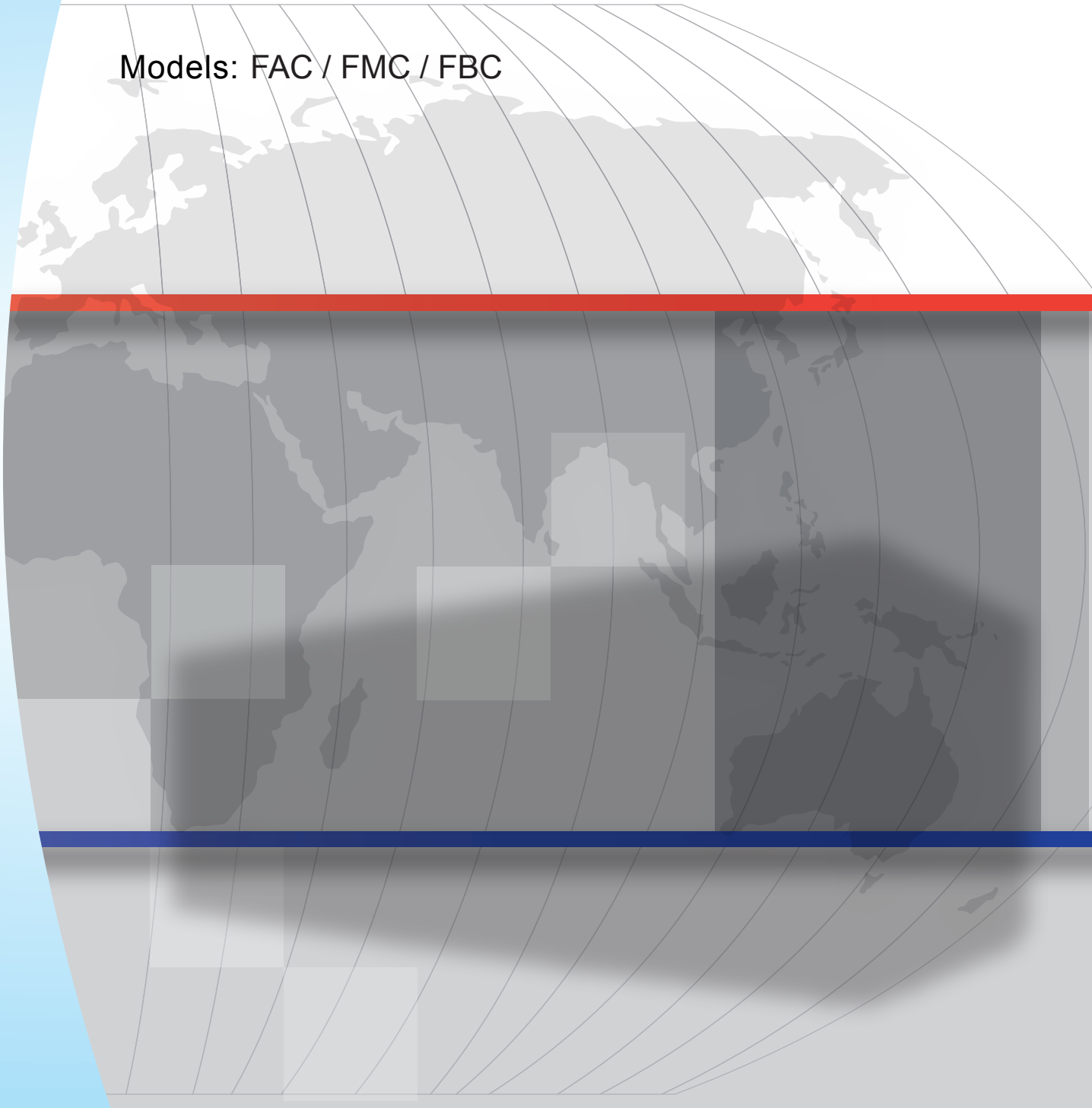
MODULAR AIR HANDLING UNIT

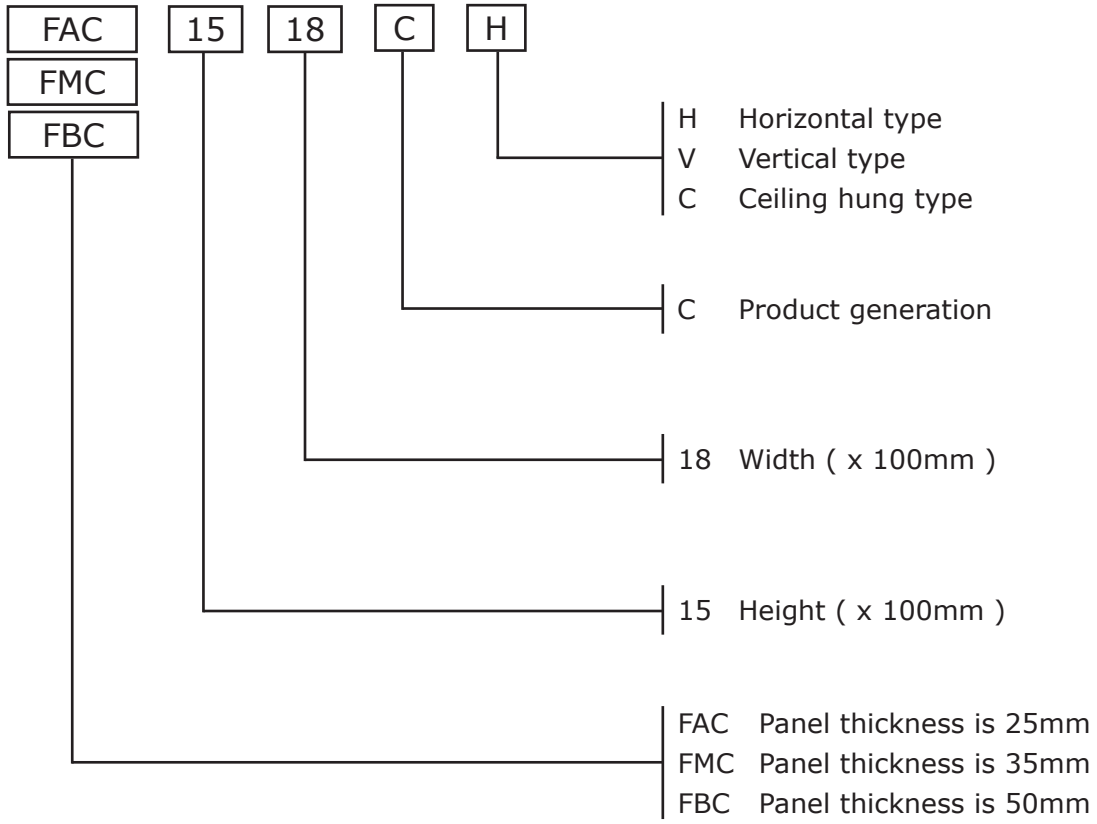
Models: FAC / FMC / FBC



Contents

Product Nomenclature

Modular Air Handling Unit



Example:

FBC 2224 CH

Panel thickness = 50mm, Panel height = 22 x 100mm, Panel width = 24 x 100mm, Horizontal type

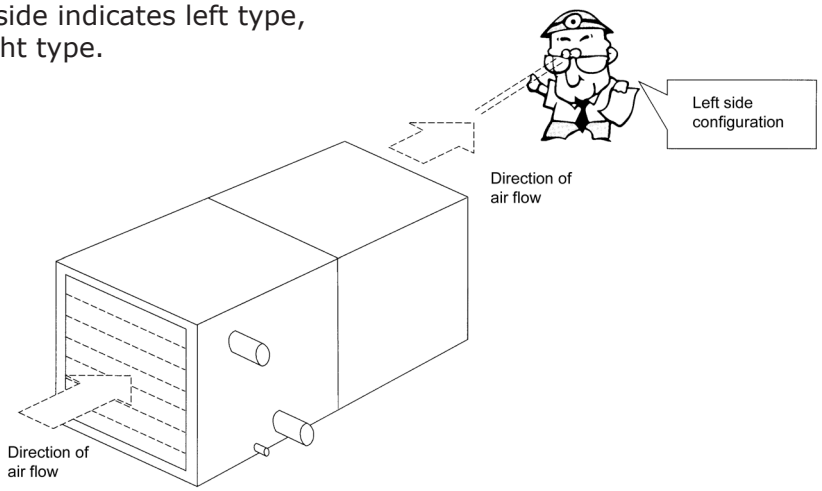
Unit total height = Panel height + T + Base height
Unit total width = Panel width + T

For FAC, T = 50mm
FMC, T = 70mm
FBC, T = 100mm

Base height = 80mm except, when Panel height > 2500mm or Panel width > 2500mm, Base height = 100mm

Method to determine the side of unit

Face the direction of air flow, water piping at left side indicates left type, otherwise, right type.



Features

Proprietary Panel Design

FAC/FMC/FBC's panel is made of powder coated steel (outer) and galvanized steel (inner) with high pressure PU foam sandwiched in between, thus producing a rigid and robust panel. Structure of FAC/FMC/FBC is reinforced with specially designed hidden aluminum alloy frame that are being fastened to the panels with bolts and nuts. As a result, the structure is strong and lightweight, at the same time possesses superior thermal insulation and anti-rust property.

Low Air Leakage

Patented "Labyrinth" panel design featuring integrated frame and panel structure, proprietary aluminum profile fastened with bolts and nuts and ingeniously designed insulation method, reduces the connecting edges which produces a leading edge low air leakage panel structure.

No Cold Bridge

High pressure PU foam sandwiched between panels and specially designed insulation method is isolating all metal surfaces inside the air handling unit from outside air which eliminate the possibility of cold bridge. Thus, no condensation will happen and at the same time minimize loss of energy.

Modular Design

FAC/FMC/FBC's design is adopting modular concept in both the length and width, making it flexible and robust to suite different site conditions. Panels are fastened with bolts and nuts, thus making site installation work easy but with factory standard assembly finishing.

Built In Leveler

Base frame is equipped with built in leveler to ease the leveling work between sections. This will ensure a seamless integration of modules which in turn eliminate air leakage, vibration and providing an unsurpassed finishing.

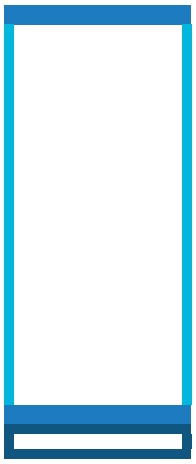
Low Noise

Rigidly bolted panels, dynamically and statically balanced fan assembly with spring isolator and closely integrated sections reduces the vibrations and noise generated, thus, providing a quiet operation air handling unit.

All cooling and heating coils are designed using professional computer selection software. The software is carefully formulated, designed and being fine tuned through laboratory testing and real life application to meet the highest standard of the HVAC industry.

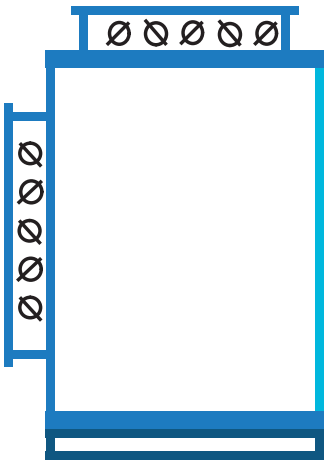
Funtional Sections Description

Cabinet



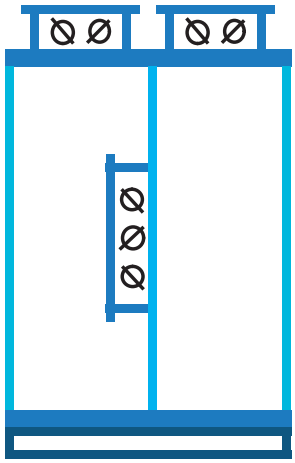
Cabinets consist of standard panels measuring 100mm each in length. The inter-connecting parts of panels are made of proprietary designed aluminum profiles which guarantee minimum air leakages and panels are fitted together with bolts and nuts. As a result, the panels can be assembled or dis-assembled at site without compromising the quality of assembly. The construction of panels are from pre-coated grey color GI metal sheet (external surface), PU foam (as insulation material) and GI metal sheet (internal surface). The proprietary designed aluminum frames for panels act as built in structural supports and this is further strengthened by additional internal/ hidden frames. Apart form that, the bottom panels are designed to withstand weight of service and maintenance personnel without deformaiton of panels. The highly integrated method of joining ensure minimum leakages, no cold bridge, minimum or no corrosion, rigid and strong. The unit and components come with hanging/hoisting holes for easier transportation and commissioning at site.

Mixing Section



Providing chamber for mixing of Return Air and Fresh Air to modulate the ratio of air mixture. It has air dampers, which is made of GI metal vanes with aerofoil profile that can be controlled manually or with motorized control. Sizing of air dampers is based on maintaining surface velocity of 8m/s to ensure that the noise generated by the air dampers do not exceed the overall noise level of the unit. When the air dampers are installed above the unit, the section length will determine the height of the dampers and maximum height is equals:
Section Length - 160mm.

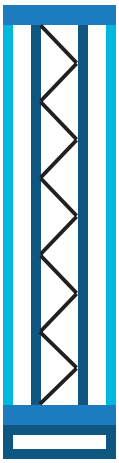
Fresh Air And Exhaust Air Section



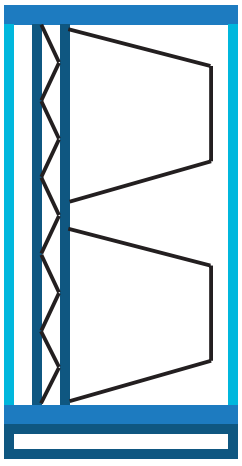
Able to modulate the amount of air to be exhausted, fresh air and return air ratio.

Filters Section

Filters' quality, air resistance, anti-static properties, moisture absorption ability, fire retardancy and filtration efficiency are complied to GB/T 14295-93 standard. The cross sectional air speed for entering air is uniform and greater than 80% of the nominal air speed of the unit.



Panel Filter



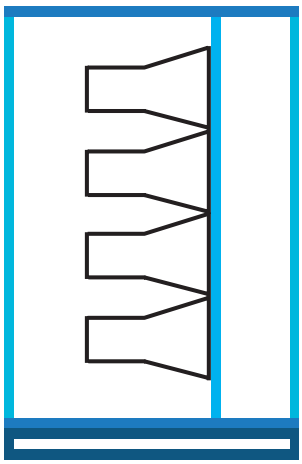
Bag Filter or Rigid Filter

Classification of filters:

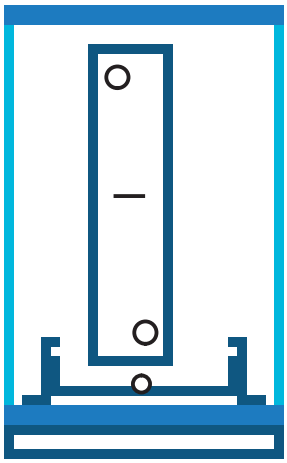
- Primary :
  Panel and Bag type; Made of synthetic fiber and non-woven cloth
- Secondary :
  Panel, Bag and Rigid type; Made of fiber glass
- Sub-Hepa :
  Bag and Rigid type; Made of fine fiber glass
- Hepa :
  Rigid and Paper type
- Active Carbon Filter :
  Used to remove bad odor and pollution from air. Normal filters are required to be installed before and after Active Carbon Filter to prolong the lifespan of filter and to prevent loose carbon particles from entering the air stream.

Self-Cleaning High Efficiency Filter Section

Self-Cleaning High Efficiency Filter has high capacity for dust collection. When the dust has been accumulated, service personnel can remove the dust by blowing with compressed air and the dust will be collected at the metal pan at the bottom. This will eliminate the needs to change the filter frequently.

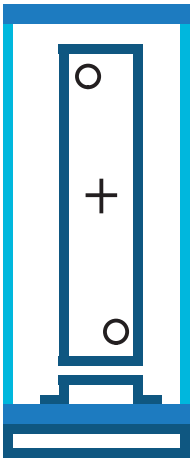


Coil Section

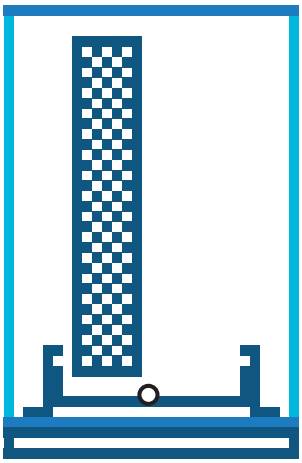


Cooling Coil

Cooling and Heating coils are made of aluminum fins and copper tubes with copper tubes being mechanically expanded and securely bonded to aluminum fins. Aluminum fins ranging from 8 - 13 fins/inch. The coils are designed for easy maintenance in mind and they can be easily slided out for service and maintenance works. The headers of coil are made of steel with an air vent at the top and also an water release port at the bottom. Coil's cross sectional air speed is greater than 80% of nominal air speed. All coils have been leak tested with 2.5MPa pressure and the recommended maximum operating pressure is 1.6MPa. All water pipes and condensing water pipes are located at the same side of the unit. Optional water droplets eliminator can be installed to prevent water carry over even at high air velocity. The drain pan is made of insulated steel plate and galvanized steel pipes as condensate water discharge pipe.



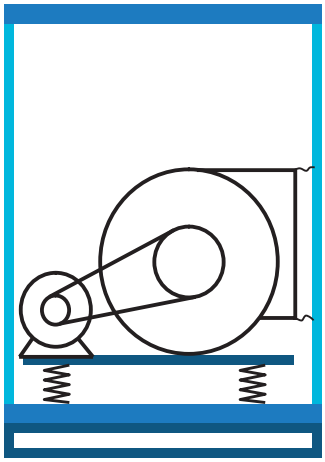
Heating Coil



Evaporative Cooling

Spraying water on evaporative material which achieve cooling through evaporation of water. No refrigerant is needed and the operating cost is low.

Fan Section



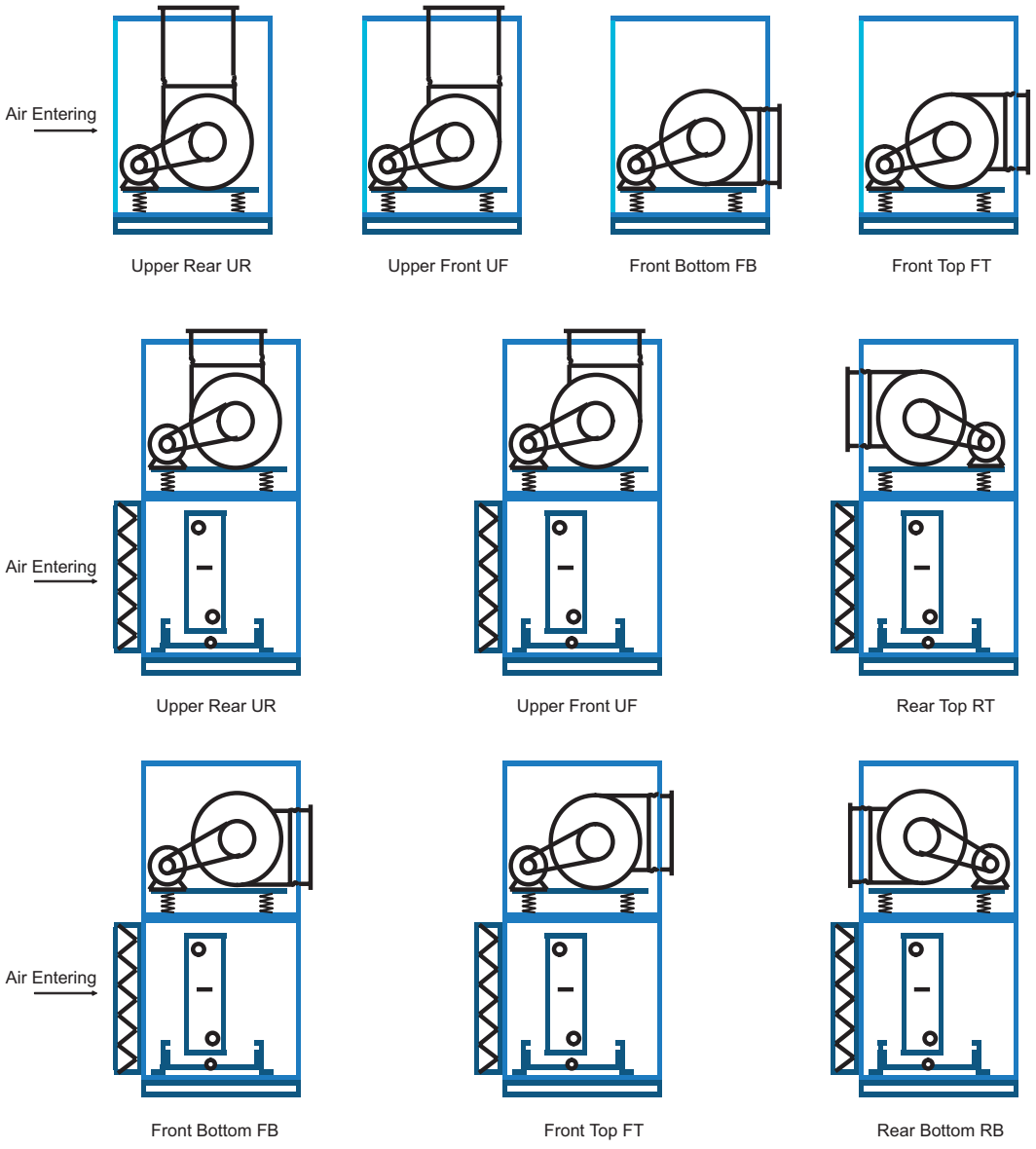
Base on the requirements of air flow rate and external static pressure, the selection software able to select one or multiple centrifugal fan. Various type of fan blades design can be chosen base on different application needs, i.e. Forward Curved, Backward Curved and Aerofoil.

Fan are statically and dynamically balanced and are driven by multiple anti-static V-belts. Bearings are of seal type and there is no lubrication required for the whole operating life of bearings. All the blower housing and frames are made of GI steel.

Fan motors are of totally closed enclosure type, with single speed and 4 poles in general. Base bracket/frame of fan motor is adjustable and together with fan blower, they are sitting on a structure that equipped with vibration isolator (with noise damper and adjusting rod).

Flexible ducting is used to connect fan discharge to the unit and all Fan Sections are equipped with access door, detachable service panel that enable the fan and motor to be completely removed from unit for replacement or maintenance.

Fan Outlet Direction

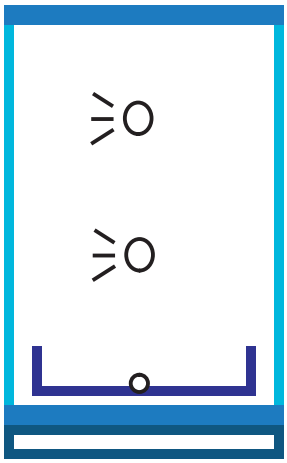


Humidifying Section

There are a few types of humidifier:

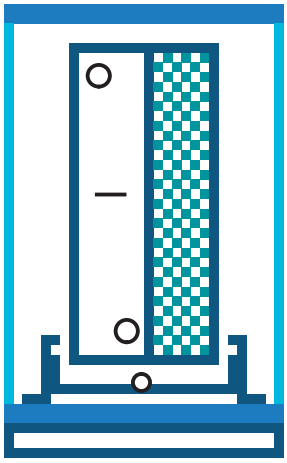
a. Dry steam humidifier - Isotherm humidifier, made of stainless steel and with properties of high corrosion resistance, small size, easy installation, clean humidification and high efficiency. There are 2 types of dry steam humidifier, i.e. electric driven or manual. Applicable for sites with steam source.

b. Electrode humidifier - Generate steam from water through application of AC current. It is microcomputer controlled with modulating control or ON/OFF control. Applicable for industrial sites without steam source.



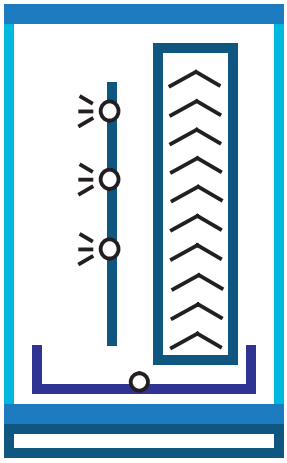
Steam Humidifier

c. Evaporative humidifier - Using wet film to absorb water and evaporize the water by air stream flowing through it. It has the effect of washing the air and can be used for droplets eliminator at the same time. Can use domestic tap water or recirculation water.

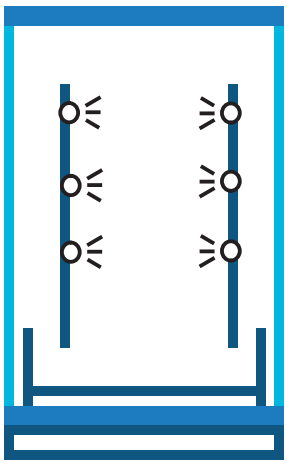


Wet Film Humidifier

d. High pressure spray humidifier - pressurized the water and inject through nozzle to create mist and humidify the air through evaporization of the mist. The efficiency is about 40 ~ 50%



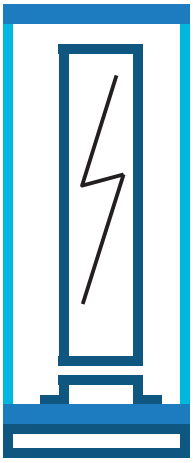
High Pressure Spray Humidifier



Air Washer Humidifier

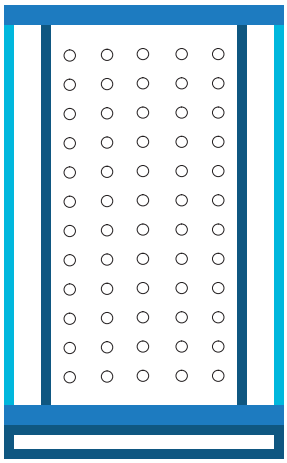
Air Washer can achieve various air treatment simultaneously. It is able to reduce the enthalpy, humidity and temperature of air and at the same time form an water curtain across the air stream to clean the air.

Electric Heater Section



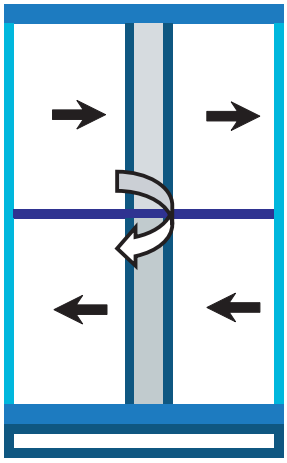
There are 2 types of electric heater used, spiral fins type or PTC heating elements. The heating elements are fitted on a frame and the control for heaters is field supplied.

Sound Attenuator Section



Under different application requirements and noise characteristics of fan, 2 types of Sound Attenuators can be installed, i.e. Sound Absorption Medium Plate Muffler or a Micro-Perforated Plate Muffler. Sound Absorption Medium Plate Muffler is made of perforated panel filled with noise absorbing material. It has good sound attenuation effect towards high and medium frequency noise. Micro-Perforated Plate Muffler is made of micro-perforated panel which applying principles of resonance for sound attenuation. It has good filtering effect for low and medium frequency noise. Since it does not require sound absorbing medium, it is non-polluting and not affected by moisture. Sound attenuator can be classified as Return Air Sound Attenuator and Supply Air Sound Attenuator.

Heat Recovery Section



There are a few types of Heat Recovery devices:

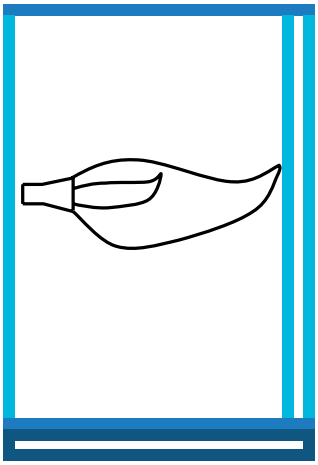
a. Heat Wheel - for both sensible and latent heat recovery with the efficiency of 70~90%. The counter flow between fresh air and exhaust air offers self-cleaning capability.

b. Intermediate heat exchanger - the media used can be water or glycol solution and can be applied for small temperature difference system. The efficiency is lower than 60%.

c. Counter flow plate heat exchanger - fresh air and exhaust air exchange the energy in the plate type heat exchanger and depends on the material used for heat exchanger, the heat transferred can be sensible only or total heat. The efficiency is about 50%, however, due to no physical contact of fresh air and exhaust air, there is no pollution of fresh air by the exhaust air.

d. Heat pipe heat exchanger - each pipe contains Freon or ammonia as the working fluid and the heat recovery is done through phase change of working fluid with no moving parts involve.

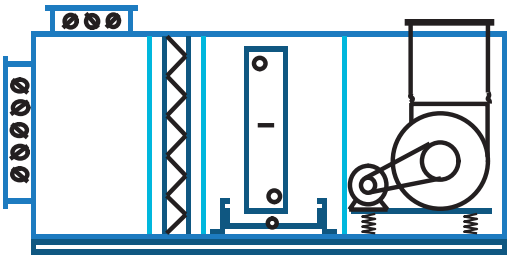
Gas Heater Section



There are two methods of heating, one is to burn the gas directly inside the plenum to heat the air stream and it is suitable for huge conditions space. Second is to heat the air at the burner outside the unit and channel the hot air through tubes which are running within the air stream. This will avoid consuming the oxygen in the air stream and maintain the supply air quality.

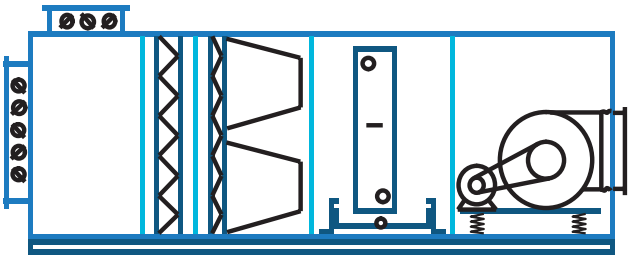
Applications

Horizontal Combination 1:



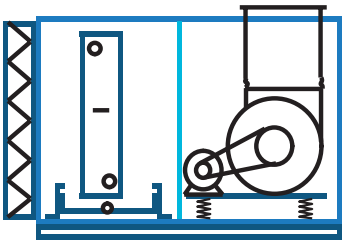
Mixing + Panel Filter + Cooling Coil + Fan

Horizontal Combination 2:



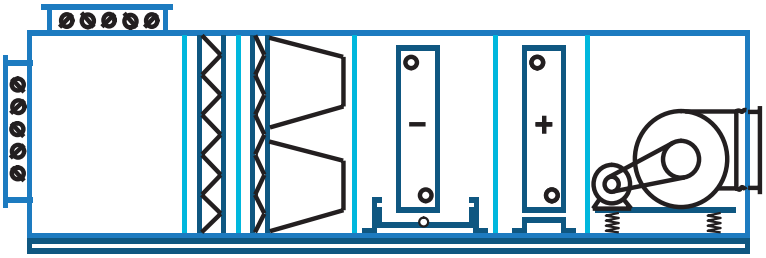
Mixing + Panel Filter + Bag Filter + Cooling Coil + Fan

Horizontal Combination 3:



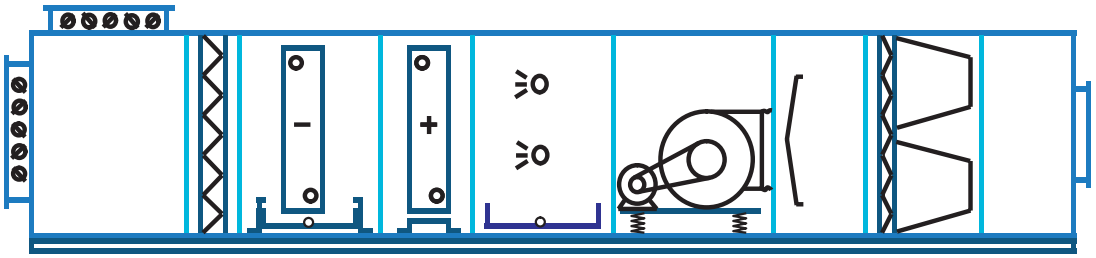
Exposed Filter + Cooling Coil + Fan

Horizontal Combination 4:



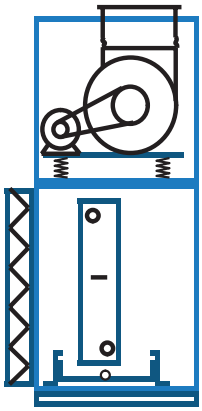
Mixing + Panel Filter + Bag Filter + Cooling Coil + Heating Coil + Fan

Horizontal Combination 5:



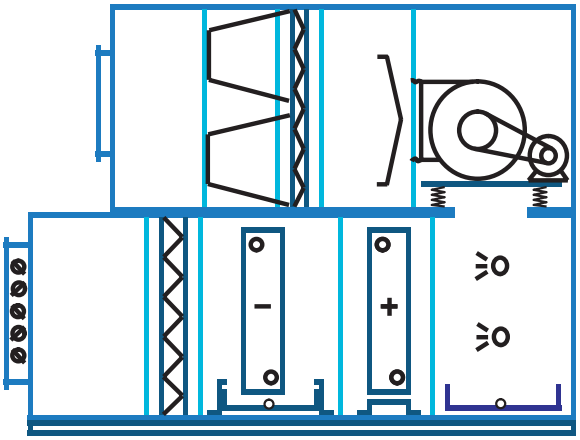
Mixing + Panel Filter + Cooling Coil + Heating Coil + Humidifier + Fan + Diffusion + Bag Filter + Air Supply

Vertical Combination 1:



Exposed Filter + Cooling Coil + Fan

Vertical Combination 2:



Mixing + Panel Filter + Cooling Coil + Heating Coil + Humidifier + Fan + Diffusion + Bag Filter + Air Supply

Engineering Specifications

Cooling Coil Performance Chart

FAC/FMC/ FBC	Air Flow		Fresh Air Condition						Return Air Codnition					
			4 Rows		6 Rows		8 Rows		4 Rows		6 Rows		8 Rows	
			SC	TC	SC	TC	SC	TC	SC	TC	SC	TC	SC	TC
	CMH	CFM	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
06 07	1958	1152	9	21	12	29	13	31	8	9	9	12	10	15
07 07	2238	1316	11	24	14	33	15	36	9	11	10	14	11	17
06 09	2758	1622	13	29	17	41	18	44	11	13	12	17	14	21
06 10	3158	1858	15	33	19	46	21	50	12	15	14	19	16	24
06 11	3558	2093	17	37	22	52	23	57	14	17	16	22	18	27
07 10	3610	2124	17	38	22	53	24	58	14	17	16	22	18	28
07 11	4067	2392	19	43	25	60	27	65	16	20	18	25	21	31
08 10	4512	2654	21	47	28	66	30	72	18	22	20	27	23	35
08 11	5083	2990	24	53	31	75	34	81	20	24	22	31	26	39
08 12	5655	3326	27	59	35	83	37	90	22	27	25	34	29	43
08 13	6226	3662	29	66	38	92	41	99	24	30	27	38	31	48
08 14	6798	3999	32	72	42	100	45	108	27	33	30	41	34	52
10 12	7351	4324	35	77	45	108	49	117	29	35	32	45	37	56
10 13	8094	4761	38	85	50	119	53	129	32	39	36	49	41	62
10 14	8837	5198	42	93	54	130	58	141	34	42	39	54	45	68
10 15	9580	5635	45	101	59	141	63	153	37	46	42	58	48	73
10 16	10323	6072	49	109	63	152	68	165	40	50	45	63	52	79
11 15	11054	6502	52	116	68	163	73	176	43	53	49	67	56	85
11 16	11911	7006	56	125	73	175	79	190	46	57	52	72	60	91
11 17	12769	7511	60	134	78	188	84	204	50	61	56	78	64	98
12 17	13620	8012	64	143	84	200	90	217	53	65	60	83	69	104
12 18	14534	8549	69	153	89	214	96	232	57	70	64	88	73	111
13 17	15322	9013	72	161	94	225	101	244	60	74	67	93	77	118
13 18	16351	9618	77	172	100	241	108	261	64	79	72	99	82	125
13 19	17380	10224	82	183	107	256	115	277	68	83	76	106	88	133
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14 20	19431	11430	92	204	119	286	128	310	76	93	85	118	98	149
15 19	20277	11928	96	213	124	298	134	324	79	97	89	123	102	156
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15 21	22677	13339	107	239	139	334	150	362	89	109	100	138	114	174
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16 22	25014	14714	118	263	153	368	165	399	98	120	110	152	126	192
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19 22	30699	18058	145	323	188	452	203	490	120	147	135	186	155	235
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20 26	38237	22492	180	402	234	563	252	610	149	184	168	232	193	293
21 26	40968	24099	193	431	251	603	270	654	160	197	180	249	207	314
23 26	45065	26509	212	474	276	663	297	719	176	216	198	274	227	346
22 28	45877	26986	216	483	281	675	303	732	179	220	202	279	231	352
25 28	53276	31339	251	560	327	784	352	850	208	256	234	324	269	409
25 31	59449	34970	280	625	365	875	392	948	232	285	261	361	300	456
25 34	65621	38601	309	690	402	965	433	1047	256	315	288	398	331	503
28 34	74735	43962	352	786	458	1100	493	1192	292	359	328	454	377	573
28 38	84107	49475	397	885	516	1237	555	1342	328	404	370	511	424	645
29 40	90959	53505	429	957	558	1338	600	1451	355	437	400	552	459	698
31 41	99115	58303	467	1043	608	1458	654	1581	387	476	435	602	500	760
32 45	111833	65784	527	1177	686	1645	738	1784	436	537	491	679	564	858
35 46	126904	74649	598	1335	778	1867	838	2025	495	609	558	771	640	973
37 50	146713	86302	692	1543	900	2158	968	2341	573	705	645	891	740	1125
38 55	171152	100678	807	1801	1050	2518	1130	2731	668	822	752	1039	863	1313
43 58	206317	121363	973	2171	1265	3035	1362	3292	805	991	906	1263	1040	1582
45 65	239469	140864	1129	2519	1468	3523	1581	3821	935	1150	1052	1454	1207	1837

Note :

1. Fresh air condition : 35°C DB / 28°C WB
2. Return air condition : 27°C DB / 19.5°C WB
3. Chilled water entering/leaving temperature, 7°C/12°C
4. Manufacturer reserves the rights to change the data without prior notice.
5. Abbreviations : SC - Sensible Cooling Capacity, TC - Total Cooling Capacity

Heating Coil Performance Chart

FAC/FMC/ FBC	Air Flow	Air Flow	Fresh Air Condition				Return Air Condition			
			1 Row	2 Rows	3 Rows	4 Rows	1 Row	2 Rows	3 Rows	4 Rows
			TH	TH	TH	TH	TH	TH	TH	TH
	CMH	CFM	kW	kW	kW	kW	kW	kW	kW	kW
06 07	1958	1152	12	18	23	26	9	14	19	21
07 07	2238	1316	14	20	26	30	10	16	21	24
06 09	2758	1622	17	25	32	37	12	20	26	30
06 10	3158	1858	20	29	37	42	14	23	30	34
06 11	3558	2093	22	32	41	47	16	25	34	39
07 10	3610	2124	23	33	42	48	16	26	34	39
07 11	4067	2392	26	37	47	54	18	29	39	44
08 10	4512	2654	28	41	52	60	20	32	43	49
08 11	5083	2990	32	46	59	68	23	36	49	55
08 12	5655	3326	36	52	65	75	25	41	54	62
08 13	6226	3662	39	57	72	83	28	45	59	68
08 14	6798	3999	43	62	79	91	30	49	65	74
10 12	7351	4324	46	67	85	98	33	53	70	80
10 13	8094	4761	51	74	94	108	36	58	77	88
10 14	8837	5198	56	81	102	118	39	63	84	96
10 15	9580	5635	60	87	111	128	42	69	91	105
10 16	10323	6072	65	94	120	138	46	74	99	113
11 15	11054	6502	70	101	128	147	49	79	106	121
11 16	11911	7006	75	109	138	159	53	85	114	130
11 17	12769	7511	81	116	148	170	57	91	122	139
12 17	13620	8012	86	124	158	182	60	98	130	149
12 18	14534	8549	92	133	168	194	64	104	139	159
13 17	15322	9013	97	140	177	204	68	110	146	167
13 18	16351	9618	103	149	189	218	72	117	156	178
13 19	17380	10224	110	158	201	232	77	124	166	190
14 19	18345	10791	116	167	212	245	81	131	175	200
14 20	19431	11430	123	177	225	259	86	139	186	212
15 19	20277	11928	128	185	235	270	90	145	194	221
16 19	21242	12495	134	194	246	283	94	152	203	232
15 21	22677	13339	143	207	263	302	100	162	217	247
16 21	23757	13975	150	217	275	317	105	170	227	259
16 22	25014	14714	158	228	290	334	111	179	239	273
17 22	26151	15383	165	238	303	349	116	187	250	285
16 24	27529	16194	174	251	319	367	122	197	263	300
18 22	28425	16721	179	259	329	379	126	204	271	310
19 22	30699	18058	194	280	355	409	136	220	293	335
19 23	32242	18966	204	294	373	430	143	231	308	352
19 24	33785	19874	213	308	391	450	150	242	323	369
19 25	35328	20781	223	322	409	471	157	253	337	386
20 25	36637	21551	231	334	424	488	162	262	350	400
20 26	38237	22492	241	349	443	510	169	274	365	417
21 26	40968	24099	259	374	474	546	182	293	391	447
23 26	45065	26509	284	411	522	601	200	323	430	492
22 28	45877	26986	290	418	531	612	203	329	438	501
25 28	53276	31339	336	486	617	710	236	382	509	581
25 31	59449	34970	375	542	688	793	263	426	568	649
25 34	65621	38601	414	598	760	875	291	470	627	716
28 34	74735	43962	472	682	865	996	331	535	714	816
28 38	84107	49475	531	767	974	1121	373	602	803	918
29 40	90959	53505	574	829	1053	1213	403	652	869	993
31 41	99115	58303	626	904	1148	1322	439	710	947	1082
32 45	111833	65784	706	1020	1295	1491	496	801	1068	1220
35 46	126904	74649	801	1157	1469	1692	562	909	1212	1385
37 50	146713	86302	926	1338	1699	1956	650	1051	1401	1601
38 55	171152	100678	1080	1561	1982	2282	758	1226	1635	1868
43 58	206317	121363	1302	1881	2389	2751	914	1478	1970	2251
45 65	239469	140864	1512	2184	2773	3193	1061	1715	2287	2613

Note :

1. Fresh air condition : 7°C DB
2. Return air condition : 15°C DB
3. Hot water entering/leaving temperature, 60°C/50°C
4. Manufacturer reserves the rights to change the data without prior notice.
5. Abbreviations : TH - Total Heating Capacity

Equipment Selection

Air Flow Chart

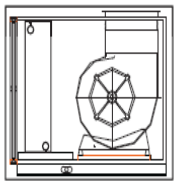
FAC/FMC/ FBC	Coil Face Velocity (m/s)											
	2.00		2.25		2.50		2.80		3.00		3.50	
06 07	1567	922	1762	1036	1958	1152	2193	1290	2350	1382	2742	1613
07 07	1790	1053	2014	1185	2238	1316	2507	1475	2686	1580	3133	1843
06 09	2207	1298	2483	1461	2758	1622	3089	1817	3310	1947	3862	2272
06 10	2527	1486	2843	1672	3158	1858	3537	2081	3790	2229	4422	2601
06 11	2847	1675	3203	1884	3558	2093	3985	2344	4270	2512	4982	2931
07 10	2888	1699	3249	1911	3610	2124	4043	2378	4332	2548	5053	2972
07 11	3253	1914	3660	2153	4067	2392	4555	2679	4880	2871	5694	3349
08 10	3610	2124	4061	2389	4512	2654	5053	2972	5414	3185	6317	3716
08 11	4067	2392	4575	2691	5083	2990	5694	3349	6100	3588	7117	4186
08 12	4524	2661	5089	2994	5655	3326	6334	3726	6786	3992	7917	4657
08 13	4981	2930	5604	3296	6226	3662	6974	4102	7472	4395	8717	5128
08 14	5438	3199	6118	3599	6798	3999	7614	4479	8158	4799	9517	5598
10 12	5881	3459	6616	3892	7351	4324	8234	4844	8822	5189	10292	6054
10 13	6476	3809	7285	4285	8094	4761	9066	5333	9713	5714	11332	6666
10 14	7070	4159	7954	4679	8837	5198	9898	5822	10605	6238	12372	7278
10 15	7664	4508	8622	5072	9580	5635	10730	6312	11496	6762	13412	7889
10 16	8259	4858	9291	5465	10323	6072	11562	6801	12388	7287	14453	8502
11 15	8843	5202	9949	5852	11054	6502	12381	7283	13265	7803	15476	9104
11 16	9529	5605	10720	6306	11911	7006	13341	7848	14294	8408	16676	9809
11 17	10215	6009	11492	6760	12769	7511	14301	8412	15322	9013	17876	10515
12 17	10896	6409	12258	7211	13620	8012	15254	8973	16344	9614	19068	11216
12 18	11628	6840	13081	7695	14534	8549	16279	9576	17441	10259	20348	11969
13 17	12258	7211	13790	8112	15322	9013	17161	10095	18387	10816	21451	12618
13 18	13081	7695	14716	8656	16351	9618	18313	10772	19621	11542	22892	13466
13 19	13904	8179	15642	9201	17380	10224	19465	11450	20856	12268	24332	14313
14 19	14676	8633	16511	9712	18345	10791	20547	12086	22015	12950	25684	15108
14 20	15545	9144	17488	10287	19431	11430	21763	12802	23318	13716	27204	16002
15 19	16221	9542	18249	10735	20277	11928	22710	13359	24332	14313	28387	16698
16 19	16994	9996	19118	11246	21242	12495	23791	13995	25491	14995	29739	17494
15 21	18141	10671	20409	12005	22677	13339	25398	14940	27212	16007	31748	18675
16 21	19005	11179	21381	12577	23757	13975	26607	15651	28508	16769	33259	19564
16 22	20011	11771	22513	13243	25014	14714	28016	16480	30017	17657	35020	20600
17 22	20921	12306	23536	13845	26151	15383	29289	17229	31381	18459	36611	21536
16 24	22023	12955	24776	14574	27529	16194	30832	18136	33034	19432	38540	22671
18 22	22740	13376	25582	15048	28425	16721	31836	18727	34110	20065	39795	23409
19 22	24559	14446	27629	16252	30699	18058	34383	20225	36839	21670	42979	25282
19 23	25794	15173	29018	17069	32242	18966	36111	21242	38690	22759	45139	26552
19 24	27028	15899	30407	17886	33785	19874	37839	22258	40542	23848	47299	27823
19 25	28263	16625	31795	18703	35328	20781	39568	23275	42394	24938	49459	29094
20 25	29309	17241	32973	19396	36637	21551	41033	24137	43964	25861	51291	30171
20 26	30589	17994	34413	20243	38237	22492	42825	25191	45884	26991	53531	31489
21 26	32774	19279	36871	21689	40968	24099	45884	26991	49162	28919	57355	33738
23 26	36052	21207	40558	23858	45065	26509	50473	29690	54078	31811	63091	37112
22 28	36702	21589	41289	24288	45877	26986	51382	30225	55052	32384	64228	37781
25 28	42621	25071	47949	28205	53276	31339	59670	35100	63932	37607	74587	43875
25 31	47559	27976	53504	31473	59449	34970	66582	39166	71338	41964	83228	48958
25 34	52497	30881	59059	34741	65621	38601	73495	43232	78745	46321	91869	54041
28 34	59788	35169	67261	39565	74735	43962	83703	49237	89682	52754	104629	61546
28 38	67286	39580	75697	44528	84107	49475	94200	55412	100929	59370	117750	69265
29 40	72767	42804	81863	48155	90959	53505	101874	59926	109151	64206	127343	74908
31 41	79292	46642	89204	52473	99115	58303	111009	65299	118938	69964	138761	81624
32 45	89467	52628	100650	59206	111833	65784	125253	73678	134200	78941	156567	92098
35 46	101523	59719	114213	67184	126904	74649	142132	83607	152285	89579	177665	104509
37 50	117371	69042	132042	77672	146713	86302	164319	96658	176056	103562	205398	120822
38 55	136921	80542	154037	90610	171152	100678	191690	112759	205382	120813	239612	140948
43 58	165054	97091	185658	109211	206317	121363	231075	135926	247581	145636	NA	NA
45 65	191575	112691	215522	126778	239469	140864	268205	157768	280000	164706	NA	NA

Coil Calculation

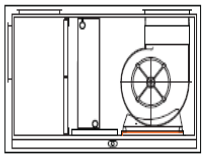
AHU No.		AHU-1
Model		FBD300DH-R4
Structure		
Quantity		1
Coil Model		4PWF 4K-42T*2390
Copper Type		1/2 Plain tube
Operating Mode(C / H)		Cooling
Media		Water
Pipe		Copper
Fin Material		Aluminum
Fin Length	mm	2390
TH		42
Rows		4
Sheet Number / Inch		11
Loop Number		42
Header Diameter	DN	DN65
Air Volume	m3/h	28900
Entering DB	°C	27.00/ 19.50
Leaving DB	°C	13.80/ 13.15
Total.Cool Capacity	kW	179.23
Sen.Cool Capacity	kW	128.53
Face velocity	m/s	2.52
PD	Pa	
Water Side		
Water Flow	L/s	8.55
Entering Temp.	°C	7.0
Leaving Temp.	°C	12.0
WaterSpeed	m/s	1.82
Water Resistance	kPa	64.05

Unit Configuration

Unit Configuration



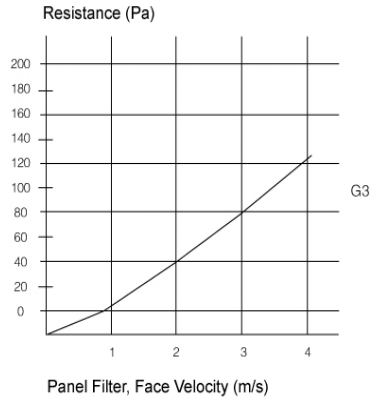
Horizontal Type 1, H1
Pre-filter [G3/G4filter (slide rail)] + Cooling coil + Fan section

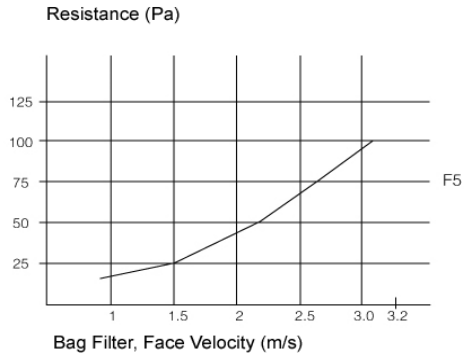


Horizontal Type 2, H2
Mixing box + Pre-filter [G3/G4 (slide rail)] + Cooling coil + Fan section

Filter Data

Air Flow Resistance Charts





China - GB/T14295	Pre Filter ≥ 5μm 80% > Efficiency ≥ 15%					Secondary Filter ≥ 1μm 70% > Efficiency ≥ 20%				High Efficiency Filter ≥ 1μm 99% > Efficiency ≥ 70%			Secondary HEPA Filter ≥ 0.5μm 99.9% > Efficiency ≥ 95%				HEPA Filter ≥ 0.5μm Efficiency ≥ 99.99%			
U.S. - ASHRAE	C1	C2 ~ C4	L5	L6	L7	L8	M9	M10	M11	M12	M13	M14	H12 ~ H16				VH17	VH18	VH19	VH20
Europe - New Standard	G1	G2	G3		G4	F5		F5		F7	F8	F9	H10	H11	H12	H13		H14	V15V17	
	65%	80%	80% ~ 90%		> 90%	40%		60%		80%	90%	85%	95%	99%	99.9%	99.95%		99.995%	99.9995%	
Europe - Old Standard	EU1	EU2	EU3		EU4	EU5		EU6		EU7	EU8	EU9	EU10	EU11		EU12	EU13	EU14		

Filter Size And Quantity

Model		0607	0707	0609	0610	0611	0710	0711	0810	0811	0812	0813	0814	1012	1013	1014	1015	1016	1115	1116
Filter Size	24" x 24"													1	2	2	2	2	2	2
	24" x 12"	2	2	2	3	3	3	3	3	3	2	4	4	1	2	2	2	3	2	3
	24" x 20"										1			1						

Model		1117	1217	1218	1317	1318	1319	1419	1420	1519	1619	1521	1621	1622	1722	1624	1822	1922	1923	1924
Filter Size	24" x 24"	2	2	2	4	4	6	6	6	6	6	6	6	6	6	6	6	9	9	9
	24" x 12"	3	1		2	2					3		3	5	5	5	5	3	3	3
	24" x 20"		2	3																

Model		1925	2025	2026	2126	2326	2228	2528	2531	2534	2834	2838	2940	3141	3245	3546	3750	3855	4358	4565
Filter Size	24" x 24"	12	12	12	12	12	12	16	20	20	20	24	24	30	35	35	42	48	63	70
	24" x 12"					4	7	4		4	9	6	10	5		12	6	6		
	24" x 20"																			

Note :

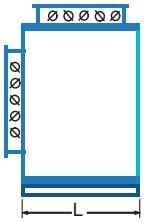
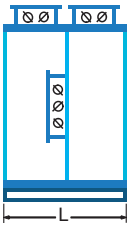
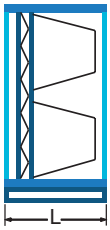
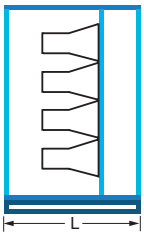
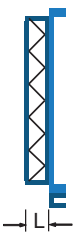
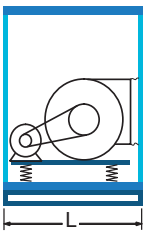
1. Table above only applicable to Panel and Bag filter.
2. Panel filter

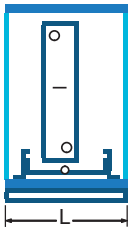
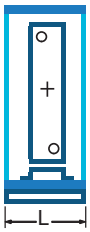
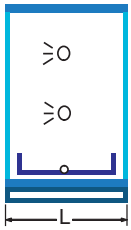
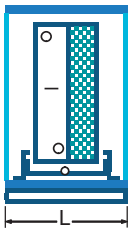
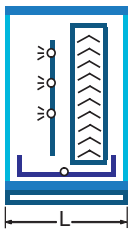
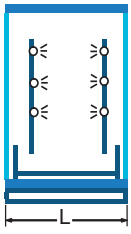
Nominal Size	Actual Size (Length x Width x Thickness, mm)
24" x 24"	595 x 595 x 46
24" x 12"	595 x 290 x 46
24" x 20"	595 x 493 x 46

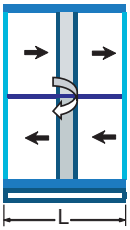
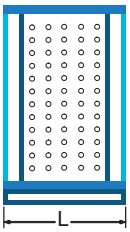
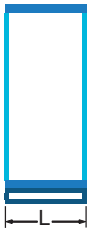
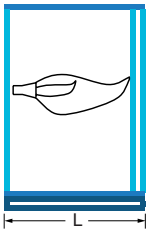
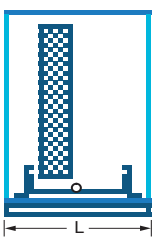
3. Bag filter

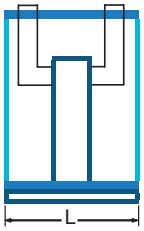
Nominal Size	Actual Size (Length x Width x Thickness, mm)
24" x 24"	592 x 592 x 381
24" x 12"	592 x 287 x 381
24" x 20"	592 x 490 x 381

Functional Sections Specifications

Section's Name	Symbol	Specifications (for reference only)
Mixing Section		Model / L 0607 - 1117 / 600 1217 - 2126 / 800 2326 - 2534 / 1000 2834 - 4565 / 1200
Fresh Air and Exhaust Air Section		Model / L 0607 - 1925 / 1200 2025 - 2940 / 1500 3141 - 4565 / 1800
Panel Filter Section		L = 100mm Panel filter can be Pre-filter or Secondary filter, can be install inside the Mixing Section or as External Filter Section.
Bag Filter Section or Rigid Filter Section		Bag Filter L = 500 Rigid Filter L = 400
Self-Cleaning High Efficiency Filter Section		L = 1800
External Filter Section		L = 100 Install at outside of unit and will not take up space inside unit.
Fan Section		L = 900 - 3000 Details refer to Sections Length Table.

Section's Name	Symbol	Specifications (for reference only)
Cooling Coil Section		Model L(1R-6R) L(8R-12R) 0607 - 2940 700 900 3141 - 4565 1000 1200
Heating Coil Section		Model L(1R-2R) 0607 - 2940 300 3141 - 4565 600 For model smaller than 3141, if heating coil is located after cooling coil which is not larger than 8rows, the heating and cooling coil can be located in the same drain pan. Total length is 900mm.
Electric Heater Section		T L < 4 300 ≥ 4 700 T = Electric Power (W) / Air Flow (CMH)
Steam Humidifier Section		L = 600 If it is located after Fan, L = 900.
Wet Film Humidifier Section		If it is installed next to Cooling Coil Section, does not need individual section length; if located in an independent section, L = 600
High Pressure Spray Humidifier Section		L = 900 (Need water droplet eliminator)
Air Washer Humidifier Section		L Single row 1800 Double/Triple rows 2100

Section's Name	Symbol	Specifications (for reference only)
Heat Recovery Section		L must be determined base on the actual Heat Recovery device selected.
Diffusion Section		L = 600
Sound Attenuator Section		L = 500, 800, 1100
Access Door Section		L = 600 Access Door can be added before Filter Section, Cooling Coil Section, Heating Coil Section, Sound Attenuator Section, etc to ease maintenance works.
Supply Air Section		Model L 0607 - 1117 600 1217 - 2126 800 2326 - 2534 1000 2834 - 4565 1200
Gas Heater Section		L = 3000
Evaporative Cooling Section		L = 900

Section's Name	Symbol	Specifications (for reference only)
De-Humidifier Section		L must be determined base on the actual De-Humidifier used.

Dimensions and Weights

Length Of Functional Sections

FAC/FMC/FBC	Length (mm)												
	Mixing	Panel Filter	Bag Filter	Rigid Filter	Fresh Air and Exhaust Air	Cooling Coil (1R-6R)	Cooling Coil (8R-12R)	Steam, Hot Water	Access Door	Sound Attenuator	Fan (Fan type A)	Fan (Fan type B)	Others
06 07	600	100	400	400	1200	700	900	300	600	800	900 (200)	1100 (225)	Length of Heat Recovery and De-humidifier Section need to be determined base on actual device installed; Gas Heater Section:3000; Active Carbon Section:100~500
07 07	600	100	400	400	1200	700	900	300	600	800	900 (200)	1100 (2.5)	
06 09	600	100	400	400	1200	700	900	300	600	800	700 (200)	1200 (280)	
06 10	600	100	400	400	1200	700	900	300	600	800	700 (200)	1300 (315)	
06 11	600	100	400	400	1200	700	900	300	600	800	800 (225)	1300 (315)	
07 10	600	100	400	400	1200	700	900	300	600	800	700 (200)	1300 (315)	
07 11	600	100	400	400	1200	700	900	300	600	800	800 (225)	1300 (315)	
08 10	600	100	400	400	1200	700	900	300	600	800	700 (200)	1300 (315)	
08 11	600	100	400	400	1200	700	900	300	600	800	800 (225)	1300 (315)	
08 12	600	100	400	400	1200	700	900	300	600	800	800 (315)		
08 13	600	100	400	400	1200	700	900	300	600	800	800 (315)		
08 14	600	100	400	400	1200	700	900	300	600	800	800 (315)		
10 12	600	100	400	400	1200	700	900	300	600	800	800 (315)	1500 (400)	
10 13	600	100	400	400	1200	700	900	300	600	800	900 (355)	1500 (400)	
10 14	600	100	400	400	1200	700	900	300	600	800	900 (355)	1500 (400)	
10 15	600	100	400	400	1200	700	900	300	600	800	900 (355)	1500 (400)	
10 16	600	100	400	400	1200	700	900	300	600	800	900 (355)	1500 (400)	
11 15	600	100	400	400	1200	700	900	300	600	800	1000 (400)	1800 (500)	
11 16	600	100	400	400	1200	700	900	300	600	800	1000 (400)	1800 (500)	
11 17	600	100	400	400	1200	700	900	300	600	800	1100 (450)	1800 (500)	
12 17	800	100	400	400	1200	700	900	300	600	800	1100 (450)		
12 18	800	100	400	400	1200	700	900	300	600	800	1100 (450)	1200 (500)	
13 17	800	100	400	400	1200	700	900	300	600	800	1100 (450)		
13 18	800	100	400	400	1200	700	900	300	600	800	1100 (450)	1200 (560)	
13 19	800	100	400	400	1200	700	900	300	600	800	1100 (450)	1300 (560)	
14 19	800	100	400	400	1200	700	900	300	600	800	1200 (500)	1300 (560)	
14 20	800	100	400	400	1200	700	900	300	600	800	1200 (500)	1300 (560)	
15 19	800	100	400	400	1200	700	900	300	600	800	1200 (500)	1300 (560)	
16 19	800	100	400	400	1200	700	900	300	600	800	1200 (500)	1300 (560)	
15 21	800	100	400	400	1200	700	900	300	600	800	1300 (560)	1500 (630)	
16 21	800	100	400	400	1200	700	900	300	600	800	1300 (560)	1500 (630)	
16 22	800	100	400	400	1200	700	900	300	600	800	1300 (560)	1500 (630)	
17 22	800	100	400	400	1200	700	900	300	600	800	1300 (560)	1500 (630)	
16 24	800	100	400	400	1200	700	900	300	600	800	1300 (560)	1700 (710)	
18 22	800	100	400	400	1200	700	900	300	600	800	1500 (630)	2600 (800)	
19 22	800	100	400	400	1200	700	900	300	600	800	1500 (630)	2600 (800)	
19 23	800	100	400	400	1200	700	900	300	600	800	1500 (630)	2600 (800)	
19 24	800	100	400	400	1200	700	900	300	600	800	1700 (710)	2600 (800)	
19 25	800	100	400	400	1200	700	900	300	600	800	1700 (710)	1800 (800)	
20 25	800	100	400	400	1500	700	900	300	600	800	1700 (710)	1800 (800)	
20 26	800	100	400	400	1500	700	900	300	600	800	1800 (800)	3000 (900)	
21 26	800	100	400	400	1500	700	900	300	600	800	1800 (800)	3000 (900)	
23 26	1000	100	400	400	1500	700	900	300	600	800	1800 (800)	3000 (900)	
22 28	1000	100	400	400	1500	700	900	300	600	800	2100 (900)	3300 (1000)	
25 28	1000	100	400	400	1500	700	900	300	600	800	2100 (900)	3300 (1000)	
25 31	1000	100	400	400	1500	700	900	300	600	800	2100 (900)	2200 (1000)	
25 34	1000	100	400	400	1500	700	900	300	600	800	2100 (900)	2200 (1000)	
28 34	1200	100	400	400	1500	700	900	300	600	800	2100 (900)	2200 (1000)	
28 38	1200	100	400	400	1500	700	900	300	600	800	2600 (800*2)		
29 40	1200	100	400	400	1500	700	900	300	600	800	2600 (800*2)		
31 41	1200	100	400	400	1800	1000	1200	600	600	800	2600 (800*2)		
32 45	1200	100	400	400	1800	1000	1200	600	600	800	2800 (900*2)		
35 46	1200	100	400	400	1800	1000	1200	600	600	800	3300 (1000*2)		
37 50	1200	100	400	400	1800	1000	1200	600	600	800	3300 (1000*2)		
38 55	1200	100	400	400	1800	1000	1200	600	600	800	3400 (1120*2)		
43 58	1200	100	400	400	1800	1000	1200	600	600	800	3400 (1120*2)		
45 65	1200	100	400	400	1800	1000	1200	600	600	800	3500 (1250*2)		

Note:

1. Unit total length is equals to the summation of all sections.
2. The length as listen above is for reference only. Actual dimensions may vary due to actual application and design.

Unit Weight (Cabinet Only)

FAC/FMC/	Weight (kg)														
	Panel Thickness = 25mm					Panel Thickness = 35mm					Panel Thickness = 50mm				
	End Panel	300	600	900	1200	End Panel	300	600	900	1200	End Panel	300	600	900	1200
06 07	5	38	68	86	99	6	40	70	90	104	7	41	73	99	111
07 07	6	40	70	88	101	7	42	72	93	107	8	43	75	102	116
06 09	7	42	72	97	111	8	44	74	101	116	9	45	77	104	126
06 10	8	44	74	102	117	9	46	75	106	122	10	47	79	106	132
06 11	8	46	76	105	121	9	48	77	108	126	10	49	81	108	136
07 10	8	45	75	104	119	9	47	77	107	124	10	48	81	110	134
07 11	9	47	77	107	123	9	49	79	109	126	10	50	83	112	138
08 10	10	46	76	105	121	11	48	78	108	125	12	49	82	112	136
08 11	10	48	78	108	124	11	50	80	110	127	12	51	84	114	139
08 12	10	50	80	110	127	11	52	82	112	132	12	53	86	116	142
08 13	11	52	82	112	132	12	54	84	114	139	13	55	88	118	145
08 14	12	54	84	114	135	13	56	86	116	143	14	57	90	120	148
10 12	12	52	82	111	131	13	53	84	113	142	14	55	87	118	146
10 13	13	54	84	113	136	14	55	86	115	145	15	57	89	119	149
10 14	14	56	86	115	139	15	57	88	117	148	16	59	91	121	152
10 15	15	58	88	117	143	16	59	90	119	150	17	61	93	123	155
10 16	16	60	90	119	146	17	61	92	122	152	18	63	95	125	158
11 15	17	59	89	118	146	18	60	91	121	150	19	62	94	124	156
11 16	18	61	91	120	149	19	62	93	123	153	20	64	96	126	159
11 17	19	63	93	122	152	21	64	95	125	156	22	66	98	129	162
12 17	20	64	94	124	154	22	65	96	127	158	23	67	99	131	164
12 18	21	66	96	126	156	23	67	98	129	160	24	69	101	133	166
13 17	22	65	95	124	154	23	66	97	127	158	24	68	100	131	164
13 18	24	67	97	126	156	25	68	99	129	160	25	70	102	133	166
13 19	25	69	99	128	158	26	70	101	131	162	27	72	104	135	168
14 19	25	70	100	131	160	26	71	102	132	164	27	73	105	137	172
14 20	27	72	102	134	162	28	73	104	136	166	29	75	107	139	176
15 19	27	71	101	133	161	28	72	103	135	168	29	74	106	138	175
16 19	30	72	103	137	164	31	74	105	138	173	32	76	108	141	180
15 21	31	75	105	140	165	32	78	109	142	178	33	78	110	144	185
16 21	33	77	107	144	168	34	80	111	146	183	35	80	112	148	190
16 22	34	79	109	149	172	36	82	114	150	188	37	82	115	154	196
17 22	35	82	112	154	174	38	84	117	160	195	40	85	118	162	203
16 24	37	85	123	160	197	40	86	127	165	204	43	88	131	172	213
18 22	39	83	121	159	197	42	84	125	164	203	45	86	129	170	212
19 22	41	84	122	161	200	44	85	126	166	206	48	87	130	172	215
19 23	42	86	124	163	202	45	87	128	168	208	50	89	132	174	217
19 24	43	88	126	165	204	46	89	130	170	210	51	91	134	176	219
19 25	44	90	128	168	206	47	91	132	172	212	52	93	136	178	221
20 25	49	93	134	175	216	52	95	138	180	222	56	97	142	187	231
20 26	50	95	136	177	218	53	97	140	182	224	58	99	144	189	233
21 26	53	96	139	182	225	56	98	142	187	231	60	100	147	193	240
23 26	57	98	141	184	227	61	100	144	189	234	72	102	149	196	243
22 28	57	100	143	186	229	61	102	146	191	236	72	104	151	198	245
25 28	66	124	182	240	297	69	126	186	245	305	80	128	191	253	315
25 31	72	133	193	253	312	72	135	197	258	320	87	138	202	266	331
25 34	79	142	203	265	327	84	144	208	272	335	94	147	213	280	347
28 34	91	147	213	279	345	98	149	213	279	345	109	156	224	295	366
28 38	102	158	226	294	362	107	160	230	301	371	128	163	237	311	384
29 40	104	162	230	298	362	109	164	234	305	375	130	167	241	315	388
31 41	121	171	244	318	391	135	173	250	326	402	153	165	257	337	417
32 45	132	181	257	332	408	148	184	263	341	419	166	188	270	352	434
35 46	150	192	276	360	444	163	195	282	369	455	182	199	289	381	472
37 50	163	206	292	378	464	174	209	298	387	477	206	213	306	400	493
38 55	197	222	313	404	494	208	226	320	414	507	223	231	329	427	525
43 58	235	249	343	439	534	247	252	348	444	547	266	258	359	462	570
45 65	274	279	375	479	585	289	282	379	484	597	311	288	398	512	633

Example of weight calculation:

1. Total Weight of Cooling Coil Section = Cooling Coil Section Cabinet Weight + Coils Weight
2. Total Weight of Fan Section = Fan Section Cabinet Weight + Fan Accessories Weight + Motor Weight + Motor Accessories Weight
3. Total Unit Weight = The Sum of Weight for each Section + End Panels Weight

Unit Weight (Components Only)

FAC/FMC/ FBC	Weight (kg)																		
	Damper - Mixing Box	Panel Filter	Bag Filter	Droplets Eliminator	Sound Attenuator	Wet Film Humidifier (dry)				Standard 1/2" Coil (without water)								
						Thickness (mm)				Rows								
						50	100	150	200	1	2	3	4	5	6	8	10	12
06 07	11	4	4	5	15	7	8	10	11	15	19	21	23	25	28	32	37	41
07 07	11	5	5	6	18	7	9	10	11	17	22	23	25	28	31	36	41	46
06 09	15	5	5	7	20	8	9	11	13	17	22	24	26	30	33	39	45	50
06 10	18	6	6	8	22	8	10	11	13	17	23	26	28	32	36	43	49	55
06 11	20	6	7	10	24	8	10	12	14	18	25	27	30	35	39	46	53	59
07 10	18	6	7	10	26	8	10	12	14	19	26	29	32	36	40	47	54	61
07 11	20	7	8	11	28	8	10	12	15	20	27	30	34	38	43	51	59	66
08 10	18	7	8	12	29	9	11	13	15	23	31	34	38	43	48	57	66	74
08 11	20	8	9	14	32	9	11	13	16	24	32	36	40	46	52	62	71	80
08 12	22	9	10	15	35	9	12	14	17	25	34	38	43	49	55	66	76	86
08 13	24	10	10	17	38	9	12	15	17	26	36	40	45	52	59	70	81	92
08 14	26	10	11	19	41	10	12	15	18	27	37	42	48	55	62	75	86	98
10 12	22	11	12	20	44	10	12	15	18	31	42	48	53	61	69	83	96	108
10 13	24	12	13	22	48	10	13	16	19	32	44	50	56	65	73	88	102	116
10 14	26	13	14	24	51	10	13	17	20	33	46	52	59	68	77	93	108	124
10 15	29	14	15	26	55	11	14	17	21	34	47	55	62	72	81	99	115	131
10 16	31	15	16	28	59	11	14	18	22	35	49	57	65	75	86	104	121	139
11 15	29	15	17	30	61	11	15	18	22	38	53	62	70	81	92	112	130	149
11 16	31	16	18	33	65	11	15	19	23	39	55	64	73	85	97	118	138	158
11 17	33	17	19	35	69	12	16	20	24	40	57	67	76	89	101	124	145	166
12 17	48	19	21	37	75	12	16	20	25	43	60	71	81	94	107	131	154	176
12 18	51	20	22	40	79	12	17	21	26	44	62	73	84	98	112	137	161	185
13 17	48	20	22	42	81	12	17	21	26	47	66	78	89	104	119	145	171	196
13 18	51	22	24	45	86	13	17	22	27	48	69	81	93	109	124	152	179	206
13 19	54	23	25	48	91	13	18	23	28	49	71	84	97	113	130	159	188	216
14 19	54	25	27	51	98	13	18	24	29	52	74	88	102	119	136	167	197	227
14 20	58	26	28	54	103	14	19	24	30	53	76	91	105	124	142	174	206	238
15 19	54	26	29	56	105	14	19	25	31	56	81	96	111	130	149	183	216	249
16 19	54	28	31	59	111	14	20	25	31	58	84	100	116	135	155	191	225	260
15 21	61	29	32	63	116	14	20	26	33	59	86	102	119	140	161	199	235	272
16 21	61	31	34	66	123	15	21	27	34	61	89	107	124	146	168	207	246	284
16 22	64	33	35	69	129	15	21	28	35	63	92	110	129	151	174	215	256	296
17 22	64	35	38	73	137	15	22	28	36	65	95	114	134	158	181	224	266	309
16 24	70	36	39	77	141	16	23	30	37	66	97	117	138	162	187	232	276	320
18 22	64	37	40	79	145	16	23	30	37	70	102	123	144	170	195	242	288	333
19 22	64	39	42	85	153	16	24	31	39	75	109	132	155	182	209	260	309	358
19 23	67	41	44	90	160	17	24	32	40	76	112	136	160	188	217	270	321	373
19 24	70	42	46	94	167	17	25	33	42	78	115	140	165	195	225	280	333	387
19 25	74	44	48	98	174	17	26	34	43	80	118	144	170	201	232	290	346	402
20 25	74	46	50	102	183	18	26	35	44	82	122	149	176	208	240	299	358	416
20 26	77	48	52	106	191	18	27	36	45	84	125	153	181	215	248	310	370	431
21 26	77	51	55	114	200	19	28	37	47	89	132	163	193	229	264	330	395	459
23 26	101	55	60	126	219	20	29	39	50	96	144	177	210	249	288	361	432	503
22 28	109	57	62	128	226	20	30	40	51	95	143	177	211	250	289	363	435	507
25 28	109	65	71	149	257	21	32	43	55	108	163	202	241	287	332	417	500	584
25 31	122	72	78	166	284	23	35	47	60	114	174	218	261	312	362	456	548	641
25 34	134	79	86	184	312	24	37	50	64	120	185	233	281	336	391	494	596	698
28 34	166	88	96	209	349	26	40	55	70	135	207	362	317	379	441	559	674	789
28 38	187	99	107	236	390	28	44	60	77	143	224	286	347	417	486	617	746	875
29 40	198	108	117	255	425	29	46	63	81	151	237	304	370	445	519	661	800	939
31 41	203	118	128	281	466	31	49	67	87	163	256	330	403	485	566	721	874	1027
32 45	224	134	145	317	528	33	53	74	95	175	280	362	445	536	627	801	973	1144
35 46	229	149	162	360	590	36	58	80	104	195	311	405	499	602	705	901	1095	1290
37 50	250	172	186	416	678	39	64	90	116	216	349	457	565	683	801	1027	1251	1474
38 55	276	194	211	485	766	43	72	101	131	241	393	519	645	782	918	1180	1440	1700
43 58	291	231	251	585	914	49	82	116	151	280	461	613	764	928	1091	1406	1718	2030
45 65	328	271	295	680	1073	54	93	131	171	311	518	694	869	1057	1246	1609	1970	2331

Example of weight calculation:

1. Total Weight of Cooling Coil Section = Cooling Coil Section Cabinet Weight + Coils Weight
2. Total Weight of Fan Section = Fan Section Cabinet Weight + Fan Accessories Weight + Motor Weight + Motor Accessories Weight
3. Total Unit Weight = The Sum of Weight for each Section + End Panels Weight

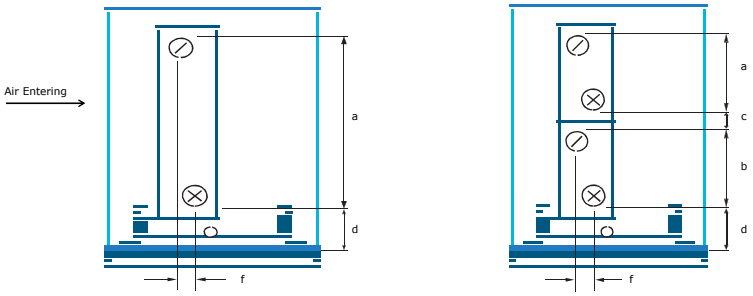
Weight - Fan and Accessories

Blower Diameter	Forward Curve	Backward Curve	Blower/Motor Base Frame
mm	kg	kg	kg
180	10	-	17.4
200	11	-	18
225	13	-	18.6
250	22	23	19.2
280	25	26	19.8
315	31	32	21.6
355	41	44	22.8
400	53	59	25
450	67	74	28
500	77	84	30
560	126	138	86
630	176	177	100
710	220	253	109
800	289	326	124
900	384	427	180
1000	450	518	204

Weight - Motor and Accessories

Motor Input Power	Motor Weight	Motor Accessories Weight
kW	kg	kg
0.37	11	3
0.55	16	3
0.75	17	3
1.1	21	4
1.5	25	5
2.2	32	7
3	36	8
4	45	14
5.5	60	20
7.5	73	23
11	116	35
15	137	42
18.5	170	56
22	186	63
30	254	84
37	308	107
45	335	124
55	450	135
75	534	163

Dimensions - Inlet / Outlet Pipe (Water Coil)



Note: ⊗ indicates water inlet pipe
⊘ indicates water outlet pipe

Loop	Model	a			b			c	d			Inlet/Outlet water pipe diameter (DN)					f							Condensate water pipe diameter (DN)		
		Rows of coil			Rows of coil							Rows of coil					Rows of coil									
		1/3	2	4/5/6/8	1/3	2	4/5/6/		FAC	FMC	FBC	1/2/3	4	5	6	8	1	2	3	4	5	6	8			
H	06 XX	453	469	469					128	138	152	40	40	40	40	40	66	94	110	97	110	138	193	If width of unit is XX06- XX24, DN32	If width of unit is XX25- XX35, DN50	If width of unit is XX36- XX60, DN50x2
	12 XX	1024	1040	1040					128	138	152	40	65	65	65	65	66	94	110	97	110	138	193			
	15 XX	1342	1358	1358					128	138	152	40	65	65	65	65	66	94	110	97	110	138	193			
	19 XX	834	850	850	897	913	913	24	128	138	152	40	65	65	65	65	66	94	110	97	110	138	193			
	22 XX	961	977	977	1024	1040	1040	24	128	138	152	40	65	65	65	65	66	94	110	97	110	138	193			
	25 XX	1151	1167	1167	1151	1167	1167	24	128	138	152	40	65	65	65	65	66	94	110	97	110	138	193			

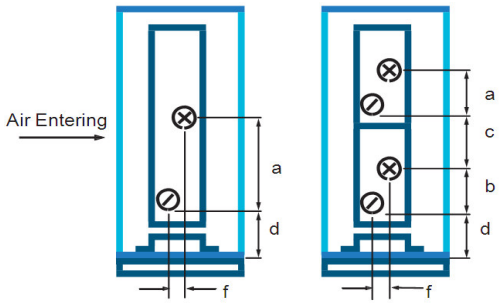
Loop	Model	a		b		c	d			Inlet/Outlet water pipe diameter (DN)					f					Condensate water pipe diameter (DN)		
		Rows of coil		Rows of coil						Rows of coil					Rows of coil							
		3	4/5/6/8	3	4/5/6/8		FAC	FMC	FBC	1/2/3	4	5	6	8	3	4	5	6	8			
P	06 XX	453	469				128	138	152	40	40	40	40	40	66	94	110	97	110	If width of unit is XX06- XX24, DN32	If width of unit is XX25- XX35, DN50	If width of unit is XX36- XX60, DN50x2
	12 XX	1024	1040				128	138	152	40	65	65	65	65	66	94	110	97	110			
	15 XX	1342	1358				128	138	152	40	65	65	65	65	66	94	110	97	110			
	19 XX	834	850	897	913	24	128	138	152	40	65	65	65	65	66	94	110	97	110			
	22 XX	961	977	1024	1040	24	128	138	152	40	65	65	65	65	66	94	110	97	110			
	25 XX	1151	1167	1151	1167	24	128	138	152	40	65	65	65	65	66	94	110	97	110			

Loop	Model	a		b		c	d			Inlet/Outlet water pipe diameter (DN)				f				Condensate water pipe diameter (DN)		
		Rows of coil		Rows of coil						Rows of coil				Rows of coil						
		2	4/6/8	20	4/6/8		FAC	FMC	FBC	2	4	6	8	2	4	6	8			
F	06 XX	469	469				128	138	152	40	40	40	40	94	97	138	193	If width of unit is XX06- XX24, DN32	If width of unit is XX25- XX35, DN50	If width of unit is XX36- XX60, DN50x2
	12 XX	1040	1040				128	138	152	40	65	65	65	94	97	138	193			
	15 XX	1358	1358				128	138	152	40	65	65	65	94	97	138	193			
	19 XX	850	850	913	913	24	128	138	152	40	65	65	65	94	97	138	193			
	22 XX	977	977	1040	1040	24	128	138	152	40	65	65	65	94	97	138	193			
	25 XX	1167	1167	1167	1167	24	128	138	152	40	65	65	65	94	97	138	193			

Loop	Model	a		b		c	d			Inlet/Outlet water pipe diameter (DN)					f					Condensate water pipe diameter (DN)		
		Rows of coil		Rows of coil						Rows of coil					Rows of coil							
		3	4/5/6/8	3	4/5/6/8		FAC	FMC	FBC	3	4	5	6	8	3	4	5	6	8			
Q	06 XX	453	469				128	138	152	40	40	40	40	40	66	94	116	149	205	If width of unit is XX06- XX24, DN32	If width of unit is XX25- XX35, DN50	If width of unit is XX36- XX60, DN50x2
	12 XX	1024	1040				128	138	152	40	65	65	65	65	66	94	116	149	205			
	15 XX	1342	1358				128	138	152	40	65	65	65	65	66	94	116	149	205			
	19 XX	834	850	897	913	24	128	138	152	40	65	65	65	65	66	94	116	149	205			
	22 XX	961	977	1024	1040	24	128	138	152	40	65	65	65	65	66	94	116	149	205			
	25 XX	1151	1167	1151	1167	24	128	138	152	40	65	65	65	65	66	94	116	149	205			

Loop	Model	a	b	c	d			Inlet/Outlet diameter (DN)		f		Condensate water pipe diameter (DN)		
		Rows of Coil	Rows of Coil					Rows of coil		Rows of coil				
		4/8	4/8		FAC	FMC	FBC	4	8	4	8			
D	06 XX	469			128	138	152	40	40	100	210	If width of unit is XX06- XX24, DN32	If width of unit is XX25- XX35, DN50	If width of unit is XX36- XX60, DN50x2
	12 XX	1040			128	138	152	65	65	100	210			
	15 XX	1358			128	138	152	65	65	100	210			
	19 XX	850	913	24	128	138	152	65	65	100	210			
	22 XX	977	1040	24	128	138	152	65	65	100	210			
	25 XX	1167	1167	24	128	138	152	65	65	100	210			

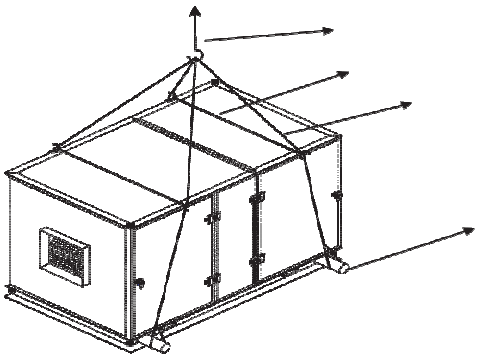
Dimension -Inlet/Outlet Pipe (Steam Coil)



Note : ⊗ Indicates steam inlet pipe

⊘ Indicates steam outlet pipe

Model	a				b				c				d				f			
	1/2/3/4 Rows				1/2/3/4 Rows				1/2/3/4 Rows				1/2/3/4 Rows							
Inlet/Outlet pipe diameter	DN32	DN40	DN50	DN65	DN32	DN40	DN50	DN65	DN32	DN40	DN50	DN65	DN32	DN40	DN50	DN65	1 Row	2 Rows	3 Rows	4 Rows
06XX	404	407	413	420													110	110	138	165
12XX	975	978	984	992													110	110	138	165
15XX	1293	1296	1302	1309													110	110	138	165
19XX	785	788	794	801	848	851	857	865	89	86	80	72	124	121	115	108	110	110	138	165
22XX	912	915	921	928	975	978	984	992	89	86	80	72	124	121	115	108	110	110	138	165
25XX	1102	1105	1111	1119	1102	1105	1111	1119	89	86	80	72	124	121	115	108	110	110	138	165



Water Pipe Installation

1. Keep the water pipes clean and install filter at the inlet of water pump.

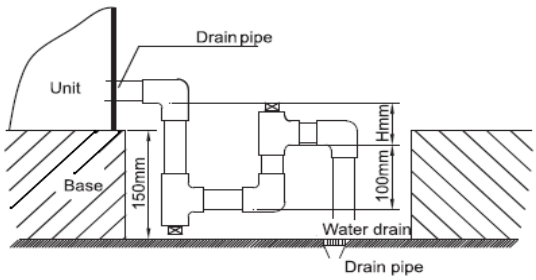
2. The condensate water pipes are positioned at the bottom of the unit. The U-trap needs to be installed (refer diagram below)to ensure condensing water can be discharged freely and to prevent in-flow of odor.

3. Use torque wrench when installing the water inlet / outlet pipes. The torque should be less than 250.8Nm (21kgf.m) to prevent heat exchanger from being damaged. Install valves at water supply and return pipes outside the unit (except the condensing water discharge pipes) for modulation of water volume and to isolate the unit during maintenance. All the water pipes outside the unit should be properly insulated.

4. If hot or chilled water is the media of the heat exchanger, the water inlet pipes are positioned at the bottom and water outlet pipes are positioned at the top. If the media is steam,the air inlets are position at the top and water outlet pipes are at the bottom.

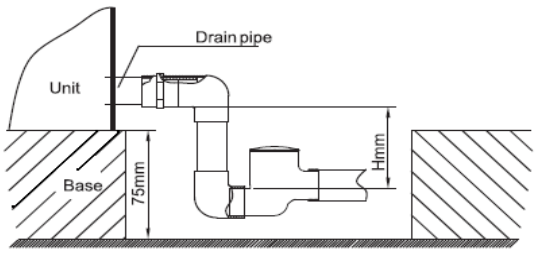
5. All the water pipes must be sealed and ensure no leakage.

6. The standard chilled water temperature should not be lower than 5°C. Hot water temperature should not be higher than 80°C and 60°C is the recommended hot water temperature.



H= Internal static pressure (mmH_2O)+20
When Unit inside static pressure exceed 750Pa have to increase base height

U-shape type water pipe installation



H= Internal static pressure (mmH_2O)+20
When Unit inside static pressure exceed 750Pa have to increase base height

Float type water pipe installation

Installation

General

1. Transportation
Depending on size of the units, transportation mode may be different. Units can be shipped in full assembly if the size is small enough. Otherwise, they can be arranged to be shipped in the form of CKD (Complete Knock Down).

2. Inspection and Acceptance
Before installation, check if all sections and components are in good condition. Inform the dealer immediately if found any defect.

3. Placement of Unit
If unit needs to be placed outdoor, ensure the unit is free from dust, rain, snow and keep it away from animals to protect the exterior finishing of the unit. The unit cannot be exposed to hot sun or the insulated panels may be deformed or discolor. Do not stack units in storage.

4. Lifting of Unit
Keep the unit level while moving or lifting to avoid damage. Hoist the unit through lifting holes provided. Ensure there is proper protection procedures adopted duirng lifting (for example, to put chipboard/plywood to isolate the lifting cable and the unit) to protect the surface of the unit.

5. Foundation

1) Leveling of the foundation will affect the installation and operation of the unit. If the foundation is not level, the following problems could happen:
    a) Difficult to install
    b) Air leakage at joints of panels and sections
    c) Condensate water discharge problem
    d) Fan installation problem

    It is recommended that the difference of level to be within ±3mm.

2) The foundation can be made of concrete or welded steel. Keep the steel surface smooth while welding. The height of foundation should not be less than 150mm. The water drainage is required for discharge of condensation water and for maintenance purposes.

3) Ensure that the foundation able to withstand the total weight of unit. Add shock absorber under the foundation if necessary.

6. Unit Installation
The installation must be done by certified installer. Take note of the following:

1) Strictly comply with the installation instructions provided.
2) Leave enough space for repair and maintenance.
3) Use flexible duct for section of duct connection between the unit and external air duct to avoid vibration transmisssion.
4) The panels must be fitted tightly. Rubber gasket must be compressed properly to avoid air leakage.
5) Air filter should be the last item to be installed.
6) Proper cleaning must be carried out to clean the interior of the unit to remove debris of installation before commissioning.

Servicing and Maintenance

The following should be examined and replaced if necessary:

1. Coils should be cleaned frequently and periodically. After 2-3 years of operation, the internal wall of water pipes should be thoroughly cleaned and if condition permit, use soft water.

2. If the unit is not in operation during winter, all the water in the system must be released, otherwise the coil will crack.

3. Check the condition of filter periodically (recommend to check monthly). If the unit is equipped with Pressure Differential Gauge, filter must be cleaned or replaced if the predefined value is reached. Recommended value for different type of filters are as following:

Filter specifications	Resistance value(Pa)
G3 (Pre-filter)	100-200
G4 (Pre-filter)	150-250
F5-F6 (Secondary filter)	250-300
F7-F8 (High Efficiency filter)	300-400
F9-F11(Sub-HEPA filter)	400-450
HEPA filter	400-600

4. The belt tension should be re-checked one week after commissioning. Subsequently, it should be examined once every 3 months.

5. The terminals for electrical wires should be re-tightened 3 days after commissioning.

6. Bearings for fan and motor must be examined periodically (recommended 3 months once). Abnormality of bearings can be determined through abnormal noise and vibration of fan, excessive usage of lubrication oil or through special bearing testing devices. Once the faulty bearings are identified, they should be replaced immediately.

7. It is recommended to check the rubber gasket, flexible ducts and connections monthly. Immediate replacement is necessary if it is found to be leak.

Troubleshooting

Troubleshooting Guide

Problem	Probable Causes	Solutions
Noise	1. The impellers and fan bearings are loose.	1. Fasten the bearing foundation.
	2. Something inside the impellers.	2. Shut down unit and remove the object.
	3. Air ducts and adjusting valves are loose.	3. Fasten
	4.V-belts not properly in grove of pulley or improper tension.	4. Have belts and pulley looked at by professional and or have belts adjusted to recommended tension.
	5. Foundation of blower is loose.	5. Fasten the panel.
	6. The soft connector is too tight.	6. Adjust or change suitable connector.
	7. Rotating speed of blower is too high.	7. Select suitable blower.
	8. Low quality of lubricant	8. Use high quality lubricant and clean the bearings.
Shortage of Air Volume	1. The filter is too dirty.	1. Clean the filter.
	2. The air ducts are not well sealed.	2. Check and eliminate the leakage.
	3. Object blocking the air ducts or air valve is not opened.	3 Check and remove the object.
	4. Improper speed of blower.	4. Adjust the speed of the blower.
	5. Improper selection of blower.	5. Contact supplier for suitable blower.
Water Leakage	1. The blower speed is too high.	1. Adjust the speed.
	2. Condensing water cannot be discharged freely. Water flows out of the drain pan.	2. Check and remove the dirt.
	3. Air leakage	3. Keep the unit sealed.
Low Cooling Capacity	1. The inlet water is too high.	1. Adjust the temperature.
	2. The surface of heat exchanger is dirty.	2. Clean the heat exchanger.
	3. Air volume is too small.	3. Enlarge the air volume.
	4. Selection is not suitable.	4. Select again.
Air Speed is Too High.	1. Air speed is too high.	1. Enlarge the air supply area.
	2. Improper airflow	2. Check the design of air ducts.
Low/Poor Air Quality	1.Low fresh air volume	1. Open the fresh air duct larger.
		2. Clean the air filter.
		3. Enlarge the air duct's cross section.