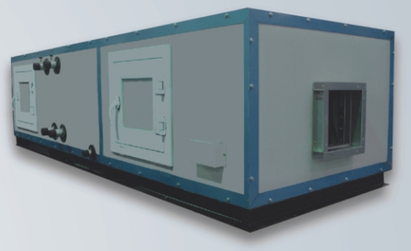
ZKT Series Air Handling Units



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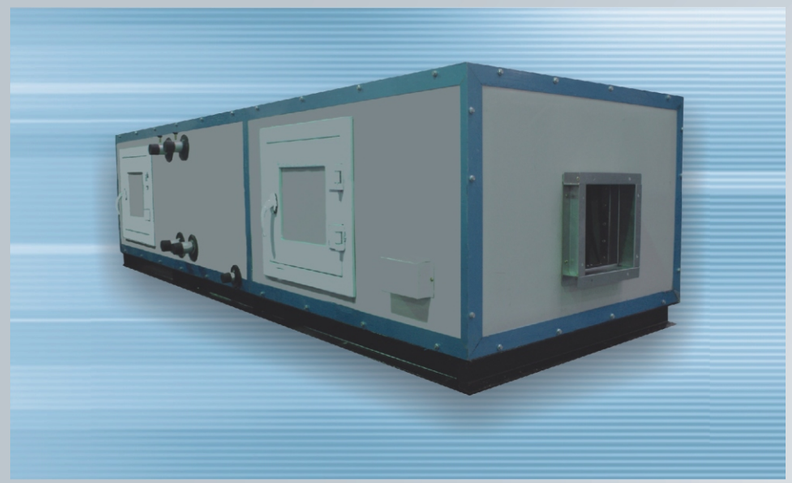

>> ZKT Series Air Handling Units

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Modular Design

INTRODUCTION

Dunnair **MBD Series Modular Air Handling Units** are robust structured double skin units engineered to meet special requirements through the application of Modules for the various design space conditions required.

MBD Air Handling Units are based on design flexibility with different Modular Sections available:

- Fan Section
- Cooling Coil Section
- Heating Coil Section
- Mixing Section
- Heat Reclaim Section
- Humidifier Section
- Spraying Section
- Noise Elimination Section
- Filter Sections

Coils, fans, fan motors and filters are packaged within the unit's modules.

Installation versatility and performance efficiency, make the MBD Air Handling units an ideal solution for a multitude of installation applications.

Catalogue

- Index ..... Page 1
- Introduction ..... Page 1
- Nomination & Pipe Location ..... Page 2
- Features ..... Page 2 - 3
- Air Flow Chart ..... Page 4
- Dimension of Modular Airhandling Sections ..... Page 5 - 6
- Dimension Notes ..... Page 7
- Information on Modular Airhandling Sections ..... Page 7 - 8
- Filters Specification Table ..... Page 9
- Coil Cooling and Heating Information ..... Page 9
- Cooling Capacity Specifications for Fresh Air Conditions ..... Page 10
- Cooling Capacity Specifications for Return Air Conditions ..... Page 11
- Heating Capacity Specifications for Fresh Air Conditions ..... Page 12
- Heating Capacity Specifications for Return Air Conditions ..... Page 13
- Water Pipe Diameter ..... Page 14
- Humidifier Section ..... Page 15
- Noise Elimination Section / Heat Reclaim Section ..... Page 16
- Electrical Heating Section / Fan Section ..... Page 16
- Weight List of Fan, Motor and Driving Medium ..... Page 17
- Combination Choices of Modular Airhandling Units ..... Page 18
- Weight of Airhandling Unit Sections With 25mm & 35mm Panels ..... Page 19
- Weight of Airhandling Units Sections With 50mm Panel ..... Page 20
- Weight of Modular Airhandling Units（Components） ..... Page 21 - 22
- Installation ..... Page 23
- Wiring Diagram ..... Page 24 - 25
- Operation and Maintenance ..... Page 26

Nomination

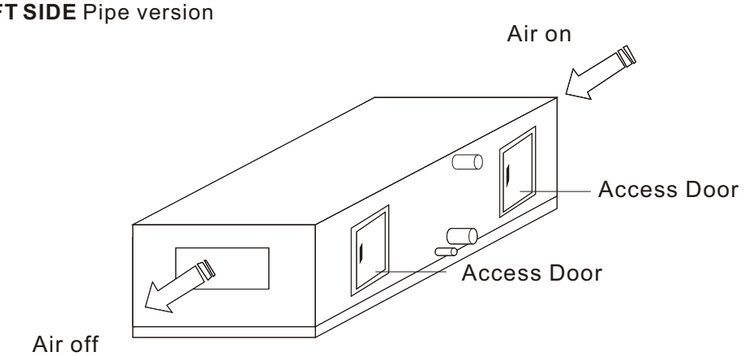
MBD 27 25 E L D

- D — Design number
- L — Take over the direction: L-Left R-Right
- E — Panel thicknessmm: E-25mm S-35mm W-50mm
- 25 — Unit within the frame high modulus (Height of within the box:Modulu*100)
- 27 — Unit width of the module within the frame (Width of within the box: Modulu*100)
- MBD — MBF Series Air Handling Units

Pipe Connection Location

Units are available with your choice of pipes on the Left side or Right side of the unit.

Unit below **is LEFT SIDE** Pipe version



Features

Patented Framework Structure Double Skin

Designed to prevent cold or heat leakage around the panel perimeter and to ensure a high level of thermal efficiency.

MBD series are designed as per the standard modulization specifications as listed in this manual. The width and height can be increased in proportion as per the modulus, to suit the requirements of width and height on site.

The internal metal casing is isolated from the outside metal casing by polyurethane foam and rubber sealing strips i.e. the panels are fixed directly with polyurethane expanding foam internally (density: 50Kg/m3)

The patented casing design has an overall structure that assures casing strength and durability as well as the prevention of cold or heat leakage around the perimeter to achieve a high level of thermal efficiency.

- Colour Bond Outer Panel
- Galvanised Steel Inner Panel
- 25mm Thick Polyurethane 35mm and 50mm also available.

Every Module has a sub pressure access door which opens outwards and a positive access door which opens inwards. This assures there is no cold bridge and air leakage of positive pressure and sub pressure sections.

To prevent panel surface scratches during transportation and installation, the external rust proof colour bond outer panel is covered by a protective film.

There are many types of Modules available; and each module can be combined quickly on site.

Rippled Fin Heat Exchanger / Red Copper Tubing

MBD Series Air Handling Units utilise red copper tubing, specially designed Fins and OAK Company (USA) Heat Exchanger for high efficiency heat transmission and low thermal contact resistance.

Dynamically Balanced Fans

Utilising our engineering software selection programs, low noise Fans are selected to ensure the fans effectively operate in accordance to the space and efficiency required in the given conditions. Centrifugal Forward, Centrifugal Backward and Wing type are available.

- Fan housing and fixings are galvanized. Anti-static belt drives are provided.
- The motor is totally enclosed; power is 415V/50Hz.
- The motor is installed on the side rail, enabling convenient belt adjustment.
- Fan and motor are located on the same base.
- The base is connected with casing through anti-vibration mounts.

The fan air outlet adopts flexible connections, to isolate the fan noise and vibration from the casing

Air Flow Chart

Model		Air Flow l/s								
		Coil Face Velocity m/s								
Width Module	Height Module	2	2.25	2.5	2.75	2.85	3	3.5	4	4.5
09	06	604	680	756	831	861	907	1058	1209	1360
12	06	871	980	1089	1198	1241	1307	1528	1743	1960
09	09	950	1069	1188	1306	1354	1425	1663	1900	2138
12	09	1369	1540	1711	1883	1951	2054	2396	2738	3080
15	09	1788	2012	2235	2459	2548	2682	3129	3576	4023
12	12	1991	2518	2489	2738	2838	2987	3485	3983	4481
15	12	2601	2926	3251	3576	3706	3901	4552	5202	5852
18	12	3211	3612	4013	4414	4575	4816	5619	6421	7224
21	12	3820	4298	4775	5253	5444	5730	6685	7640	8595
15	15	3414	3841	4267	4694	4865	5121	5974	6828	7681
18	15	3936	4741	5267	5794	6005	6321	7374	8428	9481
21	15	5014	5641	6268	6894	7145	7521	8774	10028	11281
24	15	5814	6541	7268	7994	8285	8721	10175	11628	13082
19	19	5547	6241	6934	7628	7905	8321	9708	11095	12482
21	19	6208	6983	7760	8536	8846	9312	10864	12416	13968
24	19	7198	8098	8998	9898	1026	10798	12597	14397	16196
27	19	8189	9213	10236	11260	11669	12283	14331	16378	18425
22	22	7795	8770	9744	10719	11108	11693	13642	15591	17539
24	22	8583	9656	10728	11801	12230	12874	15020	17165	19311
27	22	9764	10984	12205	13425	13913	14646	17087	19528	21968
30	22	10945	12313	13681	15049	15596	16417	19154	21890	24626

Dimensions of Modular Airhandling Sections

Model		Rated Air Flow l/s	Length mm						
Width Module	Height Module		Mixing Section / Air Discharge Section	Panel Filter Section	Bag Filter Section	Mini Pleated Filter Section	Air Mixing Section	Coil Section 2/4/6 rows	Coil Section 8 rows
09	06	756	600	100	500	400	1200	600	800
12	06	1089	600	100	500	400	1200	600	800
09	09	1188	600	100	500	400	1200	600	800
12	09	1711	600	100	500	400	1200	600	800
15	09	2235	600	100	500	400	1200	600	800
12	12	2489	600	100	500	400	1200	600	800
15	12	3251	600	100	500	400	1200	600	800
18	12	4013	800	100	500	400	1200	600	800
21	12	4775	800	100	500	400	1200	600	800
15	15	4267	800	100	500	400	1200	600	800
18	15	5267	800	100	500	400	1200	600	800
21	15	6268	800	100	500	400	1200	600	800
24	15	7268	800	100	500	400	1200	600	800
19	19	6934	800	100	500	400	1200	600	800
21	19	7760	800	100	500	400	1200	600	800
24	19	8998	800	100	500	400	1200	600	800
27	19	10236	800	100	500	400	1200	600	800
22	22	9744	1000	100	500	400	1500	600	800
24	22	10728	1000	100	500	400	1500	600	800
27	22	12205	1000	100	500	400	1500	600	800
30	22	13681	1000	100	500	400	1500	600	800

Dimensions of Modular Airhandling Sections

Model		Rated Air Flow l/s	Length mm					
Width Module	Height Module		Mixing Section / Air Discharge Section	Panel Filter Section	Bag Filter Section	Mini Pleated Filter Section	Fan Section (Fan model A)	Fan Section (Fan model B)
09	06	756	300	600	600	900	900(200)	1100(225)
12	06	1089	300	600	600	900	1100(225)	1100(250)
09	09	1188	300	600	600	900	1100(250)	1200(280)
12	09	1711	300	600	600	900	900(280)	900(315)
15	09	2235	300	600	600	900	900(315)	900(355)
12	12	2489	300	600	600	900	900(315)	1400(355)
15	12	3251	300	600	600	900	900(355)	1000(400)
18	12	4013	300	600	600	900	1000(400)	1100(450)
21	12	4775	300	600	600	900	1100(450)	1200(500)
15	15	4267	300	600	600	900	1700(450)	1800(500)
18	15	5267	300	600	600	900	1200(500)	2000(560)
21	15	6268	300	600	600	900	1200(500)	1300(560)
24	15	7268	300	600	600	900	1300(560)	1500(630)
19	19	6934	300	600	600	900	1300(560)	2300(630)
21	19	7760	300	600	600	900	2300(630)	2400(710)
24	19	8998	300	600	600	900	1500(630)	1700(710)
27	19	10236	300	600	600	900	1700(710)	1800(800)
22	22	9744	300	600	600	900	2400(710)	2600(800)
24	22	10728	300	600	600	900	1700(710)	2600(800)
27	22	12205	300	600	600	900	1800(800)	2100(900)
30	22	13681	300	600	600	900	1800(800)	2100(900)

DIMENSION NOTES:

For the Dimensional data listed on pages 7 and 8

for each Module Function Section.

MBD Series Air Handling Units utilize red copper tubing, specially designed Fins and OAK company (USA) Heat Exchanger for high efficiency heat transmission and low thermal contact resistance.

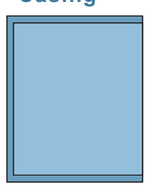
1. The dimensions of the **Mixing Section** and the **Air Discharge section** are standard.
2. Special requirements of air opening size and locations can be catered for.
3. The length of the **Humidifier Section** can be adjusted as per the actual humidifier requirements and humidifier methods.
4. No separate function section is required if the wet films are added after the coils. Another 600mm is needed if the wet film humidifiers are placed separately.
5. For access and maintenance, a **Blank Section** is essential before the **Filter Section**, **Coil Section**, **Heating Section** and **Noise Elimination Section**.
6. The length of the **Heat Reclaim Section** and the **Dehumidified Section** need to be designed as per the actual requirements.

   The length of the active Carbon Filter Section is 900mm.
7. The tables on page 7 and 8 are for reference only.

   The actual design of the modules can be adjusted to suit the project design/specification requirements.

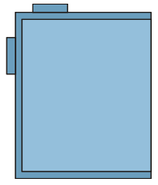
INFORMATION ON MODULAR AIRHANDLING SECTIONS

• Casing



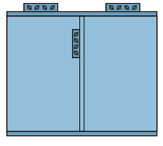
Includes colour bond outer panel and galvanized inner panel (stainless steel as option) with anti-fire polyurethane expanding foam.
Three options of panel thickness: 25mm、35mm、50mm.

• Mixing Section / Air Discharge Section



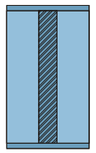
Fresh air and return air mixed fully in the space.
The locations and sizes of the fresh air inlet and the return air inlet, and also the length of mixing section can be specified as per specific requirements.
Fresh air dampers and return air dampers are available as options; to adjust the fresh air and return air.

• Air Mixing Section

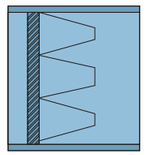


To control the percentage of fresh air, return air and air discharge through the air dampers; to enable maximum efficiency.

• Filter Section



The quality, resistance, mechanical property, anti-static property, hygroscopicity, frame resistance and filter efficiency; all meet the GB/T14295-93 standard.
The uniformity of the air flow rate on air entering cross-section is more than 80%.
The filters adopt a frame and access door/panel, for easy filter replacement.
—— Panel filter as pre-filter (bag filters as option)
—— Bag filter as medium-filter （Panel filters as option）
—— The HEPA is of mini-pleated type.



The active carbon filter is made from various carbon fibers, and is mainly used to clear away any pollutants such as peculiar odours, and gases, therefore ensuring clean air quality inside the room (IAQ)。
Regular filters need to be added next to the active carbon filter.

- **Self-clearing filter-cartridge HEPA** is mainly used in locations where dust can be an issue.
- With the increase of dust the filter-cartridge surface, when the differential pressure reaches the settings, the differential pressure controller transmits a signal to release the compressed air; to expel the dust in the filter-cartridge.

Filters Specification Table: Panel, Bag, Pleated

Unit Model		09 06	12 06	09 09	12 09	15 09	12 12	15 12	18 12	21 12	15 15	18 15
Filter Spec.	24"*24"				1			2	2	3	4	4
	12"*24"			1		2						2
	20"*24"	1	1	1	1	2		2	3	3		
	20"*20"		1				4		1			

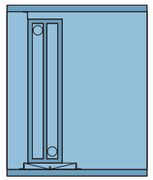
Unit Model		21 15	24 15	19 19	21 19	24 19	27 19	22 22	24 22	27 22	30 22	
Filter Spec.	24"*24"	6	6	9	9	9	12	9	9	12	12	
	12"*24"		2			3		6	6	4	7	
	20"*24"											
	20"*20?											

Panel Filter Sizes: 24"*24" = L592mm x W592mm.、12"*24" = L287mm x W592mm
20"*24" = L490mm x W592mm 20"*20"=L490mm x 490mm
Various panel thicknesses can be provided as per individual requirements.

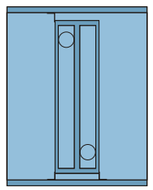
Bag Filter Sizes: 24"*24" =L,12"*24", 20"*24", 20"*20" the real sizes are（L*W*H, mm）：592*592, 287*592, 490*592.490*490
Different bag filters can be provided as per individual requirements.

Pleated Filter Sizes: whose nominal sizes are 24"*24",12"*24",20"*24",20"*20", the real sizes are（L*W*H,mm）：
592*592*292, 287*592*292, 490*592*292,490*490*292.

Cooling Section, Heating Section - Contact Resistance



Using red copper tubing, specially designed fins and OAK Company (USA) heat exchanger production equipment, the heat exchangers achieve high efficiency heat transmission and the lowest thermal contact resistance. There are 9-13 fins per inch. Seamless tubes are used. The drip tray is galvanized, with anti-flame insulation externally. Condensate water is discharged by a sloping drip tray.



Available as options:
-Copper fins and Hydrophilic fins
-Stainless steel coil end plate and drip tray.
-S/S tubes or copper tubes for water supply pipes and water return pipes.

The heating coil can be provided with a number of different options, these are as follows: steel tube with steel fins, stainless steel tubes with stainless steel fins, stainless steel tubes with aluminium fins, steel tubes with aluminium fins.

Cooling Capacity: FRESH AIR CONDITION

Model		Rated Air Flow l/s	Fresh Air Condition					
			4 Rows		6 Rows		8 Rows	
Width Module	Height Module		Sensible Cooling kW	Total Cooling kW	Sensible Cooling kW	Total Cooling kW	Sensible Cooling kW	Total Cooling kW
09	06	756	14.7	34.8	17.8	42.6	20.3	48.6
12	06	1089	21.1	49.9	26	62	29.5	70.6
09	09	1188	23.2	54.9	28.1	66.9	32	76.5
12	09	1711	33.2	78.5	40.8	97.5	46.4	104.9
15	09	2235	43	102.2	52.4	124.9	59.9	143.2
12	12	2489	48.4	114.2	59.4	141.8	67.5	161.4
15	12	3251	63	148.7	76.3	181.6	87.2	208.3
18	12	4013	79.9	190	96.6	230.8	109.5	261.7
21	12	4775	92.3	217.5	117	279.9	129.2	308.6
15	15	4267	82.7	195.1	100.1	238.4	114.5	273.4
18	15	5267	104.9	249.4	126.8	302.9	143.7	343.4
21	15	6268	121.1	285.5	153.6	367.4	169.6	405.1
24	15	7268	143.3	339.8	166.5	395.1	198.8	475.1
19	19	6934	131.7	308.7	168.1	401.7	185.8	443.7
21	19	7760	150	353.5	190.1	454.9	209.9	501.5
24	19	8998	177.4	420.7	206.2	489.1	246.2	588.2
27	19	10236	205	488	239.2	569.1	282.5	674.8
22	22	9744	189.7	448.1	232.7	557.4	258.8	618.8
24	22	10728	211.6	501.6	245.9	583.2	293.5	701.3
27	22	12205	244.4	581.8	285.2	678.6	336.8	804.6
30	22	13681	268.3	634.9	324.6	773.8	380	907.9

Note:
1. Chilled water entering /leaving temp. 7℃/12℃ .
2. Return air condition: Air on temp. 27℃ DB, 19.5℃ WB.
   Fresh air condition: air on temp. 35℃ DB, 28℃ WB.
3. The data above is for reference only. Once the air condition changes, the capacity would change accordingly.

Cooling Capacity: RETURN AIR CONDITION

Model		Rated Air Flow l/s	Return Air Condition					
			4 Rows		6 Rows		8 Rows	
Width Module	Height Module		Sensible Cooling kW	Total Cooling kW	Sensible Cooling kW	Total Cooling kW	Sensible Cooling kW	Total Cooling kW
09	06	756	11.1	14.9	13.8	20.5	15.4	23.9
12	06	1089	16.9	23.7	19.9	29.4	22.2	34.3
09	09	1188	18.2	24.6	21.8	32.3	24.3	37.6
12	09	1711	26.7	37.3	31.3	46.2	34.9	54.1
15	09	2235	35.8	51.3	41.9	63.0	45.6	70.3
12	12	2489	38.8	54.3	45.5	67.2	50.8	78.5
15	12	3251	52.1	74.6	61.0	91.6	66.3	102.3
18	12	4013	63.1	89.0	74.8	111.9	83.0	129.0
21	12	4775	76.4	109.2	90.4	136.2	97.2	150.0
15	15	4267	68.4	97.9	80.1	120.3	87.0	134.3
18	15	5267	82.8	116.8	98.3	146.9	109.0	169.3
21	15	6268	100.3	143.3	118.6	178.8	127.6	196.8
24	15	7268	114.7	162.2	134.5	200.1	149.6	231.9
19	19	6934	109.7	155.5	130.1	195.0	139.9	214.7
21	19	7760	124.1	177.5	146.9	221.4	158.0	246.7
24	19	8998	142.0	200.8	165.6	247.7	185.2	287.1
27	19	10236	163.6	233.7	191.8	287.3	212.4	330.4
22	22	9744	146.9	204.4	180.5	270.9	195.5	300.2
24	22	10728	169.3	239.4	198.6	295.4	220.8	342.3
27	22	12205	195.1	278.7	228.6	342.6	253.2	394.0
30	22	13681	212.0	295.2	258.7	389.7	280.8	434.6

Note:
1. Chilled water entering /leaving temp. 7℃/12℃.
2. Return air condition: Air on temp. 27℃ DB, 19.5℃ WB.
   Fresh air condition: air on temp. 35℃ DB, 28℃ WB.
3. The data above is for reference only. Once the air condition changes, the capacity would change accordingly.

Heating Capacity: FRESH AIR CONDITION

Model		Rated Air Flow l/s	Fresh Air Condition			
			1 Rows	2 Rows	3 Rows	4 Rows
Width Module	Height Module		Total Heating kW	Total Heating kW	Total Heating kW	Total Heating kW
09	06	756	11.3	21.9	27.7	34.4
12	06	1089	17.5	32.7	41.6	44.3
09	09	1188	17.9	34.5	43.6	54.1
12	09	1711	27.5	51.4	65.4	80.1
15	09	2235	37.2	68.3	87.2	103.7
12	12	2489	40	74.7	95.1	116.6
15	12	3251	54.2	99.4	126.9	159
18	12	4013	68.4	118.4	154.3	188.7
21	12	4775	76.3	143	186.1	223.1
15	15	4267	71.1	130.4	166.5	198
18	15	5267	89.7	155.5	202.5	247.7
21	15	6268	100.2	187.6	244.2	292.8
24	15	7268	118.7	212.9	286	342.5
19	19	6934	111.2	205.8	268	327.3
21	19	7760	124.1	232.3	302.4	362.5
24	19	8998	147	255.4	654.1	424.1
27	19	10236	170	294.9	398.6	485.7
22	22	9744	157	277.3	364.1	439.8
24	22	10728	175.2	304.5	422.2	505.6
27	22	12205	202.7	351.7	475.3	565.3
30	22	13681	230.1	399	537	638.6

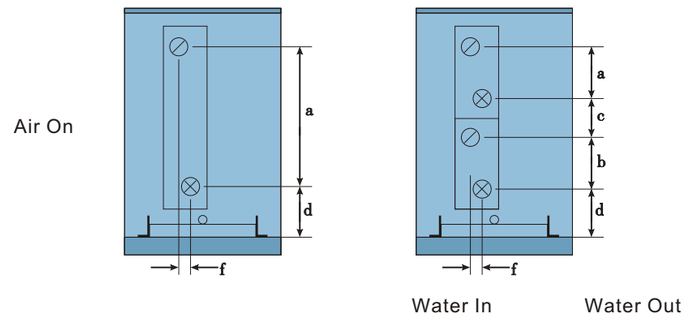
Note:
1. The water entering /leaving temp. is 60℃/50℃;
2. Return air condition: air entering temp. 15℃ DB; Fresh air condition: air entering temp. 7℃ DB.
3. The data above is for reference only. Once the air condition changes, the capacity will change accordingly.

Heating Capacity: Return AIR CONDITION

Model		Rated Air Flow l/s	Return Air Condition			
			1 Rows	2 Rows	3 Rows	4 Rows
Width Module	Height Module		Total Heating kW	Total Heating kW	Total Heating kW	Total Heating kW
09	06	756	8.9	17.5	23.8	27.8
12	06	1089	13.8	26.3	33.4	41.4
09	09	1188	14.9	29.2	36.5	45.5
12	09	1711	21.7	41.3	52.5	65.1
15	09	2235	29.6	55.1	70.3	86.5
12	12	2489	31.6	60.1	76.3	94.6
15	12	3251	42	75	102.2	125.8
18	12	4013	54.6	95	128.2	153.4
21	12	4775	66.1	114.9	149.9	184.5
15	15	4267	56.5	105.2	134.2	165.1
18	15	5267	71.6	124.6	168.3	201.3
21	15	6268	86.8	150.9	196.8	242.2
24	15	7268	102.1	177.2	230.8	278.5
19	19	6934	95	165.1	222.5	260.6
21	19	7760	107.5	186.8	243.6	299.9
24	19	8998	126.4	219.3	285.8	344.8
27	19	10236	135	235.4	321.1	395.4
22	22	9744	126.9	223	293.5	363.7
24	22	10728	150.7	261.5	340.8	332.7
27	22	12205	160.9	280.7	391.2	471.4
30	22	13681	183.2	319.2	433.2	531.8

Note:
1. The water entering / leaving temp. is 60℃/50℃;
2. Return air condition: air entering temp. 15℃ DB; Fresh air condition: air entering temp. 7℃ DB.
3. The data above is for reference only. Once the air condition changes, the capacity will change accordingly.

Water Pipe Diameter

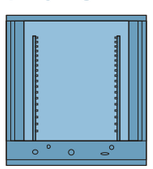


Height Module	a	b	c	d			Water Pipe Diameter (DN)				
				25mm panel	35mm Panel	50mm panel	1/2/3 rows	4 rows	5 rows	6 rows	8 rows
06	421	—	—	153	163	178	40	40	40	40	40
09	675	—	—	153	163	178	40	40	40	40	40
12	993	—	—	153	163	178	40	65	65	65	65
15	1311	—	—	153	163	178	40	65	65	65	65
19	802	802	85	168	178	193	40	65	65	65	65
22	993	929	85	168	178	193	40	65	65	65	65

Height Module	Drain Pipe (DN)	f					
		1 row 2 rows	3 rows	4 rows	5 rows	6 rows	8 rows
06	32	66	88	83	110	138	193
09	32	66	88	83	110	138	193
12	32	66	88	83	110	138	193
15	32	66	88	83	110	138	193
19	32	66	88	83	110	138	193
22	32	66	88	83	110	138	193

Note:
1. The above data is for reference only. Once the water pipe diameter changes, the pipe location size would change.

• Spraying Section

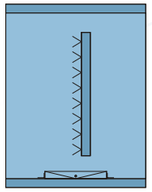


The spraying section will improve the air handling process including:

- Enthalpy Drop / Enthalpy Increase / Dehumidify / Humidify /
- Temperature Decrease / Temperature Increase.
- The spray in the enterclose of air flow will improve air quality.

Option for single row, two rows and three rows spraying.

• Humidifier Section



• Introduction of Humidifier Type as Option

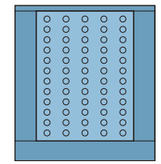
Method	Isothermal Humidification			Iso-enthalpy wetting	
Humidifier Type	Dry steam humidification	Electrode humidification	Electric heating humidification	High pressure spraying humidification	Wet film humidification
Humidification Theory	Bring in the steam directly	Amps: Water to steam through heating	Adopt electrical heating for water boiling - to become steam	The pressurized water is pulverized through nozzle, and evaporates	Infiltrate the wet film through water. Air passes through the wet film and the water evaporates.
Condition	Steam pressure ≤0.4MPa	Water quality: clean tap water or soft water	Water Quality: clean tap water or other equivalent water	Water quality: clean tap water or other equivalent water	Water quality: clean tap water or other equivalent water
Range of Usage	Cleansing of air conditioning system	All kinds of air conditioning system	All kinds of air conditioning system	All kinds of air conditioning system	Non-cleansing air conditioning system

• Humidification Amount

Module		Dry Steam Humidification Amount kg/h	High Pressure Spraying Humidification Amount kg/h	Wet Film Humidification Amount kg/h			
Width Modulu	Height Modulu			Efficiency 40%	Efficiency 60%	Efficiency 75%	Efficiency 85%
09	06	22	10	7	11	14	15
12	06	32	14	10	16	19	22
09	09	35	16	12	18	22	24
12	09	51	23	17	25	31	34
15	09	67	30	22	34	41	46
12	12	74	33	25	37	45	50
15	12	98	44	33	49	59	66
18	12	121	55	41	60	74	82
21	12	145	65	49	72	88	98
15	15	129	58	43	64	78	87
18	15	160	72	54	79	97	109
21	15	191	86	64	94	116	130
24	15	220	99	74	110	134	150
19	19	237	107	79	118	144	161
21	19	246	111	82	122	150	167
24	19	287	129	97	142	174	195
27	19	326	147	110	162	198	222
22	22	325	146	110	162	198	221
24	22	340	153	114	169	207	231
27	22	387	174	130	192	235	263
30	22	434	195	146	215	264	295

Note: 1. Humidification amounts correspond to the condition before being humidified: 28°DB; relative humidity level:10%.
2. When the humidification efficiency of wet film is 40%, 60%,75%, 80%; the thickness is 50,100,150, 200mm.

• Noise Elimination Section

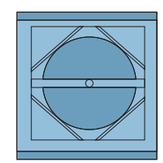


- The Noise Elimination Section will reduce the noise of the air outlet fan or return opening and is therefore located at the supply air section or return air section.
- A chip dissipative muffler is used inside this section, to eliminate the noise utilising acoustic material.
- Extra-fine glass wool with high sound absorption efficiency is adopted as the acoustic material. This material is anti-fire, antisepsis and damp proof.
- The dissipative muffler is extremely effective in eliminating medium and high frequency noise.

• Noise Degeneration Table:

Noise Elimination Section	Space needed mm	Center frequency attenuation data of octave frequency band（dB）							
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
One	900	8	14	18	21	22	20	16	12
Two	1500	10	17	25	28	31	28	24	18

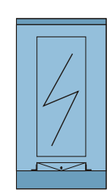
• Heat Reclaim Section



Heat Reclaim Section will reclaim the **Sensible Heating** and the **Latent Heat.**

Air Exhaust and Fresh Air distribute through the wheel in reverse direction alternately. The heat reclaim efficiency is 60~85%.

• Electrical Heating



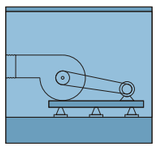
The electrical heating equipment adopts stainless steel spiral fins or PTC heating elements.
The electrical heating elements are fixed on the galvanized frames.
The electrical power is 415V or 240V (selected as per the clients' requirements), and can have one or multi wirings to meet the control requirements of various electrical heating power.
The electrical heating wiring connection would lead to the junction box which is outside the casing. The main control cabinet would be installed by the client themselves.

• Weight List of Fan, Motor and Driving Medium

Fan Model	Forward Fan	Backward Fan	Frame of Fan and Motor	Motor Power	Motor Weight	Driving Medium Weight
	kg	kg	kg	kW	kg	kg
180	10	—	11	0.37	11	3
200	11	—	13	0.55	16	3
225	13	—	17	0.75	17	3
250	22	23	17	1.1	21	4
280	25	26	18	1.5	25	5
315	31	32	20	2.2	32	7
355	41	44	21	3	38	8
400	53	59	38	4	49	14
450	57	74	42	5.5	64	20
500	77	84	45	7.5	77	23
560	126	138	46	11	122	35
630	176	177	53	15	140	42
710	220	253	58	18.5	170	56
800	289	326	78	22	186	63
900	384	427	85	30	254	84
1000	450	518	92	37	308	107
—	—	—	—	45	335	124
—	—	—	—	55	450	135
—	—	—	—	75	534	163

The Fan Section Module uses the following above Models - for reference, also refer page No. 08 (Dimensions of Modular Airhandling Sections), which lists the Fan models【Fan model A / Fan model B】for each type of Fan Module Section.

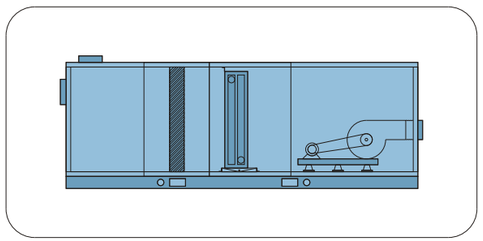
• Fan Section



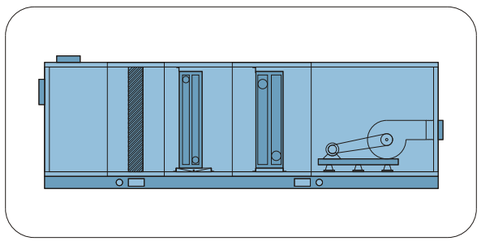
- To meet the correct requirement of air flow and static pressure, fans are selected using engineering fan selection software programs.
- Fans are dynamically balanced and are available as centrifugal forward, backward or wing type asoptions.
- Fan housing and fixings are galvanized. Anti-static belt drives are provided.
- The motor is of a totally enclosed type; power is 415V/50Hz.
- The motor is installed on the side rail, enabling convenient belt adjustment.
- Fan and motor are located on the same base.
- The base is connected with casing through anti-vibration mounts.
- The fan air outlet adopts flexible connections, to isolate the fan noise and vibration from the casing.

• Combination Choices of Modular Airhandling Units

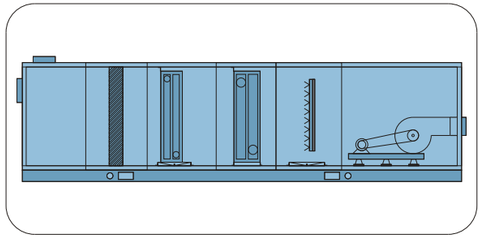
Mixing section + pre-filter section + coil section + fan section



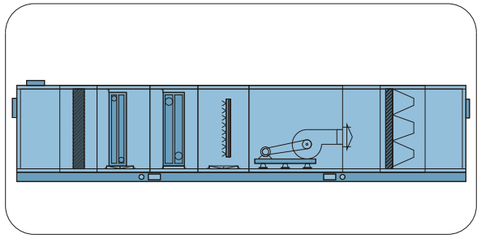
Mixing section + pre-filter section + coil section + heating section + fan section



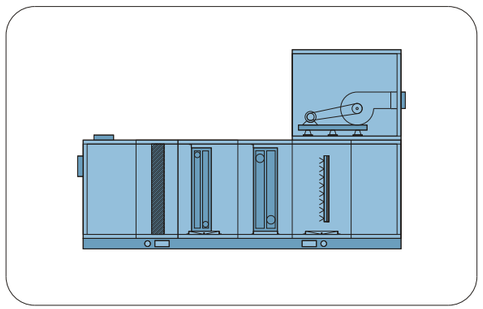
Mixing section + pre-filter section + coil section + heating section + humidification section + fan section



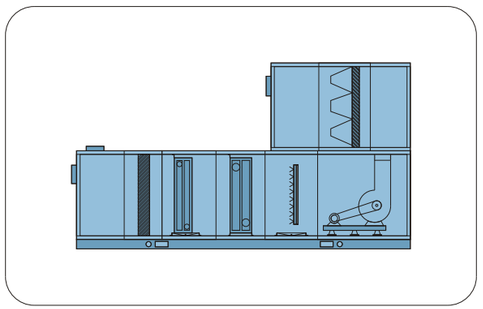
Mixing section + pre-filter section + coil section + heating section + humidification section + fan section+ blank section + medium filter section + air discharge section



Mixing section + pre-filter section + coil section+ heating section + humidification section + fan section



Mixing section + pre-filter section + coil section + heating section +humidification section + fan section +Blank section + medium filter + Air discharge section



• Weight of the Modular Sections for: 25mm Panel & 35mm Panel

Model		The Weight of Blank Casing (kg)									
		Panel Thickness 25mm					Panel Thickness 35mm				
Width Module	Height Module	End Plate	300	600	900	1200	End Plate	300	600	900	1200
09	06	6	31	49	66	84	7	32	50	68	87
12	06	8	33	53	72	91	9	34	54	74	94
09	09	9	38	58	77	96	10	39	59	79	99
12	09	12	40	62	83	104	13	41	63	85	107
15	09	14	43	66	88	111	15	44	67	91	115
12	12	15	48	71	93	116	16	49	72	96	120
15	12	18	50	75	99	123	19	51	76	102	128
18	12	21	52	78	105	131	23	53	81	108	136
21	12	25	55	82	110	138	26	56	85	114	144
15	15	23	57	84	110	136	23	58	86	113	141
18	15	27	60	88	115	143	27	61	90	119	149
21	15	31	62	91	121	151	32	63	94	125	156
24	15	35	64	95	127	158	36	66	98	131	164
19	19	35	70	101	132	162	36	72	104	136	168
21	19	38	72	103	135	167	39	73	106	140	174
24	19	43	74	107	141	174	44	76	111	146	181
27	19	50	76	111	147	182	49	78	115	152	189
22	22	47	80	114	148	182	46	81	117	153	189
24	22	51	81	116	152	187	50	83	120	157	194
27	22	57	84	120	157	194	56	85	124	163	202
30	22	63	86	124	163	201	62	88	128	168	210

Note:
1.Weight of coil section = the relative module length, weight + relative coils weights.
2.Fan section' s weight = the relative module length weight + Fan's weight + weight of motor + weight of driving medium + the weight of fan and motor base.
3. The total weight of unit = weights of all the function sections + end plates' weight.

• Weight of the Modular Sections for: 50mm Panel

Model		The Weight of Blank Casing (kg)				
		Panel Thickness 50mm				
Width Module	Height Module	End Plate	300	600	900	1200
09	06	8	34	55	76	97
12	06	10	37	60	83	106
09	09	10	42	65	88	111
12	09	13	45	70	96	121
15	09	16	48	75	103	131
12	12	17	53	81	108	136
15	12	20	56	86	116	146
18	12	24	59	91	123	156
21	12	27	61	96	131	166
15	15	24	64	96	128	161
18	15	29	67	101	136	171
21	15	33	69	106	143	180
24	15	37	72	112	151	190
19	19	37	78	117	155	194
21	19	40	80	120	160	200
24	19	45	83	125	168	210
27	19	51	86	131	175	220
22	22	48	89	132	175	218
24	22	52	91	136	180	225
27	22	58	94	141	188	235
30	22	63	97	146	195	245

Note:
1.Weight of coil section = the relative module length, weight + relative coils weights.
2.Fan section' s weight = the relative module length weight + Fan's weight + weight of motor + weight of driving medium + the weight of fan and motor base.
3. The total weight of unit = weights of all the function sections + end plates' weight.

• The weight or Airhandling sections（Components）

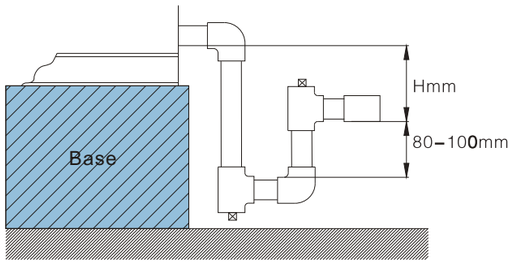
Model		Weight kg				
Width Module	Height Module	Air Valves of Mixing Section	Panel Filter Section	Bag Filter Section	Manger	Noise Elimination
09	06	15	5	3	5	20
12	06	22	6	4	7	26
09	09	15	7	4	7	30
12	09	22	9	6	10	40
15	09	29	11	7	13	50
12	12	22	12	8	15	53
15	12	29	15	10	20	66
18	12	51	18	12	24	79
21	12	61	21	14	29	92
15	15	42	19	12	26	83
18	15	51	23	15	32	99
21	15	61	26	17	38	116
24	15	70	30	19	44	132
19	19	54	30	19	42	132
21	19	61	34	21	47	146
24	19	70	38	25	54	167
27	19	80	43	28	61	188
22	22	84	41	26	58	177
24	22	92	44	28	64	194
27	22	105	50	32	73	218
30	22	118	55	35	82	242

• The weight or Airhandling sections（Components）

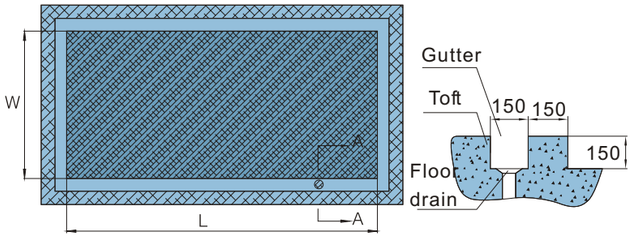
Model		Weight kg										
Width Module	Height Module	Wet Film Humidifier (dry)				1/2" Coil（without water）						
		50mm Thick	100mm Thick	150mm Thick	200mm Thick	1 row	2 row	3 row	4 row	5 row	6 row	8 row
09	06	8	10	11	13	15	18	20	22	25	28	34
12	06	9	11	13	16	16	20	23	26	30	33	41
09	09	9	11	13	15	24	29	32	36	40	45	54
12	09	10	13	15	18	25	32	37	41	47	53	65
15	09	11	14	18	21	27	35	41	47	54	62	76
12	12	11	14	18	22	37	46	53	60	69	77	94
15	12	12	16	21	25	39	50	59	68	79	89	111
18	12	13	18	23	28	41	55	65	76	89	102	127
21	12	14	20	26	31	43	59	72	85	99	114	144
15	15	13	18	24	29	51	66	78	89	103	117	145
18	15	14	20	27	33	53	71	86	100	117	134	167
21	15	16	23	29	36	56	77	94	111	130	150	188
24	15	17	25	32	40	59	82	102	122	144	166	210
19	19	16	24	31	38	68	91	110	129	151	173	216
21	19	17	25	33	41	70	96	117	138	162	186	234
24	19	18	27	36	45	73	102	127	151	179	206	261
27	19	20	30	40	50	77	109	137	165	195	226	288
22	22	19	29	38	48	84	117	143	170	200	230	290
24	22	20	30	41	51	87	122	151	180	213	246	311
27	22	22	33	44	55	91	130	163	196	233	269	343
30	22	23	35	48	60	95	138	175	212	253	293	375

• Installation

- For stable consistent running, install on a level horizontal foundation.
- There should remain enough space (no less than 0.6m) around the unit, especially around the pipes and access panels, for ease of maintenance.
- Hydroseal must be used in the drain pipe outlet. Drain pipe can then be connected to the external pipes.
- Connect all piping being careful not to exert pressure upon the pipes so as to avoid potential damage to the internal structure of the unit.
- The electrical power is 415V / 50Hz, AC. Please check the voltage, frequency and phases before wiring. After wiring, please turn on the motor first, to check the fan direction.
- The motor should be connected to power source that has overload protection.
- Flexible connections should be used.

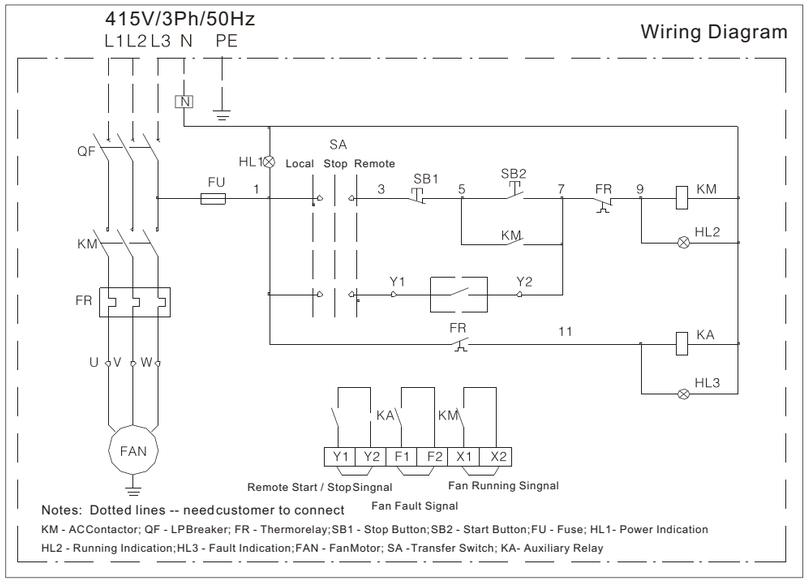


H= negative pressure inside the unit（mmH2O）+20mm
Note: The negative pressure inside the unit is the negative pressure of the coils.

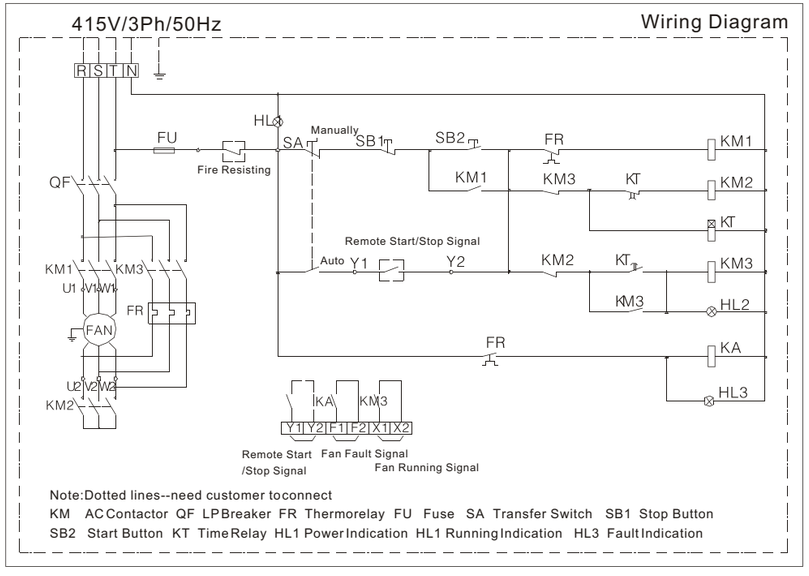


L- length of unit; W- width of unit

• Wiring Diagram: Direct starting type (motor power＜15W)



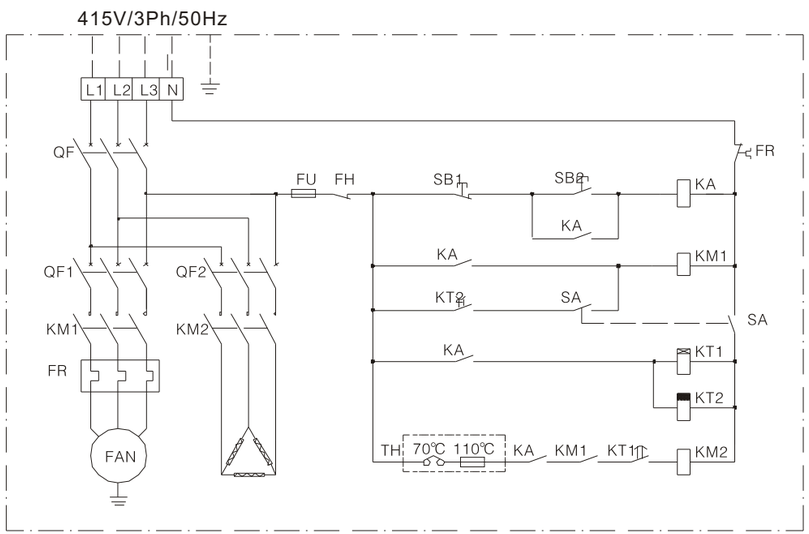
• Wiring Diagram: Star-delta starting (motor power≥15KW)



The user lines are directly connected to the motor connector post. During the wiring process; overload, short circuit and overheating protections must be installed

- **Wiring of Electrical Heating**

The electric heater is constructed in the manufacturing plant as an assembled frame.
Wirings are included, connected within, and have a power entrance.
When installing, connect to the electrical power as per the instructions.
Please refer to the following diagram for control wiring.



Note:

Sb2	Start Button
KA	Intermediate Relay
Km1	Fan Contactor
Km2	Electrical Heating Contactor
TH	Electrical Heating Protector
FH	Anti-Fire Valve;
Kt1	Electrified Delay Time Relay
Kt2	Shut Off Delay Time Relay
QF	Low Pressure Break
SA	Option Switch (On air; off - heating)

- **KT1 Delay Time Relay must be set up with a minimum delay of 30 seconds.**
- **Kt2 Shut Off Delay Time Relay should be set up with a minimum delay of 180 seconds.**

⚠ Warning

To assure there is no short circuiting; the electrical heating temperature protector switch must be connected to the fan and control loop of electrical heating.

Electric Heating

On unit first start up, the fan must commence running before electrical heating operation.
When turning off the unit, Electrical heating must be turned off (set for 180 seconds delay) before turning off the Fan.

Humidifier

For wirings of humidifier and other electrical devices please refer to the wiring diagrams provided with the unit.
For the Humidifier, the Fan must be turned On first, before Humidifier can be operated.
Humidifier must be turned Off first, before fan can be turned Off.

Motorised Dampers

When utilizing motorized dampers; the actuator of the dampers must be turned On first; before turning On the fan.
Fan must be turned Off first before Damper Actuator is turned Off.

⚠ Warning

The unit and all electrical wiring must be electrically 'grounded' before turning the unit On.

Warning:

Steam Valves

When turning on the Steam Valves, the Fan must be turned on first: Fan must be operating.
When turning Off the Stream Valves, the Stream Valves must be turned Off before the Fan is turned Off.

Operation and Maintenance

- Please confirm that all the valves of pipes are in good working condition before starting the unit.
- Periodic inspection is required for connections and running performance of fans, motors, etc.
- The pre-filter should be washed by water or abluent; The frequency of cleaning will depend on the Unit
- operating usage; therefore filters should be checked regularly.
- The medium filter should be washed or replaced when the resistance becomes twice of the original resistance.
- If unit is out of operation usage for long periods, water should be removed from the coils.
- The chilled water and heating water should be softened clean water. After one year of operation, any scale deposits on the coils should be cleaned by chemical method. Any scales on the surface of the fins should be cleaned by compressed air or water. The drip tray and the hydroseal elbows also need to be leaned.

Note: For more details of installation, operation and maintenance please refer to the instructions enclosed with units.