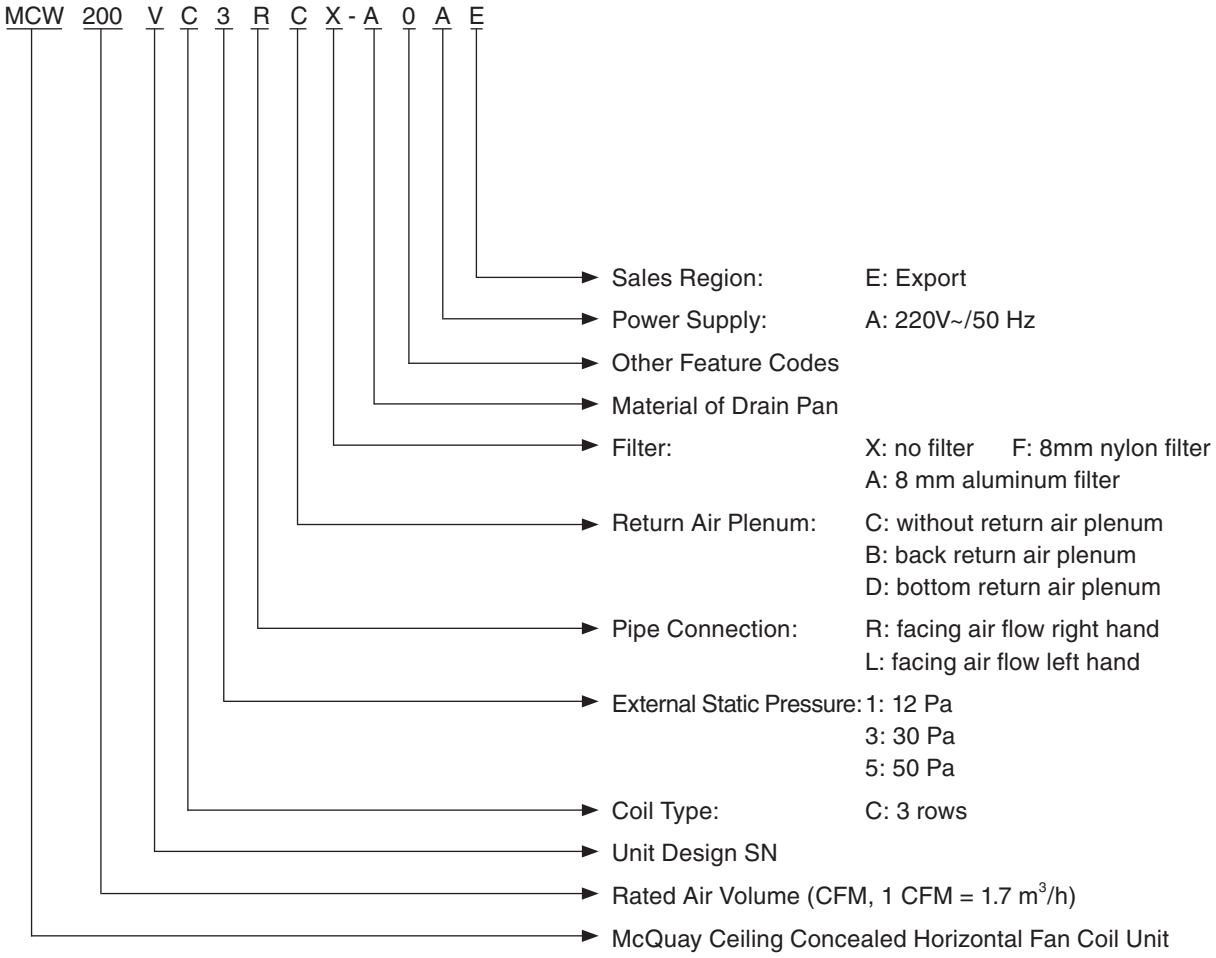
Contents

NOTE: Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment.

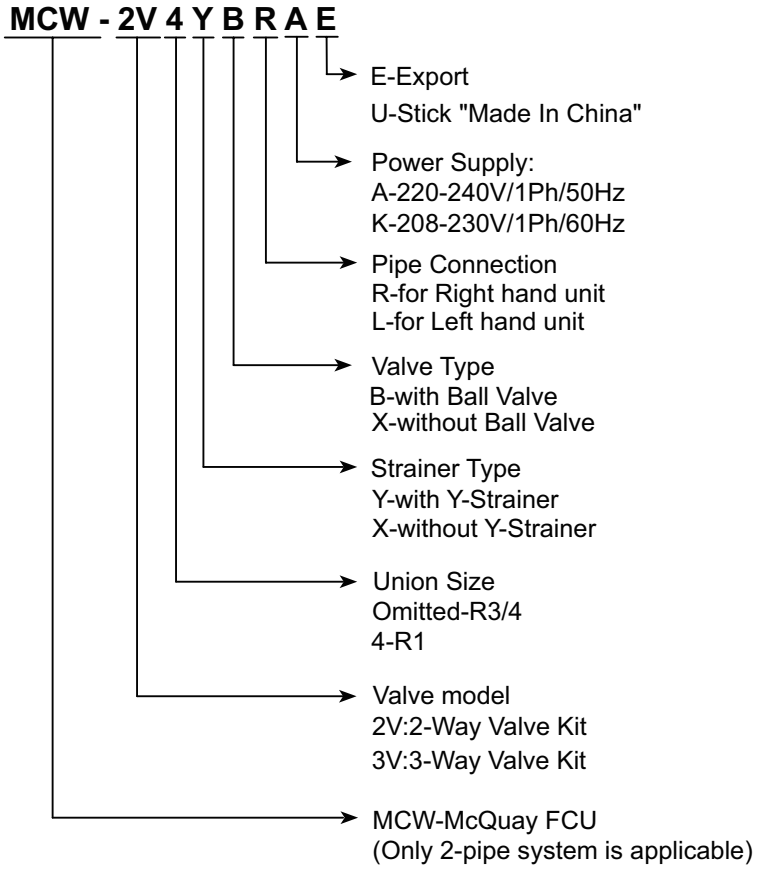
Caution: Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

Warning: Moving machinery and electrical power hazard. May cause severe personal injury or death. Disconnect and lock off power before servicing equipment.

Nomenclature



Valve Nomenclature



Features

Compact

- Light-weighted, good-looking appearance, and compact and solid structure.
- 235 mm height, allowing installation on the ceiling with a limited space.

Low-noise

- Low-noise motor for driving the low speed fan with a wide impeller; strictly tested before delivery.
- Precise distance between the impeller inlet/outlet and the heat exchanger for more reasonable air flow distribution.
- Highly efficient sound-absorbing and heat-preserving materials inside to minimize noises produced by the unit.

Reliable

- Single-phase capacitor motor with the protection grade IP20 and insulation grade B to ensure operation safety.
- Permanently lubricated and sealed ball bearing with high precision, which is provided by internationally famous brands and receives processing including hardening and tempering as well as chroming.
- Motor power outlet wires protected by metal hoses to ensure its durability.
- Working pressure up to 1.6 MPa and test pressure up to 2.0 MPa for the heat exchanger to endure high pressures and prevent leakage.

High Efficiency

- Heat exchanger with the high-quality mechanically expanded copper pipe and hydrophilic aluminum fins to ensure high efficiency.
- Intensified air supply using a large air flow fan with a wide impeller to maximize the heat transfer performance.
- Precise matching of the fan and motor to guarantee the maximum cooling capacity but a low power input.

Flexible

- Multiple external static pressures designed based on the unit's cooling capacity, meeting the air supply requirements at different distances.
- Optional bottom return air plenum or back return air plenum with support for onsite changes, featuring time saving.
- Variable accessories for more options.

Anti-leakage

- Delicate condensate-proof drain pan made of the cold-rolled steel through one-time impact molding, with coating on both sides and high-quality heat-preserving materials on the exterior.
- Unique independent mounting bracket without soldering seams or joints, requiring no bolts for fixing to prevent damages to the drain pan heat-preserving layer or cold bridges.
- Tilt structure for rapid condensate water drainage.

Specifications

General Data

MCW-VC												
MODEL			MCW200VC	MCW300VC	MCW400VC	MCW500VC	MCW600VC	MCW700VC	MCW800VC	MCW1000VC	MCW1200VC	MCW1400VC
Air Flow	HIGH	m^3/h	340	510	680	850	1020	1170	1360	1700	2040	2380
		CFM	200	300	400	500	600	688	800	1000	1200	1400
	MEDIUM	m^3/h	279	418	558	697	836	564	1115	1394	1673	1952
		CFM	164	246	328	410	492	332	656	820	984	1148
	LOW	m^3/h	170	255	340	425	510	282	680	850	1020	1190
		CFM	100	150	200	250	300	166	400	500	600	700
EXTERNAL STATIC PRESSURE		Pa/in.wg	12,30,50/0.05,0.12,0.20									
TOTAL COOLING CAPACITY		W	2220	3300	4260	5050	5820	6600	8200	9300	11190	13000
		Btu/h	7575	11260	14536	17231	19859	22520	27980	31733	38182	44358
SENSIBLE COOLING CAPACITY		W	1380	2220	2770	3400	4000	4550	5500	6500	7700	9200
		Btu/h	4709	7575	9452	11601	13649	15525	18767	22179	26273	31392
TOTAL HEATING CAPACITY		W	3500	5330	6800	8400	9600	11100	13500	15800	18300	21500
		Btu/h	11942	18187	23203	28662	32757	37875	46064	53912	62442	73361
WATER FLOW RATE		m^3/h	0.37	0.58	0.72	0.88	1.02	1.14	1.41	1.67	1.95	2.29
		USGPM	1.6	2.6	3.2	3.9	4.5	5.0	6.2	7.4	8.6	10.1
HEAD LOSS (COOLING)		Pa	25	21	33	32	32	35	32	40	40	47
		in.wg.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
UNIT WEIGHT (WITHOUT PLENUM)		kg	10.3	12.4	12.8	15.1	16.7	17.6	25.2	28.6	31.0	33.5
		lb	22.7	27.3	28.2	33.3	36.8	38.8	55.6	63.1	68.3	73.9
UNIT GROSS WEIGHT (Without plenum)		kg	12.4	14.7	15.3	17.8	19.4	20.4	28.9	32.4	35.4	38.5
		lb	27.3	32.4	33.7	39.2	42.8	45.0	63.7	71.4	78.0	84.9
DIMENSIONS	Without Return Air Plenum	mm	625×465×235	815×465×235	865×465×235	945×465×235	1045×465×235	1095×465×235	1425×465×235	1475×465×235	1675×465×235	1825×465×235
	With Back Return Air Plenum	mm	625×516×235	815×516×235	865×516×235	945×516×235	1045×516×235	1095×516×235	1425×516×235	1475×516×235	1675×516×235	1825×516×235
	With Bottom Return Air Plenum	mm	625×497×235	815×497×235	865×497×235	945×497×235	1045×497×235	1095×497×235	1425×497×235	1475×497×235	1675×497×235	1825×497×235
UNIT WEIGHT (With plenum)		kg	13.2	16.0	16.7	19.3	21.2	22.4	31.3	34.8	38.0	41.5
		lb	29.1	35.3	36.8	42.5	46.7	49.4	69.0	76.7	83.8	91.5
UNIT GROSS WEIGHT (With plenum)		kg	15.3	18.3	19.2	22.0	23.9	25.2	35.0	38.6	42.4	46.5
		lb	33.7	40.3	42.3	48.5	52.7	55.6	77.2	85.1	93.5	102.5
CONDENSATE DRAIN SIZE		R3/4										

NOTES:

1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.

2) ALL THE UNITS ARE BEING TESTED UNDER FOLLOWING CONTITION:

- *COOLING-27°C DB/19.5°C WB INDOOR AND WATER INLET 7°C OUTLET 12°C*
- *HEATING-21°C DB INDOOR AND WATER 60°C INLET.WATER FLOW:WAME WITH COOLING CONDITION.*

3) SOUND PRESSURE LEVEL ARE ACCORDING TO MICROPHONE POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND

Components Data

MCW-VC													
				MCW200VC	MCW300VC	MCW400VC	MCW500VC	MCW600VC	MCW700VC	MCW800VC	MCW1000VC	MCW1200VC	MCW1400VC
FAN	TYPE			GALVANIZED STEEL DOUBLE STAGE IMPELLER CENTRIFUGAL (BLADE: FORWARD)									
	QUANTITY			1	2	2	2	2	2	3	3	4	4
	MATERIAL			GALVANIZED STEEL									
	DRIVE			DIRECT DRIVE									
	DIAMETER		mm	150									
			in	5.904									
	LENGTH		mm	150/200/240									
			in	5.91/7.87/9.45									
MOTOR	TYPE			SINGLE PHAZE BALL BEARING CAPACITOR RUNNING									
	QUANTITY			1	1	1	1	1	1	2	2	2	2
	IP/INSULATION GRADE			IP20/B									
COIL	TUBE	MATERIAL		COPPER									
		DIAMETER	mm	7									
			in	0.28									
		THICKNESS	mm	0.25									
			in	0.01									
	FIN	MATERIAL		HYDROPHILIC ALUMINUM									
		THICKNESS	mm	0.11									
			in	0.0043									
		FACE AREA	m^2	0.08	0.12	0.13	0.15	0.17	0.18	0.25	0.26	0.30	0.34
			ft^2	0.86	1.29	1.40	1.61	1.83	1.94	2.69	2.80	3.23	3.66
		ROW		3									
		FIN PER INCH		17									
AIR FILTER (Option)	TYPE			NYLON/ALUMINIUM FRAME									
	SIZE	LENGTH	mm	438	628	678	758	858	908	1238	1288	1488	1638
			in	17.24	24.72	26.69	29.83	33.77	35.74	48.73	50.70	58.57	64.47
		WIDTH	mm	196									
			in	7.71									
		THICKNESS	mm	8									
			in	0.31									

NOTES:
ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.

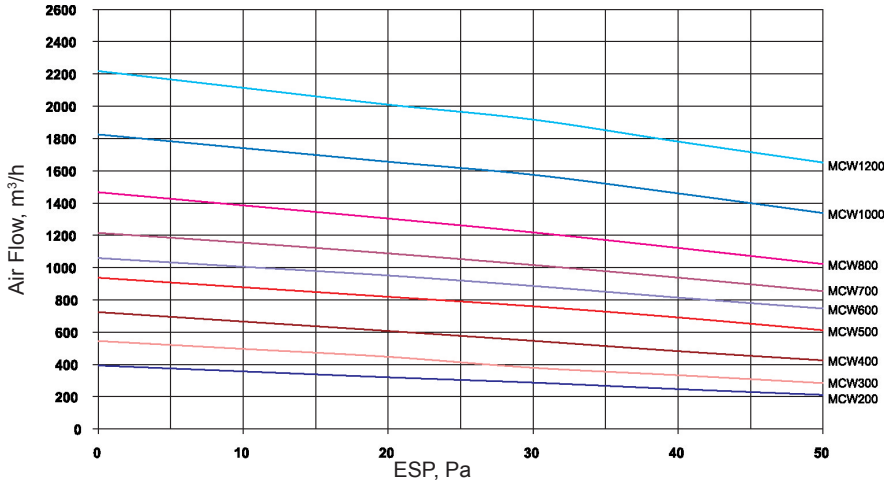
Sound Data

MCW-VC												
Model			MCW200VC	MCW300VC	MCW400VC	MCW500VC	MCW600VC	MCW700VC	MCW800VC	MCW1000VC	MCW1200VC	MCW1400VC
Sound Pressure Level (ESP: 12Pa)	High	dBA	33.9	33.2	40.0	40.3	44.4	45.2	43.9	47.9	48.0	51.0
	Middle	dBA	29.3	28.8	35.5	36.3	39	40.3	38.6	43.6	44.3	47.5
	Low	dBA	20.1	24.2	24.0	25.6	29.8	27.9	27.4	32.6	33.4	38.0
Sound Pressure Level (ESP: 30 Pa)	High	dBA	37.3	37.6	41.6	44.3	46.5	46.6	46.2	49.3	50.9	52.0
	Middle	dBA	32.5	32.5	36.5	39.5	41.1	41.8	41.3	44.9	45.7	46.0
	Low	dBA	20.9	22.8	25.8	27.3	27.3	29.4	30.6	36.4	34.7	35.5
Sound Pressure Level (ESP: 50 Pa)	High	dBA	41.2	42.2	44.4	46.4	47.5	47.5	48.3	50.6	51.8	53.5
	Middle	dBA	37.3	35.8	40.5	42.7	43.9	43.6	43.7	46.4	47.1	49.0
	Low	dBA	26.1	25.8	32.3	31.3	33.9	37.3	31.8	37.6	41.7	41.0

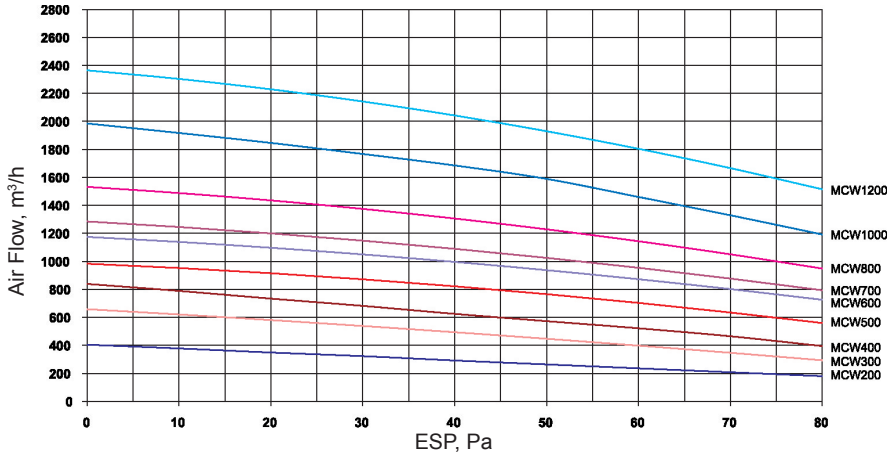
NOTES:
1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.
2) SOUND PRESSURE LEVEL ARE ACCORDING TO MICROPHONE POSITION OF THE MEASUREMENT POINT IS 1m IN FRONT AND 1m BELOW THE UNIT.

Air Flow vs ESP Curve

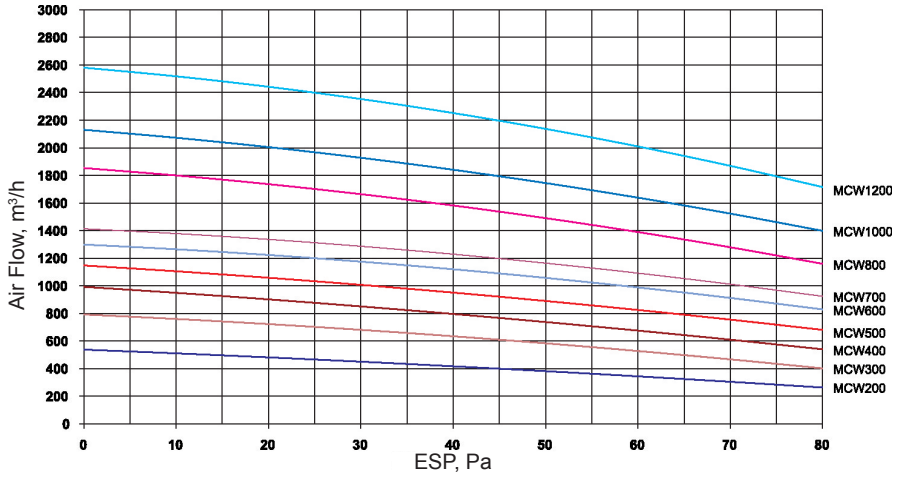
ESP, 12Pa



ESP, 30Pa



ESP, 50Pa

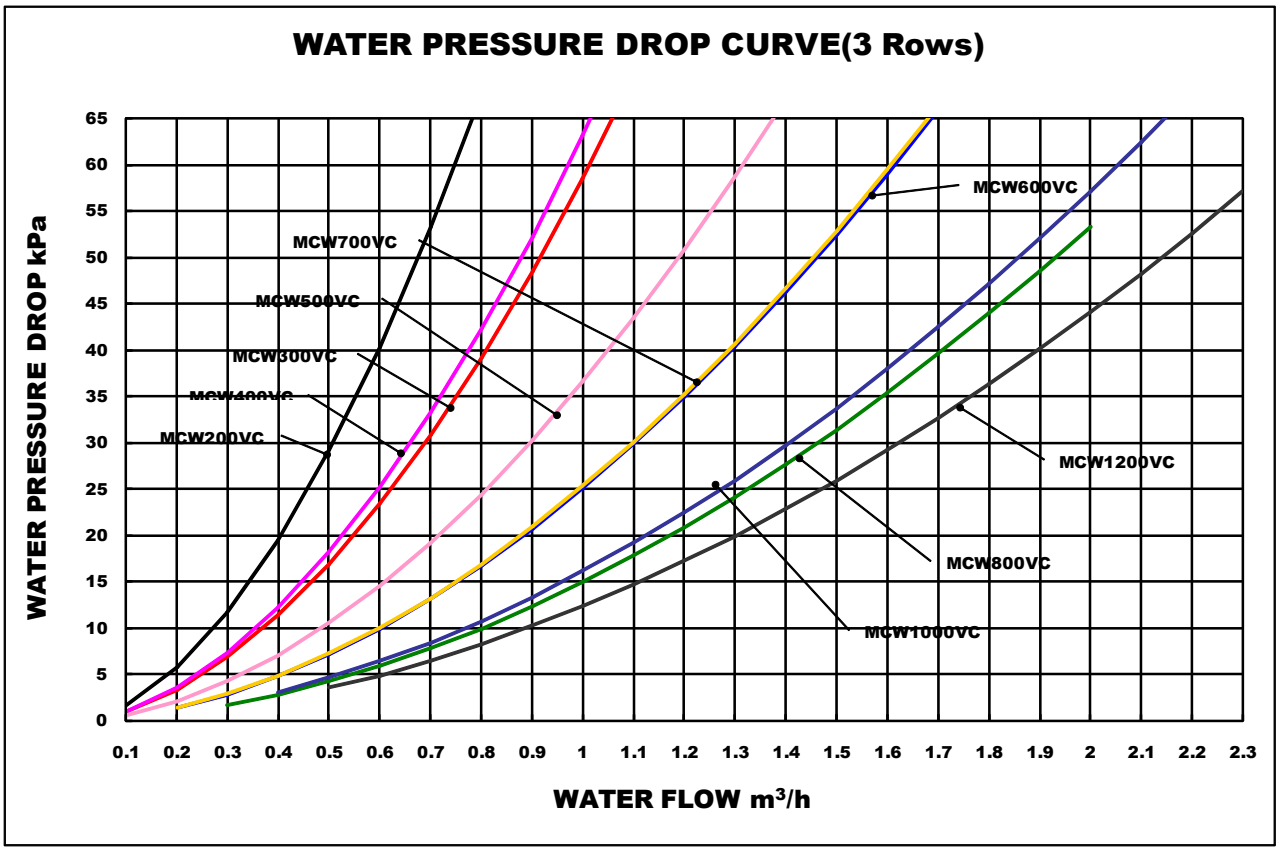


Operating Limits

Operating Limits	MCW-V
Water Circuit	
Max. Water side pressure	1.6MPa
Min. Entering water temperature	3ºC (cooling)
Power supply	
Operating voltage limits	±10% Volt
Operating frequency limits	±2Hz

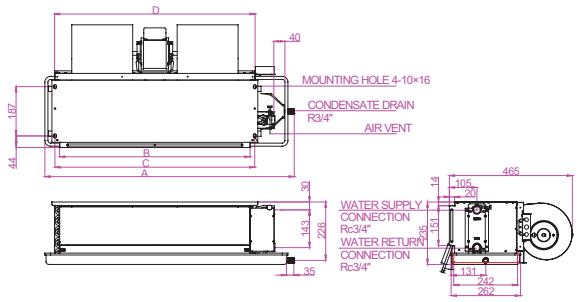
Water Flow Rate/Pressure Drop Chart

MCW-VC



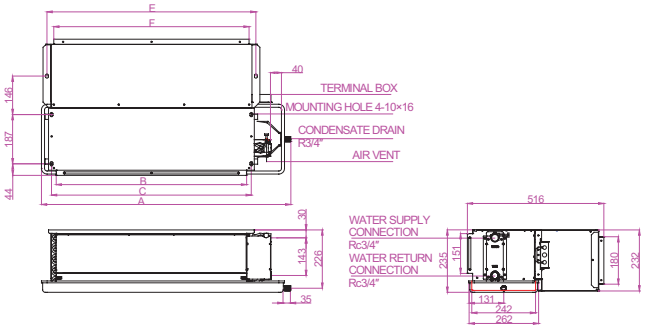
Outlines and Dimensions

WITHOUT PLENUM



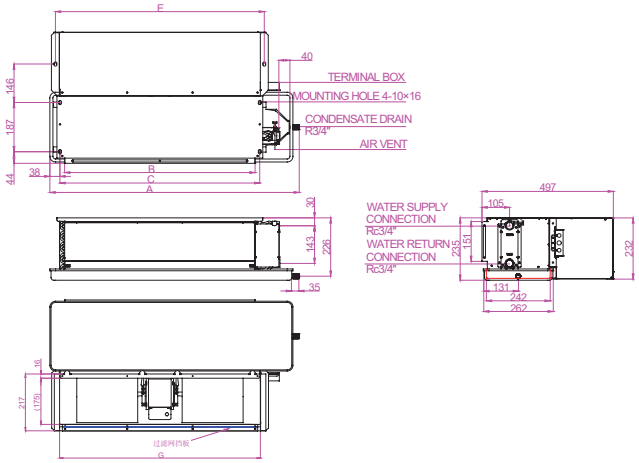
Model	A		B	C	D	Number Of Fans
	Standard Drain Pan	Long Drain Pan				
MCW200V	625	725	402	437	440	1
MCW300V	815	915	592	627	630	2
MCW400V	865	965	642	677	680	2
MCW500V	945	1045	722	757	760	2
MCW600V	1045	1145	822	857	860	2
MCW700V	1095	1195	872	907	910	2
MCW800V	1425	1525	1202	1237	1240	2
MCW1000V	1475	1575	1252	1287	1290	3
MCW1200V	1675	1775	1452	1487	1490	4
MCW1400V	1825	1925	1602	1637	1640	4

WITH BACK PLENUM



Model	A		B	C	D	E	F	Number Of Fans
	Standard Drain Pan	Long Drain Pan						
MCW200V	625	725	402	437	440	472	420	1
MCW300V	815	915	592	627	630	662	610	2
MCW400V	865	965	642	677	680	712	660	2
MCW500V	945	1045	722	757	760	792	740	2
MCW600V	1045	1145	822	857	860	892	840	2
MCW700V	1095	1195	872	907	910	942	890	2
MCW800V	1425	1525	1202	1237	1240	1272	1220	2
MCW1000V	1475	1575	1252	1287	1290	1322	1270	3
MCW1200V	1675	1775	1452	1487	1490	1522	1470	4
MCW1400V	1825	1925	1602	1637	1640	1672	1620	4

WITH BOTTOM PLENUM



Model	A		B	C	D	E	G	Number Of Fans
	Standard Drain Pan	Long Drain Pan						
MCW200V	625	725	402	437	440	472	441	1
MCW300V	815	915	592	627	630	662	581	2
MCW400V	865	965	642	677	680	712	681	2
MCW500V	945	1045	722	757	760	792	761	2
MCW600V	1045	1145	822	857	860	892	861	2
MCW700V	1095	1195	872	907	910	942	911	2
MCW800V	1425	1525	1202	1237	1240	1272	1241	2
MCW1000V	1475	1575	1252	1287	1290	1322	1291	3
MCW1200V	1675	1775	1452	1487	1490	1522	1491	4
MCW1400V	1825	1925	1602	1637	1640	1672	1641	4

Electrical Data

MCW-VC

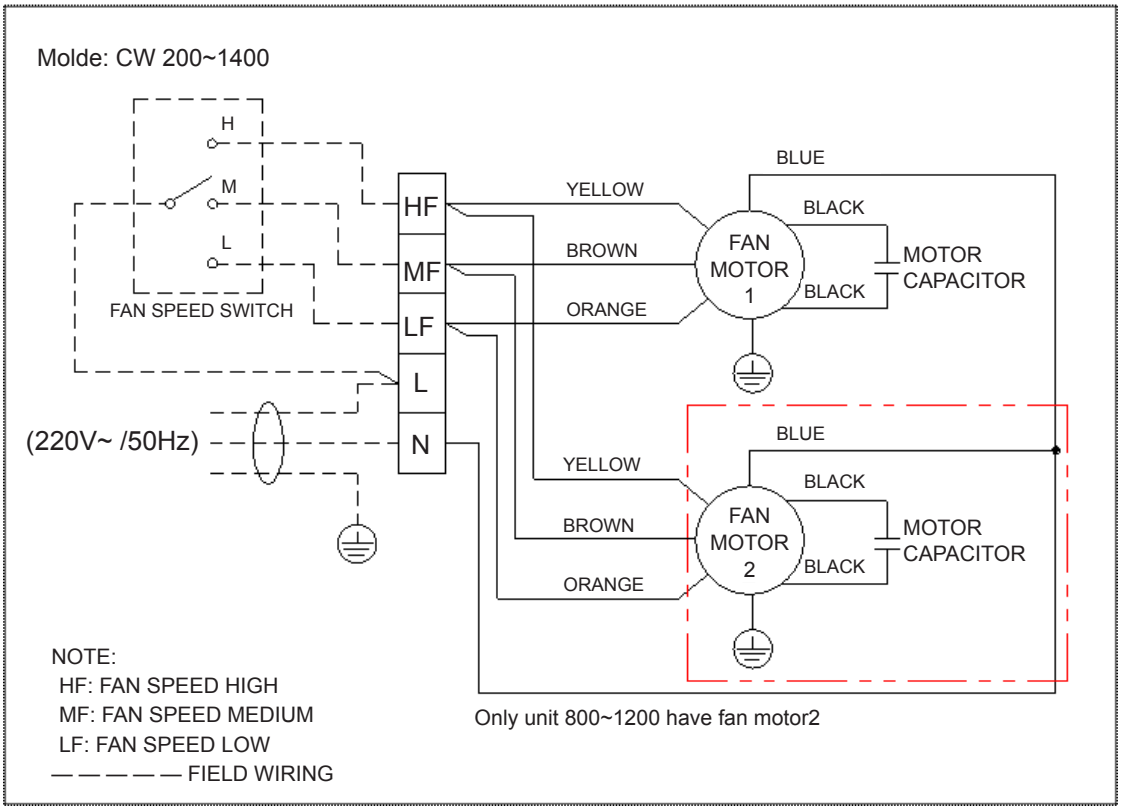
MODEL			MCW200VC	MCW300VC	MCW400VC	MCW500VC	MCW600VC	MCW700VC	MCW800VC	MCW1000VC	MCW1200VC	MCW1400VC
12Pa MOTOR	INSULATION GRADE		B									
	POWER SOURCE	V/Ph/Hz	220~/1/50									
	RATED INPUT POWER	W	32	43	56	73	93	113	133	152	188	228
	RATED RUNNING CURRENT	A	0.15	0.20	0.26	0.34	0.43	0.52	0.61	0.70	0.86	1.12
	POLES		4P									
30Pa MOTOR	INSULATION GRADE		B									
	POWER SOURCE	V/Ph/Hz	220~/1/50									
	RATED INPUT POWER	W	39	53	72	83	107	122	142	174	217	250
	RATED RUNNING CURRENT	A	0.18	0.24	0.33	0.38	0.49	0.56	0.65	0.80	1.00	1.19
	POLES		4P									
50Pa MOTOR	INSULATION GRADE		B									
	POWER SOURCE	V/Ph/Hz	220~/1/50									
	RATED INPUT POWER	W	46	62	80	95	112	131	168	200	237	290
	RATED RUNNING CURRENT	A	0.21	0.28	0.37	0.44	0.51	0.60	0.77	0.92	1.09	1.45
	POLES		4P									

NOTES:

1) ALL SPECIFICATIONS ARE SUBJECTED TO CHANGE BY THE MANUFACTURER WITHOUT PRIOR NOTICE.

2) ALL ELECTRIC DATA ARE BEING TESTED UNDER HIGH SPEED.

Wiring Diagrams



Installation

Receiving

All units leaving the McQuay plant have been inspected to ensure the shipment of high quality products and reasonable means are utilized to properly pack the fan coil units to protect them in transit.

Carefully inspect all shipments immediately upon delivery. When damage is visible, note this fact on the carrier's freight bill and request that the carrier sends a representative to inspect the damage. This may be done by telephone or in person, but should always be confirmed in writing.

The shipment should be unpacked in the presence of the agent so that the damage or loss can be determined.

The carrier's agent will make an inspection report and a copy will be given to the consignee for forwarding to the carrier with a formal claim.

Location

Before installation, please check the following:

There must be enough space for unit installation and maintenance. Please refer to the unit's drawings and dimensions and fig.1 for the minimum distance between the unit and obstacle.

Please ensure enough space for piping connection and electrical wiring.

Please make sure that the hanging rods can support weight of the unit.

Installation

The unit is designed for concealed ceiling installation.

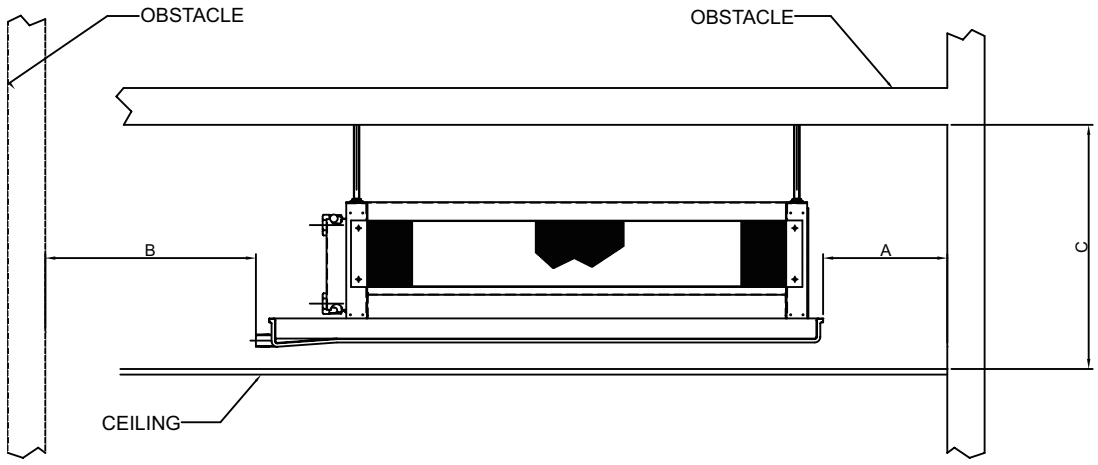
There are holes on the top of the unit for hanging. Please refer to Fig.1.Fig.2 and Fig.3.

Make sure that the top of the unit is level.

Insulation

1) Use proper insulation material only
2) Chilled water pipes and all parts on the pipes should be insulated
3) It is also necessary to insulated air ducted
4) Adhesive for insulation should work under range 0˚F(-18˚C) to 200˚F(93.3˚C).

Fig.1



A≥200mm B≥400mm C≥265mm

Fig.2 WITH AND WITHOUT PLENUM FORM:

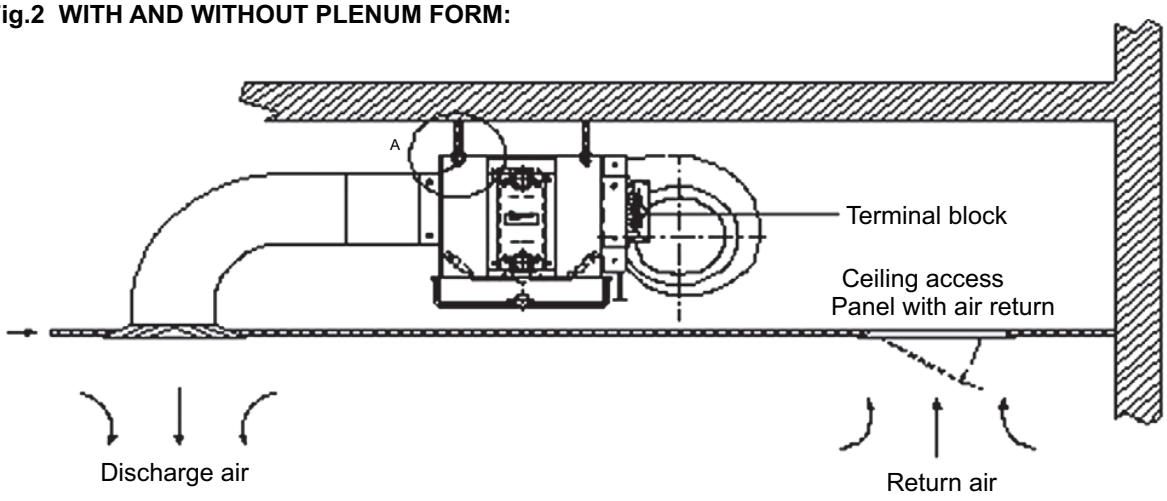
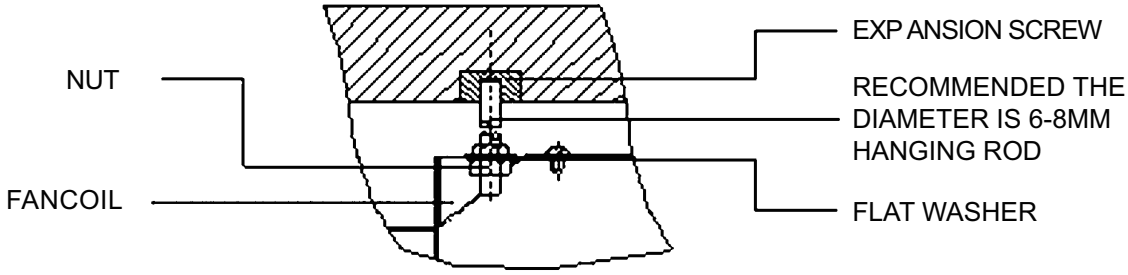


Fig.3 DETAIL A:



Air Duct Connection

Circulatory air pressure drop should be within External Static Pressure
Galvanized steel air ducts are suitable
Make sure there is no leak of air.
Air duct should be fireproof, refer to concerned country national and local regulations.

Pipe Connection

Using suitable fittings as water pipe connections. Refer to the specification
The water inlet is on the bottom while outlet on top.
The connection must be concealed with rubberized fabric to avoid leakage.
Drainpipe can be PVC or steel.
The suggested slope of the drainpipe is at least 1:50.

Wiring

1) Wiring connection must be done according to the wiring diagram on the unit.
2) The unit must be GROUNDED well.
3) An appropriate strain relief device must be used to attach the power wires to the terminal box.
4) A 7/8” knockout hole is designed on the terminal box for field installation of the strain relief device.
5) Field wiring must be complied with the national security regulations.

Valve Kit

The valve kit is applied for 2-pipe system.

The kit consists of (refer structure figure 0):

- **2/3 way valve body** is made of brass, maximum working pressure 1.6MPa.
- **Electric actuator** has the following specifications:

  -Power supply: 220V±10%/50/60Hz (±2Hz)

  -Activation: ON/OFF
- **Hydraulic kit** for the installation of the valve on the heat exchanger, complete with 2 ball valves for adjusting the water flow and for closing the water circuit when perform maintenance to the unit.
- **Y-strainer** protects unit from impurity, increases the service life and insolating valves.

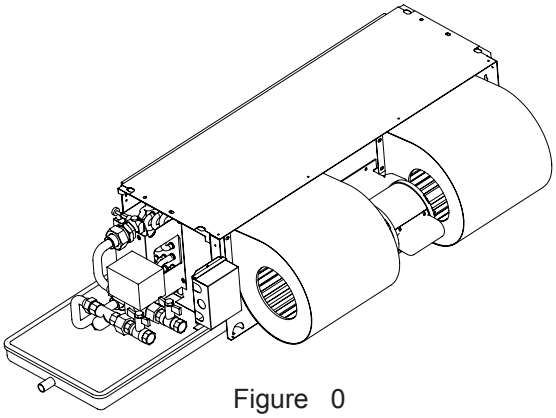


Figure 0

All parts of 2-way valve kit are indicated in the figure 1. (For right pipe connection unit.)

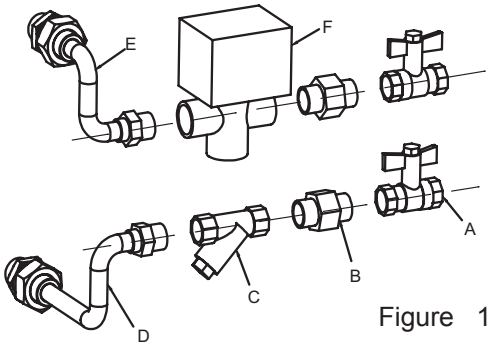


Figure 1

A Ball valve
B Brass connector
C Y-strainer
D Water inlet pipe
E Water outlet pipe
F 2-way valve

All parts of 3-way valve kit are indicated in the figure 2. (For right pipe connection unit.)

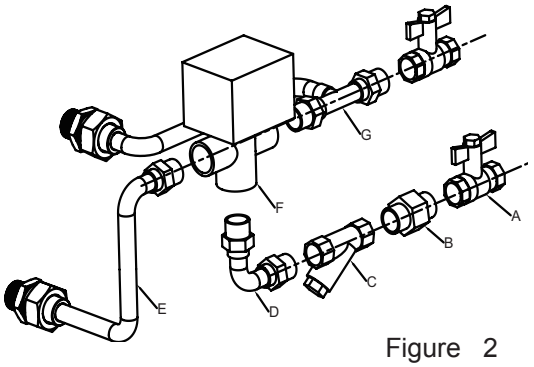


Figure 2

A Ball valve
B Brass connector
C Y-strainer
D Connector pipe
E Water inlet pipe
F 3-way valve
G Water outlet pipe

Installation

1. Install the 2-way valve kit as indicated in the pictures of figure 3. (For right pipe connection unit.) As shown as detail A, firstly take apart connector, then install ① to unit with necessary sealing material . Fix ② between ① and ③. At last tighten ③, make sure all of connectors are sealed.
2. Install the 3-way valve kit as indicated in the pictures of figure 4. (For right pipe connection unit.) Detail is as same as 2-way valve unit.

⚠ The valve kit has been pre-assembled for easy installation.

- Where needed the connections are pre-coated with sealing material.
- The connections are not tightened for easy adjustment.
- After determining the final position of the valve kit, tighten all connections to obtain water tightness.

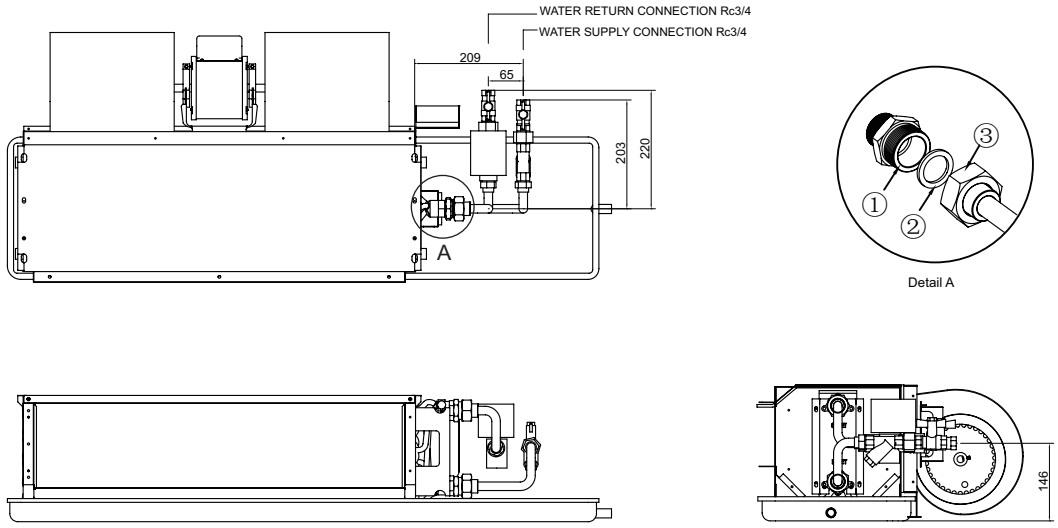
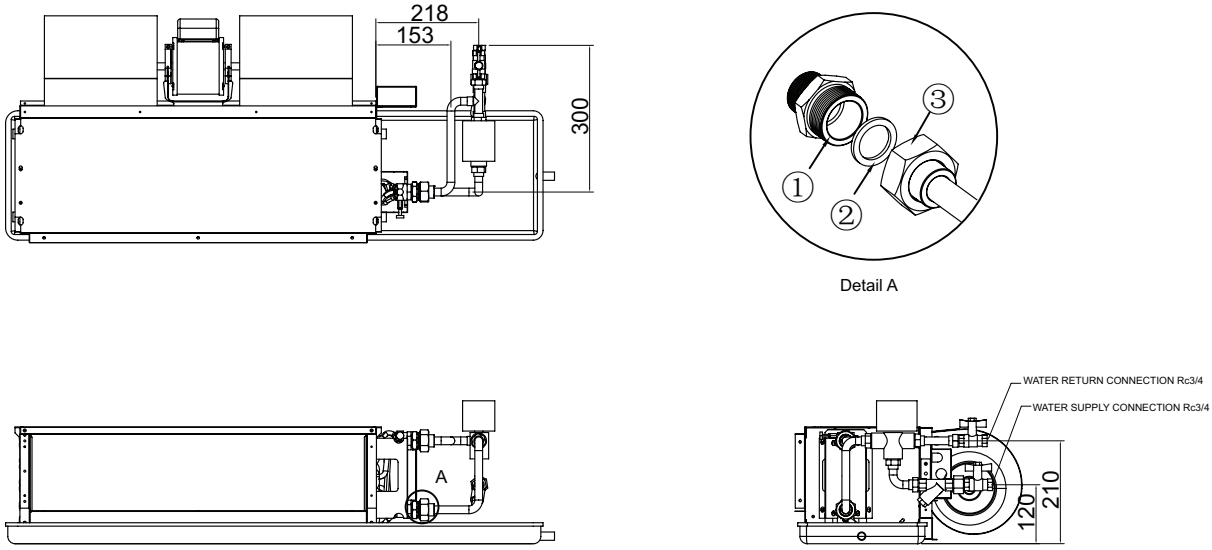


Figure 3 2-Way Valve



Insulation

1. The insulation design and materials should be complying with local and national codes and regulations.
2. Chilled water pipes and all parts on the pipes should be insulated.

The flow resistance of the connecting valve/hydraulic kit assembly is obtained from the following formula:

$\triangle P_W = (Q_W/100K_v)^2$

P_W is the flow resistance (Pa)

Q_W is the water flow rate (m^3/h)

K_v is the flow rate identified in the table

Valve Model	DN	Conncetion Type	Valve Type	KV	Shut-off Pressure Difference (MPa)
MC-FCV3335G	20	Rc3/4"	3-way Valve	3.4	0.18
MC-FCV2334G	20	Rc3/4"	2-way Valve	3.0	0.18

Pipe Connection

1. Using suitable fittings as water pipe connections with reference to the outline and dimensions.
2. The water inlet is on the bottom while outlet on top.
3. The connection must be concealed with rubberized fabric to avoid leakage.
4. Tightening torque should not be too high when connecting water pipes, in order to avoid brass deformation or water-leakage by torsion split.

Wiring

1. Refer to the wiring diagram of the appropriate controller.
2. For connection with the McQuay controller, position the water temperature probe into the appropriate position. Refer to the dedicated controller installation and operation manual.

McQuay International

ISO 9001
Certificate No.: 9601019

BS-OHSAS 18001
Certificate No.: 7644

ISO 14001
Certificate No.: EMS 80362

CNAS L0778

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